

BASIC ASSESSMENT REPORT FOR PROPOSED MUSHROOM FARM FILLING STATION KYALAMI

Remaining Extent of Portion 2 of the Farm Bothasfontein 408 JR



REFERENCE: Gaut: 002/14-15/0280

SEPTEMBER 2015

Part 1 of 2

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Basic Assessment Report in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014 (Version 1)

Kindly note that:

1. This **Basic Assessment Report** is the standard report required by GDARD in terms of the EIA Regulations, 2014.
2. This application form is current as of 8 December 2014. It is the responsibility of the EAP to ascertain whether subsequent versions of the form have been published or produced by the competent authority.
3. **A draft Basic Assessment Report must be submitted, for purposes of comments within a period of thirty (30) days, to all State Departments administering a law relating to a matter likely to be affected by the activity to be undertaken.**
4. **A draft Basic Assessment Report (1 hard copy and two CD's) must be submitted, for purposes of comments within a period of thirty (30) days, to a Competent Authority empowered in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended to consider and decide on the application.**
5. Five (5) copies (3 hard copies and 2 CDs-PDF) of the final report and attachments must be handed in at offices of the relevant competent authority, as detailed below.
6. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
7. Selected boxes must be indicated by a cross and, when the form is completed electronically, must also be highlighted.
8. An incomplete report may lead to an application for environmental authorisation being refused.
9. **Any report that does not contain a titled and dated full colour large scale layout plan of the proposed activities including a coherent legend, overlain with the sensitivities found on site may lead to an application for environmental authorisation being refused.**
10. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the application for environmental authorisation being refused.
11. No faxed or e-mailed reports will be accepted. Only hand delivered or posted applications will be accepted.
12. Unless protected by law, and clearly indicated as such, all information filled in on this application will become public information on receipt by the competent authority. The applicant/EAP must provide any interested and affected party with the information contained in this application on request, during any stage of the application process.
13. Although pre-application meeting with the Competent Authority is optional, applicants are advised to have these meetings prior to submission of application to seek guidance from the Competent Authority.

DEPARTMENTAL DETAILS

Gauteng Department of Agriculture and Rural Development
Attention: Administrative Unit of the of the Environmental Affairs Branch
P.O. Box 8769
Johannesburg
2000

Administrative Unit of the of the Environmental Affairs Branch
Ground floor Diamond Building
11 Diagonal Street, Johannesburg

Administrative Unit telephone number: (011) 240 3377
Department central telephone number: (011) 240 2500

(For official use only)

NEAS Reference Number:						
File Reference Number:						
Application Number:						
Date Received:						

If this BAR has not been submitted within 90 days of receipt of the application by the competent authority and permission was not requested to submit within 140 days, please indicate the reasons for not submitting within time frame.

Not applicable

Is a closure plan applicable for this application and has it been included in this report?

NO

if not, state reasons for not including the closure plan.

Not applicable

Has a draft report for this application been submitted to a competent authority and all State Departments administering a law relating to a matter likely to be affected as a result of this activity?

YES

Is a list of the State Departments referred to above attached to this report including their full contact details and contact person?

YES

If no, state reasons for not attaching the list.

Have State Departments including the competent authority commented?

Yes

If no, why?

Not applicable

SECTION A: ACTIVITY INFORMATION

1. PROPOSAL OR DEVELOPMENT DESCRIPTION

Project title (must be the same name as per application form):

Proposed Mushroom Farm Filling Station

The proposed development of the Mushroom Farm Filling Station will entail a Filling Station, consisting of a canopy covered forecourt, Pumps (8 x 2 hose and 1 x 3 hose), four Islands, five underground tanks, two with a 46,000 litre capacity (diesel and super) and three with 23,000 litre capacity (leaded, unleaded, and diesel), a convenience store of approximately 200m² and a place of refreshment, parking bays, oil separator, installation of water and sewage services, and concrete containment structures.

The Jukskei River runs approximately 850m west of the site in a north-westerly direction; and a tributary of the Jukskei River flows 350m south of the site in a westerly direction.

The proposed development site is located on and east of the M39 (Allandale Road) with the R55 (Woodmead Drive) running past the western property boundary, within the City of Johannesburg Metropolitan Municipality. The site is situated 3.5km west-south-west of Midrand and 5km north-east of Bryanston on what is currently known as the Tongaat Mushroom Farm due to Mushrooms having been farmed there in the past.

The applicant acquired the land (Remainder of Portion 2 of Bothasfontein 408 JR and Remainder of Portion 88 of Bothasfontein 408 JR) from Pedrag Rajcic t/a Erf 51 Melville CC on 5 October 2012 (T 75612/12). GDARD granted an Environmental Authorisation (GAUT 002/09-10/N0800) to the former land owner in terms of the 2006 NEMA Regulations (Activity 15 of GNR 386 and Activity 2 of GNR 387) on 2 June 2011 for mixed use development. An application for amendment of ownership from Erf 51 Melville CC to Century Property developments (Pty) Ltd was approved (Gaut 006/11-12/E0070) on 6 June 2013, with certain conditions pertaining monitoring of primary vegetation and wetlands removed.

Township Establishment for Kyalami Gardens Extension 27 was approved on Part of the Remainder of Portion 2 of Bothasfontein 408 JR and Remainder of Portion 88 of Bothasfontein 408 JR by the City of Johannesburg Land Use Development on 20 October 2010 for four erven zoned as Special and Private Open Space.

The proposed filling station is situated on one of the erven zoned as Special. A Feasibility study conducted considered the impact of the proposed development on existing competitor stations. The study site will not likely cause a significant loss of fuel sales at existing filling stations.

Select the appropriate box

The application is for an upgrade of an existing development

The application is for a new development

Other, specify

Does the activity also require any authorisation other than NEMA EIA authorisation?

YES	NO
X	

If yes, describe the legislation and the Competent Authority administering such legislation

National Water Act - The proposed development site is not affected by 1:50 and 1:100 flood line, it does however occur **within 500m radius from the boundary of a wetland** and therefore the General Authorisation for Section 21 c and i water use does not apply, and the development requires a Section 21 WULA for Activities (c) and (i) – **Department of Water Affairs**

Petroleum Products Act – a site/retail license is required for filling station - **Department of Energy**

If yes, have you applied for the authorisation(s)?

YES	NO
	X
YES	NO
	X

If yes, have you received approval(s)? (attach in appropriate appendix)

2. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations:

Title of legislation, policy or guideline:

Administering authority:

Promulgation Date:

National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended).

National & Provincial

27 November 1998

The NEMA is primarily an enabling Act in that it provides for the development of environmental implementation plans and environmental management plans. The principles listed in the act serve as a general framework within which environmental management and implementation plans must be formulated.

The Minister of Environmental Affairs and Tourism passed (in April 2006) Environmental Impact Assessment Regulations¹ (the Regulations) in terms of Chapter 5 of the National Environmental management Act, 1998² (NEMA). The new Regulations came into effect on 3 July 2006.

The Minister of Environmental Affairs passed (in June 2010) the Amended Environmental Impact Assessment Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA). The Regulations were amended once again in 2014. The Amended Regulations came into effect on 8 December 2014, and therefore all new applications must be made in terms of the Amended NEMA regulations and not in terms of the 2010 NEMA Regulations. The purpose of this process is to determine the possible negative and positive impacts of the proposed development on the surrounding environment and to provide measures for the mitigation of negative impacts and to maximize positive impacts.

Notice **No. R 983, R 984 and R 985** of the Amended Regulations list the activities that indicate the process to be followed. The activities listed in Notice No. R 983 requires that a Basic Assessment process be followed and the Activities listed in terms of Notice No. R 984 requires that the Scoping and EIA process be followed. Notice No. 985 has been introduced to make provision for Activities in certain geographical and sensitive areas.

Subsequently, Listing (R. 983) requires that a Basic Assessment Process be followed. It should however be noted that the Draft Guideline Document of DEA [Department of Environmental Affairs, previously known as the Department of Environmental Affairs and Tourism] states that if an activity being applied for is made up of more than one listed activity, and the Scoping and EIA process is required for one or more of these activities, the Scoping and EIA process must be followed for the whole application.

National Water Act (Act No. 36 of 1998)	National & Provincial	20 August 1998
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The purpose of this Act is to ensure that the Nation's water resources are protected, used, developed, conserved, managed and controlled in ways that take into account, amongst other factors, the following:

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Reducing and preventing pollution and degradation of water resources;
- Facilitating social and economic development; and
- Providing for the growing demand for water use.

In terms of the section 21 of the National Water Act, the developer must obtain water use licences if the following activities are taking place:

- a) Taking water from a water resource;
- b) Storing water;
- c) Impeding or diverting the flow of water in a water course;
- d) Engaging in a stream flow reduction activity contemplated in section 36;
- e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
- f) Discharging waste or water containing waste into a water resource through a pipeline, canal, sewer, sea outfall or other conduit;
- g) Disposing of waste in a manner which may detrimentally impact on a water resource;
- h) Disposing in any manner which contains waste from or which has been heated in any industrial or power generation process;
- i) Altering the bed, banks, course or disposing of water found underground if it is necessary for the safety of people;
- j) Removing, discharging, or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- k) Using water for recreational purposes.

The National Water Act also requires that (where applicable) the 1:50 and 1:100 year flood line be indicated on all the development drawings (even the drawings for the external services) that are submitted for approval.

Conservation of Agricultural Resources Act (Act No. 43 of 1983)	National	1 June 1983
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This act provides for control over the utilization of natural agricultural resources of South Africa in order to promote the conservation of soil, water sources and the

vegetation as well as the combating of weeds and invader plants; and for matters connecting therewith.

**National Heritage Resources Act
(Act No. 25 of 1999)**

**National
&
Provincial**

1999

The National Heritage Resources Act legislates the necessity and heritage impact assessment in areas earmarked for development, which exceed 0.5ha and linear development exceeding 300m in length. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).

National Environmental Management: Waste Act (Act 59 of 2009)

National

**11 June
2010**

This Act came into effect on 11 June 2009. It aims to consolidate waste management in South Africa, and contains a number of commendable provisions, including:

- The establishment of a national waste management strategy, and national and provincial norms and standards, for amongst other, the classification of waste, waste service delivery, and tariffs for such waste services;
- Addressing reduction, reuse, recycling and recovery of waste;
- The requirements for industry and local government to prepare integrated waste management plans;
- The establishment of control over contaminated land;
- Identifying waste management activities that requires a license, which currently include facilities for the storage, transfer, recycling, recovery, treatment and disposal of waste on land;
- Co-operative governance in issuing licenses for waste management facilities, by means of which a licensing authority can issue an integrated or consolidated license jointly with other organs of state that has legislative control over the activity; and
- The establishment of a national waste information system.

On the 29th of November 2013 the Minister of Environmental Affairs and Tourism amended the list of waste management activities that might have a detrimental effect on the environment.

**National Environmental Management Protected Areas Act
(Act No. 57 of 2003)**

National

2003

The purpose of this Act is to provide for the protection, conservation, and management of ecologically viable areas representative of South Africa's biological biodiversity and its natural landscapes.

**National Environmental Management: Biodiversity Act
(Act 10 of 2004)**

National

2004

The Biodiversity Act provides for the management and protection of the country's biodiversity within the framework established by NEMA. It provides for the protection of species and ecosystems in need of protection, sustainable use of indigenous biological resources, equity, and bioprospecting, and the establishment of a regulatory body on biodiversity- **South African National Biodiversity Institute.**

Objectives of the Act:**(a) With the framework of the National Environmental Management Act, to provide for:**

- (i) The management and conservation of biological diversity within the Republic and of the components of such biological diversity;
- (ii) The use of indigenous biological resources in a sustainable manner; and
- (iii) The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources;

(b) To give effect to ratified international agreements relating to biodiversity which are binding on the republic;**(c) To provide for co-operative governance in biodiversity management and conservation; and****(d) To provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.**

Under this Act notices are published in terms of alien and invasive species or threatened ecosystems in order to promote the biodiversity of natural resources and protect species endemic to South Africa.

National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	National & Provincial	2004
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The NEMA: AQA serves to repeal the Atmospheric Pollution Prevention Act (45 of 1965) and various other laws dealing with air pollution and it provides a more comprehensive framework within which the critical question of air quality can be addressed.

The purpose of the Act is to set norms and standards that relate to:

- Institutional frameworks, roles and responsibilities
- Air quality management planning
- Air quality monitoring and information management
- Air quality management measures
- General compliance and enforcement.

Amongst other things, it is intended that the setting of norms and standards will achieve the following:

- The protection, restoration and enhancement of air quality in South Africa
- Increased public participation in the protection of air quality and improved public access to relevant and meaningful information about air quality.
- The reduction of risks to human health and the prevention of the degradation of air quality.

The Act describes various regulatory tools that should be developed to ensure the implementation and enforcement of air quality management plans. These include:

- Priority Areas, which are air pollution 'hot spots'.

<ul style="list-style-type: none"> Listed Activities, which are 'problem' processes that require an Atmospheric Emission Licence. Controlled Emitters, which includes the setting of emission standards for 'classes' of emitters, such as motor vehicles, incinerators, etc. Control of Noise. Control of Odours. 		
Gauteng Transport Infrastructure Amendment Act	Provincial	2003
<p>The aim of this Amendment Act is to amend the Gauteng Transport Infrastructure Act, 2001 so as to amend and insert certain definitions; to provide for the necessary land use rights with respect to stations and for the necessary powers of the MEC to enter into contracts for road and rail projects; to amend the procedure in relation to route determination; to make a second environmental investigation at the stage of preliminary design of a road or railway line unnecessary where the competent environmental authority decides that the environmental investigation at the stage of route determination is adequate; and to provide for incidental matters.</p>		
Petroleum Products Act	National	2006
<p>In terms of the Petroleum Products Act, 1977 (PPA) as amended in 2006, and which is administered by the national Department of Energy, one cannot apply for a site and/or retail license before you have both land use rights and an environmental authorisation.</p> <p>In terms of the Petroleum Products Act, energy authorities must ensure that the number of filling stations is appropriate to local sales volumes and does not exceed the optimal number for an area.</p>		
The Deeds Registries Act, 47 of 1937	National & Provincial	1 September 1937
<p>The Act was created to consolidate and amend the laws in force in the Republic relating to the Registration of deeds. The act caters for the registration of servitudes.</p>		
Occupational Health & Safety Act, 85 of 1993	National & Provincial	1993
<p>The Act was created to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.</p>		
GDARD Draft Ridges Policy	Provincial	2001
<p>This policy is provided for the protection, conservation and maintenance of ridges within the Gauteng Province.</p>		
Gauteng conservation plan (C-Plan) Version 3.3	Provincial	October 2011
<p>Gauteng Nature Conservation (hereafter Conservation), a component of the Gauteng Department of Agriculture and Rural Development (GDARD) produced</p>		

the Gauteng Conservation Plan Version 3 (C-Plan 3) in December 2010. The conservation plan was edited on three occasions since then: C-Plan 3.1 was released in July 2011 after it became apparent that some areas were not desirable in Critical Biodiversity Areas (CBAs hereafter). Not all areas were addressed in the first round of editing, so this was done during September 2011 resulting in C-Plan Version 3.2. It was soon released however, that some CBAs became separated by the removal of undesirable areas causing some attributes not to be completely reflective of that CBAs any longer. C-Plan 3.3 became available in October 2011 after this issue was addressed.

The main purposes of C-Plan 3.3 are:

- to serve as the primary decision support tool for the biodiversity component of the Environmental Impact Assessment (EIA) process;
- to inform protected area expansion and biodiversity stewardship programs in the province;
- To serve as a basis for development of Bioregional Plans in municipalities within the province.

GDARD Agricultural Hub Policy	Provincial	2006
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GDARD identified 7 Agricultural Hubs in Gauteng province. These hubs are earmarked for agricultural activities and there are policies and guidelines that should be taken into consideration when one plans to develop in these hubs areas. Urban development is usually not supported in these hubs.

Gauteng Noise Control Regulations	Provincial	1999
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The regulation controls noise pollution. According to the acceptable noise levels in a residential area situated within an urban area is 55dBA and the maximum acceptable noise levels in a rural area is 45dBA.

Gauteng Urban Edge	Provincial	2011
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According to the Gauteng Department of Economic Development the urban edge is now delineated on a yearly basis and it is the responsibility of the local authorities to request for a yearly amendment to the urban edge. The aim of the Urban Edge Policy is to curb unbridled urban growth.

City of Johannesburg Integrated Development Plan (IDP) 2012-2016	Local	
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The Johannesburg IDP is a short-long-term planning tool which provides space for the development of the municipality in an integrated and coordinated manner. The policy envisions a city that is resilient, sustainable, and liveable. This is to be achieved through various developmental strategies including the Spatial Development Frameworks. The spatial development strategies supported by the proposed development are:

- Supporting an efficient movement system; and
- Initiating and implementing corridor development.

City of Johannesburg Metropolitan Municipality's Growth Management Strategy (GMS)	Local	
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The GMS prescribes where, and under what conditions, growth can be accommodated. The future growth of the City must ensure that population and economic growth is supported by complimentary services and infrastructure whilst also meeting spatial and socio-economic objectives. The two key objectives of the strategy are to:

- a) Determine priority areas for short-medium term investment and allocation

- of future development rights.
- b) Re-direct the respective capital investment programmes of the City's service providers to address the short-term hotspots and strategic priority areas.

The GMS sets high, medium, and low priority areas across the City and describes specific interventions. The list below provides a summary of the other seven Development Strategies of the sub-region:

- **Supporting an efficient movement system;**
- Ensuring strong viable nodes;
- Supporting sustainable environmental management;
- Initiating and implementing corridor development;
- Managing urban growth and delineating and urban development boundary;
- Increased densification of strategic locations; and
- Facilitating sustainable housing environments in appropriate locations.

Description of compliance with the relevant legislation, policy or guideline:

Legislation, policy of guideline	Description of compliance
National Environmental Management Act No. 107 of 1998 (as amended)	The application for the proposed development consists of activities listed under Notice R. 983 (Listing No. 1) and therefore a Basic Assessment Report will be submitted to GDARD for consideration.
National Water Act (Act No. 36 of 1998)	The proposed development site is not affected by 1:50 and 1:100 flood line, it does however occur within 500m radius from the boundary of a wetland and therefore the General Authorisation for Section 21 c and i water use does not apply, and the development requires a Section 21 WULA for Activities (c) and (i).
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	The proposed development site does not fall within any of the Agricultural Hubs of Gauteng and does not fall within an area with high agricultural potential. According to GAPA 3, the site has low agricultural potential. No Agricultural Potential Study was therefore conducted
National Heritage Resources Act (Act No. 25 of 1999)	Considering the proposed development is bigger than 0.5ha a HIA is required. The Phase 1 Heritage Survey conducted revealed no heritage resources on the development footprint of the proposed development. The development can thus proceed, however if any resources are unearthed during construction, construction activities must cease until such time as a heritage specialist investigated the find.
National Environmental Management: Waste Act (Act	No listed waste activities will take place on site and therefore a waste license will not be required. Construction and operational general waste will have to be removed to a registered landfill site.

59 of 2009)	
National Environmental Management Protected Areas Act (Act No. 57 of 2003)	The proposed development site does not form part of a protected area or occur near a protected area, the site does however occur within an Ecological Support Area.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	No Red or Orange listed plant species are known to occur on the proposed development site according to the Gauteng Conservation Plan Version 3.3. The site does not fall within a Critical Biodiversity Area.
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	During the construction phase of the proposed development, generation of dust and noise can become a significant factor to residence living adjacent to the planned development site. During the operational phase, fumes from hydrocarbons could be of concern to clients as well as residents in the area if fuel is not managed correctly. However if the development is well planned and the mitigating measures are successfully implemented the proposed development's contribution to air and noise pollution can become less significant.
Gauteng Transport Infrastructure Amendment Act	The proposed development site is bounded by the future provincial road K58 (Allandale Road) and therefore the act applies and requires involvement of the Gauteng Department of Roads & Transport.
Petroleum Products Act	Environmental Authorization as well as land use rights are required prior to applying for filling station with the Department of Energy.
The Deeds Registries Act, 47 of 1937	Considering the proposed development entails the installation of Municipal services, the developer has to allow for municipal services servitudes.
Occupational Health & Safety Act, 85 of 1993	Considering the proposed development will occur within an urban environment next to a Metropolitan road running through a residential area, the Act not only applies to the persons who will be responsible for construction, but also to the safety of members of the public.
GDARD Draft Ridges Policy	No ridges occur on, or in the direct vicinity of the study site. The development site has a level topography.
Gauteng conservation plan (C-Plan) Version 3.3	The proposed development occur within an area classified as Ecological Support Area in terms of the Gauteng Conservation Plan.
GDARD Agricultural Hub Policy	The application site does not fall within any of the Gauteng Agricultural Hubs and available GAPA data regarding Agricultural Potential within the Gauteng Province indicate that the study area has low Agricultural Potential
Gauteng Noise Control Regulations	If well planned and if mitigation measures are successfully implemented, the proposed filling station development will not contribute to significant noise generation in the

	area. The noise impacts will mainly be during the construction phase and is therefore only short term.
Gauteng Urban Edge	The proposed development site falls within the Gauteng Urban Edge. The proposed development is regarded as being in line with the Urban Edge Policy.
City of Johannesburg Integrated Development Plan (IDP) 2012-2016	From the above, the proposed development is in line with the development principles of the spatial development for the City of Johannesburg.
City of Johannesburg Metropolitan Municipality's Growth Management Strategy (GMS)	The proposed development of a filling station supports the objectives of the City of Johannesburg GMS.

3. ALTERNATIVES

Describe the proposal and alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. The determination of whether the site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment.

The no-go option must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. **Do not** include the no go option into the alternative table below.

Note: After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Please describe the process followed to reach (decide on) the list of alternatives below

No other layout alternatives were considered due to the limited size of the site.

The developer owns this property and identified a need for a filling station on this portion of land due to the ideal location of this site in terms of accessibility.

Therefore no other alternatives were considered.

Provide a description of the alternatives considered

No.	Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other (provide details of "other")	Description
1	Proposal	Proposed Filling Station development with associated services and infrastructure.
2	Alternative 1	
3	Alternative 2	
	Etc.	

In the event that no alternative(s) has/have been provided, a motivation must be included in the table below.

No other layout alternatives were considered due to the limited size of the site.

The developer owns this property and identified a need for a filling station on this portion of land due to the ideal location of this site.

Therefore no other alternatives were considered.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the total physical size (footprint) of the proposal as well as alternatives. Footprints are to include all new infrastructure (roads, services etc), impermeable surfaces and landscaped areas:

Proposed activity (**Total environmental (landscaping, parking, etc.) and the building footprint**)

Size of the activity:

2500m²

Alternatives:

Alternative 1 (if any)

Alternative 2 (if any)

Ha/ m²

or, for linear activities:

Proposed activity

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Alternatives:

Alternative 1 (if any)

Alternative 2 (if any)

m/km

Indicate the size of the site(s) or servitudes (within which the above footprints will occur):

Proposed activity

2500m ²

Alternatives:

Alternative 1 (if any)

Alternative 2 (if any)

Ha/m²

5. SITE ACCESS

Proposal

Does ready access to the site exist, or is access directly from an existing road?

YES X	NO
m	

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

Access to the proposed filling station exists via a gravel road leading off Allandale Road.

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 1

Does ready access to the site exist, or is access directly from an existing road?

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

YES	NO
m	

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 2

Does ready access to the site exist, or is access directly from an existing road?

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

YES	NO
m	

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

PLEASE NOTE: Points 6 to 8 of Section A must be duplicated where relevant for alternatives

Section A 6-8 has been duplicated

0

Number of times

(only complete when applicable)

6. LAYOUT OR ROUTE PLAN

A detailed site or route (for linear activities) plan(s) must be prepared for each alternative site or alternative activity. It must be attached to this document. The site or route plans must indicate the following:

- the layout plan is printed in colour and is overlaid with a sensitivity map (if applicable);
- layout plan is of acceptable paper size and scale, e.g.
 - A4 size for activities with development footprint of 10sqm to 5 hectares;
 - A3 size for activities with development footprint of > 5 hectares to 20 hectares;
 - A2 size for activities with development footprint of >20 hectares to 50 hectares);
 - A1 size for activities with development footprint of >50 hectares);
- The following should serve as a guide for scale issues on the layout plan:
 - A0 = 1: 500
 - A1 = 1: 1000
 - A2 = 1: 2000
 - A3 = 1: 4000
 - A4 = 1: 8000 (±10 000)
- shapefiles of the activity must be included in the electronic submission on the CD's;
- the property boundaries and Surveyor General numbers of all the properties within 50m of the site;
- the exact position of each element of the activity as well as any other structures on the site;
- the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, septic tanks, storm water infrastructure;
- servitudes indicating the purpose of the servitude;
- sensitive environmental elements on and within 100m of the site or sites (including the relevant buffers as prescribed by the competent authority) including (but not limited thereto):
 - Rivers and wetlands;
 - the 1:100 and 1:50 year flood line;
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation (even if it is degraded or infested with alien species);
- Where a watercourse is located on the site at least one cross section of the water course must be included (to allow the position of the relevant buffer from the bank to be clearly indicated)

FOR LOCALITY MAP (NOTE THIS IS ALSO INCLUDED IN THE APPLICATION FORM REQUIREMENTS)

- the scale of locality map must be at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map;
- the locality map and all other maps must be in colour;
- locality map must show property boundaries and numbers within 100m of the site, and for poultry and/or piggery, locality map must show properties within 500m and prevailing or predominant wind direction;
- for gentle slopes the 1m contour intervals must be indicated on the map and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the map;
- areas with indigenous vegetation (even if it is degraded or infested with alien species);
- locality map must show exact position of development site or sites;
- locality map showing and identifying (if possible) public and access roads; and
- the current land use as well as the land use zoning of each of the properties adjoining the site or sites.

Refer Annexure A

7. SITE PHOTOGRAPHS

Colour photographs from the center of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under the appropriate Appendix. It should be supplemented with additional photographs of relevant features on the site, where applicable.

Refer Annexure B

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity to be attached in the appropriate Appendix.

Refer Annexure C

SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

Note: Complete Section B for the proposal and alternative(s) (if necessary)

Instructions for completion of Section B for linear activities

- 1) For linear activities (pipelines etc) it may be necessary to complete Section B for each section of the site that has a significantly different environment.
- 2) Indicate on a plan(s) the different environments identified
- 3) Complete Section B for each of the above areas identified
- 4) Attach to this form in a chronological order
- 5) Each copy of Section B must clearly indicate the corresponding sections of the route at the top of the next page.

Section B has been duplicated for sections of the route times

Instructions for completion of Section B for location/route alternatives

- 1) For each location/route alternative identified the entire Section B needs to be completed
- 2) Each alternative location/route needs to be clearly indicated at the top of the next page
- 3) Attach the above documents in a chronological order

Section B has been duplicated for location/route alternatives times (complete only when appropriate)

Instructions for completion of Section B when both location/route alternatives and linear activities are applicable for the application

Section B is to be completed and attachments order in the following way

- All significantly different environments identified for Alternative 1 is to be completed and attached in a chronological order; then
- All significantly different environments identified for Alternative 2 is to be completed and attached chronological order, etc.

Section B - Section of Route (complete only when appropriate for above)

Section B – Location/route Alternative No. (complete only when appropriate for above)

1. PROPERTY DESCRIPTION

Property description:
(Including Physical Address and Farm name, portion etc.)

Remaining Extent of Portion 2 of the Farm Bothasfontein 408 JR

2. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in decimal degrees. The degrees should have at least six decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

Alternative:

Latitude (S):	Longitude (E):
26.003451S^o	28.087902 E^o

In the case of linear activities:

Alternative:

- Starting point of the activity
- Middle point of the activity
- End point of the activity

Latitude (S):	Longitude (E):
°	°
°	°
°	°

For route alternatives that are longer than 500m, please provide co-ordinates taken every 250 meters along the route and attached in the appropriate Appendix

Addendum of route alternatives attached

The 21 digit Surveyor General code of each cadastral land parcel

PROPOSAL	T	0	J	R	0	0	0	0	0	0	0	0	0	4	0	8	0	0	0	0
ALT. 1																				
ALT. 2																				
etc.																				

3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Flat X	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5
-------------------------	-------------	-------------	-------------	--------------	-------------	------------------

4. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site.

Ridgeline	Plateau	Side slope of hill/ridge	Valley	Plain X	Undulating plain/low hills	River front
-----------	---------	--------------------------	--------	--------------------------	----------------------------	-------------

5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

a) Is the site located on any of the following?

Shallow water table (less than 1.5m deep)

Dolomite, sinkhole or doline areas

Seasonally wet soils (often close to water bodies)

Unstable rocky slopes or steep slopes with loose soil

Dispersive soils (soils that dissolve in water)

Soils with high clay content (clay fraction more than 40%)

Any other unstable soil or geological feature

An area sensitive to erosion

YES	NO X
YES	NO X
YES	NO X
YES	NO X
YES	NO X
YES	NO X
YES X	NO
YES	NO X

(Information in respect of the above will often be available at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by Geological Survey may also be used).

The Geotechnical study conducted concluded that the site comprises of two Zones; Zone 1 – Residual Granite, and Zone 2 – Rock outcrops. The site was found to be favourable for the proposed development provided that the following is considered:

- Moderate collapsible potential of foundations sub-grades;
- Potential differential settlement of sub-grade interfaces; and
- Potential corrosive conditions on steel pipes and fittings.

b) are any caves located on the site(s)

YES	NO X
-----	-----------------------

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):	Longitude (E):
°	°

c) are any caves located within a 300m radius of the site(s)

YES	NO X
-----	-----------------------

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):	Longitude (E):
°	°

d) are any sinkholes located within a 300m radius of the site(s)

YES	NO X
-----	-----------------------

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):

Longitude (E):

--	--

If any of the answers to the above are "YES" or "unsure", specialist input may be requested by the Department

6. AGRICULTURE

Does the site have high potential agriculture as contemplated in the Gauteng Agricultural Potential Atlas (GAPA 4)?

YES	NO X
-----	-----------------------

Please note: The Department may request specialist input/studies in respect of the above.

7. GROUNDCOVER

To be noted that the location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Indicate the types of groundcover present on the site and include the estimated percentage found on site

Natural veld - good condition % =	Natural veld with scattered aliens % =	Natural veld with heavy alien infestation % = 80	Veld dominated by alien species % =	Landscaped (vegetation) % =
Sport field % =	Cultivated land % =	Paved surface (hard landscaping) % =	Building or other structure % =	Bare soil % = 20%

Please note: The Department may request specialist input/studies depending on the nature of the groundcover and potential impact(s) of the proposed activity/ies.

Are there any rare or endangered flora or fauna species (including red list species) present on the site

YES	NO X
-----	-----------------------

If YES, specify and explain:

--

Are there any rare or endangered flora or fauna species (including red list species) present within a 200m (if within urban area as defined in the Regulations) or within 600m (if outside the urban area as defined in the Regulations) radius of the site.

YES	NO X
-----	-----------------------

If YES, specify and explain:

--

Are there any special or sensitive habitats or other natural features present on the site?

YES X	NO
------------------------	----

If YES, specify and explain:

Despite no protected fauna or flora occurring on the proposed development site, the site occurs within an area classified as Ecological Support Area in terms of the Gauteng Conservation Plan.

Was a specialist consulted to assist with completing this section

YES X	NO
------------------------	----

If yes complete specialist details

Name of the specialist:

Pieter I Olivier of Strategic Environmental Focus

Qualification(s) of the specialist:

Ecologist - Candidate Professional Natural Scientist

Postal address:

PO Box 74785 Lynwood Ridge

Postal code:

0040

Telephone:

012 349 1307

Cell:

E-mail:

sef@sefsa.co.za

Fax:

Are any further specialist studies recommended by the specialist?

YES

NO

X

If YES, specify:

If YES, is such a report(s) attached?

YES

NO

If YES list the specialist reports attached below

--

Signature of specialist:

Date:

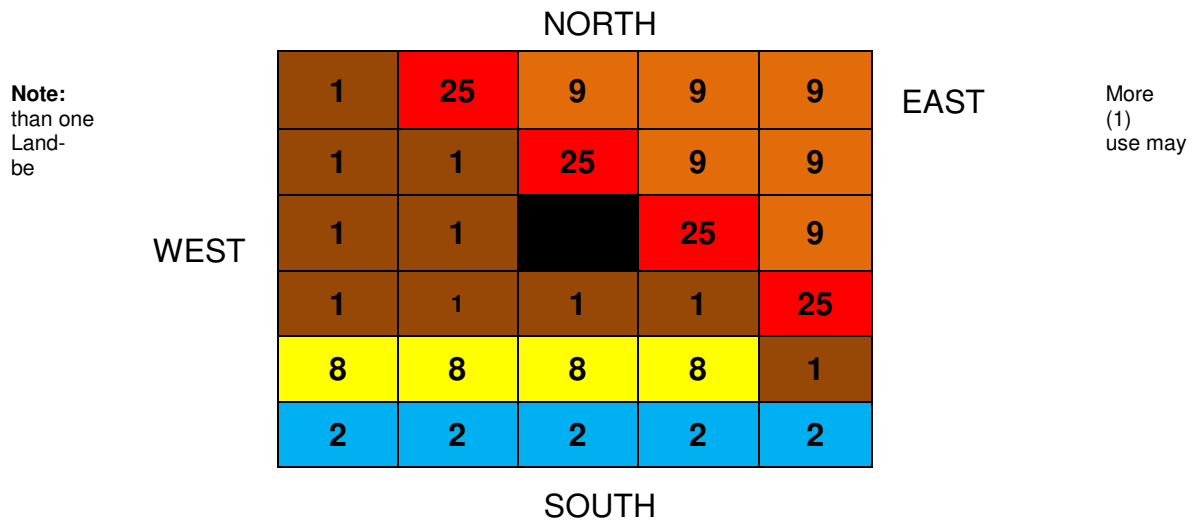
Please note; If more than one specialist was consulted to assist with the filling in of this section then this table must be appropriately duplicated

8. LAND USE CHARACTER OF SURROUNDING AREA

Using the associated number of the relevant current land use or prominent feature from the table below, fill in the position of these land-uses in the vacant blocks below which represent a 500m radius around the site

1. Vacant land	2. River, stream, wetland	3. Nature conservation area	4. Public open space	5. Koppie or ridge
6. Dam or reservoir	7. Agriculture	8. Low density residential	9. Medium to high density residential	10. Informal residential
11. Old age home	12. Retail	13. Offices	14. Commercial & warehousing	15. Light industrial
16. Heavy industrial ^{AN}	17. Hospitality facility	18. Church	19. Education facilities	20. Sport facilities
21. Golf course/polo fields	22. Airport ^N	23. Train station or shunting yard ^N	24. Railway line ^N	25. Major road (4 lanes or more)^N
26. Sewage treatment plant ^A	27. Landfill or waste treatment site ^A	28. Historical building	29. Graveyard	30. Archaeological site
31. Open cast mine	32. Underground mine	33. Spoil heap or slimes dam ^A	34. Small Holdings	
Other land uses (describe):				

NOTE: Each block represents an area of 250m X 250m, if your proposed development is larger than this please use the appropriate number and orientation of hashed blocks



indicated in a block

Please note: The Department may request specialist input/studies depending on the nature of the land use character of the area and potential impact(s) of the proposed activity/ies. Specialist reports that look at health & air quality and noise impacts may be required for any feature above and in particular those features marked with an "A" and with an "N" respectively.

Have specialist reports been attached

YES	NO
X	

If yes indicate the type of reports below

Traffic Impact Study Geotechnical Study Landscape Ecological Assessment Faunal Assessment
--

9. SOCIO-ECONOMIC CONTEXT

Describe the existing social and economic characteristics of the area and the community condition as baseline information to assess the potential social, economic and community impacts.

NEED FOR FILLING STATION DEVELOPMENT

The subject property falls within Administrative Region A, Sub-area 6 of the Johannesburg Regional Spatial Development Framework. The development objectives of this area are to enhance existing investment within the Kyalami Specialist Node and to retain and enhance the urban neighbourhood and character of the residential area.

The proposed filling station will therefore contribute to the RSDF objectives by enhancing investment as well as enhancing the urban neighbourhood by providing residents with access to fuel.

The proposed Mushroom farm filling station will serve more than one filling area and is in line with Councils policy. The nearest service stations are situated approximately 2km north-west and 2km south-east of the development site. Considering that filling stations form an essential part of a residential area and the continued development of the Kyalami area, there is definitely a need for another service station in the vicinity of to the proposed development site.

A Feasibility study (Annexure E7) conducted considered the impact of the proposed development on existing competitor stations. The study site will not likely cause a significant loss of fuel sales at existing filling stations. A traffic count was conducted on 24 February 2015 and was used to calculate the average monthly fuel sales for a modern, benchmark filling station. The study site will likely sell ± 650'000 litres of fuel per month upon maturity.

SUITABILITY FOR DEVELOPMENT

The proposed development site is vacant and situated across from a residential area which could benefit socially from having a filling station in close proximity. The filling station will also create job opportunities for locals thus contributing to the local economy.

PROVINCIAL STRATEGIES

The construction of a filling station will contribute to residential development therefore contributing to the densification strategy of the Gauteng Special Development Framework, 2011.

ECONOMIC ADVANTAGES

In terms of the CoJMM Growth Management Strategy which sets high, medium, and low priority areas across the City and describes specific interventions, one of the seven Development Strategies of the sub-region is supporting an efficient movement system. The proposed development of a filling station is thus supported by the COJMM Growth Management Strategy.

The proposed development further contributes by means of job opportunities during and after the construction phase for construction related workers (skilled, semi-skilled, and un-skilled individuals). The development can therefore be of economic importance to the surrounding community and the City of Johannesburg.

10. CULTURAL/HISTORICAL FEATURES

Please be advised that if section 38 of the National Heritage Resources Act 25 of 1999 is applicable to your proposal or alternatives, then you are requested to furnish this Department with written comment from the South African Heritage Resource Agency (SAHRA) – Attach comment in appropriate annexure

38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-

- (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50m in length;
- (c) any development or other activity which will change the character of a site-
 - (i) exceeding 5 000 m2 in extent; or
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- (d) the re-zoning of a site exceeding 10 000 m2 in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Are there any signs of culturally (aesthetic, social, spiritual, environmental) or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or close (within 20m) to the site?

YES	NO X
-----	-----------------------

If YES, explain:

If uncertain, the Department may request that specialist input be provided to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist if one was already appointed:

Will any building or structure older than 60 years be affected in any way?

YES	NO X
YES	NO X

Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?

If yes, please attached the comments from SAHRA in the appropriate Appendix

SECTION C: PUBLIC PARTICIPATION (SECTION 41)

1. The Environmental Assessment Practitioner must conduct public participation process in accordance with the requirement of the EIA Regulations, 2014.

In terms of the Guideline Document for Environmental Impact Assessment (EIA) Regulations promulgated in terms NEMA, stakeholders (I&APs) were notified of the Environmental Evaluation Process as follows:

- Site notices were erected (at prominent points on and around the study area) from 27 May 2015;
- Land owners and occupiers were notified via hand delivered notices as well as email communication on 28 May 2015;
- Notices regarding the project were further e-mailed, faxed and sent via registered mail to a list of interested and affected parties that registered for the project;
- A list of all persons, organizations and organs of state that were registered as interested and affected parties in relation to the application are attached as Proof of Advertisement;

- An advertisement was placed in the Star Newspaper on 3 June 2015;
- SAHRA was informed of the proposed water infrastructure development in writing;
- The ward councillor of **Ward 93** was informed of the applicant's intention to submit an application to the competent authority;
- The following institutions and organs of state were also identified as I & AP's and added to the register of the I & AP's:
 - Gauteng Department of Roads and Transport (GDRT);
 - Johannesburg Roads Agency (JRA);
 - Gauteng Department of Water & Sanitation (DWA);
 - Gauteng Department of Energy;
 - Eskom;
 - City Power;
 - Johannesburg Water;
 - South African Heritage Resources Agency (SAHRA);
 - Department of Land Claims; and
 - City of Johannesburg Metropolitan Municipality.

2. LOCAL AUTHORITY PARTICIPATION

Local authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least thirty (30) calendar days before the submission of the application to the competent authority.

Was the draft report submitted to the local authority for comment?

YES	NO
X	

If yes, has any comments been received from the local authority?

YES	NO
X	

If "YES", briefly describe the comment below (also attach any correspondence to and from the local authority to this application):

If "NO" briefly explain why no comments have been received or why the report was not submitted if that is the case.

The CoJMM made the following recommendations:

1. The design of storm water management systems should be based on Sustainable Urban Drainage Systems (SUDS) and Water Sensitive Urban Design approaches (WSUDS). A Storm water Management Plan is subject for approval by JRA prior to the Site Development Plan stage.
2. A groundwater management plan with relevant groundwater monitoring and reporting protocol must be established and calibrated annually.
3. Hydrological monitoring data should be evaluated bi-annually by a qualified Hydro geologist.
4. Monitoring boreholes must be drilled in order to monitor any possible diesel or petrol leaks from the underground tanks. A leak detector must be installed.
5. All landscaping in common areas and street scaping should use indigenous plants only, with preference given to endemic species where possible.

3. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the activity, site or property, such as servitude holders and service providers, should be informed of the application at least **thirty (30) calendar days** before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders?

YES	NO
X	

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

Two objections were received from Filling Station owners within a 3km radius of the proposed development site.

If "NO" briefly explain why no comments have been received

4. GENERAL PUBLIC PARTICIPATION REQUIREMENTS

The Environmental Assessment Practitioner must ensure that the public participation process is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees and ratepayers associations. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was flawed.

The EAP must record all comments and respond to each comment of the public / interested and affected party before the application report is submitted. The comments and responses must be captured in a Comments and Responses Report as prescribed in the regulations and be attached to this application.

5. APPENDICES FOR PUBLIC PARTICIPATION

All public participation information is to be attached in the appropriate Appendix. The information in this Appendix is to be ordered as detailed below

Appendix 1 – Proof of site notice

Appendix 2 – Written notices issued as required in terms of the regulations

Appendix 3 – Proof of newspaper advertisements

Appendix 4 – Communications to and from interested and affected parties

Appendix 5 – Minutes of any public and/or stakeholder meetings

Appendix 6 - Comments and Responses Report

Appendix 7 –Comments from I&APs on Basic Assessment (BA) Report

Appendix 8 –Comments from I&APs on amendments to the BA Report

Appendix 9 – Copy of the register of I&APs

Refer to Annexure D

SECTION D: RESOURCE USE AND PROCESS DETAILS

Note: Section D is to be completed for the proposal and alternative(s) (if necessary)

Instructions for completion of Section D for alternatives

- 1) For each alternative under investigation, where such alternatives will have different resource and process details (e.g. technology alternative), the entire Section D needs to be completed
- 4) Each alternative needs to be clearly indicated in the box below
- 5) Attach the above documents in a chronological order

Section D has been duplicated for alternatives times (complete only when appropriate)

Section D Alternative No. (complete only when appropriate for above)

1. WASTE, EFFLUENT, AND EMISSION MANAGEMENT

Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

YES X	NO
200m³	

If yes, what estimated quantity will be produced per month?

How will the construction solid waste be disposed of (describe)?

During construction the disposal of solid waste will be the responsibility of the main contractor appointed by the developer. An area on the application site will be earmarked for temporary dumping of solid waste to be disposed of during the construction phase. This area must be situated carefully not to be visual from the surrounding residences. The demarcated area must be easily accessible for dumping trucks to collect waste. The waste, including builder's rubble, will be carted to a nearby registered landfill site.

Where will the construction solid waste be disposed of (describe)?

All solid waste resulting from construction activities will be disposed nearest registered landfill site allowed to take building rubble. No solid waste will be dumped on open or adjacent properties.

Will the activity produce solid waste during its operational phase?

YES X	NO
Approximately 2.5kg per day	

If yes, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

During the operational phase all disposal of solid waste will be the responsibility of the Local Authority.

Has the municipality or relevant service provider confirmed that sufficient air space exists for treating/disposing of the solid waste to be generated by this activity?

YES	NO X
-----	-----------------------

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

All solid waste resulting from construction activities will be disposed at the nearest registered landfill site. No solid waste will be dumped on open or adjacent properties.

Note: If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?

YES	NO X
-----	-----------------------

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?

YES	NO X
-----	-----------------------

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Describe the measures, if any, that will be taken to ensure the optimal reuse or recycling of materials:

It is proposed that all waste construction materials be sorted into recyclable and non-recyclable materials. The recyclable materials should be re-used wherever possible or disposed of by a reputable recycling company.

Liquid effluent (other than domestic sewage)

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

YES	NO X
-----	-----------------------

If yes, what estimated quantity will be produced per month?

m ³	
YES	NO

If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity(ies)?

Will the activity produce any effluent that will be treated and/or disposed of on site?

Yes	NO X
-----	-----------------------

If yes, what estimated quantity will be produced per month?

m ³	
----------------	--

If yes describe the nature of the effluent and how it will be disposed.

Note that if effluent is to be treated or disposed on site the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA

Will the activity produce effluent that will be treated and/or disposed of at another facility?

YES	NO X
-----	-----------------------

If yes, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

Liquid effluent (domestic sewage)

Will the activity produce domestic effluent that will be disposed of in a municipal sewage system?

YES X	NO
------------------------	----

If yes, what estimated quantity will be produced per month?

250m³	
-------------------------	--

If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the domestic effluent to be generated by this activity(ies)?

YES	NO X
-----	-----------------------

Will the activity produce any effluent that will be treated and/or disposed of on site?

YES	NO X
-----	-----------------------

If yes describe how it will be treated and disposed off.

Emissions into the atmosphere

Will the activity release emissions into the atmosphere?

YES	NO X
-----	-----------------------

If yes, is it controlled by any legislation of any sphere of government?

YES	NO
-----	----

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

The proposed development will not generate any emissions.

2. WATER USE

Indicate the source(s) of water that will be used for the activity

Municipal X	Directly from water board	groundwater	river, stream, dam or lake	other	the activity will not use water
------------------------------	---------------------------	-------------	----------------------------	-------	---------------------------------

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:

_____ liters

If Yes, please attach proof of assurance of water supply, e.g. yield of borehole, in the appropriate Appendix

Does the activity require a water use permit from the Department of Water Affairs?

YES X	NO
------------------------	----

If yes, list the permits required

The proposed development site is not affected by 1:50 and 1:100 flood line, it does however occur **within 500m radius from the boundary of a wetland** and therefore it does not resort under the General Authorisation for Section 21 c and i water use, and requires a Section 21 WULA for Activities (c) and (i)

If yes, have you applied for the water use permit(s)?

YES	In progress
YES	NO

If yes, have you received approval(s)? (attached in appropriate appendix)

3. POWER SUPPLY

Please indicate the source of power supply eg. Municipality / Eskom / Renewable energy source

City of Johannesburg Metropolitan Municipality

If power supply is not available, where will power be sourced from?

Not Applicable

4. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

The following could be considered:

- Where possible energy saving light bulbs must be used;
- Time switches are to be used for outdoor lighting;
- Geysers must be fitted with insulation blankets;
- Solar panels can possibly be used for geysers and for outdoor lighting.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

Due to the proposed filling station development that will be dependent on a permanent power source for pumping of fuel, it is crucial to have a constant source of electricity to the filling station. A municipal electrical source is therefore crucial and back-up generators is recommended.

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts as well as the impacts of not implementing the activity (Section 24(4)(b)(i)).

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summarise the issues raised by interested and affected parties.

Two complaints were received from Filling Station owners within a 3km radius of the proposed filling station (Refer to Annexure D6).

Summary of response from the practitioner to the issues raised by the interested and affected parties (including the manner in which the public comments are incorporated or why they were not included)

(A full response must be provided in the Comments and Response Report that must be attached to this report):

All comments on the Draft Basic Assessment Report and Public Participation have been incorporated into The Comments & Response Report forming part of the Final Basic Assessment Report (Refer to Annexure D6).

2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION AND OPERATIONAL PHASE

Briefly describe the methodology utilised in the rating of significance of impacts

Significance Description Methodology

The significance of Environmental Impacts was assessed in accordance with the following method:

Significance is the product of probability and severity. Probability describes the likelihood of the impact actually occurring, and is rated as follows:

Likelihood	Description	Rating
Improbable	Low possibility of impact to occur either because of design or historic experience	2
Probable	Distinct possibility that impact will occur	3
Highly probable	Most likely that impact will occur	4
Definite	Impact will occur, in the case of adverse impacts regardless of any prevention measures	5

The severity factor is calculated from the factors given to "intensity" and "duration". Intensity and duration factors are awarded to each impact, as described below.

The Intensity factor is awarded to each impact according to the following method:

Intensity	Description	Rating
Low intensity	Natural and man-made functions not affected.	1
Medium intensity	Environment affected but natural and man-made functions and processes continue.	2
High intensity	Environment affected to the extent that natural or man-made functions are altered to the extent that it will temporarily or permanently cease or become dysfunctional.	4

Duration is assessed and a factor awarded in accordance with the following:

Duration	Description	Rating
Short term	<1 to 5 years - Factor 2	2
Medium term	5 to 15 years - Factor 3	3
Long term	Impact will only cease after the operational life of the activity, either because of natural process or by human intervention.	4
Permanent	Mitigation, either by natural process or by human intervention, will not way or in such a time span that the impact can be considered	4

transient.

The severity rating is obtained from calculating a severity factor, and comparing the severity factor to the rating in the table below. For example:

$$\begin{aligned} \text{The Severity factor} &= \text{Intensity factor X Duration factor} \\ &= 2 \times 3 \\ &= 6 \end{aligned}$$

A Severity factor of six (6) equals a Severity Rating of Medium severity (Rating 3) as per table below:

Severity Factor	Severity	Rating
Calculated values 2 to 4	Low Severity	2
Calculated values 5 to 8	Medium Severity	3
Calculated values 9 to 12	High Severity	4
Calculated values 13 to 16	Very High severity	5

A Significance Rating is calculated by multiplying the Severity Rating with the Probability Rating.

Significance	Rating	Influence
Low significance	Rating 4 to 6	Positive impact and negative impacts of low significance should have no influence on the proposed development project.
Medium significance	Rating >6 to 15	Positive impact: Should weigh towards a decision to continue Negative impact: Should be mitigated to a level where the impact would be of medium significance before project can be approved.
High significance	Rating 16 and more	Positive impact: Should weigh towards a decision to continue, should be enhanced in final design. Negative impact: Should weigh towards a decision to terminate proposal, or mitigation should be performed to reduce significance to at least medium significance rating.

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the construction phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Proposal

Potential impacts	Significance rating of impacts	Proposed mitigation	Significance rating of impacts after mitigation	Risk of the impact and mitigation not being implemented
PLANNING PHASE				
Adverse Impacts				
Water Quality				
The proposed development could potentially negatively impact on storm water and groundwater quality.	Moderate	A Storm water Management Plan is subject for approval by JRA prior to the Site Development Plan stage. Monitoring boreholes must be drilled to monitor possible leaks from fuel tanks.	Low	Low risk as a plan and monitoring boreholes will prevent storm water pollution and detect ground water pollution.
CONSTRUCTION PHASE				
Beneficial Impacts				
Institutional Environment				
The proposed development activity compliments proposed residential developments in the area i.e. filling station will provide fuel to current and future residents when residential development occurs.	High	None due to positive impact.	High	No risk due to positive impact
Social & Economic Environment				
Creation of Job opportunities during construction and operational phase of the project.	Moderate	The proposed filling station will create job opportunities during the construction phase of the project. It is recommended that local employment be sourced.	Moderate	No risk due to positive impact
Services				
Upgrading of services	High	The proposed filling station will provide fuel to residents in the Kyalami area. An EA and Land use rights are required prior to submitting filling station application to department of energy.	High	No risk due to positive impact
Fauna & Flora				
Eradication of invasive Eucalyptus species.	High	Eradication of invasive Eucalyptus species during the construction phase would benefit the biophysical environment in the sense that more groundwater will become available. Not necessary to mitigate.	High	No risk due to positive impact
Adverse Impacts				
Geology & Soils				
If not planned and managed correctly topsoil will be lost.	Low	• Topsoil removed from the proposed route should be stored separately from all stockpiled materials and subsoil, according to the stockpiling methods as described below. The stockpiled	Low	Soil erosion could occur if

		<p>topsoil should be used for rehabilitation and landscaping purposes after construction has been completed;</p> <ul style="list-style-type: none"> The installation of services could leave soils exposed and susceptible to erosion. Soils should be stored adjacent to the excavated trenches that are excavated to install services, and this should be filled up with the in-situ material as the services are installed. All stones and rocks bigger than 80 mm should be removed from the top layer of soil and these disturbed areas should be re-vegetated immediately after works in a specific area are completed to prevent erosion; Excavations on site must be kept to minimum and done only one section at a time. Excavated soils must be stockpiled directly on the demarcated area on site. Considering that the proposed filling station occurs in an urbanised area with low agricultural potential, and the mitigation measures proposed the residual adverse impact of the development on the soils is anticipated to be low. 		mitigation is not implemented
Collapse of structures		Recommendations made in the geotechnical study pertaining to collapsible potential, differential settlement and corrosive conditions must be adhered to during construction phase.		Structures could collapse if recommendations pertaining to construction are not implemented.
Air quality and noise pollution				
Construction during the dry and windy season could cause excessive dust pollution during construction works.	Low	Regular and effective damping down working areas (especially during the dry and windy periods) must be carried out to avoid dust pollution that will have a negative impact on the surrounding residents and Allandale Road. When necessary, these working areas should be damped down at least twice a day.	Low	If mitigation is not implemented drivers visibility could be impaired.
Nuisance to neighbours in terms of dust generation due to construction during the dry and windy season.	Low	The application site must be damped at a regular basis with water to prevent dust pollution to nearby residents and commuters utilising Allandale Road.	Low	If mitigation is not implemented residents could complain about nuisance dust.
The noise created by earthmoving machinery will result in an increase in ambient noise levels. This will be short term, being generated only during the day.	Moderate	All construction activities must be restricted to normal working hours from 8:00 in the morning to no later than 18:00 in the afternoons. No construction may take place on Sundays and public holidays.	Low	If mitigation is not implemented residents could complain about nuisance noise.
Hydrology & groundwater				
Impacting wetland functionality	Moderate	The proposed development occurs within 500m from a wetland. A section 21 c and i Water Use License is required prior to construction commencing. Conditions associated with this WUL as well as IWQQMMP must be adhered to during construction.	Low	If mitigation is not implemented Wetland function could be impaired.
Increased storm water run-off volumes and velocity	Low	Due to the clearing of vegetation the volume of storm water run-off will increase as well as velocity. The area to be cleared is however small (2500m ²). Proper storm water infrastructure will have to be constructed and maintained in accordance with a Storm water management plan. The Storm water Management Plan must be compiled and submitted to JRA for approval prior to the Site Development Plan stage, and included as part of the WULA.	Low	If storm water infrastructure is inadequate, erosion could occur.

Hydrocarbon pollution of surface and ground water	Moderate	An oil trap must be installed to capture and filter all run-off from the filling station prior to releasing it into the Municipal storm water system. Requirement for Monitoring boreholes to be drilled to be incorporated into the IWQQMMP. A ground water monitoring plan will be included in the IWQQMMP as part of the Water Use License Application. Requirement for Hydrological monitoring data to be evaluated bi-annually by a qualified Hydro geologist to be incorporated into the IWQQMMP.	Low	If run-off from the filling station is not filtered, Municipal storm water could be polluted.
Excavated materials that are stockpiled in wrong areas can interfere with the natural drainage.	Low	The proposed development site is flat; however an area must be allocated for stockpiling of topsoil before any construction take place on the application site. The stockpiles must be situated away from any water source or drainage channel. A sediment fence or barrier must be constructed around the stockpile, to prevent soil from washing away by rain or any water.	Low	If mitigation is not implemented, topsoil could be lost.
Construction during the rainy season can cause delays and damage to the environment.	Low	It is recommended that the construction phase be scheduled for the winter months; It is also recommended that the precautionary measures be taken in order to prevent the extensive loss of soil during rainstorms. Large exposed areas should adequately be protected against erosion by matting or cladding; Measures should be implemented during the rainy season to channel storm water away from open excavations and foundations.	Low	If mitigation is not implemented, erosion could occur.
Cultural and Archaeology				
Occurrence of cultural historical assets on the proposed development site.	Low	Considering the results of the HIA it is not anticipated that sites or features of historical significance will be unearthed during construction, however, if archaeological sites are exposed during construction work, it should immediately be reported to a museum, preferably one at which an archaeologist are available so that an investigation and evaluation of the site can be made.	Low	If mitigation is not implemented cultural heritage finds unearthed during construction, could be destroyed.
Roads and Traffic				
Impact on future planned K- roads	Moderate	Considering the proposed development is situated on Allandale Road which is the proposed K58, the developer has to correspond with Gautrans regarding the development.	Low	If mitigation is not implemented, Gautrans could object to the development.
Heavy vehicle traffic increase could disrupt the surrounding landowners' daily routines.	Low	Heavy vehicles responsible for material deliveries must be instructed to only use the main roads during off-peak hours.	Low	If mitigation is not implemented, traffic flow could be negatively affected.
Provision for safe and effective traffic flow.	Moderate	A TIS has been conducted and recommendations made are to be implemented to ensure effective and safe traffic flow into and out of the filling station.	Low	If mitigation is not implemented, motorists safety could be at risk.
Access to existing properties.	Low	Construction activities should cater for continued access to existing properties, if applicable.	Low	If mitigation is not

				implemented, residents could complain about accessibility to their properties.
Construction might impact traffic flow.	Moderate	Liaison is required with the responsible traffic authorities to ensure compliance with legal requirements during construction activities. Appropriate signage and barricading will be required to ensure safe construction activities and smooth traffic flow during the construction phase.	Low	If mitigation is not implemented, motorists safety could be at risk.
Safety and Security				
During the construction phase safety and security problems (especially surrounding residents) are likely to occur.	Moderate	<ul style="list-style-type: none"> Construction must be completed in as short time as possible. No construction worker or relative may reside on the construction site during the construction phase. All construction workers must leave the site at the end of a day's work. A security guard should be appointed on site to prevent any loss of materials and damage to construction equipment. 	Low	If mitigation is not implemented, residents and construction companies could be affected by crime.
The excavations associated with proposed development could pose a safety risk to pedestrians.	Moderate	The necessary safety precautions must be in place i.e. excavations must be fenced off with barrier tape; signage must be in place to identify excavations.	Low	If mitigation is not implemented, pedestrians safety could be at risk.
Construction activities might affect the public e.g. road users	Moderate	Public safety especially that of Allandale Road users is to be catered for during construction phase.		If mitigation is not implemented, motorists' safety could be at risk.
Visual Impact				
Dumping of builder's rubble on neighbouring properties.	Low	A specific location for building rubble must be allocated on site in order to concentrate and collect the building rubble and cart it to a registered landfill site. The allocated area must be out of sight of neighbouring properties not to have a visual impact.	None	If mitigation is not implemented, pollution could occur.
Stockpile areas for construction materials could have a negative visual impact and possibly impair drivers' views.	Moderate	An area on the site must be allocated for the stockpile of construction materials. The area must be situated on the construction site, and must be situated to have a minimal visual impact on the neighbouring area. Stockpiles may not be stockpiled higher than 1m in order to prevent impairing views (line of sight) of drivers utilising accessing Allandale Road.	Low	If mitigation is not implemented, vehicle accidents could occur.
The construction vehicles, the site camp, and other construction related facilities will have a negative visual impact during the construction phase.	Moderate	Before any construction commence on site, an area on site must be demarcated for a site camp. The selected site should not impair views (line of sight) of drivers utilising upgraded roads, nor should it be a distraction.	Low	If mitigation is not implemented, community complaints could occur.

Flora & Fauna				
Construction works might cause destruction of protected species	Low	<p>No protected species were recorded on site.</p> <p>Considering the proposed filling station will transect an Ecological Support Area the following must be applied:</p> <ul style="list-style-type: none"> • Construction personnel should be trained not to destroy mammal specimens. • The contractors must ensure that no fauna species are trapped, hunted, or killed during the construction phase. • Should any mammal species be encountered during the construction phase, they should be relocated to natural areas in the vicinity. 	Low	If mitigation is not implemented, protected species could be destroyed.
Uncontrolled fires may cause damage and loss to vegetation and fauna in the area.	Low	<ul style="list-style-type: none"> • No fires are allowed on the construction site. • Smoking only allowed in designated areas away from vegetation which could possibly catch fire. • Cigarette disposal facilities should be catered for in the designated smoking areas. 	Low	If mitigation is not implemented, protected species could be destroyed.
Waste Management				
Site office, camp and associated waste (visual, air and soil pollution)	Moderate	<p>The site camp should not be located in a highly visual area on the study area, or a screen or barrier should be erected as not have a negative impact on the sense of place.</p> <p>The site camp and the rest of the study area should appear neat at all times;</p> <p>A temporary waste storage point shall be determined and established on site by means of demarcation. This storage points shall be accessible by waste removal vehicles.</p> <p>The temporary storage site may not be highly visible from the properties of the surrounding residents/ Landowners and should be located downwind from the residential area.</p> <p>Waste materials should be removed from the site on a regular basis (at least weekly), to a registered landfill site.</p>	Low	If mitigation is not implemented, community complaints could be received.
Disposal of construction waste and waste materials.	Moderate	<p>All the waste generated by the proposed filling station must be temporarily stored at a preselected area on site to be carted to a registered landfill site allowed to take building rubble;</p> <p>Waste storage should occur in areas that have already been disturbed.</p> <p>Small general waste containers should be provided along the length of roads to be upgraded to prevent windblown waste;</p> <p>These small waste receptacles must be emptied at the temporary waste storage area on a weekly basis for removal.</p> <p>All waste must be removed to a registered landfill site on a weekly basis. No waste materials may be disposed of on or adjacent to the site;</p> <p>The storage of solid waste on site, until such time that it may be disposed of, must be in the manner acceptable to the local authority; and</p> <p>Records of waste reused, recycled, and disposed must be kept for future reference or inspection by authorities.</p>	Low	If mitigation is not implemented, pollution might occur.
Socio-economic				
Development not approved in terms of Petroleum Products Act	Moderate	<p>Environmental Authorization as well as land use rights are required prior to applying for filling station with the Department of Energy.</p> <p>Approval required from DoE for establishment of filling station in proposed location.</p>	Low	If mitigation is not implemented, a

OPERATIONAL PHASE				
Beneficial Impacts				
Social & Economic Environment				
Service provision.	High	The proposed filling station will provide fuel to local residents and passersby.	High	No risk due to positive impact
Compatibility with CoJ Growth management strategy	High	The proposed development of a filling station is in line with the CoJ Growth management strategy in that it supports an efficient movement system.	High	No risk due to positive impact.
Compatibility with CoJ Integrated Development Plan	High	The proposed development of a filling station is in line with the CoJ IDP in that it supports an efficient movement system.	High	No risk due to positive impact.
Adverse Impacts				
Fauna and Flora				
Invasive plant species occurrence	Moderate	Only indigenous plants are to be used in landscaped gardens.	Low	If mitigation is not implemented, invasive plants could spread.
Hydrology				
Increased storm water run-off volumes and velocity	Low	Due to the impermeable surfaces the volume of storm water run-off will increase as well as velocity. The area to be surfaced is however small (2500m ²). Proper storm water infrastructure will have to be maintained in accordance with a Storm water management plan specific to the filling station.	Low	If mitigation is not implemented, erosion could occur.
Impacting wetland functionality and groundwater	Moderate	The storage of hazardous substances underground and within 500m from a wetland poses potential for water pollution. Conditions associated with this WUL as well as IWQQMMP must be adhered to during operational phase and frequent pressure testing of the tanks in accordance with legislation is required.	Low	If mitigation is not implemented, wetland could be polluted.
Hydrocarbon pollution of surface and ground water	Moderate	Oil trap installed to capture and filter all run-off from the filling station must be maintained and cleaned frequently to ensure only clean storm water run-off is released into the Municipal storm water system. Groundwater monitoring to be conducted in accordance with the groundwater monitoring plan.	Low	If mitigation is not implemented, surface and ground water could be polluted.
Fire				
Potential of fire and explosion due to storing bulk hazardous substances	Moderate	Storage facilities and the use thereof to comply with national legislation as well as national standards.	Low	If mitigation is not implemented the risk of fire and/or explosion exists.
Hazardous waste				
Land contamination by hydrocarbons removed from oil trap	Moderate	Hydrocarbons trapped in oil trap are to be removed at a frequency in accordance with OEM of the trap installed and are to be stored in 210l drums for recycling or disposal at a registered landfill site.	Low	If mitigation is not implemented, land contamination could occur.

No-Go Alternative

Potential impacts	Significance rating of impacts	Proposed mitigation	Significance rating of impacts after mitigation	Risk of the impact and mitigation not being implemented
<p>The no-go alternative will result in no development. No positive impacts are foreseen for the no-go alternative, as it would result in the application site remaining in its current state. The present state of the study site is associated with vacant land open to dumping and illegal settlement. The area is also covered by exotic trees which utilize a significant amount of groundwater.</p> <p>Infrastructure in the area will be left in its current state and no upgrades/ further provision of water and sewer reticulation systems and other services will occur.</p> <p>The social and economic benefits associated with the potential development will not be realized if the development does not go ahead.</p>				

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

- Feasibility Study
- Traffic Impact Study
- Geotechnical Study
- Landscape Ecological Assessment
- Wetland Study
- Heritage Impact Assessment
- Faunal Assessment
- Township Establishment approval

Describe any gaps in knowledge or assumptions made in the assessment of the environment and the impacts associated with the proposed development.

3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the decommissioning and closure phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Proposal

Potential impacts:	Significance rating of impacts:	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Geology & Soils				
Soil erosion, siltation, and gully formation.	Low	Compaction of fill material following construction should take place. Topsoil stockpiled should be returned and used for rehabilitation of disturbed areas.	Low	If no mitigation measures are implemented, erosion of fill material could occur.
Loss of topsoil due to poor rehabilitation.	Low	Rehabilitation works must be done immediately after the involved works in an area is completed in order to prevent loss of topsoil and possible erosion.	Low	If no mitigation measures are implemented, loss of topsoil could occur.
Hydrology & Groundwater				
Impacting wetland functionality and groundwater	Moderate	Decommissioning activities within 500m from a wetland poses potential for water pollution. Conditions associated with this WUL as well as IWQQMMP must be adhered to during decommissioning phase.	Low	If no mitigation measures are implemented, wetland could be negatively impacted.
Not reinstating natural run-off/drainage following completion of construction phase.	Low	Due to construction activities such as excavations and stockpiling, the natural drainage of the area will temporarily be changed. Following completion of the construction phase and completion of rehabilitation, natural drainage should be reinstated to its former (prior to construction) state.	Low	If no mitigation measures are implemented, natural run-off could be negatively altered.
Demolition works during the rainy season can cause unnecessary delays and damage to the environment, especially damage to existing roads in the area.	Low	Should decommissioning take place in the wetter months, frequent rain could cause very wet conditions, which makes it extremely difficult to do the necessary rehabilitation works of disturbed areas. Wet soils are vulnerable to compaction. Wet conditions often causes delays and the draining of water away from the works (in the case of high water tables) into the water bodies of the adjacent properties, could (if not planned and managed correctly) have an impact on the water quality of these water bodies. Rehabilitation should be planned to take place prior to the onset on the rainy season i.e. prior to Spring, if possible.	Low	If no mitigation measures are implemented, the environment could be damaged.
Roads & Traffic				
Heavy vehicle traffic increase could disrupt the surrounding landowners' daily routines.	Low	Heavy vehicles responsible for collecting waste or rehabilitation during the decommissioning phase must be instructed to only use the main roads during off-peak hours.	Low	If no mitigation measures are implemented, residents might complain.
Restrictions of access to surrounding properties and the construction area during decommissioning and closure phases.	Low	To minimize the impacts on local traffic, vehicles associated with decommissioning should avoid using the local road network during peak traffic times. These vehicles should use only specific roads and strictly keep within the speed limits and abide to all traffic laws. No speeding or reckless driving should be allowed. Access to the site for decommissioning vehicles should be planned to minimize the impact on the surrounding network; and Warning signs should be erected on the roads that these vehicles will use, at big crossings/ access roads and on the site if needed.	Low	If no mitigation measures are implemented, residents might complain.
Damage to roads.	Low	Provisions made for temporary access to and from the construction site along local roads should be removed. Any damage to the local road curbs at access points to construction site caused by	None	If no mitigation measures are implemented, road could be damaged without being

		construction activities should be repaired.		repaired.
Access to adjacent properties	Low	Existing accesses to properties should be restored to former state prior to construction having commenced, in order to prevent complaints.	None	If no mitigation measures are implemented, adjacent properties might not be accessible.
Safety & Security				
Decommissioning activities could cause danger to drivers and pedestrians.	Moderate	The necessary safety precautions must remain in place until decommissioning phase is concluded i.e. signage must be in place to identify activities in progress.	Low	If no mitigation measures are implemented, erosion of fill material could occur.
Waste Management				
Site office, camp and associated waste (visual, air and soil pollution)	Moderate	Temporary site camp and waste storage areas are to be decommissioned. Disturbed areas are to be rehabilitated and returned to its former state (prior to construction commencing).	Low	If no mitigation measures are implemented, sense of place will be negatively affected.
Disposal of construction waste and waste materials.	Moderate	All waste generated during the construction phase of the project is to be collected and disposed of at a registered landfill site. Records must be kept of waste reused, recycled, and disposed for inspection by authorities.	Low	If no mitigation measures are implemented, the environment will be polluted.
Air quality and noise				
Demolition works during the dry and windy season.	Low	Regular and effective damping down of working areas (especially during the dry and windy periods) must be carried out to avoid dust pollution that will have a negative impact on the surrounding environment. When necessary, these working areas should be damped down at least twice daily.	Low	If no mitigation measures are implemented, dust pollution could occur.
The noise created by decommissioning activities will result in an increase in ambient noise levels. This will be short term, being generated only during the day.	Low	All decommissioning and closure activities must be restricted to normal working hours from 8:00 in the morning to no later than 18:00 in the afternoons. No construction may take place on Sundays and public holidays.	Low	If no mitigation measures are implemented, noise pollution could occur.
Visual Impact				
Dumping of builder's rubble on neighbouring properties.	Moderate	All waste temporarily stored on the construction site during the operational phase has to be removed from the site during the decommissioning phase and prior to the project being regarded as closed.	Low	If no mitigation measures are implemented, pollution could occur resulting in community complaints.
Flora				
Not immediately rehabilitating disturbed areas resulting in spread of invasive plants and weeds..	Moderate	Disturbed areas to be rehabilitated as soon as construction has concluded in order to prevent the spread of invasive plants and weeds.	Low	If mitigation measures is not implemented, invasive species might thrive.
Not rehabilitation with indigenous plant species resulting in spread of aliens.	Moderate	All landscaping should use indigenous plants only, with preference given to endemic species where possible.	Low	If mitigation measures is not implemented, invasive species might thrive.

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

Traffic Impact Study
Landscape Ecological Assessment
Wetland Study
Faunal Assessment

Where applicable indicate the detailed financial provisions for rehabilitation, closure and ongoing post decommissioning management for the negative environmental impacts.

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4. CUMULATIVE IMPACTS

Describe potential impacts that, on their own may not be significant, but is significant when added to the impact of other activities or existing impacts in the environment. Substantiate response:

Should the proposed development be approved, the majority of cumulative impacts will be related to the construction phase.

- Potential cumulative impact on the wetland system situated within 500m from the proposed development site. Poor stockpiling could lead to topsoil stockpiles washing away and silting up the wetland or storm water infrastructure. Increased storm water run-off due to cleared areas, could lead to erosion and siltation of the wetland. Spilling of hydrocarbons during installation of tanks or during operational phase could potentially end up in the wetland which will negatively affect its functionality. Recommendations made in EMP and conditions associated with water use license issued should be adhered to.
- Traffic flow could be negatively affected by the proposed construction activities coupled with peak traffic hours. It is thus important that use of Allandale Road be limited to off-peak hours.
- Noise due to construction activities added to the normal traffic background noise levels could result in noise pollution to local residents across the development site. Construction activities may thus only take place during the daytime.
- Cumulative negative visual impact on surrounding views due to camp site, movement of construction vehicles, building rubble storage, and construction works etc. This impact may be minimized by locating the site camp and rubble storage area in an area with low visibility from surrounding developments and road networks.
- Background dust pollution caused by traffic could be aggravated by clearing of vegetated areas. Dust control can be applied by means of water trucks, particularly in the dry winter months.
- During the construction phase some safety problems (especially for the surrounding residents and road users) are likely to occur due to construction activities. In order to minimize this, site workers are not to be allowed to sleep on the construction site at night and provision for adequate security/ site supervision must be made during the day. Compliance with the OHS Act as well as Road Traffic Act is required to ensure safety of road users and public during construction phase.

As illustrated, these cumulative impacts can be mitigated if activities are correctly planned and measures are implemented to manage activities which could cause any negative cumulative impacts.

Cumulative impacts associated with the operational phase include:

- Potential wetland impact due to hydrocarbon spillages or leakage from tanks; and
Fire risk associated with storage of bulk hazardous substances.

5. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that sums up the impact that the proposal and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Proposal

The major impacts that is likely to occur during the construction and operational phase, after management, include:

NATURAL ENVIRONMENT

- Considering the Ecological Support Area has been degraded by former land use and is not linked to viable ecological environments, the proposed development will not negatively affect the ecological environment. The removal of Eucalyptus trees currently found on the development site will contribute to a rise in groundwater levels.
- Functionality of the wetland situated 350m south of the proposed development site will not be affected by the construction activities considering stockpiling methods and construction during dry periods, which will prevent loss of topsoil. Storm water infrastructure will be installed as well as an oil trap to ensure that all run-off from the site is filtered prior to being released into the Municipal storm water system. The operation of the bulk fuel storage facility will not affect the wetland due to pressure testing of tanks and complying with national standards in terms of installation and use.

SOCIAL ENVIRONMENT

- The proposed filling station will not likely cause a significant loss of fuel sales at existing filling stations. The study site will likely sell ± 650'000 litres of fuel per month upon maturity. The trading potential against existing competitor stations is very good for the study site.
- The construction of the proposed filling station adjacent to a future K road will not negatively affect the proposed K road if traffic impact study recommendations are implemented. The relevant roads authority will also be liaised with during the public participation process.
- The construction phase will be carried out during daylight hours only and therefore it is not foreseen that the surrounding residents will be affected by noise pollution.
- Considering that cleared areas will be dampened it is not foreseen that air pollution will be a concern to local residents and traffic on Allandale Road.
- Construction activities (campsite, rubble storage areas etc.) will be placed out of site from local residents and traffic as far as possible, but might be temporarily visually unpleasant.
- The surrounding residents as well as commuters making use of Allandale Road will benefit socially from the presence of a filling station in the proposed location.
- The proposed project supports the CoJMM Growth Strategy as well as

Integrated Development Plan in terms of supporting an efficient movement system by providing fuel.

ECONOMIC ENVIRONMENT

- A Feasibility study concluded the trading market is very good for a filling station at the proposed location. The development site is positioned mainly to intercept traffic from the Allandale Road arterial catchment market and it will serve the local developing market.
- The proposed development will contribute significantly to the economy of the area during both the construction and the operational phases. During both phases a significant number of jobs will be created for skilled and unskilled workers.

Through development of the study area an increase in rates and taxes for the Local Authority will take place.

Alternative 1

Not applicable

Alternative 2

Not applicable

No-go (compulsory)

The no-go alternative will result in no development. No positive impacts are foreseen for the no-go alternative, as it would result in the application site remaining in its current state. The present state of the study site is associated with vacant land open to dumping and illegal settlement. The area is also covered by exotic trees which utilize a significant amount of groundwater.

Infrastructure in the area will be left in its current state and no upgrades/further provision of water and sewer reticulation systems and other services will occur.

The social and economic benefits associated with the potential development will not be realized if the development does not go ahead.

6. IMPACT SUMMARY OF THE PROPOSAL OR PREFERRED ALTERNATIVE

For proposal:

Considering the proposed development occurs on vacant land open to illegal dumping and settlement, where thirsty alien trees occur, the proposed development will not have a negative impact on the ecological surroundings. Only 1 alternative is proposed for this development on the proposed land in the proposed location due to being vacant, accessible and the location in proximity to other filling stations.

Bio-Physical

- The proposed layout is not affected by the 100yr, 50yr flood lines.
- Despite a wetland occurring 350m south of the proposed development site, it is not anticipated that the development will have any effect on the wetland due to the level topography as well as recommendations made in the EMP pertaining to stockpiling and storm water management or the wetland, because there is no wetland on the site.
- The proposed development site is currently vacant.

Ecological

- There is no protected flora or fauna species on the site.
- The proposed development occurs in an area classified as Ecological Support Area; however the area is not connected/linked to protected areas or areas where protected species are known to occur.
- Eradication of Eucalyptus trees occurring on site would contribute positively to groundwater levels.

Institutional

- The proposed development is in line with the local council's plans and strategies in terms of supporting an efficient movement system.
- Allandale road is a proposed K-road, thus the filling station is ideally located considering future traffic load.
- Township Establishment has already taken place for the larger area on which the proposed filling station is situated.
- Environmental Authorization was granted to the former land owner for developing the land on which the proposed filling station will be situated.

Economical

- A Feasibility study concluded the trading market is very good for a filling station at the proposed location.
- The filling service station development will create much needed employment opportunities during construction and operational phases to several skilled, semi-skilled and un-skilled individuals. With any filling station development and typical service station, domestic workers and petrol attendants, and tellers will be needed. This could create job opportunities to disadvantaged individuals within the surrounding area.
- The proposed development will provide the Local Authority with additional rates and taxes.

Social

- No Cultural/Historically significant areas were identified on the application site and thus no areas of historical or cultural value will be affected.
- The development will create employment opportunities, both temporary and permanent.

- The site is in an excellent position for the filling/ service station development due to surrounding residential developments and due to the distance from the nearest filling stations in the area.
- The proposed filling station is unlikely to cause significant loss of fuel sales at existing filling stations. The trading potential against existing competitor stations is very good for the development site.

Based on the biophysical, institutional, social, and economical characteristics, it is evident that the site is suitable for the proposed development.

The development will create numerous job opportunities during the construction and operational phases which will be beneficial for the community, Local Authority and the Gauteng Province in general.

As already indicated in the report, most of the construction related activities could be mitigated to more acceptable levels and no detrimental ecological impacts are anticipated.

As a result of the above mentioned information, we are of the opinion that the proposed development (only if planned, implemented, and managed correctly) will promote sustainable development and it will have a significant positive impact on the local area.

It is therefore requested that the development be allowed to proceed, and that the implementation of the Environmental Management Plan (**Appendix G**) be one of the conditions of such approval.

For alternative:

Not applicable

Having assessed the significance of impacts of the proposal and alternative(s), please provide an overall summary and reasons for selecting the proposal or preferred alternative.

Considering the proposed development occurs on vacant land open to illegal dumping and settlement, where thirsty alien trees occur, the proposed development will not have a negative impact on the ecological surroundings. Only 1 alternative is proposed for this development on the proposed land in the proposed location due to being vacant, accessible and the location in proximity to other filling stations.

7. SPATIAL DEVELOPMENT TOOLS

Indicate the application of any spatial development tool protocols on the proposed development and the outcome thereof.

Refer to Annexure E7 – Feasibility Study

8. RECOMMENDATION OF THE PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the Environmental Assessment Practitioner as bound by professional ethical standards and the code of conduct of EAPASA).

YES X	NO
------------------------	-----------

If "NO", indicate the aspects that require further assessment before a decision can be made (list the aspects that require further assessment):

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

Bokamoso is of the opinion that both beneficial and adverse impacts were thoroughly assessed, and the needs and benefits for this project have been assessed so as to give the proposed filling station development the go-ahead. As a result Bokamoso is of the opinion that the proposed Mushroom Farm Filling Station will have a significant long-term socio-economic beneficial impact on the subject property and its immediate surroundings. Considering all the above mentioned information it is requested that this Basic Assessment be approved **subject to the implementation of the mitigation measures** contained in the Environmental Management Plan (**Appendix G**) and the **other mitigation measures and recommendations** mentioned below to achieve maximum advantage from beneficial impacts, and sufficient mitigation of adverse impacts. Should all the recommendations be adhered to it is foreseen that there would be no reason for this application not to be approved.

It is recommended that, based on the findings of the BAR and supplemental specialist information that:

- Should the proposed Mushroom Farm Filling Station obtain the necessary environmental authorisation, an Environmental Management Plan (EMP) must be implemented for the construction and operational phases of the development. The EMP, as attached to this document, should be made part of the contractual documents of the contractors;
- Mitigation measures, as set out in the EMP, must be implemented during the construction and operational phases;
- External environmental monitoring must be conducted to ensure overall compliance with legislative requirements and the EMP;
- Rehabilitation must be done correctly and timeously, particularly in terms of erosion control and the prevention of exposed soils; and
- The implementation of a Groundwater Monitoring Plan;
- The implementation of a Storm water Management Plan;
- Oil traps are recommended to catch oil before entering the storm water system;
- The implementation of a Service Station Emergency Plan;
- Signage/advertising board signage should comply with the relevant by-laws, regulations and standards of the local authority; and
- If during construction any new evidence of archaeological sites or artifacts, paleontological fossils, graves or other heritage resources are found, the operations must be stopped and a qualified archaeologist

or SAHRA must be contacted immediately for an assessment of the find;

- The safety and security of the people in the surrounding area are important and must be taken in to careful consideration during the construction phase;
- Local people are to be given employment preference;
- A confirmation letter of the handling and disposing of solid waste during the construction phase will be obtained from the relevant Landfill Site. A copy thereof should be forwarded to DWS and GDARD once in receipt of it;
- A confirmation letter on the available capacity for the liquid effluent (domestic sewage) from the City of Johannesburg should be obtained and a copy thereof should be forwarded to DWS, GDARD and Johannesburg Water once in receipt of it;
- Recommendations of the Traffic Impact Study should be adhered to.
- Any additional authorizations required from e.g. from DWS, DoE, and Gautrans should be obtained and conditions complied with; and

All recommendations made by the specialists in reports compiled for this development should be adhered to at all times.

9. THE NEEDS AND DESIRABILITY OF THE PROPOSED DEVELOPMENT (as per notice 792 of 2012, or the updated version of this guideline)

The subject property falls within Administrative Region A, Sub-area 6 of the Johannesburg Regional Spatial Development Framework. The development objectives of this area are to enhance existing investment within the Kyalami Specialist Node and to retain and enhance the urban neighbourhood and character of the residential area.

The proposed filling station will therefore contribute to the RSDF objectives by enhancing investment as well as enhancing the urban neighbourhood by providing residents with access to fuel.

The proposed Mushroom farm filling station will serve more than one filling area and is in line with Councils policy. The nearest service stations are situated approximately 2km north-west and 2km south-east of the development site. Considering that filling stations form an essential part of a residential area and the continued development of the Kyalami area, there is definitely a need for another service station in the vicinity of to the proposed development site.

A Feasibility study conducted considered the impact of the proposed development on existing competitor stations. The study site will not likely cause a significant loss of fuel sales at existing filling stations. A traffic count was conducted on 24 February 2015 and was used to calculate the average monthly fuel sales for a modern, benchmark filling station. The study site will likely sell $\pm 650'000$ litres of fuel per month upon maturity.

10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED
(CONSIDER WHEN THE ACITIVTY IS EXPECTED TO BE CONCLUDED)

20 years plus

11. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) (must include post construction monitoring requirements and when these will be concluded.)

If the EAP answers "Yes" to Point 7 above then an EMP is to be attached to this report as an Appendix

EMPr attached

YES
X

SECTION F: APPENDIXES

The following appendixes must be attached as appropriate (this list is inclusive, but not exhaustive):

It is required that if more than one item is enclosed that a table of contents is included in the appendix

Appendix A: Site plan(s) – *(must include a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers)*

Appendix B: Photographs

Appendix C: Facility illustration(s)/Conceptual Layout

Appendix D: Public participation information

Appendix E: Specialist reports

Appendix F: Correspondence with government departments

Appendix G: EMP

Appendix H: Bokamoso Profile

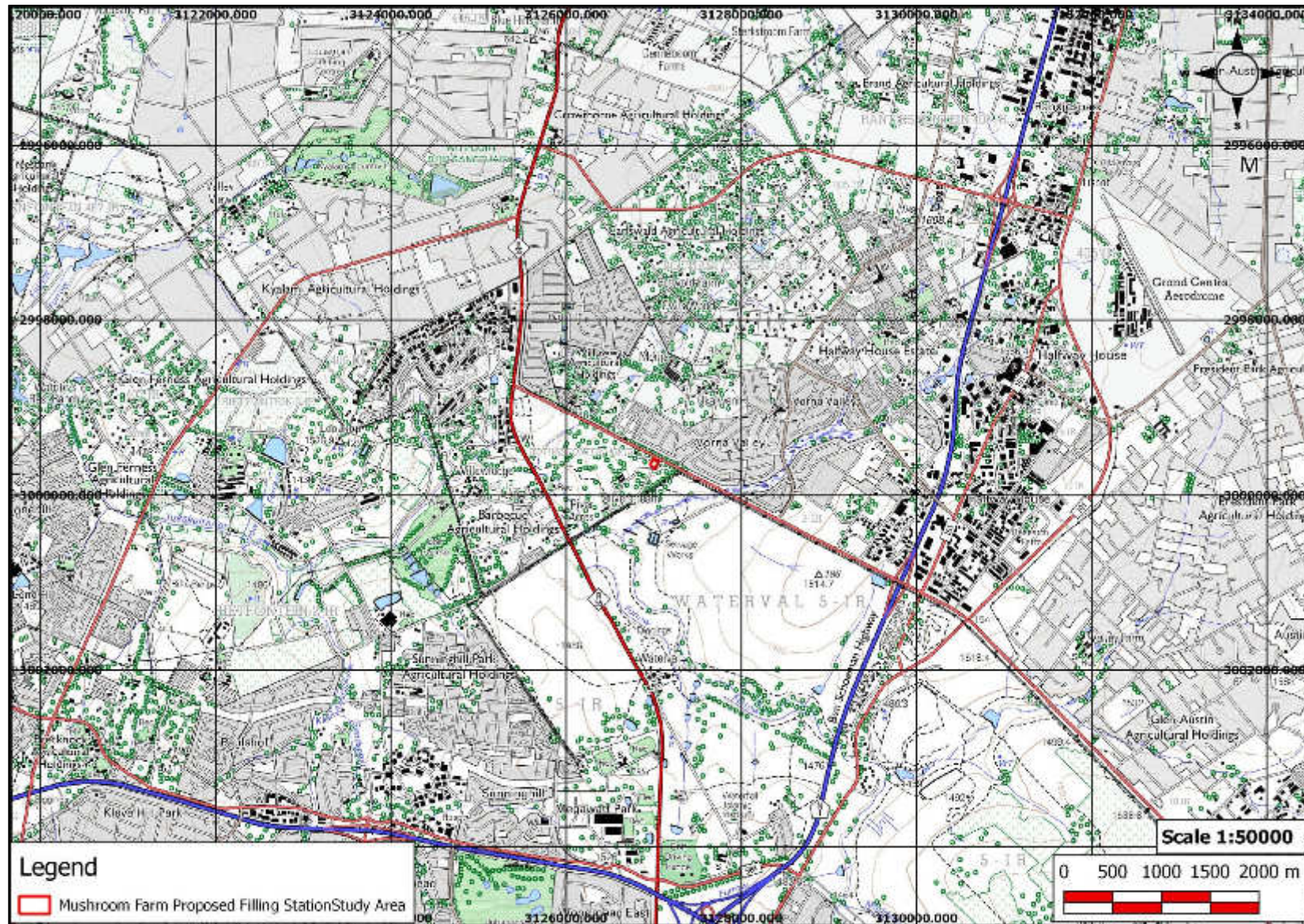
CHECKLIST

To ensure that all information that the Department needs to be able to process this application, please check that:

- Where requested, supporting documentation has been attached;
- All relevant sections of the form have been completed.

ANNEXURE A:
SITE PLANS/MAPS

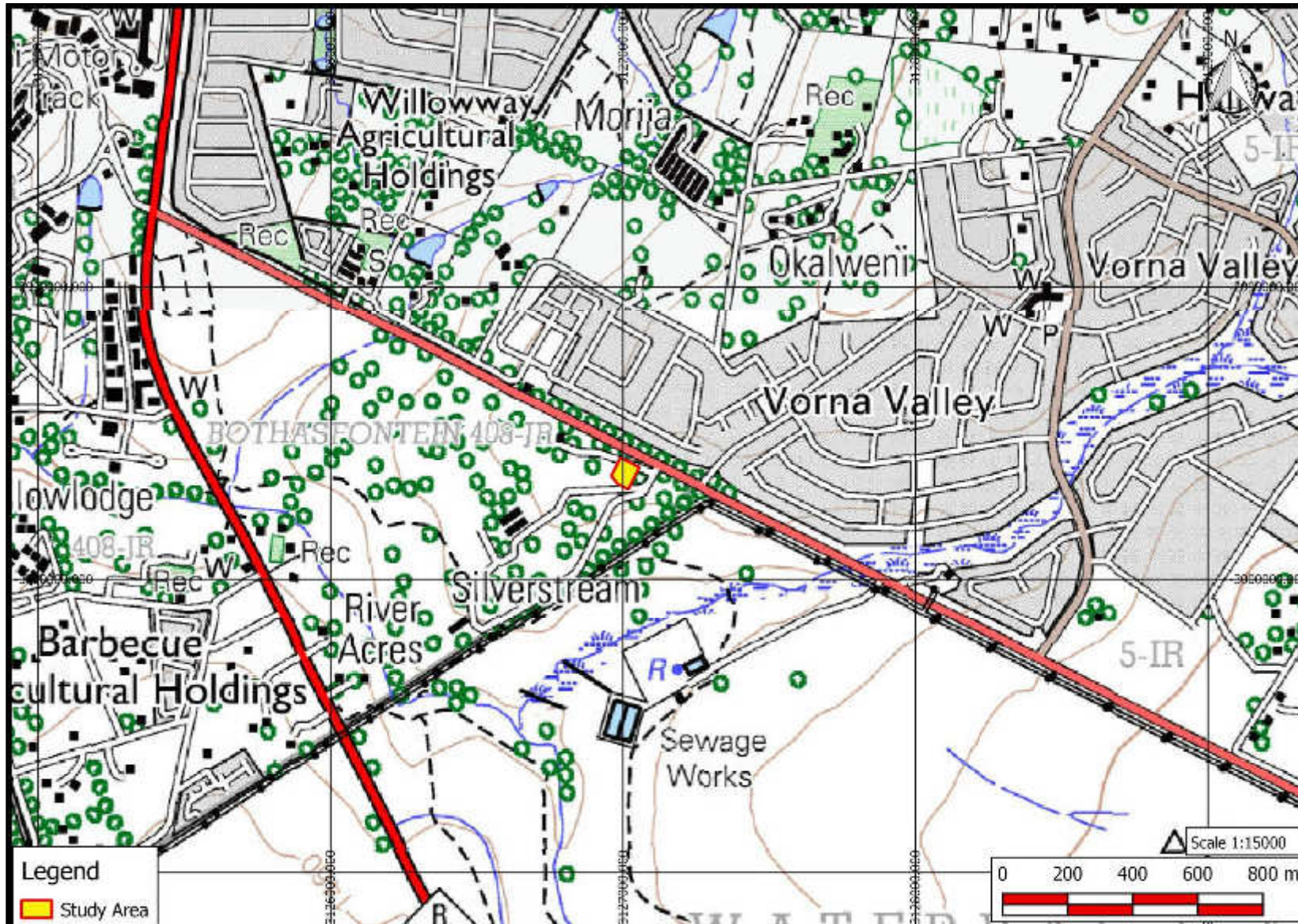
Mushroom Farm Proposed Filling Station Locality Map



Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

Mushroom Farm Filling Station

Locality Map

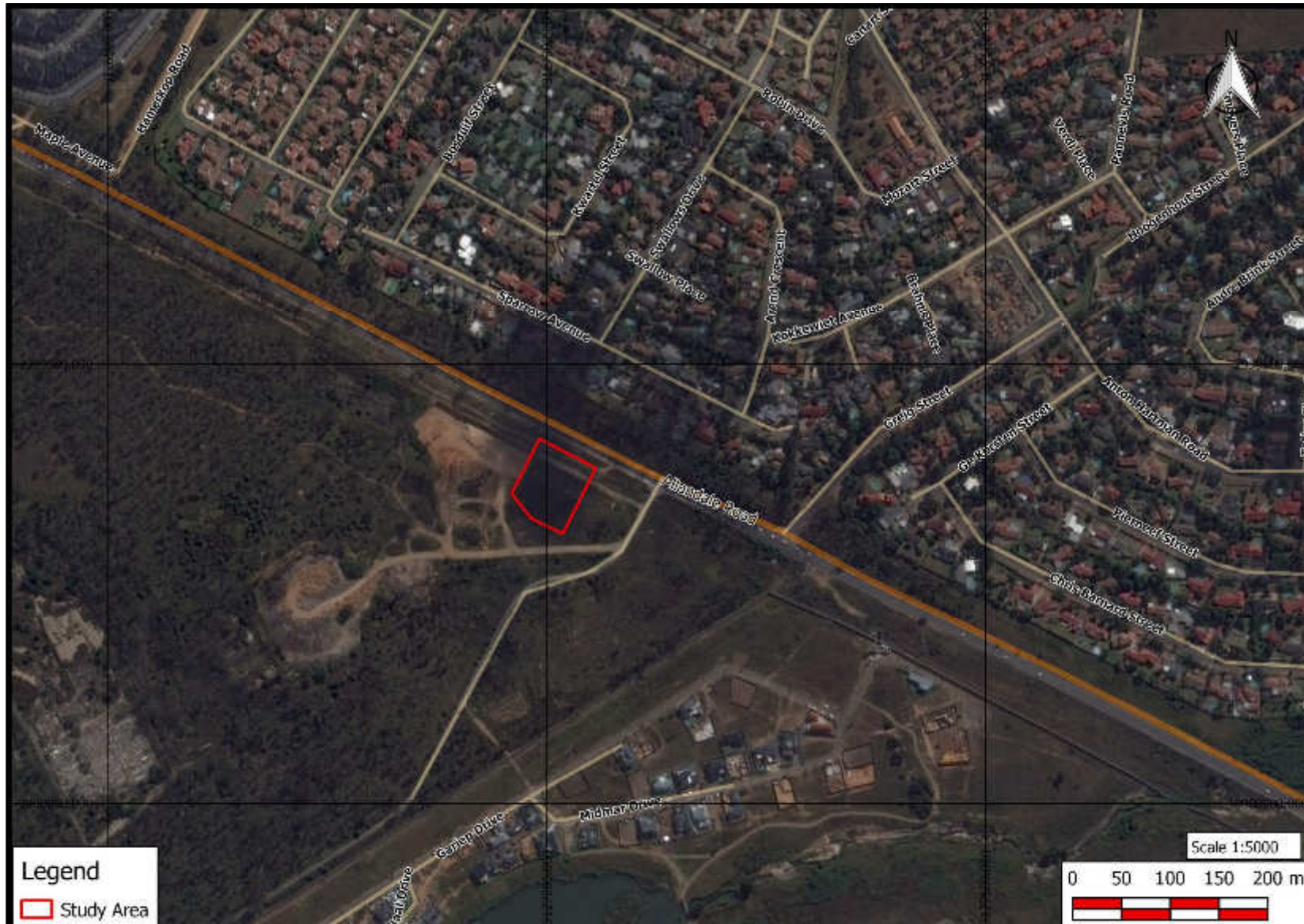


Legend
[Yellow Square] Study Area

Projection - Transverse Mercator
Datum - Hartebeeshoek 1994
Reference Ellipsoid - WGS 1984
Central Meridian - 29

Mushroom Farm Filling Station

Locality Map



Legend
[Red Rectangle] Study Area

Projection - Transverse Mercator
Datum - Hartbeeshoek 1994
Reference Ellipsoid - WGS 1984
Central Meridian - 29

Bokamoso Environmental Consultants
Website: www.bokamoso.biz
E-Mail: Lizelleg@bokamweb.co.za

Mushroom Farm Proposed Filling Station



Aerial Street Map



Projection – Transverse Mercator
Datum- Hartbeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

Bokamoso Environmental Consultants
Website: www.bokamoso.biz
E-Mail: Lizelleg@bokamweb.co.za

Project Name

Type of Map



Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

Bokamoso Environmental Consultants
Website: www.bokamoso.biz
E-Mail: Lizelleg@bokamweb.co.za

Mushroom Farm Proposed Filling Station Soils Map

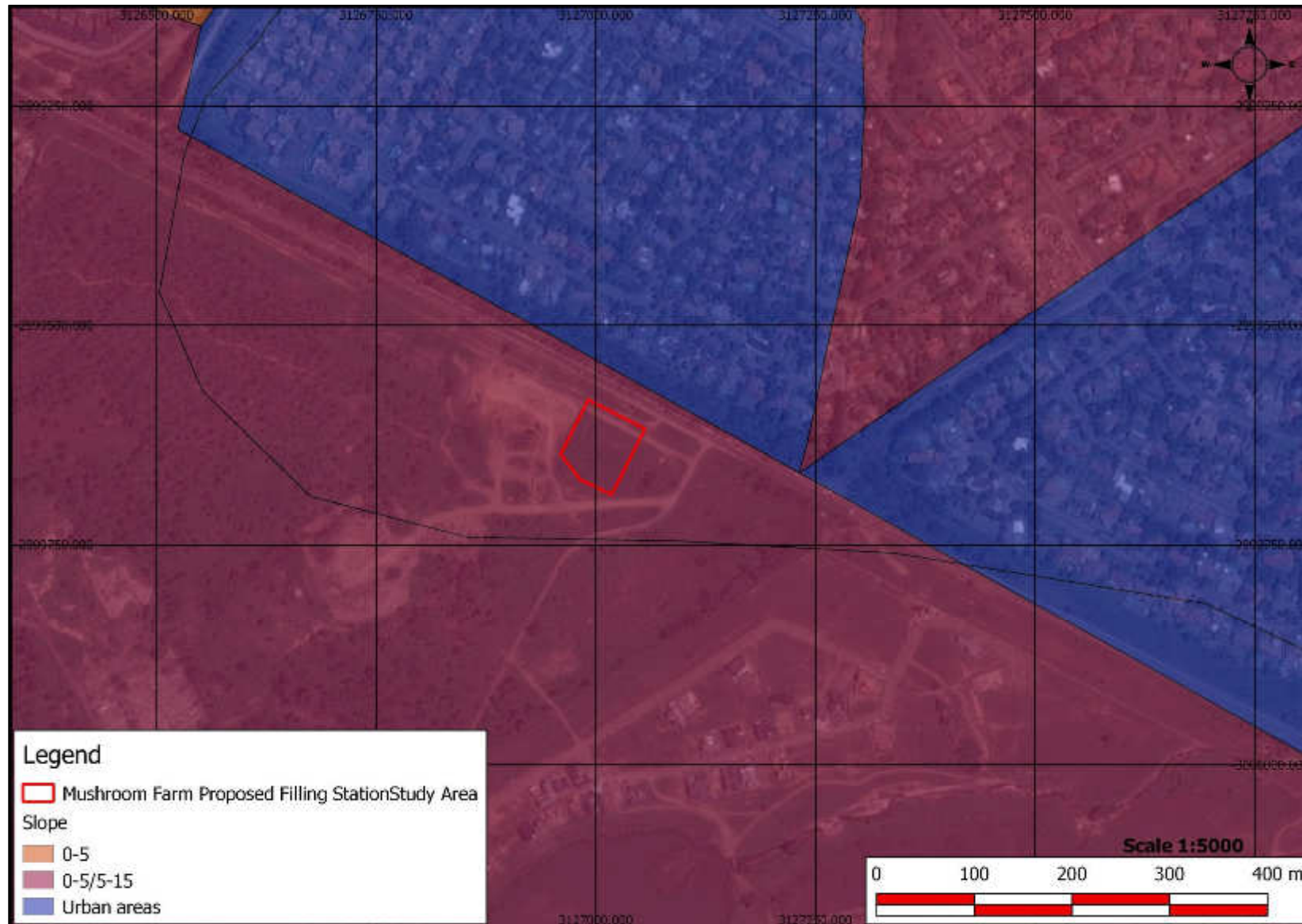


Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

Bokamoso Environmental Consultants
Website: www.bokamoso.biz
E-Mail: Lizelleg@bokamweb.co.za

Project Name

Type of Map



Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

Bokamoso Environmental Consultants
Website: www.bokamoso.biz
E-Mail: Lizelleg@bokamweb.co.za

Mushroom Farm Proposed Filling Station

Urban Edge Map



Legend
[Red Outline] Mushroom Farm Proposed Filling Station Study Area
[Yellow Outline] Urban Edge

Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

Mushroom Farm Proposed Filling Station

C plan Irreplaceable



Legend

- Mushroom Farm Proposed Filling Station Study Area
- C Plan- Irreplaceable
- RL plant hab, OL plant hab, Prim veg

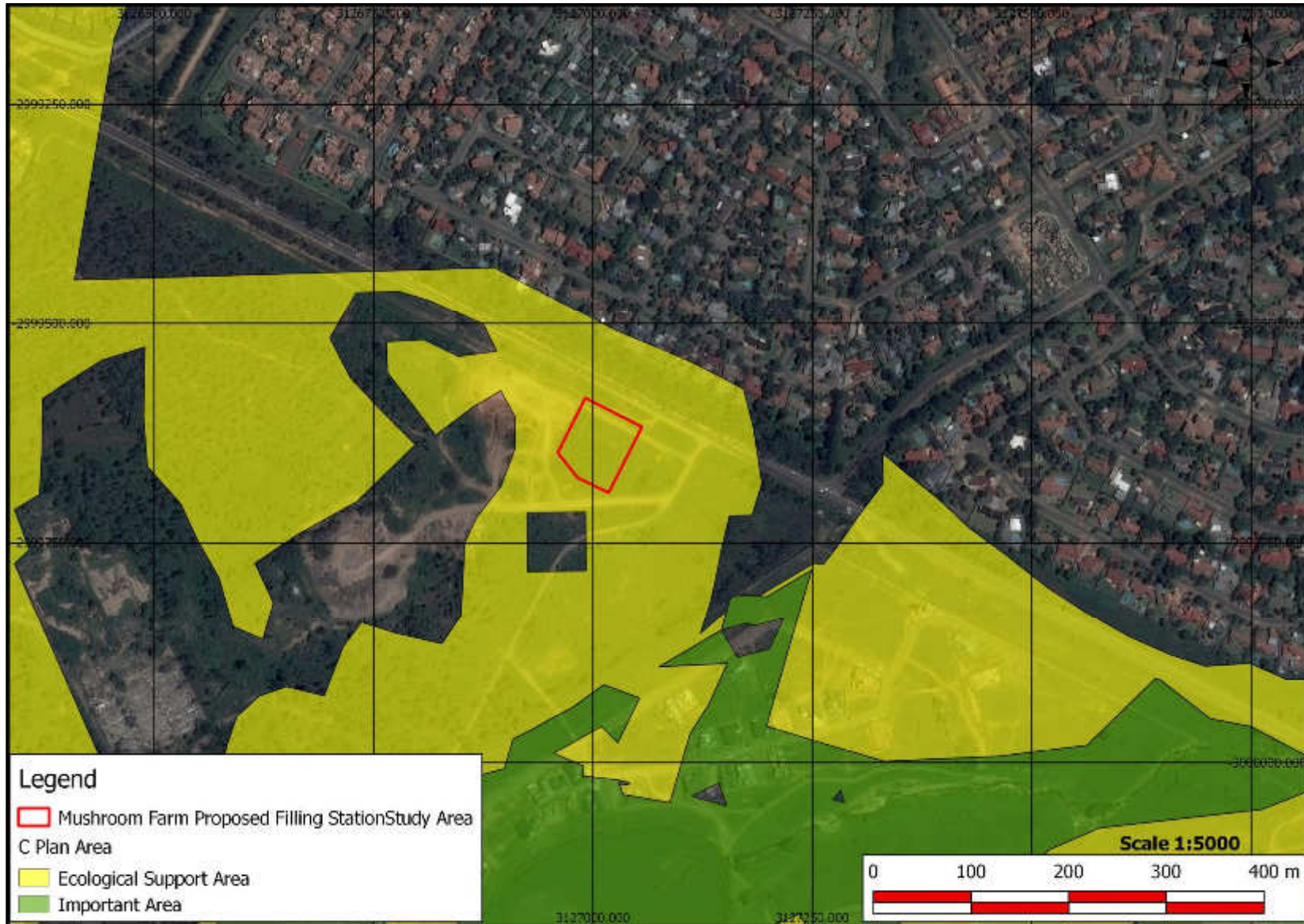


Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

Bokamoso Environmental Consultants
Website: www.bokamoso.biz
E-Mail: Lizelleg@bokamweb.co.za

Mushroom Farm Proposed Filling Station

C Plan Area

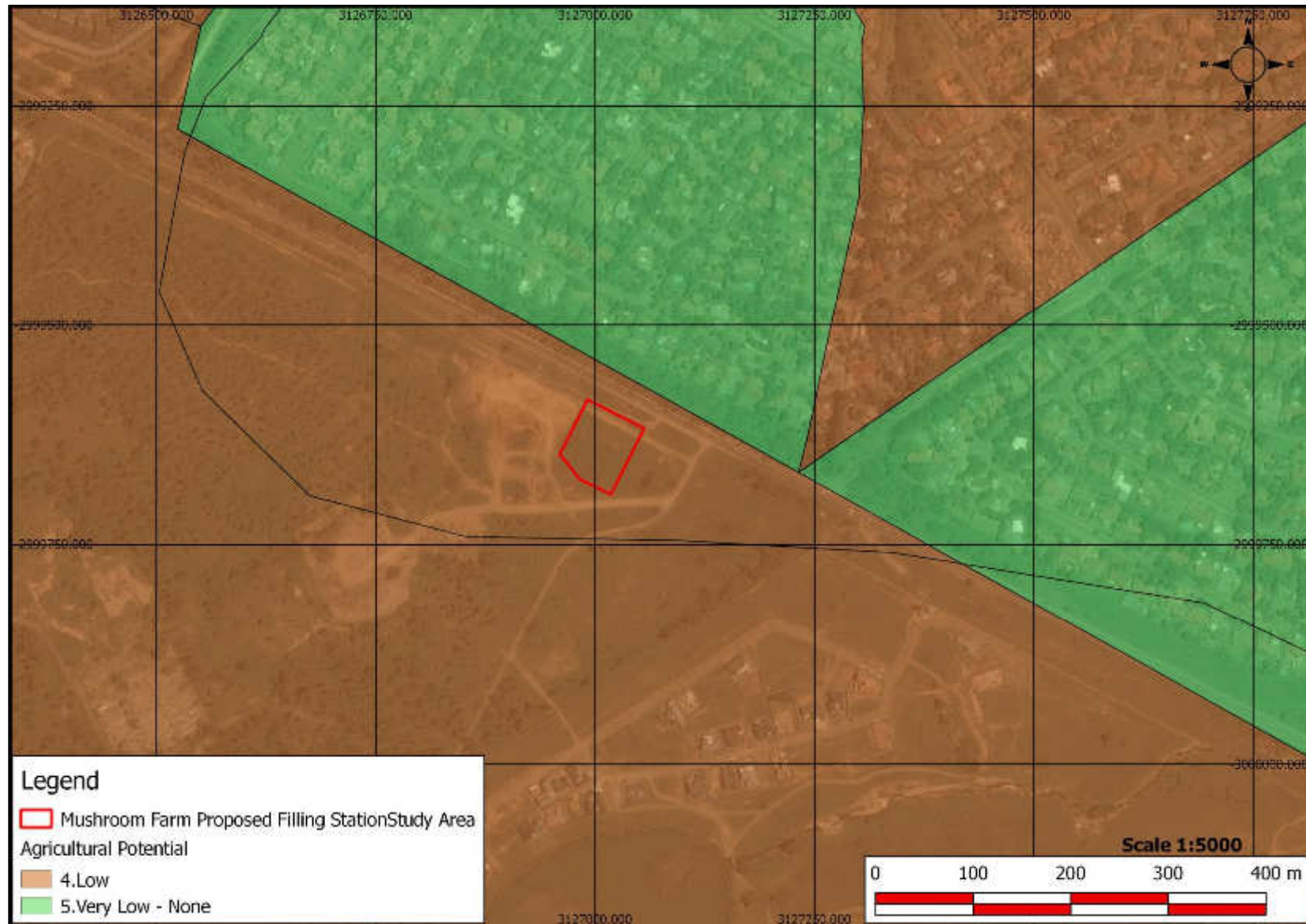


Projection – Transverse Mercator
Datum- Hartebeeshoek 1994
Reference Ellipsoid –WGS 1984
Central Meridian -29

Bokamoso Environmental Consultants
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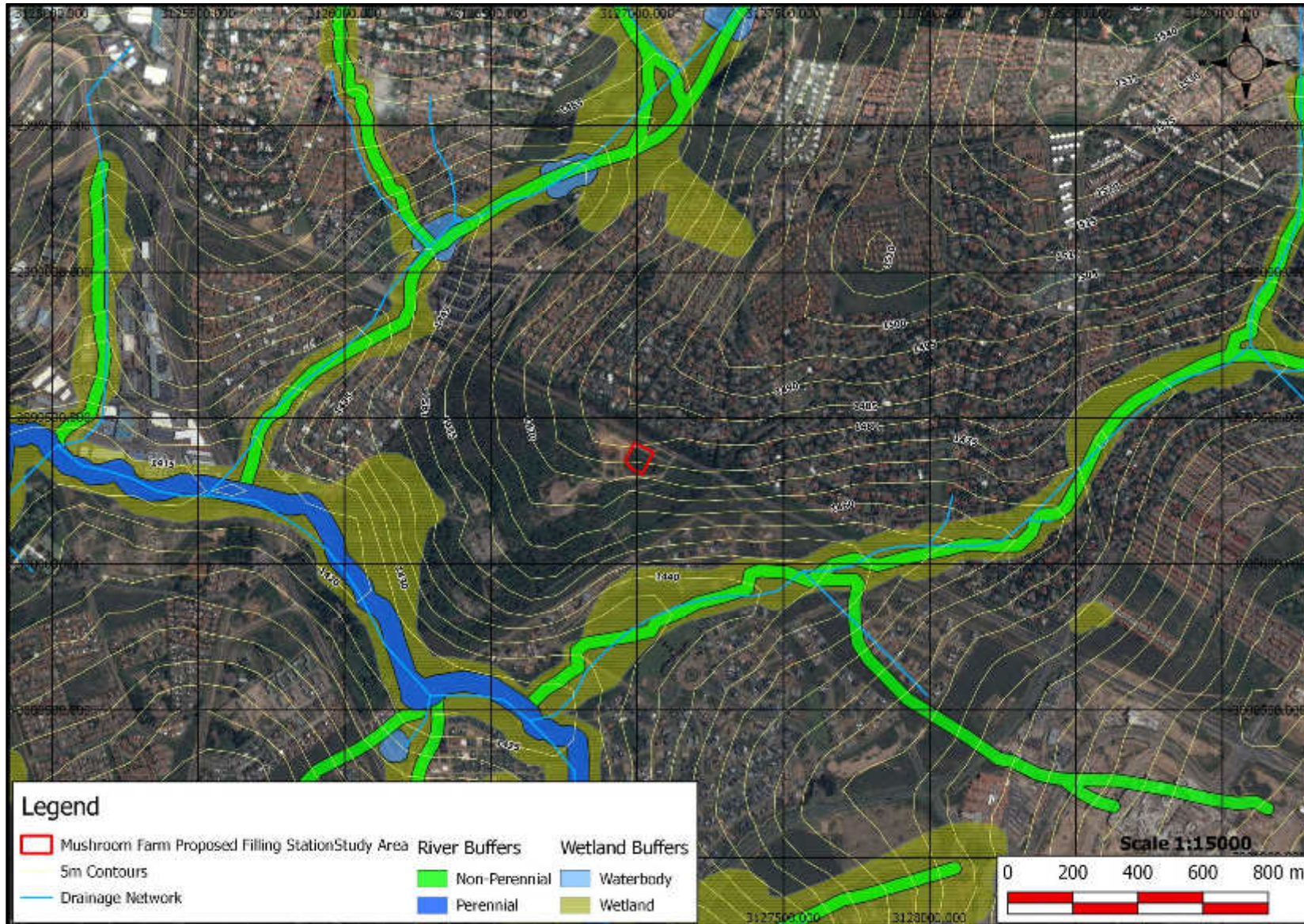
Mushroom Farm Proposed Filling Station

Agricultural Potential



Projection - Transverse Mercator
Datum - Hartebeeshoek 1994
Reference Ellipsoid - WGS 1984
Central Meridian - 29

Mushroom Farm Proposed Filling Station Hydrology



ANNEXURE B:
PHOTOGRAPHS



ANNEXURE C:

DESIGN DRAWING

REV	DATE	BY	DESCRIPTION
A	2015-04-10	ND	ISSUED FOR INFORMATION
		DA	LS
		CHK	APD



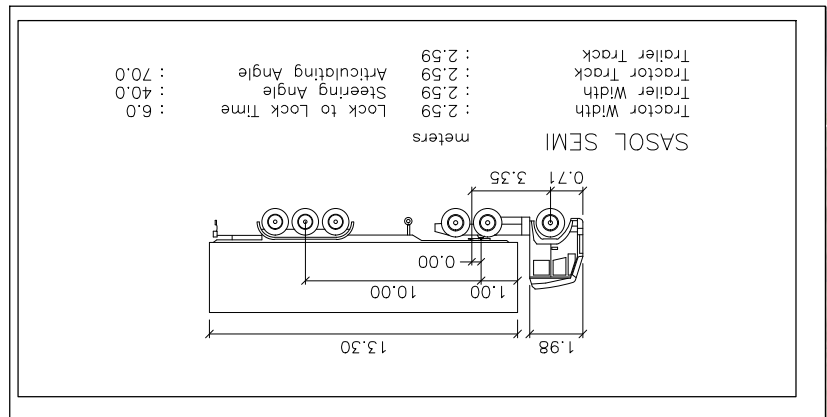
PRELIMINARY
DRAWING STATUS: If drawing status = construction, a signed copy of this drawing (either in hardcopy or electronic format) is available at the office of origin and at the office of issue.



WSP Group Africa (Pty) Ltd
Civil and Coastal Division
314 Glenwood Road, Lynwood Park, Pretoria, 0081
Postal Suite 287, Private Bag X025, Lynwood Ridge, 0040
Tel: +27(0)12-762-1200 Fax: +27(0)12-762-1301 www.wspgroup.co.za

PROJECT: MUSHROOM FARM FILLING STATION
TITLE: PROPOSED SITE AND ACCESS LAYOUT (PRELIMINARY EIA LAYOUT)

SCALE @ A3:	1:1000	CHECKED:	DR ACKERMAN	APPROVED:	J. GROBLER
DESIGN:	DR ACKERMAN	DRAWN:	ND MOKANSI	DATE:	2015/04/10
PROJECT No.:	17260	DRAWING No.:	SKC002	REV:	A



ANNEXURE D:
PUBLIC PARTICIPATION
INFORMATION

**ANNEXURE D1:
PROOF OF SITE NOTICE**

NOTICE OF BASIC ASSESSMENT PROCESS

Notice is given of an application for a **Basic Assessment Process** that was submitted to the Gauteng Department of Agriculture and Rural Development, in terms of Regulation No. R982 published in the Government Notice No. 38282 of 4 December 2014 of the National Environment Management Act, 1998 (Act No. 107 of 1998) governing **Basic Assessment Procedures (Listing Notice: 1 & 3 – Government Notice R983 & R985)** for the following activity:

Project Name: Mushroom Farm Filling Station

Property Description: Remaining Extent of Portion 2 of the Farm Bothasfontein 408 JR

Listing Activities Applied for:

GNR 983 (Listing Notice 1), 4 December 2014	Activity 9
GNR 983 (Listing Notice 1), 4 December 2014	Activity 10
GNR 983 (Listing Notice 1), 4 December 2014	Activity 14
GNR 983 (Listing Notice 1), 4 December 2014	Activity 27
GNR 985 (Listing Notice 3), 4 December 2014	Activity 10
GNR 985 (Listing Notice 3), 4 December 2014	Activity 12

Proponent Name: Century Property Developments (Pty) Ltd

Location: The study site is located south-west of Vorna Valley and south of Allandale Road. The site is abutted by other developments such as the Waterfall Country Lifestyle Village located east of the site, and Kyalami Glen Estate on the R55/Woodmead Drive, which is situated west of the site.

Date of Notice: 27 May 2015 – 26 June 2015

Queries regarding this matter should be referred to:

Bokamoso Landscape Architects and Environmental Consultants CC

Public Participation registration and Enquiries: **Juanita De Beer**

Project Enquiries: **Anè Agenbacht**

P.O. Box 11375

Maroelana 0161

www.bokamoso.biz

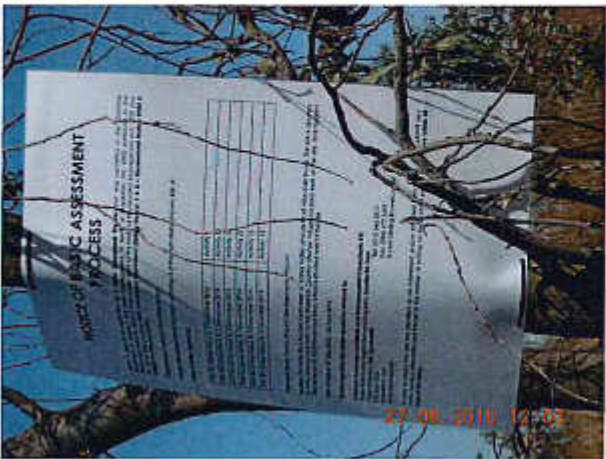
Tel: (012) 346 3810

Fax: (086) 570 5659

E-mail: lizelleg@mweb.co.za

In order to ensure that you are identified as an Interested and/or Affected Party (I&AP) please submit your name, contact information and interest in the matter, in writing, to the contact person given above **within 30 days of this Notice**.





ANNEXURE D2:
WRITTEN NOTICES ISSUED AS
REQUIRED IN TERMS OF THE
REGULATION

Mushroom Farm Filling Station Draft Basic Assessment Report for Review

All interested and affected parties are invited to review the development information and to register any issues and concerns to be included and addressed in the Final BA Report.

Venue: Halfway House Public Library

Address: 563 Old Pretoria Rd, Midrand

Tel: 011 805 3547

Date: 29 July 2015 – 31 August 2015

Also available on our Website:

www.bokamoso.biz

Please do not hesitate to contact us if there are any questions in connection with the abovementioned development.

Contact person: **Juanita De Beer**

Tel: 012 346 3810 Fax: 086 570 5659

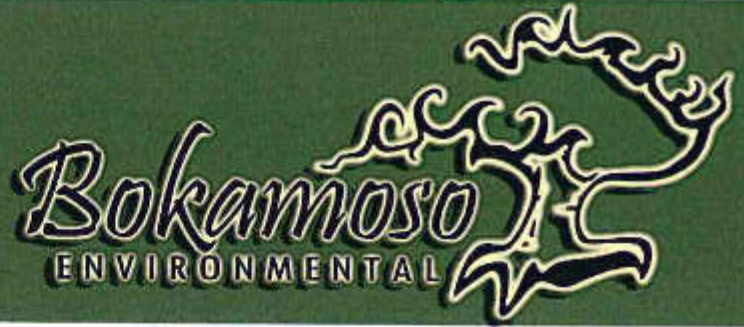
E-mail: lizelle@mweb.co.za



LEBOMBO GARDEN BUILDING
36 LEBOMBO ROAD
ASHLEA GARDENS
0081

P.O. BOX 11375
MAROELANA
0181

Tel: (012) 346 3810
Fax: 086 570 5659
E-mail: lizelleg@mwweb.co.za
Website: www.bokamoso.biz



Dear Landowner/Tenant

27 May 2015

You are hereby informed that Bokamoso Environmental Consultants were appointed (as EAP) by Century Property Developments (Pty) Ltd to conduct the Basic Assessment Process in terms of the amended 2014 NEMA EIA Regulations for the proposed Mushroom Farm Filling Station on Remaining Extent of Portion 2 of the Farm Bothasfontein 408 JR.

The proposed Land-uses for the study area are as follows:

Proposed Mushroom Farm Filling Station

In terms of Regulation No. R982 published in the Government Notice No. 38282 of 4 December 2014 of the National Environment Management Act, 1998 (Act No. 107 of 1998) governing Basic Assessment Procedures (Notice 1 & 3 – Governing Notice R983 & R985) of the 2014 amended NEMA Regulations, the EAP must inform all landowners and tenants within 100m from the study area of the proposed development.

Bokamoso already supplied you (landowner/tenant) of the property within 100m with notification letter and request that you supply the contact details of any tenants or other interested and affected parties that reside or work on the property to Bokamoso. Bokamoso will then also supply these parties with the necessary notification letters.

Alternatively, you are also welcome to distribute copies of your notification to these parties. We will however require proof that you supplied the notices to the tenants, landowners, workers etc. Another option is to act as representative on behalf of these parties.

Please confirm (via email/fax) that you received the landowners/tenant notification and this letter. Also indicate in this confirmation letter whether you have tenants on your property and you're preferred method of tenant/worker notification.

Regards

.....
Lizelle Gregory/Juanita De Beer

LEBOMBO GARDEN BUILDING
36 LEBOMBO ROAD
ASHLEA GARDENS
0081

P.O. BOX 11375
MAROELANA
0181

Tel: (012) 346 3810
Fax: 086 570 5659
E-mail: lizelleg@mweb.co.za
Website: www.bokamoso.biz



Background Information Document for a BASIC ASSESSMENT PROCESS

For the proposed **Mushroom Farm Filling Station** on **part of the Remaining Extent of Portion 2 of the Farm Bothasfontein 408 JR**, Kyalami Gardens, City of Johannesburg, Gauteng Province.

July 2015

PROJECT BACKGROUND

Notice is given, in terms of the Amended 2014 EIA Regulations published in Government Notice No. R983 and R985 of the National Environmental Management Act (Act No. 107 of 1998) on 4 December 2014, of intent to carry out a **Basic Assessment Process (i.i.o. Listing Notice 1 Activity 9, 10, 14, and 27 – Government Notice 983, and Listing Notice 3 Activity 10 and 12 – Government Notice 985)**.

Century Property Developments (Pty) Ltd appointed **Bokamoso Landscape Architects and Environmental Consultants CC** to undertake a **Basic Assessment Process** for the proposed development, **Mushroom Farm Filling Station**, Kyalami Gardens, City of Johannesburg.

THE PROPOSED PROJECT

The proposed project is for the construction of a filling station on the M39 (Allandale Road), to service Kyalami Gardens and surrounds. Infrastructure associated with the proposed development is addressed as part of this application.

REG NO: CK 2010/087490/23
VAT REG NO: 4080260872

BOKAMOSO LANDSCAPE ARCHITECTS AND ENVIRONMENTAL CONSULTANTS CC TRADING AS BOKAMOSO ENVIRONMENTAL

MEMBER: Lizelle Gregory

THE PROPOSED SITE

Remaining Extent of Portion 2 of the Farm Bothasfontein 408 JR, Kyalami Gardens, City of Johannesburg, Gauteng Province.

LOCATION

The proposed development is located on the M39 (Allandale Road) south-west of Vorna Valley in Kyalami Gardens, approximately 3.5km west-south-west from Midrand. The R55 (Woodmead Drive) runs past the proposed site to the west. The Jukskei River flows from South to North on the western perimeter of the site.

LEGAL ASPECT OF PROJECT

In terms of Regulation No. R983 and R985 published in the Government Notice No. 38282 of 4 December 2014 of the National Environment Management Act (Act No. 107 of 1998) a specific list of activities was identified which could have a detrimental impact on the receiving environment. These listed activities require Environmental Authorization from the Competent Authority, i.e. the Gauteng Province, Gauteng Department of Agriculture and Rural Development (GDARD).

The application was submitted for the following activities in terms of the Government Listing Notice 1 (R983), 4 December 2014:

Indicate the number and date of the relevant notice: Activity No (s) (in terms of the relevant notice) : Describe each listed activity as per project description:

GN R983 (Listing Notice 1), 4 December 2014	9	The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve; or (b) where such development will occur within an urban area.
GN R983 (Listing Notice 1), 4	10	The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste

Indicate the number and date of the relevant notice:

Activity No (s) (in terms of the relevant notice) :

Describe each listed activity as per project descriptionⁱ:

December 2014		water, return water, industrial discharge or slimes (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve; or (b) where such development will occur within an urban area.
GN R983 (Listing Notice 1), 4 December 2014	14	The development of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous goods, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.
GN R983 (Listing Notice 1), 4 December 2014	27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.

The application was submitted for the following activities in terms of the Government Listing Notice 3 (R985), 4 December 2014:

Indicate the number and date of the relevant notice:

Activity No (s) (in terms of the relevant notice) :

Describe each listed activity as per project descriptionⁱⁱ:

GN R985 (Listing Notice 3), 4 December 2014	10	The development of facilities or infrastructure for the storage, or storage and handling of dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic meters. (c) In Gauteng: i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. National Protected Area Expansion Strategy Focus Areas; iii. Gauteng Protected Area Expansion Priority Areas; iv. Sites identified as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans; v. Sites identified within threatened ecosystems listed in terms of the National Environmental Management Act;
---	----	---

Indicate the number and date of the relevant notice:

Activity No (s) (in terms of the relevant notice) :

Describe each listed activity as per project descriptionⁱⁱ:

		<p>Biodiversity Act (Act No. 10 of 2004);</p> <p>vi. Sensitive areas identified in an environmental management framework adopted by relevant environmental authority;</p> <p>vii. Sites identified as high potential agricultural land in terms of Gauteng Agricultural Potential Atlas;</p> <p>viii. Sites or areas identified in terms of an International Convention</p> <p>ix. Sites managed as protected areas by provincial authorities, or declared as nature reserves in terms of the Nature Conservation Ordinance (Ordinance 12 of 1983) or the National Environmental Management Protected Areas Act (Act No. 57 of 2003);</p> <p>x. Sites designated as nature reserves within municipal SDFs; or</p> <p>xi. Sites zoned for conservation or public open space or equivalent zoning.</p>
<p>GN R985 (Listing Notice 3), 4 December 2014</p>	<p>12</p>	<p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>(a) In Eastern Cape, Free State, Gauteng, Limpopo, North West and Western Cape provinces:</p> <ol style="list-style-type: none"> i. Within critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans; iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on even in urban areas; or <p>On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space. Conservation or had an equivalent zoning</p>

Accordingly, the proposed project requires authorisation from GDARD via the Basic Assessment process outlined in Regulation 982 published in the Government Notice No. 38282 of 4 December 2014 of NEMA.

After GDARD have issued the decision, Interested and Affected Parties (I&APs) will be notified of the decision and of the opportunity to appeal to the MEC of GDARD.

THE PUBLIC PARTICIPATION PROCESS

A Public Participation Process will be conducted in terms of Chapter 6 in Regulation 983, published in the Government Gazette No. 38282 of 4 December 2014, of the National Environmental Management Act, 1998 (Act No 107 of 1998). The Public Participation Guideline in the Integrated Environmental Management Guideline Series (Guideline 7) is also used, as published in Government Gazette No. 35769 on 10 October 2012.

1. Site notices will be erected at prominent points on and around the study area.
2. Flyers will be distributed to the neighboring properties and estates/developments that may be affected by the proposed development.
3. Registered mail will be send to all surrounding land owners within a 100m radius of the study area.
4. Notices regarding the project will be e-mailed or faxed to the councilors in the area and possible stakeholders (including authorities, Department of Energy Gauteng, Gauteng Department of Roads and Transport, Gauteng Department of Water Affairs, Johannesburg Water, etc.) in the area.
5. An advertisement will be placed in a local newspaper.

THE ENVIRONMENT

Topography

The proposed development site topography is level with no gradient, and occurs 1480 meters above mean sea level.

Vegetation

The proposed development falls within an urban area, within the Egoli Grassland Vegetation Unit. The site is mainly covered with exotic Eucalyptus trees.

Wetlands

A wetland occurs approximately 330 meters south from the proposed development site.

Soil conditions

The site comprise of two soil formations; shallow to fairly deep loose silty sand granite and quartz gravel colluvium underlain by a weather residual granite, and shallow weathered granite overlays un-weathered hard granite rock on the banks of the Jukskei River.

ISSUES AND CONCERNS RAISED BY THE PUBLIC

Possible concerns to be addressed:

- Geology and soils;
- Traffic;
- Servitudes;
- Hazardous substance storage;
- Noise;
- Dust;
- Waste generation;
- Safety;
- Socio-economic issues;
- Cultural heritage;
- Hydrology and storm water management;
- Wetlands; and
- Ecological surroundings.

PURPOSE OF THIS DOCUMENT

The purpose of this document is to provide information regarding the proposed **Mushroom Farm Filling Station** and to provide possible Interested and Affected Parties (I&APs) and Stakeholders with an opportunity to register and to add their comments and issues to our final reports that will be submitted to the Gauteng Department of Agriculture and Rural Development (GDARD).

In order to ensure that you are identified as an Interested and/or Affected Party (I&AP) please submit your name, contact information and concerns regarding the proposed development by means of one of the following methods: E-mail, Post, or hand delivery.

Please refer queries regarding the proposed development to:

Bokamoso Landscape Architects and Environmental Consultants CC.

Project Consultant: **Pirate Ncube**

Public Participation: **Juanita De Beer**

P.O. Box 11375

Tel: (012) 346 3810

Figure 1: Locality Map

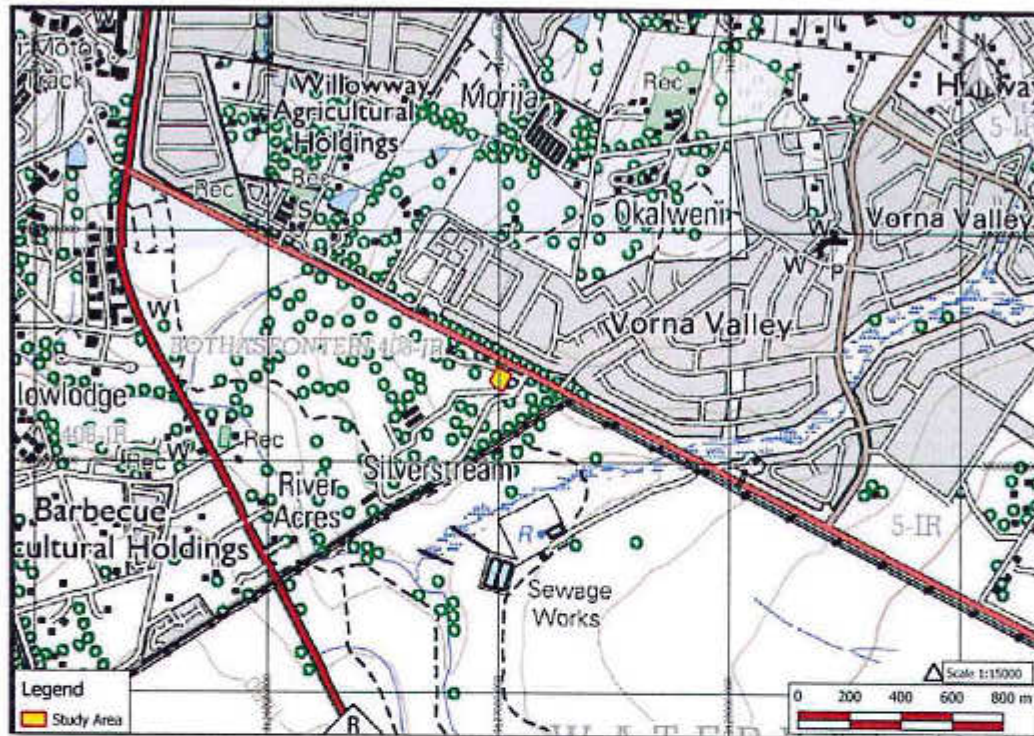







Figure 2: Aerial Map



Mushroom Farm Filling Station Landowner Notification

Acknowledgement of Receipt of land owner notification concerning the proposed Mushroom Farm Filling
Station project.

	Name	Address	Contact Details	Signature
1	SHANE	CNR MAEN 3 RD 70104	Email: ADMIN@SHANE BBQ.CC.ZA Fax: Tel: 011057 3191	
2	CAREL	HWY AIRPORT KENNAM	Email: Fax: 011 465 3111 Tel: 011 465 3411	
3	JAN	CNR BUKLER + LE ROUX PDS	Email: Fax: Tel: 011 315 9701	
4	DAZO	10 HAPPY GARDEN 57th ST.	Email: Fax: Tel: 0118057504	
5			Email: Fax: Tel:	
6			Email: Fax: Tel:	
7			Email: Fax: Tel:	
8			Email: Fax: Tel:	
9			Email: Fax: Tel:	
10			Email: Fax: Tel:	
11			Email: Fax: Tel:	
12			Email: Fax: Tel:	
13			Email: Fax: Tel:	
14			Email: Fax: Tel:	
15			Email: Fax: Tel:	

**ANNEXURE D3:
PROOF OF NEWSPAPER
ADVERTISEMENT**

Legals & Tenders

Inheritances
NOTICE OF EXECUTION OF WILL
 WHEREAS the late **LEONARD THOMPSON** died on the 19th day of May, 2013, and his will has been admitted to probate by the Court of Common Pleas for the County of York, Ontario, as follows: **LEONARD THOMPSON** WILL
 I hereby certify that I am the executor named in the above will and I hereby give notice that I will apply to the Court of Common Pleas for the County of York, Ontario, for the appointment of the executor named in the above will.
 L. THOMPSON
 1218 Bay Street, Toronto, Ontario
 M5G 1A7
 Tel: 416-593-1111

THE SECOND MORTGAGE OF MORTGAGE
 Notice is hereby given that the second mortgage of mortgage registered in the name of **LEONARD THOMPSON** in the name of **LEONARD THOMPSON** is hereby assigned to **LEONARD THOMPSON**.
 L. THOMPSON
 1218 Bay Street, Toronto, Ontario
 M5G 1A7
 Tel: 416-593-1111

Lost Dead
NOTICE OF INTENTION TO CANCEL A WILL
 WHEREAS the late **LEONARD THOMPSON** died on the 19th day of May, 2013, and his will has been admitted to probate by the Court of Common Pleas for the County of York, Ontario, as follows: **LEONARD THOMPSON** WILL
 I hereby certify that I am the executor named in the above will and I hereby give notice that I will apply to the Court of Common Pleas for the County of York, Ontario, for the appointment of the executor named in the above will.
 L. THOMPSON
 1218 Bay Street, Toronto, Ontario
 M5G 1A7
 Tel: 416-593-1111

Public Notices
NOTICE OF CANTON JUDICIAL DISTRICT
 NOTICE OF CANTON JUDICIAL DISTRICT: The Court of Common Pleas for the County of York, Ontario, has appointed **JUDITH A. BROWN** as the Clerk of the Court for the County of York, Ontario, as follows: **JUDITH A. BROWN**
 1218 Bay Street, Toronto, Ontario
 M5G 1A7
 Tel: 416-593-1111

NOTICE OF CANTON JUDICIAL DISTRICT
 NOTICE OF CANTON JUDICIAL DISTRICT: The Court of Common Pleas for the County of York, Ontario, has appointed **JUDITH A. BROWN** as the Clerk of the Court for the County of York, Ontario, as follows: **JUDITH A. BROWN**
 1218 Bay Street, Toronto, Ontario
 M5G 1A7
 Tel: 416-593-1111

Miscellaneous
NOTICE OF CANTON JUDICIAL DISTRICT
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 M5G 1A7
 Tel: 416-593-1111

Safe in Execution
NOTICE OF CANTON JUDICIAL DISTRICT
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 1218 Bay Street, Toronto, Ontario
 M5G 1A7
 Tel: 416-593-1111

Safe in Execution
NOTICE OF CANTON JUDICIAL DISTRICT
 NOTICE OF CANTON JUDICIAL DISTRICT: The Court of Common Pleas for the County of York, Ontario, has appointed **JUDITH A. BROWN** as the Clerk of the Court for the County of York, Ontario, as follows: **JUDITH A. BROWN**
 1218 Bay Street, Toronto, Ontario
 M5G 1A7
 Tel: 416-593-1111

Sale of Business
NOTICE OF CANTON JUDICIAL DISTRICT
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 M5G 1A7
 Tel: 416-593-1111

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 1218 Bay Street, Toronto, Ontario
 M5G 1A7
 Tel: 416-593-1111

Sale of Business
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Sale of Business
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 1218 Bay Street, Toronto, Ontario
 M5G 1A7
 Tel: 416-593-1111

Town Planning
NOTICE OF CANTON JUDICIAL DISTRICT
 NOTICE OF CANTON JUDICIAL DISTRICT: The Court of Common Pleas for the County of York, Ontario, has appointed **JUDITH A. BROWN** as the Clerk of the Court for the County of York, Ontario, as follows: **JUDITH A. BROWN**
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 Tel: 416-593-1111

NOTICE OF CANTON JUDICIAL DISTRICT
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Town Planning
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 Tel: 416-593-1111

NOTICE OF CANTON JUDICIAL DISTRICT
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 1218 Bay Street, Toronto, Ontario
 M5G 1A7
 Tel: 416-593-1111

Liquor Act
NOTICE OF CANTON JUDICIAL DISTRICT
 NOTICE OF CANTON JUDICIAL DISTRICT: The Court of Common Pleas for the County of York, Ontario, has appointed **JUDITH A. BROWN** as the Clerk of the Court for the County of York, Ontario, as follows: **JUDITH A. BROWN**
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 M5G 1A7
 Tel: 416-593-1111

NOTICE OF CANTON JUDICIAL DISTRICT
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Liquor Act
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 1218 Bay Street, Toronto, Ontario
 M5G 1A7
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ANNEXURE D4:
COMMUNICATION TO AND FROM
INTERESTED AND AFFECTED
PARTIES

Juanita

From: Juanita <user3@bokamoso.net>
Sent: 30 July 2015 09:06 AM
To: jgrobler@geoscience.org.za; asalomon@sahra.org.za;
maphata.ramphele@gauteng.gov.za; keetm@dwaf.gov.za; 'SiwelaneL@dws.gov.za';
tshifaror@dwa.gov.za; MathebeT@dwa.gov.za; 'central@eskom.co.za';
'paia@eskom.co.za'; 'schmidk@nra.co.za'; kumen.govender@gauteng.gov.za;
mmpshe@randwater.co.za; nkoneigh@randwater.co.za; Noziphom@joburg.org.za;
loveous.tampane@transnet.net; CLCC@ruraldevelopment.gov.za;
'annette@deppe.co.za'; kmogale@citypower.co.za; 'Nmahlo@jra.org.za';
'Juanita.Kuhn@jwater.co.za'; zanel.chauke@energy.gov.za;
'lister.mbowane@energy.gov.za'; 'Avishkar.nandkishore@energy.gov.za';
kallie@erasmuslaw.com; bravoeco@icloud.com; sjsmining@mweb.co.za;
'kat@adtrp.co.za'; 'praxis@mweb.co.za'
Subject: Mushroom Farm Filling Station - Review Invitation Notice
Attachments: Review Notice.pdf

Dear Interested and/or Affected Party Member,

Please refer to the attached Review Invitation Notice regarding the proposed *Mushroom Farm Filling Station* Project.

The Draft Basic Assessment Report will be available from today, 29 July 2015 – 31 August 2015 at the Halfway House Public Library or on our website: www.bokamoso.biz

Kind Regards/Vriendelike Groete

Juanita De Beer

Public Participation Consultant



**Landscape Architects &
Environmental Consultants**

T: (+27)12 346 3810 | F: (+27) 86 570 5659 | E: lizellen@mweb.co.za | www.bokamoso.biz
36 Lebombo Street, Ashlea Gardens, Pretoria | P.O. Box 11375 Maroelana 0161



Final Comment

In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999)

Attention: Century Property Developments (Pty) Ltd
P.O. Box 70406
Bryanston, 2021

Remaining Extent of Portion 2 of the Farm Bothasfontein 408 JR

Century Property Developments (Pty) Ltd proposes to the proposed Mushroom Farm Filling Station. It will be located on remaining extent of Portion 2 of the farm Bothasfontein 408 JR, City of Johannesburg Metropolitan Municipality, Gauteng Province.

In terms of the National Heritage Resources Act (NHRA), no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that before such sites are disturbed by development it is incumbent on the developer (or mine) to ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.

The surface of the land is significantly disturbed and the area is located on palaeontologically insignificant geology.

SAHRA Notification of Development comment

SAHRA Archaeology, Paleontology and Meteorites Unit will exempt this development from conducting any heritage studies on condition that the following conditions are adhered to:

If any evidence of archaeological sites or remains (e.g., remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments and charcoal/ash concentrations), fossils or other categories of heritage resources are found during the proposed activities, SAHRA APM Unit (Nokukhanya Khumalo/Colette Scheermeyer 021 462 4502), and unmarked human burials contact the SAHRA BGG Unit (Mimi Seetelo 012 320 8490), must be alerted immediately, and a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance a Phase 2 rescue operation might be necessary.

Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Yours faithfully



Mushroom Farm Filling Station

Our Ref: 7798

Enquiries: Nokukhanya Khumalo
Tel: 021 462 4502
Email: nkhumalo@sahra.org.za
CaseID: 7798

Date: Wednesday June 24, 2015

Page No: 2



an agency of the
Department of Arts and Culture

Nokukhanya Khumalo
Heritage Officer
South African Heritage Resources Agency

ADMIN:

Direct URL to case: <http://www.sahra.org.za/node/273447>

Terms & Conditions:

1. This approval does not exonerate the applicant from obtaining local authority approval or any other necessary approval for proposed work.
2. If any heritage resources, including graves or human remains, are encountered they must be reported to SAHRA immediately.
3. SAHRA reserves the right to request additional information as required.



The South African Heritage Resources Agency

Street Address: 111 Harrington Street, Cape Town 8000 * Postal Address: PO Box 4637, Cape Town 8000
* Tel: +27 21 462 4502 * Fax: +27 21 462 4509 * Web: <http://www.sahra.org.za>

Juanita

From: Juanita <user3@bokamoso.net>
Sent: 08 July 2015 02:05 PM
To: jgrobler@geoscience.org.za; asalomon@sahra.org.za;
maphata.ramphele@gauteng.gov.za; keetm@dwaf.gov.za; siwelanel@dwa.gov.za;
tshifaror@dwa.gov.za; MathebeT@dwa.gov.za; 'central@eskom.co.za';
'paia@eskom.co.za'; 'schmidk@nra.co.za'; kumen.govender@gauteng.gov.za;
mmpshe@randwater.co.za; 'nkoneigh@randwater.co.za'; Noziphom@joburg.org.za;
loveous.tampane@transnet.net; CLCC@ruraldevelopment.gov.za;
'annette@deppe.co.za'; kmogale@citypower.co.za; 'Nmahlo@jra.org.za';
'Juanita.Kuhn@jwater.co.za'; zanel.chauke@energy.gov.za;
'lister.mbowane@energy.gov.za'; 'Avishkar.nandkishore@energy.gov.za';
kallie@erasmuslaw.com; bravoeco@icloud.com; sjsmining@mweb.co.za;
'kat@adtrp.co.za'; 'praxis@mweb.co.za'
Subject: Mushroom Farm Filling Station - BID
Attachments: BID Mushroom Filling Station.pdf

Dear Interested and/or Affected Party Member,

Please refer to the attached Background Information Document (BID) regarding the proposed *Mushroom Farm Filling Station* Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Public Participation Consultant



**Landscape Architects &
Environmental Consultants**

T: (+27)12 346 3810 | F: (+27) 86 570 5659 | E: lizelle@nweb.co.za | www.bokamoso.biz
36 Lebombo Street, Ashlea Gardens, Pretoria | P.O. Box 11375 Marbelana 0181

Juanita

From: Bokamoso <lizelle@mweb.co.za>
Sent: 10 June 2015 12:48 PM
To: user3@bokamoso.net
Cc: user1@bokamoso.net
Subject: FW: Mushroom Farm Filling Station - Public Participation Process

From: Siwelane Lilian (PTA) [mailto:SiwelaneL@dws.gov.za]
Sent: 10 June 2015 12:39 PM
To: Bokamoso
Subject: RE: Mushroom Farm Filling Station - Public Participation Process

Good day

The proposed project is noted, please send to the Department a copy of the basic assessment report/ EIA once it is ready.

Regards

Lillian

From: Bokamoso [mailto:lizelle@mweb.co.za]
Sent: 28 May 2015 08:32 AM
To: jgrobler@geoscience.org.za; asalomon@sahra.org.za; maphata.ramphele@gauteng.gov.za; Keet Marius (GAU); Siwelane Lilian (PTA); Tshifaro Rabelani; Mathebe Tshepo (GAU); central@eskom.co.za; paia@eskom.co.za; schmidk@nra.co.za; kumen.govender@gauteng.gov.za; mmpshe@randwater.co.za; nkoneigh@randwater.co.za; RudzaniM@TSHWANE.GOV.za; loveous.tampane@transnet.net; CLCC@ruraldevelopment.gov.za; annette@deppe.co.za; kallie@erasmuslaw.com
Subject: Mushroom Farm Filling Station - Public Participation Process

Dear Interested and/or Affected Party Member,

Please refer to the attached Public Notice regarding the proposed *Mushroom Farm Filling Station* Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Public Participation Consultant



**Landscape Architects &
Environmental Consultants**

T: (+27)12 346 3810 | F: (+27) 85 570 5659 | E: lizelle@mweb.co.za | www.bokamoso.biz

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Juanita

From: Bokamoso <lizelle@mweb.co.za>
Sent: 29 June 2015 10:27 AM
To: user3@bokamoso.net
Cc: user1@bokamoso.net
Subject: FW: Mushroom Farm Petrol Filling Station
Attachments: PRAXIS - Registration - 500 - 25 June 2015 - Mushroom Farm.pdf

Importance: High

Flag Status: Flagged

From: Danie Neumann [mailto:praxis@mweb.co.za]
Sent: 27 June 2015 03:11 PM
To: 'Bokamoso'
Cc: 'SAPRA - Henriette Coetzee'
Subject: Mushroom Farm Petrol Filling Station
Importance: High

Dear Lizelle

Kindly confirm the registration as Interested / Affected Parties on this application dated 25 June 2015 as per e-mail below.

