Final Basic Assessment Report for the Proposed Nooitgedacht 534 JQ Ptn 366

Reference No: Gaut: 002/13-14/E0315

October 2013

BOKAMOSO
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APPLICATION FORM [REGULATION 12 (1)&(2)(A)(B)(I)(II)]

Gauteng Department of Agriculture and Rural Development

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010 (Version1)

Kindly note that:

1. This application form is to be completed for both the Basic Assessment process and the Scoping & EIA process.
2. This application form is current as of 2 August 2010. 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. The application must be typed within the spaces provided in the form. The sizes of the spaces provided are not necessarily indicative of the amount of information to be provided. It is in the form of a table that can extend itself as each space is filled with typing.
4. Selected boxes must be indicated by a cross and, when the form is completed electronically, must also be highlighted.
5. Incomplete applications may be returned to the applicant for revision.
6. 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 rejection of the application as provided for in the regulations.
7. Three copies of this form and the attachments must be handed in at the offices of the relevant competent authority as detailed below.
8. No faxed or e-mailed applications shall be accepted. Only hand delivered or posted applications will be accepted.
9. 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/Environmental Assessment Practitioner (EAP) must provide any Interested and Affected Party (I&AP's) with the information contained in this application on request, during any stage of the application process.
10. Attachments, where applicable, to this document are to be ordered in the following prescribed manner

Annexure - A	Locality map
Annexure - B	a) Proof of notification to the Land owner b) Proof of receipt of such notice by the owner
Annexure - C	List of all organs of state and State Departments of where the draft report will be submitted, their full contact details and contact person

Annexure -D	Property description list
Annexure -E	Current land use zonings list
Addendum-A	Declaration of Independence by EAP to be submitted with the report if the application form was submitted by applicant -

DEPARTMENTAL DETAILS

Gauteng Department of Agriculture and Rural Development
Attention: Administrative Unit of the Sustainable Utilisation of the Environment (SUE) Branch
P.O. Box 8769
Johannesburg
2000

Administrative Unit of the Sustainable Utilisation of the Environment (SUE) Branch
18th floor Glen Cairn Building
73 Market Street, Johannesburg

Administrative Unit telephone number: (011) 355 1345
Department central telephone number: (011) 355 1900

APPLICATION FORM [REGULATION 12 (1)&(2)(A)(B)(I)(II)]

(For official use only)

File Reference Number:	
Application Number:	
Date Received:	

1. NATURE OF THE ACTIVITY

The establishment of land use rights for industrial purposes, including the assembling of products, the re-packaging of products and distribution centres.

Select the appropriate box with regards to the application form submission

An application for conducting a basic assessment (as defined in the regulations)?	X	**A resubmission of an application for conducting a basic assessment (as defined in the regulations)?**	
An application for conducting a Scoping & EIA process (as defined in the regulations)		**A resubmission of an application for conducting a SR & EIA process (as defined in the regulations)**	

If this is a class application, has a copy of approval letter to undertake such an application been attached as such application may/shall not be undertaken without an approval from this Department

Has this project or a substantial similar project which has been previously submitted by the applicant been denied authorisation by the relevant authority in the last three (3) years

YES	NO
	X

If yes will the application contain new or additional material not submitted previously

YES	NO

To be noted that Regulation 68 of EIA Regulations, 2010 states that no applicant may resubmit an application which is substantially similar to an application previously denied authorisation by the relevant authority unless 3 years has lapsed since the refusal or new material is to be presented

2. PROJECT DETAILS

Project title: Proposed development of Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City

To be noted that the project will be registered under this title and this title must be duplicated through the application life of the project

Local authority(ies) in whose jurisdiction the proposed application will fall: Mogale City Local Municipality

3. 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):
25°59'50.12"S	27°55'10.38"E

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 **N/A**

Property description: **Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City**

(Farm name, portion etc.) Where a large number of properties (including alternatives) are involved (e.g. linear activities), please attach a list of the property descriptions to this application.

4. ACTIVITIES APPLIED FOR

Describe the activity and associated infrastructure, which is being applied for, in detail

The proposed establishment to be known as **Portion 366 Nooitgedacht 534 JQ Mogale City** will consist of the following zonings and land-uses

- Industrial Purposes to include
  - the assembling of products,
  - the re-packaging of products
  - distribution centres

This establishment is located near the corner of Malibongwe Drive and R512 south of the N14 and Lanseria International Airport, North of Cosmo City and South West of Diepsloot Township

Which Listing Notice is the activity(ies) listed under?

Listing Notice 1 [x] Listing Notice 2 [ ] Listing Notice 3 [x]

If "or also" listed under Listing Notice 3, describe the Geographical Area triggering the activity and its regional, provincial, national & international significance

An application may be made for more than one listed or specified activity that, together, make up one development proposal. All the listed activities that make up this application must be listed.

Indicate the number and date of the relevant Government Notice:	**Activity No (s) (In terms of the relevant notice): e.g. Listing notices 1, 2 or 3**	**Describe each listed activity as per the wording in the relevant listing notice:**
Listing Notice 1: R544, 18 June 2010	Activity 9	The construction of facilities or infrastructure exceeding 1000 meters in length for the bulk transportation of water, sewage or storm water – (i) With an internal diameter of 0.36 meters or more; or (ii) With a peak throughput of 120 litres per second or more excluding where a Such facilities or infrastructure are for bulk transportation of water, sewage or storm water drainage inside a road reserve; or b Where such construction will occur within urban areas but further than 32 meters from a watercourse, measured from the edge of the watercourse
Listing Notice 1, R544 18 June 2010	Activity 11	The construction of: (vi) bulk storm water outlet structures (x) buildings exceeding 50 square metres in size, or (xi) infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.
Listing Notice 1, R544, 18 June 2010	Activity 18	The infilling or depositing of any material of more than 5 cubic metres into or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from 1.) A watercourse; 2.) The sea;

		3.) The seashore; 4.) The litoral active zone, an estuary or a distance of 100m inland of the highwater mark of the sea or an estuary, whichever distance is the greater- But excluding where such infilling, depositing, dredging, excavation, removal or moving, a.) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or b.) Occurs behind the development setback line	
Listing Notice 1 R544, 18 June 2010	Activity 22	The construction of a road, outside urban areas, (i) with a reserve wider than 13,5 meters or, (ii) where no reserve exists where the road is wider than 8 meters, or (iii) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 or activity 18 in Notice 545 of 2010	
Listing Notice 1, R544 18 June 2010	Activity 24	The transformation of land bigger than 1000 square meters in size, to residential, retail commercial, industrial or institutional use, where, at the time of coming into effect of this Schedule or thereafter such land was zoned as open space, conservation or had an equivalent zoning	
Listing Notice 3 R546 18 June 2012	Activity 3	The construction of masts or towers of any material or type used for telecommunication broadcasting or radio transmission broadcasting or radio transmission purposes where the mast (a) is to be placed on a site not previously used for this purpose, and (b) Will exceed 15 metres in height but excluding attachments to existing buildings and masts on rooftops	Gauteng i A protected area identified in terms of NEMPAA, excluding conservancies, ii National Protected Area Expansion Strategy Focus areas, iii Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority, iv. Sites or areas identified in terms of an International Convention, v Sites identified as irreplaceable or important sites in the Gauteng Conservation Plan vi Areas larger than 2 hectares zoned for use as public open space vii Areas zoned for a conservation purpose
Listing Notice 3, R546, 18 June 2010	Activity 4	The construction of a road wider than 4 meters with a reserve less than 13,5 meters	In Gauteng i A protected area identified in terms of NEMPAA, excluding conservancies, ii National Protected Area Expansion Strategy Focus areas, iii Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority, iv Sites identified in terms of the Ramsar Convention, v Sites identified as irreplaceable or important in the Gauteng Conservation plan, vi Areas larger than 2 hectares zoned for use as public open space, vii Areas zoned for a conservation purpose viii Any declared protected area including Municipal or Provincial Nature Reserves as contemplated by the Environmental conservation Act, 1989 (Act No 73 of 1989) and the Nature Conservation Ordinance (Ordinance 12 of 1983), ix Any site identified as land with high agricultural potential located within the Agricultural Hubs or Important Agricultural Sites identified in terms of the Gauteng Agricultural Potential Atlas, 2008.
Listing Notice 3, R546,	Activity 16	The construction of: (iv) infrastructure	In Gauteng: i. A protected area identified in terms of

18 June 2010		covering 10 square metres or more Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line	NEMPAA, excluding conservancies; ii. National Protected Area Expansion Strategy Focus areas, iii Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of Act and as adopted by the competent authority, iv Sites or areas identified in terms of an International Convention; v Sites identified as irreplaceable or important in the Gauteng Conservation Plan vi Any declared protected area including Municipal or Provincial Nature Reserves as contemplated by the Environment Conservation Act, 198 (Act No 73 of 1989) and the Nature Conservation Ordinance (Ordinance 12 of 1983) vii Areas zoned for a conservation purpose
Listing Notice 3, R546 18 June 2010	Activity 24	The expansion of: a) infrastructure where the infrastructure will be expanded by 10 square metres or more Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line	In Gauteng i A protected area identified in terms of NEMPAA excluding conservancies, ii National Protected Area Expansion Strategy Focus areas iii Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority, iv Sites or areas identified in terms of an International Convention, v. Sites identified as irreplaceable or important in the Gauteng Conservation Plan, vi Any declared protected area including Municipal or Provincial Nature Reserves as contemplated by the Environment Conservation Act, 1989 (Act No 73 of 1989) and the Nature Conservation Ordinance (Ordinance 12 of 1983), vii Areas zoned for a conservation purpose

Please note that any authorisation that may result from this application will only cover activities specifically applied for.

5. OTHER AUTHORISATIONS REQUIRED

5.1 DO YOU NEED ANY AUTHORISATIONS IN TERMS OF ANY OF THE FOLLOWING LAWS?

4.1.1 National Environmental Management: Waste Act	Yes/No
4.1.2 National Environmental Management: Air Quality Act	Yes/No
4.1.3 National Environmental Management: Protected Areas Act	Yes/No
4.1.4 National Environmental Management: Biodiversity Act	Yes/No
4.1.5 Mineral Petroleum Development Resources Act	Yes/No
4.1.6 National Water Act	**Yes**/No
4.1.7 National Heritage Resources Act	Yes/No
4.1.8 Other (please specify)	Yes/No
4.2 Have such applications been lodged already?	Yes/No

6. BACKGROUND INFORMATION

Project applicant:	Katue River Trading (Pty) Ltd		
Trading name (if any):			
Contact person:	Dave Mitchell		
Physical address:			
Postal address:	P.O. Box 7149, Krugersdorp North		
Postal code:		**Cell:**	
Telephone:	(011) 953 1082	**Fax:**	086 626 6051
E-mail:	andre@wesplan.co.za		

Project Environmental Assessment Practitioner:	Bokamoso Landscape Architects & Environmental Consultants
Contact person:	Lizelle Gregory
Postal address:	P.O. Box 11375, Maroelana
Postal code:	0161
Telephone:	(012) 346 3810
E-mail:	lizelleg@mweb.co.za
	Cell: 083 255 8384
	Fax: 086 570 5659
EAP qualifications & relevant experience	Registered Landscape Architect & Environmental Consultant (degree obtained from the University of Pretoria), with more than 18 years experience in • The compilation of Environmental Evaluation Reports • Environmental Management Plans • Strategic Environmental Assessments • All stages of Environmental Input • EIA under the ECA and the new and amended NEMA Regulations, and Various other Environmental Reports and documents
Professional affiliation(s) (if any)	The South African Council of the Landscape Architects Profession (SACLAP), The Institute for Landscape Architects in South Africa (ILASA), and The Institute for Environmental Management and Assessment (IEMAS)

Landowner:	Katue River Trading (Pty) Ltd
Contact person:	Mr Dave Mitchell
Postal address:	P.O. Box 7149, Krugersdorp North
Postal code:	1741
Telephone:	(011) 953 1082
E-mail:	andre@wesplan.co.za
	Cell:
	Fax: 086 626 6051

In instances where there is more than one landowner (including for alternative sites), please attach a list of landowners with their contact details to this application.

In instances where the landowner is not the applicant –attach proof of notification of the landowner and a proof of receipt of such notice by the owner, manager or person in control of the land.

List of the land owner is attached	N/A
Landowner notification proof is attached	N/A
Landowner proof of receipt of such notification is attached	N/A

Local authority in whose jurisdiction the proposed activity will fall:	Mogale City Local Municipality
Contact person:	Snowy Mothiba-IEM Directorate
Postal address:	P.O. Box 24, Mogale Local Municipality
Postal code:	1740
Telephone:	011-660 8757
E-mail:	snowym@mogalecity.gov.za
	Cell: -
	Fax: 011-951 2000

In instances where there is more than one local authority involved (including for alternative sites), please attach a list of local authorities with their contact details to this application.

List of local authorities is attached	N/A

List of properties is attached	N/A

Town(s) or district(s):	Krugersdorp, Mogale City
Street/Physical address:	Corner of Pollard Road and Main Reef Road, Krugersdorp

In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.

List of towns or districts is attached: N/A

State Departments administering a law affecting the environment:	Department of Water Affairs
Contact person:	Mr Justice Makuleke
Postal address:	Private Bag X313
Postal code:	0001
Telephone:	(012) 336 6507
E-mail:	MakulekeJ@dwa.gov.za
Cell:	-
Fax:	(012) 336 6311

In instances where there is more than one State Department involved, please attach a list of all State Departments with their contact details.

Current land-use zoning: Agricultural Holdings

In instances where there is more than one current land-use zoning (including alternatives), please attach a list of current land use zonings that also indicate which portions each use pertains to , to this application.

List of current land use zonings is attached: N/A

Locality map:

A locality map(s) (including alternatives) must be attached to the back of this document, as Annexure A. The scale of the locality map must be between 1:10 000 and 1:50 000. The scale must be indicated on the map. The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites;
- all rivers within a 1km radius of the site or alternative sites; and
- a north arrow.

7. COMPLIANCE WITH CONDITIONS

Have you ever been in non-compliance with a condition of an authorisation or exemption issued by this Department or any other provincial or national environmental department in terms of the Environment Conservation Act (No 73 of 1989) or the National Environmental Management Act (No 107 of 1998) as amended?	YES	NO
		X

If yes, indicate details of non-compliance together with reasons for non-compliance:

Attach all relevant documentation e.g. compliance audit reports, pre-directives, directives, compliance notices

8. ACTIVITY INFORMATION

Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R40 000 000.00	
What is the expected yearly income that will be generated by or as a result of the activity?	R30 000 000.00	
Will the activity contribute to service infrastructure?	YES X	No
Will the activity contribute to a public amenity	YES X	No
Total number of new employment opportunities to be created in the development phase of this activity.	± 90	
Of these opportunities how many are:		
Women	35	

People with disabilities	
Female	4
Male	2
Youth	
Female	
Male	
What is the expected value of the employment opportunities during the development phase?	± R3 500 000.00/ Annum
What percentage of this will accrue to previously disadvantaged individuals?	
Total number of new employment opportunities to be created in the operational phase of this activity.	± R10 000 000.00
Of these opportunities how many are:	
Women	±50%
People with disabilities	10%
Female	10%
Male	
Youth	
Female	
Male	
What is the expected current value of the employment opportunities during the first 10 years?	± R100 000 000.00
What percentage of this will accrue to previously disadvantaged individuals?	± 60%

Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

The need and desirability of the proposed development are supported by various planning policies. The property owner/developer realised the development potential of the site as it has been identified as an industrial and commercial development zone

Mogale City area where the application site is located, is characterised by light industrial and commercial townships. There are few vacant land parcels within this area which are suitable for development. These land parcels should be better utilised as the provision of municipal services becomes more viable with an increase in the industrial density through infill development

This area has experienced a major boom in the residential, commercial, retail and industrial sectors and during the past 5 to 10 years and is still developing despite the current economic climate. Current planning, legislation and development plans for the area have added value and secured the investment potential of the area for the period of 2008-2020 (MWPDF, 2008). Thereby, creating a need for erven zoned for industrial and commercial land use

Indicate any benefits that the activity will have for society in general:

This region, with surrounded Villages like Thabo Mbeki Village, Nooitgedacht 88 Settlement and Cosmo City will create job opportunities to skilled and unskilled workers on a temporary as well as a permanent bases

Indicate any benefits that the activity will have for the local communities where the activity will be located:

The income that will be generated by the Local Authority via rates and taxes, payment of service and the creation of job opportunities will have a multiple effect on the overall economic growth within the Nooitgedacht, Lanseria and Cosmo City area

9. DECLARATIONS

The Applicant

I, **Mr Dave Mitchell**, declare that I -

- am[1], the applicant in this application for **the Proposed Development of Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City**
- [have appointed / will appoint] an environmental assessment practitioner to act as the independent environmental assessment practitioner for this application / will apply to obtain exemption from the requirement to appoint / obtain an environmental assessment practitioner[2];
- will provide the environmental assessment practitioner and the competent authority with access to all information at my disposal that is relevant to the application;
- will be responsible for the costs incurred in complying with the Environmental Impact Assessment Regulations, 2010, including but not limited to –
  - costs incurred in connection with the appointment of the environmental assessment practitioner or any person contracted by the environmental assessment practitioner;
  - costs incurred in respect of the undertaking of any process required in terms of the Regulations;
  - costs in respect of any fee prescribed by the Minister or MEC in respect of the Regulations;
  - costs in respect of specialist reviews, if the competent authority decides to recover costs; and
  - the provision of security to ensure compliance with conditions attached to an environmental authorisation, should it be required by the competent authority;
- will ensure that the environmental assessment practitioner is competent to comply with the requirements of these Regulations and will take reasonable steps to verify whether the EAP complies with the Regulations;
- will inform all registered interested and affected parties of any suspension of the application as well as of any decisions taken by the competent authority in this regard;
- am responsible for complying with the conditions of any environmental authorisation issued by the competent authority;
- hereby indemnify the Government of the Republic, the competent authority and all its officers, agents and employees, from any liability arising out of the content of any report, any procedure or any action which the applicant or environmental assessment practitioner is responsible for in terms of these Regulations;
- will not hold the competent authority responsible for any costs that may be incurred by the applicant in proceeding with an activity prior to obtaining an environmental authorisation or prior to an appeal being decided in terms of these Regulations;
- will perform all other obligations as expected from an applicant in terms of the Regulations;
- all the particulars furnished by me in this form are true and correct; and
- I am aware that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the applicant[3]/ Signature on behalf of the applicant:

Kafue River Trading (Pty) Ltd

Name of company (if applicable):

6 May 2013

Date:

Signature of the Commissioner of Oaths:

6 May 2013

Date:

CA(SA)

Designation:

Commissioner of Oaths Official stamp (below) LEONARD THEO GREGORY
COMMISSIONER OF OATHS
36 LEBOMBO ROAD
ASHLEA GARDENS
PRETORIA
CHARTERED ACCOUNTANT OF SOUTH AFRICA

[1] If this is signed on behalf of the applicant, proof of such authority from the applicant must be attached.
[2] If exemption is obtained from appointing an EAP, the responsibilities of the EAP shall automatically apply to the person conducting the environmental impact assessment in terms of the Regulations.
[3] If the applicant is a juristic person, a signature on behalf of the applicant is required as well as proof of such authority.

ADDENDUM A

10. DECLARATIONS[4]

The Environmental Assessment Practitioner;

I, **Lizelle Gregory** declare under oath that I –

- I act as the independent environmental practitioner for this application **the Proposed Development of Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City**
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting environmental impact assessments, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I will take into account, to the extent possible, the matters listed in regulation 8 of the regulations when preparing the application and any report relating to the application;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application;
- I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report;
- I will keep a register of all interested and affected parties that participated in a public participation process; and
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not
- all the particulars furnished by me in this form are true and correct;
- will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and
- I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act.

For Basic Assessment applications I further declare under oath that

- I will fix the site notice(s) in a conspicuous place, on the property(ies) where it is intended to undertake the activity(ies)
- I will place a notice in the required newspaper(s)
- I will provide the following with all the project information and give I&AP's an opportunity to register as an I&AP
    - landowners and occupiers of adjacent land
    - landowners and occupiers of land within 100 metres of the boundary of the property
    - the ward councillor
    - any organisation that represents the community in the area of the application
    - the municipality which has jurisdiction over the area in which the proposed activity will be undertaken
    - any organ of state that may have jurisdiction over any aspect of the activity of the applicant's intention to submit an application to the competent authority; and
- I will include on the register all persons as required per Regulation 55 (1) (c)
- The Reports as submitted will contain the same information (including layout, project design and mitigation) as provided to the registered I&APs for comment
- All issues raised by the I&APs during the public participation process will be included in the Comments and Response Report as attached

Signature of the Environmental Assessment Practitioner:

[4] Addendum A must be completed and submitted with the report if application form was done and submitted by the applicant.

Bokamoso Landscape Architects and Environmental Consulting CC
Name of company:

6 May 2013
Date:

Signature of the Commissioner of Oaths:

6 May 2013.
Date:

CA(SA).
Designation:

Commissioner of Oaths Official stamp (below)

BERNARD THEO GREGORY
COMMISSIONER OF OATHS
36 LEBOMBO ROAD
ASHLEA GARDENS
PRETORIA, 0081
CHARTERED ACCOUNTANT OF SOUTH AFRICA

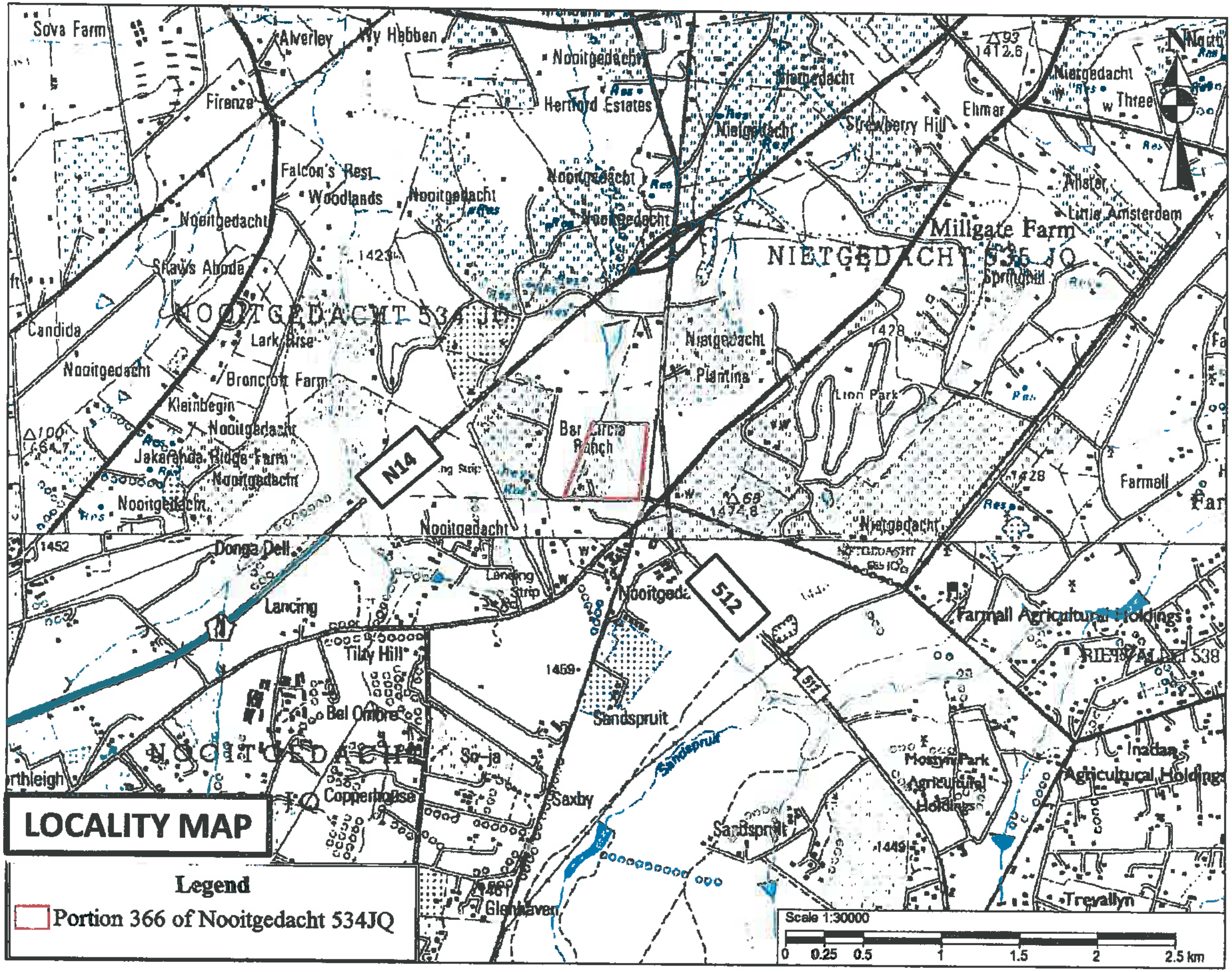
11. CHECKLIST

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; and
- The form has been signed by the applicant, by the EAP or both.

Annexure A:

- **Locality and Aerial map**



LOCALITY MAP
Legend
Portion 366 of Nooitgedacht 534JQ
N14
512
NOOITGEDACHT 534 JQ
NIETGEDACHT 535 JQ
Millgate Farm
Sova Farm
Alverley
Wy Habben
Nooitgedacht
Hertford Estates
Firenze
Falcon's Rest
Woodlands
Shaw's Abode
Candida
Lark Rise
Broncroft Farm
Kleinbegin
Jakaranda Ridge Farm
Nietgedacht
Plantina
Lion Park
Strawberry Hill
Elmar
Allister
Little Amsterdam
Springhill
Farmall
Farmall Agricultural Holdings
Donga Dell
Lancing
Landing Strip
Tilly Hill
Bel Ombre
So-ja
Copperhouse
Saxby
Sandspruit
Glenhaven
Mostyn Park Agricultural Holdings
Inadan Agricultural Holdings
Trevallyn
Scale 1:30000
0 0.25 0.5 1 1.5 2 2.5 km

Aerial Photo

Legend

Portion 366 of Nooitgedacht 534JQ

Annexure B:

- **Proof of notification to the Land owner –**

  Not applicable;

- **Proof of receipt of such notice by the owner –**

  Not applicable.

Annexure C:

- **List of all organs of state and State Departments of where the draft report will be submitted, their full contact details and contact person**

Local authority in whose jurisdiction the proposed activity will fall:	**Mogale City Local Municipality**		
Contact person:	Snowy Mothiba IEM Directorate		
Postal address:	P.O. Box 24, Mogale Local Municipality		
Postal code:	1740	**Cell:**	-
Telephone:	011-660 8757	**Fax:**	011-951 2000
E-mail:	snowym@mogalecity.gov.za		

Local authority in whose jurisdiction the proposed activity will fall:	**Department of Water Affairs**		
Contact person:	Mr. Justice Makuleke		
Postal address:	Private Bag X 313, Pretoria		
Postal code:	0001	**Cell:**	
Telephone:	(012) 336 6507	**Fax:**	(012) 336 8311
E-mail:	MakulekeJ@dwa.gov.za		

Other State Organs where the Draft Basic Assessment Report will be submitted to:

Local authority in whose jurisdiction the proposed activity will fall:	**Department of Transport**
Contact person:	Mr. Mangisi George Mahlalela
Postal address:	Private Bag X 193, Pretoria
Postal code:	0001
Telephone:	(012) 309 3698
E-mail:	
Cell:	
Fax:	(012) 328 3370

Local authority in whose jurisdiction the proposed activity will fall:	**Department of Human Settlements**
Contact person:	Mr. Thabane Zulu
Postal address:	Private Bag X 644, Pretoria
Postal code:	0001
Telephone:	(012) 421 1312
E-mail:	Nakuthula.mbele@dhs.gov.za
Cell:	
Fax:	(012) 341 2998

Local authority in whose jurisdiction the proposed activity will fall:	**Department of Economic Development**
Contact person:	Mr. Ebrahim Patel
Postal address:	Private Bag X 149, Pretoria
Postal code:	0001
Telephone:	(012) 394 1006
E-mail:	
Cell:	
Fax:	(012) 394 0255

Annexure D:

- **Property description list -**

Portion 366 of the Farm Nooitgedacht 534 JQ,
Mogale City

Annexure E:

- **Current land use zoning list –**
  Agricultural Holdings

GAUTENG DEPARTMENT AGRICULTURE AND RURAL DEVELOPMENT

Diamond Corner Building, 68 Eloff & Market Street, Johannesburg
P O Box 8769, Johannesburg, 2000

Telephone: (011) 355-1900
Fax: (011) 355-1000

Reference:	Gaut: 002/13-14/E0315
Enquiries:	Faith Mlambo
Telephone:	011 355 1974
Email:	faith.mlambo@gauteng.gov.za

Bokamoso Landscape Architects & Environmental Consultants

Email. lizelleg@mweb.co.za

PER EMAIL

Dear Sir / Madam

Application for Environmental Authorisation: Proposed development of portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City

The Department acknowledges having received the application form for environmental authorisation of the above-mentioned project on 07/05/2013.

The application has been assigned the reference number Gaut: 002/13-14/E0315. Kindly quote this reference number in any future correspondence in respect of the application.

Please circulate the draft report to any state department that administers a law relating to a matter affecting the environment to comment.

You are required to submit two (2) copies (full colour CDs-PDF) of the Draft Basic Assessment Report as well as proof of submission to state departments referred to above.

In order to determine whether a biodiversity assessment is required and, if so, which specialist studies are required, please send a shapefile (WGS84 datum; geographic co-ordinate system) of the application site to our biodiversity information service (GDACE_BiodiversityInfo@gauteng.gov.za), the e-mail clearly indicating the project reference number. Where biodiversity assessment is required; please ensure that it is conducted consistent with the *GDACE Requirements for Biodiversity*

Assessments. A copy of this document can be obtained by e-mailing GDACE_BiodiversityInfo@gauteng.gov.za

In terms of Regulation 67(1) (2) of the NEMA EIA Regulations 2010, this application will lapse should you fail to submit the requested information within 6 months of the date of signature of this letter, except in the case where the Department has received and accepted written explanation for failure to submit such information.

Please draw the applicant's attention to the fact that the activity may not commence prior to an environmental authorisation being granted by the Department.

Yours faithfully

Nhlanhla Makhathini
Assistant Director: Strategic Administration Support
Date: 23/05/2013

CC: Kafue River Trading (Pty) Ltd

Att: Mr D Mitchell
Tel: 0119531082
Email: andre@wesplan.co.za

agriculture and rural development
Department: Agriculture and Rural Development
GAUTENG PROVINCE

Diamond Corner Building, 68 Eloff & Market Street, Johannesburg
P O Box 8769, Johannesburg, 2000

Telephone: (011) 355-1900
Fax: (011) 355-1000
Website: http://www.gdard.gpg.gov.za

Reference:	Gaut: 002/13-14/E0315
Enquiries:	Justine Chan
Telephone:	(011) 355-1256
Email:	Justine.Chan@gauteng.gov.za

Bokamoso Landscape Architects and Environmental Consultants

Email/Fax: lizelleg@mweb.co.za

Dear Sir / Madam

Draft Basic Assessment Report: Proposed development of portion 366 of the farm Nooitgedacht 534 JQ, Mogale City

The Department acknowledges having received the Draft Basic Assessment Report for environmental authorisation of the above-mentioned project on 23/08/2013.

You are required to submit five (5) copies (3 full colour hard copies and 2 CDs-PDF) of the Final Basic Assessment Report.

Please draw the applicant's attention to the fact that the activity may not commence prior to an environmental authorisation being granted by the Department.

Yours faithfully

Boniswa Belot
Deputy Director: Strategic Administration Support
Date: 17/09/2013

CC: Kafue River Trading (Pty) Ltd Att: D Mitchell
Email/Fax: andre@wesplan.co.za

Gauteng Department of Agriculture and Rural Development (GDARD)

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, 2010

List of all organs of state and State Departments where the draft report has been submitted, their full contact details and contact person

Kindly note that:

1. This **Basic Assessment Report** is the standard report required by GDARD in terms of the EIA Regulations, 2010and must be submitted together with the application form.

2. This application form is current as of 2 August 2010. 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 to all State Departments administering a law relating to a matter likely to be affected by the activity to be undertaken; the submission of such a draft report to such State Departments must be done on the day of submission of the draft report to the competent authority, this Department. (Attach a signed proof of such submission). signed**

4. 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.

5. Selected boxes must be indicated by a cross and, when the form is completed electronically, must also be highlighted.

6. An incomplete report may be returned to the applicant for revision.

7. 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 rejection of the application as provided for in the regulations.

8. 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.

9. No faxed or e-mailed reports will be accepted. Only hand delivered or posted applications will be accepted.

10. 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.