Warm regards

Danie Neumann
MSc, Med. Sci., Pr. Sci. Nat.
MANAGING DIRECTOR
PRAXIS – Theory Enacted (Pty) Ltd
P O Box 212
WIERDA PARK
0149
Cell: 072 643 4361
E-Mail: praxis@mweb.co.za



From: Danie Neumann [mailto:praxis@mweb.co.za]
Sent: 25 June 2015 06:23 PM
To: 'Bokamoso'

Cc: praxis@mweb.co.za; SAPRA - Henriette Coetzee
Subject: Mushroom Farm Petrol Filling Station
Importance: High

Dear Lizelle

Attached please find a letter with the request to register as Interested / Affected Party on this project.

Kindly advise us on the reference number of the application.

Warm regards

Danie Neumann

MSc, Med. Sci., Pr. Sci. Nat.

MANAGING DIRECTOR

PRAXIS – Theory Enacted (Pty) Ltd

P O Box 212

WIERDA PARK

0149

Cell: 072 643 4361

E-Mail: praxis@mweb.co.za

The logo for Praxis, featuring the word "PRAXIS" in a large, blue, serif font. The text is centered within a white rectangular box, which is itself set against a dark purple background. The entire logo is enclosed in a thin, dark purple border.

PRAXIS

Theory Enacted

Our Ref: PRAXIS/Registration/500/2015
25 June 2015

THE MANAGER
BOKAMOSO Environmental Consultants
P O Box 11375
MAROELANA
0161

Attention: Lizelle Gregory
Via e-mail: lizelleg@mweb.co.za

REGISTRATION AS INTERESTED / AFFECTED PARTY
on the Mushroom Farm Filling Station
(Remaining Extent of Portion 2 of the farm Bothasfontein 408 JR)
Reference number unknown

Dear Lizelle

PRAXIS – Theory Enacted (Pty) Ltd hereby register as Interested / Affected Party on the above-mentioned development on behalf of the South African Petroleum Retailers' Association (SAPRA) and some of their affected members.

Please contact me should you have any enquiries relating to this registration.

Warm regards



Danie Neumann (MSc)
MANAGING DIRECTOR
PRAXIS – Theory Enacted (Pty) Ltd
P O Box 212
WIERDA PARK
0149
Cell: 074 092 3602
E-Mail: praxis@mweb.co.za

Juanita

From: Bokamoso <lizelle@mweb.co.za>
Sent: 29 June 2015 10:13 AM
To: user3@bokamoso.net
Cc: user1@bokamoso.net
Subject: FW: Mushroom Farms Filling Station
Attachments: 7926_Mushroom Farm FS_Registration letter.pdf

From: Katlego Makhura [mailto:kat@adtrp.co.za]
Sent: 29 June 2015 09:57 AM
To: lizelle@mweb.co.za
Subject: Mushroom Farms Filling Station

Greetings

Please find attached our letter to register as I&AP to the EIA for the proposed Mushroom Farms Filling Station on Remaining Extent of Portion 2 of the Farm Bothasfontein 408 JR, Gauteng.

Best Regards;

Katlego Makhura
Technical Town Planner
E mail: kat@adtrp.co.za
Andre Du Toit Town Planners
Tel: 014 576 2293 / 087 802 2738
Fax: 086 671 6588

ANDRE DU TOIT

TOWN AND REGIONAL PLANNERS Property Development Consultants

Fax/Tel: (014) 576 – 2293
Fax: 086 – 671 – 6588
Cell No.: 083-659-4037
E-mail: andre@adtrp.co.za

P.O. Box 1125
Rant en Dal
1751

Our Ref.: -7926

Date: - Monday, 29 June 2015

Bokamoso Landscape Architects and Environmental Consultants
P.O. Box 11375
Maroelana
0161

Attention: - Juanita De Beer

Tel: 012 346 3810
Fax: 086 570 5659
Email: lizelleg@mweb.co.za

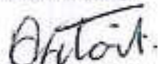
REGISTRING AS INTERESTED AND AFFECTED PARTY TO THE ENVIRONMENTAL IMPACT ASSESMENT NOTIFICATION PLACED IN STAR NEWSPAPER ON THE 29 MAY 2015.

**Property Description: - Remaining Extent of Portion 2 of the Farm Bothasfontein 408JR,
Gauteng**

EIA Process – Registration as interested and affected party

1. We register as an interested and affected party to the subject EIA process on behalf of our clients Engen Allandale, Engen Barbeque Downs, Engen Midway Mews, Engen Waterfall, Engen Woodlands Convenient Centre and Engen Woodmead Convenient Centre.
2. We hereby request for the Background Information Document (BID) as a matter of urgency.
3. Kindly advise us once the Draft Basic Assessment Report is available for perusal and comment. Once received we will be in a position to elaborate and comment in the interim in this respect.
4. We reserve our client's right to address your firm or the relevant department on the detail relating to the representations and to further comment and elaborate pertaining to our reasons for registering as I&AP.
5. We await your reply confirming our registration as I&AP's in this regard.
6. It is imperative that you acknowledge receipt of this document in the space provided. Fax the same to 086 671 6588

REGARDS



ANDRE DU TOIT

Pr Pln 835/1995

Assisted by

Katlego Makhura

C17672/2014

Acknowledge Receipt: -

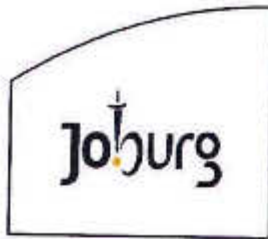
Signature: _____

Name & Surname: _____

Date: _____

A.S. Du Toit PR Pln. A/835/1995 B.Art.et.Sc, Planning /Beplanning PU for CHE /CHO, MSAPI
CPP – Commercial Property Practitioner – UP/SAPOA

Assisted by- Henco Harmse, Katlego Makhura, Amanda Herbst, Loraine Dick, & Associates



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City of Johannesburg

Environment, Infrastructure & Services Department

118 Jorissen Street
Traduna House
Braamfontein

PO Box 1049
Johannesburg
South Africa
2000

Tel +27(0) 11 587 4201
Fax +27(0) 11 587 4244

www.joburg.org.za

UNIT: IMPACT MANAGEMENT & COMPLIANCE

Our Reference: EIM-02/08/2015

Contact: Etienne Allers

CoJ Region: A

Tel: (011) 587 4230

Fax: 0866277516

Date: 13 August 2015

Bokamosa
P.O. BOX 11375
Maroelana
0161

Attention: Anè Agenbacht

DRAFT BASIC ASSESSMENT FOR THE PROPOSED CONSTRUCTION OF THE MUSHROOM FARM FILLING STATION ON THE REMAINING EXTENT OF PORTION 2 OF THE FARM BOTHASFONTEIN 408-JR (PROPOSED KYALAMI GARDENS EXT.27)

(GAUT: 002/14-15/0280)

Your report dated 28 July 2015 refers.

Description of the project:

The applicant proposes to construct a new filling station with associated infrastructure consisting of the following:

- Erection of a suspended forecourt.
- Pumps
- Four islands
- Five underground tanks
- Convenience shop and restaurant of $\pm 200\text{m}^2$.
- Place of refreshment
- Oil separator
- Installation of water and sewage services.

Guidelines, by-laws, Precinct Plans and policies:

The Report takes into account all relevant policies, by-laws and strategies. The development is in line with the RSDP 2010/11 for Region A, Sub Area 6, which states that the objective of the sub-area is to retain and enhance existing investment within the Kyalami Specialist Node and to retain and enhance the urban neighbourhood and character of the Sub Area.

Description of alternatives:

The submitted DBAR has identified alternatives for executing the proposal.

Description and assessment of the identified environmental issues:

A Landscape Ecological Study; Geotechnical Report; Faunal Assessment; Wetland Assessment, Feasibility Impact Study and Cultural Heritage Impact Assessment Report was done and included in the Draft BAR. These studies were included in the EIA for the proposed Kyalami Gardens Ext.27 of which Environmental Authorisation was granted on 2 June 2011 and 6 June 2013.

Evaluation and presentation of mitigation measures:

Mitigation measures are proposed for each identified environmental impact. The proposed mitigation measures are included in an Environmental Management Plan contained in Appendix H.

Public participation:

Public participation is in the process of taking place. A list of I&AP's and their comments should be incorporated into the Final BAR.

Recommendations:

1. The design of storm water management systems should be based on Sustainable Urban Drainage Systems (SUDS) and Water Sensitive Urban Design approaches (WSUDS) which enhance natural drainage through permeable surfacing and which integrate landscaping with storm water in line with best practice storm water management. A Stormwater Management Plan is subject for approval by JRA prior to the Site Development Plan stage.

Management of stormwater will also need to be designed in such a manner as to prevent negative impacts such as erosion and sedimentation, and to ensure environmental protection of downstream areas. Such plan would be required to meet the following criteria/standards:

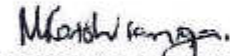
Peak discharge - no increase in discharge for any event of any duration up to the 25 year RI event.

Volume of runoff	- no increase up to the annual 10 year rainfall
Runoff frequency	- no surface runoff for the 1 yr RI event of any duration
Water Quality	- no deterioration

2. A groundwater management plan with relevant groundwater monitoring and reporting protocol must be established and calibrated annually.
3. Hydrological monitoring data should be evaluated bi-annually by a qualified Hydrogeologist
4. Monitoring boreholes must be drilled in order to monitor any possible diesel or petrol leaks from the underground tanks. A leak detector must be installed.
5. All landscaping in common areas and streetscaping should use indigenous plants only, with preference given to locally indigenous species where possible.

Should you have any queries please do not hesitate to contact Etienne Allers on the numbers indicated above.

Yours faithfully



MASHUDU RATSHITANGA
SUB HEAD: ENVIRONMENTAL IMPACT MANAGEMENT

Tel: (011) 587 4225

Fax: 0866277516

E-mail: mashudur@joburg.org.za

Juanita

From: Juanita <user3@bokamoso.net>
Sent: 28 May 2015 09:13 AM
To: 'Noziphom@joburg.org.za'
Subject: Mushroom Farm Filling Station - Public Participation Process
Attachments: Public Notice BA.pdf

Dear Interested and/or Affected Party Member,

Please refer to the attached Public Notice regarding the proposed *Mushroom Farm Filling Station* Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Public Participation Consultant



**Landscape Architects &
Environmental Consultants**

T: (+27)12 346 3810 | F: (+27) 86 570 5659 | E: lizell@qweb.co.za | www.bokamoso.biz
38 Lebombo Street, Ashlea Gardens, Pretoria | P.O. Box 11375 Marobela 0161

Juanita

From: Juanita <user3@bokamoso.net>
Sent: 01 June 2015 01:13 PM
To: 'Avishkar.nandkishore@energy.gov.za'
Subject: Mushroom Farm Filling Station - Public Participation Process
Attachments: Public Notice BA.pdf

Dear Interested and/or Affected Party Member,

Please refer to the attached Public Notice regarding the proposed *Mushroom Farm Filling Station* Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Public Participation Consultant



**Landscape Architects &
Environmental Consultants**

T: (+27)12 346 3810 | F: (+27) 86 570 5659 | E: lizelle@mwweb.co.za | www.bokamoso.biz
36 Lebombo Street, Ashlea Gardens, Pretoria | P.O. Box 11375 Maroelana 0161

Juanita

From: Juanita <user3@bokamoso.net>
Sent: 28 May 2015 08:32 AM
To: jgrobler@geoscience.org.za; asalomon@sahra.org.za;
maphata.ramphele@gauteng.gov.za; keetm@dwaf.gov.za; siwelanel@dwa.gov.za;
tshifaror@dwa.gov.za; MathebeT@dwa.gov.za; 'central@eskom.co.za';
'paia@eskom.co.za'; 'schmidk@nra.co.za'; kumen.govender@gauteng.gov.za;
mmpshe@randwater.co.za; 'nkoneigh@randwater.co.za';
RudzaniM@TSHWANE.GOV.za; loveous.tampane@transnet.net;
CLCC@ruraldevelopment.gov.za; annette@deppe.co.za; kallie@erasmuslaw.com
Subject: Mushroom Farm Filling Station - Public Participation Process
Attachments: Public Notice BA.pdf

Dear Interested and/or Affected Party Member,

Please refer to the attached Public Notice regarding the proposed *Mushroom Farm Filling Station* Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Public Participation Consultant



**Landscape Architects &
Environmental Consultants**

T: (+27)12 346 3810 | F: (+27) 86 570 5859 | E: ljzellea@imweb.co.za | www.bokamoso.biz
36 Lebombo Street, Ashlea Gardens, Pretoria | P.O. Box 11375 Marceliana 0161

Juanita

From: Juanita <user3@bokamoso.net>
Sent: 25 August 2015 08:11 AM
To: 'EtienneA@joburg.org.za'
Subject: RE: Kyalami Hills Ext 27 Filling station

Dear Etienne Allers,

Thank you for your response, we have noted your comments on our Issues and Comments Register for the proposed Mushroom Farm Filling Station Project.

Kind Regards/Vriendelike Groete

Juanita De Beer

Public Participation Consultant



**Landscape Architects &
Environmental Consultants**

T: (+27)12 346 3810 | F: (+27) 86 570 5659 | E: lizelleq@mweb.co.za | www.bokamoso.biz

From: EtienneA@joburg.org.za [<mailto:EtienneA@joburg.org.za>]
Sent: 21 August 2015 08:59 AM
To: lizelleq@mweb.co.za
Subject: Kyalami Hills Ext 27 Filling station



Good morning

Find attached my comments for the above-mentioned report.

Kind regards

Etienne Allers
Environmental Impact Management

The contents of this e-mail and any attachments are confidential. It is intended for the named recipient(s) only. If you have received this email in error please notify the system manager or the sender immediately and do not disclose the contents to any one or make copies.

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Juanita

From: Juanita <user3@bokamoso.net>
Sent: 28 May 2015 04:25 PM
To: 'sjsmining@mweb.co.za'
Subject: RE: Mushroom Farm Filling Station

Dear Brian Shaw,

Thank you for your response, we have registered you as an Interested and/or Affected Party Member for the proposed Mushroom Farm Filling Station Project.

We have noted your comments on our Issues and Comments Register.

We will keep you updated regarding the process in the future.

Kind Regards/Vriendelike Groete
Juanita De Beer
Public Participation Consultant

Landscape Architects &
Environmental Consultants

T: (+27)12 346 3810 | F: (+27) 86 570 5659 | E: lizelleg@mweb.co.za | www.bokamoso.biz
36 Lebombo Street, Ashlea Gardens, Pretoria | P.O. Box 11375 Maroelana 0161

-----Original Message-----

From: Brian Shaw [mailto:sjsmining@mweb.co.za]
Sent: 28 May 2015 02:19 PM
To: lizelleg@mweb.co.za
Cc: benny eichner
Subject: Mushroom Farm Filling Station

Good day,

As the owner of a Filling station in the Vorna Valley area I strongly object to the application for the development of another Filling Station in the Halfway Gardens/ Vorna Valley /Waterfall Estate and the greater Midrand Area.

With Waterfall Park 's intention to also develop 3-4 Filling Stations within the already over proliferated area will affect the sustainability of the current Filling Stations in the greater Midrand Metropolitan Area.

The principle that Filling Stations should not be within 3 km radius from one another will not be adhered to with the construction of another filling station in the area.

Yours Sincerely,

Brian Shaw

0825765370

Sent from my iPad

This email is free from viruses and malware because avast! Antivirus protection is active.
<http://www.avast.com>

Juanita

From: Juanita <user3@bokamoso.net>
Sent: 01 June 2015 08:37 AM
To: 'bravoeco@icloud.com'
Subject: RE: Mushroom Farm Filling Station

Dear Benny Eichner,

Thank you for your response, we have registered you as Interested and/or Affected Party Member for the proposed Mushroom Farm Filling Station Project.

We have noted your comments on our Issues and Comments Register.

We will keep you updated regarding the process in the future.

Kind Regards/Vriendelike Groete

Juanita De Beer

Public Participation Consultant



**Landscape Architects &
Environmental Consultants**

T: (+27)12 346 3810 | F: (+27) 86 570 5659 | E: ljzelleg@mweb.co.za | www.bokamoso.biz
36 Lebombo Street, Ashlea Gardens, Pretoria | P.O. Box 11375 Maroelana 0161

From: benny eichner [<mailto:bravoeco@icloud.com>]
Sent: 29 May 2015 12:38 PM
To: ljzelleg@mweb.co.za
Cc: Tandina Charters
Subject: Fwd: Mushroom Farm Filling Station

Subject: Mushroom Farm Filling Station

Good day,

As the owner of a Filling station in the Barbeque Downs area I strongly object to the application for the development of another Filling Station in the Halfway Gardens/ Vorna Valley /Waterfall Estate and the

greater Midrand Area.

With Waterfall Park 's intention to also develop 3-4 Filling Stations within the already over proliferated area will affect the sustainability of the current Filling Stations in the greater Midrand Metropolitan Area.

The principle that Filling Stations should not be within 3 km radius from one another will not be adhered to with the construction of another filling station in the area. The new proposed filling station is less than 1 Km away from our site.

Yours Sincerely,

Benny Eichner
082 444 9736
bravoeco@icloud.com

Juanita

From: Juanita <user3@bokamoso.net>
Sent: 28 May 2015 02:31 PM
To: 'bravoeco@icloud.com'
Subject: RE: Mushroom Farm filling station

Dear Benny Eichner,

Thank you for your response, we have registered you as Interested and/or Affected Party Member for the proposed **Mushroom Farm Filling** Station Project.

We will keep you updated regarding the process in the future.

Kind Regards/Vriendelike Groete

Juanita De Beer

Public Participation Consultant



**Landscape Architects &
Environmental Consultants**

T: (+27)12 346 3810 | F: (+27) 86 570 5559 | E: lizelleg@mweb.co.za | www.bokamoso.biz
36 Lebombo Street, Ashlea Gardens, Pretoria | P.O. Box 11375 Maroelana 0181

From: benny eichner [<mailto:bravoeco@icloud.com>]
Sent: 27 May 2015 03:56 PM
To: lizelleg@mweb.co.za
Cc: Tandina Charters
Subject: Mushroom Farm filling station

Dear Sir/Madam

Please register us as interested and affected party.

Name: Ben Eichner
Tel: 082 444 9736
Email: bravoeco@icloud.com
Interest: Owner of Engen BBQ downs Petrol station.

Please confirm receiving this email.

Kind regards

Benny Eichner
bravoeco@icloud.com

Juanita

From: Juanita <user3@bokamoso.net>
Sent: 29 June 2015 01:52 PM
To: 'praxis@mweb.co.za'
Subject: RE: Mushroom Farm Petrol Filling Station

Dear Danie Neumann,

Thank you for your response, we have registered PRAXIS – Theory Enacted (Pty) Ltd as Interested and/or Affected Party Member for the proposed Mushroom Farm Filling Station Project.

We have noted your comments on our Issues and Comments Register.

We will keep you updated regarding the process in the future.

Kind Regards/Vriendelike Groete

Juanita De Beer

Public Participation Consultant



**Landscape Architects &
Environmental Consultants**

T: (+27)12 346 3810 | F: (+27) 86 570 5859 | E: lizelle@mweb.co.za | www.bokamoso.biz
36 Lebombo Street, Ashlea Gardens, Pretoria | P.O. Box 11375 Maroelana 0161

From: Danie Neumann [<mailto:praxis@mweb.co.za>]
Sent: 27 June 2015 03:11 PM
To: 'Bokamoso'
Cc: 'SAPRA - Henriette Coetzee'
Subject: Mushroom Farm Petrol Filling Station
Importance: High

Dear Lizelle

Kindly confirm the registration as Interested / Affected Parties on this application dated 25 June 2015 as per e-mail below.

Warm regards

Danie Neumann
MSc, Med. Sci., Pr. Sci. Nat.
MANAGING DIRECTOR
PRAXIS – Theory Enacted (Pty) Ltd
P O Box 212
WIERDA PARK
0149
Cell: 072 643 4361
E-Mail: praxis@mweb.co.za



From: Danie Neumann [<mailto:praxis@mweb.co.za>]
Sent: 25 June 2015 06:23 PM
To: 'Bokamoso'
Cc: praxis@mweb.co.za; SAPRA - Henriette Coetzee
Subject: Mushroom Farm Petrol Filling Station
Importance: High

Dear Lizelle

Attached please find a letter with the request to register as Interested / Affected Party on this project.

Kindly advise us on the reference number of the application.

Warm regards

Danie Neumann
MSc, Med. Sci., Pr. Sci. Nat.
MANAGING DIRECTOR
PRAXIS – Theory Enacted (Pty) Ltd
P O Box 212
WIERDA PARK
0149
Cell: 072 643 4361
E-Mail: praxis@mweb.co.za

PRAXIS

Juanita

From: Juanita <user3@bokamoso.net>
Sent: 29 June 2015 01:48 PM
To: 'kat@adtrp.co.za'
Subject: RE: Mushroom Farms Filling Station

Dear Katlego Makhura,

Thank you for your response, we have registered you as Interested and/or Affected Party Member for the proposed Mushroom Farm Filling Station Project.

We have noted your comments on our Issues and Comments Register.

We will keep you updated regarding the process in the future.

Kind Regards/Vriendelike Groete

Juanita De Beer

Public Participation Consultant



**Landscape Architects &
Environmental Consultants**

T: (+27)12 346 3810 | F: (+27) 86 570 5659 | E: lizelleq@mweb.co.za | www.bokamoso.biz
36 Lebombo Street, Ashlea Gardens, Pretoria | P.O. Box 11376 Maroelana 0181

From: Katlego Makhura [<mailto:kat@adtrp.co.za>]
Sent: 29 June 2015 09:57 AM
To: lizelleq@mweb.co.za
Subject: Mushroom Farms Filling Station

Greetings

Please find attached our letter to register as I&AP to the EIA for the proposed Mushroom Farms Filling Station on Remaining Extent of Portion 2 of the Farm Bothasfontein 408 JR, Gauteng.

Best Regards;

Katlego Makhura
Technical Town Planner
E mail: kat@adtrp.co.za

Andre Du Toit Town Planners
Tel: 014 576 2293 / 087 802 2738
Fax: 086 671 6588

ANNEXURE D5:
MINUTES OF ANY PUBLIC AND
STAKEHOLDER MEETING

NA

ANNEXURE D6:
COMMENTS & RESPONSE REPORT

**COMMENT AND RESPONSE REPORT-
FOR THE PROPOSED MUSHROOM FARM FILLING STATION**

Issue	Commentator	Response
<p>Please register us as Interested and affected party.</p> <p>Name: Ben Eichner Tel: 082 444 9736 Email: bravoeco@icloud.com Interest: Owner of Engen BBQ downs Petrol Station.</p> <p>As the owner of a Filling station in the Barbeque Downs area I strongly object to the application for the development of another Filling Station in the Halfway Gardens/Vorna Valley/Waterfall Estate and the greater Midrand area.</p> <p>With Waterfall Park's intention to also develop 3-4 Filling Stations within the already over proliferated area will affect the sustainability of the current Filling Stations in the greater Midrand Metropolitan Area. The principle that Filling Stations should not be within 3km radius from one another will not be adhered to with the construction of another filling station in the area. The new proposed filling station is less than 1 km away from our site.</p>	<p>Benny Eichner bravoeco@icloud.com</p>	<p>Thank you for your response, we have registered you as Interested and/or Affected Party Member for the proposed Mushroom Farm Filling Station Project.</p> <p>We have noted your comments on our Issues and Comments Register.</p> <p>We will keep you updated regarding the process in the future.</p>
<p>As the owner of a Filling station in the Vorna Valley area I strongly object to the application for the development of another Filling Station in the Halfway Gardens/Vorna Valley/Waterfall Estate and the greater Midrand Area.</p> <p>With Waterfall Park's intention to also develop 3-4 Filling Stations within the already over proliferated area will affect the sustainability of the current Filling Stations in the greater Midrand Metropolitan Area.</p> <p>The principle that Filling Stations should not be within 3km</p>	<p>Brian Shaw sjsmining@mweb.co.za</p>	<p>Thank you for your response, we have registered you as Interested and/or Affected Party Member for the proposed Mushroom Farm Filling Station Project.</p> <p>We have noted your comments on our Issues and Comments Register.</p> <p>We will keep you updated regarding the process in the future.</p>

Issue	Commentator	Response
radius from one another will not be adhered to with the construction of another filling station in the area.		
The proposed project is noted, please send to the Department a copy of the basic assessment report/EIA once it is ready.	<p>Lillian Siwelane Department of Water and Sanitation Siwelanel@dws.gov.za</p>	<p>Noted.</p> <p>A copy of the Draft basic assessment will be submitted to Department of Water and Sanitation as well as registered I&APs as soon as it becomes available.</p>
<p>Century Property Developments (Pty) Ltd proposes to the proposed Mushroom Farm Filling Station. It will be located on remaining extent of Portion 2 of the farm Bothasfontein 408 JR, City of Johannesburg Metropolitan Municipality, Gauteng Province.</p> <p>In terms of the National Heritage Resources Act (NHRA), no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that before such sites are disturbed by development it is incumbent on the developer (or mine) to ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required. The surface of the land is significantly disturbed and the area is located on palaeontologically insignificant geology.</p> <p>SAHRA Notification of Development comment SAHRA Archaeology, Paleontology and Meteorites Unit will exempt this development from conducting any heritage studies</p>	<p>Nokukhanya Khumalo nkhumalo@sahra.org.za Sahra</p>	<p>Noted.</p> <p>A Phase 1 Heritage Survey was conducted by Strategic Environmental Focus.</p> <p>The study revealed that there were no heritage resources on the development footprint of the proposed development.</p> <p>The development can thus proceed, however if any resources are unearthed during construction, construction activities must cease until such time as a heritage specialist investigated the find.</p>

Issue	Commentator	Response
<p>on condition that the following conditions are adhered to: If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments and charcoal/ash concentrations), fossil or other categories of heritage resources are found during the proposed activities, SAHRA APM Unit (Nokukhanya Khumalo/Colette Scheermeyer 021 462 4502), and unmarked human burials contact the SAHRA BGG Unit (Mimi Seetelo 012 3208490), must be alerted immediately, and a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance a Phase 2 rescue operation might be necessary.</p>		
<p>Please find attached our letter to register as I&AP to the EIA for the proposed Mushroom Farm Filling Station on Remaining Extent of Portion 2 of the Farm Bothasfontein 408 JR, Gauteng.</p> <p>Letter</p> <ol style="list-style-type: none"> 1. We register as Interested and Affected Party to the subject EIA process on behalf of our clients Engen Allandale, Engen Barbeque Downs, Engen Midway Mews, Engen Waterfall, Engen Woodlands Convenient Centre and Engen Woodmead Convenient Centre. 2. We hereby request for the Background Information Document (BID) as a matter of urgency. 3. Kindly advise us once the Draft Basic Assessment Report is available for perusal and comment. Once received we will be in a position to elaborate and comments in the interim in this respect. 4. We reserve our client's right to address your firm or the relevant department on the detail relating to the representations and to further comment and elaborate pertaining to our reasons for registering as I&AP. 5. We await your reply confirming our registration as 	<p>Katlego Makhura kat@adtrp.co.za Andre Du Toit Town and Regional Planners</p>	<p>Thank you for your response, we have registered you as Interested and/or Affected Party Member for the proposed Mushroom Farm Filling Station Project.</p> <p>We have noted your comments on our Issues and Comments Register.</p> <p>We will keep you updated regarding the process in the future.</p> <p>Response to Letter:</p> <ol style="list-style-type: none"> 1. Refer above 2. The BID Document will be provided as soon as it is available 3. As I&AP you will be informed of where the Draft BAR may be viewed for comment. 4. We take note 5. Confirmed 6. Confirmed via e-mail.

Issue	Commentator	Response
<p>I&AP's in this regard.</p> <p>6. It is imperative that you acknowledge receipt of this document in the space provided.</p>		
<p>Attached please find a letter with the request to register as Interested and Affected Party on this project.</p> <p>Letter PRAXIS – Theory Enacted (Pty) Ltd hereby register as Interested and Affected Party on the abovementioned development on behalf of the South African Petroleum Retailers' Association (SAPRA) and some of their affected members.</p> <p>Please contact me should you have any enquiries relating to this registration.</p>	<p>Danie Neumann praxis@mweb.co.za PRAXIS – Theory Enacted (Pty) Ltd</p>	<p>Thank you for your response, we have registered PRAXIS – Theory Enacted (Pty) Ltd as Interested and/or Affected Party Member for the proposed Mushroom Farm Filling Station Project.</p> <p>We have noted your comments on our Issues and Comments Register.</p> <p>We will keep you updated regarding the process in the future.</p>
After Draft Basic Assessment Report Review Process		
<p>Your report dated 28 July 2015 refers.</p> <p>Description of the project: The applicant proposed to construct a new filling station with associated infrastructure consisting of the following:</p> <ul style="list-style-type: none"> • Erection of s suspended forecourt. • Pumps • Four islands • Five underground tanks • Convenience shop and restaurant of ± 200m² • Place of refreshment • Oil separator • Installation of water and sewage services. <p>Guidelines, by-laws, Precinct Plans and policies: The Report takes into account all relevant policies, by-laws and strategies. The development is in line with the RSDF 2010/11 for</p>	<p>Etienne Allers EtienneA@joburg.org.za City of Johannesburg</p>	<p>Noted.</p>

Issue	Commentator	Response
<p>Region A, Sub Area 6, which states that the objective of the sub-area is to retain and enhance existing investment within the Kyalami Specialist Node and to retain and enhance the urban neighbourhood and character of the Sub Area.</p> <p>Description of alternatives: The submitted DBAR has identified alternatives for executing the proposal.</p> <p>Description and assessment of the identified environmental issues: A Landscape Ecological Study; Geotechnical Report; Faunal Assessment; Wetland Assessment, Feasibility Impact Study and Cultural Heritage Impact Assessment Report was done and included in the Draft BAR. These studies were included in the EIA for the proposed Kyalami Gardens Ext. 27 of which Environmental Authorization was granted on 2 June 2011 and 6 June 2013.</p> <p>Evaluation and presentation of mitigation measures: Mitigation measures are proposed for each identified environmental impact. The proposed mitigation measures are included in an Environmental Management Plan contained in Appendix H.</p> <p>Public Participation: Public Participation is in the process of taking place. A list of I&AP's and their comments should be incorporated into the Final BAR.</p> <p>Recommendations:</p> <ol style="list-style-type: none"> 1. The design of storm water management systems should be based on Sustainable Urban Drainage Systems (SUDS) and Water Sensitive Urban Design approaches (WSUDS) which enhance natural drainage through permeable surfacing and which integrated landscaping with storm water in line with best practice storm water 		

Issue	Commentator	Response
<p>management. A Stormwater Management Plan is subject for approval by JRA prior to the Site Development Plan stage.</p> <p>Management of stormwater will also need to be designed in such a manner as to prevent negative impacts such as erosion and sedimentation, and to ensure environmental protection of downstream areas. Such plan would be required to meet the following criteria/standards:</p> <p>Peak discharge – no increase in discharge for any event of any duration up to the 25 year RI event. Volume of runoff – no increase up to the annual 10 year rainfall Runoff frequency – no surface runoff for the 1 yr RI event of any duration Water Quality – no deterioration.</p> <ol style="list-style-type: none"> 2. A groundwater management plan with relevant groundwater monitoring and reporting protocol must be established and calibrated annually. 3. Hydrological monitoring data should be evaluated bi-annually by a qualified Hydro geologist. 4. Monitoring boreholes must be drilled in order to monitor any possible diesel or petrol leaks from the underground tanks. A leak detector must be installed. 5. All landscaping in common areas and street scaping should use indigenous plants only, with preference given to locally indigenous species where possible. <p>Should you have any queries please do not hesitate to contact Etienne Ailers on the numbers indicated above.</p>		<p>Response to Recommendations:</p> <ol style="list-style-type: none"> 1. A Stormwater Management Plan will be compiled and submitted to JRA for approval prior to the Site Development Plan stage, and included as part of the WULA. 2. A ground water monitoring plan will be included in the Integrated Water Quality and Quantity Management & Monitoring Plan (IWQQMMP) as part of the Water Use License Application. 3. The recommendation for Hydrological monitoring data to be evaluated bi-annually by a qualified Hydro geologist will be incorporated into the IWQQMMP. 4. The recommendation for monitoring boreholes to be drilled will be incorporated into the IWQQMMP. 5. The recommendation that all landscaping to use indigenous plants, are to included in the Environmental Management Plan.

ANNEXURE D7:
COMMENTS FROM I&APs ON
BASIC ASSESSMENT REPORT

REFER ANNEXURE D6

ANNEXURE D8:
COMMENTS FROM I&APs ON
AMENDMENTS TO THE BASIC
ASSESSMENT REPORT

REFER ANNEXURE D6

**ANNEXURE D9:
COPY OF I&AP REGISTER**

Nr	Registered Parties	Contact details	Address
Stakeholders			
1	Council Geo-Science	igrobler@geoscience.org.za	
2	SAHRA Gauteng	asalomon@sahra.org.za	
		nndobochani@sahra.org.za	
3	PHRAG	maphata.ramphele@gauteng.gov.za	
4	DWA	keetm@dwaf.gov.za	
		siwelanel@dwa.gov.za	
		tshifaror@dwa.gov.za	
		mathebet@dwa.gov.za	
5	Eskom	central@eskom.co.za	
		paia@eskom.co.za	
6	SANRAL	schmidk@nra.co.za	
7	Gautrans	kumen.govender@gauteng.gov.za	
8	Randwater	mmpshe@randwater.co.za	
		nkoneigh@randwater.co.za	
9	City of Johannesburg	Noziphom@joburg.org.za	
		Tel: 011 587 4225	
10	Spoomet	daniel.ramokone@transnet.net	
		loveous.tampane@transnet.net	
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	Ms Nomfundo Gobodo	Tel: 012 312 8883	
12	Ward Councillor		
	Anette Deppe	annette@deppe.co.za	
	Ward 93		
13	City Power Department		
	Katlego Mogale	kmogale@citypower.co.za	
14	Johannesburg Roads		
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		Tel: 087 285 0010	

ANNEXURE E:
SPECIALIST REPORTS

**ANNEXURE E1:
TRAFFIC IMPACT STUDY**



**Proposed Filling Station in Century Mushroom Farm
(Kyalami Gardens Extension 27), Midrand, Johannesburg**





UNITED
BY OUR
DIFFERENCE



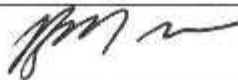
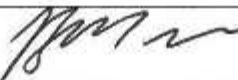
Project number 17260

TRAFFIC IMPACT ASSESSMENT

April 2015

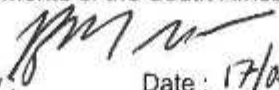
Submission Details			PREPARED BY:  WSP GROUP AFRICA (Pty) Ltd 314 Glenwood Road Lynnwood Park Pretoria, 0081 South Africa Tel: +27 (12) 762 1200 Fax: +27 (12) 762 1301 e-mail: civil-pta@WSPGroup.co.za
City of Johannesburg	Johannesburg Roads Agency	Submission Authority 3	
 a world class african city		 GAUTENG PROVINCIAL GOVERNMENT REPUBLIC OF SOUTH AFRICA	

Quality Control

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	Draft			
Date	April 2015			
Prepared by	Richard Sambo <i>Civil Technician</i>			
Signature				
Checked by	RM van Wyk <i>Pr Eng</i>			
Signature				
Authorised by	RM van Wyk <i>Pr Eng</i>			
Signature				
Project number	17260			
File reference	Z:\17000\17260 Century Mushroom Farm\11 - Reports\11.1 Traffic Reports\Traffic Impact Study			

Certification

It is herewith certified that this Traffic Impact Assessment has been prepared according to requirements of the South African Traffic Impact and Site Traffic Assessment Manual.

Signatory: 

Date: 17/04/15 ECSA no: 20100399

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Quality checklist

Items	Initial
Project take on form	√
Report & Figures reviewed	√
Authorisation for distribution	√

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Figure 5	2015 Peak Hour traffic Volumes
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Figure 9	2020 Peak Hour Traffic Volumes Plus Latent Traffic Volumes
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Drawings

Drawing SKC 004: - Proposed Access Layout to Filling Station

Annexures

Annexure A:	Intersection Pictures
Annexure B:	Detailed Trip Generation Calculations
Annexure C:	Detailed SIDRA Output

1 Introduction

1.1 BACKGROUND

WSP Group Africa (Pty) Ltd. (WSP) has been appointed to undertake a traffic impact assessment for a proposed new filling station with a convenience store development located in Century Mushroom Farm (Kyalami Gardens Extension 27) in Midrand. The proposed site is undeveloped and is located near the intersection of Allandale Road and Greig Street. The proposed site is indicated on **Figure 1**.

The purpose of this report is to consider the traffic impact at the intersection of Allandale Road and Greig Street as well as at the accesses to the proposed site.

1.2 APPROVAL OF SUBMISSIONS

This report will be subject to approval from the relevant roads authorities and this report will be submitted to the following roads authorities for approval:

- Johannesburg Roads Agency (JRA)
- City of Johannesburg (CoJ)
- Gauteng Department of Roads and Transport (GDRT)

2 Liaison & Data Collection

2.1 SITE VISITS

During April 2015 a site visit was undertaken for this study and the following was confirmed:

- Layouts of Intersections considered in the study
- Appropriateness of recommended site accesses
- Intersection control for relevant intersections
- Presence of existing public transport and non-motorised facilities

It should be noted that the site is currently undeveloped. Intersection pictures are attached to this document, see **Annexure A**.

2.2 LATENT DEVELOPMENT

There is a proposed township for a mixed use development directly adjacent to Century Mushroom Farm (Kyalami Gardens Extension 27). A traffic impact study was undertaken for the proposed township known as Centro@Kyalami by Arup (Pty) Ltd in September 2008 and was subsequently approved by JRA. It should be noted that the Centro@Kyalami mixed use development was taken into account for this traffic impact assessment.

The Centro@Kyalami mixed use development is planned to comprise of approximately 700 000 m² GLA and this includes the following land uses:

- Residential;
- Offices;
- Retails and ;
- Institutions

Latent upgrades were considered as shown on **Drawing SKC 004**.

Further detail on this development can be found in the study titled: *Traffic Impact Assessment (REV A), Centro Development at Kyalami, Arup transport Planning*. The location of the above mentioned latent development is shown on **Figure 1**. The Traffic volumes for this latent development are shown on **Figure 2**.

3 Surrounding Road Network and Study Area

3.1 ROAD NETWORK & MASTER PLANNING

3.1.1 Municipal Planning

The 2009 RIFSA City of Johannesburg planning was considered for this study. The road network planning is shown on **Figure 3**.

3.1.2 Provincial and National Planning

The application site is bounded by future K58. The 2010 Gauteng Major Road Network is shown on **Figure 4**.

3.2 SURROUNDING ROAD NETWORK

The following roads in the vicinity of the proposed filling station are regarded as relevant to this study and are discussed in detail below:

Allandale Road: This is a class 2 road located to the north of the site; this road follows an east-west alignment past the site. In the vicinity of the site, Allandale Road is a two way dual carriage road with two lanes per direction.

Greig Street: This is a class 4 road located to the east of the site; this road follows a north-south alignment and intersects with Allandale Road. In the vicinity of the site, Greig Street is a two way Street with one lane per direction.

3.3 DETERMINATION OF THE STUDY AREA

In determining the site area TMH 16 volume 1 recommends the following:

- *“Class 4 and 5 roads in the vicinity of the development up to the first Class 1 to 3 roads that can be reached by the Class 4 and 5 road network from the development, up to and including the first connection(s) on the Class 1 to 3 roads.*
- *The elements shall be restricted to those within a maximum distance of 1.5km from the accesses to the site, measured along the shortest routes to the accesses, provided that there is at least one intersection within this distance. Where there is no such intersection, the distance will be extended to include at least one intersection.”*

TMH 16 also states that judgement should be used in selecting the intersections considered and therefore specific elements like extent of the development were also considered. A larger development will by its nature require a wider study area to be considered while for a smaller development the opposite will be true.

From the above, the intersection of Allandale Road and Greig Street and the access to the filling station development were considered for this study.

4 Site Access

It is proposed that the site be served by a left-in-left-out access off Allandale Road as shown on **Drawing SKC 004**, only vehicles travelling westbound on Allandale Road will be able to access the site.

The location of this proposed site access conforms to the guidelines for access to filling stations (BB2) requirements. As per the BB2, **Plan No. GTP 16/15** a minimum of 210 m from the preceding/following intersection to the accesses of the filling station is required for a design speed of more than 80 km/h (a design speed of 100 km/h was assumed for Allandale Road).

It is therefore concluded that the accesses to the site are at a distance of 210 m from the intersection of Allandale Road and Greig Street, and meet the minimum requirements as set out in the BB2 (see **Drawing SKC 004**).

6 Development Trip Generation and Traffic Volume Scenarios

6.1 GENERAL

The South African Trip Data Manual (TMH17) does not have trip rates for filling stations, therefore the South African Trip Generation Rate (SATGR) document was used to estimate the expected development trips.

6.2 FILLING STATION

The SATGR document gives the total estimated peak hour trip generation of a filling station with a convenience store as 4% of the total peak hour traffic volumes of the adjacent road off which the filling station is to gain access from. It is important to note that a filling station is primarily an interceptor and not a generator of traffic. Thus most of the site traffic will be intercepted from the adjacent road past the site and only minimal new traffic can be expected from the surrounding neighbourhood as new or primary trips.

The SATGR further divides the total estimated peak hour trips generation of a filling station with a convenience store into primary and pass-by trips. Thus the following splits are applicable:

- Primary Fuel Trips 12.7%
- Pass-by Fuel Trips 69.1%
- Primary Convenience Store Trips 3.1%
- Pass-by Convenience Store Trips 15.1%

From the splits above it can be seen that pass-by trips equate to 84.2% of total trips and primary trips equates to 15.8% of total trips.

6.3 TRIP SUMMARY

The detailed trip generation calculations are included in **Annexure B**. Using the SATGR document the expected peak hour development trip generation was calculated and shown in **Table 6.1** below.

Table 6.1: Expected Peak Hour Development Trips

Land Use	Trip type	AM Peak			PM Peak		
		In	Out	Total	In	Out	Total
Filling station with and a C-store.	Primary trips	8	8	16	8	8	16
	Passer-by trips	42	42	84	44	44	88
	Total trips	50	50	100	52	52	104

The TMH 16 Volume 1 document requires that a traffic impact assessment be done for developments which generate more than 50 peak hour trips (including diverted and pass-by trips).

6.4 TRIP DISTRIBUTION AND ASSIGNMENT

Assumptions with respect to the expected trip distribution were based on the location of the site access in relation to the surrounding road network; the existing traffic volumes, travel patterns as well as the land use nature of the proposed development. **Figure 7** shows the expected trip distribution and the expected development traffic to the proposed development.

6.5 GROWTH RATE

TMH 16 Volume 1 requires that a five year horizon be considered for developments that generate more than 50 trips. TMH 17 recommends growth rates for developments as shown in **Table 6.2**.

Table 6.2: Typical Traffic Growth Rates

Development Area	Growth Rate
Low growth areas	0 – 3%
Average growth areas	3 – 4%
Above average growth areas	4 – 6%
Fast growing areas	6 – 8%
Exceptionally high growth areas	>8%

A growth rate of 3% was considered appropriate for this study.

6.6 TRAFFIC VOLUME SCENARIOS

The 2014 peak hour traffic volumes (see **Figure 5**) were thus subjected to a 3% growth rate over five years; this is in line with an average growth rate as given in **Table 6.2**. The 2020 peak hour traffic volumes are shown on **Figure 8** and the 2020 peak hour traffic volumes plus latent traffic volumes are shown on **Figure 9**.

Ultimately the expected 2020 peak hour traffic plus latent traffic plus development traffic volumes are shown on **Figure 10**.

7 Traffic Impact & Capacity Analyses

7.1 GENERAL

The weekday AM and PM peak hour trip generation of the development was analysed. The critical peak hour analysis was considered for the following worst case scenarios:

- **2020 without development scenario (includes latent trips); and**
- **2020 with development scenario (includes latent trips)**

This is in line with TMH16 document requirement for scenarios to be considered in a traffic impact assessment.

The considered intersection layouts are shown on **Drawings SKC 004**.

7.2 CAPACITY ANALYSIS

Sidra version 6.1 was used for the analysis of the intersections and the results are shown in **Tables 7.1 – 7.2** for the 2020 without and with development traffic scenarios per intersection.

Table 7.1: Intersection performance – Allandale Road and Greig Street

<i>Scenario 1 : 2020 Peak Hour Traffic (Includes Latent)</i>									
AM Peak					PM Peak				
NB*	WB*	SB*	EB*	Total	NB*	WB*	SB*	EB*	Total
C	C	D	D	C	D	B	B	C	C
(23.1)	(29.0)	(35.1)	(39.1)	(32.0)	(44.6)	(17.3)	(17.1)	(28.1)	(24.4)
{0.697}	{0.931}	{0.931}	{0.922}	{0.931}	{0.915}	{0.987}	{0.235}	{0.886}	{0.987}
<i>Scenario 2 : 2020 Peak Hour Traffic plus Development (Includes Latent)</i>									
AM Peak					PM Peak				
NB*	WB*	SB*	EB*	Total	NB*	WB*	SB*	EB*	Total
C	C	D	D	C	D	B	B	C	C
(23.1)	(29.4)	(35.5)	(39.5)	(32.3)	(44.6)	(17.2)	(17.3)	(28.4)	(24.5)
{0.697}	{0.916}	{0.933}	{0.924}	{0.933}	{0.915}	{0.989}	{0.235}	{0.888}	{0.989}
Legend			B – Level of service						
			(16.4) – Delay in seconds						
			{0.527} – Volume / Capacity						

Note: *N/A_ Not Applicable,

*As per COTO TMH16, the level of service and v/c ratios are reported for each individual movement and contained in **Annexure C**.

The analysis indicates that the intersection operate at acceptable levels of service and/or v/c ratios with the proposed intersection layout considered. No road upgrades are required.

The intersection layouts are shown on **Drawings SKC 004**.

Table 7.2: Intersection performance – Allandale Road and Access (filling station)

<i>Scenario 1 : 2020 Peak Hour Traffic (Includes Latent)</i>									
AM Peak					PM Peak				
NB*	WB*	SB*	EB*	Total	NB*	WB*	SB*	EB*	Total
NOT ANALYSED									
<i>Scenario 2 : 2020 Peak Hour Traffic plus Development (Includes Latent)</i>									
AM Peak					PM Peak				
NB*	WB*	SB*	EB*	Total	NB*	WB*	SB*	EB*	Total
NA (5.6) {0.028}	NA (0.2) {0.375}	NA	NA	NA (0.4) {0.375}	NA (5.6) {0.029}	NA (0.2) {0.380}	NA	NA	NA (0.4) {0.380}
Legend			B – Level of service						
			(16.4) – Delay in seconds						
			{0.527} – Volume / Capacity						

Note: *N/A_ Not Applicable,

*As per COTO TMH16, the level of service and v/c ratios are reported for each individual movement and contained in **Annexure C**.

The analysis indicates that the intersection operate at acceptable levels of service and/or v/c ratios with the proposed intersection layout considered. No road upgrades are required.

The intersection layouts are shown on **Drawings SKC 004**.

8 Non-Motorised & Public Transport

In terms of the National Land Transport Transition Act (NLTTA) 22 of 2000, section 29, it is a requirement that an assessment of the public transport be included in a traffic impact assessment.

The following comments are made regarding public transport:

- Allandale Road is a public transport route and provision is made for taxi/bus drop-off facilities and sidewalks as shown on **Drawing SKC 004** along Allandale Road.
- The provision of the drop-off facilities is to facilitate pedestrian movement and safety.

9 Conclusions & Recommendations

Based on the content of this document, the following key conclusions and recommendations are relevant:

- The proposed filling station with a convenience store is to be located in Century Mushroom Farm (Kyalami Gardens Extension) near the intersection of Allandale Road and Greig Street (see **Figure 1**).
- The site will be served by a left-in-left-out access off Allandale Road as shown on **Drawing SKC 004**. This access meets the minimum requirement as stated in the guidelines for accesses to filling stations (BB2).
- The expected weekday peak hour development trips were calculated and found to be 100 and 104 during the weekday AM and PM peaks respectively.
- Intersection capacity analysis of all intersections falling within the study area and for all relevant analysis scenarios indicates that no upgrading is required. See **Drawing SKC 004**.
- Allandale Road is a public transport route and provision is made for taxi/bus drop-off facilities and sidewalks as shown on **Drawing SKC 004** along Allandale Road.

It is therefore concluded and recommended that the proposed development can be accommodated in Century Mushroom Farm (Kyalami Gardens Extension 27) in Midrand from a traffic engineering point of view.

10References

- 1) TMH 16 Volume 2, South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual, Version 1.0, Committee of Transport Officials (COTO) August 2012.
- 2) TMH 17 Volume 1, South African Trip Data Manual, Version 1.0, Committee of Transport Officials (COTO) September 2012.
- 3) Highway Capacity Manual, Transportation Research Board, National Research Council Washington D.C., 2010.
- 4) South African Road Traffic Signs Manual, 3rd Edition, Volume 3 Traffic Signal Design.
- 5) Manual for Traffic Impact Studies, Department of Transport, October 1995
- 6) South African Trip Generation Rates, 2nd edition, Department of Transport, June 1995
- 7) Department of Transport, Road and Works, the Guidelines for Access to Filling Stations (BB2), Revised November 2003.

Figures

Figure 1	Locality Plan
Figure 2	Latent Traffic Volumes
Figure 3	2009 RIFSA City of Johannesburg Road Network Planning
Figure 4	2010 Gauteng Major Road Network
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Figure 7	Development Traffic Volumes
Figure 8	2020 Peak Hour Traffic Volumes
Figure 9	2020 Peak Hour Traffic Volumes Plus Latent Traffic Volumes
Figure 10	2020 Peak Hour Traffic Plus Latent Traffic Plus Development Traffic Volumes



Centro@kyalami
(Latent development)

PROPOSED DEVELOPMENT

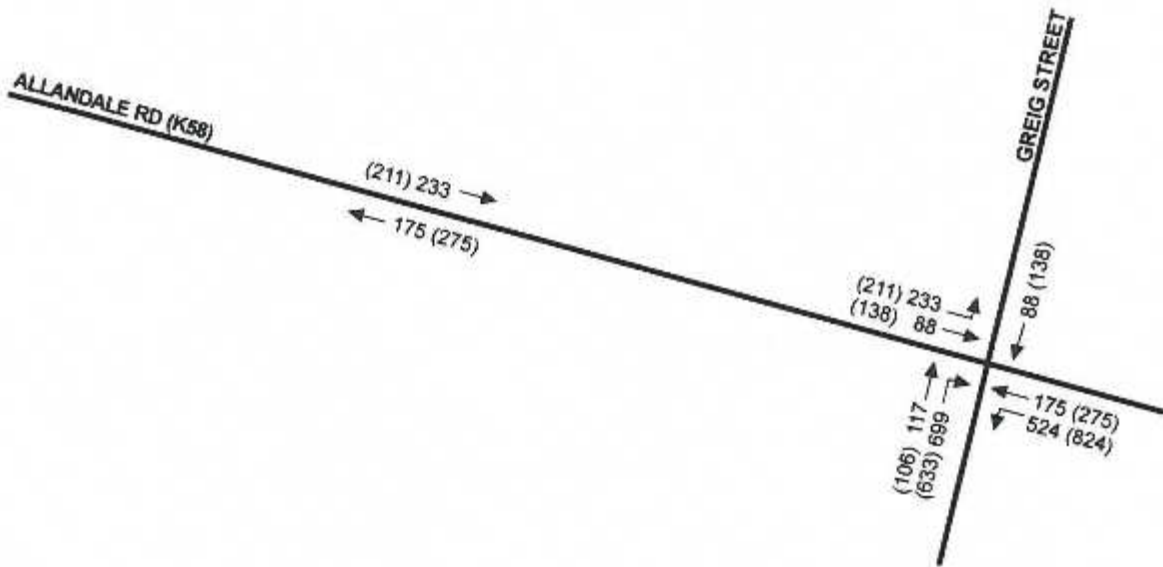
LEGEND:
● TRAFFIC COUNT POSITION

Checked by : R.M. Van Wyk Pr. Eng

17260_Century Mushroom Farm F/S_Locality Plan_1.cdr



Project: CENTURY MUSHROOM FARM FILLING STATION	Figure: LOCALITY PLAN	No. 1
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GENERAL LEGEND:

255 - Weekday AM Peak hour Volumes
(255) - Weekday PM Peak hour Volumes

Checked by : R.M. Van Wyk Pr. Eng

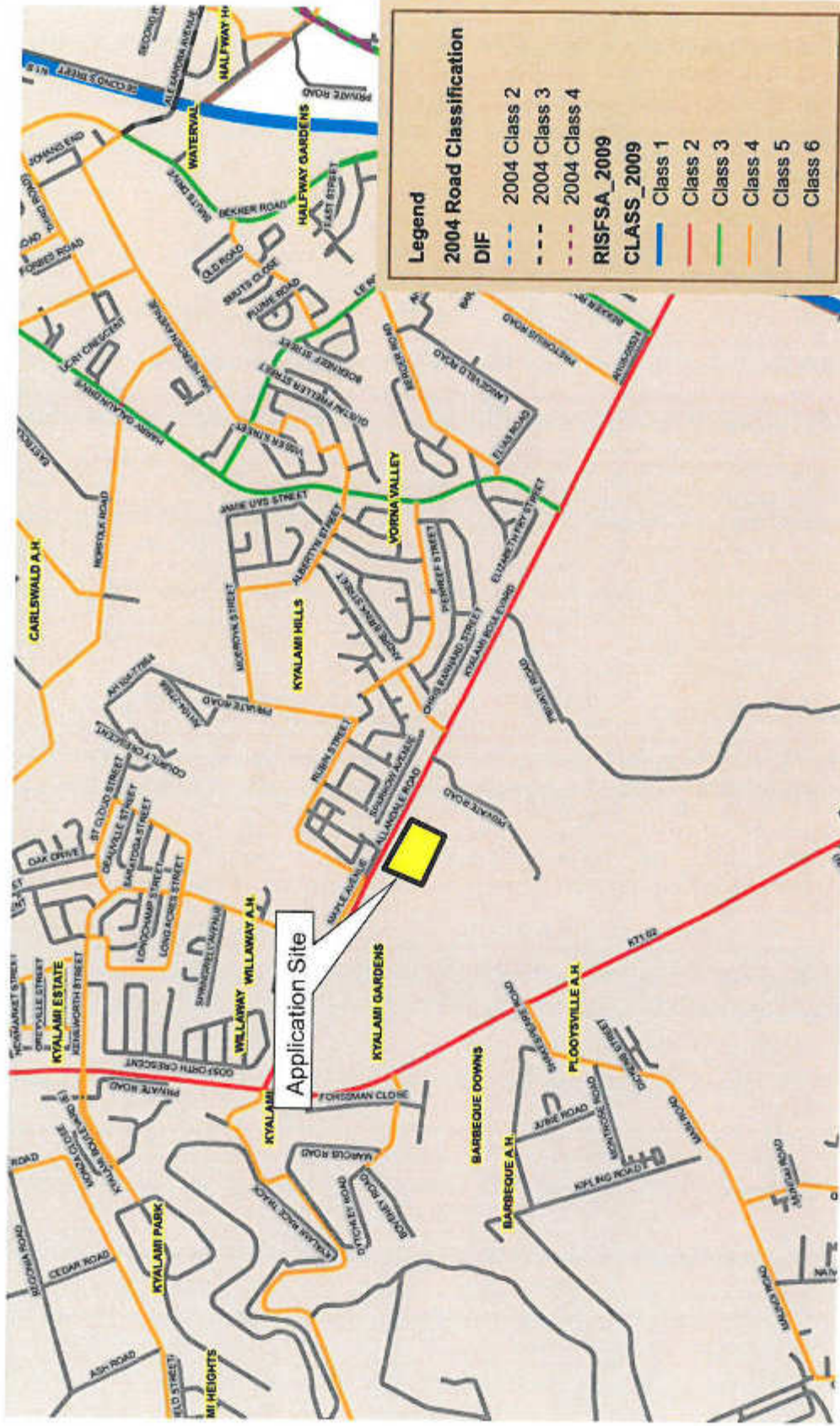
17260_Century Mushroom Farm F/S_Latent Traffic Volumes_4.cdr



Project:
**CENTURY MUSHROOM FARM
FILLING STATION**

Figure:
LATENT TRAFFIC VOLUMES

No.
2



Legend

2004 Road Classification

DIF

- 2004 Class 2
- 2004 Class 3
- 2004 Class 4

RISFSA_2009

CLASS_2009

- Class 1
- Class 2
- Class 3
- Class 4
- Class 5
- Class 6

Not to scale - Diagrammatic only

Checked by: RM van Wyk Pr Eng



Project:
CENTURY MUSHROOM FARM FILLING STATION

Figure Description:
2009 RISFSA CITY OF JOHANNESBURG ROAD NETWORK PLANNING



ROAD NETWORK LEGEND

- | | |
|--------------------------|----------------------------|
| CLASS 1 ROADS (FREEWAYS) | Existing road |
| CLASS 2 ROADS | Powerlines |
| CLASS 3 ROADS | Gaurain |
| CLASS 4 ROADS | Railway |
| CLASS 5 ROADS | Airport |
| CLASS 6 ROADS | Rivers |
| CLASS 7 ROADS | Canal |
| CLASS 8 ROADS | Pipeline |
| CLASS 9 ROADS | Slimes dam |
| CLASS 10 ROADS | Viar / Marsh |
| CLASS 11 ROADS | Dam |
| CLASS 12 ROADS | Colabral |
| CLASS 13 ROADS | Nature Reserve |
| CLASS 14 ROADS | Built Up Areas |
| CLASS 15 ROADS | Metro Municipal Boundaries |
| CLASS 16 ROADS | Promoval Boundary |

BACKGROUND LEGEND

- | | |
|--------------------------|----------------------------|
| CLASS 1 ROADS (FREEWAYS) | Existing road |
| CLASS 2 ROADS | Powerlines |
| CLASS 3 ROADS | Gaurain |
| CLASS 4 ROADS | Railway |
| CLASS 5 ROADS | Airport |
| CLASS 6 ROADS | Rivers |
| CLASS 7 ROADS | Canal |
| CLASS 8 ROADS | Pipeline |
| CLASS 9 ROADS | Slimes dam |
| CLASS 10 ROADS | Viar / Marsh |
| CLASS 11 ROADS | Dam |
| CLASS 12 ROADS | Colabral |
| CLASS 13 ROADS | Nature Reserve |
| CLASS 14 ROADS | Built Up Areas |
| CLASS 15 ROADS | Metro Municipal Boundaries |
| CLASS 16 ROADS | Promoval Boundary |

Not to scale - Diagrammatic only

Checked by : RM van Wyk Pr Eng

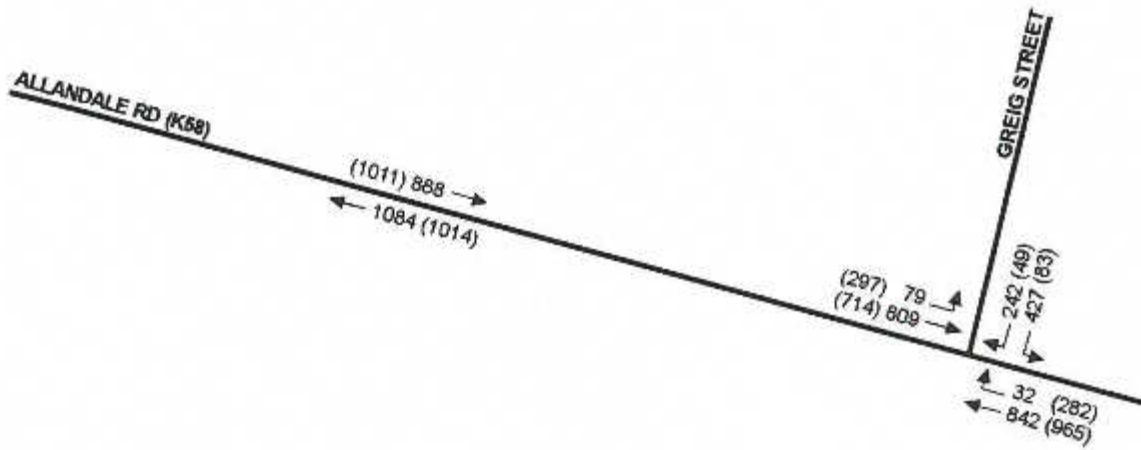


Project:

CENTURY MUSHROOM FARM FILLING STATION

Figure Description:

2010 GAUTENG MAJOR ROAD NETWORK



GENERAL LEGEND:

255 - Weekday AM Peak hour Volumes
 (255) - Weekday PM Peak hour Volumes

Checked by : R.M. Van Wyk Pr. Eng

17260_Century Mushroom Farm F/S_2015 Peak hr Traffic Volumes_5.dwg



Project:

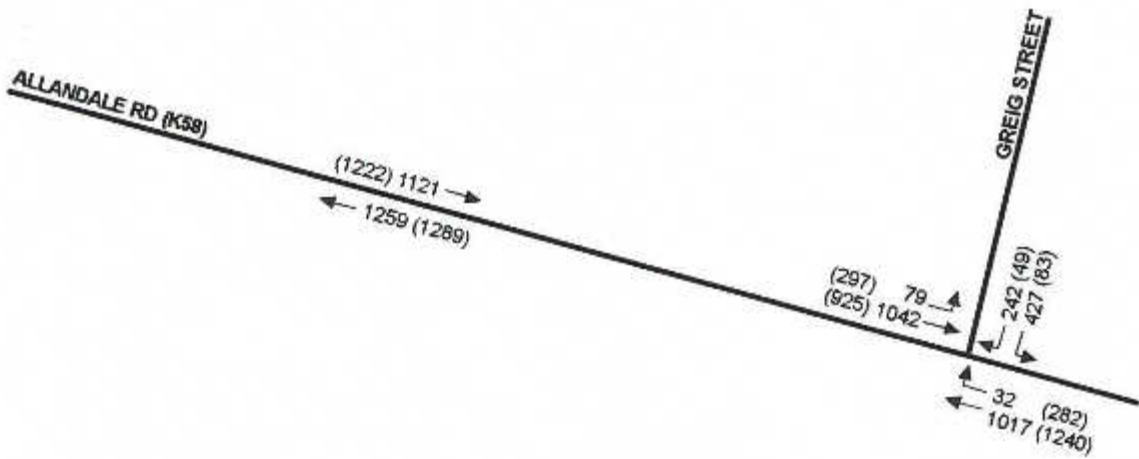
**CENTURY MUSHROOM FARM
 FILLING STATION**

Figure:

**2015 PEAK HOUR
 TRAFFIC VOLUMES**

No.

5



GENERAL LEGEND:

255 - Weekday AM Peak hour Volumes
 (255) - Weekday PM Peak hour Volumes

Checked by : R.M. Van Wyk Pr. Eng

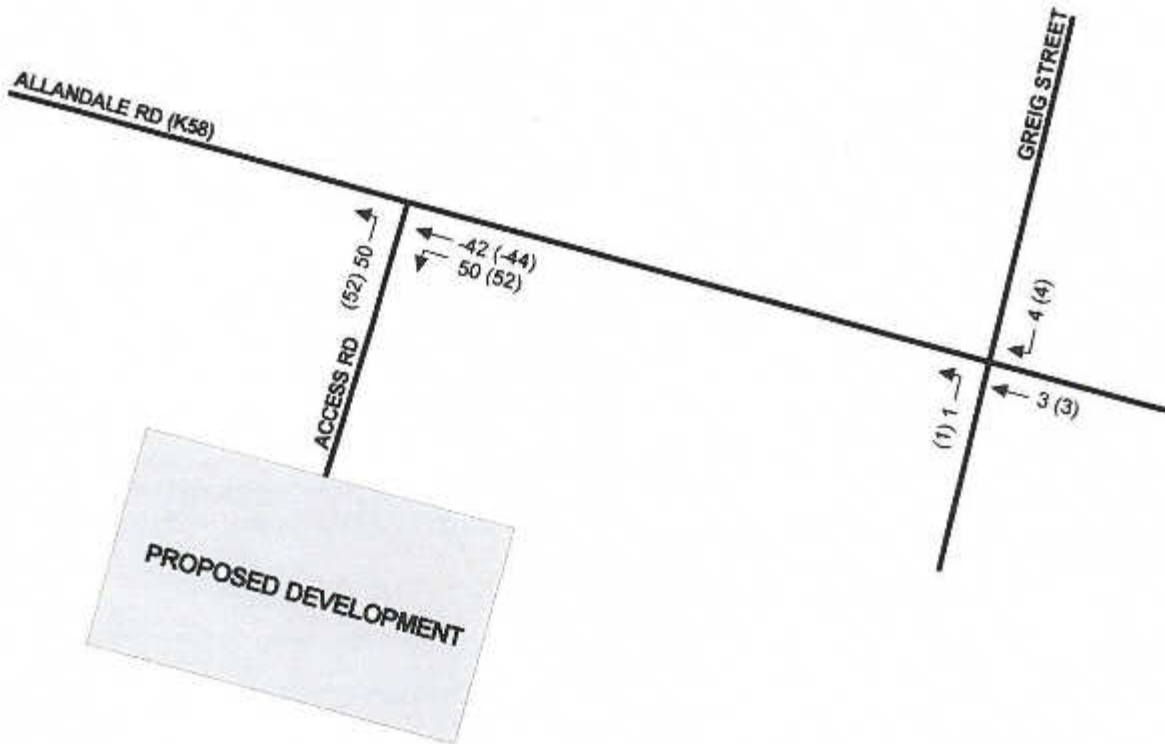
17260 Century Mushroom Farm F/S, 2015 Peak Hr. Traffic Volumes Plus Latent Traffic Volumes, 6.dwg



Project:
**CENTURY MUSHROOM FARM
 FILLING STATION**

Figure:
**2015 PEAK HOUR TRAFFIC VOLUMES
 PLUS LATENT TRAFFIC VOLUMES**

No.
6



GENERAL LEGEND:

255 - Weekday AM Peak hour Volumes
(255) - Weekday PM Peak hour Volumes

Checked by : R.M. Van Wyk Pr. Eng

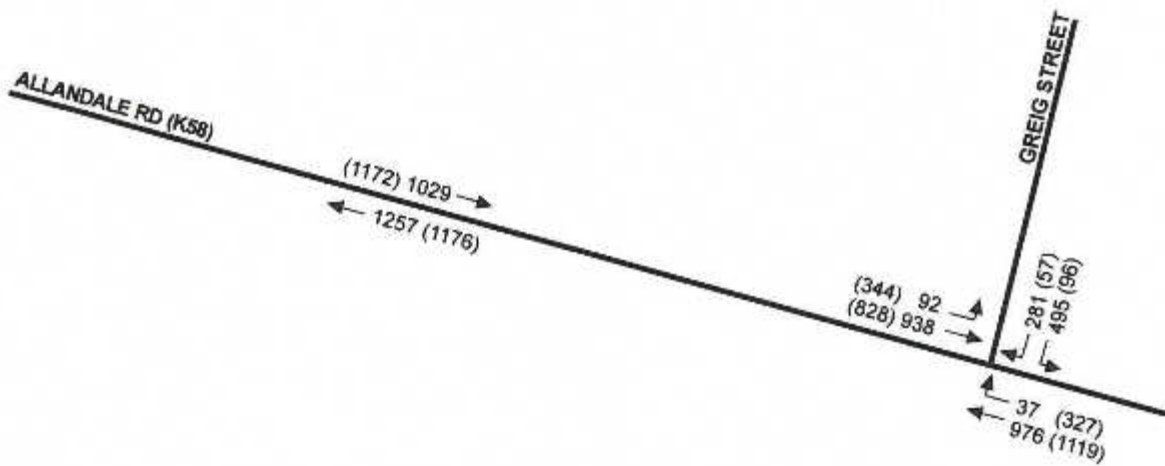
17260_Century Mushroom Farm F/S_Development Traffic Volumes_9.cdr



Project:
**CENTURY MUSHROOM FARM
FILLING STATION**

Figure:
DEVELOPMENT TRAFFIC VOLUMES

No.
7



GENERAL LEGEND:

255 - Weekday AM Peak hour Volumes
 (255) - Weekday PM Peak hour Volumes

Checked by : R.M. Van Wyk Pr. Eng

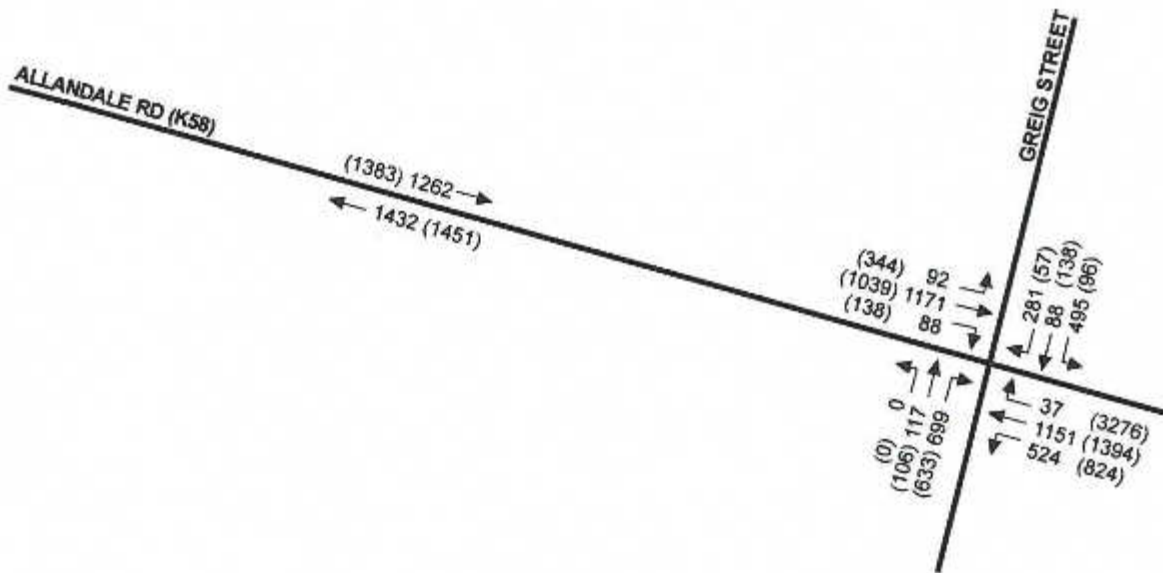
17260_Century Mushroom Farm F/S_2020 Peak hr Traffic Volumes_7.cd



Project:
**CENTURY MUSHROOM FARM
 FILLING STATION**

Figure:
2020 PEAK HOUR TRAFFIC VOLUMES

No.
8



GENERAL LEGEND:

255 - Weekday AM Peak hour Volumes
 (255) - Weekday PM Peak hour Volumes

Checked by : R.M. Van Wyk Pr. Eng

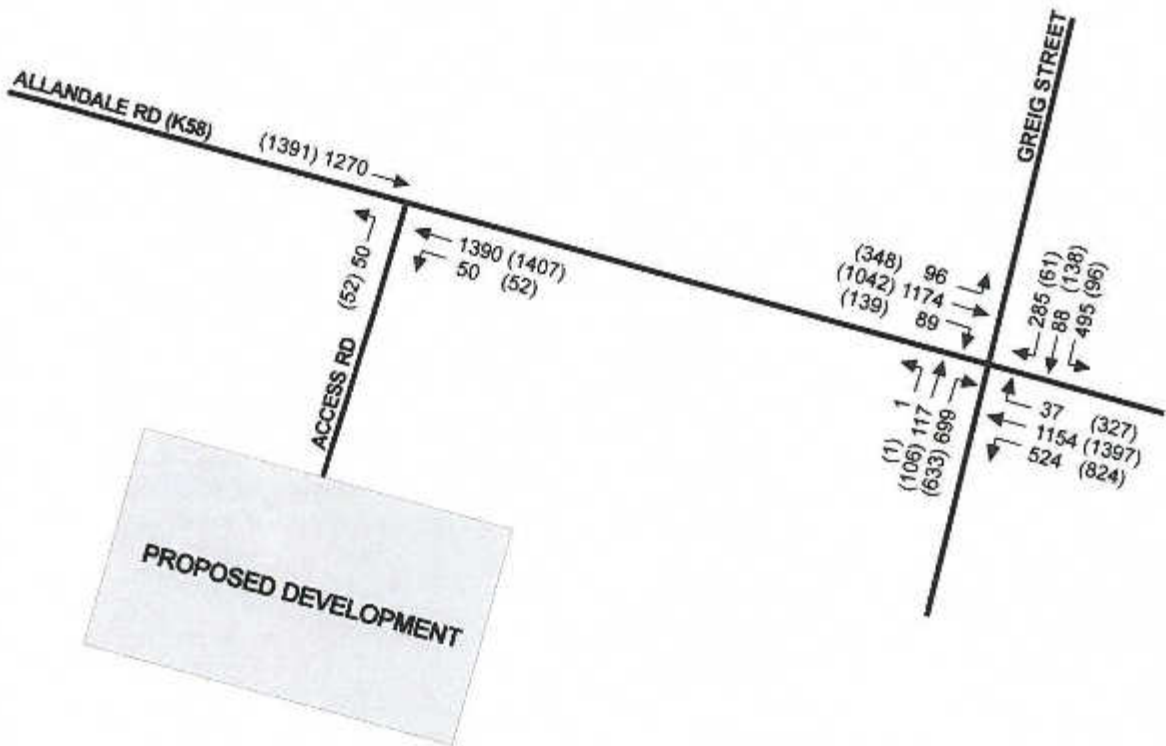
17280 Century Mushroom Farm F/S, 2020 Peak Hr Traffic Plus Latent Traffic Volumes_B.cdr



Project:
**CENTURY MUSHROOM FARM
 FILLING STATION**

Figure:
**2020 PEAK HOUR TRAFFIC
 PLUS LATENT TRAFFIC VOLUMES**

No.
9



GENERAL LEGEND:

255 - Weekday AM Peak hour Volumes
 (255) - Weekday PM Peak hour Volumes

Checked by : R.M. Van Wyk Pr. Eng

17280_Century Mushroom Farm F/S_2020 Peak hr Traffic Plus Latent Traffic Plus Development Traffic Volumes_10.cdr



Project:
**CENTURY MUSHROOM FARM
 FILLING STATION**

Figure:
**2020 PEAK HOUR TRAFFIC
 PLUS LATENT TRAFFIC
 PLUS DEVELOPMENT TRAFFIC VOLUMES**

No.
10

Drawings

Drawing SKC 004: - Proposed Access Layout to Filling Station

LEGEND:

ROADS TO BE CONSTRUCTED DUE TO LATENT RIGHTS (CENTRO @ KYALAMI)



CLIENT:	CENTURY PROPERTY DEVELOPMENTS				
PROJECT:	CENTURY MUSHROOM FARM FILLING STATION				
TITLE:	PROPOSED ACCESS LAYOUT TO FILLING STATION				
SCALE @ A3:	1:2000	CHECKED:	F. VAN RENSBURG	APPROVED:	J. GROBLER
DESIGN:	DR ACKERMAN	DRAWN:	ND MOKANSI	DATE:	2015/03/04
PROJECT No:	17260	DRAWING No:	SKC004	REV:	A
DRAWING STATUS: PRELIMINARY					
If drawing status = construction, a signed copy of this drawing (either in hardcopy or electronic format) is available at the office of origin and at the office of issue.					

WSP Group Africa (Pty) Ltd
Civil and Coastal Division
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PROJECT: CENTURY MUSHROOM FARM FILLING STATION

TITLE: PROPOSED ACCESS LAYOUT TO FILLING STATION

SCALE @ A3: 1:2000

CHECKED: F. VAN RENSBURG

APPROVED: J. GROBLER

DESIGN: DR ACKERMAN

DRAWN: ND MOKANSI

DATE: 2015/03/04

PROJECT No: 17260

DRAWING No: SKC004

REV: A

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CESA

CAD FILE NAME: Z:\17000\17260\Century Mushroom Farm\3 Drawings\EXTERNAL ROADS\UPGRADE GAUTRANDS\DWG SHEETS\SKC004 PROPOSED ACCESS LAYOUT TO FILLING STATION.dwg

PLOT DATE: 2015/04/17 12:51:25 PM

TEMPLATE VERSION 1.0

Annexure A

Intersection Pictures

Annexure A– Record of site visit
Photo Sheet 1 of 2



Allandale Road and Greig Street

Annexure A– Record of site visit
Photo Sheet 2 of 2



Access position

Annexure B

Trip Generation calculations

Annexure C

Detailed SIDRA Output

MOVEMENT SUMMARY

Site: 01_Allandale Rd & Greig St

2020 AM Peak Hour Traffic Volumes (Includes latent)

Allandale Rd & Greig St

Proposed intersection Layout

Signals - Fixed Time Cycle Time = 70 seconds (User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Greig St											
1	L2	1	0.0	0.001	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
2	T1	123	0.0	0.697	19.9	LOS B	9.5	66.4	0.89	0.92	43.2
3	R2	736	0.0	0.697	23.6	LOS C	9.9	69.0	0.87	0.92	43.1
Approach		860	0.0	0.697	23.1	LOS C	9.9	69.0	0.87	0.92	43.1
East: Allandale Rd											
4	L2	552	0.0	0.297	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
5	T1	1212	0.0	0.913	39.2	LOS D	26.7	186.7	1.00	1.15	36.6
6	R2	39	0.0	0.348	43.9	LOS D	1.4	9.9	1.00	0.71	34.5
Approach		1802	0.0	0.913	29.0	LOS C	26.7	186.7	0.69	0.95	40.7
North: Greig St											
7	L2	521	0.0	0.931	48.1	LOS D	19.3	135.1	1.00	1.20	33.4
8	T1	93	0.0	0.133	16.4	LOS B	2.1	15.0	0.71	0.56	47.4
9	R2	296	0.0	0.478	18.1	LOS B	6.4	44.6	0.75	0.78	45.6
Approach		909	0.0	0.931	35.1	LOS D	19.3	135.1	0.89	0.99	37.8
West: Allandale Rd											
10	L2	97	0.0	0.089	6.3	LOS A	0.4	2.5	0.21	0.60	53.5
11	T1	1233	0.0	0.922	41.1	LOS D	27.6	193.4	1.00	1.18	35.9
12	R2	93	0.0	0.818	47.5	LOS D	3.6	25.5	1.00	0.91	33.4
Approach		1422	0.0	0.922	39.1	LOS D	27.6	193.4	0.95	1.12	36.5
All Vehicles		4994	0.0	0.931	32.0	LOS C	27.6	193.4	0.83	1.00	39.3

Level of Service (LOS) Method: Delay (HCM 2000).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: Z:\17000\17260 Century Mushroom Farm\2 - Design\2.5 Traffic\2.5.3 SIDRA\Project1 sip6

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**SIDRA
INTERSECTION 6**

MOVEMENT SUMMARY

Site: 01_Allandale Rd & Greig St

2020 PM Peak Hour Traffic Volumes (Includes latent)
Allandale Rd & Greig St

Proposed intersection Layout

Signals - Fixed Time Cycle Time = 60 seconds (User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles vah	Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h
South: Greig St											
1	L2	1	0.0	0.001	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
2	T1	112	0.0	0.915	39.6	LOS D	16.1	112.6	1.00	1.18	35.1
3	R2	666	0.0	0.915	45.5	LOS D	16.1	112.6	1.00	1.16	34.3
Approach		779	0.0	0.915	44.6	LOS D	16.1	112.6	1.00	1.16	34.4
East: Allandale Rd											
4	L2	867	0.0	0.467	5.7	LOS A	0.0	0.0	0.00	0.53	54.8
5	T1	1467	0.0	0.792	15.6	LOS B	21.3	149.1	0.84	0.83	47.8
6	R2	344	0.0	0.987	53.8	LOS D	12.7	89.1	1.00	1.23	31.5
Approach		2679	0.0	0.987	17.3	LOS B	21.3	149.1	0.59	0.78	46.7
North: Greig St											
7	L2	101	0.0	0.165	13.7	LOS B	1.1	8.0	0.73	0.72	48.5
8	T1	145	0.0	0.235	16.6	LOS B	3.2	22.4	0.78	0.63	47.3
9	R2	60	0.0	0.146	24.2	LOS C	1.4	9.7	0.80	0.73	42.4
Approach		306	0.0	0.235	17.1	LOS B	3.2	22.4	0.77	0.68	46.6
West: Allandale Rd											
10	L2	362	0.0	0.345	9.3	LOS A	3.6	25.3	0.54	0.72	51.5
11	T1	1094	0.0	0.886	31.8	LOS C	19.6	137.1	1.00	1.10	39.5
12	R2	145	0.0	0.877	46.9	LOS D	5.8	40.9	1.00	1.11	33.6
Approach		1601	0.0	0.886	28.1	LOS C	19.6	137.1	0.90	1.02	41.0
All Vehicles		5365	0.0	0.987	24.4	LOS C	21.3	149.1	0.75	0.90	42.7

Level of Service (LOS) Method: Delay (HCM 2000)

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report.

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Project: Z:\17000\17260 Century Mushroom Farm\2 - Design\2.5 Traffic\2.5.3 SIDRA\Project11.sip6
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**SIDRA
INTERSECTION 6**

MOVEMENT SUMMARY

 Site: 01_Allandale Rd & Greig St

2020 AM Peak Hour + Development Traffic Volumes (Includes latent)

Allandale Rd & Greig St

Proposed intersection Layout

Signals - Fixed Time Cycle Time = 70 seconds (User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Greig St											
1	L2	1	0.0	0.001	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
2	T1	123	0.0	0.697	19.9	LOS B	9.5	66.4	0.89	0.92	43.2
3	R2	736	0.0	0.697	23.6	LOS C	9.9	69.0	0.87	0.92	43.1
Approach		860	0.0	0.697	23.1	LOS C	9.9	69.0	0.87	0.92	43.1
East: Allandale Rd											
4	L2	552	0.0	0.297	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
5	T1	1215	0.0	0.916	39.7	LOS D	26.9	188.5	1.00	1.16	36.4
6	R2	39	0.0	0.349	43.9	LOS D	1.4	9.9	1.00	0.71	34.4
Approach		1805	0.0	0.916	29.4	LOS C	26.9	188.5	0.69	0.96	40.5
North: Greig St											
7	L2	521	0.0	0.933	48.8	LOS D	19.5	136.5	1.00	1.20	33.2
8	T1	93	0.0	0.133	16.4	LOS B	2.1	15.0	0.71	0.56	47.4
9	R2	300	0.0	0.485	18.2	LOS B	6.5	45.3	0.75	0.78	45.5
Approach		914	0.0	0.933	35.5	LOS D	19.5	136.5	0.89	1.00	37.7
West: Allandale Rd											
10	L2	101	0.0	0.072	6.3	LOS A	0.4	2.6	0.21	0.60	53.5
11	T1	1236	0.0	0.924	41.6	LOS D	27.9	195.3	1.00	1.18	35.7
12	R2	94	0.0	0.830	47.6	LOS D	3.7	25.6	1.00	0.90	33.4
Approach		1431	0.0	0.924	39.5	LOS D	27.9	195.3	0.94	1.12	36.4
All Vehicles		5009	0.0	0.933	32.3	LOS C	27.9	195.3	0.83	1.01	39.1

Level of Service (LOS) Method: Delay (HCM 2000).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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**SIDRA
INTERSECTION 6**

MOVEMENT SUMMARY

Site: 01_Allandale Rd & Greig St

2020 PM Peak Hour + Development Traffic Volumes (Includes latent)
Allandale Rd & Greig St

Proposed intersection Layout

Signals - Fixed Time Cycle Time = 60 seconds (User-Given Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Greig St											
1	L2	1	0.0	0.001	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
2	T1	112	0.0	0.915	39.6	LOS D	16.1	112.6	1.00	1.18	35.1
3	R2	666	0.0	0.915	45.5	LOS D	16.1	112.6	1.00	1.16	34.3
Approach		779	0.0	0.915	44.6	LOS D	16.1	112.6	1.00	1.16	34.4
East: Allandale Rd											
4	L2	867	0.0	0.467	5.7	LOS A	0.0	0.0	0.00	0.53	54.8
5	T1	1471	0.0	0.794	15.7	LOS B	21.4	149.9	0.84	0.83	47.8
6	R2	344	0.0	0.989	53.2	LOS D	12.6	88.0	1.00	1.22	31.7
Approach		2682	0.0	0.989	17.2	LOS B	21.4	149.9	0.59	0.78	46.7
North: Greig St											
7	L2	101	0.0	0.165	14.0	LOS B	1.2	8.2	0.75	0.71	48.3
8	T1	145	0.0	0.235	16.6	LOS B	3.2	22.4	0.78	0.63	47.3
9	R2	64	0.0	0.156	24.3	LOS C	1.5	10.4	0.80	0.73	42.3
Approach		311	0.0	0.235	17.3	LOS B	3.2	22.4	0.77	0.68	46.5
West: Allandale Rd											
10	L2	366	0.0	0.339	9.1	LOS A	3.7	25.7	0.52	0.71	51.6
11	T1	1097	0.0	0.888	32.1	LOS C	19.8	138.4	1.00	1.11	39.3
12	R2	146	0.0	0.885	48.2	LOS D	6.0	41.9	1.00	1.12	33.2
Approach		1609	0.0	0.888	28.4	LOS C	19.8	138.4	0.89	1.02	40.9
All Vehicles		5381	0.0	0.989	24.5	LOS C	21.4	149.9	0.75	0.90	42.7

Level of Service (LOS) Method: Delay (HCM 2000).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report

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Project: Z:\17000\17260 Century Mushroom Farm\2 - Design\2.5 Traffic\2.5.3 SIDRA\Project1.sip6

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MOVEMENT SUMMARY

Site: 02_Allandale Rd & Access to filling Station

2020 AM Peak Hour + Development Traffic Volumes (Includes latent)
 Allandale Road and Access to filling station
 Proposed Intersection Layout
 Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South: Access												
1	L2	53	0.0	0.028	5.6	LOS A	0.0	0.0	0.00	0.53	54.9	
Approach		53	0.0	0.028	5.6	NA	0.0	0.0	0.00	0.53	54.9	
East: Allandale Road												
4	L2	53	0.0	0.028	5.5	LOS A	0.0	0.0	0.00	0.58	53.6	
5	T1	1463	0.0	0.375	0.0	LOS A	0.0	0.0	0.00	0.00	59.9	
Approach		1516	0.0	0.375	0.2	NA	0.0	0.0	0.00	0.02	59.7	
All Vehicles		1568	0.0	0.375	0.4	NA	0.0	0.0	0.00	0.04	59.5	

Level of Service (LOS) Method: Delay (HCM 2000)

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation

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 SIDRA INTERSECTION 6.0.24.4877

Project: Z:\17000\17260 Century Mushroom Farm\2 - Design\2.5 Traffic\2.5.3 SIDRA\Project1.sip6
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**SIDRA
 INTERSECTION 6**

MOVEMENT SUMMARY

Site: 02_Allandale Rd & Access to filling Station

2020 PM Peak Hour + Development Traffic Volumes (Includes latent)
Allandale Road and Access to filling station
Proposed Intersection Layout
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OB Mov	Demand Total veh/h	Flows HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop Queued	Effective Stop Rate per veh	Average Speed km/h	
South: Access												
1	L2	55	0.0	0.029	5.6	LOS A	0.0	0.0	0.00	0.53	54.9	
Approach		55	0.0	0.029	5.6	NA	0.0	0.0	0.00	0.53	54.9	
East: Allandale Road												
4	L2	55	0.0	0.029	5.5	LOS A	0.0	0.0	0.00	0.58	53.6	
5	T1	1481	0.0	0.380	0.1	LOS A	0.0	0.0	0.00	0.00	59.9	
Approach		1536	0.0	0.380	0.2	NA	0.0	0.0	0.00	0.02	59.7	
All Vehicles		1591	0.0	0.380	0.4	NA	0.0	0.0	0.00	0.04	59.5	

Level of Service (LOS) Method: Delay (HCM 2000).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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**SIDRA
INTERSECTION 6**

ANNEXURE E2: GEOTECHNICAL STUDY

GEO TECHNICAL REPORT

REMAINING EXTENT OF PORTION 2 BOTHASFONTEIN 408-JR

Lidwala Document No. G/05/012/1G

June 2005

Prepared For:

ERF 51 MELVILLE CC

LIDWALA



Prepared By:

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Northcliff, 2115

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GEO TECHNICAL REPORT

REMAINING EXTENT OF PORTION 2 BOTHASFONTEIN 408-JR

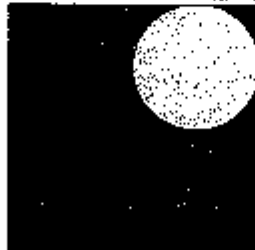
Lidwala Document No. G/05/012/1G

June 2005

Prepared For:

ERF 51 MELVILLE CC

LIDWALA



Prepared By:

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APPENDIX F: DCP Test Results
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EXECUTIVE SUMMARY

A mixed land use development is proposed on Remaining Extent of Portion 2 of the farm Bothasfontein 408 JR in Midrand for the Erf 51 Melville CC.

Lidwala Consulting Engineers Gauteng (Pty) Ltd were appointed by the developers, Erf 51 Melville CC, as Consulting Civil Engineers to carry out a geotechnical investigation which includes the preparation of a geotechnical report that has to be presented to the Department of Geological Surveys.

The investigation consisted of three phases, i.e.:

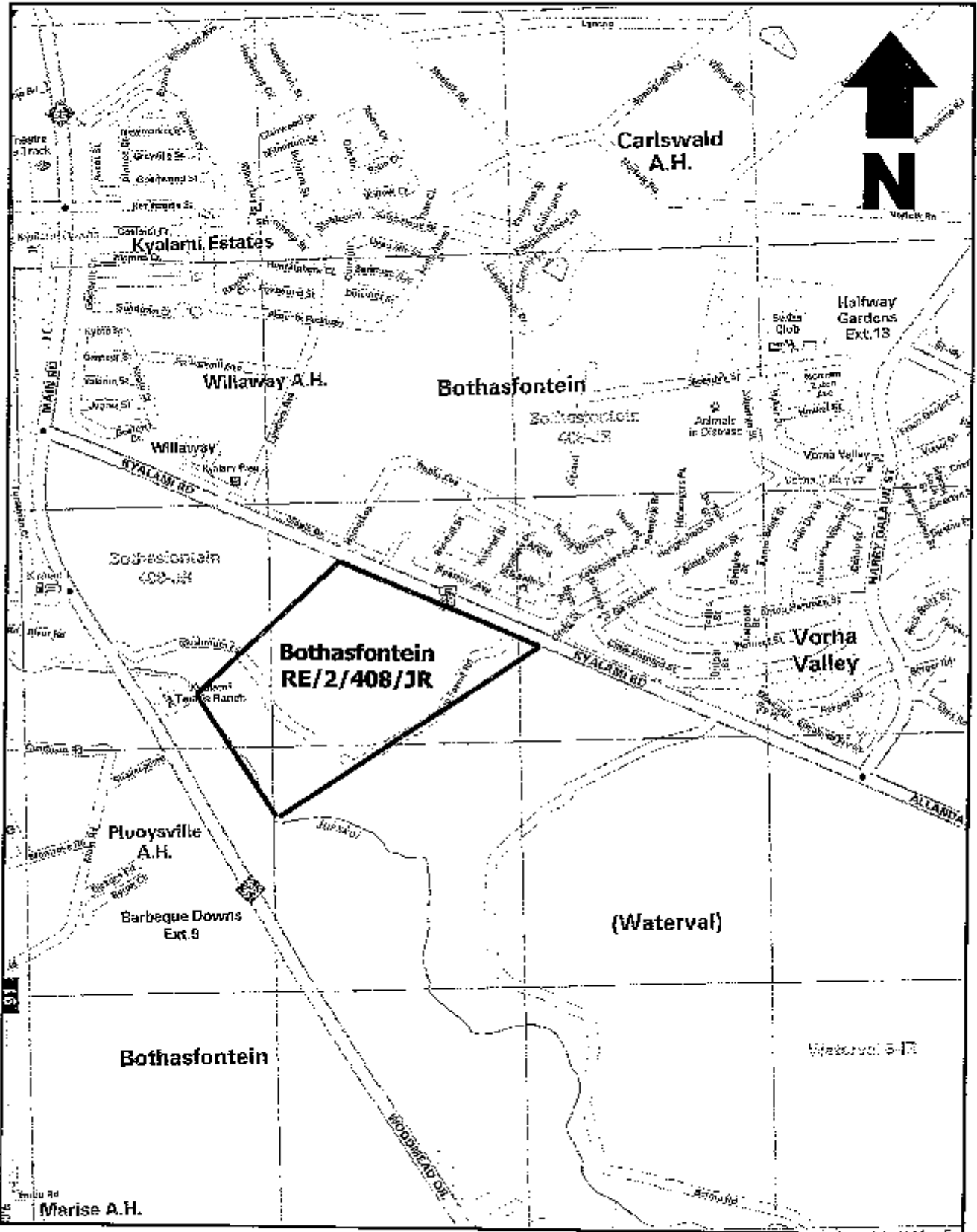
1. a desk study to establish the geology of the site;
2. fieldwork, which included the excavation of five test pits for soil profiling and sampling purposes; and
3. laboratory testing to establish the characteristics of the in-situ materials on site.

The abovementioned investigation phases are discussed in the report and recommendations are made with regard to the different aspects of township development.

Generally speaking it could be summarised that the geotechnical conditions of the site are favourable for the proposed housing development.

A M A Raspi Pr. Tech. Eng.
Lidwala Consulting Engineers (Gauteng) (Pty) Ltd

FIGURE 1: LOCALITY PLAN



1. INTRODUCTION AND TERMS OF REFERENCE

A mixed land use township is to be developed on Remaining Extent of Portion 2 of the farm Bothasfontein-408 JR in Midrand.

Lidwala Consulting Engineers Gauteng (Pty) Ltd were appointed by the developers, Erf 51 Melville CC, as consulting civil engineers to carry out a geotechnical investigation, including the preparation of a geotechnical report.

The object of the investigation were to:

- establish the stratigraphy and relevant engineering properties of the materials underlying the site;
- determine the suitability of the property for residential township development in terms of the requirements of geological survey (Department of Mineral and Energy Affairs); and acting on behalf of the Director of Local Government; and
- determine the suitability of materials in a road pavement design.

This report outlines the method of the investigation and describes the geological conditions encountered. The results of the investigation are evaluated and conclusions drawn with regard to the above objectives.

2. DESCRIPTION OF THE SITE AND ACCESS

The site comprises the Remaining Extent of Portion 2 of the farm Bothasfontein-408 JR. The locality of the site is shown on the locality plan in Figure 1. The total area of the site is approximately 55,3 hectares. Access to the site is obtained from Allandale Road via N1 Freeway, turning west onto Allandale Road and then turning south into the said property, which is situated, in the Midrand region of the Greater Johannesburg Metropolitan Council. The site is bound by Allandale road and the Jukskei River on its northern and southern boundaries respectively and by the future K73 road reserve and remainder of Portion 1 of the Farm Waterval No. 5-IR. The site slopes from northeast to southwest at an average grade of 1:15.

Vegetation consists mainly of veld grasses with many scattered wattle and eucalyptus trees. The site was previously as a mushroom farm, which has been in disuse for many years. Equestrian activities as well as the manufacture of compost are currently being undertaken on portions of the property.

A mixed land use development is proposed for this.

3. INVESTIGATION PROCEDURE

3.1 DESK STUDY

A desk study involving the perusal of the 1:250 000 geological maps of the East and West Rand (no's 2628 and 2625 respectively) as well as a detailed geological description of the area by *Brink (1979)* was undertaken to establish broad geological boundaries. A contour map and aerial photographs were also used to assist in the location of the test pits.

3.2 FIELD-WORK

The field-work included the excavation of forty test pits, TP1 to TP40, across the site, in order to determine the soil formations of the underlying soil and to obtain samples for possible laboratory testing.

A CAT 428C Series II tractor-loader-backhoe (TLB) equipped with a 600mm bucket was used to excavate the test pits. The test pits positions are indicated on the site development plan in **Appendix A**.

The soil profiling of thirty eight (38) test pits was carried out according to the guidelines proposed by *Jennings et al (1973)*. The profile logs of the test pits are given in **Appendix G**.

Soil samples were taken from strategic horizons along the sides of the test pits for laboratory testing.

The Dynamic Cone Penetrometer was used to determine in-situ bearing strengths of the various soil horizons. The results are included in **Appendix F**.

3.3 LABORATORY TESTING

Soil samples taken during the field-work stage were submitted to the laboratory Civilab Civil Engineering Testing Laboratories for the following testing:

- a) Foundation Indicator Test: TMH1 - Test method A1-A6
- b) Road indicator test: TMH1 - Test method A1-A5
- c) Collapse potential with Double Oedometer Test
- d) pH of soil suspension: TMH1 - Test method A20
- e) Conductivity: TMH1 - Test method A21T

The test results are included in the Appendices at the back of the report.

4. SITE GEOLOGY

4.1 GENERAL GEOLOGY

Published geological maps and the investigation have indicated that the site generally overlies granite and gneiss rocks of the basement complex. These rocks are part of the Johannesburg-Pretoria granite Inlier of Halfway House Granite Dome. A syenite dyke crosses midway through the site from west to east.

A shallow porous colluvium overlies the residual granite soils over the whole of the proposed development site, except for the central part of the site where the site was disturbed for the construction of concrete slabs and tunnels for mushroom farming activities. Rock outcrops are evident along the Jukskei River on the southern boundary of the property.

4.2 SITE ZONING AND PEDOLOGY

It is considered convenient to divide the site into two typical soil formations according to the soil profiles included in *Appendix G*. The geological characteristics of each zone are outlined separately below:

Zone 1

The typical soil profile is characterized by shallow to fairly deep (0,2 – 0,9 m) loose silty sand granite and quartz gravel colluvium underlain by a weathered residual granite. The colluvium comprises mainly of decomposed granite and other silty sand gravel in an orange to light brown silty sand gravel sand matrix, which are agriculturally reworked. The underlying residual granite extends to variable depths due to differential weathering. It consists of a silty sand gravel, which has a blue grey to greyish white speckled orange to light brown colour. The consistency of the residual granite improves from firm to hard with depth. Refusal in the residual granite took place at approximately 1,1 – 3 m deep. Coarse gravel and boulders were encountered at depths of 1,1 to 2,5. (See profiles TP 3, TP 13 and TP 36).

Zone 2

Zone 2 is found mainly on the banks of the Jukskei River that is the southern boundary of the site. The colluvial layer found in the other zones, as well as most of the weathered residual granite has been washed away by the stream. The result of this is that a shallow weathered granite layer overlays the unweathered hard granite rock which daylight as rock outcrops close to the river's main flow path.

4.3 GROUND WATER

No ground water was encountered in any of the test pits. The site is however well covered with many large Eucalyptus and Wattle trees. These trees are known to draw large amounts of water, which may result in the lowering of the water table. Should these trees be removed to make way for development, the water table is likely to rise over a period of time.

5. GEOTECHNICAL EVALUATION

The relevant engineering characteristics of the materials encountered have been evaluated by visual assessment during profiling and from the results of the field and laboratory testing

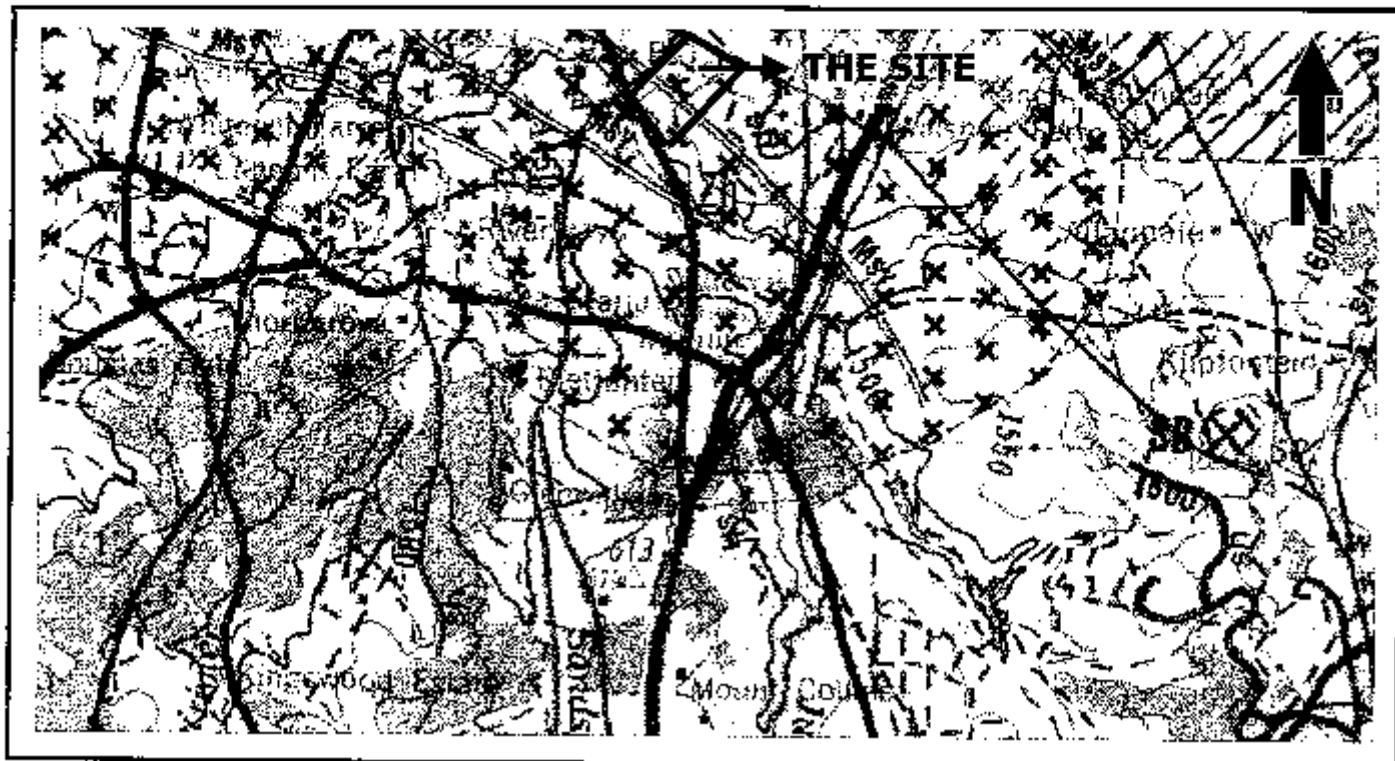
These may be summarized as follows:

5.1 CONSOLIDATION CHARACTERISTICS

Undisturbed samples of the decomposed residual granite and silt sand transported soil (2nd horizon) were tested using the Double Oedometer Test. The test consists of one sample being compressed at natural moisture content and another in the saturated state using one-dimensional consolidometer.

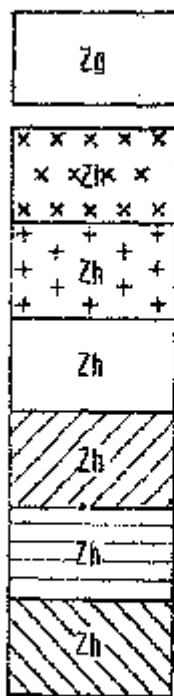
The collapse potential of the weathered residual granite has been estimated according to the method described by *Schwartz* (1985) and *Schmertmann* (1953). The results of the Double Oedometer Test are given in *Appendix C*.

FIGURE 2: GEOLOGICAL MAP OF PROPOSED DEVELOPMENT



Msy Syenite
Siëniet Dyke

- Gneiss, migmatite, porphyritic granodiorite (× ×)
- Gneis, migmatiet, porfiritiese granodioriet (× ×)
- Grey, medium-grained, porphyritic granodiorite (+ +)
- Grys, middelkorrelrige, porfiritiese granodioriet (+ +)
- Grey, medium-grained granodiorite ()
- Grys, middelkorrelrige granodioriet ()
- Zh Migmatite, banded gneiss, porphyritic granodiorite (//)
- Migmatiet, gestreepte gneis, porfiritiese granodioriet (//)
- Pinkish-grey medium- to coarse-grained, granodiorite (———)
- Pienkerige grys, middel- tot grofkorrelrige, granodioriet (———)
- Ultramafic rocks, granitic rocks, dioritic gneiss, hornblende gneiss, biotite gneiss, hybrid mafic rocks (\ \ \)
- Ultramafiese gesteentes, granitiese gesteentes, dioritiese gneis, horingblendegneis, biotietgneis, hibridiese mafiese gesteentes (\ \ \)



HALFWAY HOUSE GRANITE
HALFWEGHUISGRANIT

Two samples which were tested are in the transported soils (TP 3) and in the residual granites (TP 33), the material is collapsible at a rate between 1,7% (transported soils) and 3,5% (residual granites).

The collapse potential has been calculated to fall in the range 1% - 5% (Moderate Trouble) outlined in Appendix C, this indicates moderate collapse problems. It is stated by *Jennings & Knight* (1975) that the value of C_p is only a "ball park" figure, but it can be expected that only slight collapse problems will occur with only residential buildings are built on the site.

5.2 HEAVE

The methods proposed by *Van der Merwe* (1964) have been used to determine the heave potential at the site. None of the horizons appear to be potentially expansive, with all samples falling into the "low" range of the *Van der Merwe* activity diagram, as indicated on the diagrams included in *Appendix B*.

5.3 BEARING CAPACITY

The DCP test results are included in *Appendix F*. The average Unconfirmed Compressive Strength (UCS) of the samples from the test pits at a depth of 300mm is approximately 100kPa - 150kPa increasing with increasing depth. From these results it can be concluded that no shear or bearing capacity problems are anticipated for the expected low applied foundation loading associated with residential buildings.

5.4 EXCAVATABILITY

Limited hard or boulder excavation is foreseen within a depth range of between 1,1m to 2,5m. Hard granite rock outcrops mainly of the southern portion of the site close to the Jukskei River have, however, been encountered. Excavations in these rock formations would require blasting.

5.5 ENGINEERING PROPERTIES OF THE IN SITU MATERIALS

The materials were classified in terms of TRH 14 for road construction purposes, as shown in the summary of the test pit data.

In general both the colluvium and the decomposed granite complies with G6 properties and can thus be used as selected subgrade material in the layer works of the road pavement structures. G5 materials were encountered in the decomposed granites. A G5 material can be used as a natural or a cement treated sub-base or as base in certain road pavement structures.

5.6 pH OF SOIL SUSPENSION

The results of the chemical testing of residual soils indicate a pH value of 4.9 to 6.7 and the soil conductivity of 25 mS/m and 104 mS/m. These soils are thus considered as corrosive, due to the acidity of the soil. (Results are given in *Appendix E*).

5.7 EXCHANGEABLE SODIUM PERCENTAGE SOIL DISPERSIVENESS TEST

The results given in *Appendix E* show that the samples tested from TP 3 and TP 33 are non dispersive. (As described by Harmse, Prof HJ Von M; 1980)

6. RECOMMENDATIONS

6.1 FOUNDATIONS

The site is suitable for development, however, due to the collapse potential and presence of rock outcrops, founding precautions need to be undertaken.

Zone 1	Residual Granite	Class C1
Zone 2	Rock Outcrops	Class C/R

Zone 1 Residual Granite Class C1

This area covers approximately 94% of the site. This area is suitable for development, but the profile exhibits a collapse potential, thus special founding procedures are required.

Light Structures

For light structures founded on decomposed residual granite the following foundations and building procedures can be applied;

- reinforced strip footings and articulated brickwork, or
- over excavation and re-compaction of in-situ material to a depth 1,5 times foundation width below founding level. Re-compaction to 93% Mod AASHTO together with lightly reinforced strip footing; or
- stiffened raft, or
- mini-piles

Medium to heavy structures

For such structures augured or driven piles are considered the most practical founding option.

Zone 2 Rock Outcrops

These areas are areas of well-defined outcrop areas.

These are, however, mainly situated along the Jukskei River banks in the floodline area.

Locating footings on the outcrop areas outside the floodline areas is possible, but blasting and leveling may be necessary.

The layout of the site/structure should, where possible, incorporate these outcrops as features such that they do not have to be destroyed. Special founding precautions need to be taken in the transition zone between the hard rock and highly weathered residual granite.

6.2 ROADWORKS

The in-situ materials can be used selectively in the roadworks as a natural selected sub-grade and natural or cement treated sub-base. It is not foreseen that any drainage problems will be encountered during roadworks.

6.3 UTILITY SERVICES

The neutral to acid soil suspension will necessitate special measures for the protection of steel pipes and steel pipe fittings.

6.4 GENERAL

As the area is characterized by a collapsing profile, good control and drainage of stormwater runoff must be ensured to minimize ponding and ingress of water in the foundation profile. Moisture is often the trigger mechanism for collapse and thus the following additional precautions should also be considered:

- Discharge of stormwater/surface water in lined channels;
- Impermeable surround around structures.

It is recommended that founding conditions be re-assessed once layout, floor levels and type of structures are finalized and where necessary additional geotechnical investigation be undertaken.

Soft to Intermediate excavation is expected to a depth of 1m-2m.

In areas of rock outcrop hard excavation (e.g blasting) may be required.

7. CONCLUSION

It is the author's opinion that the geotechnical conditions at this site are generally favourable for the proposed development, provided that cognisance is taken of the following:

- Moderate collapse potential of foundations sub-grades
- Potential differential settlement on sub-grade interfaces
- Potential corrosive conditions on steel pipes and fittings

This can be solved inter alia through:

- Reinforced strip footings and pre-collapse of foundation sub-grades
- Protection of steel pipes and fittings.

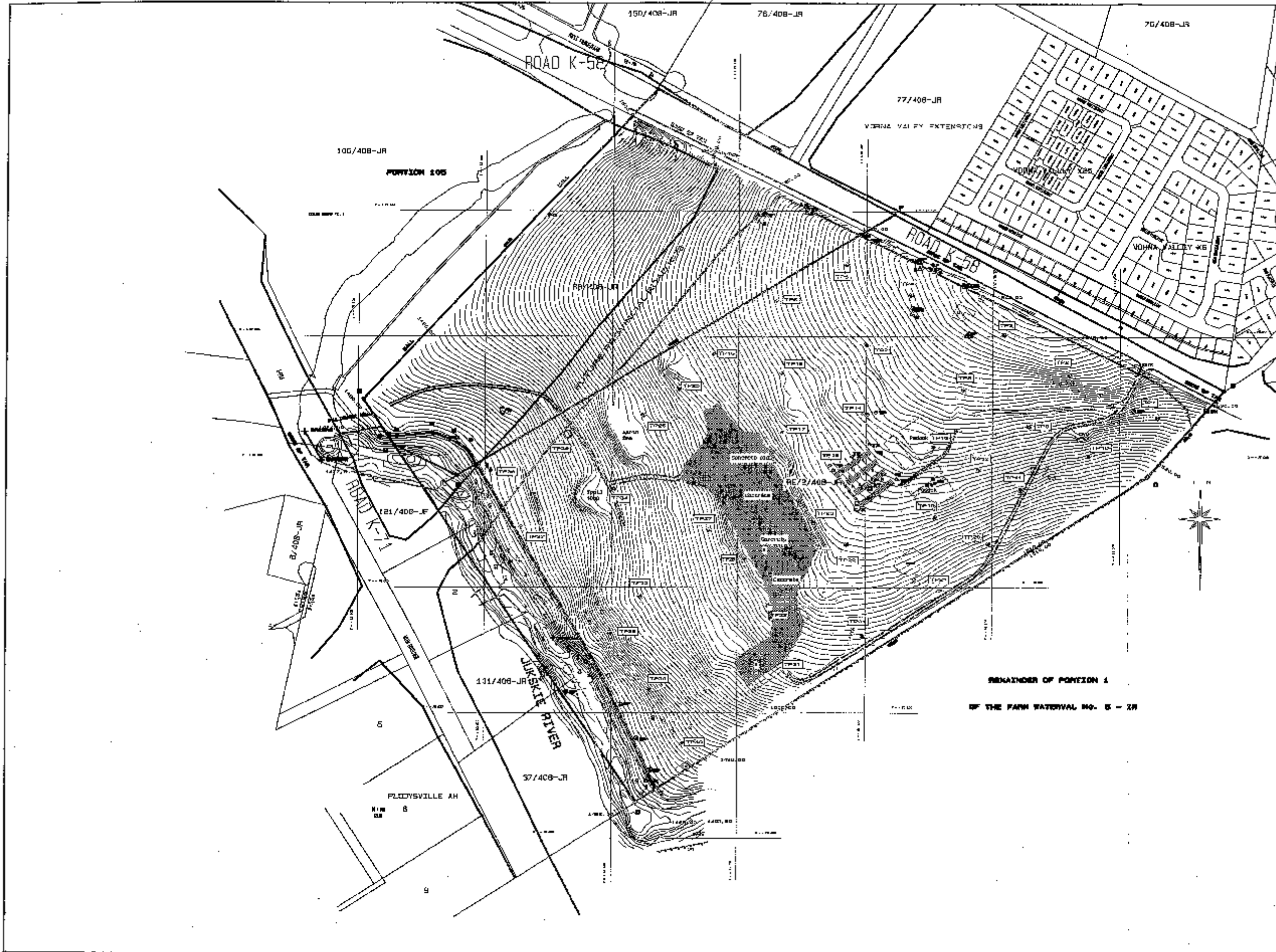
It should be borne in mind that the conclusions reached and recommendations made in this report apply to the proposed township in general. Individual stands may, therefore, have ground conditions, which differ somewhat from that encountered during this investigation.

LIST OF REFERENCES

- BRINK A B A. 1985. *Engineering Geology of Southern Africa*. Building Publications: Pretoria.
- DAS B M. 1994. *Principles of Geotechnical Engineering*. P W S Publishing Company: Boston.
- JENNINGS J E et al. 1973. Revised guide to soil profiling for Civil Engineering purposed in Southern Africa. *The Civil Engineering in South Africa*. Volume 15, No. 1, pp. 3-12. SAICE: Johannesburg.
- JENNINGS J E & KNIGHT K. 1975. A guide to construction on or with materials exhibiting additional settlement due to "collapse" of grain structure. *Proceedings of the Sixth Regional Conference for Africa on Soil Mechanics and Foundation Engineering*. pp. 99-105. Durban.
- PECK R B et al. 1974. *Foundation Engineering*. John Wiley & Sons: New York.
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- SCHWARTZ K. 1985. Collapsible soils. *The Civil Engineering in South Africa*, Volume 27, No. 7, pp. 379-393. SAICE: Johannesburg.
- HARMSE H J VON M. Dispersiewe grond en hul ontstaan, identifikasie en stabilisasie. *Ground profile No. 22*, April 1980.

APPENDIX A

DRAWINGS



Notes
 1. True Nth positions are approximate

LEGEND

- Arched Roads
- Concrete/Asphalt
- Zone 1 Watercourse Channel Geotechnical Class 1/2
- Zone 2 Channel Bank Geotechnical Class 1/2/3/4
- Park Flume
- Trench
- GIC Limits

NO.	DATE	PROVIDED	SCALE

PROJECT
 BATHASFONTEN RE/2/408-JR

TITLE DRAWING
 GEOTECHNICAL INVESTIGATION
 SITE ZONING
 AND TESTPIT POSITIONS

DESIGNER	DATE
A. RASPI	11/8
SCALE	DATE
1:6000	JUNE 2025
DRAWN BY	

PROJECT NO.
 G6505762

APPENDIX B

**INDICATOR TEST
RESULTS**

FOUNDATION INDICATOR

FOUNDATION INDICATOR (TMH 1 : A1, A2, A3, A4, A5 & A6)

CLIENT : LIDWALA CONSULTING ENGINEERS
 P O BOX 4221
 NORTHCLIFF
 2115

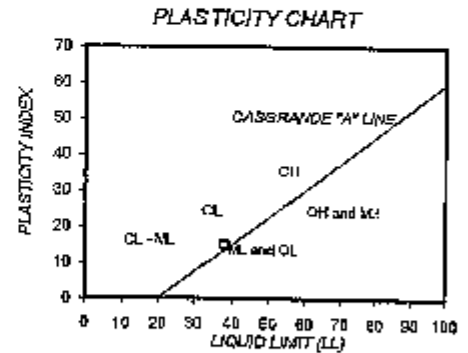
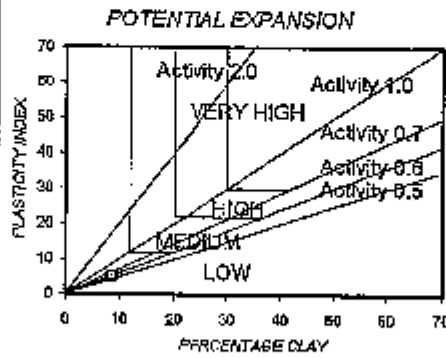
DATE REPORTED : 15-Jun-05
 YOUR REF. : G/05/015-07/mvt
 OUR REF. : HP/B 76-27
 SAMPLE No. : 25768

SAMPLE DESCRIPTION : TP2: 1.100 - 2.000

Attention A RASPI

Material description SANDY LEAN CLAY

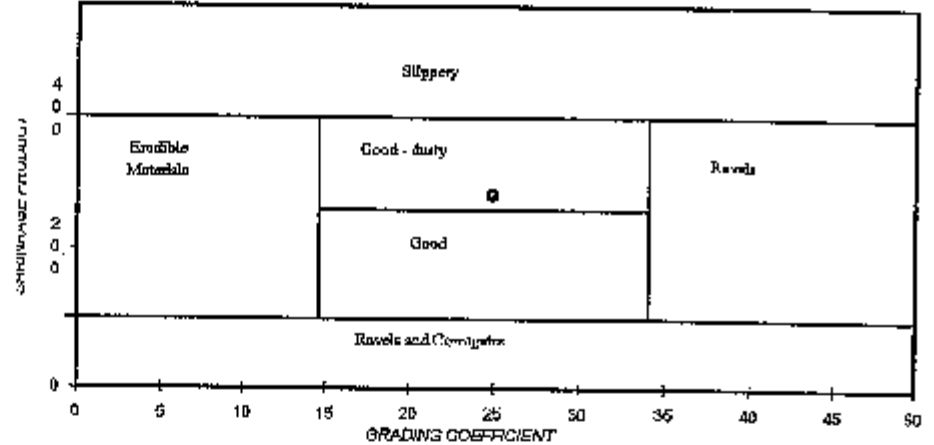
Sieve analysis Cumulative percentage passing (mm)	
75.0	100
63.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	98
4.75	90
2.000	72
0.425	35
0.075	25
0.050	22
0.005	12
0.002	9



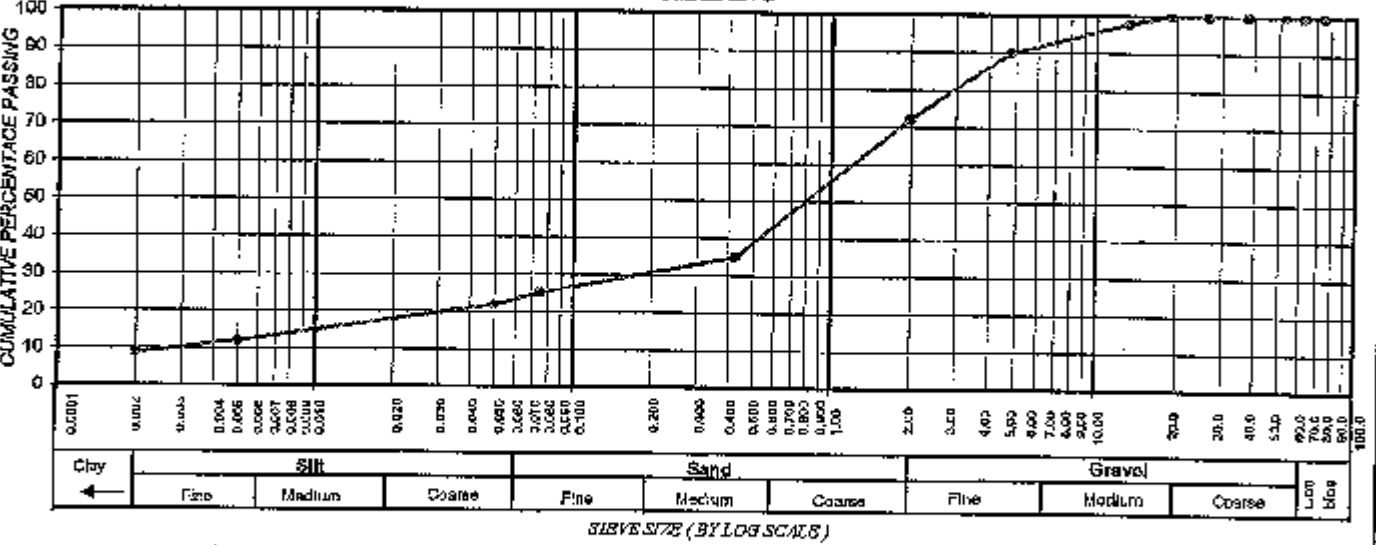
Soil Monitor Analysis % < 2.0mm	
2.000 - 0.425	51.7
0.425 - 0.250	5.8
0.250 - 0.150	3.9
0.150 - 0.075	3.9
< 0.075	34.8

Effective size	0.003
Uniformity Coefficient	433.3
Curvature Coefficient	9.3
Oversize Index	0.0
Shrinkage Product	279.0
Grading Coefficient	24.9
Grading modulus	1.68
Aterberg Limits	
Liquid Limit	38
Plasticity Index	15
Linear Shrinkage	6
Unified Soil Classification	CL
U.S. Highway Classification	A-2-6(0)
pH - Value	-
Conductivity mS/cm	-

PERFORMANCE AS WEARING COURSE



SIEVE GRADING



Remarks: The sample were subjected to analysis according to test method A8 of TMH 1 1979
 The results reported relate only to the sample tested
 Documents may only be reproduced or published in their full context

For: Civilab

FOUNDATION INDICATOR (TMH 1 : A1, A2, A3, A4, A5 & A6)

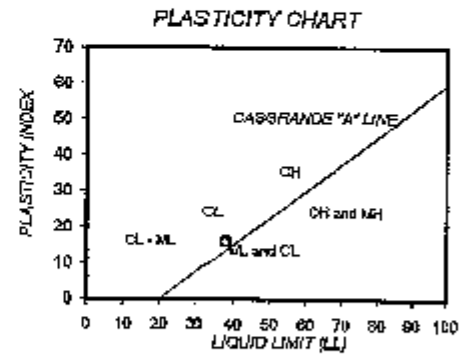
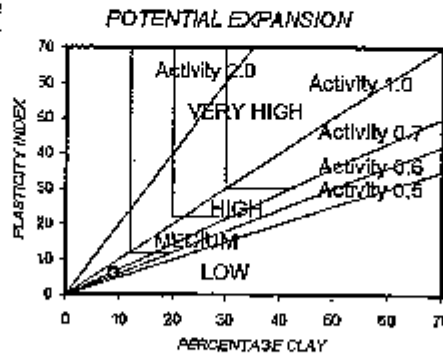
CLIENT : LIDWALA CONSULTING ENGINEERS
 P O BOX 4221
 NORTHCLIFF
 2115

DATE REPORTED : 15-Jun-05
 YOUR REF. : G/05/015-07/mvt
 OUR REF. : HP/B 76-27
 SAMPLE No. : 25771
 SAMPLE DESCRIPTION : TP16: 0.300-2.500

Attention A RASPI

Material description SANDY LEAN CLAY

Sieve analysis Cumulative percentage passing (mm)	75.0	100
	63.0	100
	53.0	100
	37.5	100
	26.5	100
	19.0	100
	13.2	100
	4.75	94
	2.000	71
	0.425	38
	0.075	27
	0.050	22
0.005	13	
0.002	9	



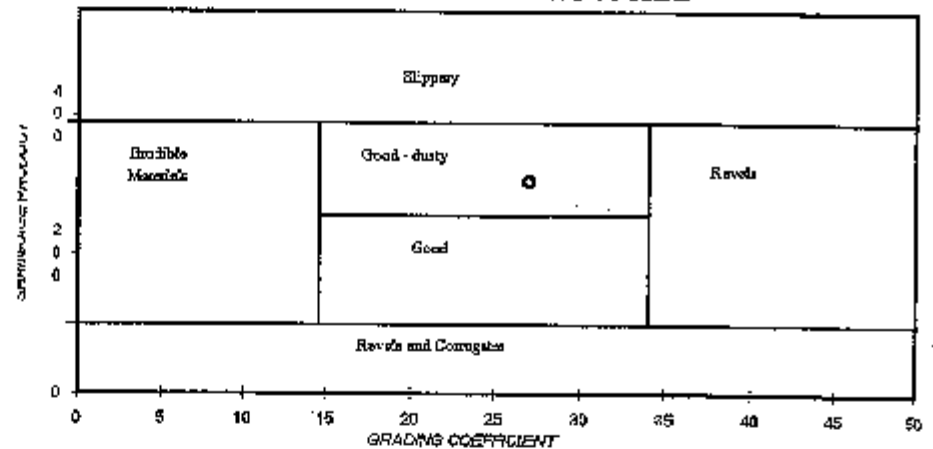
Soil Mottle Analysis % < 2.00mm	2.000 - 0.425	46.1
	0.425 - 0.250	5.4
	0.250 - 0.150	5.4
	0.150 - 0.075	5.4
< 0.075	37.7	

Effective size	0.003
Uniformity Coefficient	520.0
Curvature Coefficient	4.4
Oversize Index	0.0
Shrinkage Product	306.4
Grading Coefficient	27.1
Grading modulus	1.64

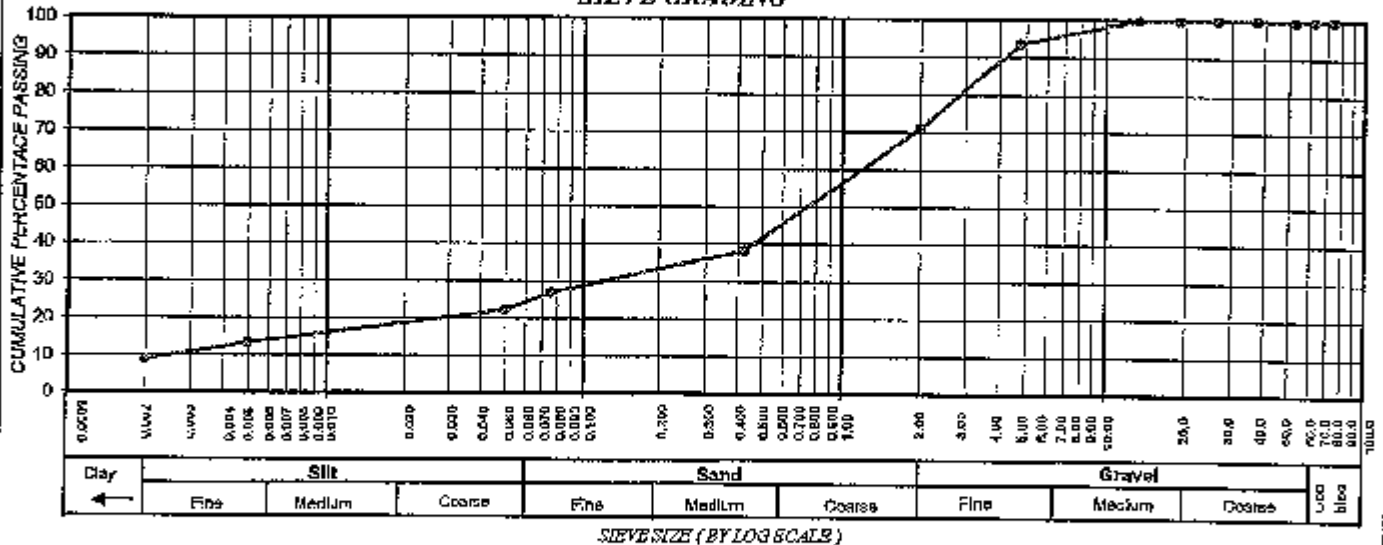
Atter berg Limits	Liquid Limit	38
	Plasticity Index	16
	Linear Shrinkage	8

Unified Soil Classification	CL
U.S. Highway Classification	A-2-6(1)
pH - Value	-
Conductivity ms/cm	-

PERFORMANCE AS WEARING COURSE



SIEVE GRADING



Remarks : The sample were subjected to analysis according to test method A8 of TMH1 1978
 The results reported relate only to the sample tested
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For: Civilab

FOUNDATION INDICATOR (TMH 1 : A1, A2, A3, A4, A5 & A6)

CLIENT : LIDWALA CONSULTING ENGINEERS
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 NORTHCLIFF
 2115

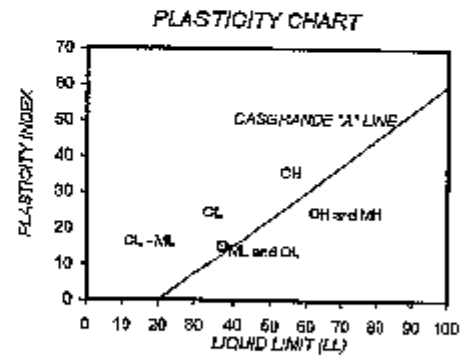
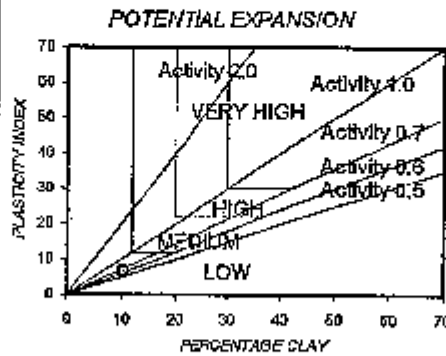
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 YOUR REF. : G/05/015-07/mvt
 OUR REF. : HP/B 76-27
 SAMPLE No. : 25772

SAMPLE DESCRIPTION : TP18: 0.450-1.300

Attention A RASPI

Material description SANDY LEAN CLAY

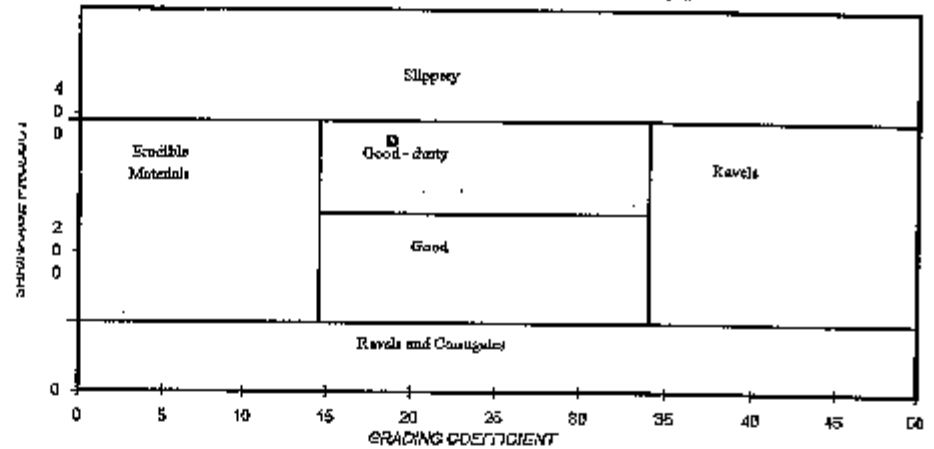
Sieve analysis Cumulative percentage passing (mm)	75.0	100
	63.0	100
	53.0	100
	37.5	100
	26.5	100
	19.0	100
	13.2	100
	4.75	98
	2.000	80
	0.425	45
	0.075	33
	0.050	28
0.005	16	
0.002	10	



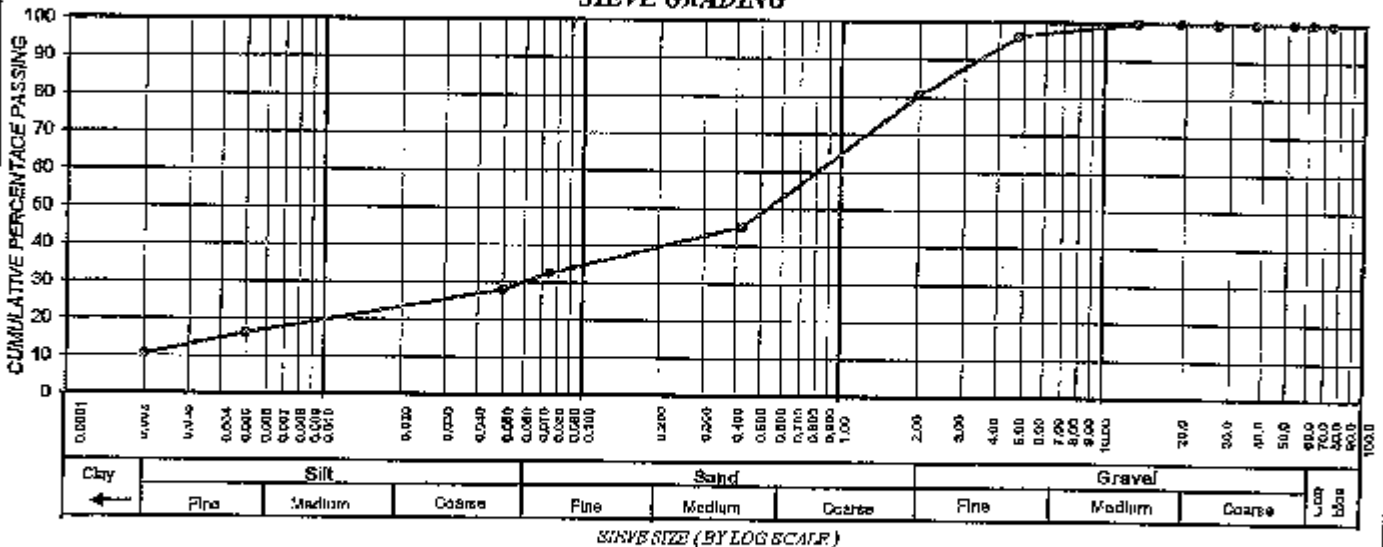
Soil Montar Analysis % < 2.00mm	2.000 - 0.425	43.8
	0.425 - 0.250	5.6
	0.250 - 0.150	4.5
	0.150 - 0.075	5.6
	< 0.075	40.5

Effective size	0.002	
Uniformity Coefficient	405.0	
Curvature Coefficient	2.2	
Oversize Index	0.0	
Shrinkage Product	361.8	
Grading Coefficient	18.9	
Grading modulus	1.42	
After- using Limits	Liquid Limit	37
	Plasticity Index	15
	Linear Shrinkage	8
Unified Soil Classification	CL	
U.S. Highway Classification	A-2-B(1)	
pH - Value	-	
Conductivity ms/cm	-	

PERFORMANCE AS WEARING COURSE



SIEVE GRADING



Remarks: The sample were subjected to analysis according to test method A6 of TMH1 1979
 The results reported relate only to the sample tested
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For: Civilab

FOUNDATION INDICATOR (TMH 1 : A1, A2, A3, A4, A5 & A6)

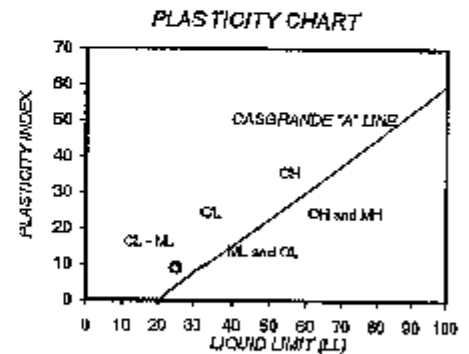
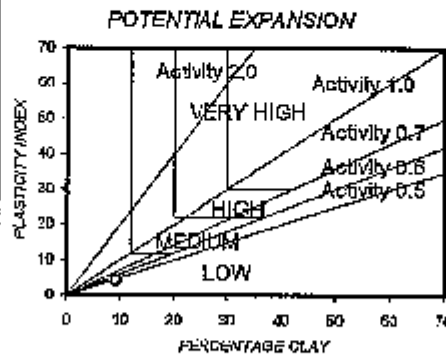
CLIENT : LIDWALA CONSULTING ENGINEERS
 P O BOX 4221
 NORTHCLIFF
 2115

DATE REPORTED : 15-Jun-05
 YOUR REF. : G/05/015-07/mvt
 OUR REF. : HP/B 70-27
 SAMPLE No. : 25773
 SAMPLE DESCRIPTION : TP21: 0,400-1,200

Attention A RASPI

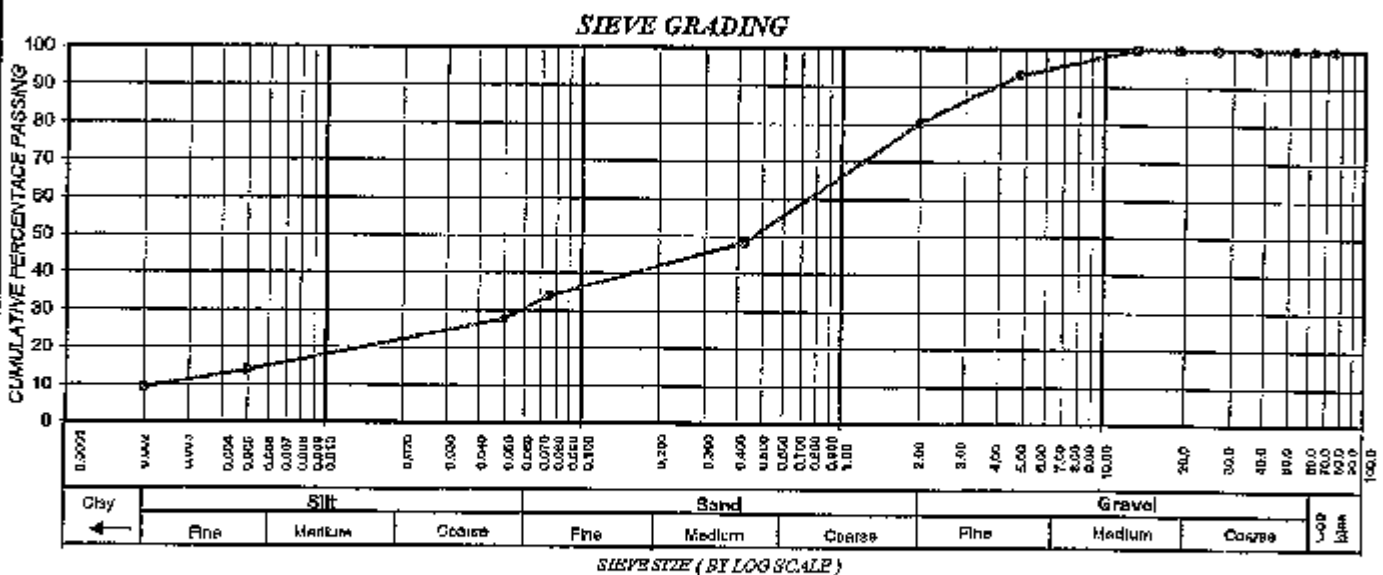
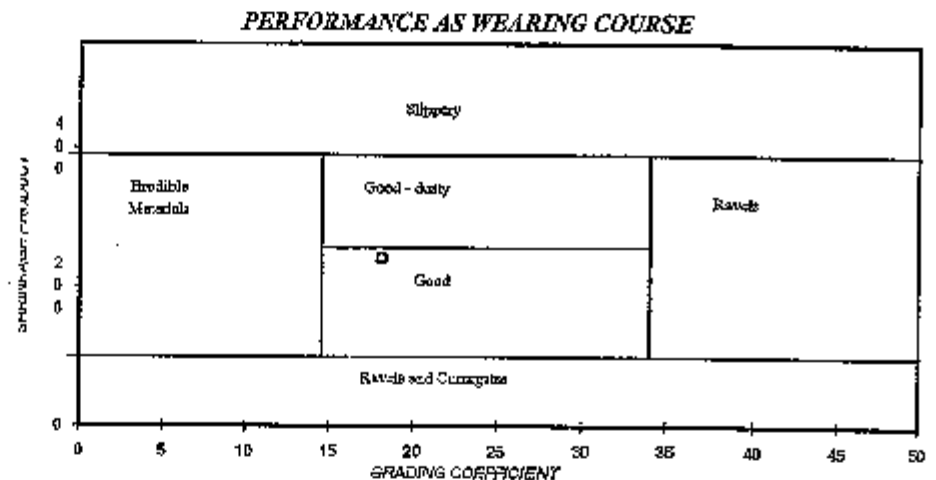
Material description SANDY LEAN CLAY

Sieve analysis Cumulative percentage passing (mm)	75.0	100
	63.0	100
	53.0	100
	37.5	100
	26.5	100
	19.0	100
	13.2	100
	4.75	93
	2.000	81
	0.425	48
	0.075	34
	0.050	28
0.005	14	
0.002	9	



Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	39.8
	0.425 - 0.250	4.8
	0.250 - 0.150	4.8
	0.150 - 0.075	8.4
< 0.075	42.1	

Effective size	0.002	
Uniformity Coefficient	375.0	
Curvature Coefficient	2.4	
Overize Index	0.0	
Shrinkage Product	242.3	
Grading Coefficient	18.1	
Grading modulus	1.97	
After being Lumps	Liquid Limit	25
	Plasticity Index	9
	Linear Shrinkage	5
Unified Soil Classification	CL	
U.S. Highway Classification	A-2-4(0)	
pH - Value	-	
Conductivity mS/cm	-	



Remarks: The sample were subjected to analysis according to test method A8 of TMH1 1979
 The results reported relate only to the sample tested
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For: Civilab

FOUNDATION INDICATOR (TMH 1 : A1, A2, A3, A4, A5 & A6)

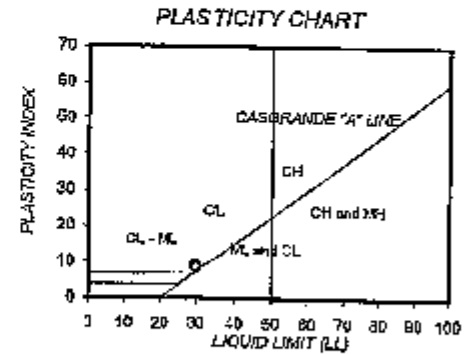
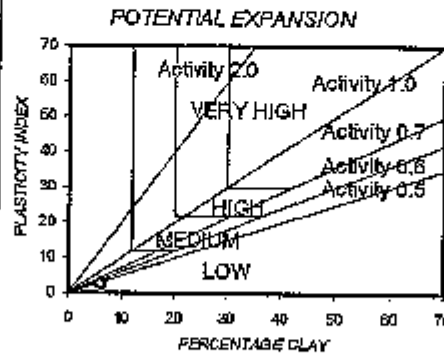
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 P O BOX 4221
 NORTHCLIFF
 2115

DATE REPORTED : 15-Jun-06
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OUR REF. : HP/B 76-27
SAMPLE No. : 25775
SAMPLE DESCRIPTION : TP28: 1.900-2.700

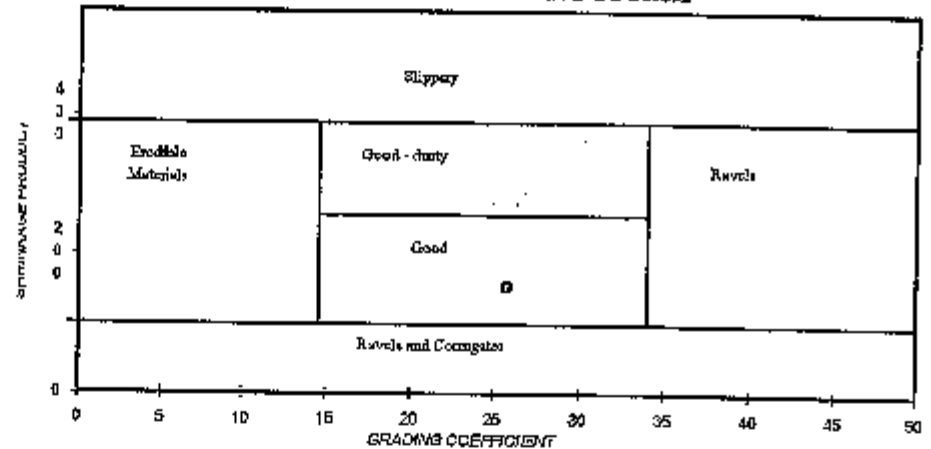
Attention : A RASPI

Material description CLAYEY GRAVEL WITH SAND

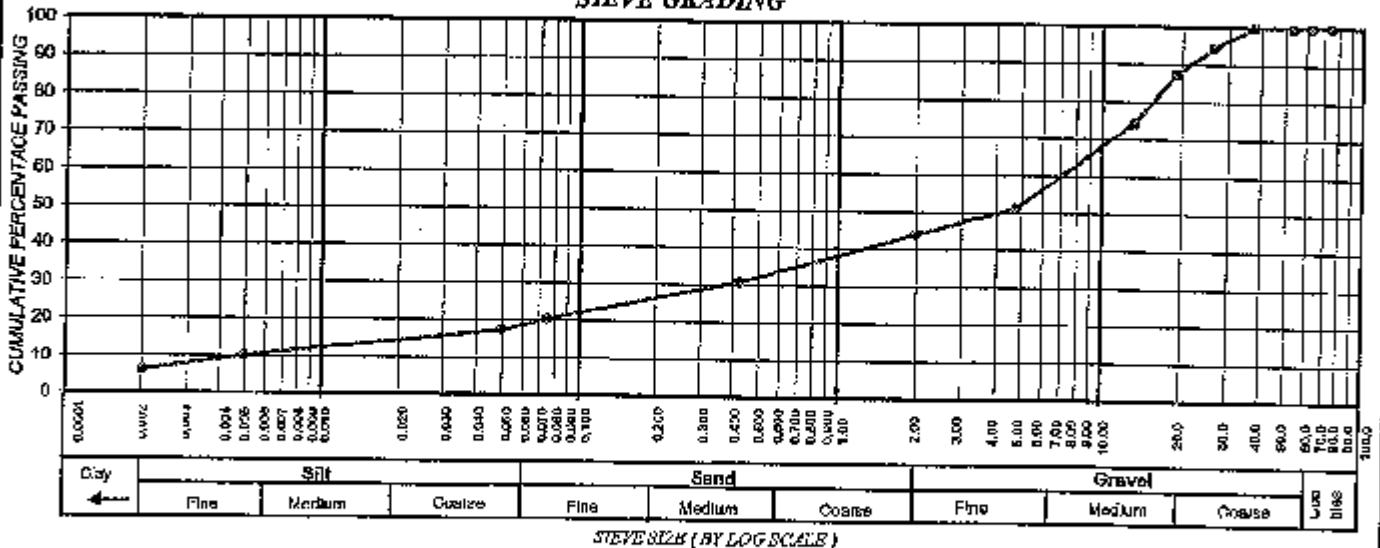
Sieve analysis Cumulative percentage passing (mm)	75.0	100
	63.0	100
	53.0	100
	37.5	100
	28.5	95
	19.0	87
	13.2	74
	4.75	51
	2.000	44
	0.425	31
	0.075	20
	0.050	17
0.005	10	
0.002	6	
Soil Mottar Analysis % < 2.00mm	2.000 - 0.425	30.0
	0.425 - 0.250	8.4
	0.250 - 0.150	7.0
	0.150 - 0.075	8.4
	< 0.075	48.2
Effective size	0.005	
Uniformity Coefficient	1400.0	
Curvature Coefficient	4.6	
Oversize Index	0.0	
Shrinkage Product	154.1	
Grading Coefficient	25.9	
Grading modulus	2.05	
Atter- berg Limits	Liquid Limit	50
	Plasticity Index	9
	Linear Shrinkage	5
Unified Soil Classification	GC	
U.S. Highway Classification	A-2-4(0)	
pH - Value	-	
Conductivity msc/m	-	