DEPARTMENTAL DETAILS

Gauteng Department of Agriculture and Rural Development
Attention: Administrative Unit of the Sustainable Utilisation of the Environment (SUE) Branch
P.O. Box 8769
Johannesburg
2000

Administrative Unit of the Sustainable Utilisation of the Environment (SUE) Branch
18th floor GlenCairnBuilding
73 Market Street, Johannesburg

Admin Unit telephone number: (011) 355 1345
Department central telephone number: (011) 355 1900

(For official use only)

File Reference Number:						
Application Number:						
Date Received:						

(i) Submission to State Department (Section 3 above)

(A) Has a draft report for this application been submitted to all State Department administering a law relating to a matter likely to be affected as a result of the activity? **YES**

(B) Is a list of State Departments referred to in section A above been attached to this report, **YES**

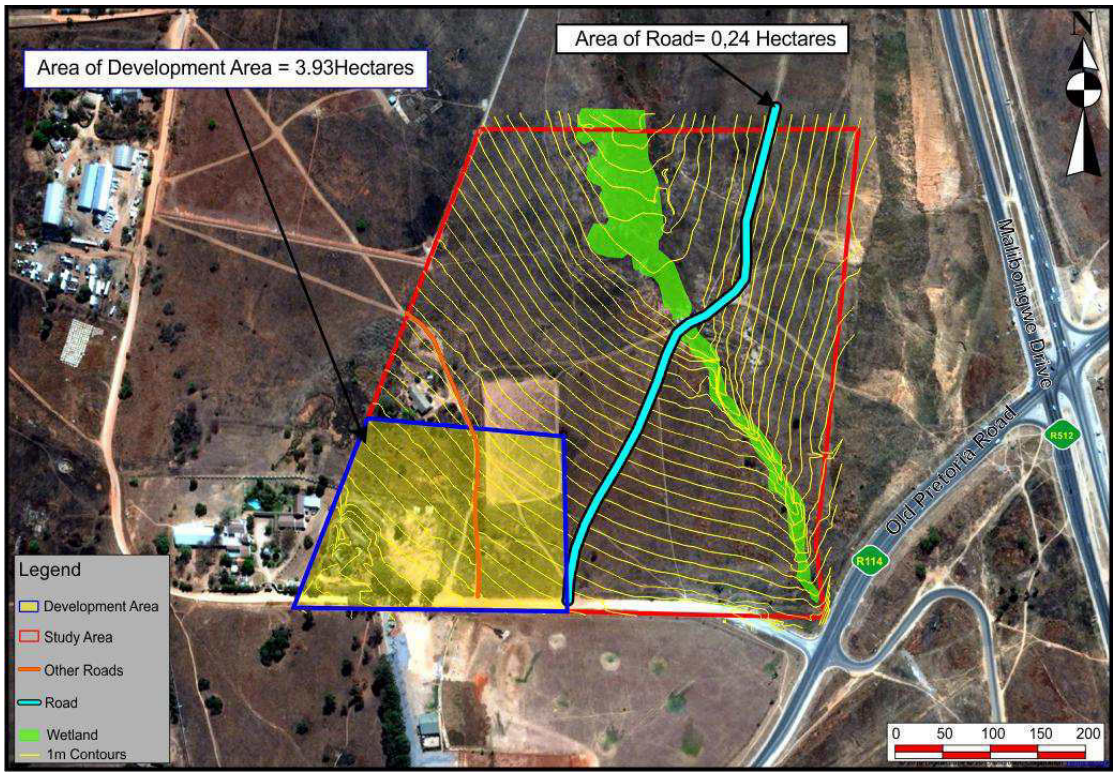
if no, state reasons for not attaching the list.

SECTION A: ACTIVITY INFORMATION

1. ACTIVITY DESCRIPTION

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

The establishment of land use rights for industrial purposes, including the assembling of products, the re-packaging of products and distribution centres.



Select the appropriate box

The application is for an upgrade of an existing development		The application is for a new development	X	Other, specify	

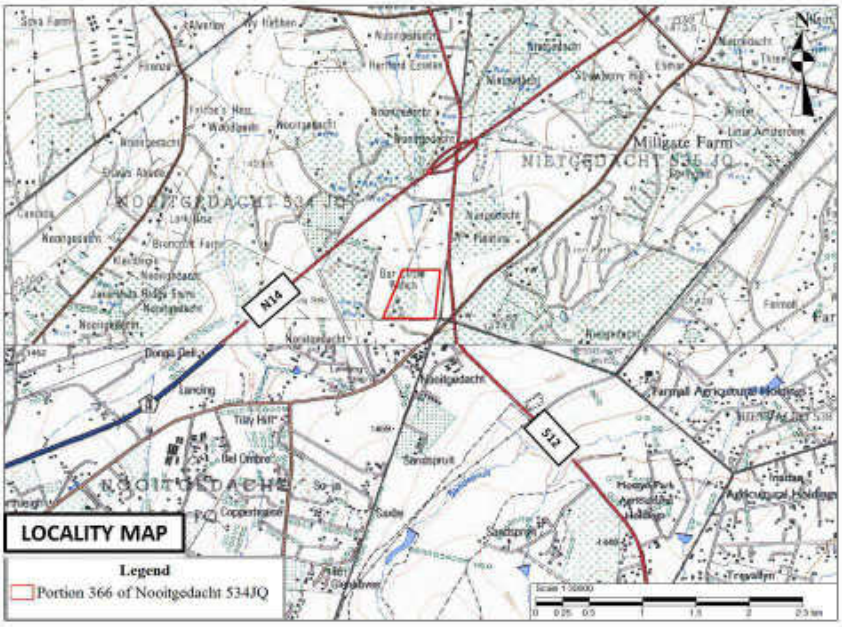


Figure 1: Locality Map

Figure 2: Aerial Map

Describe the activity and associated infrastructure, which is being applied for, in detail

The proposed establishment to be known as **Portion 366 Nooitgedacht 534 JQ Mogale City** will consist of the following zonings and land-uses:

- Industrial Purposes to include:
  - the assembling of products;
  - the re-packaging of products; and

- distribution centres.

The development area will cover 3.93 ha in the south-western corner of the study area while the access road will be 0.24 ha in extent.

This establishment is located near the corner of Malibongwe Drive and R512, south of the N14 and Lanseria International Airport, North of Cosmo City and South West of Diepsloot Township.

The owners of the property wants to establish a distribution warehouse on the western side of the City of Johannesburg due to the increased fuel price, the introduction of the e-toll system on the Gauteng Freeways, more affordable land costs and the increased capacity of the Lanseria International Airport.

Activities Applied for:

Indicate the number and date of the relevant Government Notice:	**Activity No (s) (in terms of the relevant notice) :**	**Describe each listed activity:**
Listing Notice 1, R544, 18 June 2010	Activity 9	The construction of facilities or-infrastructure exceeding 1000metres in length for the bulk transportation of water, sewage or stormwater 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 facilities or infrastructure are for bulk transportation of water, sewage or stormwater or stormwater drainage inside a road reserve; or b) where such construction will occur within urban areas but further than 32metres from a watercourse, measured from the edge of the watercourse.
Listing Notice 1, R544, 18 June 2010	Activity 11	The construction of: i. bulk stormwater outlet structures ii. buildings exceeding 50 square metres in size; or iii. infrastructure or structures covering 50

		square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.
Listing Notice 1, R544, 18 June 2010	Activity 18	The infilling or depositing of any material of more than 5 cubic metres into or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres form : 1.) A watercourse; 2.) The sea; 3.) The seashore; 4.) The litoral active zone, an estuary or a distance of 100m inland of the highwater mark of the sea or an estuary, whichever distance is the greater- But excluding where such infilling, depositing, dredging, excavation, removal or moving, a.) Is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or b.) Occurs behind the development setback line.
Listing Notice 1, R544, 18 June 2010	Activity 22	The construction of a road, outside urban areas, (i) with a reserve wider than 13,5 meters or, (ii) where no reserve exists where the road is wider than 8 meters, or (iii) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 or activity 18 in Notice 545 of 2010
Listing Notice 1, R544, 18 June 2010	Activity 24	The transformation of land bigger than 1000 square metres in size, to residential, retail, commercial, industrial or institutional use, where, at the time of the coming into effect of this Schedule such land was zoned open space, conservation or had an equivalent zoning.
Listing Notice 3,	Activity 3	The construction of masts or towers of any material or type used for telecommunication

R 546, 18 June 2012		broadcasting or radio transmission broadcasting or radio transmission purposes where the mast: (a) Is to be placed on a site not previously used for this purpose, and (b) Will exceed 15 metres in height, but excluding attachments to existing buildings and masts on rooftops. Gauteng: i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. National Protected Area Expansion Strategy Focus areas; iii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; iv. Sites or areas identified in terms of an International Convention; v. Sites identified as irreplaceable or important sites in the Gauteng Conservation Plan; vi. Areas larger than 2 hectares zoned for use as public open space; vii. Areas zoned for a conservation purpose.
R. 546, 18 June 2010	Activity 4	The construction of a road that is wider than 4 meters with a reserve less than 13, 5 metres. **(b) In Gauteng:** (i) A protected area identified in terms of NEMPAA, excluding conservancies; (ii) National Protected Area Expansion Strategy Focus areas; (iii) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (iv) Sites identified in terms of the Ramsar Convention; (v) Sites identified as irreplaceable or important in the Gauteng Conservation plan; (vi) Areas larger than 2 hectares zoned for use as public open space; (vii) Areas zoned for a conservation purpose; (viii) Any declared protected area including Municipal or Province Nature Reserves as

		contemplated by the Environment Conservation Act, 1989 (Act No. 73 of 1989) and the Nature Conservation Ordinance (Ordinance 12 of 1983) (ix) Any site identified as land with high agricultural potential located within the Agricultural Hubs or Important Agricultural Sites identified in terms of the Gauteng Agricultural Potential Atlas, 2006.
Listing Notice 3, R546, 18 June 2010	Activity 16	The construction of: (iv) Infrastructure covering 10 square metres or more Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line. In Gauteng: i. A protected area identified in terms of NEMPAA, excluding conservancies, ii. National Protected Area Expansion Strategy Focus areas; iii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of Act and as adopted by the competent authority; iv. Sites or areas identified in terms of an International Convention; v. Sites identified as irreplaceable or important in the Gauteng Conservation Plan; vi. Any declared protected area including Municipal or Provincial Nature Reserves as contemplated by the Environment Conservation Act, 198 (Act No. 73 of 1989) and the Nature Conservation Ordinance (Ordinance 12 of 1983); vii. Areas zoned for a conservation purpose.
Listing Notice 3, R546, 18 June 2010	Activity 24	The expansion of: d. infrastructure where the infrastructure will be expanded by 10 square metres or more; Where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a

		watercourse, excluding where such construction will occur behind the development setback line. In Gauteng: i. A protected area identified in terms of NEMPAA, excluding conservancies; ii. National Protected Area Expansion Strategy Focus areas; iii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; iv. Sites or areas identified in terms of an International Convention; v. Sites identified as irreplaceable or important in the Gauteng Conservation Plan; vi. Any declared protected area including Municipal or Provincial Nature Reserves as contemplated by the Environment Conservation Act, 1989 (Act No. 73 of 1989) and the Nature Conservation Ordinance (Ordinance 12 of 1983); vii. reas zoned for a conservation purpose

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:	Administrating Authority:	Promulgation Date:
National Environmental Management Act No. 107 of 1998	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 Regulations[1] (the Regulations) in terms of Chapter 5 of the National Environmental management Act,

1998[2] (NEMA). The new Regulations came into effect on 3 July 2006.

Notice No. R 386 and R 387 of the New Regulations list activities which require that the EIA Process be followed. The Activities listed in Notice No. R 386 requires that a Basic Assessment Process be followed and the Activities listed in Notice No. R 387 requires that the Scoping and EIA process be followed.

Implication to the Development:
The application for the proposed Industrial Development consists only of activities listed under Notice No. R 386, therefore a Basic Assessment Report will be submitted for the authorization from the Local Authority.

Environmental Impact Assessment Regulations in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act No 107 of 1998)	National	2010

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 Amended Regulations came into effect on 2 August 2010, and therefore all new applications must be made in terms of the Amended NEMA regulations and not in terms of the 2006 NEMA Regulations or the New Regulations of the ECA. 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 544, R 545 and R 546** of the Amended Regulations list the activities that indicate the process to be followed. The activities listed in Notice No. R 544 requires that a Basic Assessment process be followed and the Activities listed in terms of Notice No. R 545 requires that the Scoping and EIA process be followed. Notice No. 546 has been introduced to make provision for Activities in certain geographical and sensitive areas.

Subsequently, Listing (R. 546) 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.

Implication to the Development:
Significant – The application for the proposed development consist of activities listed under Notice R. 544 (Listing No. 1) and R. 546 (Listing No. 3) and therefore a Basic Assessment Report will be submitted to GDARD for consideration.

National Water Act, 1998 (Act No. 36 of 1998)	National & Provincial	20 August 1998

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:

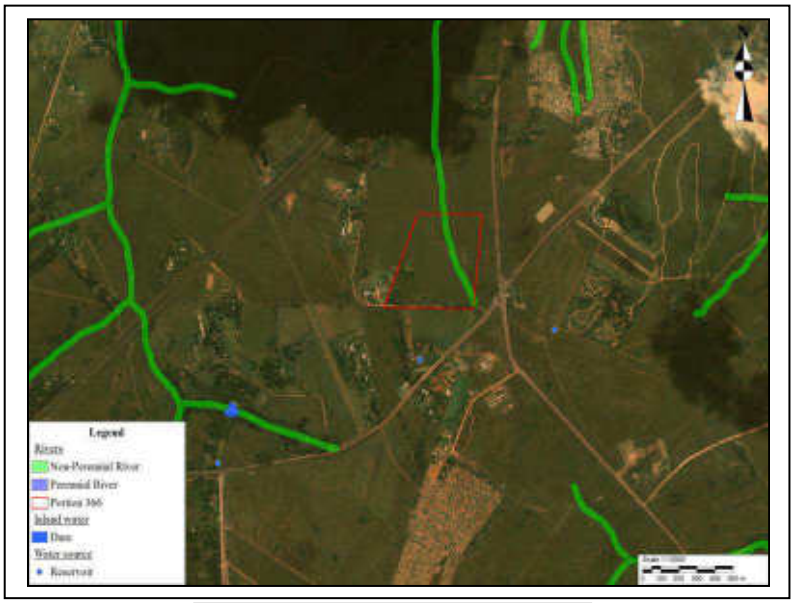


Figure 3 – Hydrology Map

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

Implication to the Development:
The proposed development is subject to a natural non-perennial stream or water course therefore in terms of Section 21 of the National Water Act, the developer will require water use licenses for the proposed development as the access road crosses the wetland area. **(Refer to Figure 3 – Hydrology Map)**

National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)	National & Provincial	2004

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'.
- 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.

Implication to the Development:
During the construction phase, dust and the generation of noise can become a significant factor, especially to the surrounding landowners. However if the development is well planned and the mitigating measures are successfully implemented the proposed development's contribution to air pollution and the generation of air pollution can become less significant.

National Heritage Resources Act, 1999 (Act No. 45 of 1965 (NHRA)	National & Provincial	April 1965

The National Heritage Resources Act legislates the necessity and heritage impact assessment in areas earmarked for development, which exceed 0.5ha. 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).

Implication to the Development:
Although no features of Heritage importance were identified during the Assessment, if any such features are discovered during construction activities and clearing of the application site, the correct "procedures

for an Environmental incident" **(at the end of EMP, Appendix H)** must be followed.

National Environmental Management Protected Areas Act, 2003 (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.

Implication to the Development:
This Act will not have to be considered for the application as the study area does not fall in any protected areas.

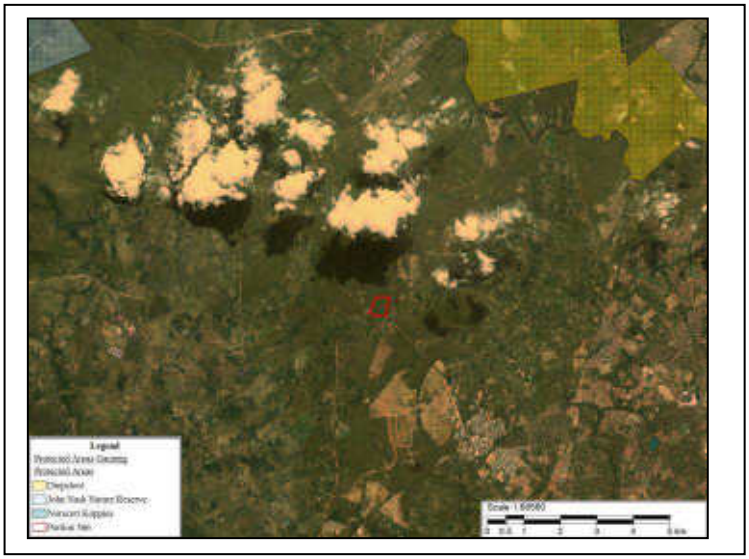


Figure 4 – Protected areas

National Environmental Management: Biodiversity Act, 2004 (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 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.

Implication to the Development:
According to the specialist's report the Open Grassland is regarded as moderately sensitive while the Wetland habitat is highly sensitive. The 30m buffer around the Wetland habitat is also regarded as highly sensitive. However, the Transformed areas are assigned with a low sensitivity value. There is also a probability that the Giant Bullfrog might use the study area as a migratory corridor as well as a number of Red Listed avifaunal species for foraging purposes. It is important to note that the area that is assigned as sensitive according to the GDARD C-Plan does not form part of the proposed Industrial Development. The access road however will be partly within this area but will have very low impact.