PERFORMANCE AS WEARING COURSE



SIEVE GRADING



Remarks : The sample were subjected to analysis according to test method AB of TMH1 1979
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For: Civilab

FOUNDATION INDICATOR (TMH 1 : A1, A2, A3, A4, A5 & A6)

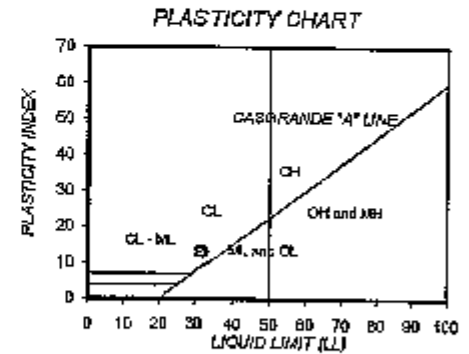
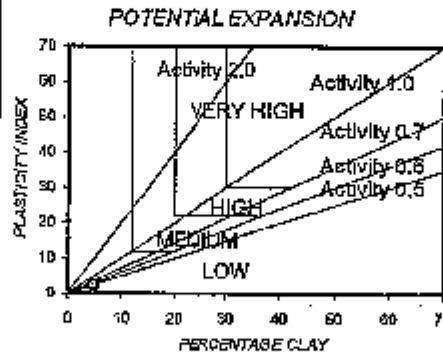
CLIENT : LIDWALA CONSULTING ENGINEERS
 P O BOX 4221
 NORTHCLIFF
 2115

DATE REPORTED : 15-Jun-05
 YOUR REF. : G/05/015-07/mvt
 OUR REF. : HP/B 76-27
 SAMPLE No. : 25778
 SAMPLE DESCRIPTION : TP33: 0.400-3.000

Attention A RASPI

Material description CLAYEY GRAVEL WITH SAND

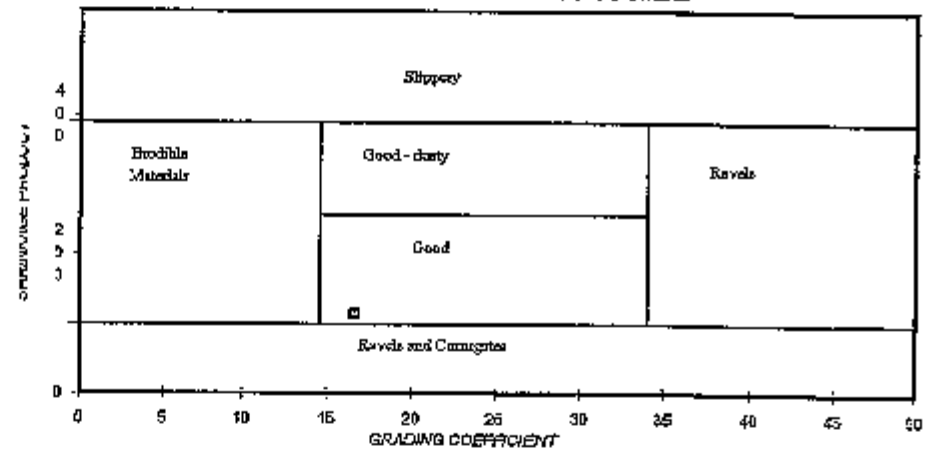
Sieve analysis Cumulative percentage passing (mm)	75.0	100
	63.0	100
	53.0	92
	37.5	79
	26.5	72
	19.0	67
	13.2	65
	4.75	51
	2.000	39
	0.425	19
	0.075	10
	0.050	9
	0.005	6
	0.002	5



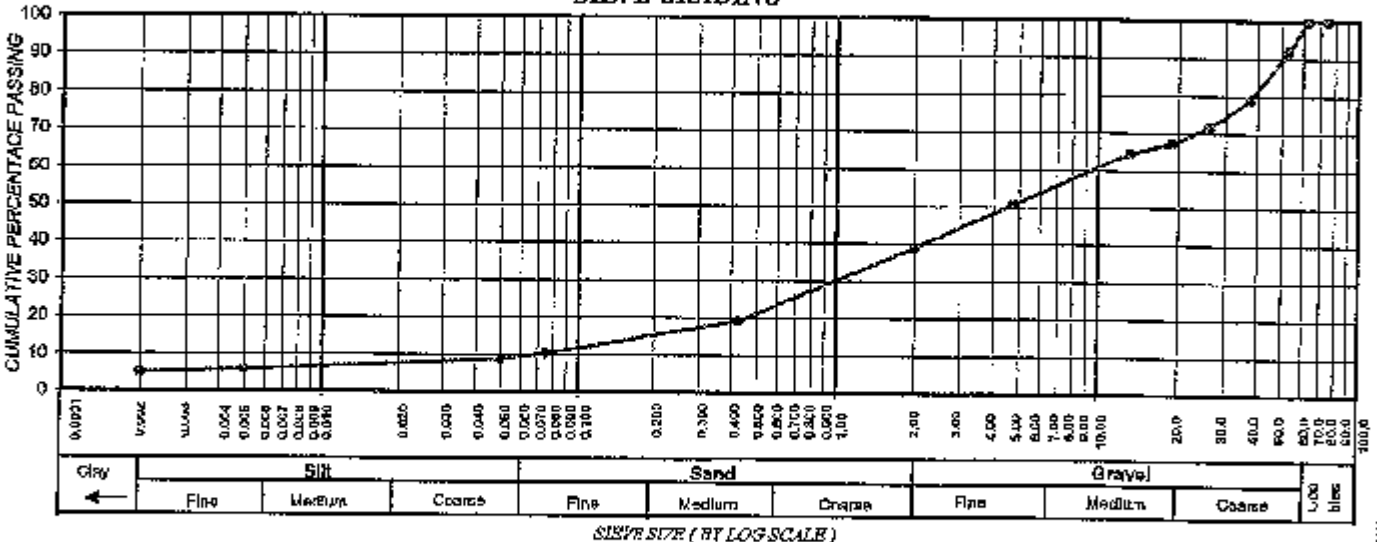
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	50.9
	0.425 - 0.250	10.8
	0.250 - 0.150	8.9
	0.150 - 0.075	4.9
	< 0.075	26.5

Effective size	0.075	
Uniformity Coefficient	126.7	
Curvature Coefficient	1.4	
Oversize Index	21.0	
Shrinkage Product	114.8	
Grading Coefficient	16.8	
Grading modulus	2.32	
Atterberg Limits	Liquid Limit	32
	Plasticity Index	13
	Linear Shrinkage	6
Unified Soil Classification	GC	
U.S. Highway Classification	A-2-6(0)	
pH - Value	-	
Conductivity ms/cm	-	

PERFORMANCE AS WEARING COURSE



SIEVE GRADING



Remarks : The sample were subjected to analysis according to test method A8 of TMH1 1979
 The results reported relate only to the sample tested
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For: Civilab

FOUNDATION INDICATOR (TMH 1 : A1, A2, A3, A4, A5 & A6)

CLIENT : LIDWALA CONSULTING ENGINEERS
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 NORTHCLIFF
 2115

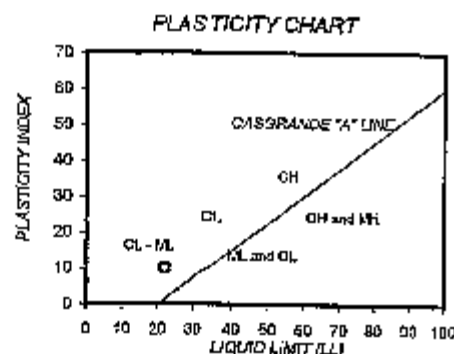
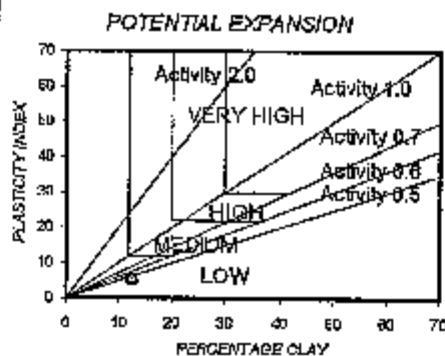
DATE REPORTED : 15-Jun-05
 YOUR REF. : G/05/015-07/mvf
 OUR REF. : HP/B 76-27
 SAMPLE No. : 25777

SAMPLE DESCRIPTION : TP34: 0.570-1.000

Attention A RASPI

Material description SANDY LEAN CLAY

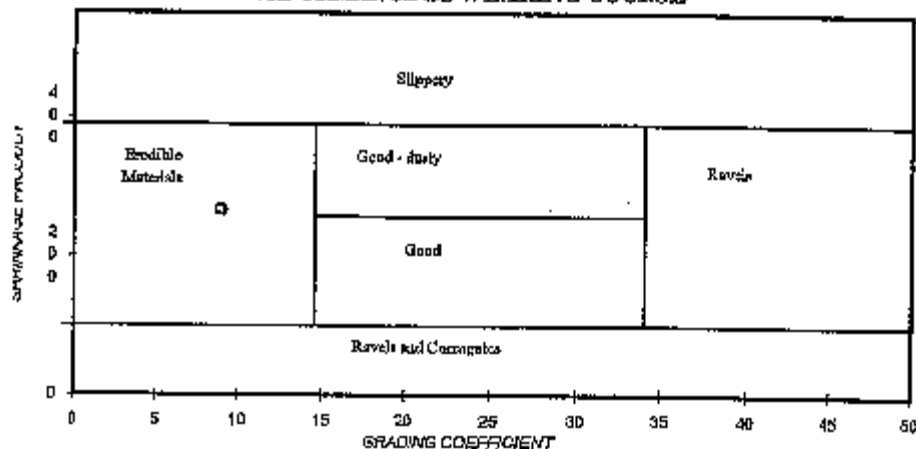
Sieve analysis Cumulative percentage passing (mm)	
75.0	100
63.0	100
53.0	100
37.5	100
26.5	100
19.0	100
13.2	100
4.75	99
2.000	91
0.425	59
0.075	32
0.050	29
0.005	19
0.002	13



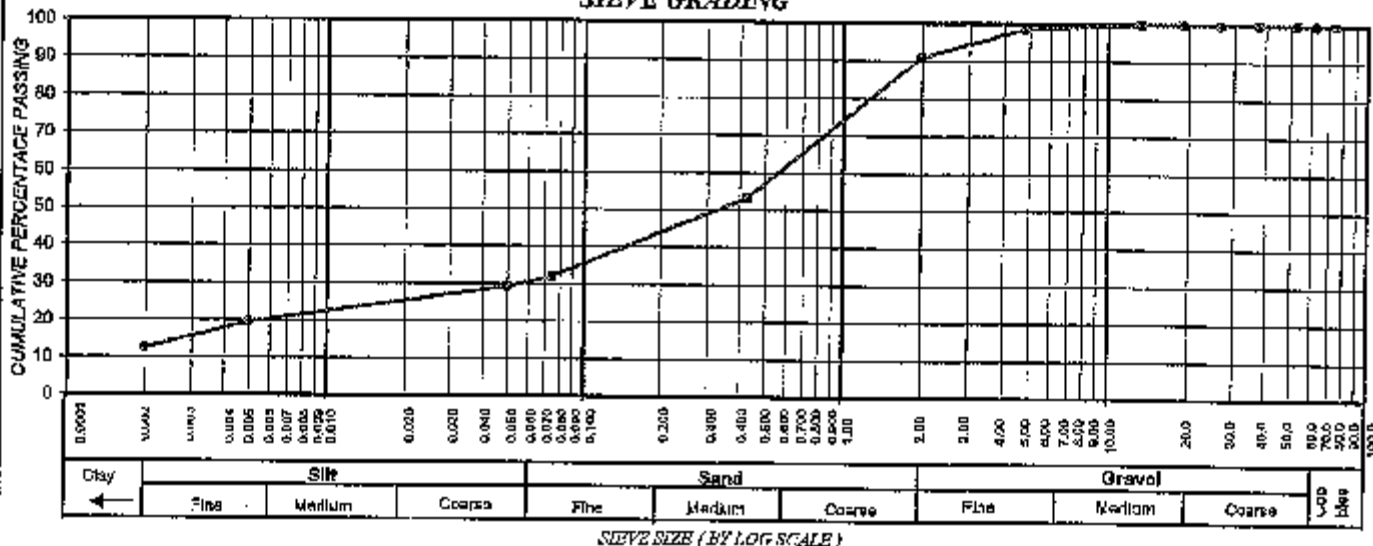
Soil Monitor Analysis % < 2.00mm	
2.000 - 0.425	41.3
0.425 - 0.250	9.4
0.250 - 0.150	7.0
0.150 - 0.075	7.0
< 0.075	35.2

Effective size	0.002	
Uniformity Coefficient	380.0	
Curvature Coefficient	4.2	
Overize Index	0.0	
Shrinkage Product	266.7	
Grading Coefficient	9.0	
Grading modulus	1.24	
Alter- berg Limits	Liquid Limit	22
	Plasticity Index	10
	Linear Shrinkage	5
Unified Soil Classification	CL	
U.S. Highway Classification	A-2-4(0)	
pH - Value	-	
Conductivity ms/cm	-	

PERFORMANCE AS WEARING COURSE



SIEVE GRADING



Remarks : The sample were subjected to analysis according to test method A8 of TMH1 1979
 The results reported relate only to the sample tested
 Documents may only be reproduced or published in their full context

For: Civilab

FOUNDATION INDICATOR (TMH 1 : A1, A2, A3, A4, A5 & A6)

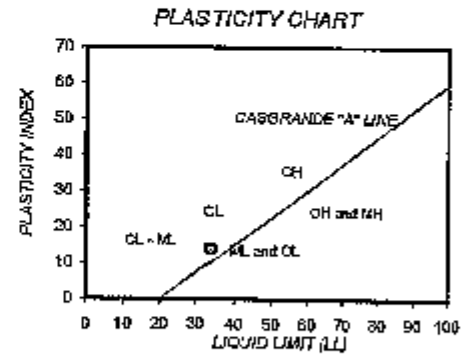
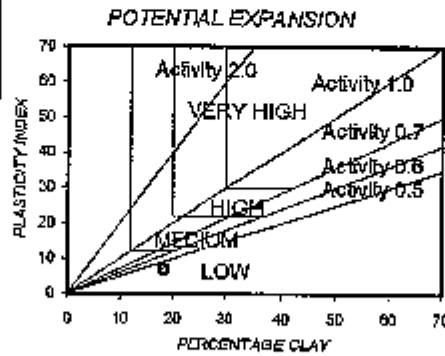
CLIENT : LIDWALA CONSULTING ENGINEERS
 P O BOX 4221
 NORTHCLIFF
 2115

DATE REPORTED : 15-Jun-05
 YOUR REF. : G/05/015-07/mvt
 OUR REF. : HP/B 76-27
 SAMPLE No. : 25778
 SAMPLE DESCRIPTION : TP38: 0-2.500

Attention A RASPI

Material description SANDY LEAN CLAY

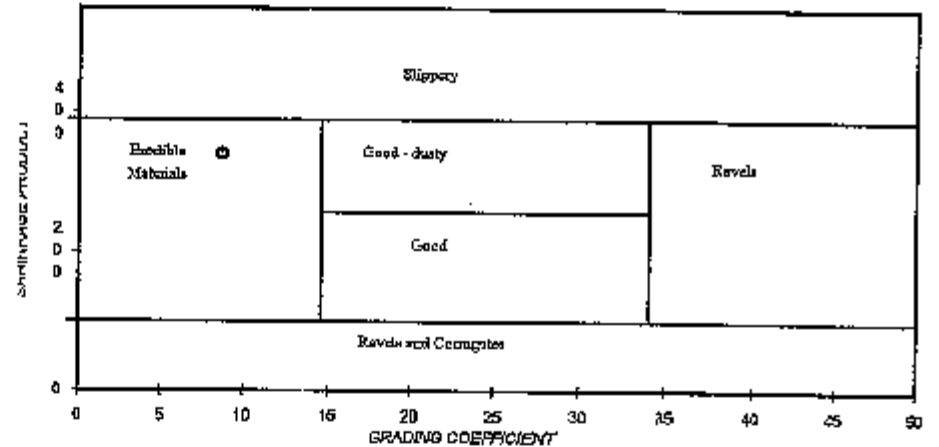
Sieve analysis Cumulative percentage passing (mm)	75.0	100
	63.0	100
	53.0	100
	37.5	100
	26.5	100
	19.0	100
	13.2	100
	4.75	99
	2.000	91
	0.425	49
	0.075	35
	0.050	32
0.005	24	
0.002	18	



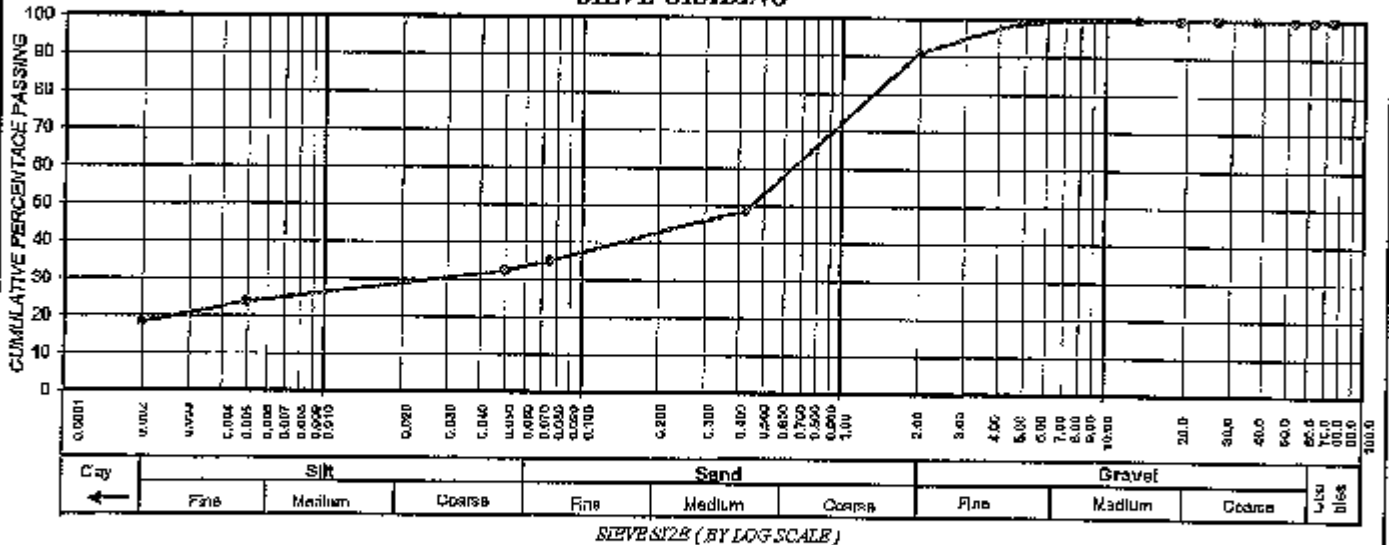
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	48.5
	0.425 - 0.250	8.4
	0.250 - 0.150	4.3
	0.150 - 0.075	4.3
	< 0.075	38.5

Effective size	0.001	
Uniformity Coefficient	541.7	
Curvature Coefficient	1.2	
Oversize Index	0.0	
Shrinkage Product	341.5	
Grading Coefficient	8.8	
Grading modulus	1.25	
After being Limbs	Liquid Limit	34
	Plasticity Index	14
	Linear Shrinkage	7
Unified Soil Classification	CL	
U.S. Highway Classification	A-2-6(1)	
pH - Value	-	
Conductivity mS/cm	-	

PERFORMANCE AS WEARING COURSE



SIEVE GRADING



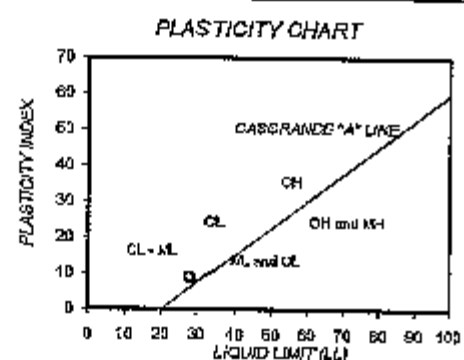
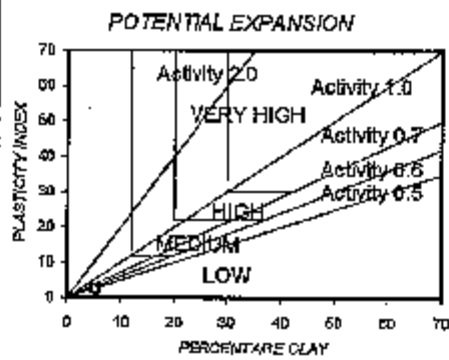
Remarks : The sample were subjected to analysis according to test method A8 of TMH1 1979
 The results reported relate only to the sample tested
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For: Civilab

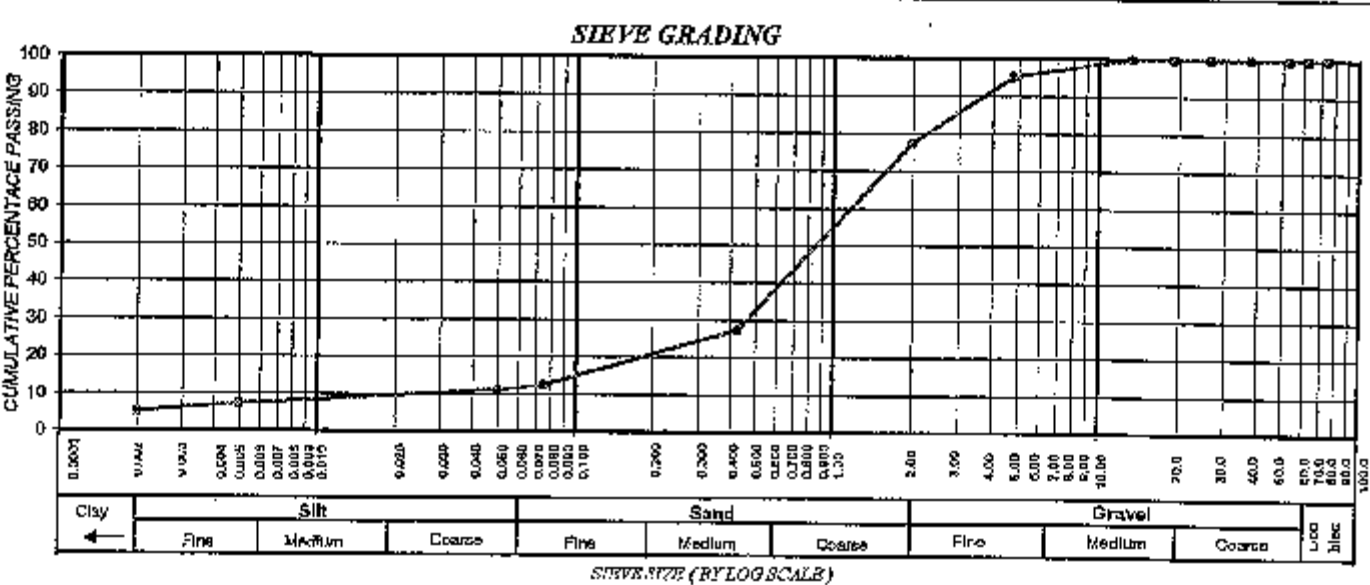
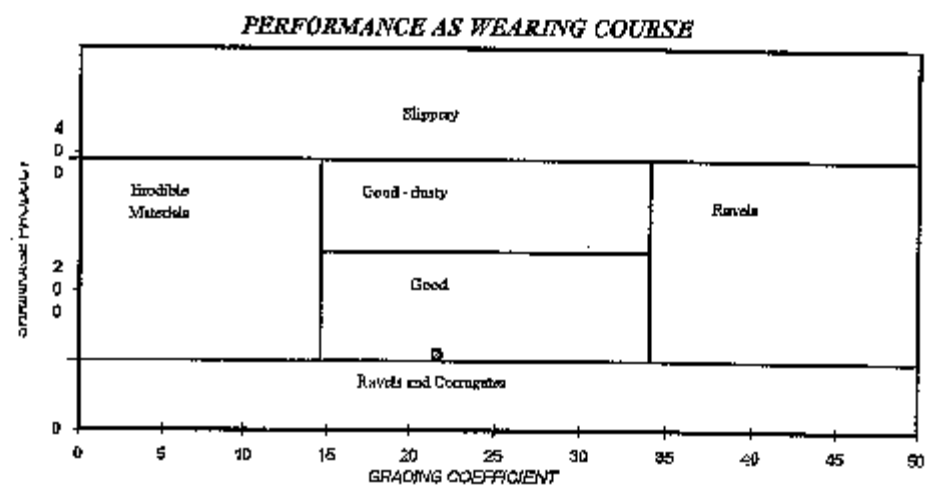
FOUNDATION INDICATOR (TMH 1 : A1, A2, A3, A4, A5 & A6)

CLIENT : LIDWALA CONSULTING ENGINEERS	DATE REPORTED : 15-Jun-05
P O BOX 4221	YOUR REF. : G/05/015-07/mvt
NORTHCLIFF	OUR REF. : HP/B 76-27
2115	SAMPLE No. : 25779
Attention : A RASPI	SAMPLE DESCRIPTION : TP39: 0.350-1.100

Material description	SANDY LEAN CLAY	
Sieve analysis		
Cumulative percentage passing (mm)		
75.0	100	
63.0	100	
53.0	100	
37.5	100	
26.5	100	
19.0	100	
13.2	100	
4.75	95	
2.000	77	
0.425	27	
0.075	13	
0.050	11	
0.005	7	
0.002	5	



Soil Moisture Analysis % < 200mm	2,000 - 0.425	64.7
	0.425 - 0.250	9.2
	0.250 - 0.150	5.7
	0.150 - 0.075	4.2
	< 0.075	16.3
Effective size	0.030	
Uniformity Coefficient	40.0	
Curvature Coefficient	5.8	
Oversize Index	0.0	
Shrinkage Product	109.3	
Grading Coefficient	21.8	
Grading modulus	1.83	
Atterberg Limits	Liquid Limit	28
	Plasticity Index	9
	Linear Shrinkage	4
Unified Soil Classification	CL	
U.S. Highway Classification	A-2-4(0)	
pH - Value	-	
Conductivity ms/cm	-	



Remarks : The sample were subjected to analysis according to test method A8 of TMH1 1979
 The results reported relate only to the sample tested
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For Civilab

FOUNDATION INDICATOR (TMH 1 : A1, A2, A3, A4, A5 & A6)

CLIENT : LIDWALA CONSULTING ENGINEERS
 P O BOX 4221
 NORTHCLIFF
 2115

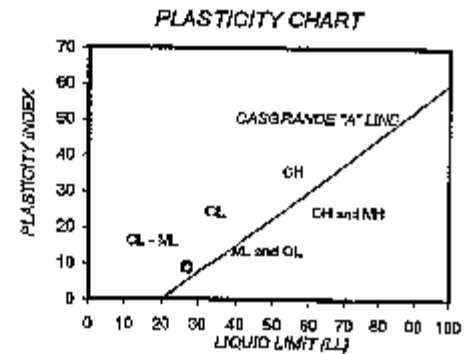
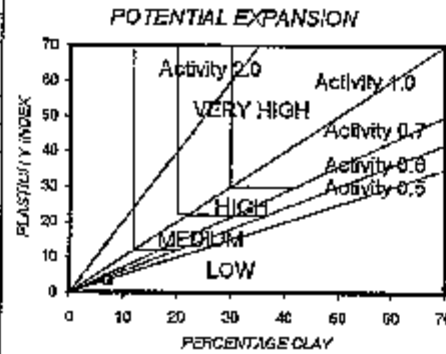
DATE REPORTED : 15-Jun-05
YOUR REF. : G/05/015-07/mvt
OUR REF. : HP/B 76-27
SAMPLE No. : 25780

SAMPLE DESCRIPTION : TP40: 1.100-2.500

Attention : A RASPI

Material description SANDY LEAN CLAY

Sieve analysis	75.0	100
Cumulative percentage passing (mm)	63.0	100
	53.0	100
	37.5	100
	26.5	100
	19.0	100
	13.2	100
	4.75	93
	2.000	82
	0.425	38
	0.075	19
	0.050	17
	0.005	10
	0.002	7



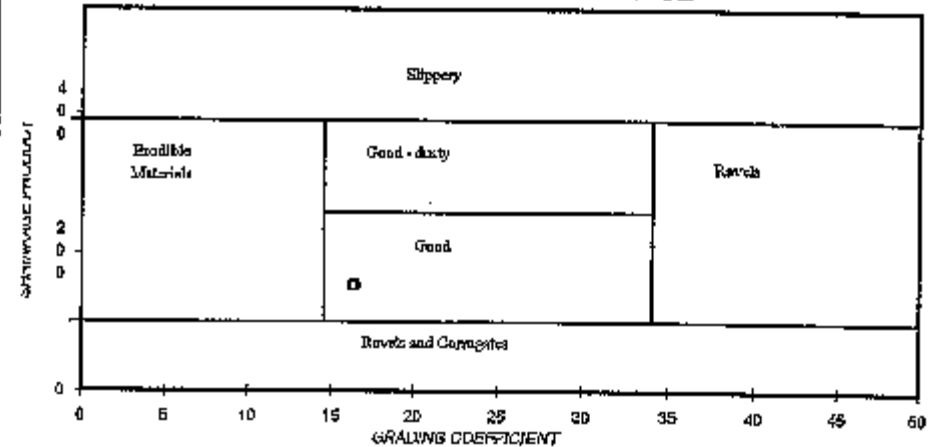
Soil Monitor Analysis % < 2.00mm	2,000 - 0.425	53.8
	0.425 - 0.250	11.1
	0.250 - 0.150	6.5
	0.150 - 0.075	5.6
	< 0.075	23.1

Effective size	0.005
Uniformity Coefficient	180.0
Curvature Coefficient	8.9
Oversize Index	0.0
Shrinkage Product	152.1
Grading Coefficient	18.4
Grading modulus	1.81

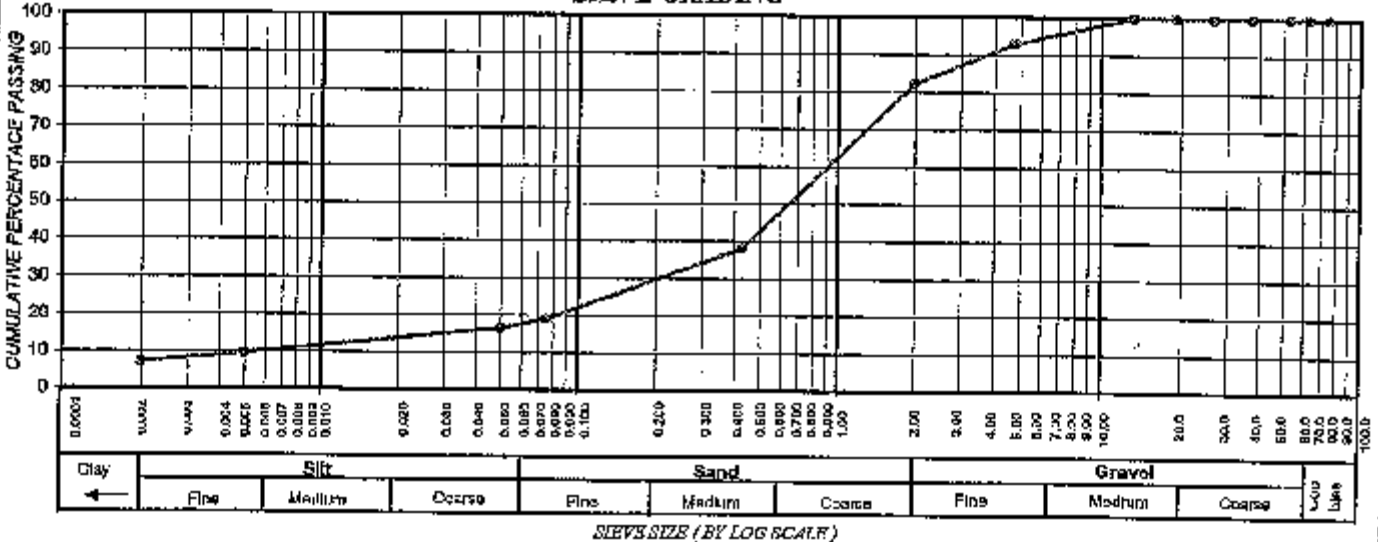
After being Lined	Liquid Limit	27
	Plasticity Index	9
	Linear Shrinkage	4

Unified Soil Classification	CL
U.S. Highway Classification	A-2-4(0)
pH - Value	-
Conductivity ms/cm	-

PERFORMANCE AS WEARING COURSE



SIEVE GRADING



Remarks : The sample were subjected to analysis according to test method A6 of TMH1 1979
 The results reported relate only to the sample tested
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For: Civilab

ROAD INDICATOR

ROAD INDICATOR (TMH 1 : A1, A2, A3, A4 & A5)

CLIENT : LIDWALA CONSULTING ENGINEERS
 P O BOX 4221
 NORTHCLIFF
 2115

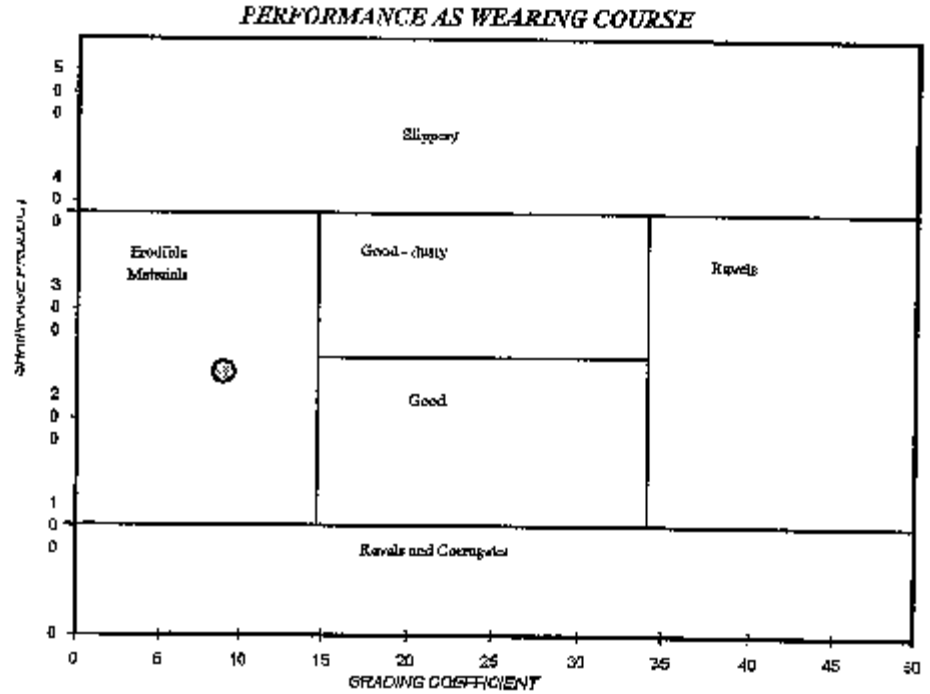
DATE REPORTED : 15-Jun-06
YOUR REF. : G/05/015-07/mvt
OUR REF. : HP/B 76-27
SAMPLE No. : 25767

SAMPLE DESCRIPTION : TP2: 0.200-1.100

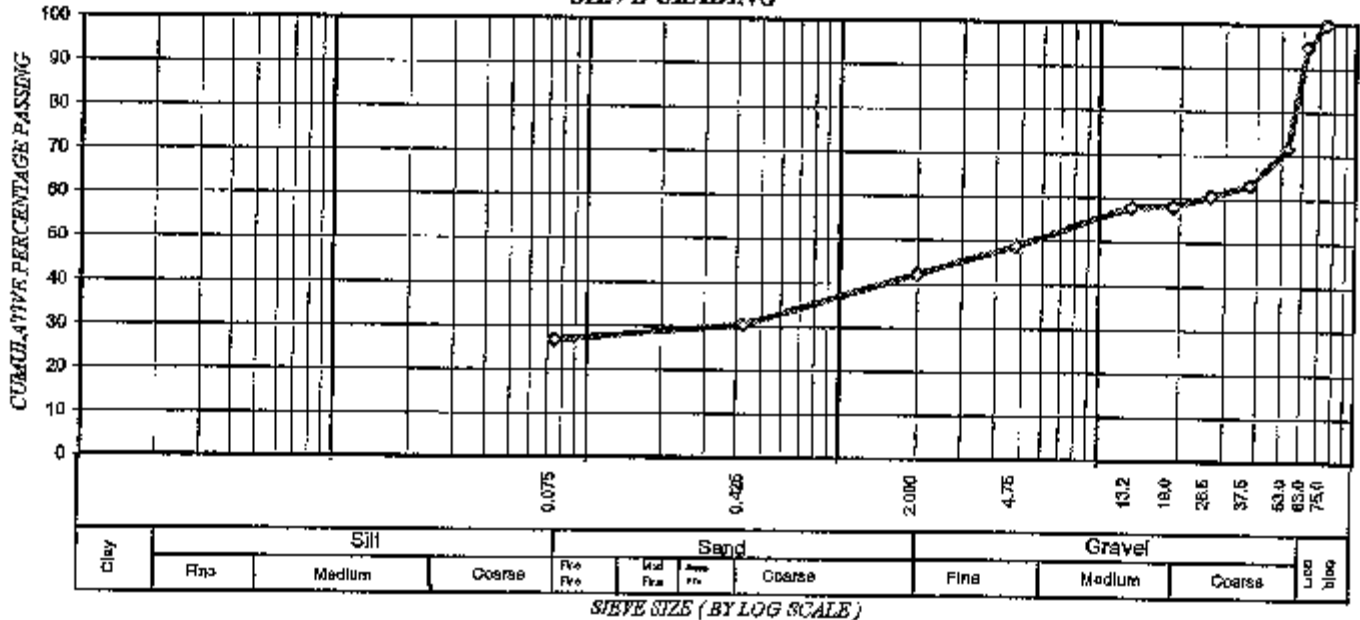
Attention A RASPI

Material description NATURAL GRAVEL

Sieve analysis Cumulative percentage passing (mm)	75.0	100
	63.0	95
	53.0	72
	37.5	63
	28.5	61
	19.0	58
	13.2	58
	4.75	49
	2.000	42
	0.425	30
Soft Matter Analysis % < 2.00mm	2.000 - 0.425	28.2
	0.425 - 0.250	2.9
	0.250 - 0.150	2.9
	0.150 - 0.075	2.9
	< 0.075	63.2
Oversize Index		36.9
Shrinkage Product		243.0
Grading Coefficient		8.9
Grading modulus		2.01
Atter- berg Limits	Liquid Limit	39
	Plasticity Index	15
	Linear Shrinkage	8
U.S. Highway Classification		A-2-6(1)
TRH 14 Class.		-



SIEVE GRADING



Remarks :

The sample were subjected to analysis according to test method A1, A2, A3, A4 & A5 of TMH1 1879
 The results reported relate only to the sample tested
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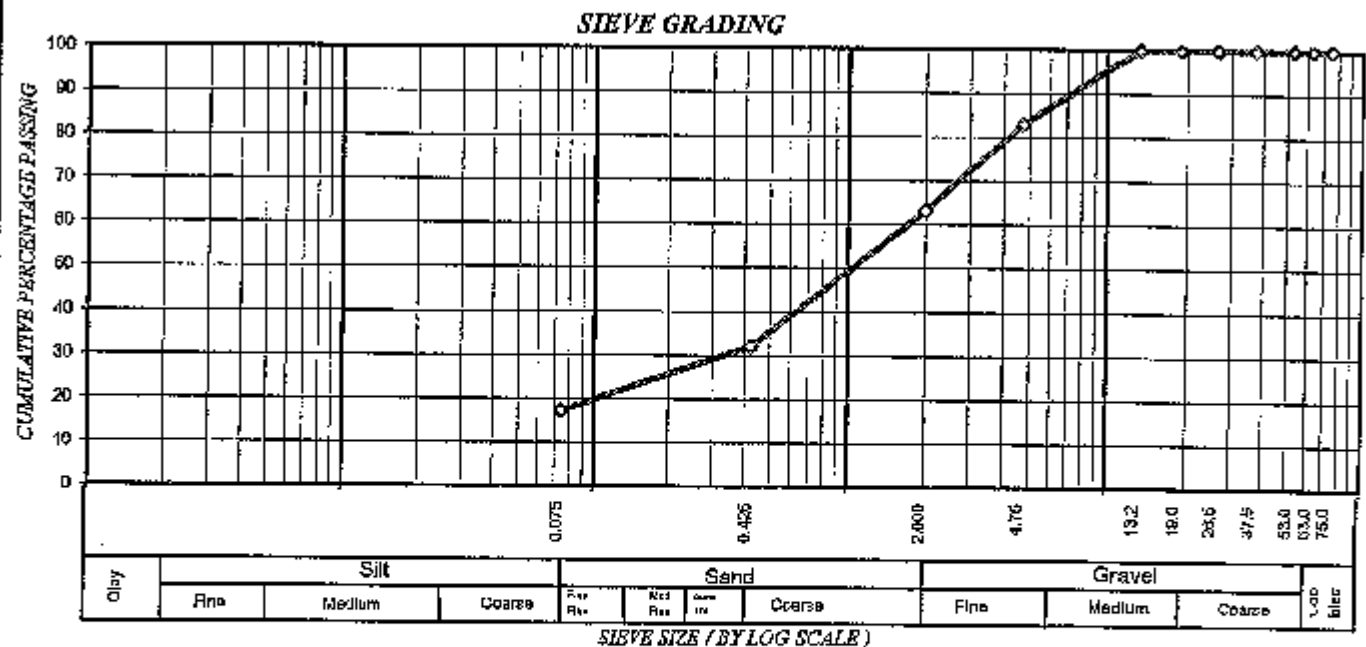
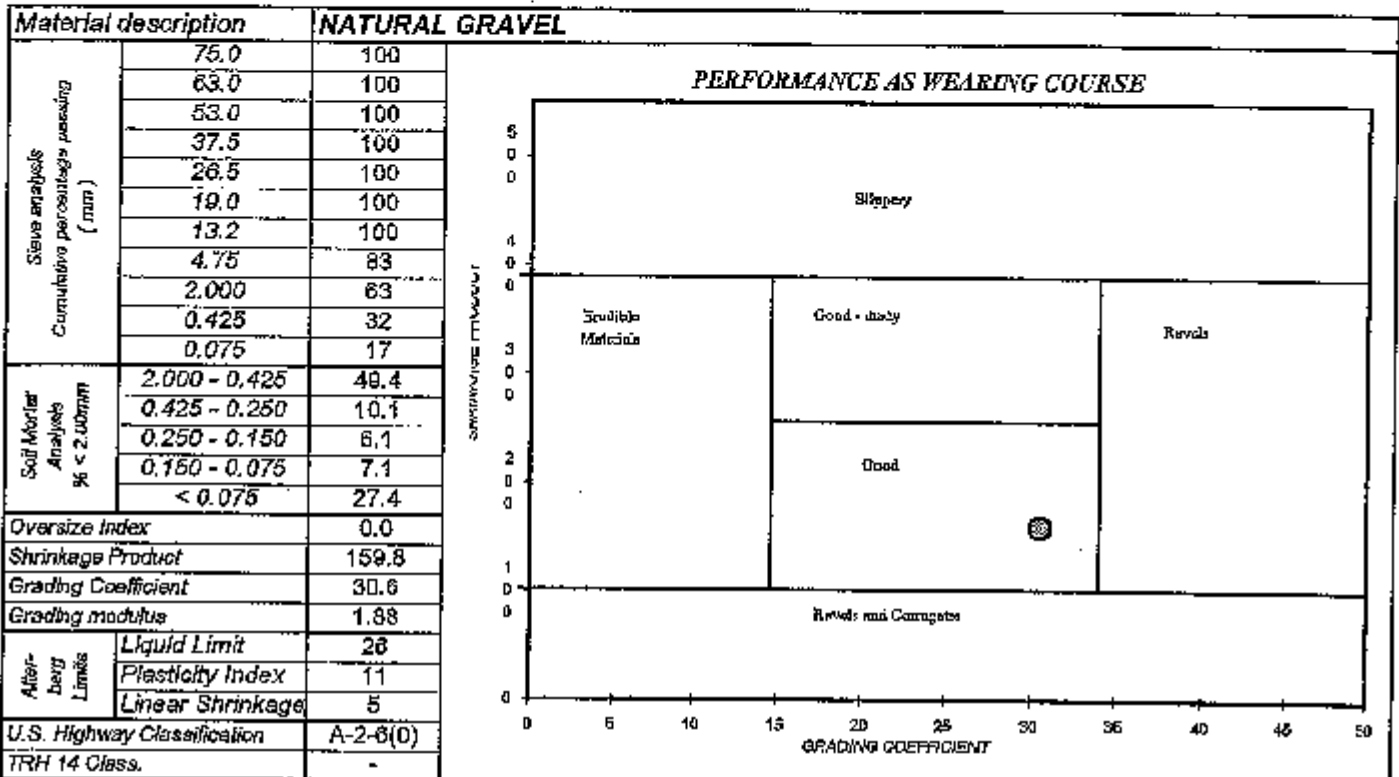
For: Civilab

ROAD INDICATOR (TMH 1 : A1, A2, A3, A4 & A5)

CLIENT : LIDWALA CONSULTING ENGINEERS
 P O BOX 4221
 NORTHCLIFF
 2115

DATE REPORTED : 15-Jun-05
 YOUR REF. : G/05/015-07/mvt
 OUR REF. : HP/B 76-27
 SAMPLE No. : 25769
 SAMPLE DESCRIPTION : TP6: 0-0.450

Attention A RASPI



Remarks :

The sample were subjected to analysis according to test method A1, A2, A3, A4 & A5 of TMH1 1979
 The results reported relate only to the sample tested
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For: Civilab

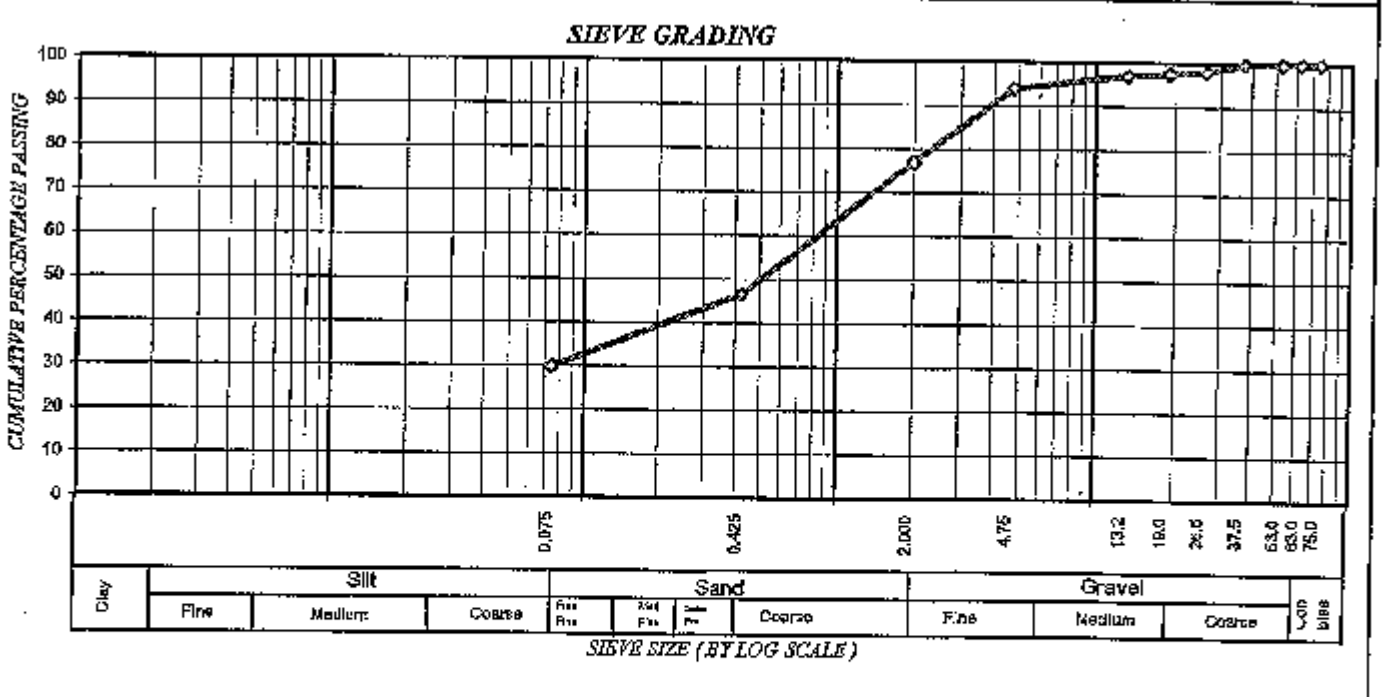
ROAD INDICATOR (TMH 1 : A1, A2, A3, A4 & A5)

CLIENT : LIDWALA CONSULTING ENGINEERS
 P O BOX 4221
 NORTHCLIFF
 2115

DATE REPORTED : 15-Jun-05
YOUR REF. : G/05/015-07/mvt
OUR REF. : HP/B 76-27
SAMPLE No. : 25770
SAMPLE DESCRIPTION : TP6: 0.450-1.500

Attention A RASPI

Material description		NATURAL GRAVEL	
Sieve analysis Cumulative percentage passing (mm)	75.0	100	
	63.0	100	
	53.0	100	
	37.5	100	
	28.5	98	
	19.0	98	
	13.2	97	
	4.75	94	
	2.000	77	
	0.425	47	
0.075	30		
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	39.3	
	0.425 - 0.250	8.5	
	0.250 - 0.150	6.1	
	0.150 - 0.075	7.3	
	< 0.075	38.9	
Oversize Index		0.0	
Shrinkage Product		233.4	
Grading Coefficient		20.0	
Grading modulus		1.47	
Atter- berg Limits	Liquid Limit	25	
	Plasticity Index	10	
	Linear Shrinkage	5	
U.S. Highway Classification		A-2-4(0)	
TRH 14 Class.		-	



Remarks:
 The sample were subjected to analysis according to test method A1, A2, A3, A4 & A5 of TMH1 1979
 The results reported relate only to the sample tested
 Documents may only be reproduced or published in their full context

For: Civilab

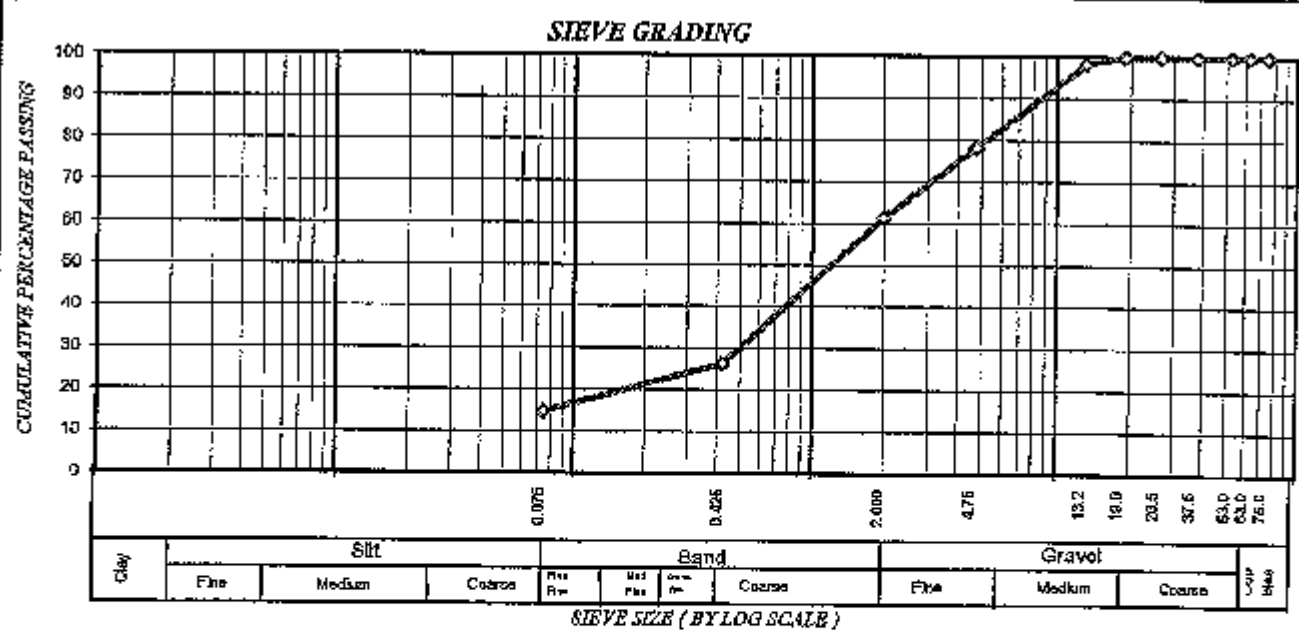
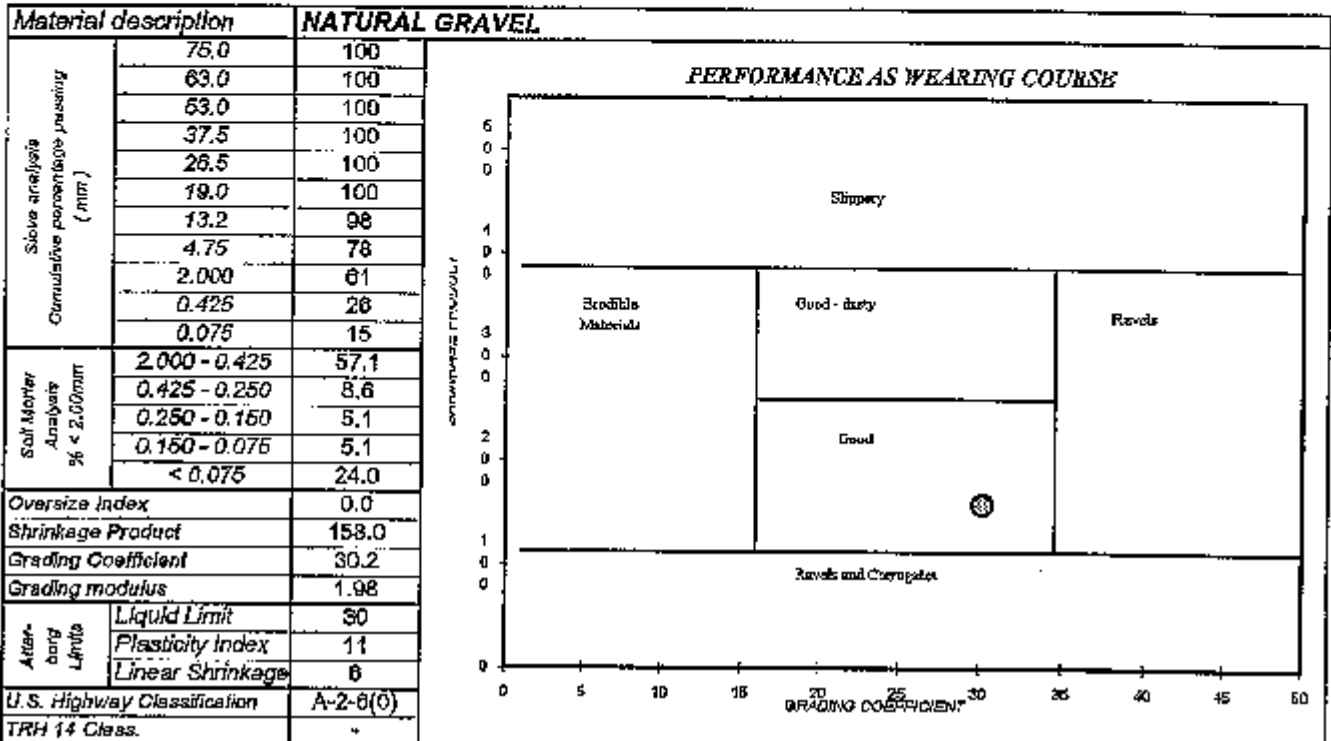
ROAD INDICATOR (TMH 1 : A1, A2, A3, A4 & A5)

CLIENT : LIDWALA CONSULTING ENGINEERS
 P O BOX 4221
 NORTHCLIFF
 2115

DATE REPORTED : 15-Jun-05
 YOUR REF. : G/05/015-07/mvt
 OUR REF. : HP/B 76-27
 SAMPLE No. : 25774

SAMPLE DESCRIPTION : TP25: 0.750-1.200

Attention A RASPI



Remarks :
 The sample were subjected to analysis according to test method A1, A2, A3, A4 & A5 of TMH1 1979
 The results reported relate only to the sample tested
 Documents may only be reproduced or published in their full context

For: Civilab

APPENDIX C

DOUBLE OEDOMETER TEST RESULTS

COLLAPSE POTENTIAL

The collapse potential test involves the wetting up of the sample at natural moisture content at a pressure of 200 kPa in the one-dimensional compression test. The deformation after wetting up is measured and the following formula is used to determine the collapse potential of the soil:

$$C_p = \frac{\Delta e}{1+e_o} \times 100\%$$

Where

C_p = collapse potential

Δe = deformation at $P = 200$ kPa

e_o = initial void ratio

Jennings & Knight (1975) reported the following guiding figures from their experience to evaluate the collapse potential:

C_p	Severity of problem
0% - 1%	No problem
1% - 5%	Moderate trouble
5% - 10%	Trouble
10% - 20%	Severe trouble
> 20%	Very severe trouble

36/38 Fourth Street, Booyens Reserve, Johannesburg 2091
 P O Box 82223, Southdale 2135
 Phone: 27 11 835-3117. Fax: 27 11 835-2503
 Email: jhb@civilab.co.za

Civilab

Civil Engineering Testing Laboratories

Consolidation Test

Project	MIDRAND			Test 2			
Project No.	1039/F13/05/2005	Sample No	J792				
Borehole No.	TP3	Depth	2.0				
Date Received	05/05/2005	Date Tested	19/05/2005				
Remarks:	An undisturbed sample tested soaked.						
Machine No.	6	Ring No.	22	Height (mm)	18.35	Diameter (mm)	77.15

Masses for Water Content Determination (g)

Wet Sample and Ring		Dry Sample and Ring	Ring Only	Water Content	
Before Test	After Test			Before Test	After Test
218.8	235.2	200.2	92	17.2%	32.3%

Pre-Determined Particle Specific Gravity 2.52

Initial Parameters

Void Ratio	0.9939	Degree of Saturation (%)	43.5	Dry Density (Kg/m ³)	1261
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Effect. Stress (kPa)	10	50	100	200	400	800	1600	400	100	10
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Consolidation Tests

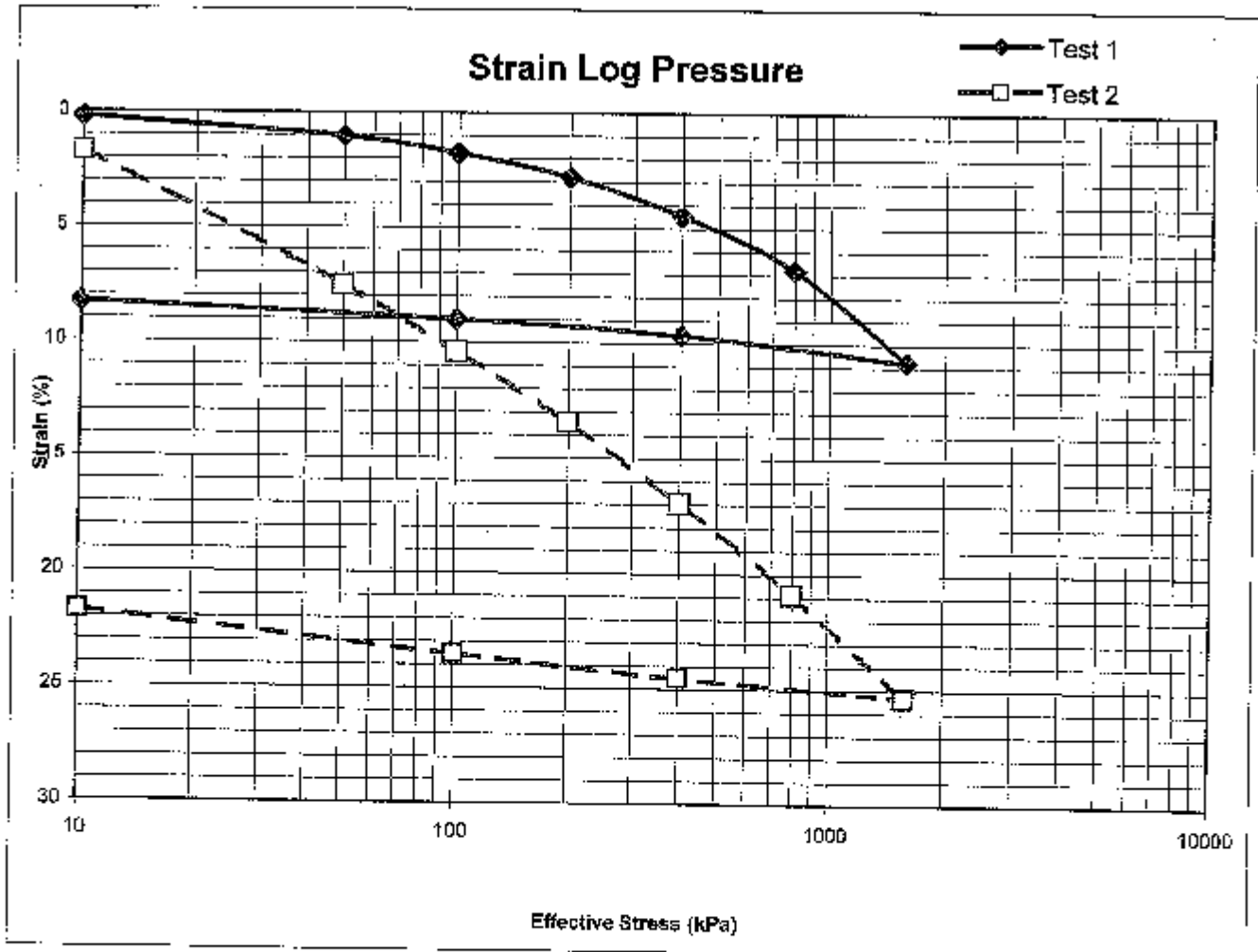
Project	MIDRAND		
Project No.	1039/F13/05/2005	Sample No.	J792
Borehole No	TP3	Depth	2.0
Date Received	05/05/2005	Date Tested	19/05/2005

Test 1

Effect. Stress (kPa)	10	50	100	200	400	800	1600	400	100	10
Strain (%)	0.21	1.03	1.76	2.80	4.46	6.82	10.77	9.64	9.01	8.29
Mv (1/MPa)		0.2056	0.1443	0.1045	0.0830	0.0589	0.0495	0.0094	0.0212	0.0802
Void Ratio	0.8039	0.7891	0.776	0.7571	0.7271	0.6845	0.613	0.6334	0.6449	0.658

Test 2

Effect. Stress (kPa)	10	50	100	200	400	800	1600	400	100	10
Strain (%)	1.70	7.51	10.40	13.45	18.94	20.86	25.31	24.54	23.53	21.71
Mv (1/MPa)		1.4537	0.5777	0.3046	0.1747	0.0980	0.0557	0.0064	0.0336	0.2028
Void Ratio	0.96	0.8441	0.7865	0.7257	0.6561	0.578	0.4892	0.5046	0.5247	0.5611



Consolidation Tests

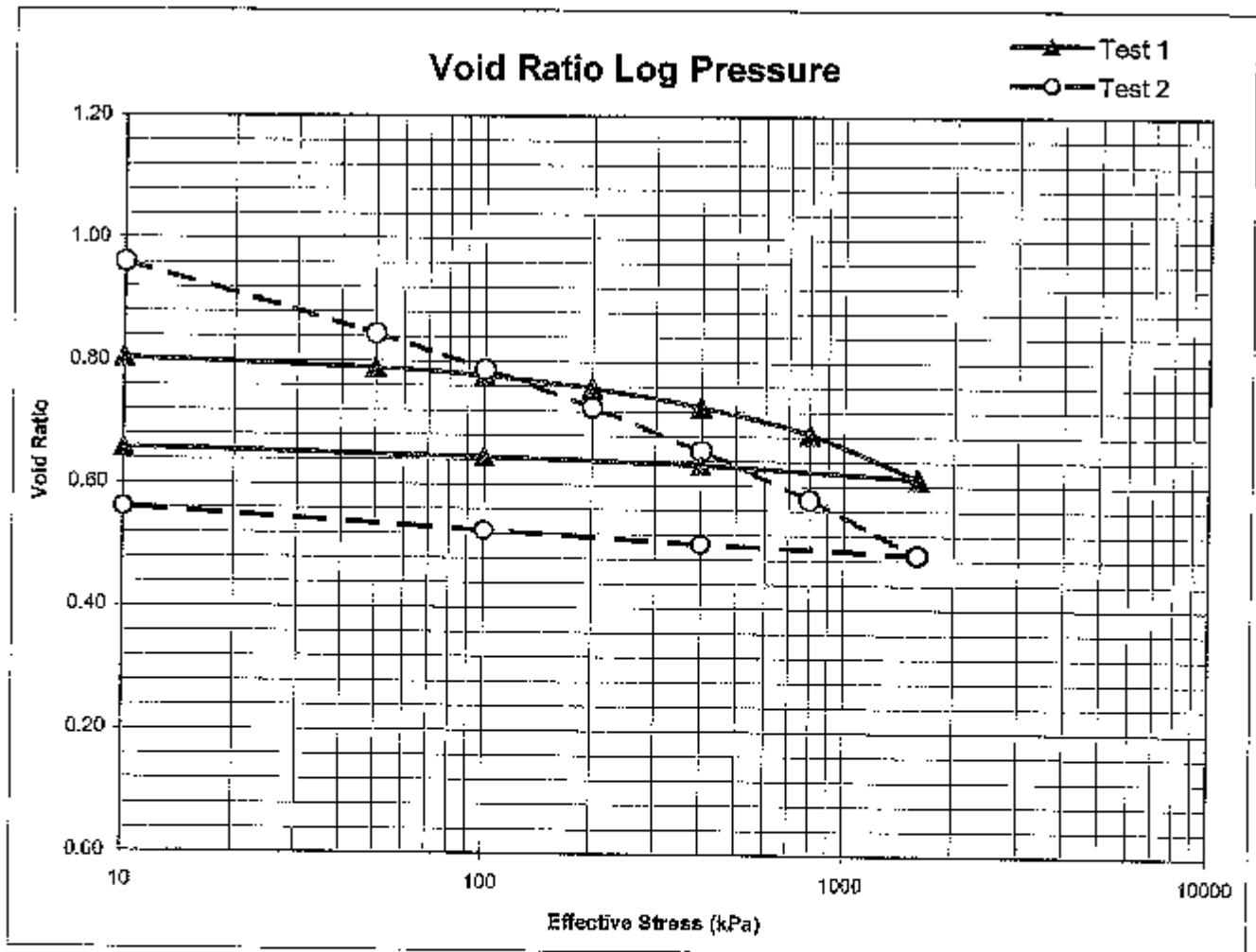
Project	MIDRAND		
Project No.	1039/F13/05/2005	Sample No.	J792
Borehole No	TP3	Depth	2.0
Date Received	05/05/2005	Date Tested	19/05/2005

Test 1

Effect. Stress (kPa)	10	50	100	200	400	800	1600	400	100	10
Strain (%)	0.21	1.03	1.76	2.80	4.46	6.82	10.77	9.64	9.01	8.29
Mv (1/MPa)		0.2056	0.1443	0.1045	0.0830	0.0589	0.0495	0.0094	0.0212	0.0802
Void Ratio	0.8039	0.7891	0.776	0.7671	0.7271	0.6845	0.613	0.6334	0.6449	0.658

Test 2

Effect. Stress (kPa)	10	50	100	200	400	800	1600	400	100	10
Strain (%)	1.7003	7.515	10.403	13.45	16.943	20.861	25.313	24.54	23.531	21.706
Mv (1/MPa)		1.4537	0.5777	0.3046	0.1747	0.098	0.0557	0.0064	0.0336	0.2028
Void Ratio	0.96	0.8441	0.7865	0.7257	0.6561	0.578	0.4892	0.5046	0.5247	0.5611



Consolidation Tests

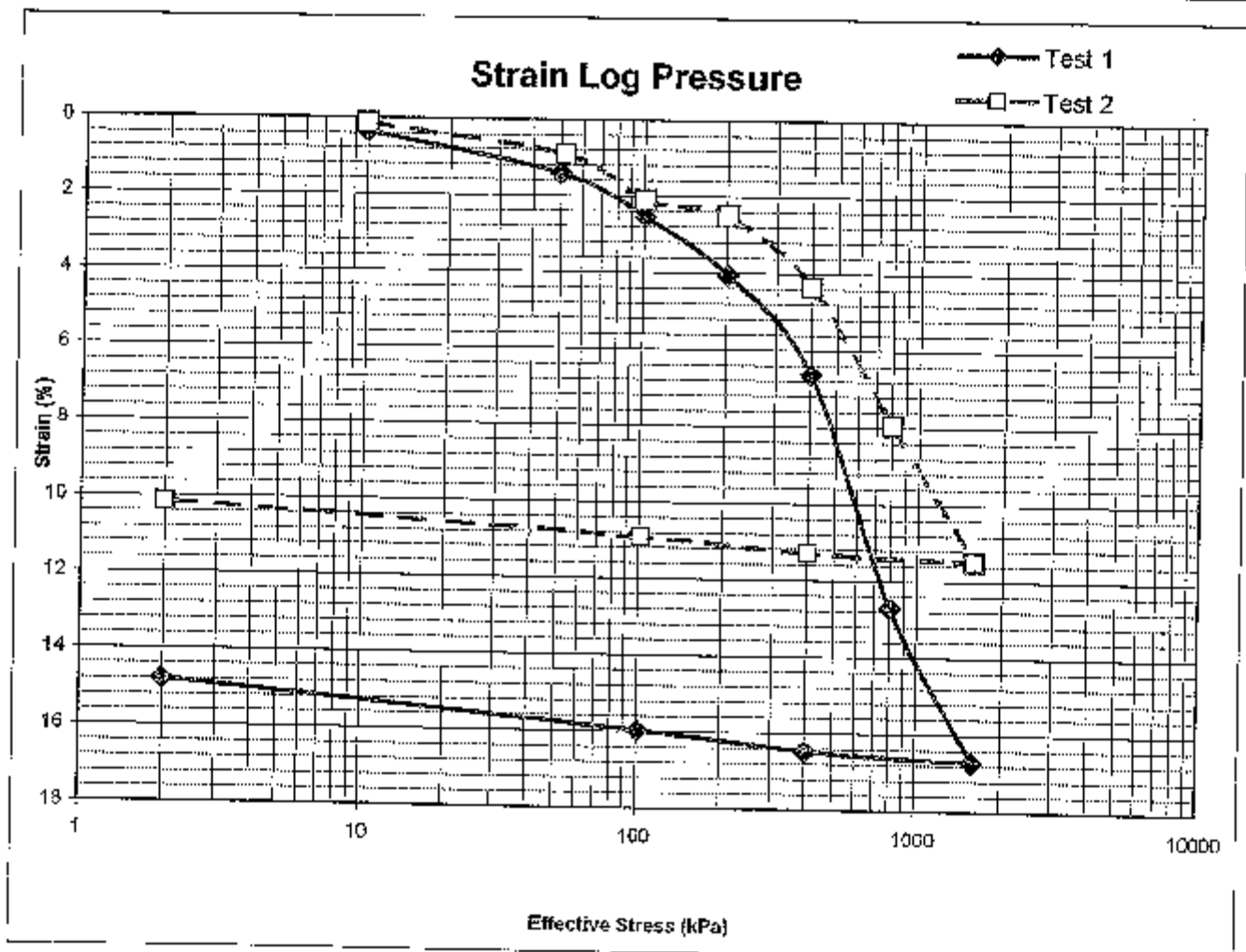
Project	MIDRAND		
Project No.	1039/F13/05/2005	Sample No.	J793
Borehole No	TP33	Depth	1.2-1.5
Date Received	05/05/2005	Date Tested	18/05/2005

Test 1

Effect. Stress (kPa)	10	50	102	202	402	802	1602	402	102	2
Strain (%)	0.36	1.42	2.54	4.05	6.63	12.70	16.72	16.46	15.97	14.81
Mv (1/MPa)		0.2639	0.2162	0.1504	0.1290	0.1518	0.0502	0.0021	0.0164	0.1166
Void Ratio	0.714	0.6959	0.6765	0.6506	0.6063	0.5018	0.4327	0.437	0.4455	0.4655

Test 2

Effect. Stress (kPa)	10	52	102	202	402	802	1602	402	102	2
Strain (%)	0.13	0.92	2.11	2.50	4.36	7.96	11.49	11.31	10.91	10.15
Mv (1/MPa)		0.1877	0.2370	0.0391	0.0930	0.0899	0.0442	0.0015	0.0134	0.0756
Void Ratio	0.632	0.6182	0.5998	0.5934	0.563	0.5042	0.4464	0.4494	0.456	0.4683



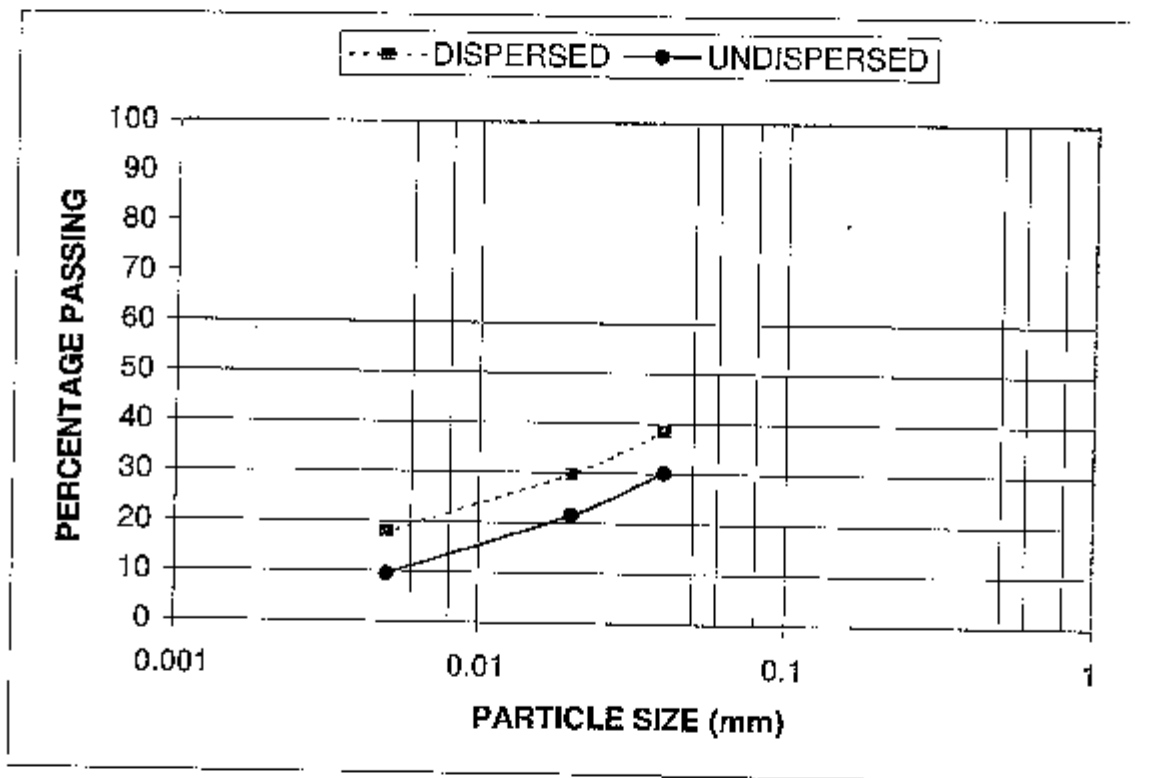
APPENDIX D

**DOUBLE
HYDROMETER TEST
RESULTS**

Double Hydrometer Test Result

Project:	MIDRAND		
Project No.:	1039/F13/05/2005	Date:	16/05/2005
Field Reference:	TP 3	Laboratory Ref.:	J792
Depth (m):	2.0m	Remarks:	

% DISPERSION: 53



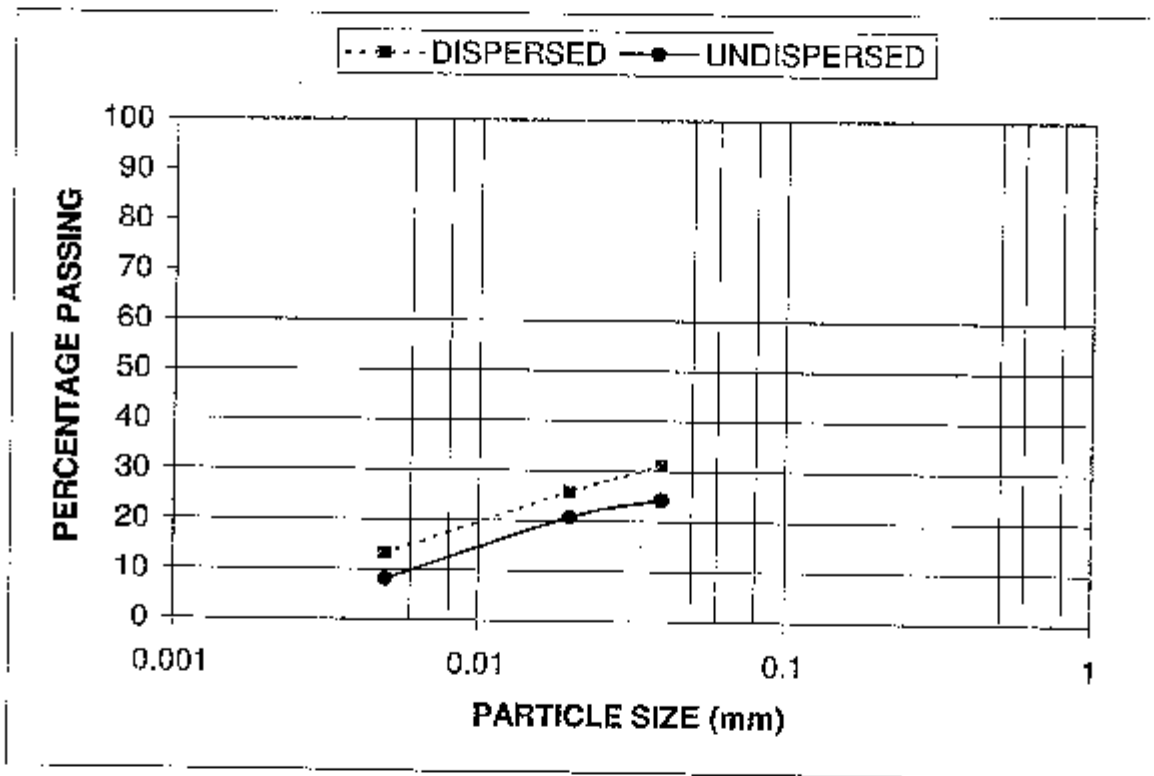
The sample was tested according to ASTM test method D4221-99
 The results relate only to the sample tested.
 Documents may only be reproduced or published in their full context.