Figure 5 – GDARD Sensitivity

GDARD Draft Ridges Policy	Provincial	2007

The main purpose of the draft Red Data Policy is to protect red data plant species in Gauteng Province. This policy requires that red data species remain in situ and it gives priority ratings (based on where they occur) to the different Red Data species. If Red Data species are discovered on the study area this policy will have relevance and it should be described in detail as to how it is applicable to this project in the BA report.

Implication to the Development:
The policy will not have to be considered for the application as the study area does not fall on a ridge or in a buffer zone of any ridge.

Figure 6 – Ridges

Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	National	1 June 1983

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.

Implication to the Development:
According to the Gauteng Agricultural Potential Atlas (GAPA 3), Nooitgedacht Development is located on high and low potential for Agricultural land.

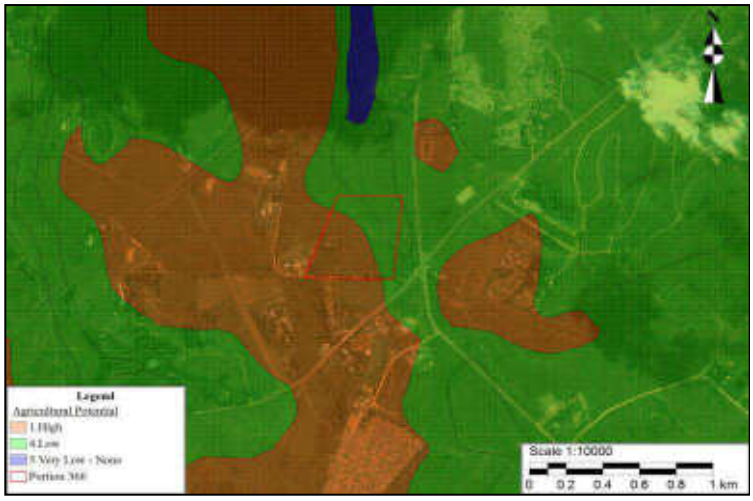


Figure 7 – Agricultural Potential

GDARD Agricultural Hub Policy	Provincial	2006

GDARD indentified 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.

Implications for the development:
Not significant. The study area is not situated within any of the 7 agricultural hubs identified for Gauteng.

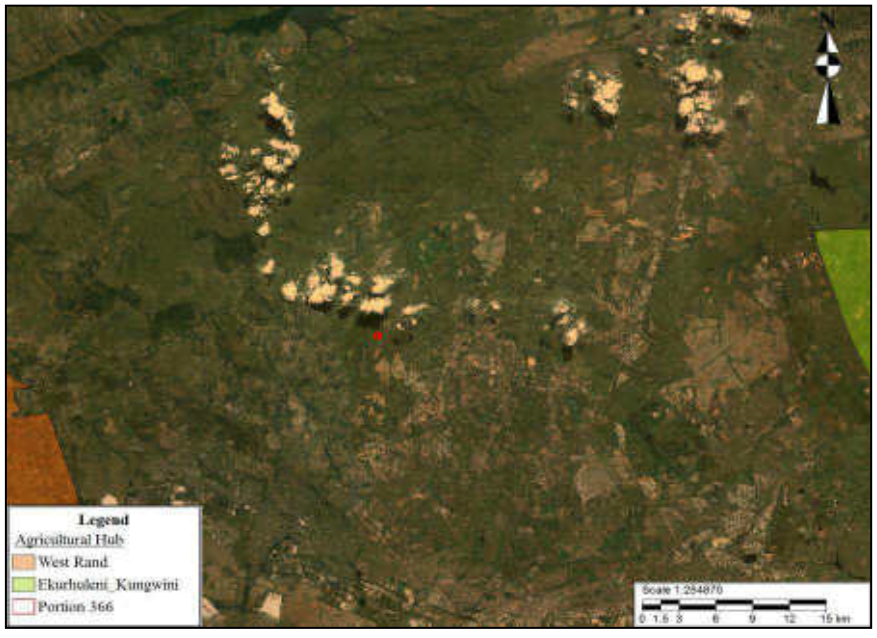


Figure 8 – Agricultural Hubs

Gauteng Urban Edge 2008 / 2009	Provincial	2009

According to Mr. Neels du Toit of 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.

From this year onwards the urban edge will be reviewed at the end of September and it will be adjusted to be in accordance with the proposals supplied by the various local authorities.

Implication to the Development:
The study area is not included into the urban edge as indicated on the spatial development framework, the 2007 provincial urban edge and into the revised 2008 / 2009 urban edge.

Figure 9 – Urban Edge

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.

Implication to the Development:
No waste management license will be required during the construction or operational phases of the proposed Industrial Development. Due to the fact that a limited amount of solid construction waste will be stored and handled on the site, before it is hauled away and dumped at the nearest registered landfill site.

Red List Plant Species Guidelines	Provincial	26 June 2006

The purpose of these guidelines is to promote the conservation of Red List Plant Species in Gauteng, which are species of flora that face risk of extinction in the wild. By protecting Red List Plant Species, conservation of diverse landscapes is promoted which forms part of the overall environmental preservation of diverse ecosystems, habitats, communities, populations, species and genes in Gauteng.

These Guidelines are intended to provide a decision-making support tool to any person or organization that is responsible for managing, or whose actions affect, areas in Gauteng where populations of Red List Plant Species grow, whether such person or organization be an organ of state or private entity or individual; thereby enabling the conservation of the Red List Plant Species that occur in Gauteng.

Implication to the Development:
Ten Red List plant species are known to occur in the 2527DD quarter degree grid cell. *Hypoxis hemerocallidea* and *Boophane disticha* are the most likely Red Listed plant species to occur on the study site.

Gauteng Noise Control Regulations, 1999	Provincial	1999

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.

Implication to the Development:
Within the construction phase of the proposed development, the impact of noise could be problematic, but such impacts are generally

short term. One should note that practical mitigation measures for noise pollution are low, but certain measures can be implemented to mitigate the severity. **(Please Refer to Appendix H (EMP) for a list of suitable guidelines and mitigation measures)**

The Gauteng Transport Infrastructure Act, 2001	Provincial	2001

The Act was created to consolidate the laws relating to roads and other types of transport infrastructure in Gauteng; and to provide for the planning, design, development, construction, financing, management, control, maintenance, protection and rehabilitation of provincial roads, railway lines and other transport infrastructure in Gauteng; and to provide for matter connected therewith.

Implication to the Development:
All developments in Gauteng must take the Gauteng Road network as published into consideration and no development may be planned across any provincial or K-route.

Figure 10 – Roads and Railways

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.

Provide a description of the alternatives considered

No.	**Alternative type**, either alternative: site on property, properties, activity, design, technology, operational or other(provide details of "other")	**Description**
1	Proposal	Industrial 1
2	Alternative 2	High density Residential Uses

NOTE: The numbering in the above table must be consistently applied throughout the application report and process

Alternative 1 (Proposal)

The proposed development is for "Industrial1" with only a part of the one portion being used for the industrial development. The development area is 3.93ha in extent with an access road covering 0.24ha. The proposed industrial development will include the following activities:

- the assembling of products;
- the re-packaging of products; and
- distribution centres

The proposed property is situated within an area that has been identified as a Future Transition Zone according to the Mogale City Spatial Development Framework. According to the Town Planning Memorandum the property forms part of the proposed nodal development at the intersection of Malibongwe Drive and the N14 Highway. Additionally, it will form part of the integration of land use activities between the City of Johannesburg and Mogale City.

Alternative 2

Alternative 2 is to establish a high density Residential area on the property. After careful consideration and research it was discovered that the establishment of an Industrial development can be done in the vicinity of the Nooitgedacht development but is not suitable for High density Residential uses from a Geotechnical point of view. When taking into consideration the infrastructure needed for such a development it will not be feasible or financially viable for the developer.

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:

Alternative:	**Size of the activity:**
Alternative 1(Proposed activity)	**4.2**
Alternative 2 (if any)	**4.2**
Alternative 3 (if any)	

Ha

or, for linear activities:

Alternative:	**Length of the activity:**
Alternative 1(Proposed activity)	
Alternative 2 (if any)	
Alternative 3 (if any)	

m/km

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

Alternative:	**Size of the site/servitude:**
Alternative 1(Proposed activity)	**19.34**
Alternative 2 (if any)	**19.34**
Alternative 3 (if any)	

Ha

5. SITE ACCESS

Alternative 1 (Proposal)

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

YES	NO
x	

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

Describe the type of access road planned:

Apart from the existing access to the site another access is planned at the northern boundary of the study area. Connecting these two accesses, a road is planned which will cross the wetland area. Both these access roads already exist, including the wetland crossing, as gravel roads and will only be upgraded.

Include the position of the access road on the site plan.

Alternative 2

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

YES	NO
x	

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

Describe the type of access road planned:

Apart from the existing access to the site another access is planned at the northern boundary of the study area. Connecting these two accesses, a road is planned which will cross the wetland area. Both these access roads already exist as gravel roads, including the wetland crossing, and will only be upgraded.

Include the position of the access road on the site plan.

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

Section A 6-8 has been duplicated **2** Number of times

(only complete when applicable)

6. SITE 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 as Appendix A to this document. The site or route plans must indicate the following:

- the scale of the plan, which must be at least a scale of 1:2000 (scale can not be larger than 1:2000 i.e. scale can not be 1:2500 but could where applicable be 1:1500)
- the property boundaries and numbers of all the properties within 50m of the site;
- the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
- the exact position of each element of the application 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, street lights, sewage pipelines, septic tanks, stormwater infrastructure and telecommunication infrastructure;
- walls and fencing including details of the height and construction material;
- servitudes indicating the purpose of the servitude;
- sensitive environmental elements on and within 100m of the site or sites 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);
- for gentle slopes the 1m contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and
- the positions from where photographs of the site were taken.
- Where a watercourse is located on the site at least one cross section of the water course must be included (to allow the 32m position from the bank to be clearly indicated)

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.

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.

SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

Note: Complete Section B for the proposal

Further:

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 | **"insert No. of duplicates"** | 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 alterative 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 | **2** | 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 2 is to be completed and attached in a chronological order; then
- all significantly different environments identified for Alternative3is 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: Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City

(Farm name, portion etc.)

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):**
	25°59'50.12"S	**27°55'10.38"E**

In the case of linear activities:

Alternative:	**Latitude (S):**	**Longitude (E):**
• Starting point of the activity	°	°
• Middle point of the activity	°	°
• End point of the activity	°	°

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 ☐

3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Flat	**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**	Undulating plain/low hills	River front

5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

REFER TO APPENDIX I: FIGURE 11 – SOILS MAP

Please note for clarity purposes all figures within the Basic Assessment for Nooitgedacht 534 JQ is in a larger format at the back of the Report as Appendix I.

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

Shallow water table (less than 1.5m deep)	**unsure**	NO
Dolomite, sinkhole or doline areas	YES	**NO**
Seasonally wet soils (often close to water bodies)	**YES wetland area**	NO
Unstable rocky slopes or steep slopes with loose soil	YES	**NO**
Dispersive soils (soils that dissolve in water)	YES	**NO**
Soils with high clay content (clay fraction more than 40%)	YES	**NO**
Any other unstable soil or geological feature	YES	**NO**
An area sensitive to erosion	YES	**NO**

(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).

b) are any caves located on the site(s) YES **NO**

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**

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**

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

According to the Engineering Geological investigation Report the site is underlain by granitic rocks of the Basement Complex, as exposed in the Johannesburg-Pretoria Dome. Archean intrusive igneous rocks are typically cross cut by diabase dykes and could possibly contain prominent structural fabric. The depth of the weathering in granitic rocks varies significantly. The high collapsible and kaolinised residual soils are present and occur in patches especially on the elevated areas.

Stormwater runoff on the proposed development site will mostly be in the form of sheetwash. Groundwater seepage was absent in the test pits, nevertheless seasonal groundwater seepage should not be excluded on the site as it may possibly be present.

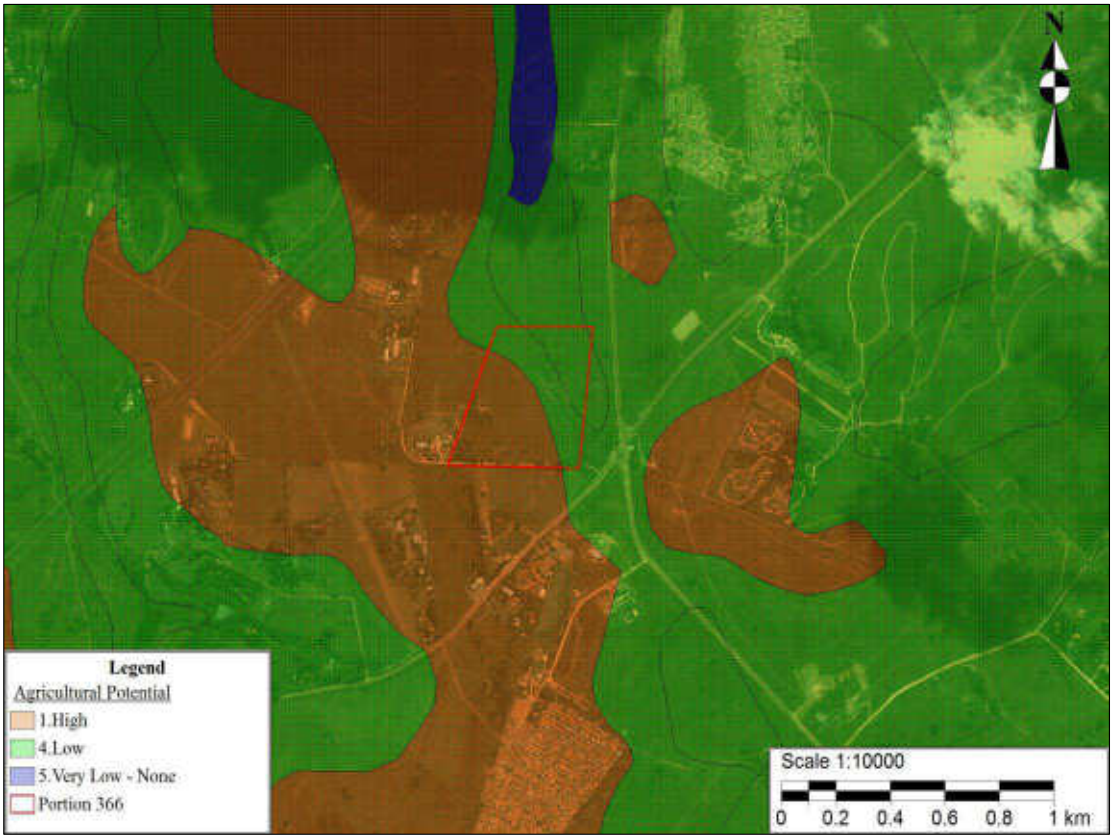
Tests conducted as part of the geotechnical study showed that the soils are collapsible and compressible. The magnitude of the proposed developments and associated structures have been calculated by assuming that 700mm wide strip footings will be positioned at an average depth of 0.8m below the natural ground surface and the foundations would apply a bearing pressure of 100kPa.

Due to the risk of a collapse (because of collapsible soils), good site drainage is essential around all structures of the development and any excess moisture should not be accumulated close to foundations.

According to the specialist study, no construction problems are anticipated on the proposed development site.

6. AGRICULTURE

REFER TO APPENDIX I: FIGURE 6 – AGRICULTURAL POTENTIAL MAP



Does the site have high potential agricultural soils as contemplated in the Gauteng Agricultural Potential Atlas (GAPA)?	**YES** Combination of high and low agricultural potential soils	NO

Please note: The Department may request specialist input/studies depending on the nature of the soil type and location of the site

Implications for the development

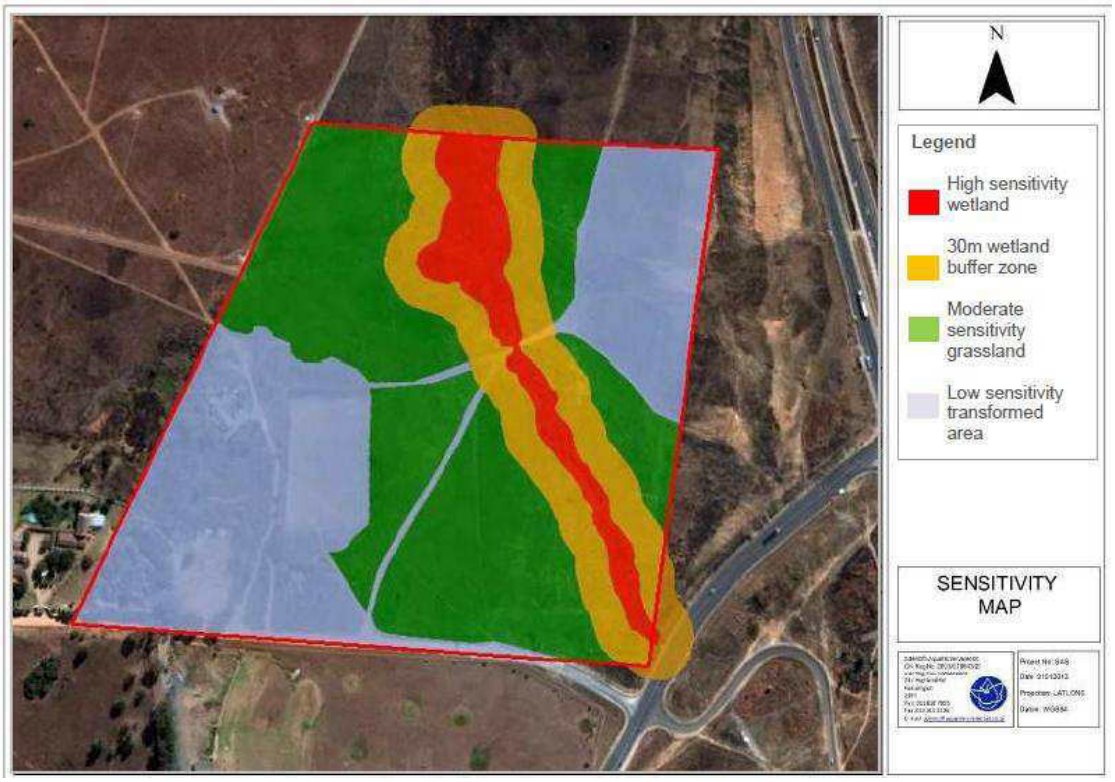
No Agricultural Potential Study was conducted for the proposed development due to the following:

- The proposed development site under application is still rural of nature, with no landowners/ tenants practicing agricultural activities;
- The proposed application is too small for economic viable Agricultural Activities:
- The application site consist of collapsible and compressible soils, and extensive irrigation of such soils is not supported;
- The Agricultural Potential of the proposed application site according to GAPA version 3 indicates a Low and High Agricultural Potential;
- The proposed development sites are not located within the Gauteng urban Edge (2010), and not located within any of the seven Agriculture Hubs Identified for the Gauteng Province. (Please refer to figure 12 – Urban Edge Map)

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).

REFER TO APPENDIX I: FIGURE 12 – SENSITIVITY MAP



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 **% =70**	Natural veld with heavy alien infestation **% =**	Veld dominated by alien species % **= 30**	Landscaped(vegetation) % =
Sport field % =	Cultivated land % =	Paved surface (hard landscaping) % =	Building or other structure % =	Bare soil % =

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

Refer to Appendix G1: Fauna and Flora Habitat Assessment

If YES, specify and explain: **Note: Although the answer is no, it was decided to supply some detail regarding the fauna and flora of the study area.**

The study area lies in the quarter degree grid cell 2527DD which has been classified as Egoli Granite Grassland, a grassland vegetation type that occurs on moderate to strongly undulating plains on Archaean granite and gneiss of the Halfway House granites. This grasslands falls within the seasonal summer rainfall region with high summer temperatures and frequent winter frosts.

This vegetation unit is considered endangered. Its conservation target is 24%. Small parts of this unit are conserved in statutory reserves such as Diepsloot and Melville Koppies Nature Reserve. Almost two thirds of the unit is already transformed by cultivation, urbanization and the construction of roads.

The proposed development site was assigned three habitat units by the specialist in terms of vegetation composition. Firstly, a wetland habitat unit was identified which falls mainly within the A21E quaternary catchment and the south eastern section falls within the A21C quaternary catchment. The specialist suggested a 30m buffer around the delineated wetland. The wetland area and suggested open space should be regarded as open space. There seems to be existing crossings over the wetland stream and therefore there is some impact on the stream connectivity. Due to these impacts, mainly anthropogenic, alien plant infestations have already occurred. The wetland habitat is important for some orchid species.

The second habitat unit that was identified is the Open Grassland which is situated to the east and west of the wetland habitat unit. Trampling and erosion as well as some evidence of fires are evident within this habitat unit. Due to the disturbances present on the site the vegetation unit is in a moderate ecological condition. Due to the high amount of alien invasive plant species it was thought to be lower but this vegetation unit provides habitat for the orchid species, *Habernaria epipactidea* and other terrestrial orchids. Providing that all mitigation measures as presented by the specialist are adhered to, any development activity to occur on the site does not pose any threat to the conservation status of the proposed development site.

Lastly, the second largest habitat unit of the proposed development site is the transformed habitat unit which consists of residential dwellings

and historic road construction. Erosion, bare soils and alien invasive plant species are present on site. Residential landscaping dominates the south western part of the study area. This habitat unit is classified as extensive loss of natural habitat.

In terms of the Faunal Assessment the study site was regarded as largely disturbed and has limited migrational connectivity because of the surrounding highways and development as well as the anthropogenic activities on the site. Due to the high levels of transformation and anthropogenic activities it is not likely that any Red Listed mammal species, invertebrates or arachnids and scorpions will utilise the site. It is possible that Red Listed avifauna can occasionally within the site area for foraging and habitation purposes. The lack of rocky and undisturbed habitat and the nearby informal settlement it is unlikely to find a large diversity of reptile species.

The wetland habitat will be the area on site with the highest conservation importance and is specifically important for amphibian species. The proposed development site falls within the distribution range of the Giant African Bullfrog (*Pyxicephalus adspersus*) and they have been noted in the larger region. The site does not seem able to support the species in terms of breeding and foraging but it might possibly serve as an area for migrating bullfrogs as they travel large distances.

The proposed development does not pose a threat to the conservation of fauna species apart from the threat to occasional migrating bullfrogs; however this can be decreased if the mitigation measures are implemented and adhered to.

As mentioned earlier, the wetland habitat comprises of two quaternary catchments, namely A21E and A21C. The A21E quaternary catchment on site is of moderate ecological importance and sensitivity as it is considered Class C present ecological status, hence a moderately modified stream. The A21C catchment on the site is of moderate ecological importance and sensitivity as it is considered Class D present ecological status, thus a largely modified steam. According to the databases used for aquatic ecology the followings findings were made:

- The proposed developments site falls within the Crocodile (west) and Marico Water Management Area (WMA);
- No NFEPA wetlands are identified within the study area;
- No wetland clusters of conservation importance within the study area; and
- No RAMSAR wetlands within or close to the study area.

Are there any rare or endangered flora or fauna species (including red list species) present within a 200m (if within urban edge, May 2002) or within 600m (if outside the urban edge, May 2002) radius of the site	**YES X**	NO

If YES, specify and explain:

Two Red List plant species are known to occur on the site, these are *Hypoxis hemerocallidea* and *Boophane disticha*. Both these species was seen scattered in the Wetland and Open Grassland Vegetation Unit. None were found in the Transformed Habitat Unit where the proposed development will take place.

Are their any special or sensitive habitats or other natural features present on the site?	**YES X**	NO

If YES, specify and explain:

The wetland habitat unit.

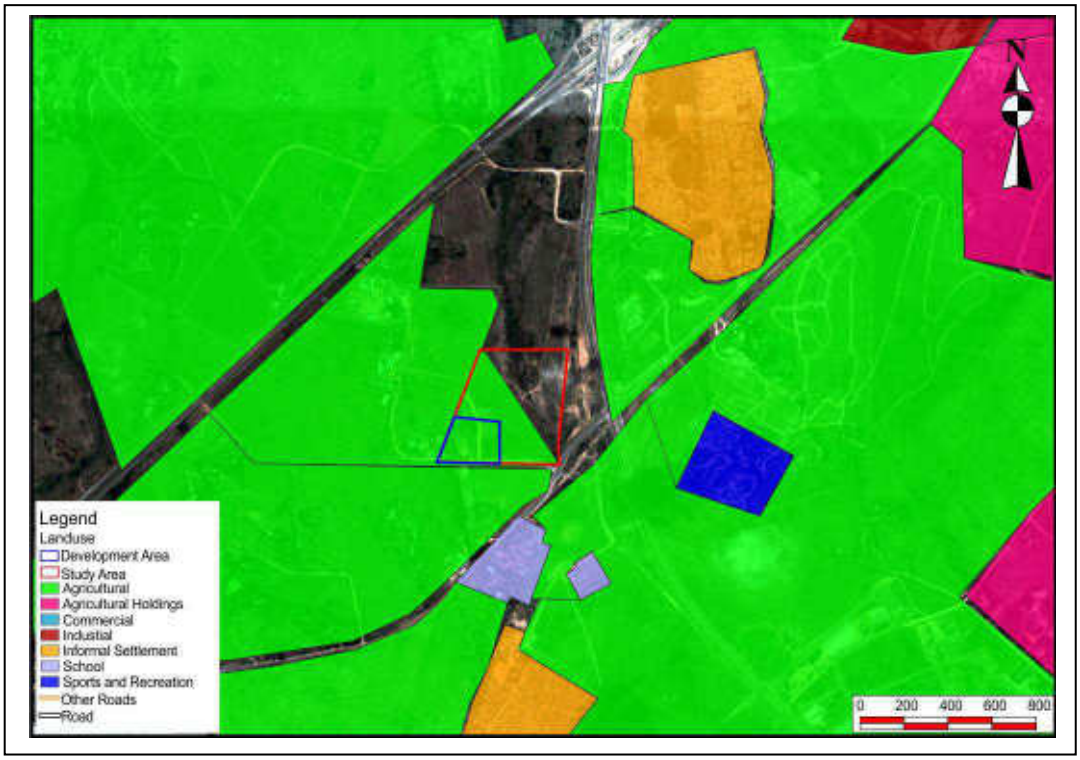
Was a specialist consulted to assist with completing this section	**YES X**	NO

If yes complete specialist details:			
Name of the specialist:	Stephan van Staden		
Qualification(s) of the specialist: Professional Registration	Pri.Sci.Nat		
Postal address:	91 Geldenhuis Road, Marlvern East Ext 1		
Postal code:	2007		
Telephone:	011 616 7893	Cell:	Not available
E-mail:	admin@sasenvironmental.co.za	Fax:	011 615 6240
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:	January 2013

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

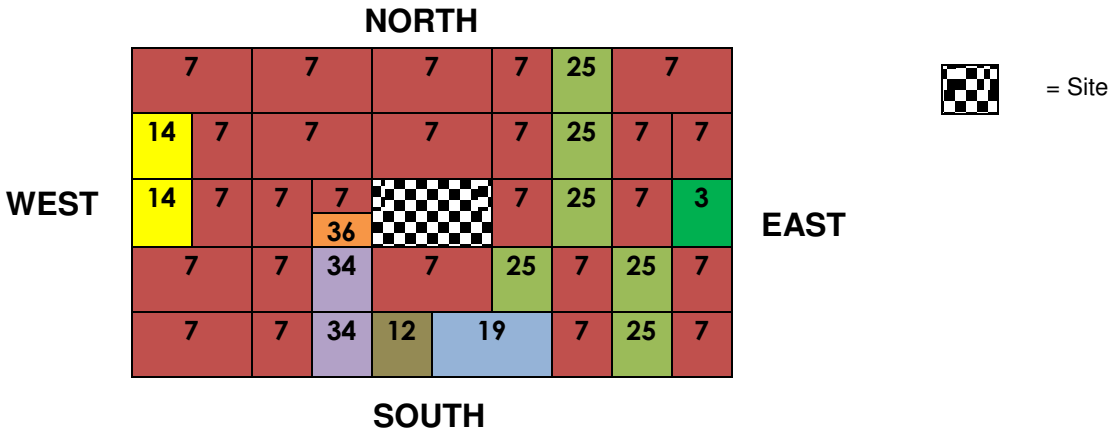
REFER TO APPENDIX I: FIGURE13 SURROUNDING LAND-USES MAPS



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	17. Hospitality facility	18.Church	**19. Education facilities**	20. Sport facilities
21. Golf course/polo fields	22. Airport	23. Train station or shunting yard	24. Railway line	**25. Major road (4 lanes or more)**
26. Sewage treatment plant	27. Landfill or waste treatment site	28. Historical building	29. Graveyard	30. Archaeological site
31. Open cast mine	32. Underground mine	33.Spoil heap or slimes dam	**34. Small Holdings**	
Other land uses (describe):	35. Illegal dumping	**36. Lodge and venue**		

NOTE: Each block represents an area of 250m X250m



Note: More than one (1)Land-use may be 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

Geological Engineering Report (Appendix G1)
Floral, Faunal and Wetland Assessment (Appendix G2)

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.

The economical and social impact of the proposed development area is in line with the planning policies and principles. The developer realized the development potential of the site as it is ideally situated for distribution purposes as the N14, Malibongwe Drive and Lanseria International Airport is close by, resulting in easy access to the West Rand, western part of Johannesburg and Pretoria.

Mogale City area, where the application site is located, is characterised by light industrial and commercial townships. There are few vacant land parcels within this area which are suitable for development. These land parcels should be better utilised as the provision of municipal services becomes more viable with an increase in the industrial density through infill development.

This area has experienced a major boom, in the residential, commercial, retail and industrial sectors and during the past 5 to 10 years and is still developing despite the current economic climate. Current planning legislation and development plans for the area have

added value and secured the investment potential of the area for the period of 2008-2020 (MWFDF, 2008). Thereby, creating a need for erven zoned for industrial and commercial land use. This proposed development will have a positive impact on the economy of the municipality and surrounding area as it will contribute to property values in the area for business opportunities such as industrial developments. The property's location in terms of the upgraded Lanseria International Airport will improve industrial business opportunities in the surrounding area.

This development can be of economic importance to the surrounding community and the area as a whole. The proposed development will contribute by means of job opportunities during the operational phase; and construction phase for construction related workers (skilled, semi-skilled and un-skilled individuals).

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:

No sites, features or objects of cultural significance were identified in the study area during the survey. Based on what was found and the evaluation, it is recommended that any development can continue, on condition of acceptance of the following recommendations:

- If construction takes place and archaeological sites are

exposed, it should immediately be reported to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made.

Will any building or structure older than 60 years be affected in any way?	YES	**NO X**
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES	**NO X**

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

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT

The Environmental Assessment Practitioner must follow any relevant guidelines adopted by the competent authority in respect of public participation and must at least –

1(a) Fix a notice in a conspicuous place, on the property where it is intended to undertake the activity which states that an application will be submitted to the competent authority in terms of these regulations and which provides information on the proposed nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations on the application may be made.

1(b) inform landowners and occupiers of adjacent land of the applicant's intention to submit an application to the competent authority

1(c) inform landowners and occupiers of land within 100 metres of the boundary of the property where it is proposed to undertake the activity and whom may be directly affected by the proposed activity of the applicant's intention to submit an application to the competent authority;

1(d) inform the ward councillor and any organisation that represents the community in the area of the applicant's intention to submit an application to the competent authority;

1(e) inform the municipality which has jurisdiction over the area in which the proposed activity will be undertaken of the applicant's intention to submit an application to the competent authority; and

1(f) inform any organ of state that may have jurisdiction over any aspect of the activity of the applicant's intention to submit an application to the competent authority; and

1(g) place a notice in one local newspaper and any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of these regulations.

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 30 (thirty) calendar days before the submission of the application.

Has any comment been received from the local authority?

YES X	NO

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

The Draft Basic Assessment Report was submitted to Mogale City Local Municipality on 23 August 2013. Comments on the Draft Basic Assessment Report were received by Mogale City Local Municipality on 19 September 2013. Please refer to Appendix E for the Comments and Issues Register.

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

3. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the site or property, such as servitude holders and service providers, should be informed of the application at least 30 (thirty) 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):

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

The Draft Basic Assessment Report was submitted to the Department of Water Affairs (DWA) on 23 August 2013. No comments on the Draft Basic Assessment Report were received by the Department. Letters was sent to DWA to confirm the date when the review period ends. Review period was extended for DWA until 9 October 2013 and still no comments was submitted to our office. Please refer to Appendix E for the Comments and Issues Register and letters sent to DWA.

4. GENERAL PUBLIC PARTICIPATION REQUIREMENTS

The Environmental Assessment Practitioner must ensure that the public participation 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 inadequate.

The practitioner must record all comments and respond to each comment of the public / interested and affected party before the application 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 to those persons detailed in 1(b) to 1(f) above

Appendix 3 – Proof of newspaper advertisements

Appendix 4 –Communications to and from persons detailed in Point 2 and 3 above

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

Appendix 10 – Comments from I&APs on the application

Appendix 11 - Other

SECTION D: RESOURCE USE AND PROCESS DETAILS

Note: Section D is to be completed for the proposal

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 alterative 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. **1 (Proposal)** (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

If yes, what estimated quantity will be produced per month? Not Available

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

During the construction phase the disposal of solid waste will be the responsibility of the developer. An area on the application site will be earmarked for dumping of solid waste to be disposed of during construction. This area must be situated carefully not to be visual from the surrounding residents. The demarcated area must be easily accessible for dumping trucks to collect waste. The waste will be carted to registered landfill site.