Investment Facility Company 842 (Pty) Limited trading as Civilab and Scowalab. Registration No: 98/19071/07
 BRANCHES: CENTURION □ JOHANNESBURG □ PIETERMARITZBURG □ RUSTENBURG □ VRYHEID

Double Hydrometer Test Result

Project:	MIDRAND		
Project No.:	1039/F13/05/2005	Date:	16/05/2005
Field Reference:	TP 33	Laboratory Ref.:	J793
Depth (m):	1.2-1.5	Remarks:	

% DISPERSION:	62
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The sample was tested according to ASTM test method D4221- 99
 The results relate only to the sample tested.
 Documents may only be reproduced or published in their full context.

Investment Facility Company B42 (Fty) Limited trading as Civilab and Scowalab. Registration No: 98/19071/07
 BRANCHES: CENTURION □ JOHANNESBURG □ PICTERMARITZBURG □ RUSTENBURG □ VRYHEID

APPENDIX E

**EXCHANGEABLE
SODIUM
PERCENTAGE TEST
RESULTS**



RONEY HOFFMANN CONSULTANTS CC
WATER AND WASTE WATER PROCESS CONSULTANTS

RONEY HOFFMANN CONSULTANTS CC, Registration number 2005/029239/23

Members:
 J.H. HOFFMANN, Pt. Sci. Agr. Eng., (Chem) Nat. Dip. Wat. Pur. Tech. MW ISA
 Assisted by: D.W. HUSSETT, Agr. Dip. Agrif. Chem.
 P.M. De BEER, M.A.D. Water Care

141 Crosswell Road, Steynon, P.O. Box 11804, Quaterwood 0121 761 802 Fax: 0121 802 4299 Cell: 082 857 9800 E-mail: roney@hcoff.com.co.za

7 JUNE 2005

SOIL DISPERSIVENESS TESTS

CLIENT	CIVILAB
REFERENCE	MIDRAMD
ORDER NO	6800
DATE SUBMITTED	5/19/2005
LINK REF NO	PM 250.5/19c

SAMPLE	pH	CONDUCTIVITY mS/cm	SODIUM meq/100 g soil (mmol/L/kg)	MAGNESIUM meq/100 g soil (mmol/L/kg)	CEC	ESP	EMgP	Na meq	Ca meq	Mg meq	SAR
TP 3 (2m)	6.7	25	0.237	2.895	13.5	1.76	21.44	1.11	0.24	0.24	2.28
TP 35 (1.2 - 1.5 m)	4.9	104	0.119	0.748	3.8	3.83	19.71	2.89	1.63	2.04	2.13

J.H. Hoffmann
 J.H. HOFFMANN

APPENDIX F

DCP TEST RESULTS

7 July 2005

Lidwala Consulting Engineers
P O Box 4221
NORTHCLIFF
2115

Attention: A Raspi

RE/2 OF THE FARM BOTHASFONTEIN 408~JR

Herewith please find results for above mentioned project.

TP 24 - Concrete Slab. Unable to excavate hole

TP 32 - There was not a TP 32. No results found

TP 36 - Please find profile attached

Thank you

Frank Grundling
BRANCH MANAGER

TEST PIT 1

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASPONTÉIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cross. Crack	Deforma	Other
TP 1	06 May 2005	3 - MID	1	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₁₀₀): 144 Selected Design Traffic: Heavy traffic
 Balance Number (BN₁₀₀) of data: 2.5 BN₁₀₀ of SPBC: 1.2
 Standard Pavement Balance Curve (SPBC): B-54, A-1231 Road category: B
 Rut Limit: 20mm Base type: Granular
 Structural capacity (MISA): 1.1 Moisture condition of base: Optimum
 (MISA = Million Standard Axles, 80 kN)

Category VIII : Averagely Balanced Inverted Structure (ABIS)

Average equivalent strength (Existing Pavement Structure)

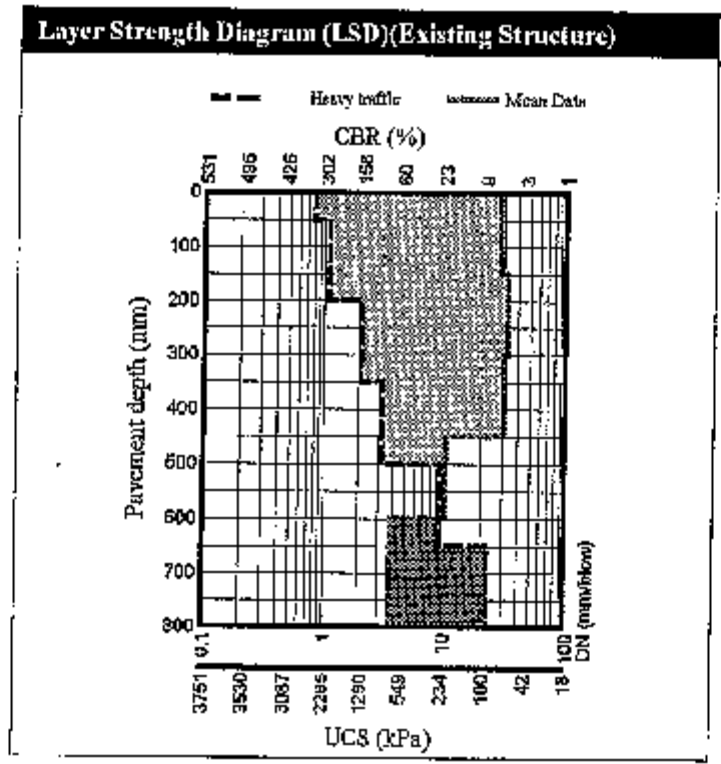
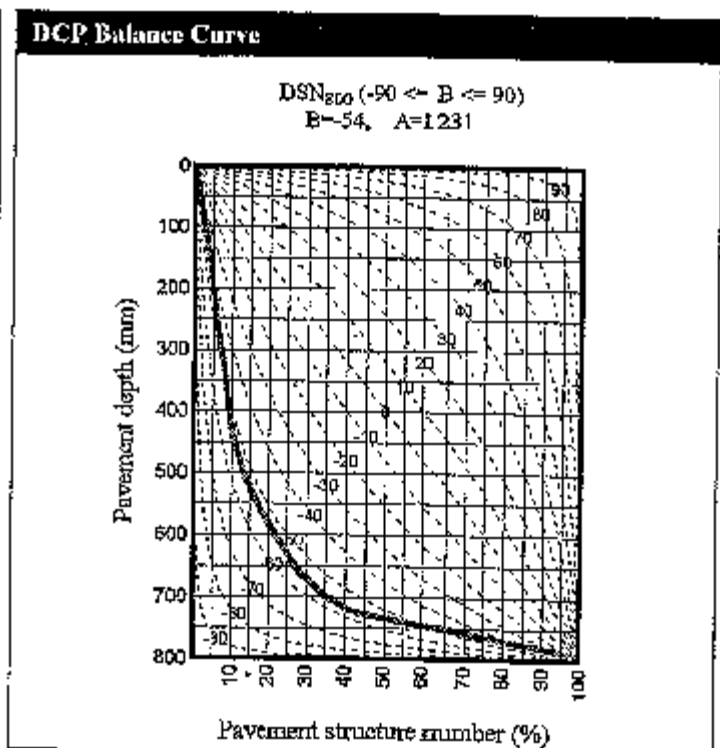
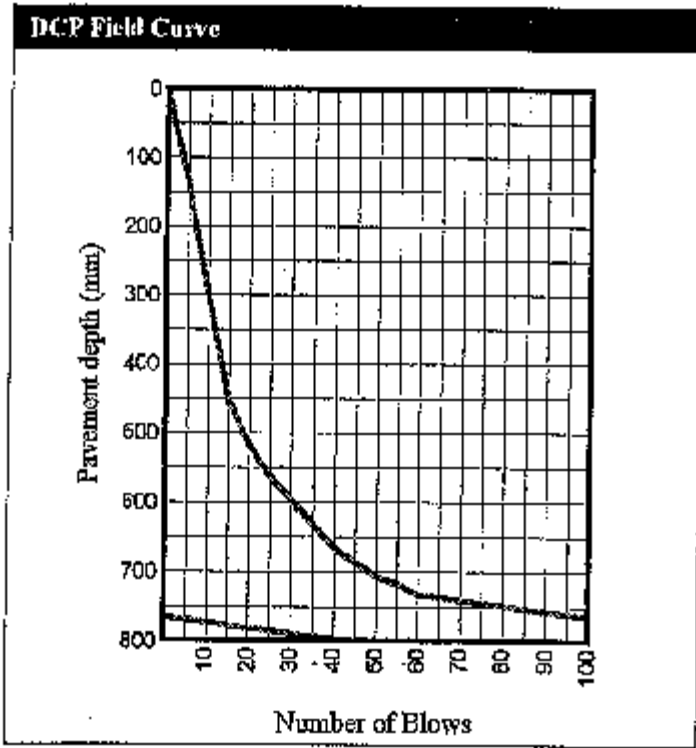
Depth (mm)	W. Avg. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modull (MPa)	E-Modull Range 10P - 90P MPa
0 - 150	27.25	5	1.5	29.7	6	74	33	14 - 74
151 - 300	32.60	5	0.0	32.6	5	62	28	12 - 63
301 - 450	30.80	5	0.0	30.8	5	66	29	13 - 67
451 - 600	10.65	16	4.2	16.0	21	216	91	40 - 207
601 - 800	3.76	113	2.6	7.1	76	681	273	120 - 623

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	33	14 - 74	6	74
151 - 300	28	12 - 63	5	62
301 - 450	29	13 - 67	5	66
451 - 600	91	40 - 207	21	216
601 - 800	273	120 - 623	76	681

TEST PIT 2

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (m)	Condition	Rating	Pumping	Long. Crack	Crac. Crack	Deform	Other
TP 2	06 May 2005	5 - MID	3	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN _{90P}):	69	Selected Design Traffic:	Heavy traffic
Balance Number (BN ₁₀₀) of data:	7.2	BN ₁₀₀ of SPBC:	11.2
Standard Pavement Balance Curve (SPBC):	B-2, A=2757	Road category:	B
Rot Limit:	20mm	Base type:	Granular
Structural capacity (MISA):	0.1	Moisture condition of base:	Optimum

(MISA = Million Standard Axles, 80 kN)

Category VIII : Averagely Balanced Inverted Structure (ABI)

Average equivalent strength (Existing Pavement Structure)

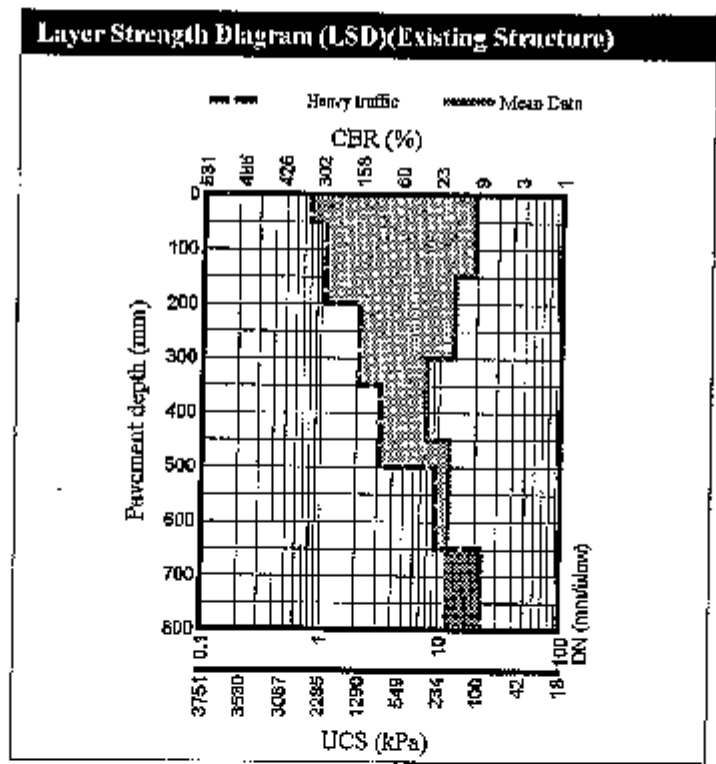
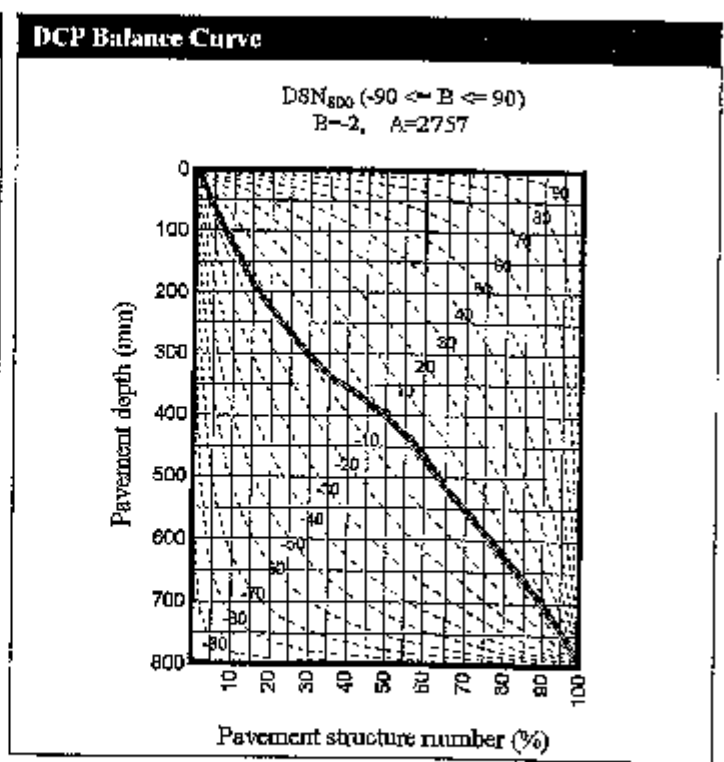
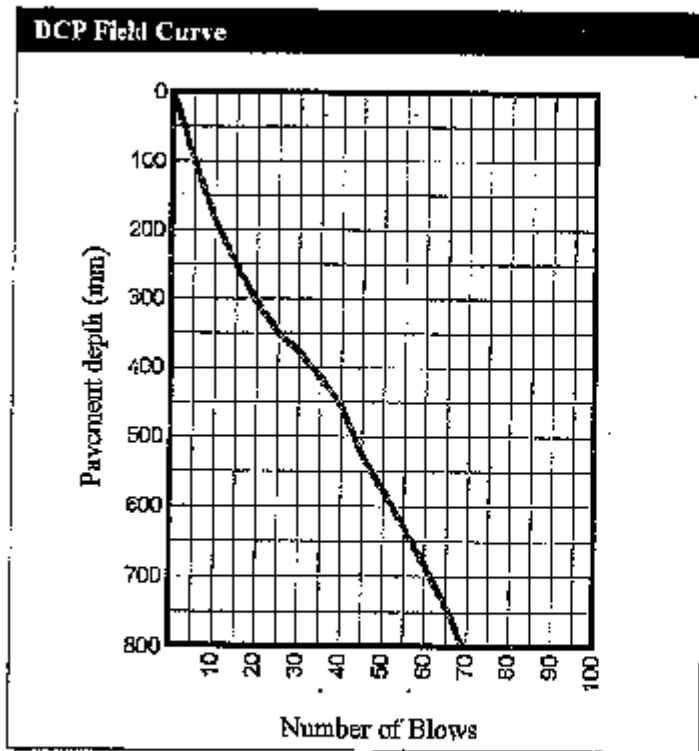
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	19.20	8	1.1	20.7	10	112	48	21 - 110
151 - 300	13.28	12	2.6	16.7	16	168	72	31 - 163
301 - 450	7.82	20	1.3	9.5	30	303	126	55 - 286
451 - 600	12.17	13	2.2	15.0	17	186	79	34 - 179
601 - 800	11.94	17	1.4	13.7	18	190	80	35 - 183

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P - Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Avg. E-Modull (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	48	21 - 110	10	112
151 - 300	72	31 - 163	16	162
301 - 450	126	55 - 286	30	303
451 - 600	79	34 - 179	17	186
601 - 800	80	35 - 183	18	190

TEST PIT 3

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS **Road number:** RE/2 BOTHASFONTEIN FARM
Project date: 06 May, 2005 **Print date:** 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
TP 3	06 May 2005	S - MID	3	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₉₀): 45 Balance Number (BN₁₀₀) of data: 3.9 Standard Pavement Balance Curve (SPBC): B-9, A-754 Rut Limit: 20mm Structural capacity (MISA): 0.0 (MISA = Million Standard Axles, 80 kN)	Selected Design Traffic: Heavy traffic BN₁₀₀ of SPBC: 3.7 Road category: B Base type: Granular Moisture condition of base: Optimum
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Category VII : Well-Balanced Inverted Structure (WBI)

Average equivalent strength (Existing Pavement Structure)

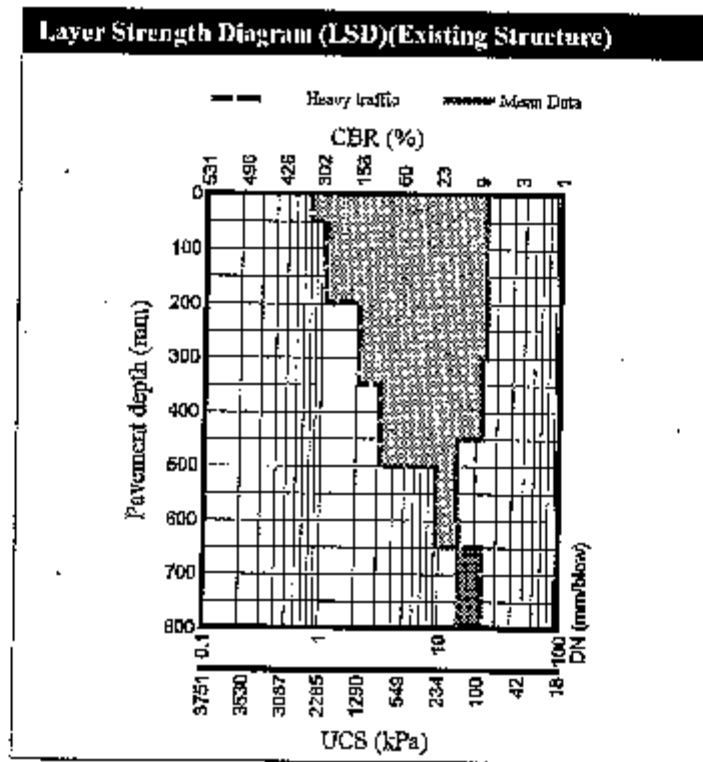
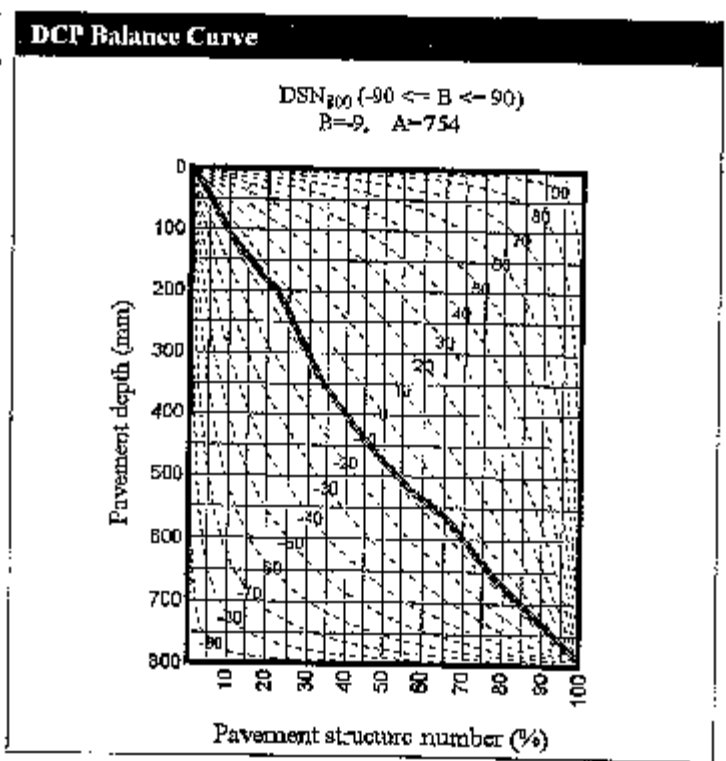
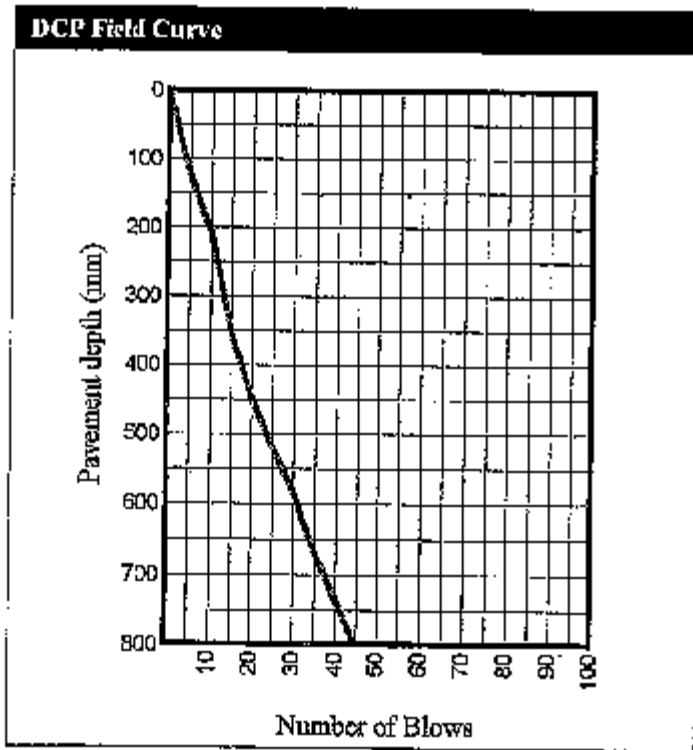
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	23.67	6	3.0	27.3	3	89	39	17 - 88
151 - 300	24.32	7	6.0	32.0	7	86	38	17 - 86
301 - 450	22.38	7	5.3	29.2	3	94	41	18 - 94
451 - 600	13.98	11	1.5	15.9	15	159	68	30 - 155
601 - 800	14.74	14	2.0	17.2	14	150	64	28 - 146

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	39	17 - 88	8	29
151 - 300	38	17 - 86	7	36
301 - 450	41	18 - 94	8	94
451 - 600	68	30 - 155	15	159
601 - 800	64	28 - 146	14	150

TEST PIT 4

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Crac. Crack	Deform	Other
DP 4	06 May 2005	S - MID	4	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN ₉₀₀): 65	Selected Design Traffic:	Heavy traffic
Balance Number (BN ₁₀₀) of data: 5.8	BN ₁₀₀ of SPBC:	6.0
Standard Pavement Balance Curve (SPBC): B=19, A=2673	Road category:	B
Rut Limit: 20mm	Base type:	Granular
Structural capacity (MISA): 0.1	Moisture condition of base:	Optimum

(MISA = Million Standard Axles, 80 kN)

Category VIII : Averagely Balanced Inverted Structure (AB)

Average equivalent strength (Existing Pavement Structure)

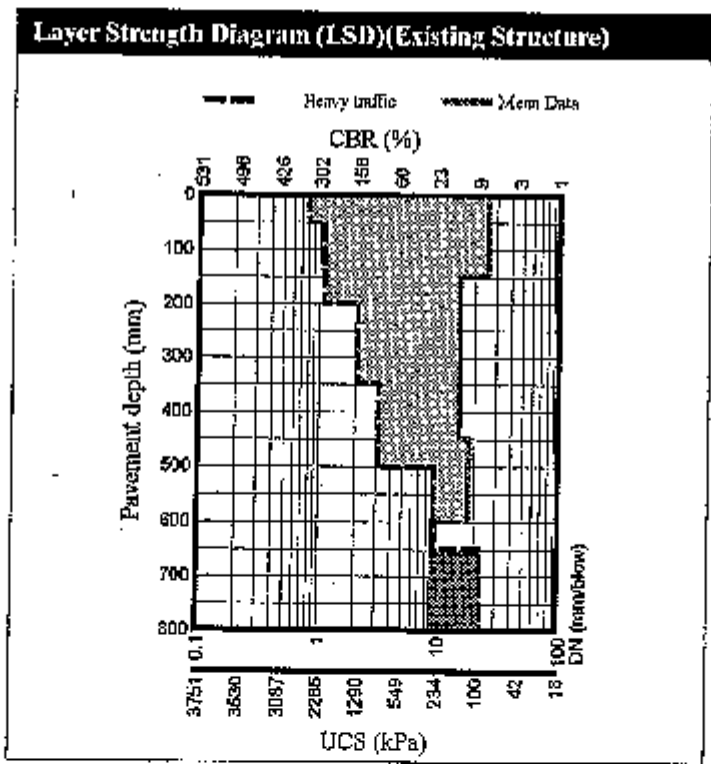
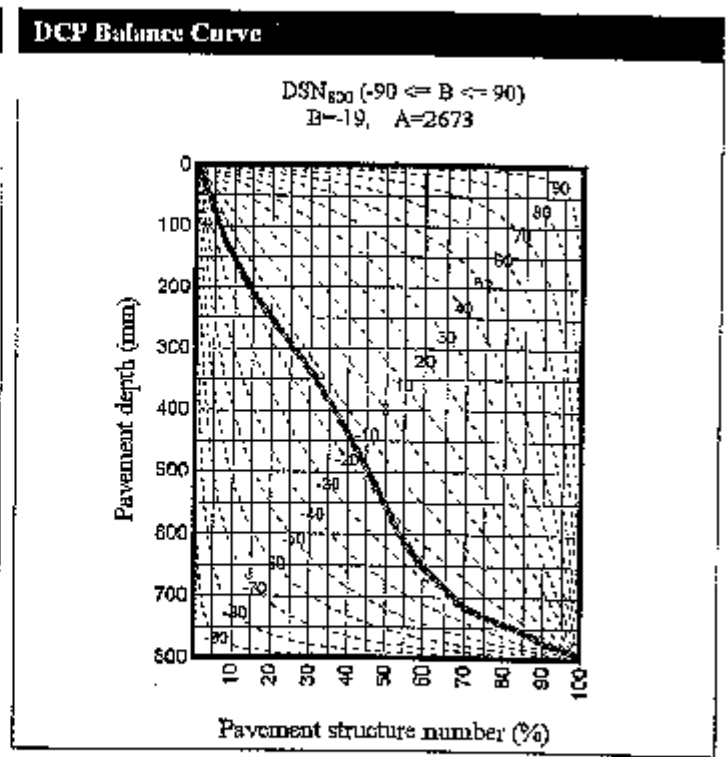
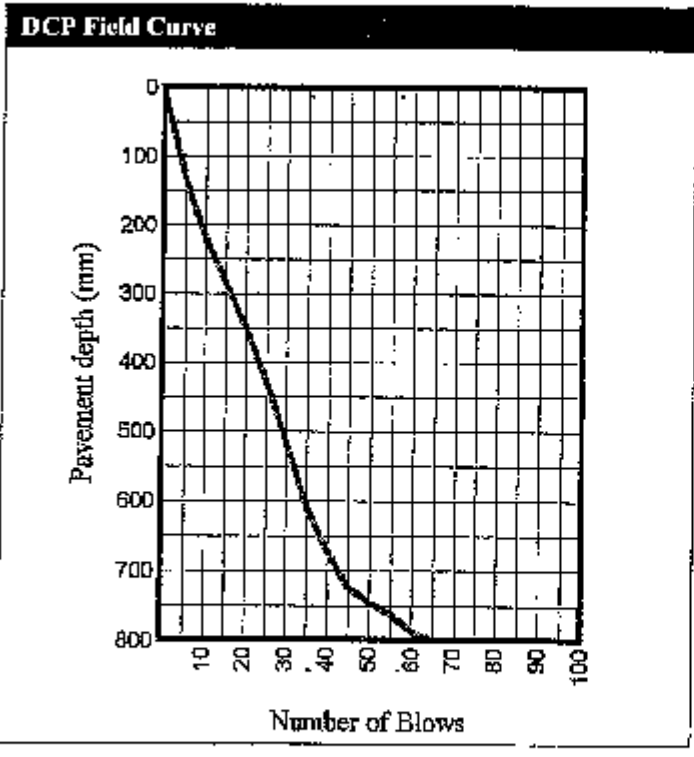
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	50P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10 ¹ - 90 ⁹ MPa
0 - 150	25.58	6	2.9	29.2	7	81	35	16 - 81
151 - 300	15.16	10	2.3	18.1	13	145	62	27 - 142
301 - 450	15.02	10	1.7	17.2	13	147	63	28 - 143
451 - 600	18.07	8	0.6	18.8	11	120	52	23 - 118
601 - 800	9.08	30	4.3	14.6	25	257	107	47 - 243

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Avg. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	36	16 - 81	7	81
151 - 300	62	27 - 142	13	145
301 - 450	63	28 - 143	13	147
451 - 600	32	23 - 118	11	120
601 - 800	107	47 - 245	25	257

TEST PIT 5

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS **Road number:** RE/2 BOTHASPONTEN FARM
Project date: 06 May, 2005 **Print date:** 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cross. Crack	Deform	Other
TP 5	06 May 2005	5 - MID	5	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₉₀₀): 88 Balance Number (BN₁₀₀) of data: 6.4 Standard Pavement Balance Curve (SPBC): B=21, A=2943 Rut Limit: 20mm Structural capacity (MISA): 0.2 (MISA = Million Standard Axles, 80 kN)	Selected Design Traffic: Heavy traffic BN₁₀₀ of SPBC: 5.5 Road category: B Base type: Granular Moisture condition of base: Optimum
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Category VIII: Averagely Balanced Inverted Structure (ABI)

Average equivalent strength (Existing Pavement Structure)

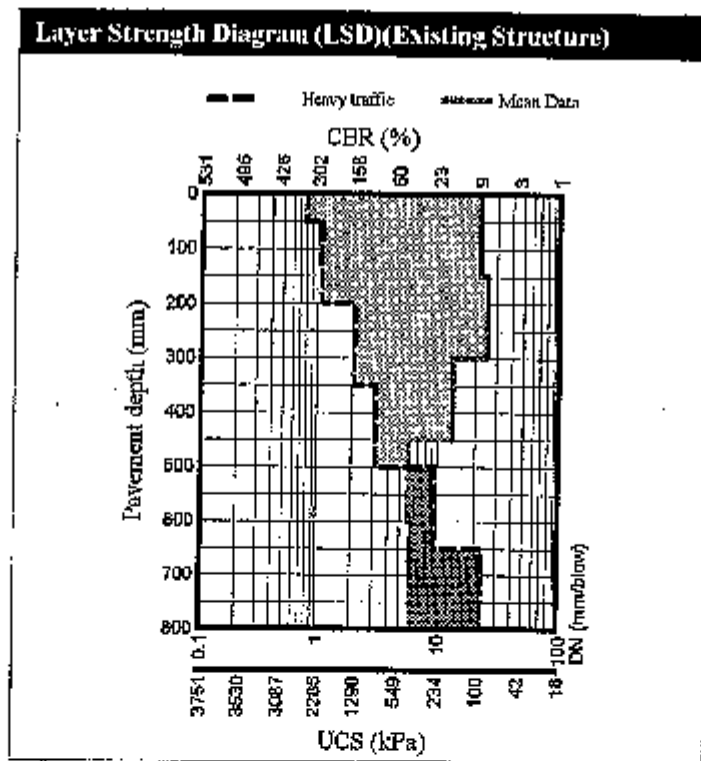
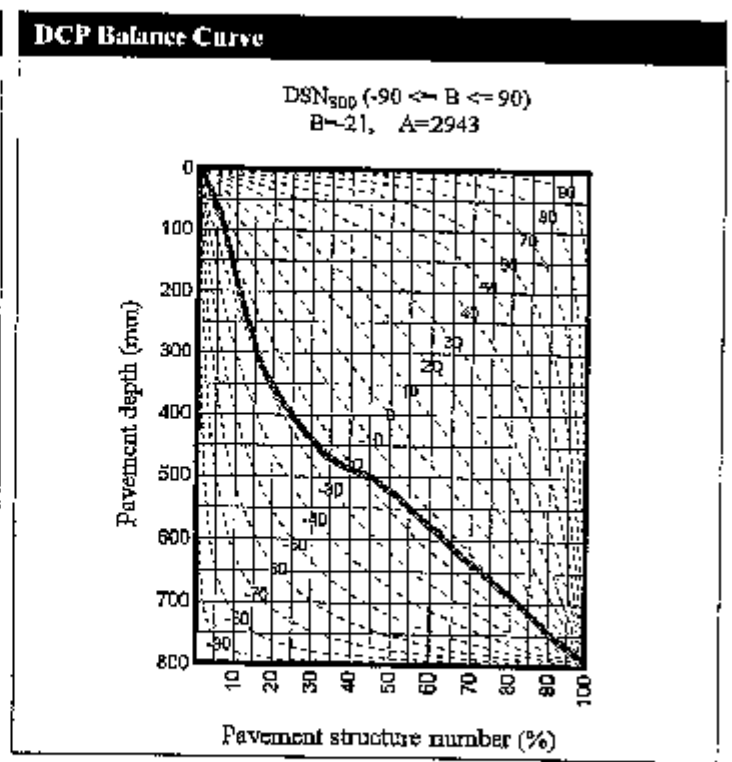
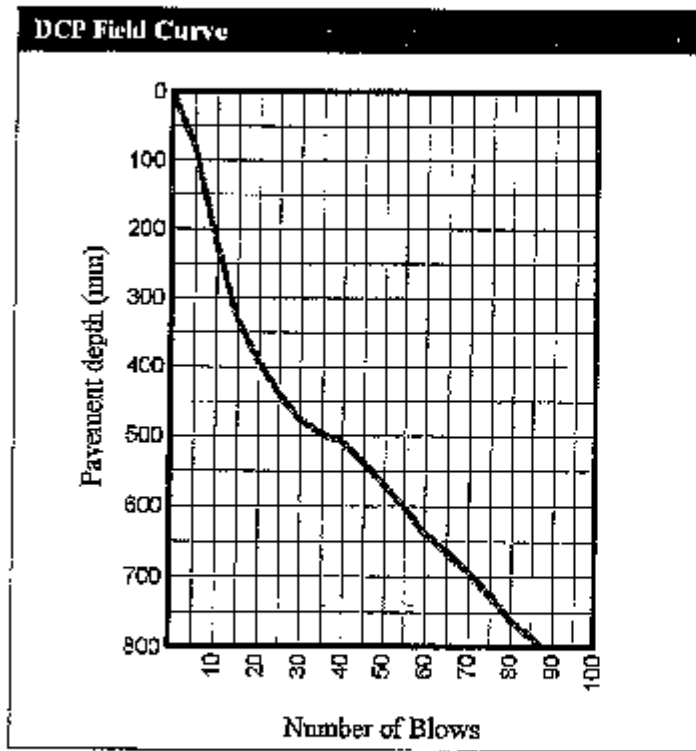
Depth (mm)	W. Avg. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	21.66	7	5.8	29.1	8	98	43	19 - 97
151 - 300	25.09	6	2.8	28.7	7	23	36	16 - 83
301 - 450	13.13	13	5.2	19.7	16	171	79	32 - 165
451 - 600	5.87	28	1.4	7.7	44	417	171	75 - 389
601 - 800	6.15	33	0.8	7.1	41	395	162	71 - 376

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Modulil (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	43	19 - 97	8	98
151 - 300	36	16 - 83	7	83
301 - 450	73	32 - 165	16	171
451 - 600	171	73 - 389	44	417
601 - 800	162	73 - 370	41	395

TEST PIT 6

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFOONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cross. Crack	Deform.	Other
TP 6	06 May 2005	S - MID	6	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₉₀₀): 131 Selected Design Traffic: Heavy traffic
 Balance Number (BN₁₀₀) of data: 5.1 BN₁₀₀ of SPBC: 7.0
 Standard Pavement Balance Curve (SPBC): B-15, A-3838 Road category: B
 Rut Limit: 20mm Base type: Granular
 Structural capacity (MISA): 0.8 Moisture condition of base: Optimum
 (MISA = Million Standard Axles, 80 kN)

Category IX : Poorly Balanced Inverted Structure (PBI)

Average equivalent strength (Existing Pavement Structure)

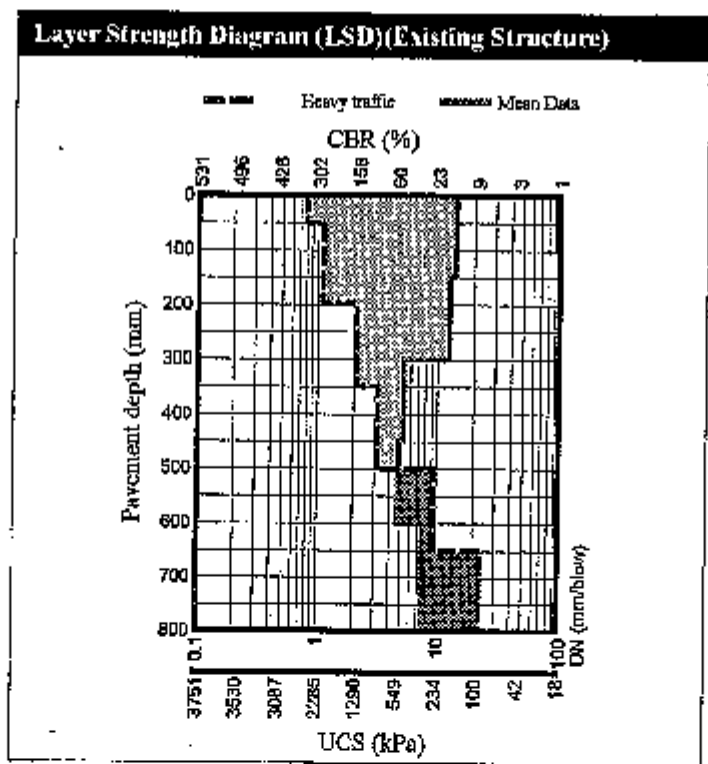
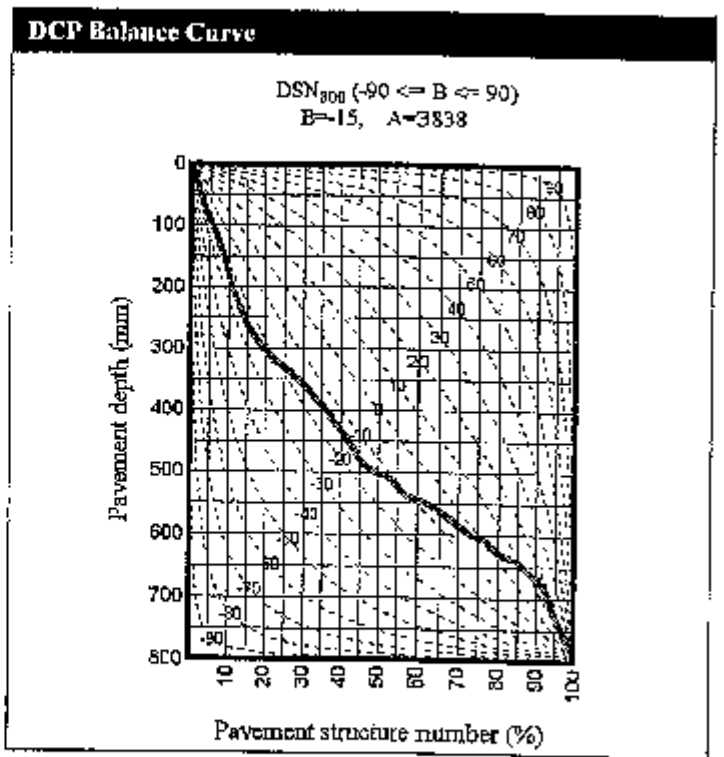
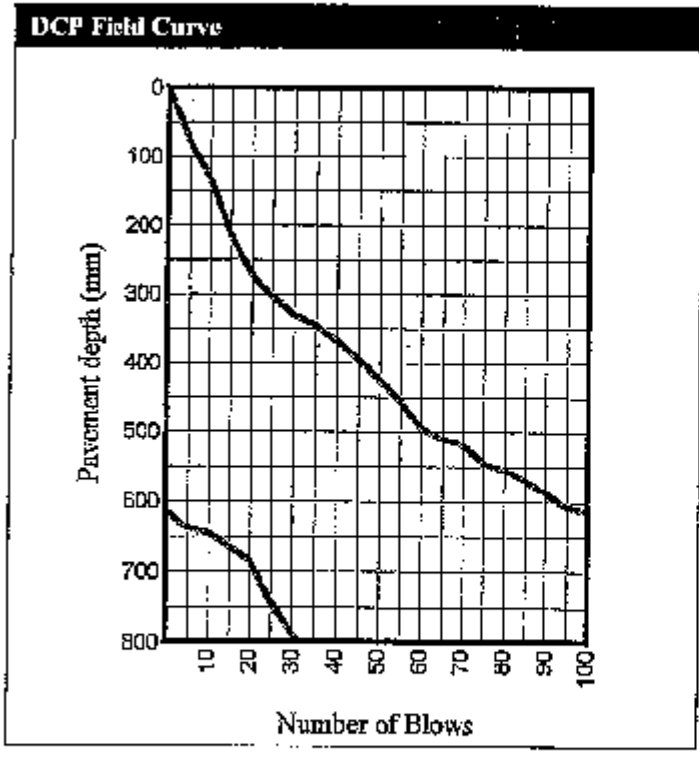
Depth (mm)	W. Avg. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Avg. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	14.24	11	2.6	17.5	14	156	67	29 - 152
151 - 300	12.50	13	3.5	17.0	17	180	76	34 - 174
301 - 450	5.27	30	1.0	6.5	50	469	191	84 - 436
451 - 600	4.75	39	2.0	7.4	57	526	213	94 - 486
601 - 800	7.59	38	3.5	12.1	32	313	130	57 - 295

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	67	29 - 152	14	156
151 - 300	76	34 - 174	17	180
301 - 450	191	84 - 436	50	469
451 - 600	215	94 - 486	57	526
601 - 800	130	57 - 296	32	313

TEST PIT 7

DCP Report - Single analysis

Region:	LIDWALA CONSULTING ENGINEERS	Road number:	RE/2 BOTHASFONTEIN FARM
Project date:	06 May, 2005	Print date:	06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Fewing	Long. Crack	Croc. Crack	Deform	Other
TP 7	06 May 2005	S-MID	7	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN ₈₀₀): 63	Selected Design Traffic:	Heavy traffic:
Balance Number (BN ₁₀₀) of data: 9.3	BN ₁₀₀ of SPBC:	7.5
Standard Pavement Balance Curve (SPBC): B=15, A=2985	Road category:	B
Rut Tolerant: 20mm	Base type:	Granular
Structural capacity (MISA): 0.1	Moisture condition of base:	Optimum

(MISA = Million Standard Axles, 80 kN)

Category VIII : Averagely Balanced Inverted Structure (ABI)

Average equivalent strength (Existing Pavement Structure)

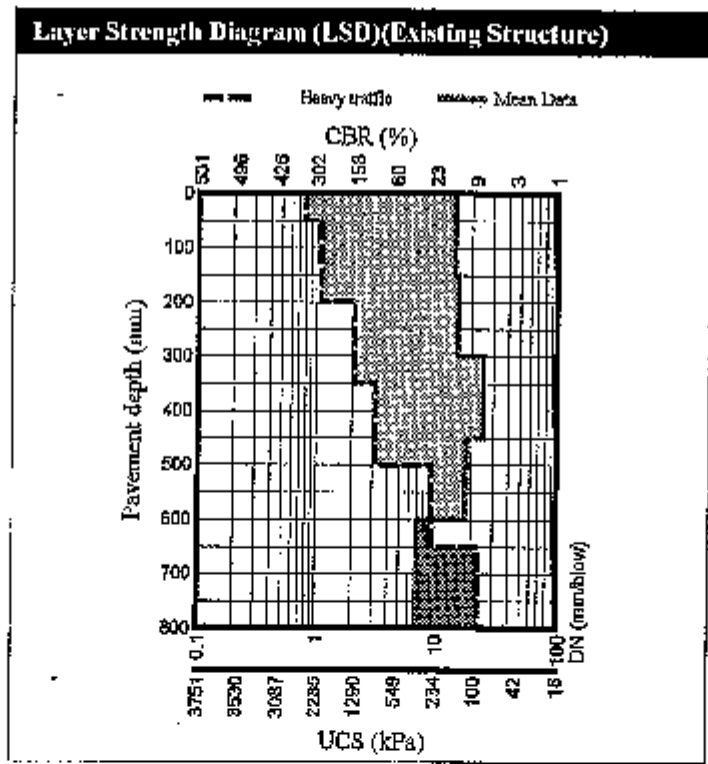
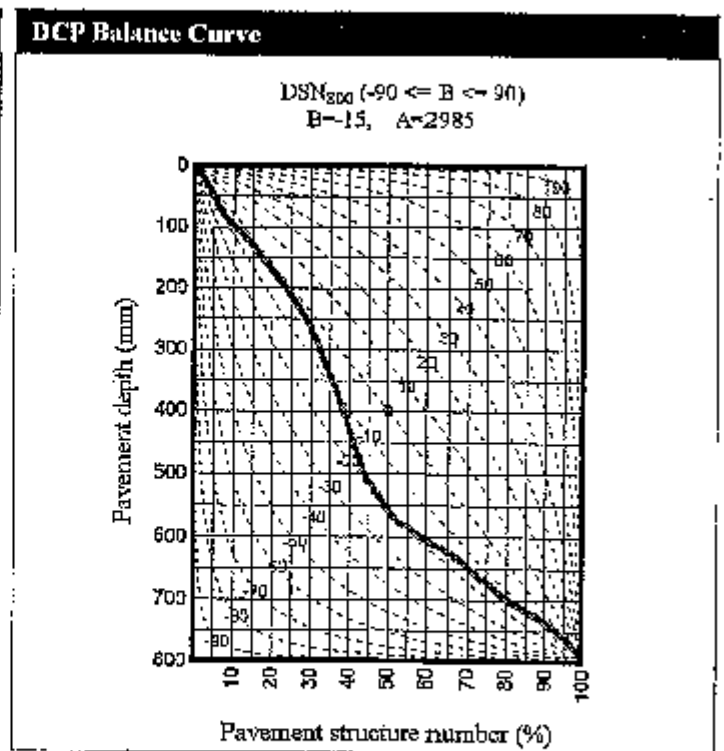
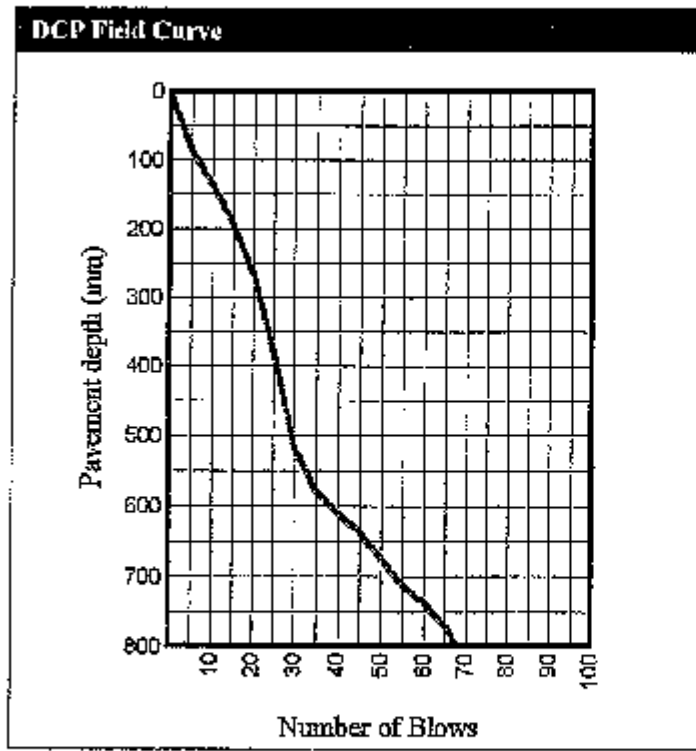
Depth (mm)	W. Avg. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Avg. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	14.43	11	3.5	18.9	14	154	66	29 - 150
151 - 300	15.38	10	4.3	20.9	13	143	61	27 - 140
301 - 450	24.87	6	2.0	27.4	7	84	37	16 - 84
451 - 600	18.03	11	8.2	28.5	11	120	52	23 - 118
601 - 800	7.10	29	1.6	9.1	34	337	139	61 - 318

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Persepolis value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	LCS (kPa)
0 - 150	66	29 - 159	14	154
151 - 300	61	27 - 140	13	143
301 - 450	37	16 - 84	7	84
451 - 600	52	23 - 118	11	120
601 - 800	139	61 - 318	34	337

TEST PIT 8

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cross. Crack	Deform	Other
TP 8	06 May 2005	5 - MED	8	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₂₀₀): 54
 Balance Number (BN₁₀₀) of data: 3.1
 Standard Pavement Balance Curve (SPBC): B-10, A-4107
 Rut Limit: 20mm
 Structural capacity (MISA): 0.0
 (MISA = Million Standard Axles, 80 kN)

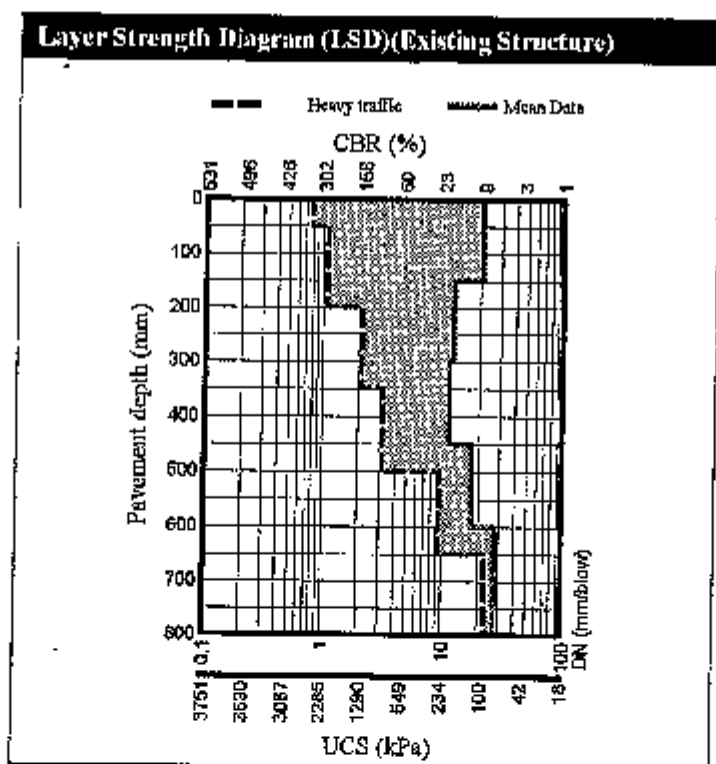
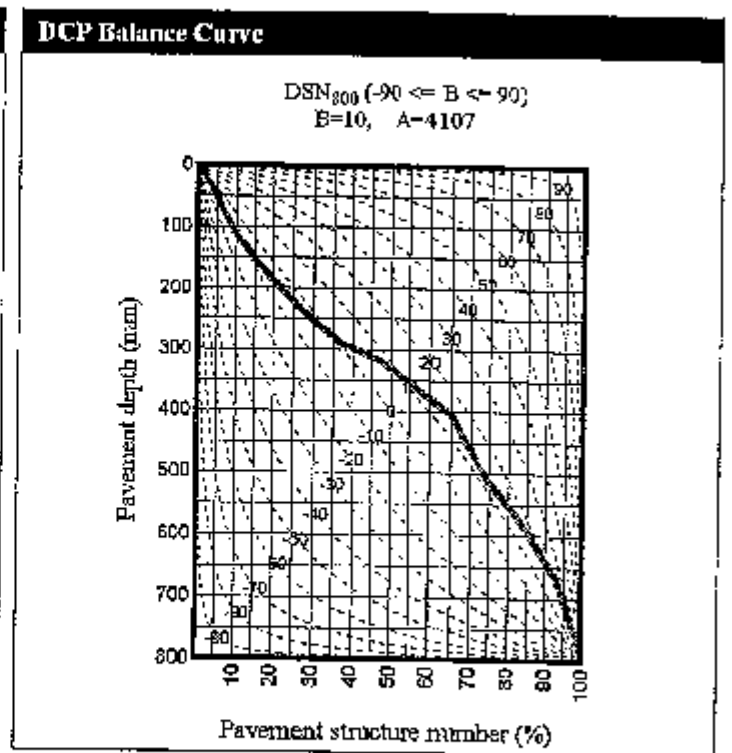
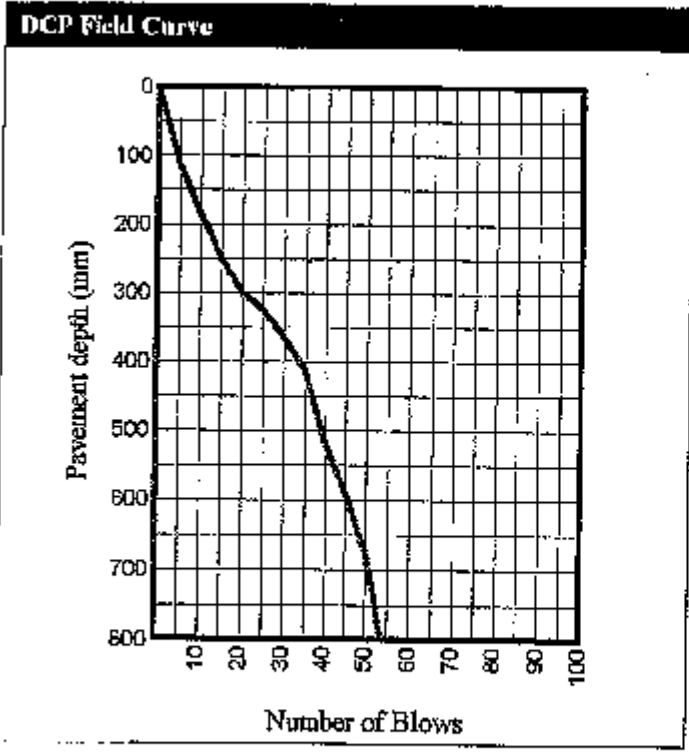
Selected Design Traffic: Heavy traffic
 BN₁₀₀ of SPBC: 17.0
 Road category: B
 Base type: Granular
 Moisture condition of base: Optimum

Category VI: Poorly Balanced Deep Structure (PBD)

Average equivalent strength (Existing Payment Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modul (MPa)	E-Modul Range 10P - 90P MPa
0 - 150	20.99	7	3.6	25.7	9	101	44	19 - 160
151 - 300	12.21	13	1.8	14.3	17	185	78	34 - 179
301 - 450	11.20	17	5.7	18.1	19	203	86	38 - 196
451 - 600	17.51	9	3.4	21.8	11	124	53	23 - 122
601 - 800	27.24	8	7.7	37.1	6	76	33	15 - 76

* Weighted average penetration rate
 ** California Bearing Ratio
 *** Unconfined Compressive Strength
 P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Avg. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (MPa)
0 - 150	44	19 - 100	9	101
151 - 300	78	34 - 179	17	185
301 - 450	86	38 - 196	19	205
451 - 600	53	23 - 122	11	124
601 - 800	33	15 - 76	6	76

TEST PIT 9

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cross. Crack	Deform	Other
TP 9	06 May 2005	S - MID	9	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₁₀₀): 104 Selected Design Traffic: Heavy traffic
 Balance Number (BN₁₀₀) of data: 4.2 BN₁₀₀ of SPBC: 3.1
 Standard Pavement Balance Curve (SPBC): B=35, A=2102 Road category: B
 Rut Limit: 20mm Base type: Granular
 Structural capacity (MISA): 0.3 Moisture condition of base: Optimum
 (MISA = Million Standard Axles, 80 kN)

Category VIII: Averagely Balanced Inverted Structure (ABD)

Average equivalent strength (Existing Pavement Structure)

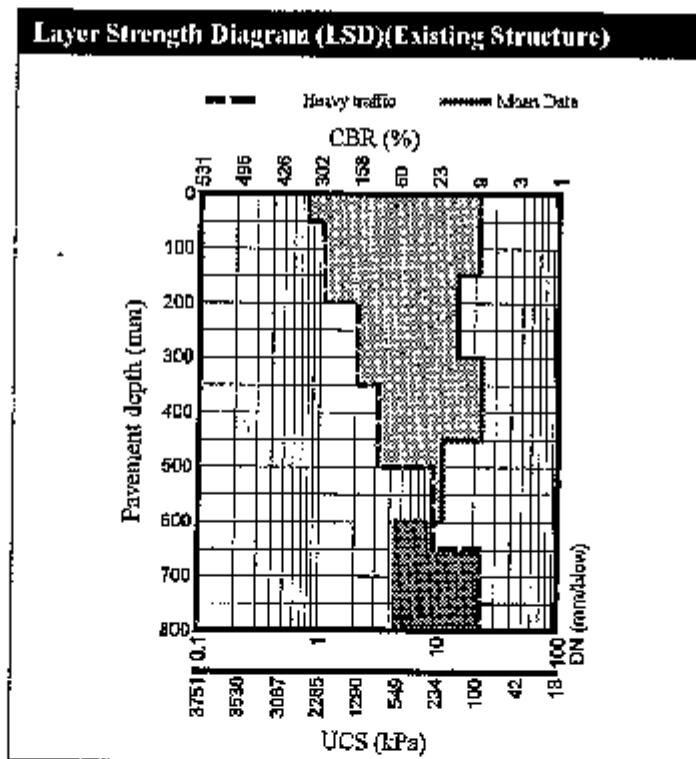
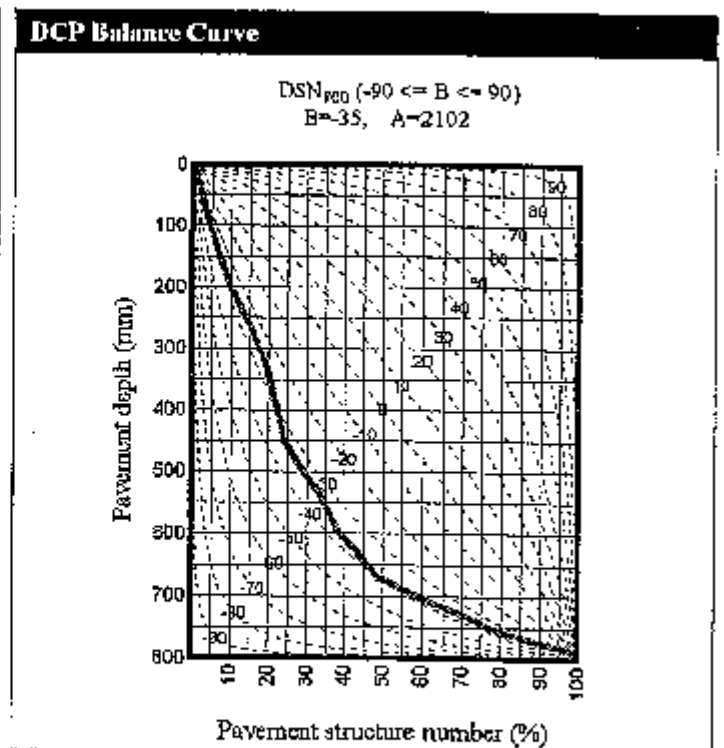
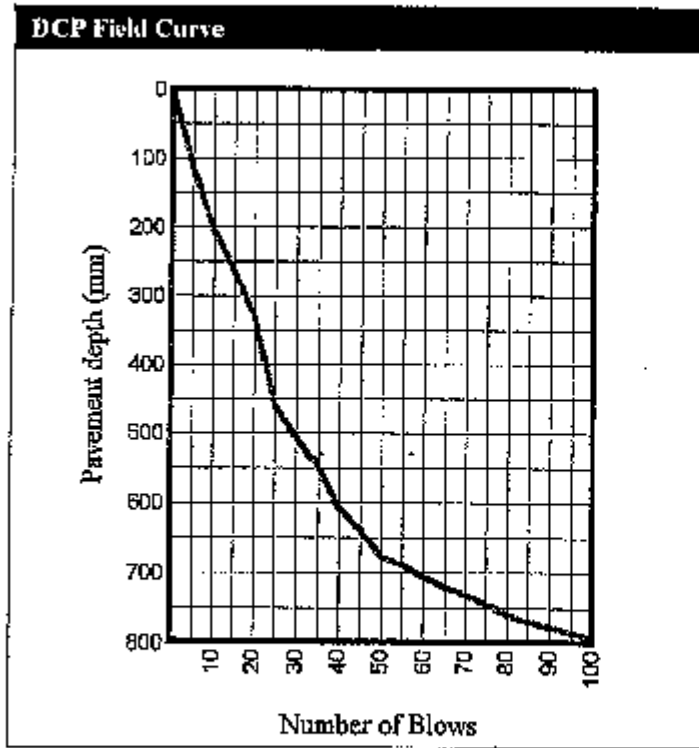
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modul (MPa)	E-Modul Range 10P - 90P MPa
0 - 150	22.02	7	2.2	24.8	8	96	42	18 - 95
151 - 300	14.47	11	2.8	18.1	14	153	65	29 - 149
301 - 450	23.04	7	4.9	29.4	8	91	40	18 - 91
451 - 600	11.05	15	4.2	16.4	20	206	87	38 - 198
601 - 800	4.49	64	2.8	8.1	61	560	227	99 - 517

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Avg E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	42	18 - 95	8	96
151 - 300	65	29 - 149	14	153
301 - 450	40	18 - 91	8	91
451 - 600	87	38 - 198	20	206
601 - 800	227	99 - 517	61	560

TEST PIT 10

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS **Road number:** RE/2 BOTHASFONTEIN FARM
Project date: 06 May, 2005 **Print date:** 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Crac. Crack	Deform	Other
TP 10	06 May 2005	S-MID	10	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₈₀): 615 **Selected Design Traffic:** Heavy traffic
Balance Number (DN₁₀₀) of data: 0.5 **BN₁₀₀ of SPBC:** 0.4
Standard Pavement Balance Curve (SPBC): B~69, A=2110 **Road category:** B
Rot Limit: 20mm **Base type:** Granular
Structural capacity (MSA): 175.1 **Moisture condition of base:** Optimum
(MSA = Million Standard Axles, 80 kN)

Category VIII : Averagely Balanced Inverted Structure (ABI)

Average equivalent strength (Existing Pavement Structure)

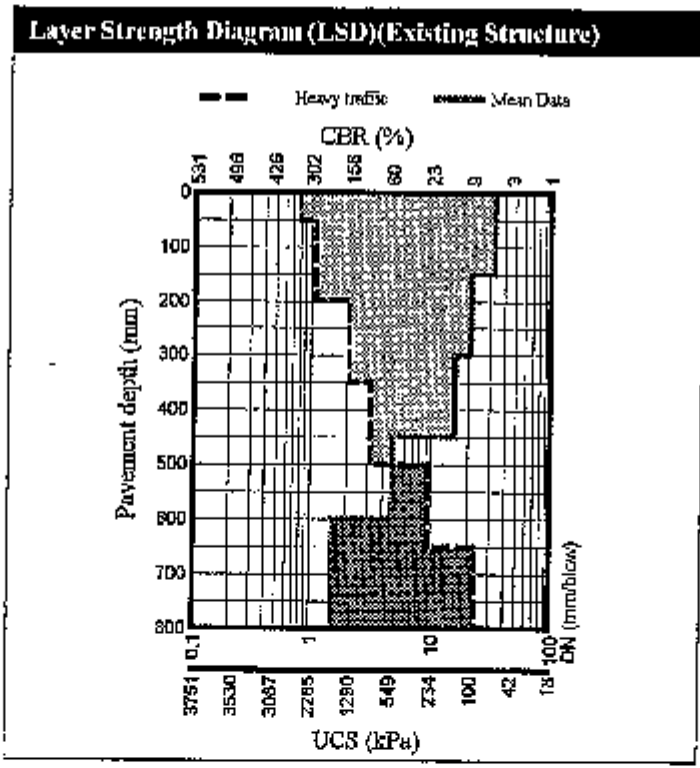
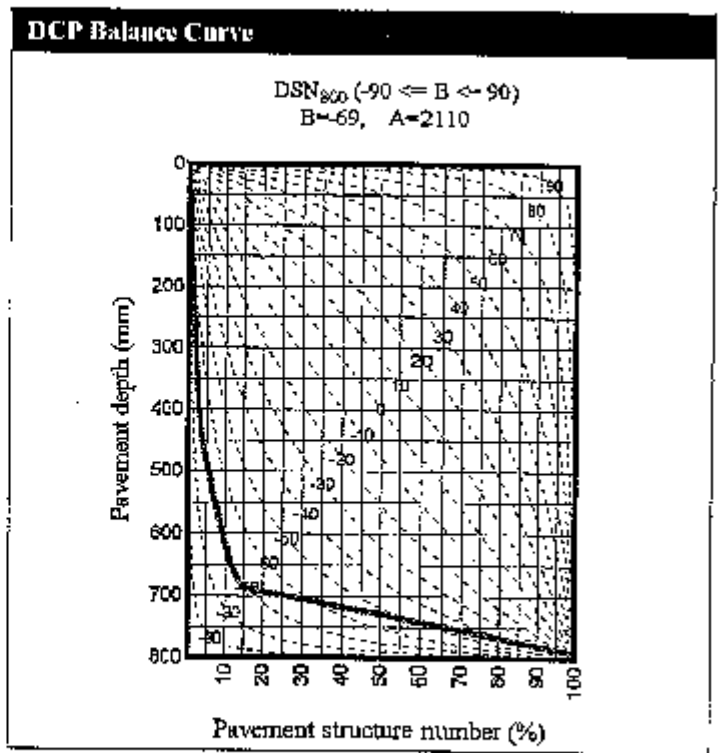
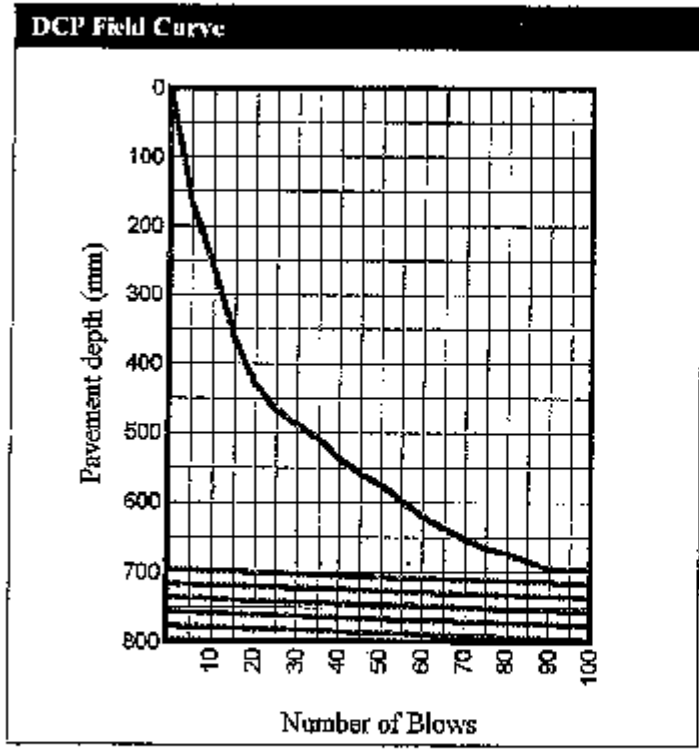
Depth (mm)	W. Avg. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ava. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	33.20	5	0.0	33.2	5	61	27	12 - 62
151 - 300	21.12	7	4.2	26.5	9	101	44	19 - 100
301 - 450	15.59	11	4.6	21.5	13	141	60	27 - 138
451 - 600	4.82	33	1.2	6.3	56	517	210	92 - 479
601 - 800	1.57	560	1.6	3.6	210	1655	691	303 - 1576