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

All construction solid waste will be collected bins and skips and removed by a service provider. No solid waste will be dumped on surrounding open areas or adjacent properties.

Will the activity produce solid waste during its operational phase? **YES X** / NO

If yes, what estimated quantity will be produced per month? Not Available

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

The solid waste will be collected in bins on the application site and then be collected by the service provider or 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)?

The involved local authority will be responsible for the removal of the domestic waste generated.

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:

Frequent correspondence between the different contractors on the proposed development will ensure optimum reuse and recycling of materials where possible. Furthermore it is proposed that all waste construction materials be sorted into recyclable and non-recyclable materials. The recyclable materials should be re-used where ever possible or disposed off by a 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?	Not Applicable	
If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity(ies)?	Not Applicable	
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?	Not Applicable	

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

Not Applicable

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?	**18 200 ℓ**	
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**

Please note: A conservancy tank will be installed on site to temporarily handle the sanitation services. Mogale City Local Municipality plans a waste water treatment works at Lindley in approximately five years time which will then service the proposed development. The conservancy tank will be cleaned out more than twice a month and disposed of at Sunderland Ridge disposal site by a service provider.

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

Not Applicable

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?

Not Applicable

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. Only the additional vehicle traffic and exhaust fumes may have an influence, but is regarded as insignificant.

2. WATER USE

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

Municipal	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:

Not Applicable

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 and Forestry?

YES	NO
x	

If yes, list the permits required **Note: Although the answer is no, it was decided to supply some detail regarding the water use permit.**

In terms of the Section 21 of the National Water Act, the developer will need a water use license for the proposed development, as the proposed development intends to build an access road from the south of the site where the development will take place to the north and this will lead to a crossing over the wetland/stream.

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

No

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

Not Applicable

3. POWER SUPPLY

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

Eskom – It has been indicated that a 5000 kVA supply will be available for the proposed development.

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:

- Units could be orientated in a northern direction
- Where possible energy saving light bulbs must be used in all the industrial units as well as outside
- Time switches must be used for outdoor lighting
- Geysers must be fitted with insulation blankets
- Solar panels can be used to heat the water and geysers and for

outdoor lighting

The developer is committed to search and investigate more solutions and opportunities to increase the sustainability of this development making it a project that will be a landmark on many levels.

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

It will be encouraged that the buildings use solar power as alternative or additional energy source, even if this alternative source only supplies a fraction of the energy required.

Section D Alternative No. **Alternative 2** (complete only when appropriate for above)

5. WASTE, EFFLUENT, AND EMISSION MANAGEMENT

Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	**YES X**	NO
If yes, what estimated quantity will be produced per month?	Not available	

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

During the construction phase the disposal of solid waste will be the responsibility of the developer. An area on the application site will be earmarked for dumping of solid waste to be disposed of during construction. This area must be situated carefully not to be visual from the surrounding residents. The demarcated area must be easily accessible for dumping trucks to collect waste. The waste will be carted to a registered landfill site.

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

All construction solid waste will be collected bins and skips and removed by a service provider. No solid waste will be dumped on surrounding open areas or adjacent properties.

Will the activity produce solid waste during its operational phase?	**YES X**	NO
If yes, what estimated quantity will be produced per month?	Not Available	

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

During the operational phase the solid waste will be collected in bins on the application site.

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 X**	NO

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

The involved local authority will be responsible for the removal of the domestic waste generated. The disposal site will be Sunderland Ridge.

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:

Frequent correspondence between the different contractors on the proposed development will ensure optimum reuse and recycling of materials where possible. Furthermore it is proposed that all waste construction materials be sorted into recyclable and non-recyclable materials. The recyclable materials should be re-used where ever possible or disposed off by a 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?	Not Applicable	
If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity(ies)?	Not Applicable	
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?	Not Applicable	

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

Not Applicable

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:

No Measures will be taken to ensure water re-use or recycling

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?	182 000 ℓ	
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.

Not Applicable

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?

Not Applicable

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. Only the additional vehicle traffic, exhaust fumes may have an influence, but is regarded as insignificant.

6. WATER USE

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

Municipal	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:

Not Applicable

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 and Forestry?

YES	NO
x	

If yes, list the permits required **Note: Although the answer is no, it was decided to supply some detail regarding the water use permit.**

In terms of the Section 21 of the National Water Act, the developer will need a water use license for the proposed development, as the proposed development intends to build an access road from the south of the site where the development will take place to the north and this will lead to a crossing over the wetland/stream.

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

No

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

Not Applicable

7. POWER SUPPLY

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

Eskom – It has been indicated that a 5000 kVA supply will be available for the proposed development.

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

Not Applicable

8. 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:

- Units could be orientated in a northern direction
- Where possible energy saving light bulbs must be used in all the industrial units as well as outside
- Time switches must be used for outdoor lighting
- Geysers must be fitted with insulation blankets
- Solar panels can be used to heat the water and geysers and for outdoor lighting.

The developer is committed to search and investigate more solutions and opportunities to increase the sustainability of this development making it a project that will be a landmark on many levels.

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

It will be encouraged that the buildings use solar power as alternative or additional energy source, even if this alternative source only supplies a fraction of the energy required.

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2006, 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.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summarise the issues raised by interested and affected parties.

The public participation for the Nooitgedacht 543 JQ development was done in order to ensure that all Interested and Affected Parties register.

The proposed project was advertised in the Beeld newspaper on Friday, 31 May 2013 **(Refer to Appendix Ei – Proof of Newspaper advertisement).** Site notices were also erected at prominent points adjacent to the application site from 31 May 2013 until 5 August 2013. **(Refer to Appendix Eii – Proof of Site Notice).** Furthermore Flyers were also distributed to residents, land owners, tenants and stakeholders in the surrounding area **(Refer to Appendix Eiii – Written Notices).**

The Draft Basic Assessment Report had a review period of 40 days in which no comments by I&AP's were submitted to Bokamoso.

It is the opinion of Bokamoso that the Public participation was extensive and transparent enough to ensure any comments or issues in regards to the proposed development to be addressed and to suggest possible mitigation measures.

Summary of response from the practitioner to the issues raised by the interested and affected parties
(A full response must be provided in the Comments and Response Report that must be attached to this report):

The Draft Basic Assessment Report will be submitted simultaneously to the I&AP's for review. The period of 21 days allowed for review and comments by I&AP's is from 11 October 2013 until 31 October 2013. All comments on the Final Report should be sent directly to Mrs. Basani Ndindani (email: basani.ndindani@gauteng.gov.za) at GDARD as well as to Bokamoso.

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

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

The beneficial and adverse impacts of the proposed development have been discussed below.

The impacts are rated based on consideration of the following:

A). Significance:

❑	Improbable	-	Low possibility of impact to occur either

because of design or historic experience.

- ❑ Probable - Distinct possibility that impact will occur.
- ❑ Highly probability - Most likely that impact will occur.
- ❑ Definite - Impact will occur, in the case of adverse impacts regardless of any prevention measures.

B).Intensity factor:

- ❑ Low intensity - natural and manmade functions not affected
- ❑ Medium intensity - environment affected but natural and man made functions and processes continue
- ❑ 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

C). Duration:

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

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.

Alternative 1 (Proposal) –Industrial 1

Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**
CONSTRUCTION PHASE			
Beneficial Impacts			
Institutional Environment			
The proposed development will be in line with the current and proposed developments in the vicinity.	**High**	Not applicable	**High**
Fauna & Flora			
Eradication of invasive species.	**High**	Eradication of invasive species during the construction phase would benefit the biophysical environment. Not necessary to mitigate.	**High**
Social & Economic Environment			
Creation of job opportunities.	**Medium**	The proposed development would create job opportunities during the construction phase. Should the local community not benefit from these opportunities, it could lead to an influx of people from other areas. Only employing people from the local community could mitigate the potential adverse impact.	**Medium**
Reduction of areas that have potential for informal settlements and illegal dumping.	**High**	The proposed development will prevent informal settlements and illegal dumping on the proposed development areas.	**High**
Increase in the rates and taxes payable to the Mogale City Local Municipality.	**Medium**	More rates and taxes will be paid to the Mogale City Local Municipality.	**Medium**
Services			
Upgrading of existing services and the construction of new services.	**High**	The developer will be responsible for the upgrading of the access road to the requirements of the Council as two provincial roads will influence the access to the property.	**High**
Optimum utilization of services.	**High**	The proposed development can be provided with water service from the Local Municipality. It is proposed that within five years optimum usage will be enabled as it will then connect to the municipal services.	**High**
Adverse Impacts			

Flora & Fauna			
Construction works will cause the eradication of existing vegetation – Site clearance forms part of any project of this scale. Large areas of exposed soil will cause erosion and dust pollution. Due to the already extensive disturbance within the study area by human activity, large bare soil areas are visible and can create opportunity for extensive erosion on site.	**Low**	• The project should be planned to ensure that only specific areas are cleared as the project progress to ensure that large areas are not exposed over long periods; • Before the removal of vegetation takes place, the area to be cleared must be clearly marked. • Strip topsoil at start of works and store in stockpiles no more than 1.5 m high in designated storage areas. The topsoil should contain the natural grass component as the seeds may help with the re-vegetation of the site during rehabilitation. • As many of the large indigenous tree specimens must be retained on the application site during construction. The trees to be retained must be marked and may not be disturbed during the construction activities.	**None**
Uncontrolled fires may cause damage and loss to vegetation and fauna in the area.	**Low**	If fires are required for cooking and heating purposes, these fires will only be permitted in designated areas on site.	**None**
Possible spreading of invaders into the natural surrounding areas.	**Low**	No plants, not indigenous to the area, or exotic plant species should be introduced into the landscaping of the proposed development.	**None**
Geology & Soils			
Soil erosion due to drainage systems – During the construction phase temporary measures should be implemented to manage stormwater and water flow on the application site. If the stormwater and water flow is not regulated and managed on site it could cause significant erosion of soil, as well as the pollution and siltation of water bodies.	**Medium**	• Only the identified areas should be cleared of vegetation. This should be done in stages as construction works progress; • Implement temporary stormwater management measures that will help to reduce the speed of the water. This measures must also assist with the prevention of water pollution, erosion and siltation; • If excavations or foundations fill up with stormwater, these	**None**

		areas should immediately be drained and measures to prevent further water from entering the excavations should be implemented. • Biodegradable matting, geo-textiles and other means of erosion control should be implemented during the construction phase on large exposed areas and where stormwater are temporarily channelled; • Any stormwater outfalls should be designed and measures should be implemented to prevent erosion and water pollution at these points. Areas around buildings, where gutters and outlets are implemented should be paved; • The services which will be installed in the area, should be designed to run in the same direction as the existing services to make installation and maintenance easy; • Trees may not be planted any closer to services than 1.5 times their mature height;	
If not planned and managed correctly topsoil will be lost.	**Medium**	• A shake down area at the exits of the construction site should be established where the excessive soil on the tires of the construction vehicles can be brushed off and kept aside for later use during rehabilitation works; • The layout of the construction site should be planned before any construction site should be planned before any construction activities take place. The areas where soil will be compacted by construction activities, heavy vehicle movement, site camp, material storage areas and stockpiling areas should be marked out and the topsoil should be removed.	**Low**

		• The areas where topsoil will not be removed and which will be conserved during the construction phase should be marked with barrier tape to ensure that vehicles do not move across these areas, and construction activities does not damage the in-situ topsoil • The removed topsoil should be stored separately from all stockpiled materials and subsoil, according to the stockpiling methods as described below. The stockpiled topsoil should be used for rehabilitation and landscaping purposes after construction has been completed; • 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.	
Excavations are not kept dry.	**Medium**	Construction works and bulk earth works which involve the construction of excavations must be proposed for the dryer season.	**Low**
Incorrect construction could increase the possibility of doline and sinkhole formation due to the collapsible and compressible conditions of the area.	**Medium**	Due to the collapsible and compressible conditions it is important that the following be adhered to: • Surface water should be routed away from buildings. Damming and	**None**

		ponding of water should be prevented; • The standard precautionary measures for developing on dolomite should be adhered to. The wet services engineer must ensure that very strict precautionary measures and design and construction practices are implemented during any construction and/ or earth works on site; • The recommended foundation design should also be adhered to as indicated within the dolomite stability investigation. • Buildings and structures should adhere to the NHBRC standards and norms; • Threes should not be planted in close proximity to water bearing services. This will prevent the roots to penetrate the wet services which could cause water leakage; • All wet services should be regular inspected to prevent leaking pipes.	
Climate			
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 especially activities such as the installation of services, foundations, excavations and road construction; • 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	**None**

		stormwater away from open excavations and foundations.	
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 environment. When necessary, these working areas should be damped down at least twice a day.	**None**
Hydrology & groundwater			
The use of insufficient drainage systems.	**Medium**	A stormwater management plan should be designed by an engineer to ensure sufficient drainage on site as sub-surface drainage should be avoided as far as possible due to collapsible and compressible soils.	**None**
Excavated materials that are stockpiled in wrong areas can interfere with the natural drainage.	**Medium**	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**
Cultural and Archaeology			
Occurrence of cultural historical assets on the proposed development site.	**Medium**	If archaeological sites are exposed during construction work, it should immediately be reported to a museum, preferably on at which an archaeologist are available so that an investigation and evaluation of the site can be made.	**None**
Localized Vibration			
The noise created by earthmoving machinery will result in the greatest increase in ambient levels. This will be short term, being generated only during the day.	**Medium**	All construction activities must be restricted during normal working hours from 8:00 in the morning to no later than 18:00 in the afternoon and Saturdays from 08:00 until 13:00. No construction may take place on Sundays and public holidays.	**Low**
Air pollution			
Nuisance to neighbours in terms of dust generation due to construction during the dry and windy season.	**Medium**	The application site must be damped at a regular basis with water (more or less 3 to 4 times on a dry day). A water tanker	**Low**

		should be used if possible.	
Roads and Traffic			
Heavy vehicle traffic increase could disrupt the surrounding landowners' daily routines.	**Medium**	Heavy vehicles must be instructed to only use the main roads during off-peak hours.	**Low**
Restrictions of access to surrounding properties and the study area during construction phases.	**Medium**	• To minimize the impacts or risks, heavy construction vehicles 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 construction 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**
Damage to roads.	**Medium**	Specific roads must be allocated for the use by construction vehicles.	**Low**
Safety and Security			
During the construction phase safety and security problems (especially for the surrounding residents) are likely to occur.	**Medium**	Construction must be completed in as short time as possible. No construction worker or relative may reside on the application site during the construction phase. All construction workers must leave the site at the end of a days work. A security guard should be appointed on site to prevent any security problems.	**Low**
Any proposed development offers the potential for unplanned informal settlement (squatting) before construction commences or after construction.	**Medium**	No construction worker, friend or relative may settle/ reside on site. Only security may be present on site after construction hours.	**Low**
Construction activities could cause danger to children and animals of the surrounding residents.	**Low**	• Although regarded as a normal practice, it is important to erect proper signs indicating the operation of heavy vehicles in the vicinity of dangerous crossings and access roads or erven with in the development site, if necessary;	**None**

		• It is also important to indicate all areas where excavations took place/ are taking place and warning signs that clearly indicate areas with excavations must be placed immediately adjacent to excavations; • A barrier should be established around dangerous excavation areas; • With the exception of appointed security personnel, no other worker, friend or relatives will be allowed to sleep on the construction site (weekends included), in the public open space or on adjacent properties; and • No worker should be allowed to enter adjacent private properties without written consent of the legal owners to the contractor.	
Visual Impact			
Dumping of builder's rubble on neighbouring properties.	**Medium**	A specific location for building rubble must be allocated on site, to concentrate and collect the building rubble and cart it to a certified landfill site. The allocated area must be out of sight of neighbouring properties to have a less visual impact.	**Low**
Stockpile areas for construction materials.	**Medium**	An area on the site must be allocated for the stockpile of construction materials. The area must be situated on the application site, and must be situated to have a minimal visual impact on the neighbouring area.	**Low**
Veld fires may cause damage to infrastructure, vegetation and neighbouring properties.	**Low**	A specific area on site must be allocated, which will have the least impact on the environment on the environment and surrounding landowners, for fires of construction workers. This allocated area must be far from any structures and no fires may be lit except in the designated location.	**Low**
The construction vehicles, the site camp and other construction related facilities	**Medium**	Before any construction commence on site, an area on site must be demarcated for a	**Low**

will have a negative visual impact during the construction phase.		site camp.	
Waste Management			
Site office, camp and associated waste (visual, air and soil pollution)	**Medium**	• Temporary waste storage points on site shall be determined. These storage points shall be accessible by waste removal trucks; • These points should not be located in areas highly visible from the properties of the surrounding landowners/ tenants/ in areas where the wind direction will carry bad odours across the properties of adjacent tenants or landowners; • The site camp and the rest of the study area should appear neat at all times; • Waste materials should be removed from the site on a regular basis, to a registered dumping site; and • 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.	**Low**
Disposal of building waste & liquids	**Medium**	• All the waste generated by the proposed developments must be dumped at a preselected area on site to be carted to a registered landfill site; • THESE AREAS SHALL BE PREDETERMINED AND LOCATED IN AREAS THAT ARE ALREADY DISTURBED; • Small lightweight waste items should be contained in skips with lids to prevent wind littering; • All waste must be removed to a recognized waste disposal site/ landfill site on a weekly basis. No waste materials may be disposed of on or adjacent to the site; • The storage of solid waste on site, until such time that it may be disposed of, must be in the manner acceptable	**Low**

		to the local authority; and • Keep records of waste reuse, recycling and disposal for future reference.	
OPERATIONAL PHASE			
Beneficial Impacts			
Social & Economic Environment			
Creation of temporary and permanent jobs.	**Medium**	During the operational phase numerous permanent jobs will be created on various levels.	**Medium**
Increasing security in the area.	**High**	In the long term the proposed development will improve the security of the area. The monitored access points will improve the security of the proposed site and surrounding areas.	**High**
Higher quality of livelihoods.	**High**	The community's quality of life will increase and more people will be economically active.	**High**
Reduction of areas that have potential for informal settlements and illegal dumping.	**High**	The proposed development will prevent informal settlements and illegal dumping on the proposed development area.	**High**
Increase in rates and taxes payable to the Mogale City Local Municipality.	**Medium**	More rates and taxes will be paid to the Mogale City Local Municipality.	**Medium**
Increase in surrounding property values for industrial uses.	**High**	If planned and managed correctly, the proposed development could have a positive impact on property values. Due to the proposed theme, the development will generally be in line with the surrounding land uses.	**High**
Visibility and accessibility of study area.	**High**	The visibility and accessibility of the study area contributes to the study area's ideal suitability for the proposed land use.	**High**
Adverse Impacts			
Hydrology			
An increase in surface water runoff to stormwater management systems (because of an increase of hard-surfaces such as roots and paved areas), may have an impact on surface quality and quantities.	**Low**	• Stormwater through the site should be managed to accommodate the higher quantities of runoff, • Sheet flow should be encouraged as far as possible, and channels should be designed sufficiently to address the problem or erosion, and • Bio-swale system could be implemented to filter water from paved areas and especially form roads and parking areas to sufficiently	**Low**

		clean water of heavy metals and other hazardous materials contained in stormwater in a natural manner. This will further provide an opportunity for water to infiltrate the soil, break the energy of stormwater and keep the water on site for longer.	
Leaking pipes could cause ground water pollution risks.	**Low**	Pipes should be inspected on a regular basis. This is very important as any subsurface water drainage or leakages may be detrimental for the stability of the geology and soils. If any leakages occur it should be fixed immediately. If a large number of water was leaked into the soil, a geological engineer should be consulted to determine the extent and the need of any further actions.	**None**
Light pollution			
Light pollution The proposed development could cause a significant level of light pollution as the light industrial development will need some security lighting.	**Low**	Lighting within the proposed development, including security lighting, could easily glare into surrounding buildings if not designed appropriately. It is recommended that all the lighting on site be designed to point downwards and designed in such a way to not cause glare dispersal or unnecessary flickering.	**None**
Pollution			
The generation of Air pollution -	**Low**	The proposed development is located within an area that is characterized by industrial, commercial and residential developments. It is therefore that one can consider the fact that the study area is surrounded by activities that will contribute to regional air pollution. One however, has to note that on a local scale, the proposed development does not include noxious industries, and therefore specifically would not contribute to any air pollution. As mentioned previously the exhaust fumes of additional vehicles may have an influence, but in this particular instance it is deemed as insignificant, and therefore on	**Low**

		a local scale would not have any affect.	
The generation of noise pollution – Additional traffic generated by the proposed development will have some impact on the ambient noise levels within the area.	**Low**	As mentioned previously, one has to note that the study area is wedged between many Provincial and National Roads which already generate ambient noise levels that exceed the acceptable levels for urban and residential areas. It is therefore, when one consider the above mentioned, that ambient noise levels generated by this particular development would not be that significant, as the proposed development, is located within an area that already exceed the acceptable noise levels.	**Low**
Roads & Traffic			
Additional vehicle traffic could have a detrimental impact on the existing roads with in the vicinity of proposed development.	**Medium**	If required, the road network which surrounds the proposed development will have to be correctly maintained/ upgraded in order to support additional traffic generated.	**Low**
Visual Impact			
The proposed development will have some visual impact on the surrounding areas.	**Medium**	• Due to the development control measures and the fact that industrial uses will be developed, it is anticipated that the proposed development will have a visual impact on the surrounding environment; • It is important that the roofs of all the buildings within the proposed development should not reflect any sunlight; • The colour scheme for the buildings should be taken from the palette of colours in the natural surroundings; • Existing trees, if any should be retained as far possible on the site, in order to soften the visual impact of the buildings associated with the development, and to bring the scale of the large buildings in scale with the surrounding environment; • It is also proposed that as many additional indigenous trees be planted in areas that were previously	**Low**

		disturbed, in order to soften the harsh visual impact of the proposed development. The planting of additional trees will help to develop a certain character for the site which will fit in with the surrounding environment.	
Impact on the sense of place.	**Low**	If not managed correctly, the proposed light industrial development will have a negative impact on the sense of place of the surrounding environment, due to the height of the buildings that will form part of the proposed development. In order to "Promote the Sense of Place" of the surrounding area, the colour scheme of the buildings which will form part of the proposed development, should be taken from a palette of colours in the natural surroundings. It is also important that a landscape development plan should be developed and implement for the study area, prior to the operational phase. Landscaped areas which will form part of the proposed development will in essence soften the harsh architectural lines and elements which are associated with the proposed development. Landscaped areas within the proposed development will also bring the scale of the buildings in relation to the surrounding environment.	**None**

Alternative 2 – High Density Residential

Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**
CONSTRUCTION PHASE			
Beneficial Impacts			
Fauna & Flora			
Eradication of invasive species and extensive weed	**High**	Eradication of invasive species and weeds during the	**High**

growth.		construction phase would benefit the biophysical environment. Not necessary to mitigate.	
Social & Economic Environment			
Creation of Job opportunities.	**High**	The proposed development would create job opportunities during the construction phase. Should the local community not benefit from these opportunities, it could lead to an influx of people from other areas including International Tourism. By focusing on the employment of people from the local community could mitigate the potential adverse impact.	**High**
Development of a vacant piece of land with no economical turnover.	**High**	Currently the proposed application site is vacant which could lead to security problems and other social related problems.	**High**
OPERATIONAL PHASE			
Beneficial Impacts			
Geology & Soils			
The permanent prevention of siltation and erosion would benefit the biophysical environment.	**High**	In order to prevent erosion, siltation and water pollution the following must be done: • The involved engineer should compile a stormwater management plan; • Mitigation measures to prevent erosion, siltation and water pollution at the stormwater discharge points should be provided by the involved stormwater engineer; • The stormwater management plan should be designed inherent to the following principles: o Retain inherent drainage systems in natural areas; o Simulate natural run-off and convergence of stormwater; o Minimize unnatural drainage diversions; o Promote sheet flow of stormwater run-off on open areas; o Conserve the in situ soil	**High**

		mantle as far as possible by ensuring that accelerated erosion caused by human activities are addressed and attended to; o Make use of energy dissipation solutions to stormwater systems where necessary; and o Protect and line open stormwater drainage channels, as an aid and secondary assistance to stormwater management. • The stormwater management plan should be designed and implemented in a way that aims to ensure that post development runoff does not exceed predevelopment values in: o Peak discharge for any given storm; o Total volume of runoff for any given storm; o Frequency of runoff; and o Pollutant and debris concentrations reaching water courses. • Construction works must be kept to a minimum on site and only be done one section at a time to prevent excessive open soil areas that could lead to soil erosion, siltation and excessive compaction.	
Hydrology			
Purification of surface drainage water.	**Medium**	The layout allows for a surface drainage system that will assist with the purification of surface water and will help to break the speed of the water. A stormwater management plan will be approved by the Local Authority and DWA (Department of Water Affairs) should be implemented.	**Medium**
Fauna & Flora			
Ex-Situ enhancement and ongoing eradication of invasive species.	**High**	The weeds and exotic invaders on the study area will be removed and after	**High**

		construction, the disturbed areas will be rehabilitated and re-vegetated. It is recommended that only indigenous/endemic species be used on site. Weeds and exotic invaders should be removed on an on-going basis also in the operational phase of the project.	
Social & Economic Environment			
Creation of temporary and permanent jobs.	**High**	During the operational phase numerous permanent jobs will be created on various levels.	**High**
Increasing security in the area.	**High**	In the long term the proposed development will improve the security of the area. The monitored access points will improve the security of the proposed site and surrounding areas. The development will also ensure that the current vacant land not become a security threat with illegal squatters, vendors etc.	**High**
Higher quality of livelihoods.	**High**	The community's quality of life will increase and more people will be economically active.	**High**
Reduction of areas that have potential for informal settlements and illegal dumping.	**High**	The proposed development will prevent informal settlements and illegal dumping on the proposed development area.	**High**
Increase in rates and taxes payable to the Mogale City Local Municipality.	**High**	More rates and taxes will be paid to the Mogale City Local Municipality.	**High**
Services			
Stormwater drainage and sewage system construction.	**High**	The quality of the ground water must be monitored on a yearly basis and the results be supplied to the health division of the involved local authority.	**High**
Upgrading of existing roads	**High**	The developer will be responsible for the upgrading of the access road to the requirements of the Council as two provincial roads will influence the access to the property.	**High**
Optimal use of existing service infrastructure.	**High**	The proposed development can be provided with water service from the Local Municipality. It is proposed that within five years optimum usage will be enabled as it will then connect to the municipal	**High**

		services.	

Potential impacts:	**Significance rating of impacts:**	Proposed mitigation:	**Significance rating of impacts after mitigation:**
CONSTRUCTION PHASE			
Adverse Impacts			
Geology and Soils			
Soil erosion, siltation and gully formation.	**Medium**	In order to prevent erosion, siltation and water pollution the following must be done: • The involved engineer should compile a stormwater management plan; • Mitigation measures to prevent erosion, siltation and water pollution at the stormwater discharge points should be provided by the involved stormwater engineer; • The stormwater management plan should be designed inherent to the following principles: o Retain inherent drainage systems in natural areas; o Simulate natural run-off and convergence of stormwater; o Minimize unnatural drainage diversions; o Promote sheet flow of stormwater run-off on open areas; o Conserve the in situ soil mantle as far as possible by ensuring that accelerated erosion caused by human activities are addressed and attended to; o Make use of energy dissipation solutions to stormwater systems where necessary; and o Protect and line open stormwater drainage channels, as an aid and secondary assistance to stormwater management.	**Low**

		• The stormwater management plan should be designed and implemented in a way that aims to ensure that post development runoff does not exceed predevelopment values in: o Peak discharge for any given storm; o Total volume of runoff for any given storm; o Frequency of runoff; and o Pollutant and debris concentrations reaching water courses. • Construction works must be kept to a minimum on site and only be done one section at a time to prevent excessive open soil areas that could lead to soil erosion, siltation and excessive compaction.	
If not planned and managed correctly, topsoil will be lost.	Medium	• A shake down area at the exit of the construction site should be established where the excessive soil on the tires of construction vehicles can be brushed off and kept aside for later use during rehabilitation works; • The construction site should be planned before any construction activities take place on site. The areas where soil will be compacted by construction activities, heavy vehicle movement (on site construction routes), site camp, material storage areas and stockpiling areas should be marked out and the topsoil should be removed; • The areas where topsoil will not be removed and that will be conserved during the construction phase should be marked with barrier tape to ensure vehicles do not move	Low

		across these areas and construction activities do not damage the in situ topsoil; • The removed topsoil should be stored separately from all stockpiled materials and subsoil, according to the stockpiling methods as described below. The stockpiled topsoil should be used for rehabilitation and landscaping purposes after construction has been completed; • 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 these should be filled up with the insitu material as the services are installed. All stones and rocks bigger than 80mm should be removed from the top layer of soil and these disturbed areas should be re-vegetated immediately after works in a specific area has been completed; • Rehabilitation works must be done immediately after the involved works in an area is completed to prevent erosion; and • Excavations on site must be kept to a minimum and done only one section at a time. Excavated soils must be stockpiled directly on the demarcated area on site.	
Heavy buildings are erected without detailed Geotechnical investigations.	**Medium**	A detailed geotechnical investigation must be conducted before any heavy buildings are constructed and all recommendations within the report must be adhered to.	**None**
Incorrect construction could increase the possibility of	**Medium**	Due to the collapsible and compressible conditions it is	**None**

doline and sinkhole formation due to the collapsible and compressible conditions in the area.		important that the following be adhered to: ▪ Surface water should be routed away from buildings and soils should be kept dry around buildings. Damming or ponding of water should be prevented, ▪ No irrigation system should be implemented as part of the Formal Landscaping, as this could increase the risk of doline and sinkhole formation. ▪ All dolomite prevention measures should be adhered to as indicated within the Dolomite Stability Report. ▪ Buildings and structures should adhere to the NHBRC standards and norms. ▪ All wet services should be regularly inspected to prevent leaking pipes. ▪ Trees should not be situated in close proximity of any wet services. This will prevent the roots to penetrate the wet service lines and cause water leakage.	
Excavations are not kept dry.	**Medium**	The excavations and construction be proposed for the drier seasons to prevent compaction and delays in construction.	**Low**
Water seepage at shallow depth could cause instability of soil or water pollution.	**Medium**	The involved geotechnical engineer and civil engineer must supply mitigation measures and construction guidelines to prevent problems.	**Low**
Possible slope failure if steep cut faces are considered.	**Medium**	The involved geotechnical engineer and civil engineer must supply mitigation measures and construction guidelines to prevent problems. These mitigation measures and guidelines should also refer to applicable safety legislation and policies.	**None**
Hydrology & Groundwater			
The use of insufficient drainage systems.	**Medium**	The stormwater and drainage systems must be designed by an engineer to ensure sufficient drainage on site.	**None**

Vehicle maintenance.	**Medium**	Vehicle maintenance may not be done on the application site. Whenever a vehicle needs maintenance it must be taken to a certified workshop for the maintenance.	**None**
Excavated materials that are stockpiled in the wrong areas can interfere with the natural drainage.	**Medium**	An area must be allocated for stockpiling of topsoil before any construction take place on the application site and must be situated from any water source or drainage channels. A sediment fence or barrier must be constructed around the stockpile to prevent soil from washing away by rain or any water.	**Low**
Surface water flows will be altered during the construction phase.	**Medium**	Due to the excavations that will take place (there will be trenches, topsoil and subsoil mounds in and around the study area), the topography of the study area will temporarily be altered. However, this will only be a short-term impact and if the levels are resorted to normal, the surface drainage patterns from the new levels should not differ too much from the surface water drainage of the original levels.	**Low**
The possibility of ground water pollution.	**Medium**	• Develop a central waste temporary holding site to be used during construction (near the access entrance). This site should comply with the following: o Skips for the containment and disposal of all waste that could cause soil and water pollution, i.e. paint, lubricants, etc.; o THESE AREAS SHALL BE PREDETERMINED AND LOCATED IN AREAS THAT ARE ALREADY DISTURBED; o Workers will only be allowed to use temporary chemical toilets on the site; o No french drain systems may be installed on site at any time; o No bins containing organic solvents such as	**Low**

		paints and thinners shall be cleaned on site, unless containers for liquid waste disposal are placed for this purpose on site; • No leaking vehicle shall be allowed on site. Before entering the study area, all vehicles and equipment shall be inspected for leaks by a qualified mechanic/other suitably qualified person and the environmental officer. The mechanic/ the mechanic of the appointed contractor must supply the environmental officer with a letter of confirmation that the vehicles and equipment are leak proof; and • If maintenance on site is absolutely necessary, it should be conducted on a concrete surface in the site camp. Spilled oil should be cleaned up and disposed off appropriately (not dumped on site). This area may not be washed with soaps and dissolvent and allowed to enter the drainage system.	
Climate			
Construction during the rainy season can cause unnecessary delays and damage to the environment.	**Medium**	Should the construction phase be scheduled for the wetter months, frequent rain could cause very wet conditions, which makes it extremely difficult to do excavations and to do the necessary rehabilitation works of disturbed areas. Wet soils are also more vulnerable to compaction. Wet conditions often cause delays to construction projects and the draining of water away from the construction works (in the case of high water tables) into the water bodies of the adjacent properties, could (if	**Low**

		not planned and managed correctly) have an impact on the water quality of these water bodies.	
Construction during the dry and windy season.	**Low**	The application site must be damped at a regular basis with sprinkling of water (more or less 3 to 4 times on a dry day). A water tanker should be used if possible.	**None**
Fauna & Flora			
The clearing of the site and the construction of the development will result in the eradication of the existing vegetation.	**Low**	The proposed development area is already disturbed and dominated by weeds.	**None**
Due to the fact that some services (temporary/ permanent) will have to be installed the excavations for the proposed services will cause some areas to be exposed due to the loss of some of the existing vegetation coverage.	**Medium**	Areas where services are installed must be levelled, re-vegetated and rehabilitated as soon as possible to prevent any soil loss.	**Low**
Uncontrolled veld fires may cause damage or loss to vegetation and fauna in the area.	**Medium**	If fires are required for cooking and heating purposes, these fires will only be permitted in designated areas on the site. The fire area should be an exposed area (no natural veld grass should be in close proximity of the fire area). Construction workers should only be allowed to smoke in the fire area and fires should preferably be prevented while strong winds are blowing.	**None**
Uncontrolled activities and access to sensitive areas in the vicinity.	**Medium**	• Dumping of building rubble and other waste on surrounding properties, vacant land or Open Space systems is strictly prohibited; and • No vehicles must be allowed to move in or across the sensitive areas within the surrounding area. This leaves visible scars and destroys habitat.	**Low**
Snaring and hunting of fauna species during the construction phase and the	**Medium**	• Strict measures to prevent the hunting/snaring/scaring of	**Low**

destruction of habitats can have a detrimental effect on some species.		fauna species should be implemented; • The gathering of wood should not be allowed on site or on any adjacent properties; • Any person that is caught hunting, snaring or damaging existing vegetation or fauna (earmarked to be retained) should be fined. The responsible contractor will also be fined and will have to replace the fauna or flora species as specified by the ECO at the time; • The involved authorities should be informed of the activity, the fine and the replacement specifications; • Caught animals should be relocated to conservation areas in the vicinity; • During the construction phase, noise should be kept to a minimum to reduce the impact of the development on the fauna and the development should be done in phases to allow faunal species to temporarily migrate; and • Where possible, work should be restricted to one area at a time. This will give the smaller fauna species a chance to weather the disturbance in an undisturbed zone close to their natural territories.	
Possible spreading of invaders into the surrounding natural areas.	**Medium**	No plants, not indigenous to the area, or exotic plant species, especially lawn grasses and other ground-covering plants should be introduced in the landscaping of the proposed development.	**Low**