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

F = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	27	12 - 62	5	51
151 - 300	44	19 - 100	9	101
301 - 450	60	27 - 138	13	141
451 - 600	210	92 - 479	36	517
601 - 800	691	303 - 1576	210	1635

TEST PIT 11

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS **Road number:** RE/2 BOTHASFONTEIN FARM
Project date: 06 May, 2005 **Print date:** 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (m)	Condition	Rattling	Pumping	Long. Crack	Crac. Crack	Deform	Other
TP 11	06 May 2005	5 - MID	11	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN ₈₀₀):	60	Selected Design Traffic:	Heavy traffic
Balance Number (BN ₁₀₀) of data:	6.8	BN ₁₀₀ of SPBC:	6.2
Standard Pavement Balance Curve (SPBC):	B-18, A=1395	Road category:	B
Rat Limit:	20mm	Base type:	Granular
Structural capacity (MISA):	0.1	Moisture condition of base:	Optimum
(MISA = Million Standard Axles, 80 kN)			

Category VII: Averagely Balanced Inverted Structure (ABI)

Average equivalent strength (Existing Pavement Structure)

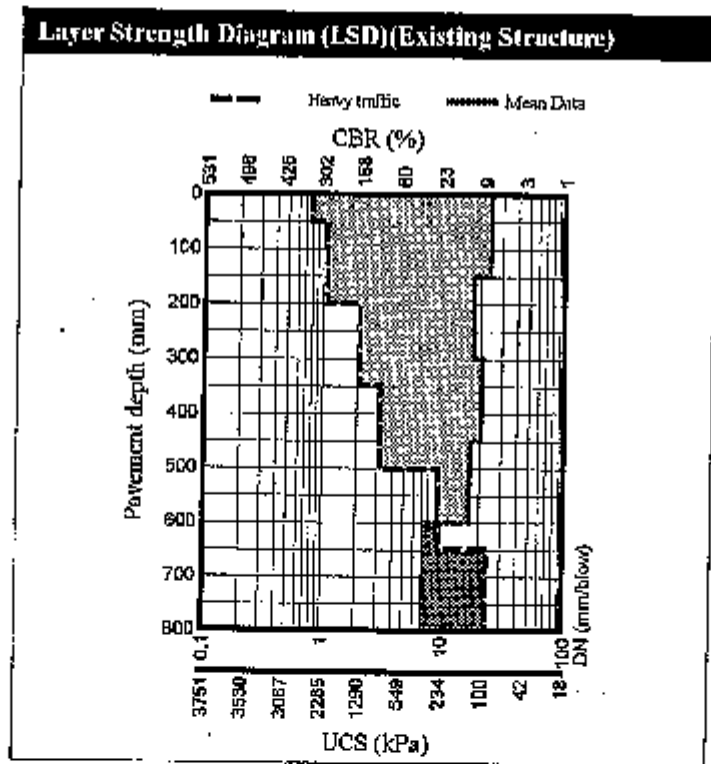
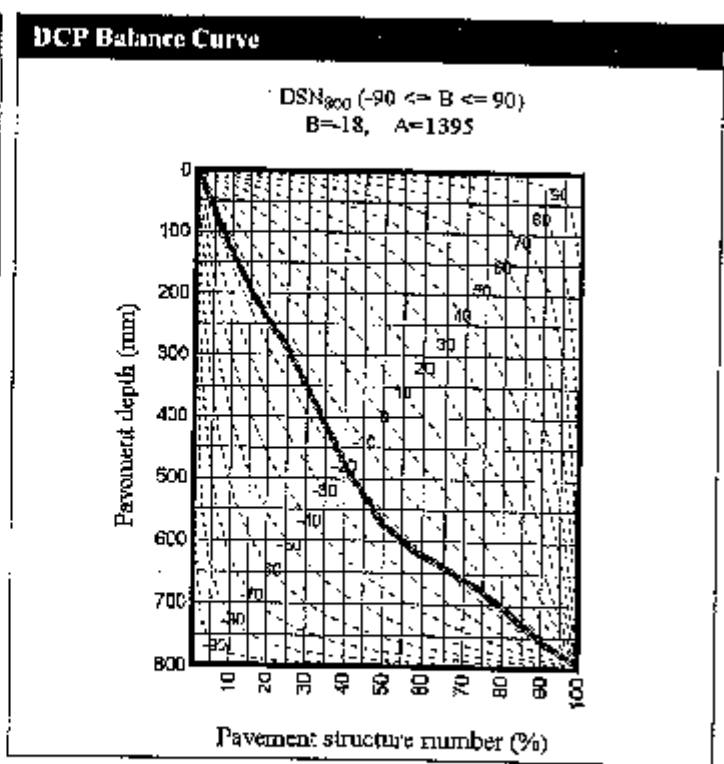
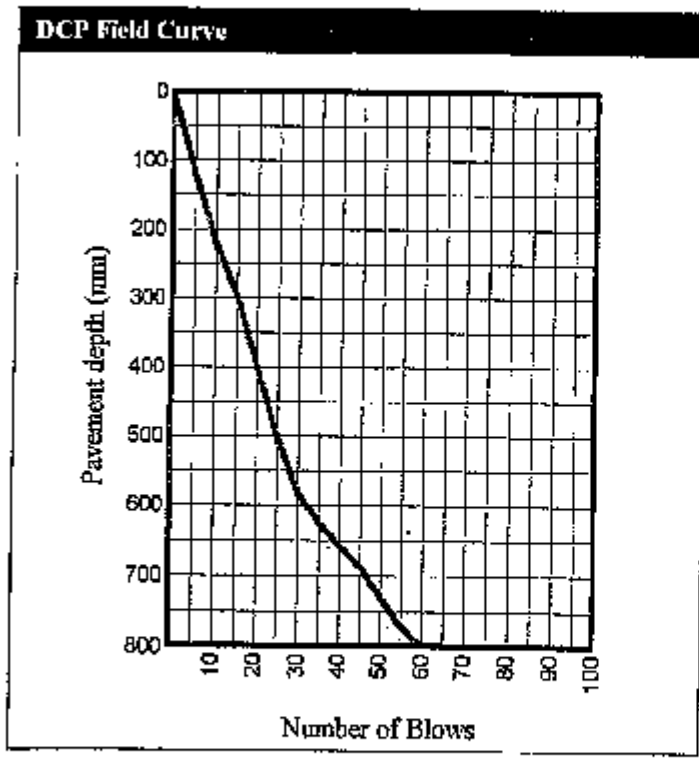
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	23.58	6	1.7	25.8	8	89	39	17 - 89
151 - 300	17.57	9	2.4	20.7	11	124	53	23 - 124
301 - 450	20.53	7	0.2	20.8	9	104	45	20 - 103
451 - 600	16.63	10	3.8	21.5	12	131	56	25 - 129
601 - 800	7.37	28	1.2	8.9	33	323	134	59 - 305

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P - Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	39	17 - 89	8	89
151 - 300	53	23 - 121	11	124
301 - 450	45	20 - 103	9	104
451 - 600	56	25 - 129	12	131
601 - 800	134	59 - 303	33	323

TEST PIT 12

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS **Road number:** RE/2 BOTHASFONTEIN FARM
Project date: 06 May, 2005 **Print date:** 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (m)	Condition	Rutting	Pumping	Long. Crack	Cruc. Crack	Deform	Other
TP 12	06 May 2005	S - MID	12	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN ₁₀₀):	99	Selected Design Traffic:	Heavy traffic
Balance Number (BN ₁₀₀) of data:	7.1	RN ₁₀₀ of SPBC:	7.8
Standard Pavement Balance Curve (SPBC):	B-12, A-2827	Road category:	B
Rut Limit:	20mm	Base type:	Granular
Structural capacity (MISA):	0.3	Moisture condition of base:	Optimum
(MISA = Million Standard Axles, 80 kN)			

Category VIII : Averagely Balanced Inverted Structure (ABI)

Average equivalent strength (Existing Pavement Structure)

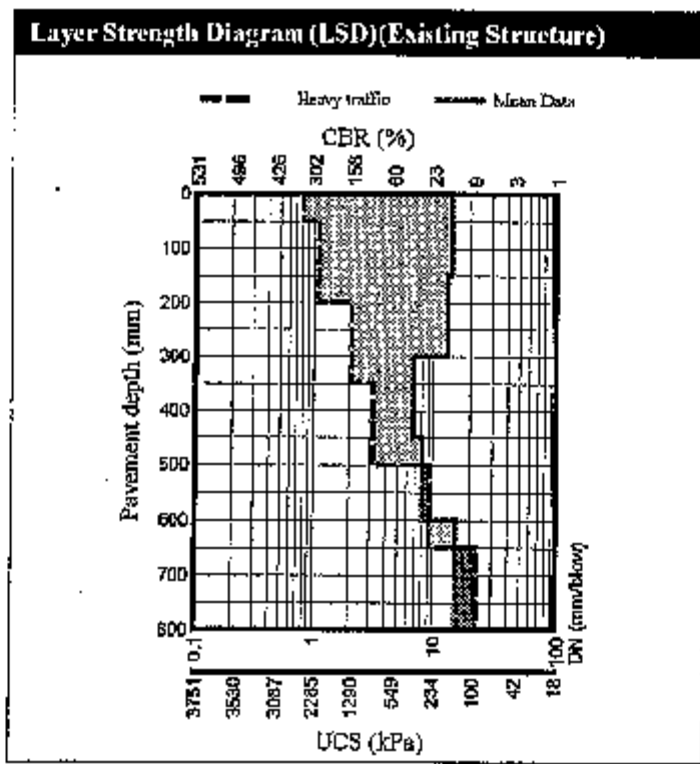
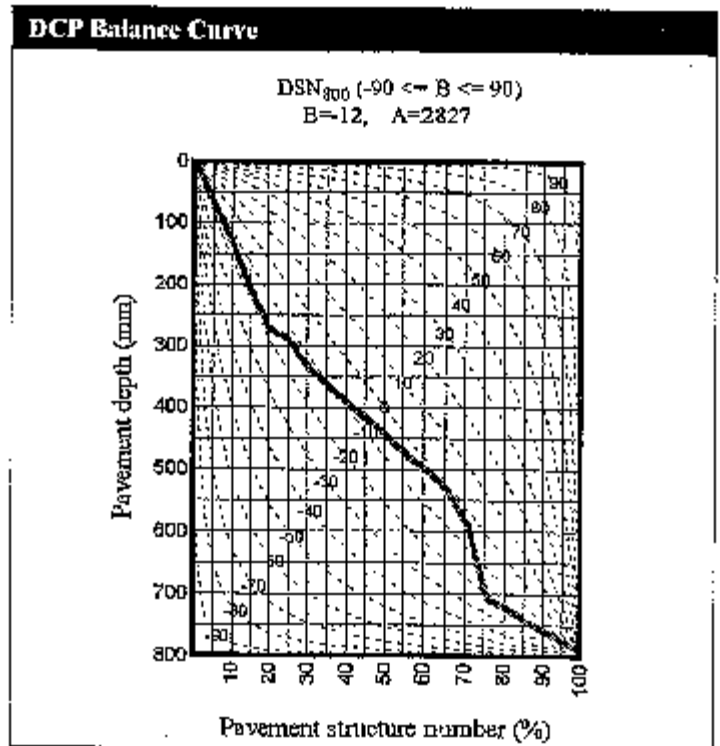
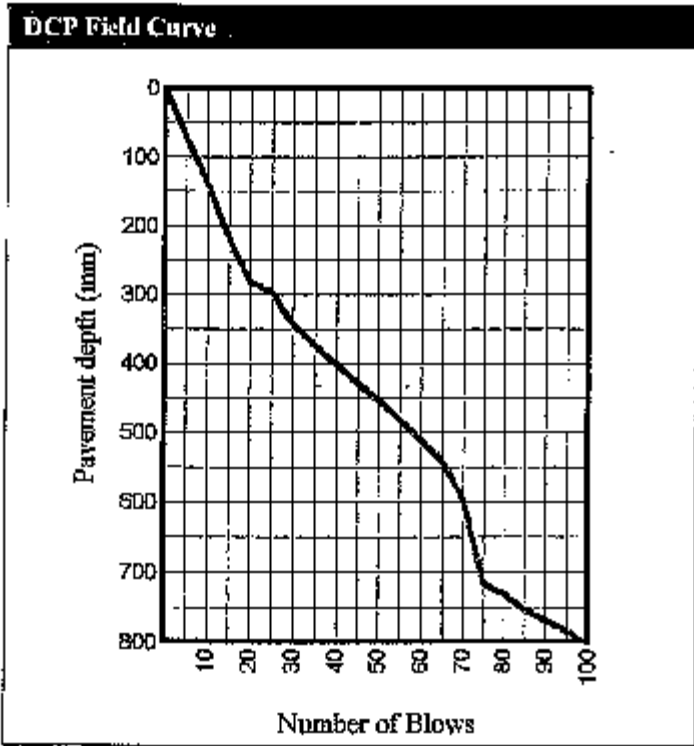
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modul (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	14.14	11	0.7	15.1	14	157	67	29 - 153
151 - 300	13.02	15	3.8	17.8	16	172	73	32 - 167
301 - 450	6.62	24	1.7	8.8	38	365	150	66 - 342
451 - 600	8.10	21	3.4	12.4	29	291	121	53 - 276
601 - 800	15.50	29	10.1	28.5	13	142	61	27 - 139

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P - Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P	CBR (%)	UCS (kPa)
0 - 150	67	29 - 133	14	157
151 - 300	73	32 - 167	16	172
301 - 450	150	66 - 342	32	365
451 - 600	121	53 - 276	29	291
601 - 800	61	27 - 139	13	142

TEST PIT 13

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
TP 13	06 May 2005	S - MOD	13	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN ₈₀₀): 82	Selected Design Traffic:	Heavy traffic
Balance Number (BN ₁₀₀) of data: 8.8	BN ₁₀₀ of SPBC:	7.5
Standard Pavement Balance Curve (SPBC): B=13, A=1907	Road category:	B
Rut Limit: 20mm	Base type:	Granular
Structural capacity (MISA): 0.1	Moisture condition of base:	Optimum

(MISA = Million Standard Axles, 80 kN)

Category VIII: Averagely Balanced Inverted Structure (ABI)

Average equivalent strength (Existing Pavement Structure)

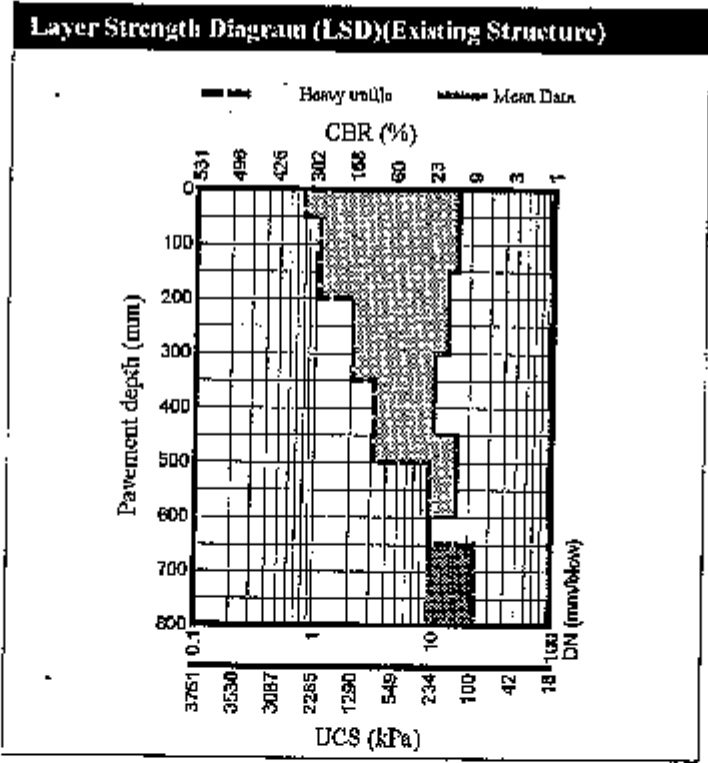
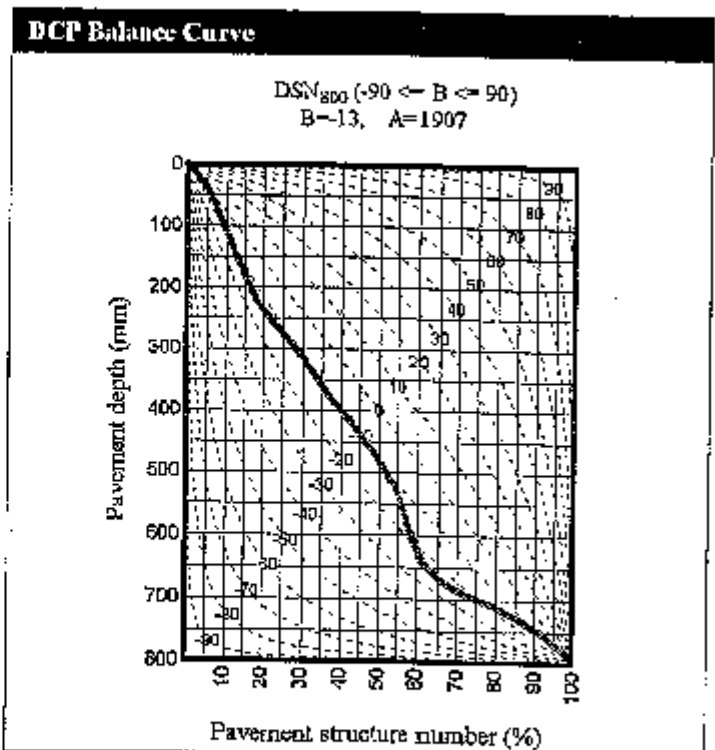
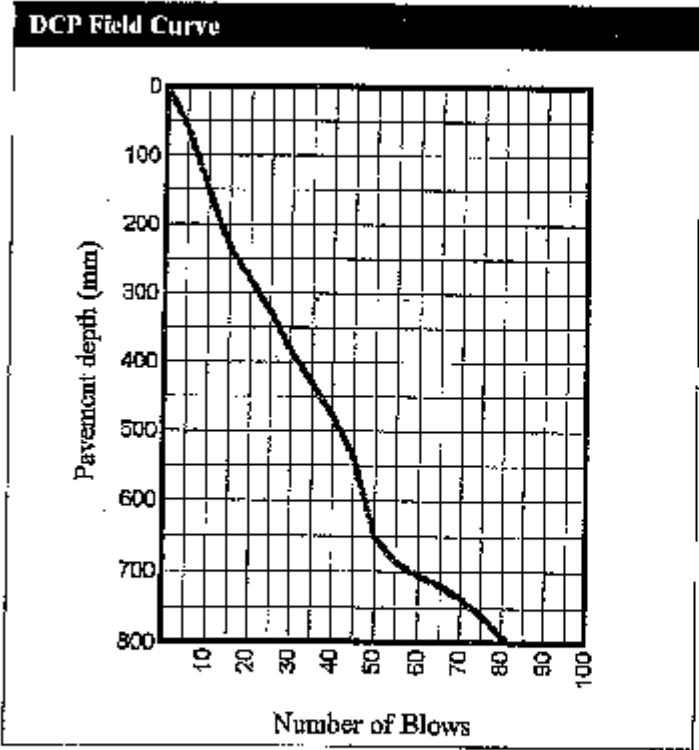
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	15.84	10	3.1	19.9	13	139	59	26 - 135
151 - 300	13.16	12	3.5	17.6	16	170	72	32 - 165
301 - 450	10.19	15	1.0	11.4	22	226	95	42 - 216
451 - 600	15.96	11	5.8	23.4	12	137	59	26 - 134
601 - 800	9.69	34	7.9	19.8	23	239	100	44 - 228

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P - Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Modull (MPa)	E-Modull Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	59	26 - 135	13	139
151 - 300	72	32 - 165	16	170
301 - 450	95	42 - 216	22	226
451 - 600	59	26 - 134	12	137
601 - 800	100	44 - 228	23	239

TEST PIT 14

DCP Report - Single analysis

Region: IJDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Crac. Crack	Deform	Other
TP 14	06 May 2005	S - MID	14	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₉₀₀): 167
 Balance Number (BN₁₀₀) of data: 4.3
 Standard Pavement Balance Curve (SPBC): B-27, A=2007
 Rut Limit: 20mm
 Structural capacity (MISA): 1.8
 (MISA = Million Standard Axles, 80 kN)

Selected Design Traffic: Heavy traffic
 BN₁₀₀ of SPBC: 4.3
 Road category: B
 Base type: Granular
 Moisture condition of base: Optimum

Category IX: Poorly Balanced Inverted Structure (PDI)

Average equivalent strength (Existing Pavement Structure)

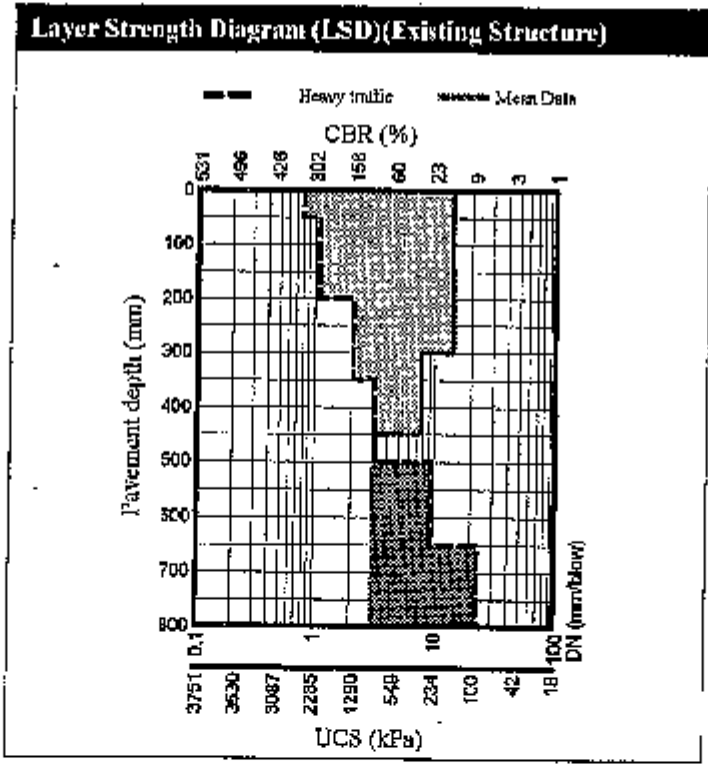
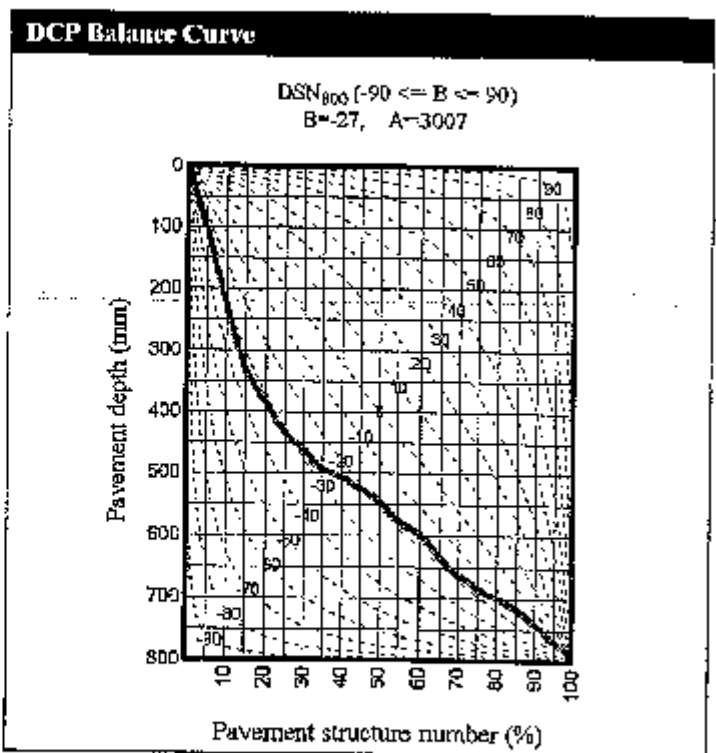
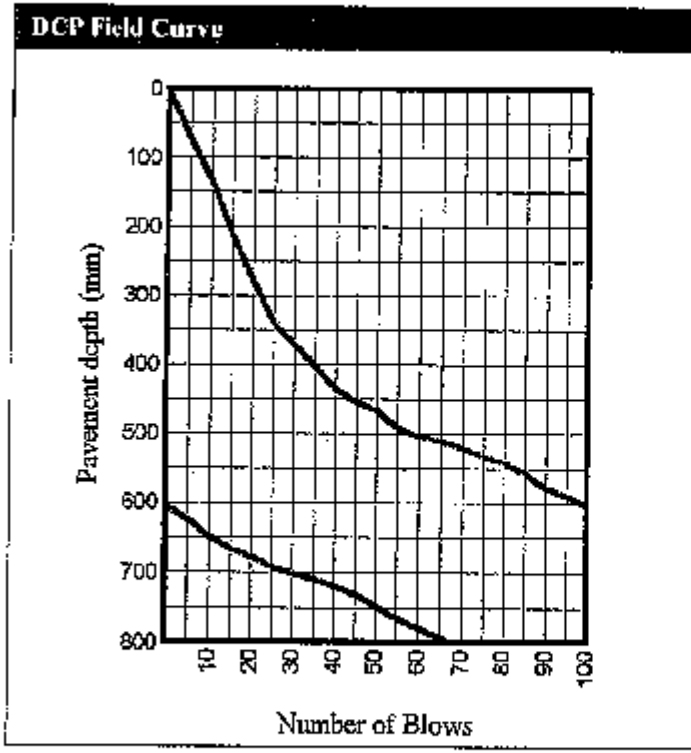
Depth (mm)	W. Ave. Pen. * (mm/blow)	Blows	SD (mm/blow)	90P (mm/blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modul (MPa)	E-Modul Range 10P - 90P MPa
0 - 150	13.81	11	1.2	15.4	15	161	69	30 - 157
151 - 300	14.15	11	1.5	16.0	14	157	67	29 - 153
301 - 450	7.65	22	2.7	11.2	31	310	129	56 - 293
451 - 600	3.23	55	1.3	4.8	93	807	322	141 - 733
601 - 800	3.15	69	0.9	4.3	96	850	330	145 - 753

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Modul (MPa)	E-Modul Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	69	30 - 157	15	161
151 - 300	67	29 - 153	14	157
301 - 450	129	56 - 293	31	310
451 - 600	322	141 - 733	93	807
601 - 800	330	145 - 753	96	830

TEST PIT 15

DCP Report - Single analysis

Region:
Project date:

LIDWALA CONSULTING ENGINEERS
06 May, 2005

Road number:
Print date:

RE/2 BOTHASFONTEIN FARM
06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (m)	Condition	Rutting	Pumping	Long. Crack	Circ. Crack	Deform	Other
TP 15	06 May 2005	S - MID	15	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN ₉₀₀):	39	Selected Design Traffic:	Heavy traffic
Balance Number (BN ₁₀₀) of data:	6.4	BN ₁₀₀ of SPBC:	5.5
Standard Pavement Balance Curve (SPBC):	B=21, A=1292	Road category:	B
Rut Limit:	20mm	Base type:	Granular
Structural capacity (MISA):	0.6	Moisture condition of base:	Optimum
(MISA - Million Standard Axles, 80 kN)			

Category VIII : Averagely Balanced Inverted Structure (ABI)

Average equivalent strength (Existing Pavement Structure)

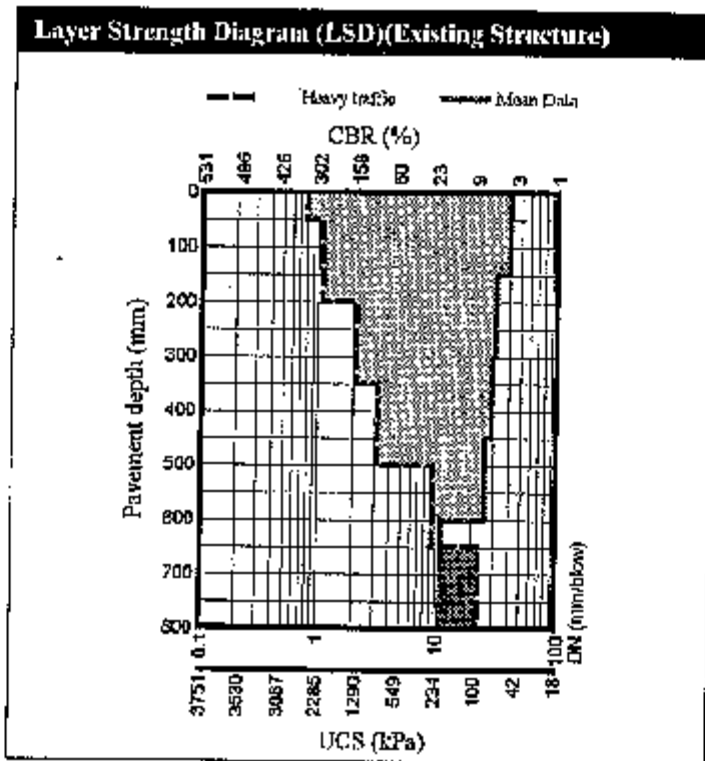
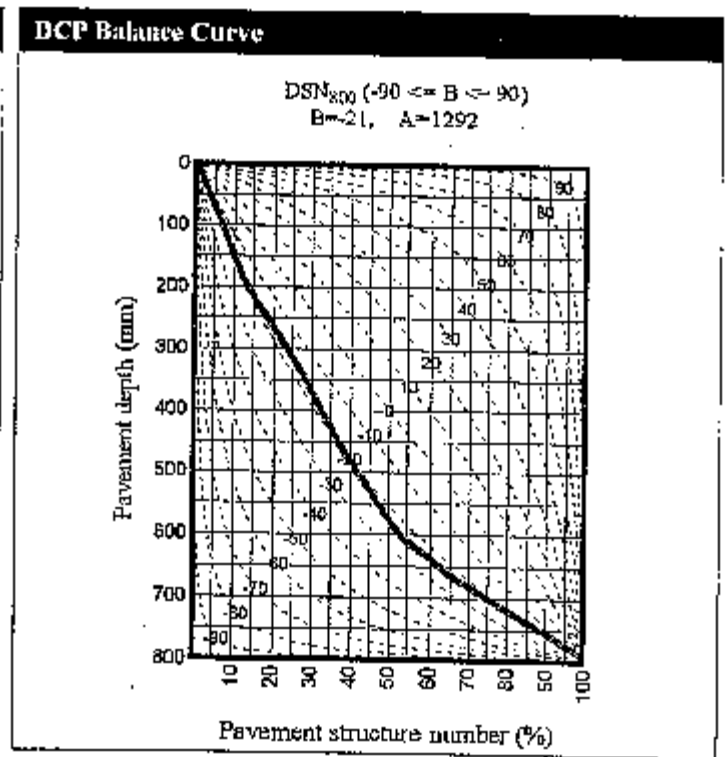
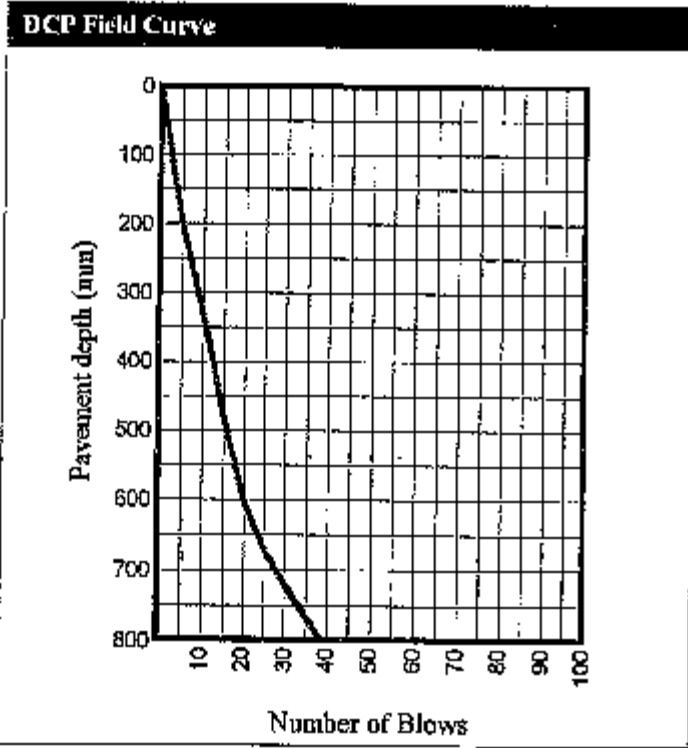
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	40.40	4	0.0	40.4	4	49	22	10 - 50
151 - 300	30.99	5	6.9	39.8	5	66	29	13 - 66
301 - 450	28.83	5	1.5	30.7	6	71	31	14 - 72
451 - 600	25.44	6	2.1	28.1	7	82	36	16 - 82
601 - 800	11.09	19	2.5	14.3	20	246	87	38 - 198

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Modulul (MPa)	E-Modulul Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	22	10 - 50	4	49
151 - 300	29	13 - 66	5	66
301 - 450	31	14 - 72	6	71
451 - 600	36	16 - 82	7	82
601 - 800	87	38 - 198	20	206

TEST PIT 16

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS **Road number:** RE/2 BOTHASFONTEIN FARM
Project date: 06 May, 2005 **Print date:** 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (m)	Condition	Rutting	Pumping	Long. Crack	Crac. Crack	Deform	Other
TP 16	06 May 2005	S - MID	16	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₁₀₀): 45 **Selected Design Traffic:** Heavy traffic
Balance Number (BN₁₀₀) of data: 31.8 **BN₁₀₀ of SPBC:** 35.0
Standard Pavement Balance Curve (SPBC): B=31, A=472 **Road category:** B
Rat Limit: 20mm **Base type:** Granular
Structural capacity (MISA): 0.0 **Moisture condition of base:** Optimum
 (MISA = Millions Standard Axles, 80 kN)

Category IV : Well-Balanced Deep Structure (WBD)

Average equivalent strength (Existing Pavement Structure)

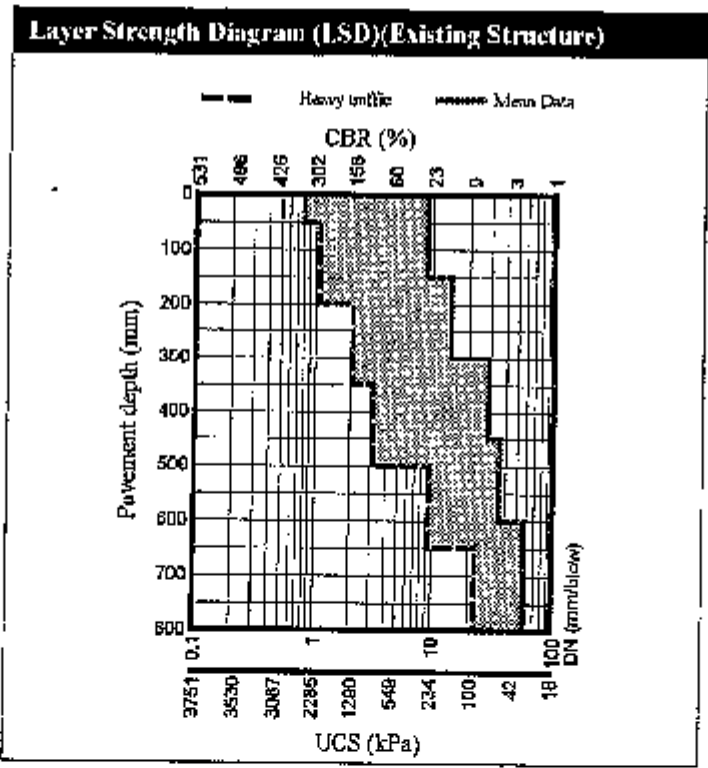
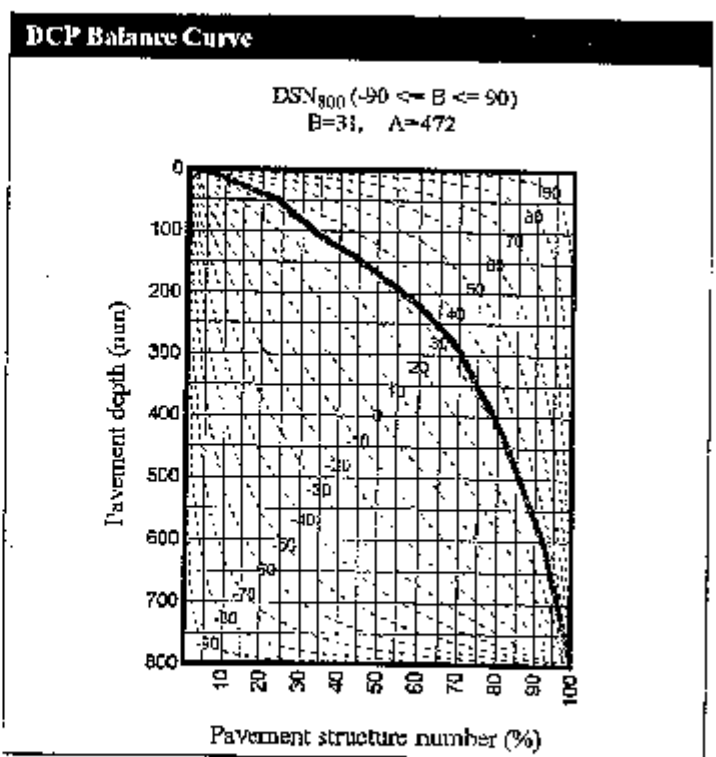
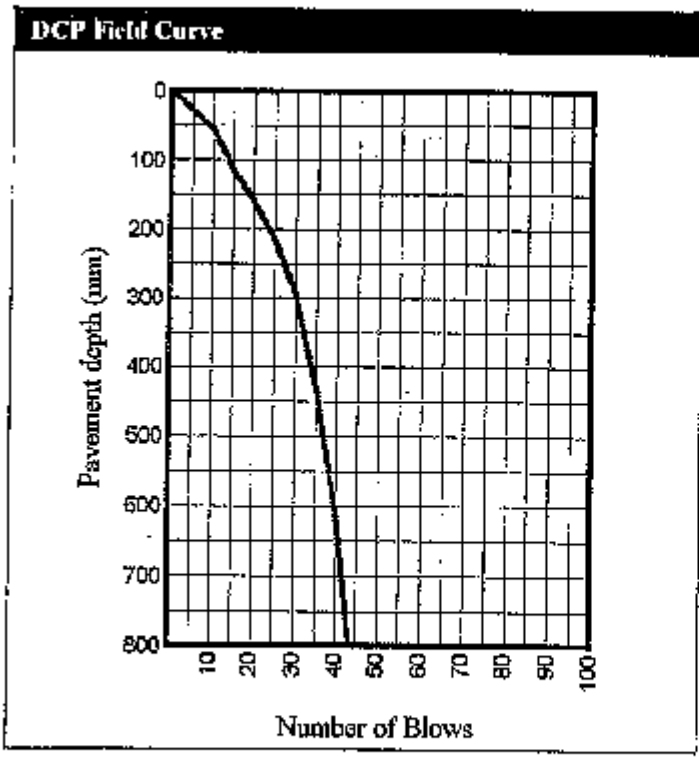
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	8.83	19	2.7	12.3	26	265	110	48 - 252
151 - 300	14.05	11	3.9	19.1	15	158	67	30 - 134
301 - 450	28.91	5	2.5	32.2	6	71	31	14 - 72
451 - 600	36.00	4	0.0	36.0	4	56	25	11 - 57
601 - 800	56.76	4	5.5	63.8	3	34	15	7 - 33

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P - Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	110	48 - 252	26	265
151 - 300	67	30 - 154	15	158
301 - 450	31	14 - 72	5	71
451 - 600	25	11 - 57	4	56
601 - 800	15	7 - 35	3	34

TEST PIT 17

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS **Road number:** RE/2 BOTHASPONTEN FARM
Project date: 06 May, 2005 **Print date:** 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Panelling	Long. Crack	Trans. Crack	Deform	Other
TP 17	06 May 2005	S - MID	17	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₁₀₀): 95 Balance Number (BN₁₀₀) of data: 4.9 Standard Pavement Balance Curve (SPBC): B-9, A=2313 Rut Limit: 20mm Structural capacity (MISA): 0.2 (MISA = Million Standard Axles, 80 kN)	Selected Design Traffic: Heavy traffic BN₁₀₀ of SPBC: 16.4 Road category: B Base type: Granular Moisture condition of base: Optimum
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Category V: Averagely Balanced Deep Structure (ABD)

Average equivalent strength (Existing Pavement Structure)

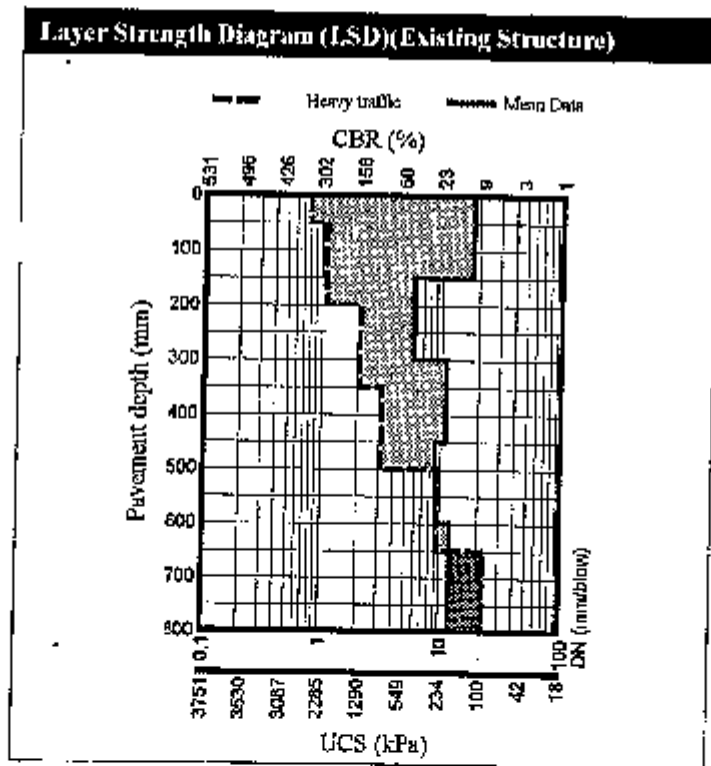
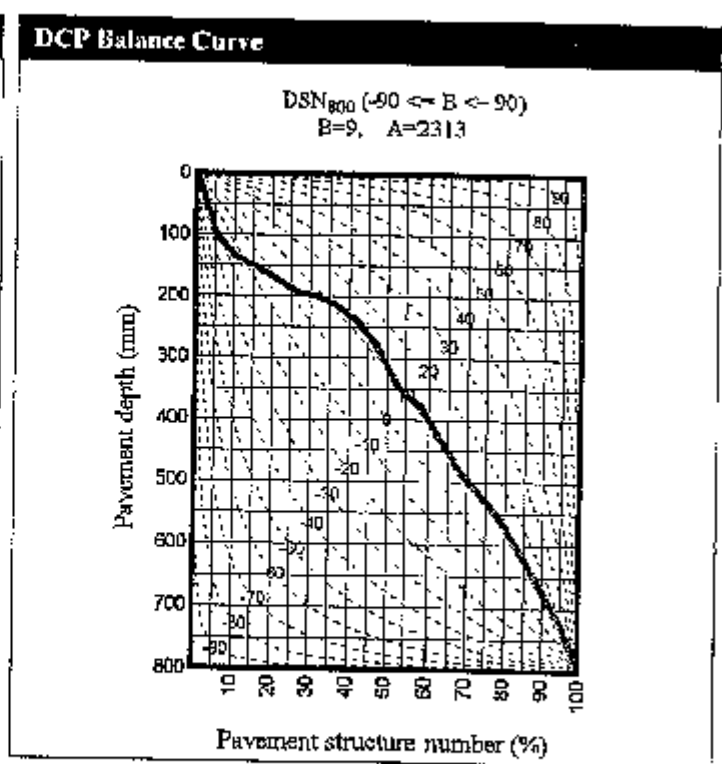
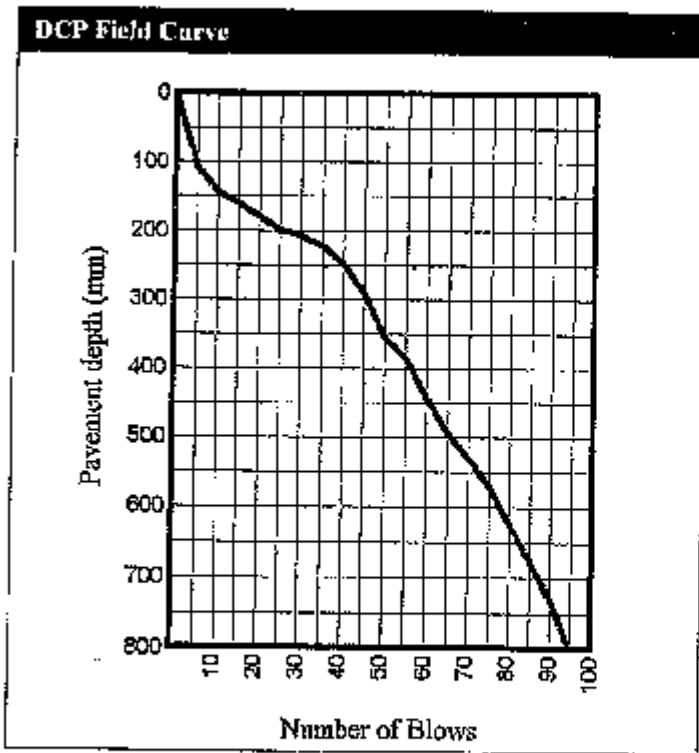
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	17.48	12	6.7	26.0	11	124	54	25 - 122
151 - 300	5.67	34	2.8	9.3	46	432	177	77 - 403
301 - 450	10.86	15	2.5	14.1	20	210	89	39 - 202
451 - 600	9.00	17	1.5	10.9	26	259	108	48 - 247
601 - 800	11.98	17	1.8	14.3	18	189	80	35 - 182

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	54	23 - 122	11	124
151 - 300	177	77 - 403	46	432
301 - 450	89	39 - 202	20	210
451 - 600	108	48 - 247	26	259
601 - 800	80	35 - 182	18	189

TEST PIT 18

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cross. Crack	Deform	Other
TP 18	06 May 2005	S - MID	18	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₈₀₀): 115 Selected Design Traffic: Heavy traffic
 Balance Number (BN₁₀₀) of data: 10.2 BN₁₀₀ of SPBC: 9.1
 Standard Pavement Balance Curve (SPBC): B-8, A-730 Road category: B
 Rut Limit: 20mm Base type: Granular
 Structural capacity (MISA): 0.5 Moisture condition of base: Optimum
 (MISA = Million Standard Axles, 80 kN)

Category VII : Well-Balanced Inverted Structure (WID)

Average equivalent strength (Existing Pavement Structure)

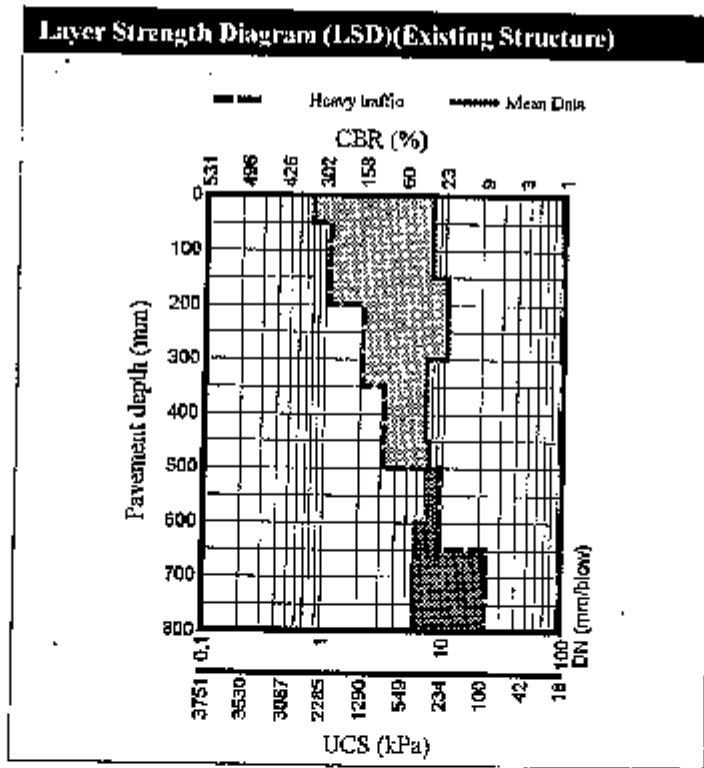
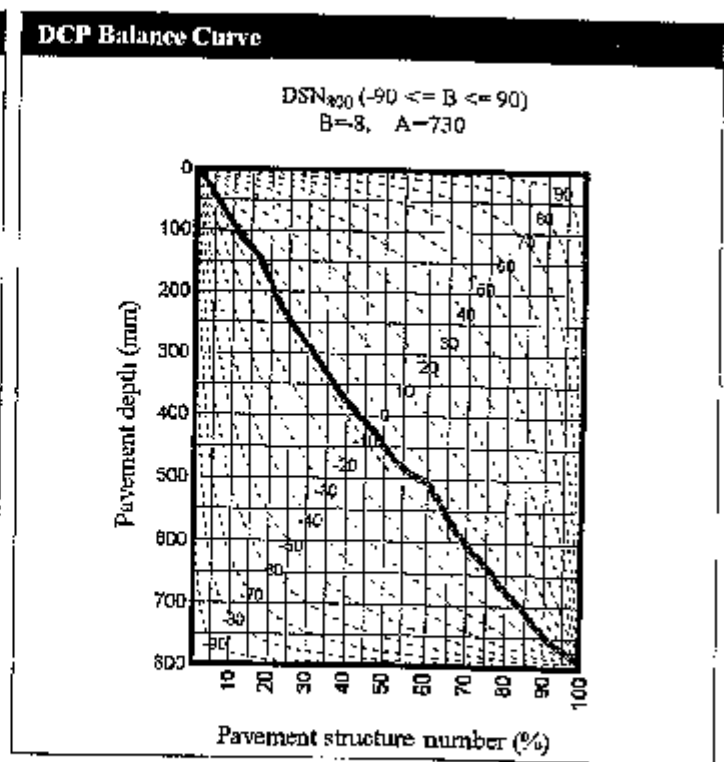
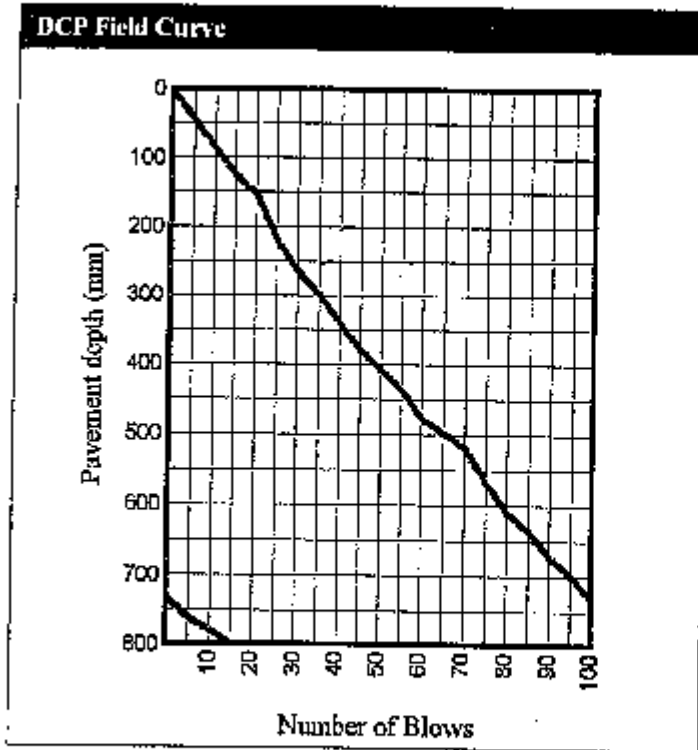
Depth (mm)	W. Avg. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	7.91	19	1.2	9.4	30	299	124	54 - 283
151 - 300	10.39	16	2.8	14.0	21	221	93	41 - 212
301 - 450	7.15	22	1.2	8.7	34	335	138	61 - 315
451 - 600	7.61	22	2.2	10.4	31	312	139	37 - 295
601 - 800	5.86	36	1.3	7.6	44	417	171	75 - 389

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P - Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Modull (MPa)	E-Modull Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	124	54 - 283	30	299
151 - 300	95	41 - 212	21	221
301 - 450	138	61 - 315	34	335
451 - 600	129	57 - 295	31	312
601 - 800	171	75 - 389	44	417

TEST PIT 19

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (m)	Condition	Rutting	Pumping	Long. Crack	Trans. Crack	Deform	Other
TP 19	06 May 2005	5 - MID	19	Sound	No	No	No	No	No	No

Design Structure Number in blows (DS_{N50}): 28 Selected Design Traffic: Heavy traffic
 Balance Number (DN₁₀₀) of data: 7.2 BN₁₀₀ of SPBCs: 6.0
 Standard Pavement Balance Curve (SPBC): B-19, A=1362 Road category: B
 Rest Limit: 20mm Base type: Granular
 Structural capacity (MUSA): 0.0 Mixture condition of base: Optimum
 (MUSA = Million Standard Axles, 80 kN)

Category VIII : Averagely Balanced Inverted Structure (ADI)

Average equivalent strength (Existing Pavement Structure)

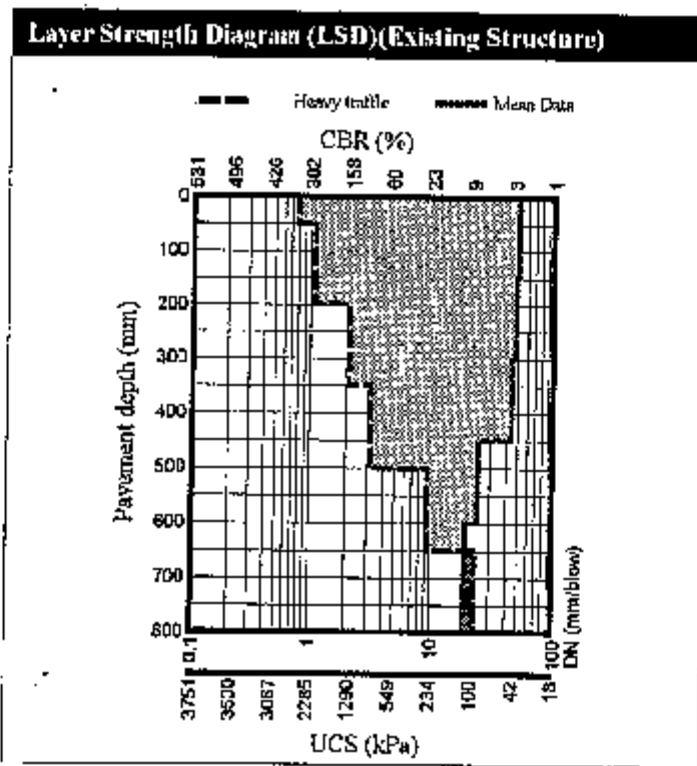
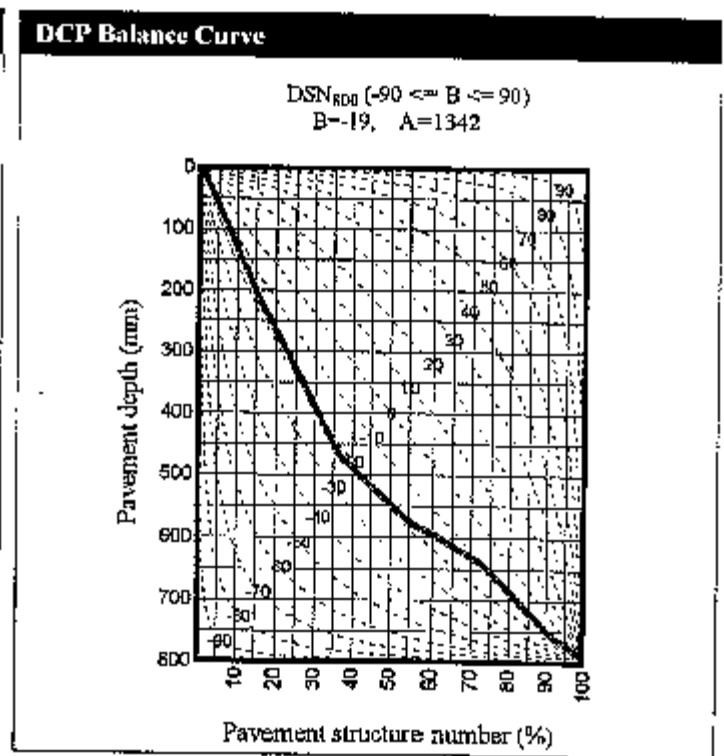
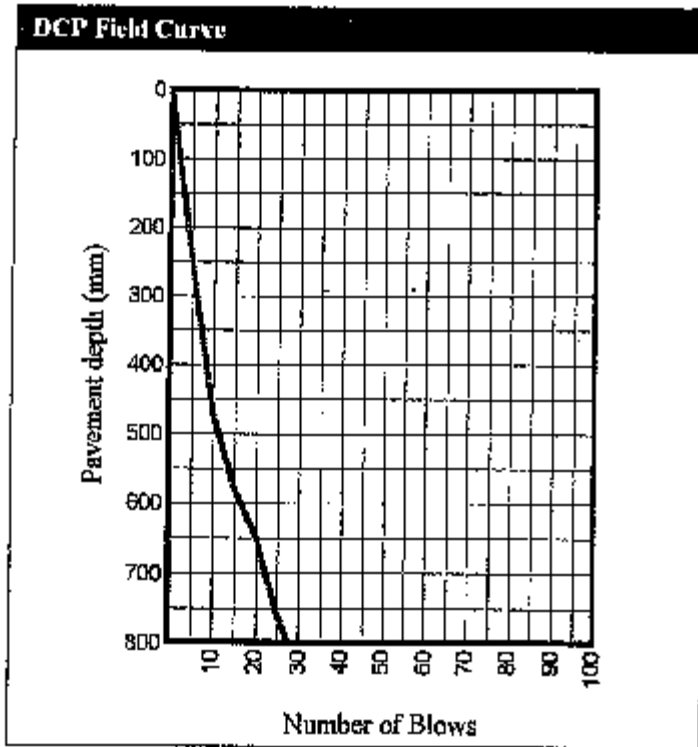
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modul (MPa)	E-Modul Range 10P - 90P MPa
0 - 150	50.40	3	0.0	50.4	3	38	17	8 - 40
151 - 300	48.54	3	2.7	52.0	3	40	18	8 - 41
301 - 450	44.60	3	0.0	44.6	3	44	20	9 - 45
451 - 600	24.14	7	9.5	36.3	7	87	38	17 - 87
601 - 800	18.91	11	4.2	24.3	10	114	49	22 - 112

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Modul (MPa)	E-Modul Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	17	8 - 40	3	38
151 - 300	18	8 - 41	3	40
301 - 450	20	9 - 45	3	44
451 - 600	38	17 - 87	7	87
601 - 800	49	22 - 112	10	114

TEST PIT 20

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rotting	Pumping	Long. Crack	Crac. Crack	Deform	Other
TP 20	06 May 2005	S - MID	20	Sound	No	No	No	No	No	No

Design Structure Number in blows (DS_{N90}): 158 Selected Design Traffic: Heavy traffic
 Balance Number (BN₁₀₀) of data: 3.5 BN₁₀₀ of SPBC: 4.3
 Standard Pavement Balance Curve (SPBC): B=27, A=1363 Road category: B
 Rut Limit: 20mm Base type: Granular
 Structural capacity (MISA): 1.5 Moisture condition of base: Optimum
 (MISA = Million Standard Axles, 80 kN)

Category VIII: Averagely Balanced Inverted Structure (AB)

Average equivalent strength (Existing Pavement Structure)

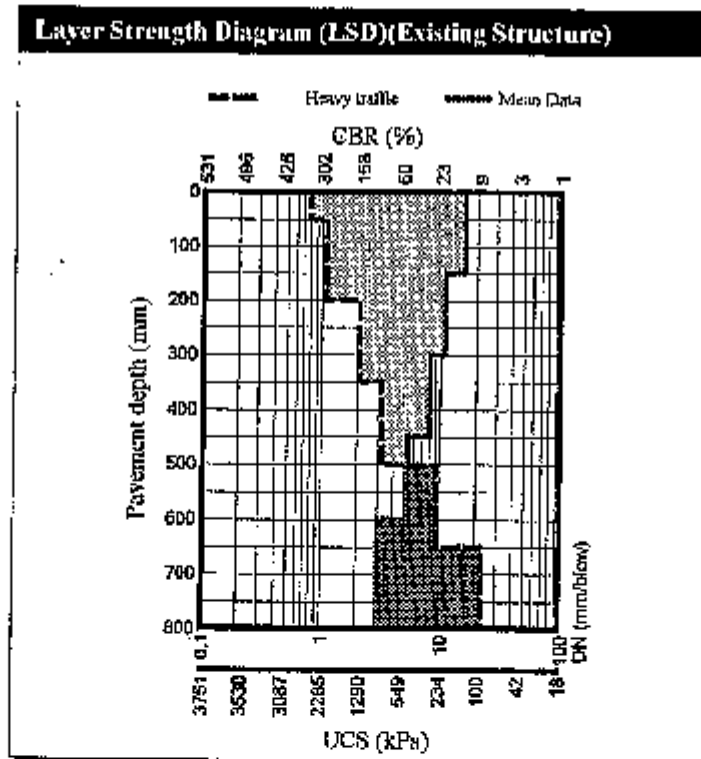
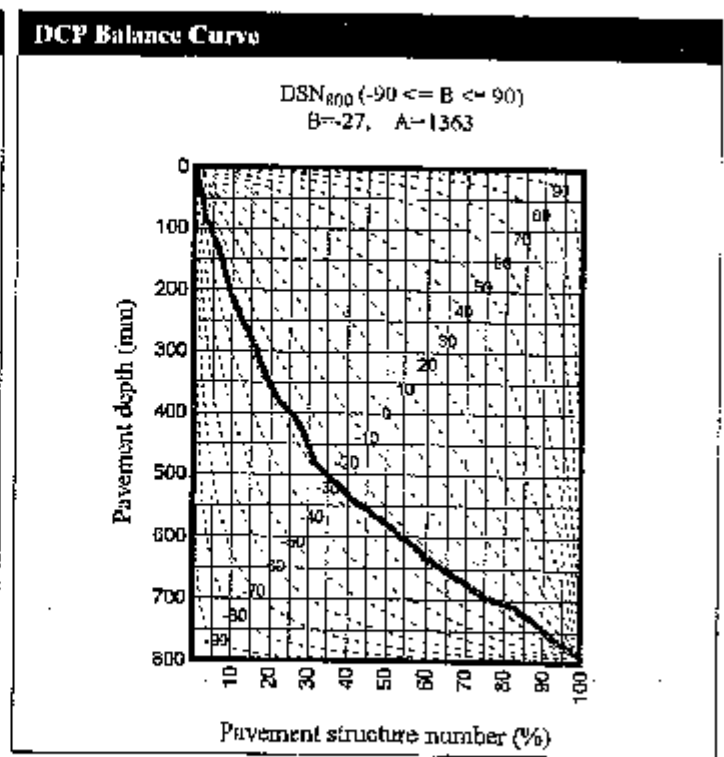
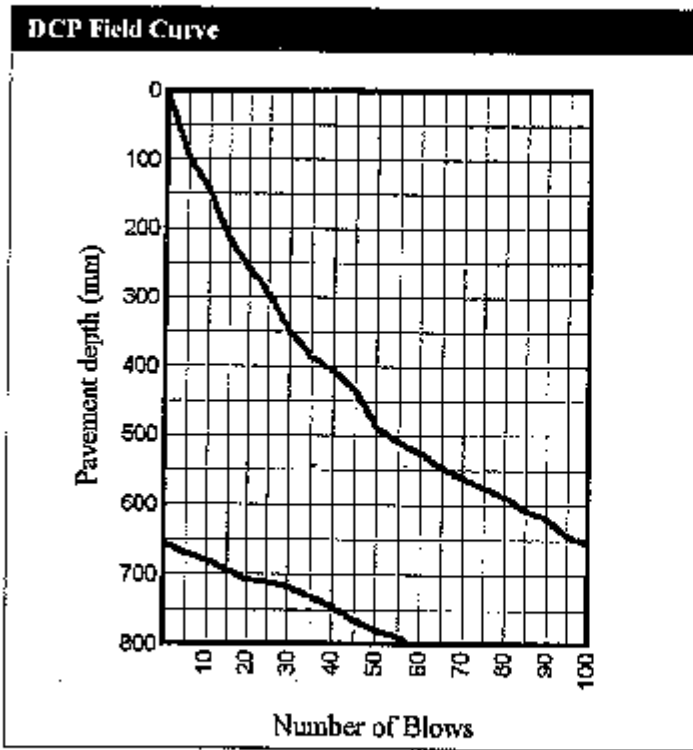
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modulus (MPa)	E-Modul Range 10P - 90P MPa
0 - 150	15.83	10	4.2	21.3	13	139	59	26 - 136
151 - 300	10.74	15	2.9	14.5	20	213	90	39 - 205
301 - 450	8.03	21	2.5	11.2	29	294	122	54 - 279
451 - 600	5.31	37	3.1	9.3	50	466	190	83 - 433
601 - 800	3.02	75	1.0	4.3	101	869	345	151 - 787

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Modull (MPa)	E-Modull Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 130	59	26 - 136	13	139
151 - 300	90	39 - 203	20	213
301 - 450	122	54 - 279	29	294
451 - 600	190	83 - 433	30	466
601 - 800	345	151 - 787	101	809

TEST PIT 21

DCP Report - Single analysis

Region:
Project date:

LIDWALA CONSULTING ENGINEERS
06 May, 2005

Road number:
Print date:

RE/2 BOTHAASFONTEIN FARM
06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rolling	Pumping	Long. Crack	Croc. Crack	Deform	Other
TP 21	06 May 2005	S - MID	21	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₈₀₀): 53

Balance Number (BN₁₀₀) of data: 9.3

Standard Pavement Balance Curve (SPBC): B=7, A=2793

Rut Limit: 20mm

Structural capacity (MISA): 0.0

(MISA = Million Standard Axles, 80 kN)

Selected Design Traffic:

BN₁₀₀ of SPBC:

Road category

Base type:

Moisture condition of base:

Heavy traffic

15.4

B

Granular

Optimum

Category V : Averagely Balanced Deep Structure (ABD)

Average equivalent strength (Existing Pavement Structure)

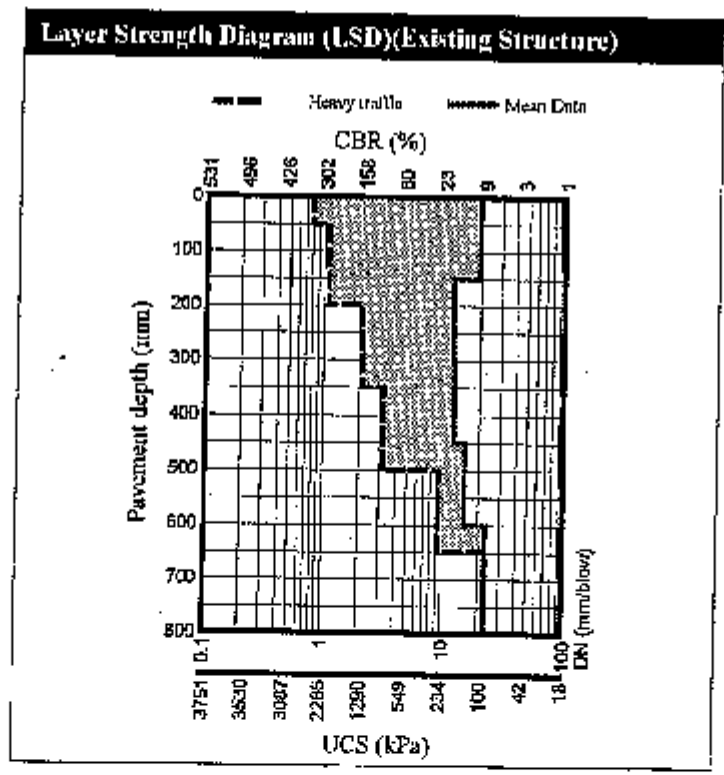
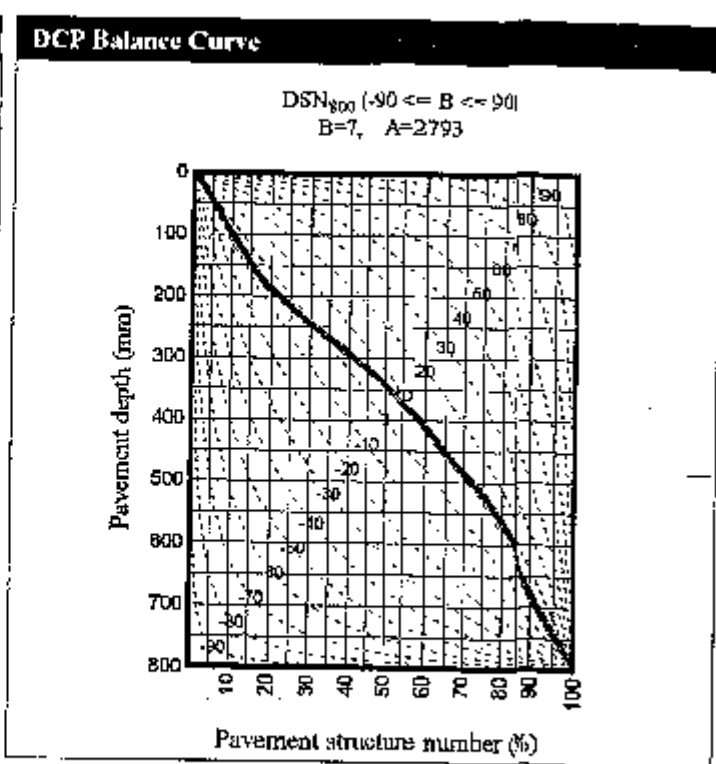
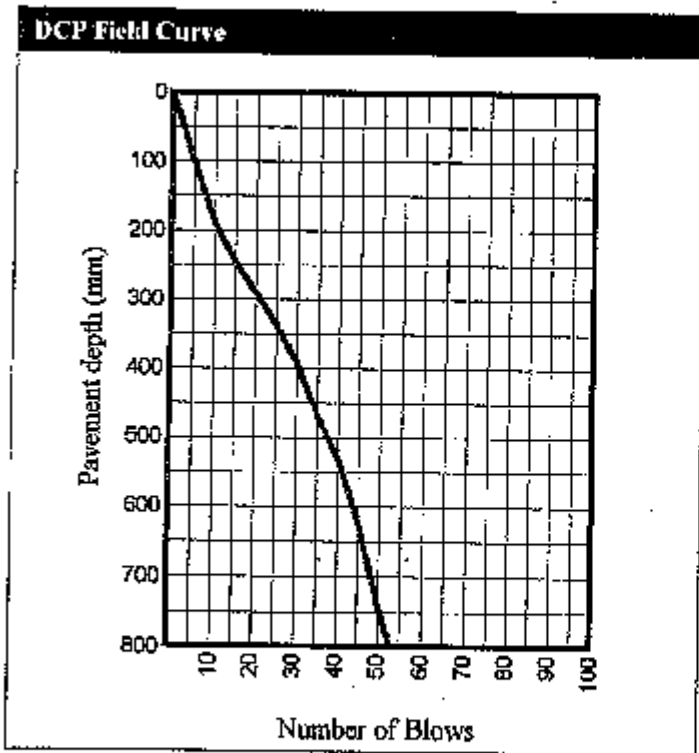
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modul (MPa)	E-Modul Range 10P - 90P MPa
0 - 150	19.57	8	1.2	21.1	10	110	47	21 - 108
151 - 300	12.11	13	3.6	16.7	18	187	79	35 - 180
301 - 450	12.38	13	2.6	15.8	17	182	77	34 - 176
451 - 600	15.23	10	2.6	18.6	13	145	62	27 - 141
601 - 800	22.53	9	2.9	26.3	8	94	41	18 - 93

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Modul (MPa)	E-Modul Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	47	21 - 108	10	110
151 - 300	79	35 - 180	18	187
301 - 450	77	34 - 176	17	182
451 - 600	62	27 - 141	13	145
601 - 800	41	18 - 93	8	94

TEST PIT 22

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
TP 22	06 May 2005	S - MID	22	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₉₀₀): 71 Selected Design Traffic: Heavy traffic
 Balance Number (BN₁₀₀) of data: 6.9 DN₁₀₀ of SPBC: 10.5
 Standard Pavement Balance Curve (SPBC): B=4, A=1272 Road category: E
 Rut Limit: 20mm Base type: Granular
 Structural capacity (MISA): 0.1 Moisture condition of base: Optimum
 (MISA = Million Standard Axles, 80 kN)

Category VIII : Averagely Balanced Inverted Structure (AIM)

Average equivalent strength (Existing Pavement Structure)

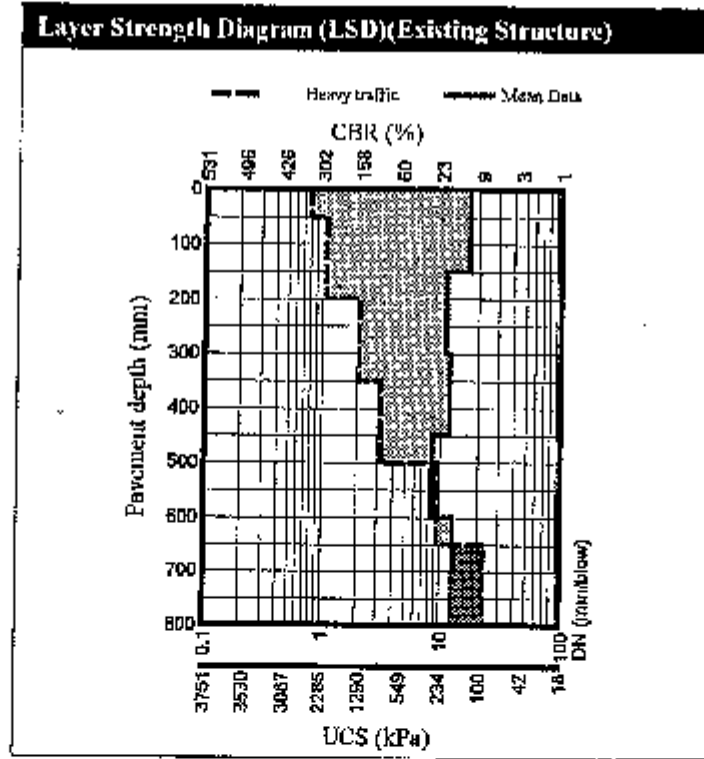
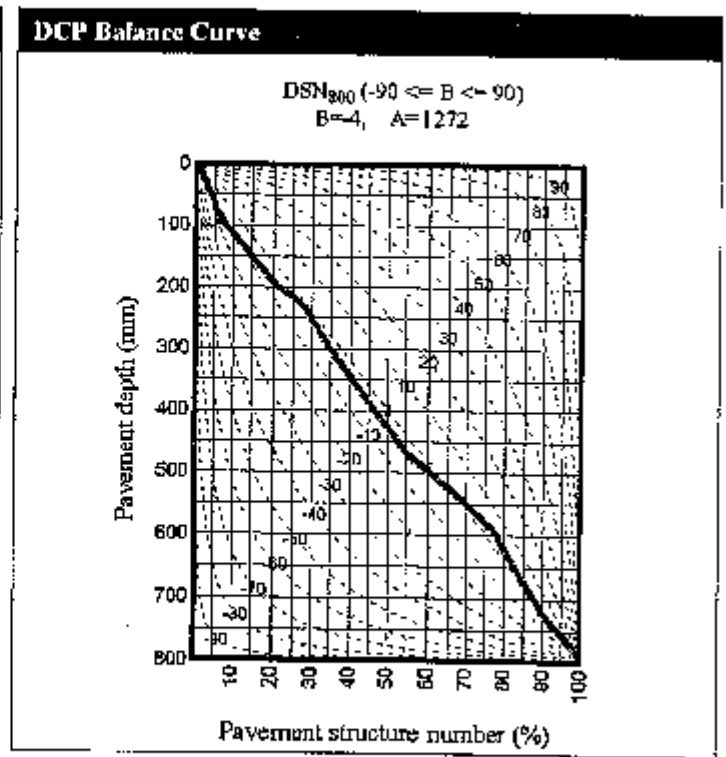
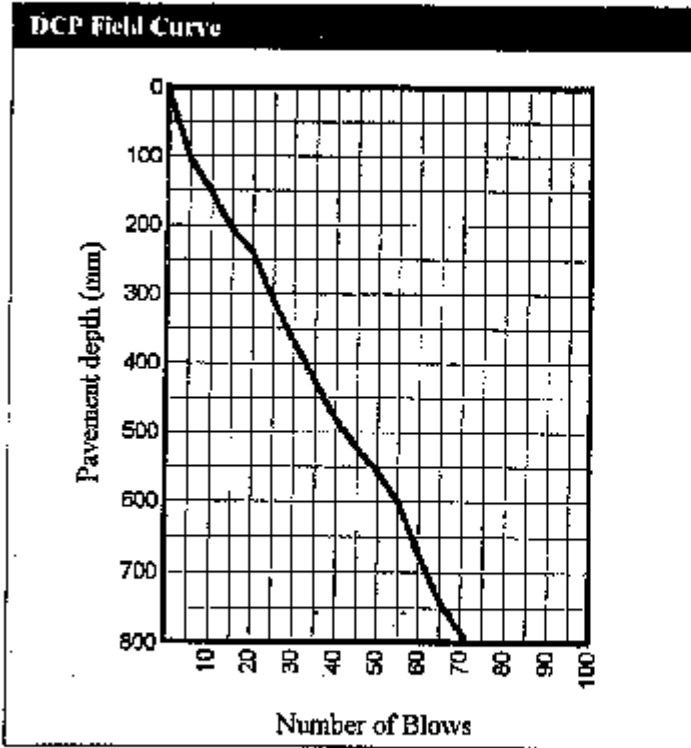
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-ModulE (MPa)	E-ModulE Range 10P - 90P MPa
0 - 150	17.07	10	4.9	23.3	11	128	55	24 - 125
151 - 300	11.16	14	2.8	14.7	19	204	86	38 - 196
301 - 450	11.83	13	0.7	12.7	18	191	81	36 - 181
451 - 600	8.52	18	1.5	10.4	27	276	115	50 - 262
601 - 800	12.72	16	2.3	15.7	16	177	75	33 - 171

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	55	24 - 125	11	128
151 - 300	86	38 - 196	19	204
301 - 450	81	36 - 185	18	191
451 - 600	115	50 - 262	27	276
601 - 800	75	33 - 171	16	177

TEST PIT 23

DCP Report - Single analysis

Region: LDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project dates: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cros. Crack	Deform	Other
TP 23	06 May 2005	S - MID	23	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₁₀₀): 119
 Balance Number (BN₁₀₀) of data: 21.6
 Standard Pavement Balance Curve (SPBC): B-17, A=826
 Rut Limit: 20mm
 Structural capacity (MISA): 0.6
 (MISA = Million Standard Axles, 80 kN)

Selected Design Traffic: Heavy traffic
 BN₁₀₀ of SPBC: 22.8
 Road category: B
 Base types: Granular
 Moisture condition of base: Optimum

Category IV : Well-Balanced Deep Structure (WBD)

Average equivalent strength (Existing Pavement Structure)

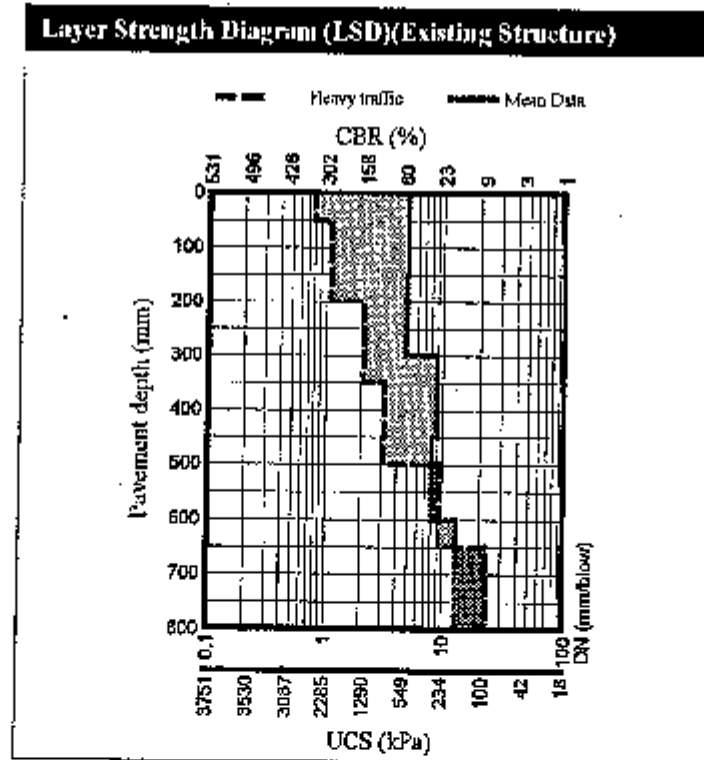
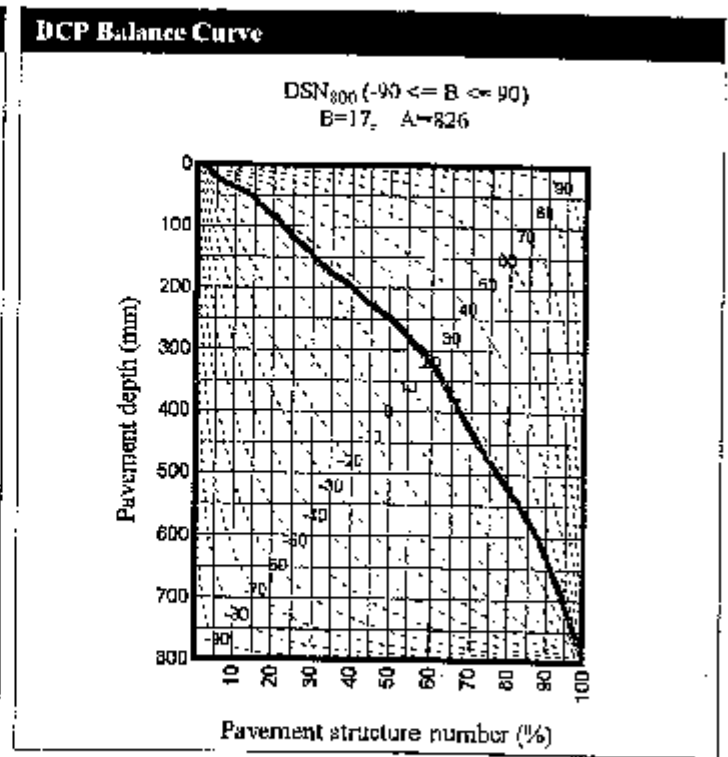
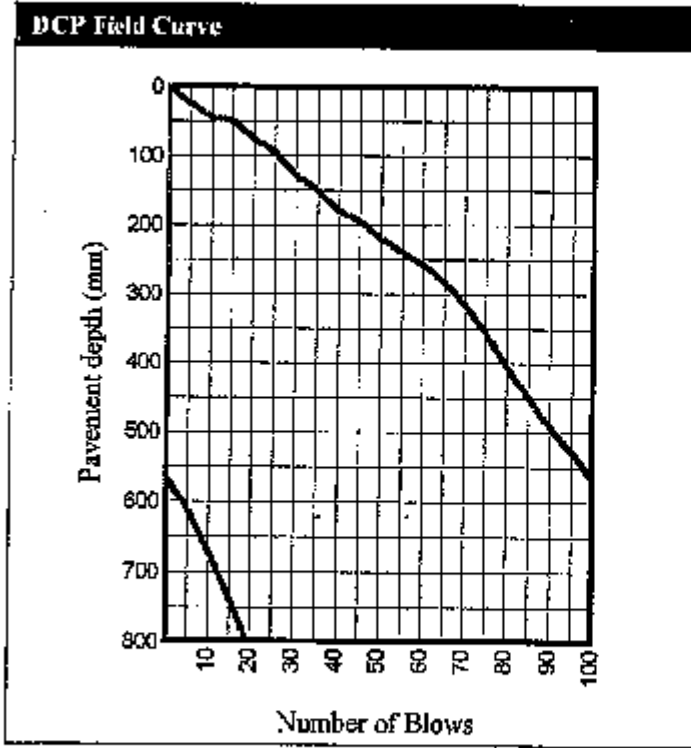
Depth (mm)	W. Avg. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	4.93	35	1.2	6.5	54	505	205	90 - 468
151 - 300	4.81	33	1.0	6.1	56	519	211	92 - 480
301 - 450	8.76	17	0.9	9.9	26	267	111	49 - 254
451 - 600	8.03	19	0.8	9.0	29	294	122	54 - 279
601 - 800	12.99	16	1.2	14.6	16	173	73	32 - 167

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Modull (MPa)	E-Modull Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	205	90 - 468	54	505
151 - 300	211	92 - 480	56	519
301 - 450	111	49 - 254	26	267
451 - 600	122	54 - 279	29	294
601 - 800	73	22 - 167	16	173

TEST PIT 25

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Fempling	Long. Crack	Croc. Crack	Deform	Other
TP-25	06 May 2005	3 - MID	25	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN ₉₀₀): 81	Selected Design Traffic:	Heavy traffic
Balance Number (BN ₁₀₀) of data: 6.9	BN ₁₀₀ of SPBC:	8.7
Standard Pavement Balance Curve (SPBC): B-9, A-795	Road category:	B
Rut Limit: 20mm	Base type:	Granular
Structural capacity (MISA): 0.1	Moisture condition of base:	Optimum

(MISA = Million Standard Axles, 80 kN)

Category VII: Well-Balanced Inverted Structure (WBI)

Average equivalent strength (Existing Pavement Structure)

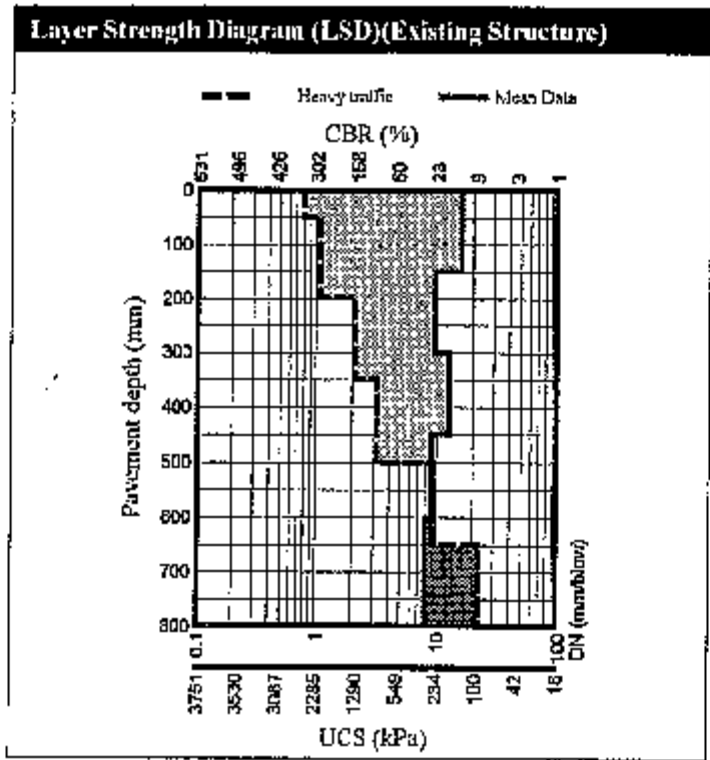
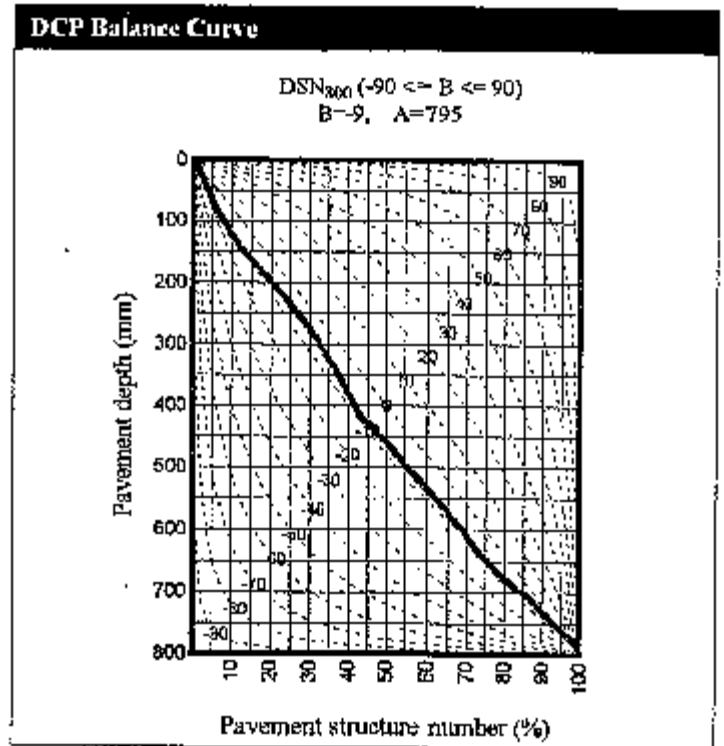
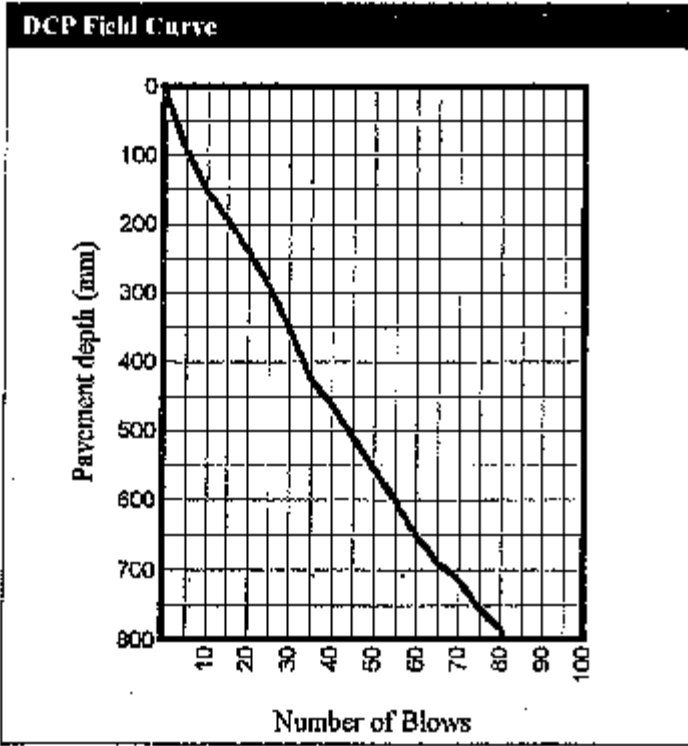
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modul (MPa)	E-Modul Range 10P - 90P MPa
0 - 130	16.09	10	3.2	20.2	12	136	58	26 - 133
151 - 300	9.47	16	1.1	10.9	24	245	103	45 - 234
301 - 450	12.63	12	2.4	15.7	17	178	76	33 - 172
451 - 600	9.12	16	0.5	9.8	23	255	107	47 - 243
601 - 800	8.12	26	2.0	10.7	29	291	121	53 - 275

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Avg. E-Modul (MPa)	E-Modul Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	58	26 - 133	12	136
151 - 300	103	45 - 234	24	245
301 - 450	76	33 - 172	17	178
451 - 600	107	47 - 243	25	255
601 - 800	121	53 - 275	29	291

TEST PIT 26

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS **Road number:** RE/2 BOTHASFONTEIN FARM
Project date: 06 May, 2005 **Print date:** 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Croc. Crack	Deform	Other
TP 26	06 May 2005	S - MID	26	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN ₁₀₀):	71	Selected Design Traffic:	Heavy traffic
Balance Number (BN ₁₀₀) of data:	24	BN ₁₀₀ of SPBC:	23
Standard Pavement Balance Curve (SPBC):	B-41, A-2853	Road category:	B
Rut Limit:	20mm	Base type:	Granular
Structural capacity (MISA):	0.1	Moisture condition of base:	Optimum

(MISA = Million Standard Axles, 80 kN)

Category VIII : Averagely Balanced Inverted Structure (ABI)

Average equivalent strength (Existing Pavement Structure)

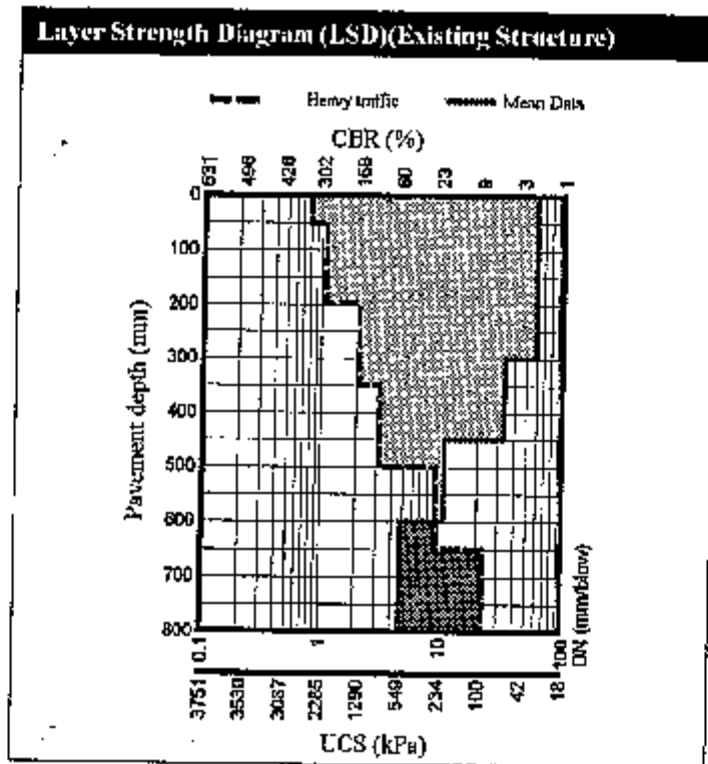
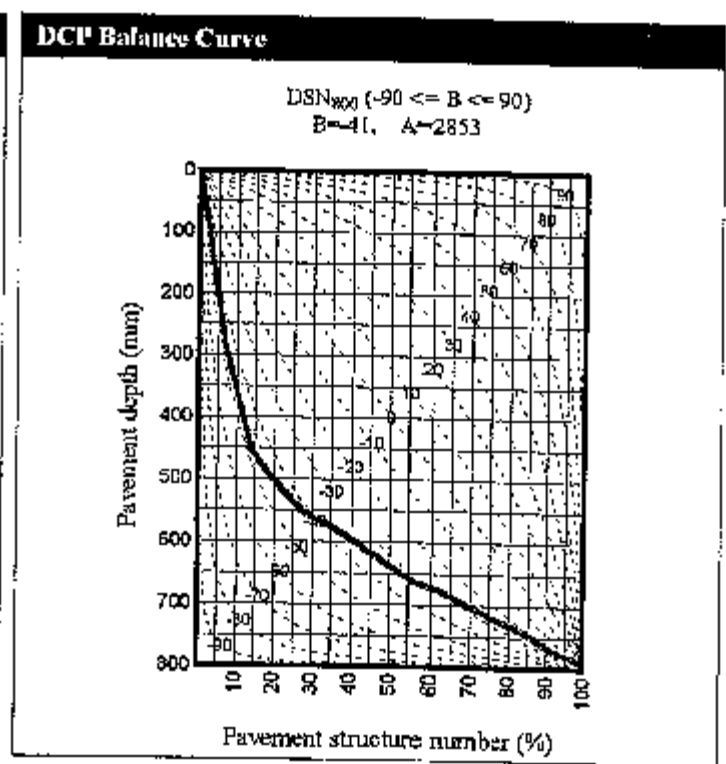
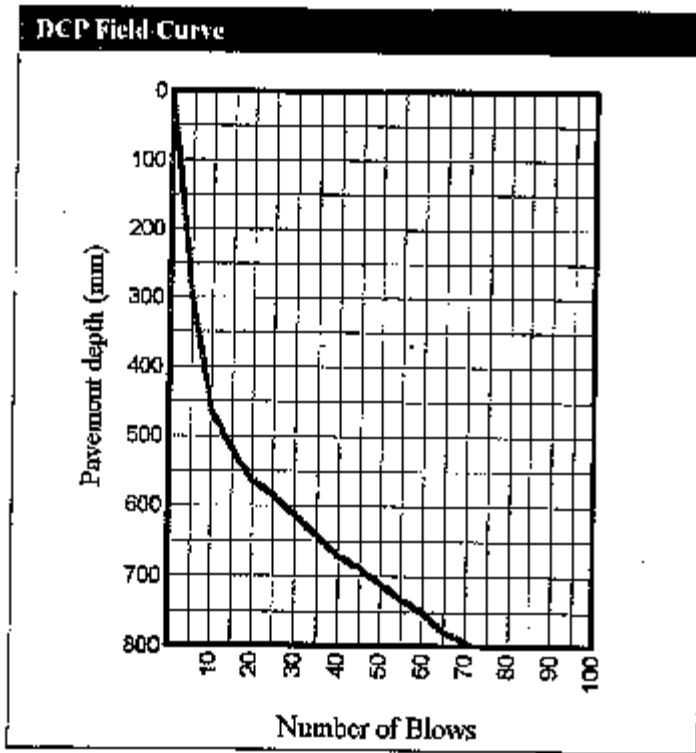
Depth (mm)	W. Avg. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Avg. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	39.60	3	0.0	39.6	2	32	15	6 - 33
151 - 300	39.25	3	3.0	63.1	2	32	15	6 - 33
301 - 450	33.20	5	0.0	33.2	5	61	27	12 - 62
451 - 600	10.92	18	7.6	20.6	20	209	88	39 - 201
601 - 800	4.84	44	1.0	6.1	56	516	209	92 - 477

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P - Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Avg. E-Modulus (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	15	6 - 33	2	32
151 - 300	15	6 - 33	2	32
301 - 450	27	12 - 62	5	61
451 - 600	88	39 - 201	20	209
601 - 800	209	92 - 477	56	516

TEST PIT 27

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS **Road number:** RE/2 BOTHASPONTEIN FARM
Project date: 06 May, 2005 **Print date:** 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Circ. Crack	Deform	Other
TP 27	06 May 2005	J - MID	27	Sound	No	No	No	No	No	No

Design Structure Number In blows (DSN₅₀₀):	15	Selected Design Traffic:	Heavy traffic
Balance Number (BN₁₀₀) of data:	29.8	BN₁₀₀ of SPBC:	33.0
Standard Pavement Balance Curve (SPBC):	B=29, A=2074	Road category:	B
Rut Limit:	20mm	Base type:	Granular
Structural capacity (MISA):	0.6	Moisture condition of base:	Optimum
(MISA = Million Standard Axles, 80 kN)			

Category V : Averagely Balanced Deep Structure (ABD)

Average equivalent strength (Existing Pavement Structure)

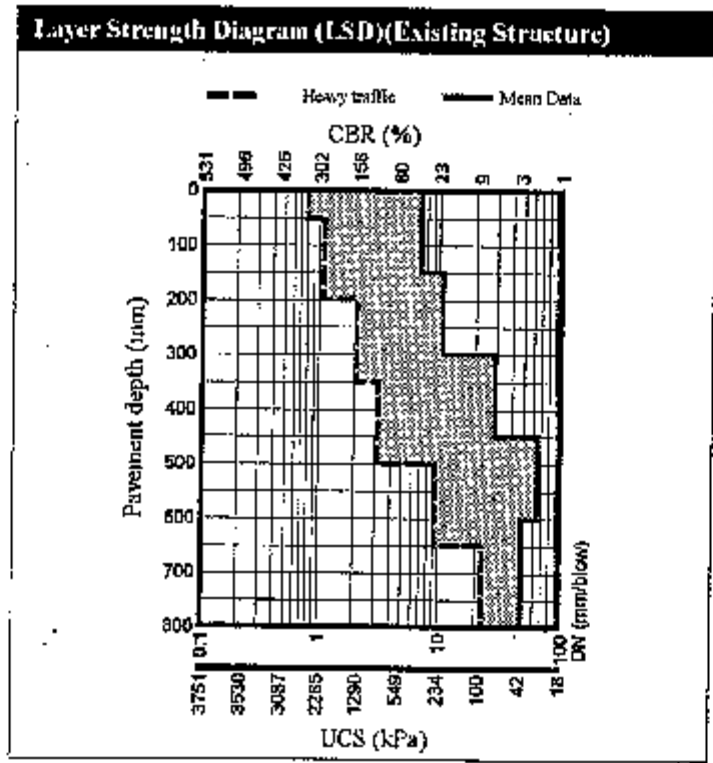
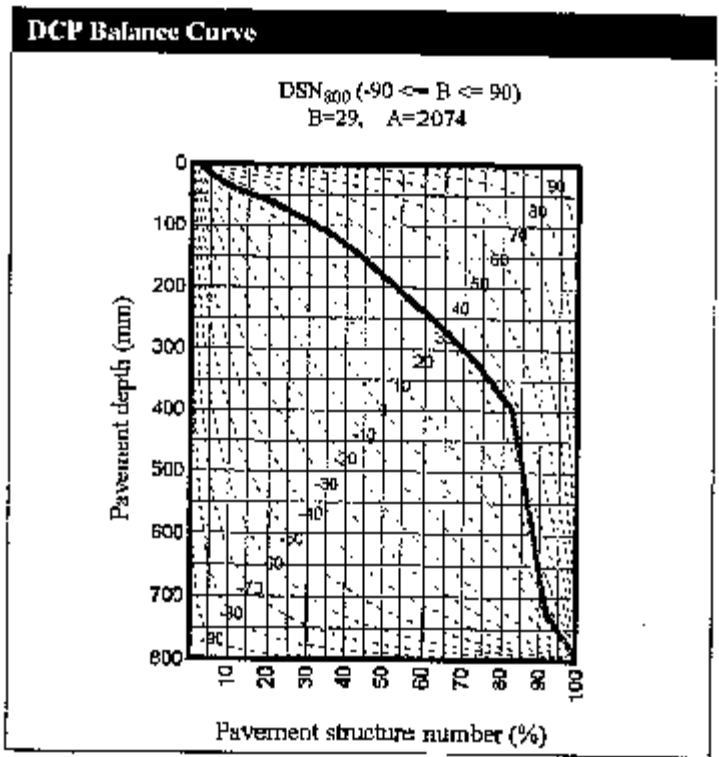
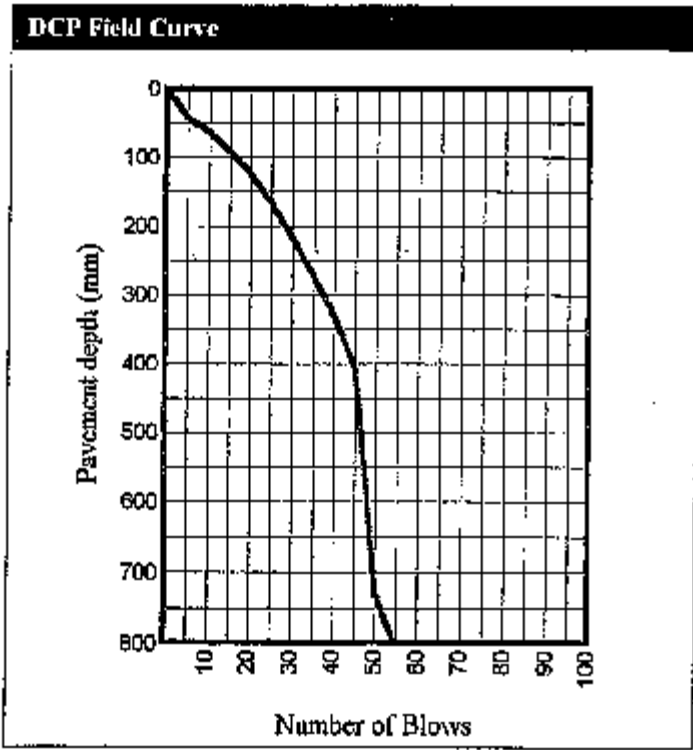
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modull (MPa)	E-Modull Range 10P - 90P MPa
0 - 150	6.95	23	1.7	9.1	35	345	142	62 - 325
151 - 300	10.65	14	1.0	11.9	21	215	91	40 - 206
301 - 450	28.84	8	23.4	58.8	6	71	31	14 - 72
451 - 600	65.00	2	0.0	65.0	2	29	13	6 - 30
601 - 800	47.82	7	23.7	78.2	3	41	18	8 - 42

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Avg. E-Modul (MPa)	E-Modul Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	142	62 - 325	35	345
151 - 300	91	40 - 206	21	215
301 - 450	31	14 - 72	6	71
451 - 600	13	6 - 30	2	29
601 - 800	18	8 - 42	3	41

TEST PIT 28

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS **Road number:** RE/2 BOTHASFONTEIN FARM
Project date: 06 May, 2005 **Print date:** 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Crns. Crack	Deform	Other
TP 28 CRUN	06 May 2005	5 - MID	28	Sound	No	No	No	No	No	No

Design Structure Number in blows (D_{SN})₁₀₀₀: 1542 Balance Number (BN₁₀₀₀) of data: 9.2 Standard Pavement Balance Curve (SPBC): B=-2, A=635 Rut Limit: 20mm Structural capacity (MISA): 4319.3 (MISA = Million Standard Axles, 80 kN)	Selected Design Traffic: Heavy traffic BN₁₀₀₀ of SPBC: 11.2 Road category: B Rose type: Granular Moisture condition of base: Optimum
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Category VII : Well-Balanced Inverted Structure (WBI)

Average equivalent strength (Existing Pavement Structure)

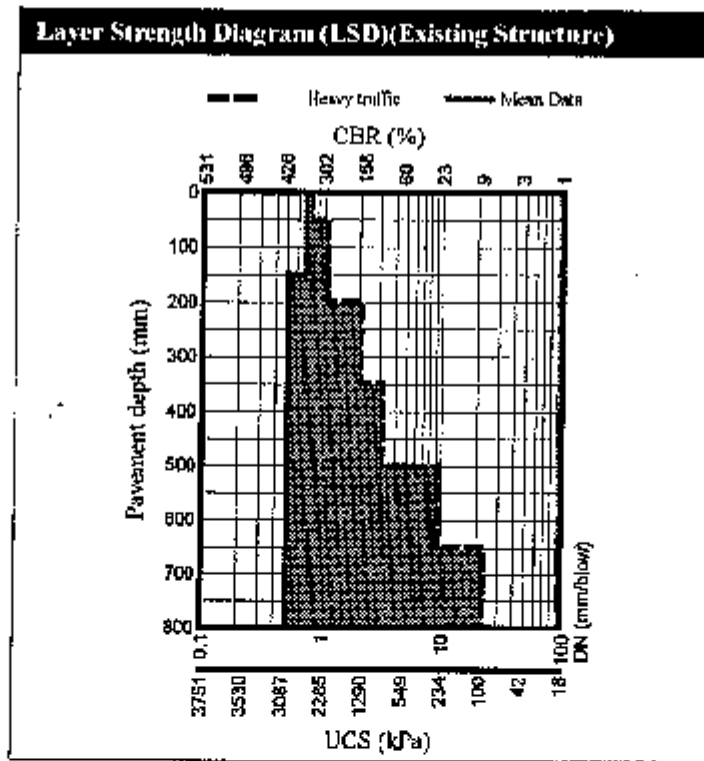
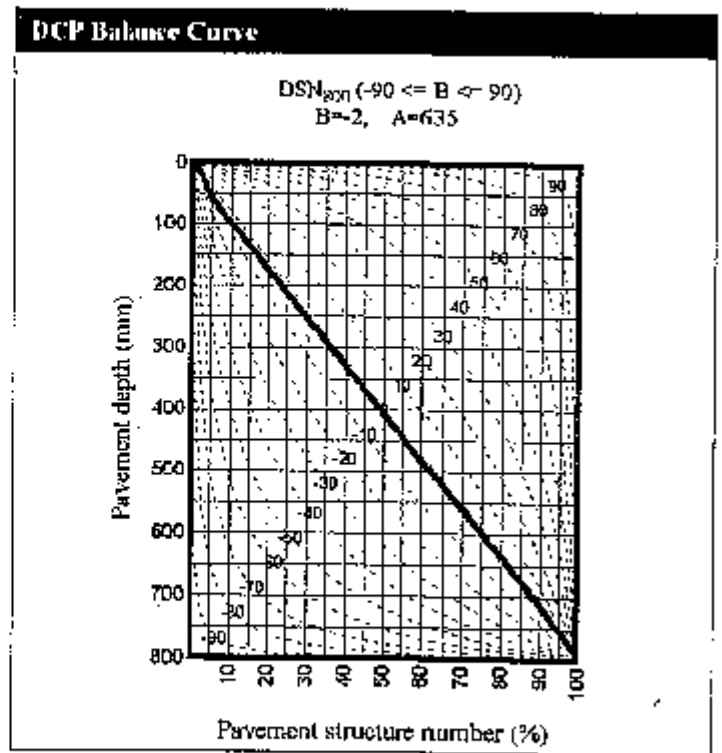
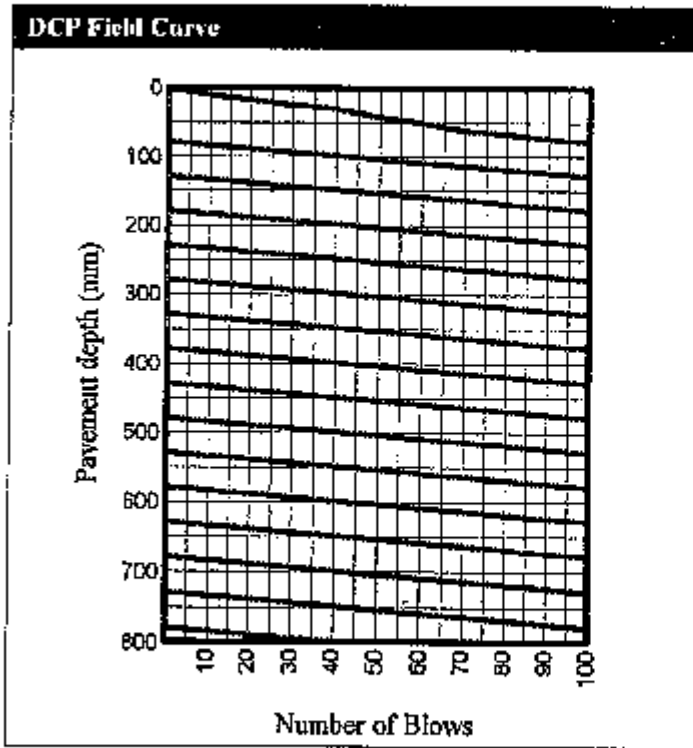
Depth (mm)	W. Avg. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Avg. E-Modul# (MPa)	E-Modul Range 10P - 90P MPa
0 - 150	0.69	242	0.3	1.0	367	2709	1649	723 - 3761
151 - 300	0.50	300	0.0	0.5	415	3020	2329	1021 - 5311
301 - 450	0.50	300	0.0	0.5	415	3020	2329	1021 - 5311
451 - 600	0.50	300	0.0	0.5	415	3020	2329	1021 - 5311
601 - 800	0.50	400	0.0	0.3	415	3020	2329	1021 - 5311

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	1649	723 - 3761	367	2709
151 - 300	2329	1021 - 5311	415	3020
301 - 450	2329	1021 - 5311	415	3020
451 - 600	2329	1021 - 5311	415	3020
601 - 800	2329	1021 - 5311	415	3020

DCP Report - Single analysis

Region: MIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 09 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cross. Crack	Deform	Other
TP 2H - 0.2 M	09 May 2005	S - MID	41	Sound	No	No	No	No	No	No

Design Structure Number in Blows (DSN₉₀₀): 124 Selected Design Traffic: Heavy traffic
 Balance Number (BN₁₀₀) of data: 28.7 IEN₁₀₀ of SPBC: 25.1
 Standard Pavement Balance Curve (SPBC): B-20, A=1973 Road category: B
 Rut Limit: 20mm Base type: Granular
 Structural capacity (MISA): 0.6 Moisture condition of base: Optimum
 (MISA = Million Standard Axles, 80 kN)

Category V: Averagely Balanced Deep Structure (ABD)

Average equivalent strength (Existing Pavement Structure)

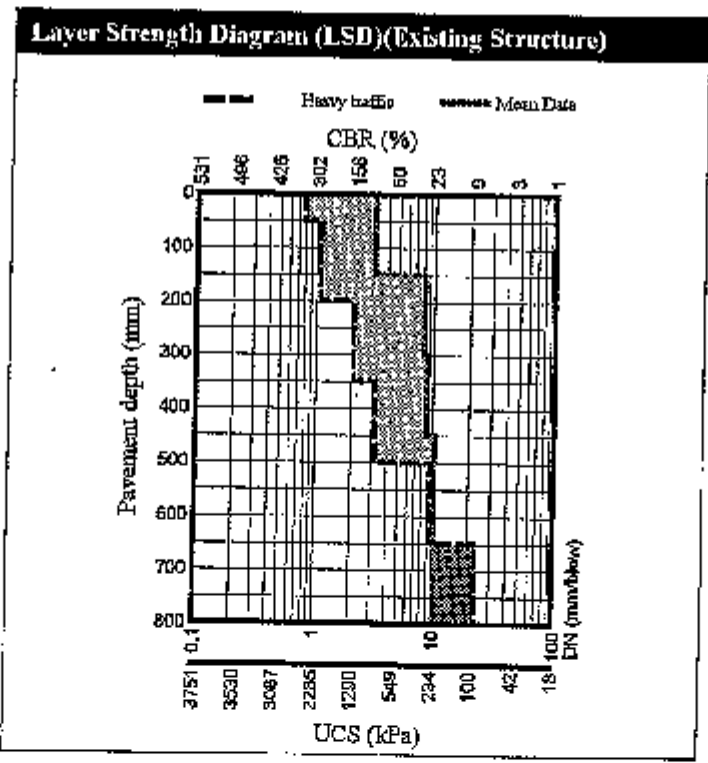
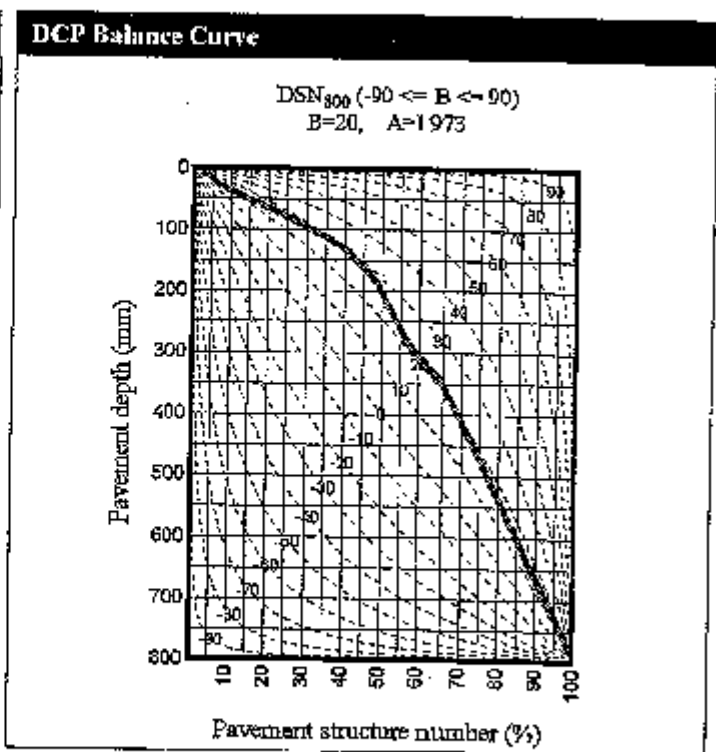
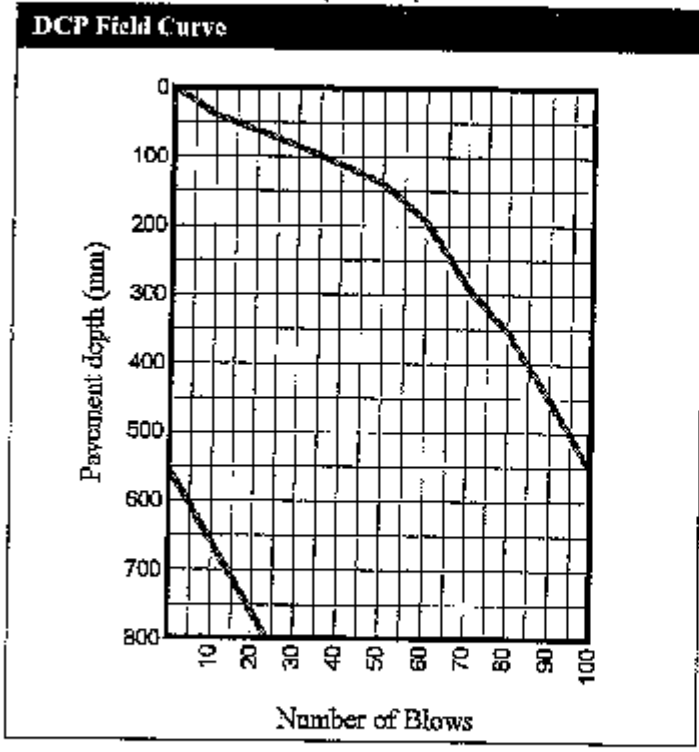
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	DCS *** (kPa)	Ave. E-Modul (MPa)	E-Modul Range 10P - 90P MPa
0 - 150	3.10	32	3.9	4.3	97	343	335	147 - 764
151 - 300	3.14	20	2.0	10.7	29	290	120	53 - 275
301 - 450	3.61	19	1.6	10.6	27	272	113	50 - 259
451 - 600	10.29	15	0.1	10.4	22	223	94	41 - 214
601 - 800	10.30	19	0.0	10.3	22	223	94	41 - 214

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	335	147 - 764	97	843
151 - 300	120	53 - 275	29	290
301 - 450	113	50 - 259	27	272
451 - 600	94	41 - 214	22	223
601 - 800	94	41 - 214	22	223

TEST PIT 29

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cross Crack	Deforn	Other
TP 29	06 May 2005	S - MID	29	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN ₃₀₀): 183 Balance Number (BN ₁₀₀) of data: 28.2 Standard Pavement Balance Curve (SPBC): B=14, A=1787 Rut Limit: 20mm Structural capacity (MISA): 2.5 (MISA = Million Standard Axles, 80 kN)	Selected Design Traffic: Heavy traffic BN ₁₀₀ of SPBC: 20.7 Road category: B Base type: Granular Moisture condition of base: Optimum
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Category V | Averagely Balanced Deep Structure (ABD)

Average equivalent strength (Existing Pavement Structure)

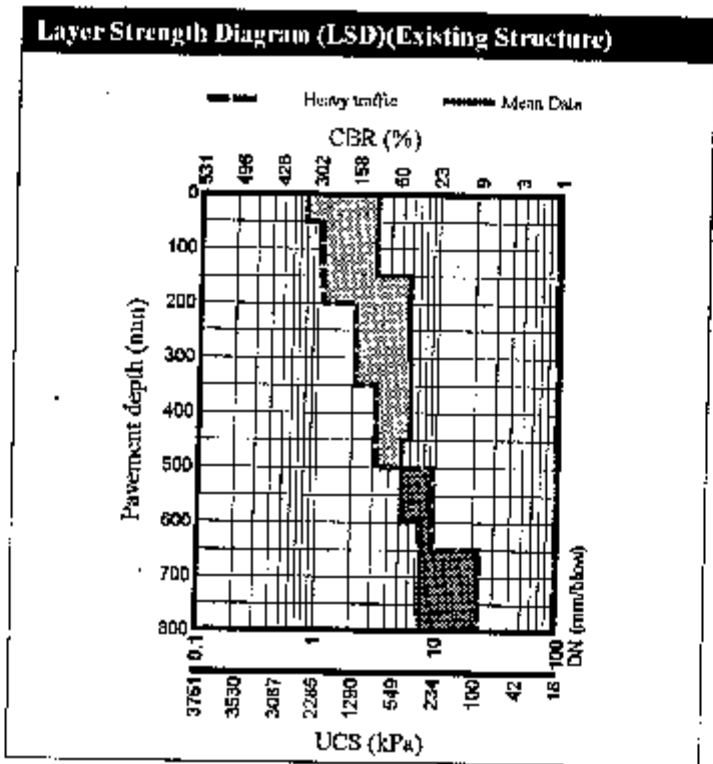
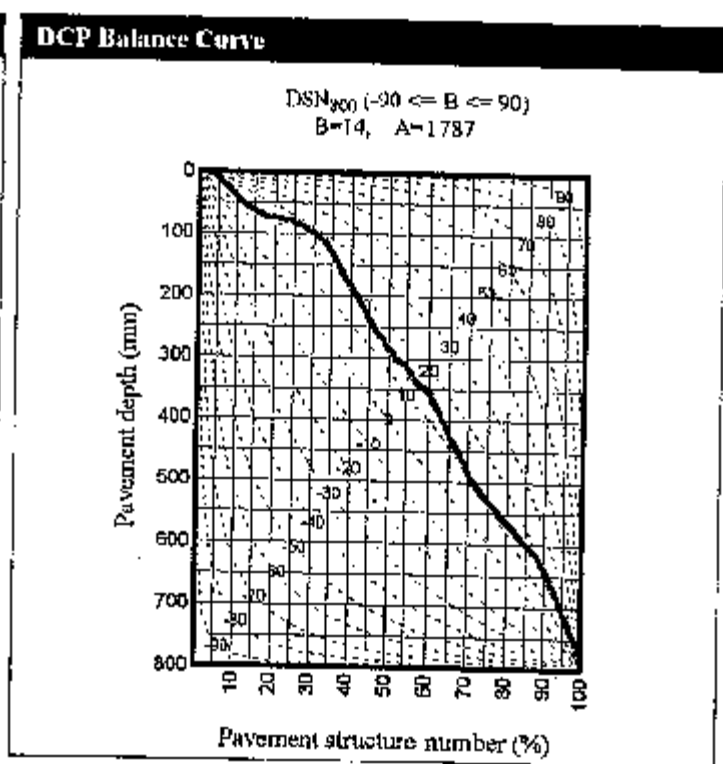
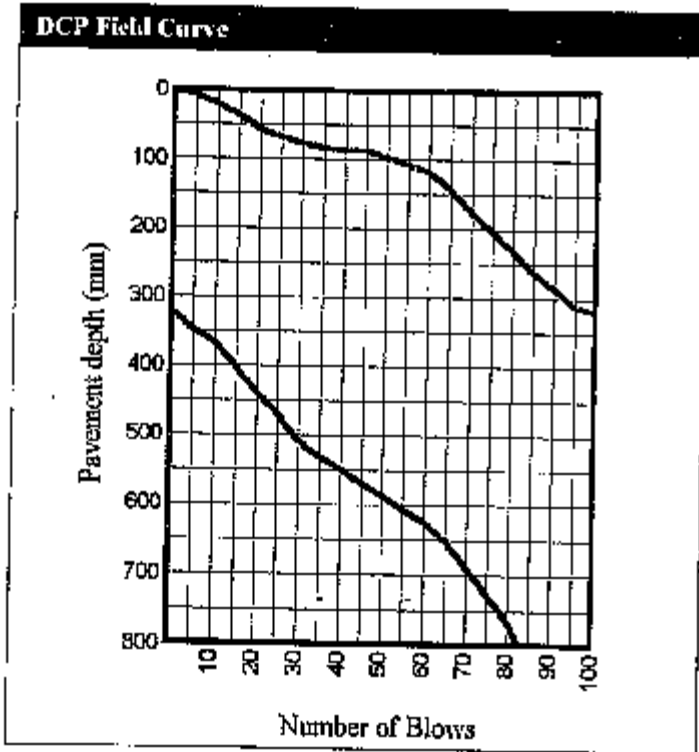
Depth (mm)	W. Avg. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Avg. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	3.11	66	1.5	5.0	97	341	334	147 - 763
151 - 300	5.74	27	0.7	6.7	45	427	175	77 - 398
301 - 450	6.01	29	1.6	8.1	42	406	166	73 - 379
451 - 600	5.20	32	1.6	7.3	51	476	194	85 - 442
601 - 800	7.60	29	2.4	10.7	32	313	130	57 - 294

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P - Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	334	147 - 763	97	841
151 - 300	175	77 - 398	45	427
301 - 450	166	73 - 379	42	406
451 - 600	194	85 - 442	51	476
601 - 800	130	57 - 295	32	313

TEST PIT 30

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHAASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Trans. Crack	Deform	Other
TP 30	06 May 2005	S - MID	30	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₂₀₀): 196
 Balance Number (BN₁₀₀) of data: 20,9
 Standard Pavement Balance Curve (SPBC): B=11, A=6734
 Rut Limit: 20mm
 Structural capacity (MISA): 3.2
 (MISA = MILLION Standard Axles, 80 kN)

Selected Design Traffic: Heavy traffic
 RN₁₀₀ of SPBC: 8,7
 Road category: B
 Base type: Granular
 Moisture condition of base: Optimum

Category IX : Poorly Balanced Inverted Structure (PBI)

Average equivalent strength (Existing Pavement Structure)

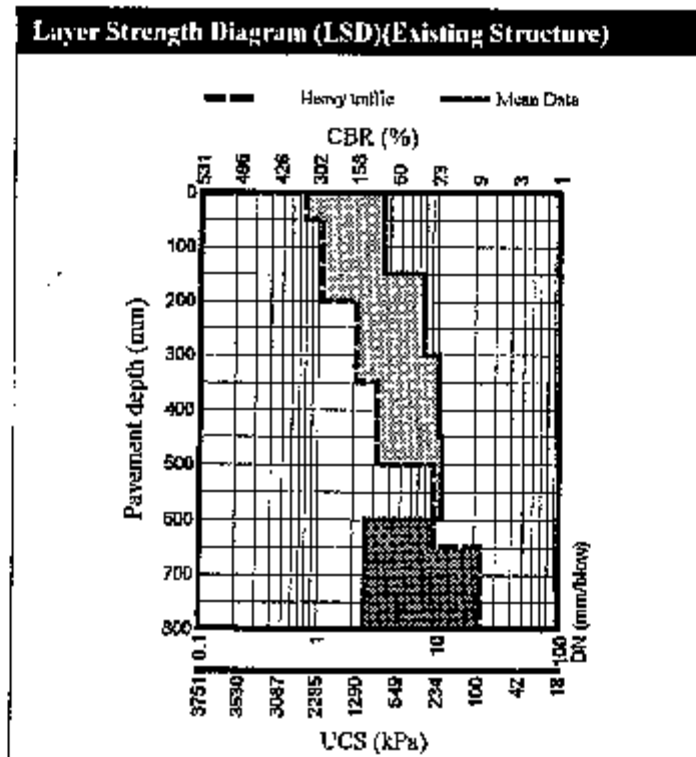
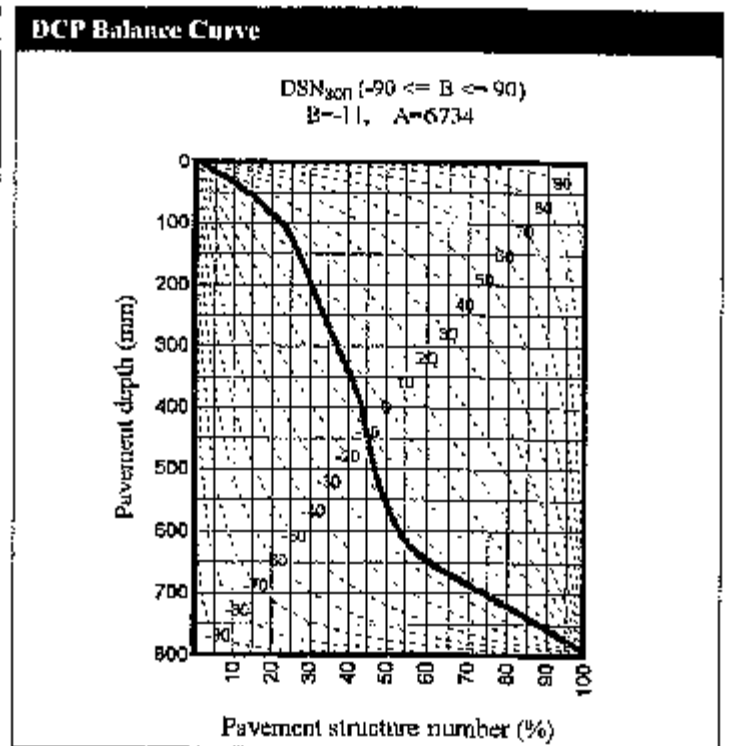
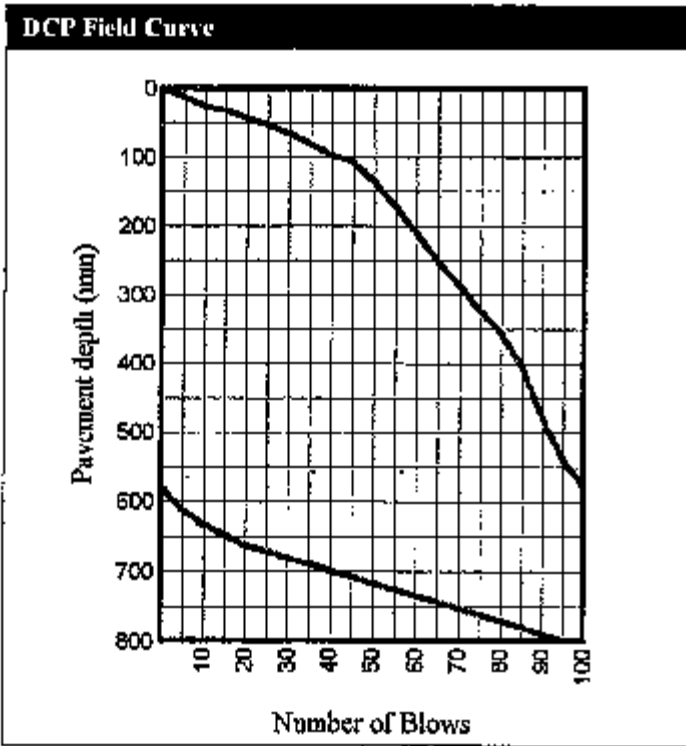
Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modul (MPa)	E-Modul Range 10P - 90P MPa
0 - 150	3.59	52	1,7	5,8	81	718	287	126 - 655
151 - 300	7.57	20	0,5	8,3	32	314	130	57 - 297
301 - 450	10.22	16	3,4	14,6	22	225	95	41 - 216
451 - 600	10.79	15	3,1	14,8	20	212	89	39 - 204
601 - 800	2.92	93	1,3	4,2	127	1062	418	183 - 954

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Avg. E-Modulus (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	287	125 - 655	81	718
151 - 300	130	57 - 297	32	314
301 - 450	95	41 - 216	22	225
451 - 600	89	39 - 204	20	212
601 - 800	418	183 - 954	127	1062

TEST PIT 31

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Cross. Crack	Deform	Other
TP 31	06 May 2005	3 - MID	31	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN₉₀): 92
 Balance Number (BN₁₀₀) of data: 12.1
 Standard Pavement Balance Curve (SPBC): B-15, A-3590
 Ret Limit: 20mm
 Structural capacity (MISA): 0.2
 (MISA = Million Standard Axles, 80 kN)

Selected Design Traffic: Heavy traffic
 BN₁₀₀ of SPBC: 20.1
 Road category: B
 Base type: Granular
 Moisture condition of base: Optimum

Category VI: Poorly Balanced Deep Structure (PBD)

Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	DCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	8.98	22	4.7	15.11	26	260	108	48 - 247
151 - 300	5.15	31	1.0	6.5	51	481	196	86 - 446
301 - 450	8.76	18	1.3	10.4	26	267	111	49 - 254
451 - 600	15.47	11	4.6	21.4	13	142	61	27 - 139
601 - 800	20.20	10	2.8	23.8	9	106	46	20 - 105

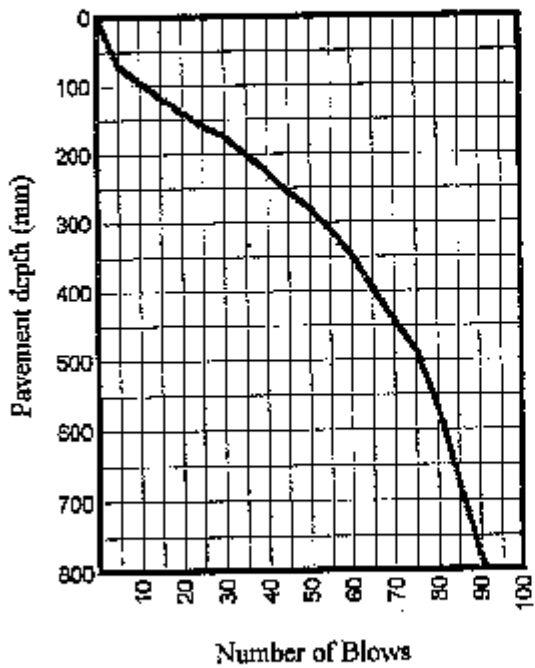
* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

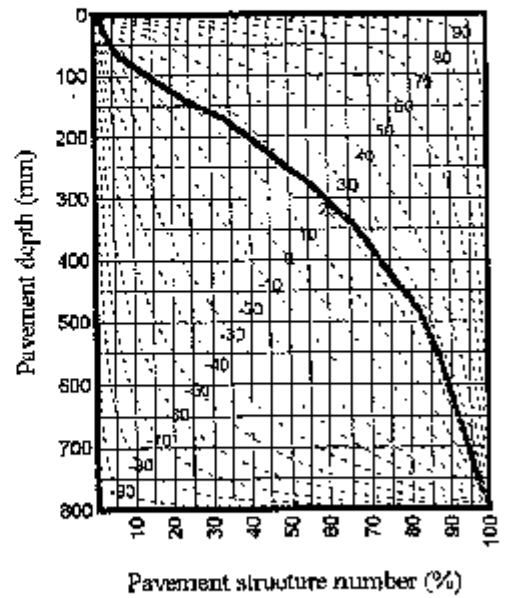
P = Percentile value in %

BCP Field Curve

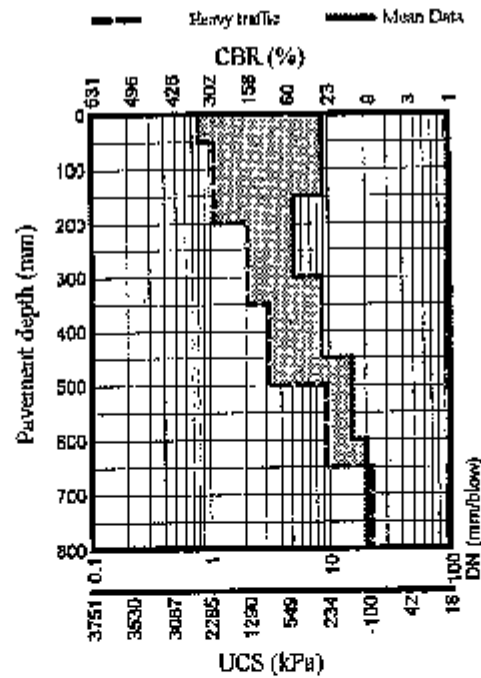


DCP Balance Curve

DSN₃₀₀ (-90 <- B <- 90)
B=15, A=3590



Layer Strength Diagram (LSD)(Existing Structure)



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Moduli (MPa)	E-Moduli Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	108	48 - 247	26	260
151 - 300	196	86 - 446	51	481
301 - 450	111	49 - 254	26	267
451 - 600	61	27 - 139	13	142
601 - 800	46	20 - 101	9	106

TEST PIT 33

DCP Report - Single analysis

Region: LIDWALA CONSULTING ENGINEERS Road number: RE/2 BOTHASFONTEIN FARM
 Project date: 06 May, 2005 Print date: 06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	rutting	Pumping	Long. Crack	Crac. Crack	Defirm	Other
TP 33	06 May 2005	S - MID	33	Sound	No	No	No	No	No	No

Design Structure Number in blows (DS _{Nom}): 83 Balance Number (BN ₁₀₀) of data: 12.8 Standard Pavement Balance Curve (SPBC): B=1, A=N44 Rut Limit: 20mm Structural capacity (MISA): 0.2 (MISA = Million Standard Axles, 80 kN)	Selected Design Traffic: Heavy traffic BN ₁₀₀ of SPBC: 12.3 Road category: B Base type: Granular Moisture condition of base: Optimum
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Category VII : Well-Balanced Inverted Structure (WBI)

Average equivalent strength (Existing Pavement Structure)

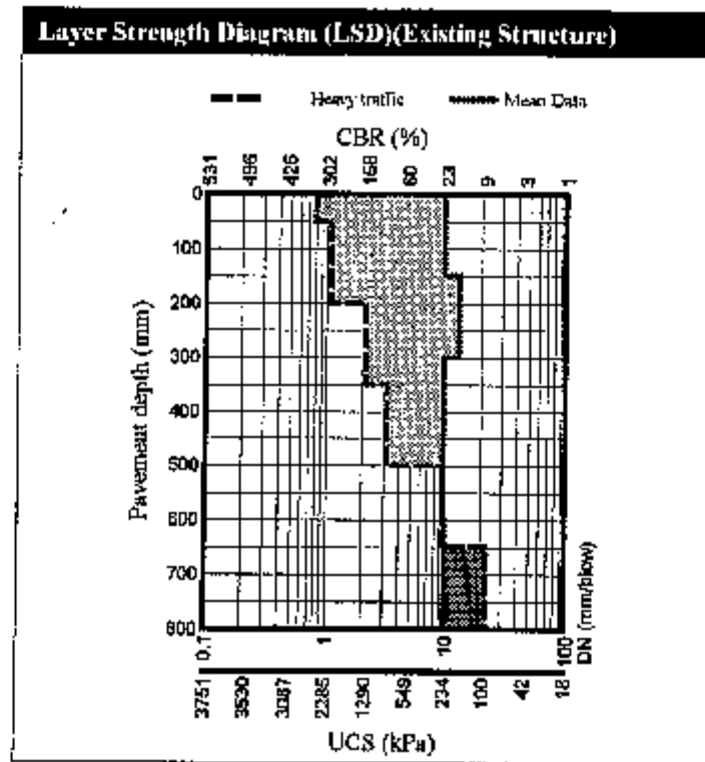
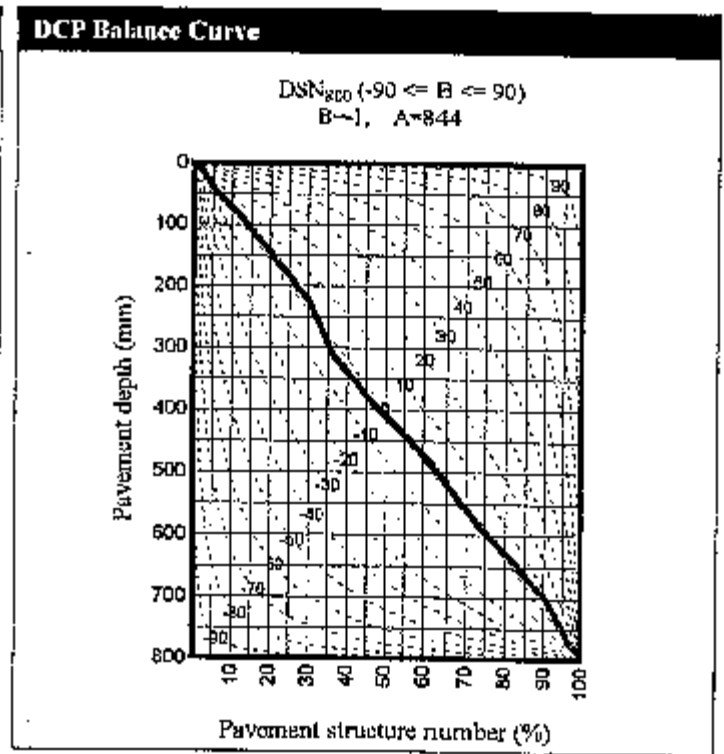
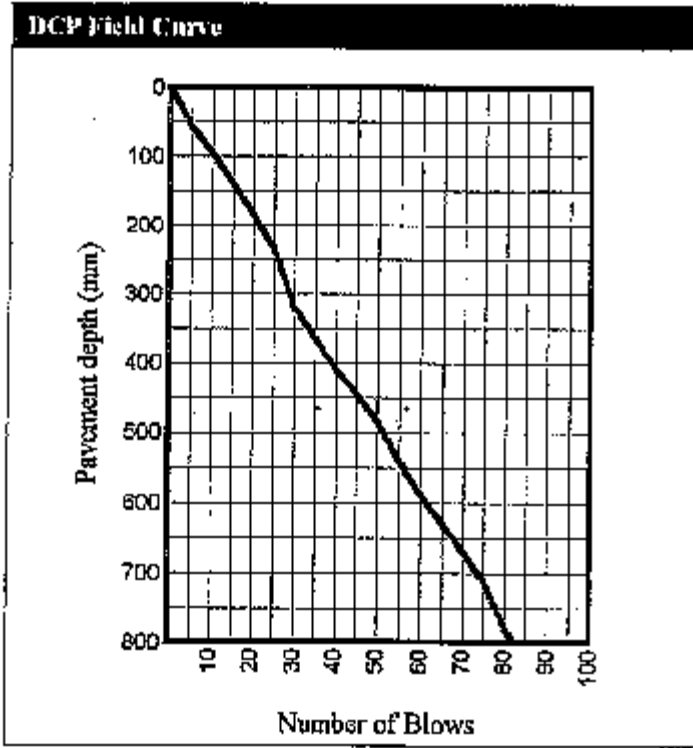
Depth (mm)	W. Avg. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Moduli (MPa)	E-Moduli Range 10P - 90P MPa
0 - 150	9.61	16	1.7	11.8	23	241	101	44 - 230
151 - 300	12.89	13	3.8	17.8	16	174	74	32 - 169
301 - 450	9.63	17	3.1	13.7	23	241	101	44 - 230
451 - 600	9.60	16	1.3	11.2	24	241	101	44 - 231
601 - 800	10.00	21	2.4	13.1	22	231	97	42 - 221

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %



E-Moduli (MPa) and Layer Strength Diagram (Existing Pavement Structure)

Depth (mm)	Ave. E-Modull (MPa)	E-Modull Range (MPa) 10P - 90P MPa	CBR (%)	UCS (kPa)
0 - 150	101	44 - 230	23	241
151 - 300	74	32 - 169	16	174
301 - 450	101	44 - 230	23	241
451 - 600	101	44 - 231	24	241
601 - 800	97	42 - 221	22	231

TEST PIT 34

DCP Report - Single analysis

Region:	LIDWALA CONSULTING ENGINEERS	Road number:	RE/2 BOTHASFONTEIN FARM
Project date:	06 May, 2005	Print date:	06 May, 2005

Measurements included in analysis

Measurement Name	Date	Position	Distance (km)	Condition	Rutting	Pumping	Long. Crack	Crac. Crack	Deform	Other
TP 34	06 May 2005	5 - MID	34	Sound	No	No	No	No	No	No

Design Structure Number in blows (DSN ₁₀₀): 130	Selected Design Traffic:	Heavy traffic
Balance Number (BN ₁₀₀) of data: 21.5	BN ₁₀₀ of SPBC:	9.7
Standard Pavement Balance Curve (SPBC): B=-8, A=3788	Road category:	T3
Roll Limit: 20mm	Base type:	Granular
Structural capacity (MISA): 0.8	Moisture condition of base:	Optimum
<i>(MISA = MILLION Standard Axles, 80 kN)</i>		

Category LK : Poorly Balanced Inverted Structure (PBI)

Average equivalent strength (Existing Pavement Structure)

Depth (mm)	W. Ave. Pen. * (mm / blow)	Blows	SD (mm / blow)	90P (mm / blow)	CBR ** (%)	UCS *** (kPa)	Ave. E-Modul (MPa)	E-Modul Range 10P - 90P MPa
0 - 150	5.41	34	2.4	8.5	48	453	186	81 - 424
151 - 300	14.87	11	3.3	19.1	14	149	64	28 - 145
301 - 450	10.12	16	2.4	13.1	22	228	96	42 - 218
451 - 600	6.61	26	2.1	9.3	38	365	150	66 - 342
601 - 800	5.21	44	1.8	7.5	51	475	193	85 - 441

* Weighted average penetration rate

** California Bearing Ratio

*** Unconfined Compressive Strength

P = Percentile value in %