Less area will be available to retain existing and plant more indigenous, endemic vegetation to attract wildlife to the gardens of the development.	**Low**	Retain as much existing indigenous, endemic vegetation as possible on site and plant new indigenous, endemic trees and vegetation.	**Low**
Cultural/Archaeology			
Occurrence of cultural historical assets on the proposed site.	**Low**	The proposed development site has no significant heritage resources. However, if archaeological sites are exposed during construction work, it should immediately be reported to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made.	**None**
Localised Vibration			
The noise created by earthmoving machinery will result in the greatest increase in ambient levels. This will be short term, being generated only during the day.	**Medium**	All construction activities must be restricted during normal working hours from 8:00 in the morning to no later than 18:00 in the afternoon and Saturdays from 08:00 until 13:00. No construction may take place on Sundays and public holidays.	**Low**
Air Pollution			
Nuisance to neighbours in terms of dust generation due to construction during the dry and windy season.	**Medium**	The application site must be damped at a regular basis with sprinkling of water (more or less 3 to 4 times on a dry day). A water tanker should be used if possible.	**Low**
Roads & Traffic			
Heavy vehicle traffic increase could disrupt the surrounding landowners' daily routines.	**Medium**	Heavy vehicles must be instructed to only use the main roads during off-peak hours.	**Low**
Restrictions of access to surrounding properties and the study area during construction phases.	**Medium**	• To minimize this impacts or risks, heavy construction vehicles 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 construction vehicles	**Low**

		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.	
Damage to roads	**Medium**	Specific roads must be allocated for the use by construction vehicles and photos must be taken prior to construction in order to determine if any damage has been done.	**Low**
Safety & Security			
During the construction phase safety and security problems (especially for the surrounding residents) are likely to occur.	**Medium**	Construction must be completed in as short a time as possible. No construction worker or relative may reside on the application site during the construction phase. All construction workers must leave the site at the end of a days work. A security guard should be appointed on site to prevent any security problems.	**Low**
Any proposed development offers the potential for unplanned informal settlement (squatting) before construction commences or after construction. In addition, the likelihood of informal vending settlements and prostitution establishing is real in the presence of the construction force.	**Medium**	No construction worker, friend or relative may settle/reside on site. Only security may be present on site after construction hours.	**None**
Construction activities could cause danger to children and animals of the surrounding residents.	**Medium**	• Although regarded as a normal practice, it is important to erect proper signs indicating the operations of heavy vehicles in the vicinity of dangerous crossings and access roads or even on the development site if necessary; • It is also important to indicate all areas where excavations took place/are taking place and warning signs that clearly indicate areas with excavations must be	**Low**

		placed immediately adjacent to excavations; • A barrier should be established around dangerous excavation areas; • With the exception of the appointed security personnel, no other workers, friend or relatives will be allowed to sleep on the construction site (weekends included), in the public open space or on adjacent properties; and • No workers should be allowed to enter adjacent private properties without written consent of the legal owners to the contractor.	
Visual Impact			
Dumping of builder's rubble on neighbouring properties.	**Medium**	A specific location for building rubble must be allocated on site, to concentrate and collect the building rubble and cart it to a certified landfill site. The allocated area must be out of sight of neighbouring properties to have a less visual impact.	**Low**
Stockpile areas for construction materials.	**Medium**	An area on the site must be allocated for the stockpile of construction materials. The area must be situated on the application site, and must be situated to have a minimal visual impact on the neighbouring area.	**Low**
Veld fires may cause damage to infrastructure, vegetation and neighbouring properties.	**Medium**	A specific area on site must be allocated, which will have the least impact on the environment and surrounding landowners, for fires of construction workers. This allocated area must be far from any structures and no fires may be lit except in the designated location.	**None**
The construction vehicles, the site camp and other construction related facilities will have a negative visual impact during the construction phase.	**Medium**	Before any construction commence on site, an area on site must be demarcated for a site camp.	**Low**

Waste Management			
Site office, camp and associated waste (visual, air and soil pollution)	**Medium**	• Temporary waste storage points on site shall be determined. These storage points shall be accessible by waste removal trucks; • These points should not be located in areas highly visible from the properties of the surrounding land-owners/tenants/in areas where the wind direction will carry bad odours across the properties of adjacent tenants or landowners; • The site camp and the rest of the study area should appear neat at all times; • Waste materials should be removed from the site on a regular basis, to a registered dumping site; and • The site camp should not be located in a highly visual area on the study area, or a screen or barrier should be erected to minimize the negative impact on the sense of place.	**Low**
Disposal of building waste & liquids.	**Medium**	• All waste generated by the development must be dumped at a pre-selected area on site to be carted to a registered landfill site. THESE AREAS SHALL BE PREDETERMINED AND LOCATED IN AREAS THAT ARE ALREADY DISTURBED; • Small lightweight waste items should be contained in skips with lids to prevent wind littering; • All waste must be removed to a recognized waste disposal site on a weekly basis. No waste materials may be disposed of on or adjacent to the site; • The storage of solid waste on site, until such time that	**Low**

		it may be disposed of, must be in the manner acceptable to the Local Authority; and • Keep records of waste reuse, recycling and disposal for future reference.	
OPERATIONAL PHASE			
Adverse Impacts			
Hydrology			
An increase in surface water runoff to stormwater management systems (because of an increase of hard surfaces such as roofs and paved areas), may have an impact on surface and groundwater quality and quantities.	**Medium**	• Stormwater throughout the site should be managed to accommodate the higher quantities of runoff; • Sheet flow should be encouraged as far as possible, and channels should be designed sufficiently to address the problem of erosion; and • Bio-swale system could be implemented to filter water from paved areas and especially from roads and parking areas to sufficiently clean water of heavy metals and other hazardous materials in stormwater in a natural manner. This will further provide an opportunity for water to infiltrate the soil, break the energy of stormwater and keep the water on site for longer. • Permeable paving should also be used if possible.	**Low**
Leaking pipes could cause ground water pollution risks.	**Medium**	• Pipes should be inspected on a regular basis; and • Ground water must be monitored once every six months a sample should be taken and tested.	**Low**
Fauna & Flora			
If kikuyu lawns are not controlled it may spread into the natural areas.	**Medium**	Kikuyu lawns on site should be eradicated and the use of kikuyu lawns in the landscaping of the new development should be restricted and not be allowed to spread into the surrounding area, by constructing a brick kerb or edging of at least 250mm deep. Kerbing can be	**None**

		used between Kikuyu and natural areas.	
Loss of agricultural land.	**Low**	The agricultural potential of the study area is very low and the impact will, therefore, not be significant. The study area is also too small to farm economically.	**None**
Loss of habitat.	**Low**	Some habitat will be lost as a result of the proposed development. However, due to increasing development pressure and the security threat it will not be sensible/ viable to leave the proposed development site vacant/undeveloped.	**None**
Geotechnical			
Incorrect construction could increase the possibility of doline and sinkhole formation due to the collapsible and compressible conditions in the area.	**High**	Due to the collapsible and compressible conditions it is important that the following be adhered to: ▪ Surface water should be routed away from buildings and soils should be kept dry around buildings. Damming or ponding of water should be prevented, ▪ No irrigation system should be implemented as part of the Formal Landscaping, as this could increase the risk of doline and sinkhole formation. ▪ All wet services should be regularly inspected to prevent leaking pipes. ▪ Trees should not be situated in close proximity of any wet services. This will prevent the roots to penetrate the wet service lines and cause water leakage.	**None**
Visual Impact			
The proposed development will have some visual impact on the surrounding areas.	**Medium**	• The proposed development will be seen from a distance and, therefore, the roofs should not reflect the sun or be covered with roofing materials that have bright colours; • The colour scheme should be taken from the palette of colours in the natural surroundings;	**Low**

		• It is proposed that as many additional indigenous (preferably endemic) trees are planted in the early stages of the development to ensure a quick and established feeling; trees should be used in the landscaping around the structures to soften the hard structures.	
Impact on the Sense of Place.	**Medium**	Due to the surrounding area being more prominent for industrial developments and warehouses a residential development will have a negative impact on the sense of place. Further should the buildings be constructed that all the main views be directed to away from the surrounding industrial developments and informal settlements. This will assist with privacy of the residents. The building should also be constructed to fit in with the surrounding area and materials. This will allow the building to be more easily accepted visually.	**Low**
Light Pollution			
Light pollution during the night, caused by unsympathetic lighting design.	**Low**	Lights that direct light beams downwards with low glaring qualities should be used for landscaping and streetlights. The lights should not be directed to glare in ongoing traffic or into the properties of surrounding residents.	**None**
Safety and Security			
Safety risk to a residential development due to crime levels in the area.	**High**	The proposed development area is surrounded by industrial developments and informal settlements. Strict security measures should be implemented for the residential area as it is close to informal settlements and away from other residential developments.	**Low**
Roads & Traffic			
Impact of additional vehicle traffic on already busy roads due to traffic associated with development.	**Medium**	The development for residential uses will increase the amount of traffic in an extensive way in the	**Low**

		surrounding area. Roads will need to be upgraded to support the anticipated amount of traffic. If this alternative is followed a traffic engineer will need to be appointed.	

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

Geological Engineering Report (Appendix G1)
Floral, Faunal and Wetland Assessment (Appendix G2)

3. IMPACTS THAT MAY RESULT FROM THE DECOMISSIONING 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.

Alternative 1 (Proposal) –Industrial

Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**
Geology & Soils			
Soil erosion, siltation and gully formation.	**Medium**	Demolition works must be kept to a minimum on site and only be done one section at a time to prevent excessive open soil areas that could lead to soil erosion, siltation and excessive compaction.	**Low**
If not planned and managed correctly, topsoil will be lost.	**Medium**	• A shake down area at the exit of the site should be established where the excessive soil on the tires of vehicles can be brushed off and kept aside for later use during rehabilitation works; • The site should be planned before any decommissioning activities take place on site. The areas where soil will be compacted, heavy vehicle movement	**Low**

		(on site construction routes), site camp, material storage areas and stockpiling areas should be marked out and the topsoil should be removed; • The areas where topsoil will not be removed and that will be conserved should be marked with barrier tape to ensure vehicles do not move across these areas and decommissioning activities do not damage the in situ topsoil; • The removed topsoil should be stored separately from all stockpiled materials and subsoil, according to the stockpiling methods as described below. The stockpiled topsoil should be used for rehabilitation purposes after decommissioning has been completed; and • Rehabilitation works must be done immediately after the involved works in an area is completed to prevent erosion.	
Water seepage at shallow depth could cause instability of soil or water pollution.	**Medium**	Geotechnical and civil engineers must supply mitigation measures and guidelines to prevent problems.	**Low**
Incorrect construction could increase the possibility of doline and sinkhole formation due to the collapsible and compressible conditions in the area.	**High**	Due to the collapsible and compressible conditions it is important that the following be adhered to: ▪ Surface water should be routed away from buildings and soils should be kept dry around buildings. Damming or ponding of water should be prevented,	**None**

		▪ No irrigation system should be implemented as part of the Formal Landscaping, as this could increase the risk of doline and sinkhole formation. ▪ All dolomite prevention measures should be adhered to as indicated within the Dolomite Stability Report. ▪ Buildings and structures should adhere to the NHBRC standards and norms. ▪ All wet services should be regularly inspected to prevent leaking pipes. ▪ Trees should not be situated in close proximity of any wet services. This will prevent the roots to penetrate the wet service lines and cause water leakage.	
Hydrology & Groundwater			
Vehicle maintenance.	**Medium**	Vehicle maintenance may not be done on the application site. Whenever a vehicle needs maintenance it must be taken to a certified workshop for the maintenance.	**None**
Excavated materials that are stockpiled in the wrong areas can interfere with the natural drainage.	**Medium**	An area must be allocated for stockpiling of topsoil before any demolishing of buildings take place on the site and must be situated from any water source or drainage channels. A sediment fence or barrier must be constructed around the stockpile to prevent soil from washing away by rain or any water.	**Low**
Surface water flows will be altered during the decommissioning phase.	**Medium**	Due to the demolishing that will take place (there will be trenches, topsoil and subsoil mounds in and around the area), the topography of the site will temporarily be altered.	**Low**
The possibility of ground water pollution.	**Medium**	• Develop a central waste temporary	**Low**

		holding site to be used during decommissioning (near the access entrance). This site should comply with the following: o Skips for the containment and disposal of all waste that could cause soil and water pollution, i.e. paint, lubricants, etc.; o Workers will only be allowed to use temporary chemical toilets on the site; o No french drain systems may be installed on site at any time; • No leaking vehicle shall be allowed on site. Before entering the area, all vehicles and equipment shall be inspected for leaks by a qualified mechanic/other suitably qualified person and the environmental officer. The mechanic/ the mechanic of the appointed contractor must supply the environmental officer with a letter of confirmation that the vehicles and equipment are leak proof; and • If maintenance on site is absolutely necessary, it should be conducted on a concrete surface in the site camp. Spilled oil should be cleaned up and disposed off appropriately (not dumped on site). This area may not be washed with soaps and dissolvent and	

		allowed to enter the drainage system.	
Climate			
Demolition works during the rainy season can cause unnecessary delays and damage to the environment, especially damage to existing roads in the area.	**Medium**	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.	**Low**
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.	**None**
Fauna & Flora			
The clearing of the site and the demolishing of buildings will result in the eradication of the existing vegetation.	**Medium**	It is proposed that only sections to be constructed be cleared at a time to ensure that unnecessary bare soil areas are exposed.	**Low**
Uncontrolled fires may cause damage or loss to vegetation and fauna in the area.	**Medium**	If fires are required for cooking and heating purposes, these fires will only be permitted in designated areas on the site. The fire area should be an exposed area (no natural veld grass should be in close proximity of the fire area). Workers should only be	**None**

		allowed to smoke in the fire area and fires should preferably be prevented while strong winds are blowing.	
Uncontrolled activities and access to sensitive areas in the vicinity.	**Medium**	• Dumping of building rubble and other waste on these areas is strictly prohibited; and • No vehicles must be allowed to move in or across the sensitive areas. This leaves visible scars and destroys habitat.	**Low**
Visual Impact			
Remnants of building structures.	**High**	All building structures must be taken down and dispatched of accordingly.	**Medium**
Aesthetically unpleasing.	**High**	The decommissioning of the buildings will be aesthetically unpleasing. Building rubble must be stockpiled where it will have the least visual impact.	**Medium**
Dumping of builder's rubble on neighbouring properties.	**Medium**	A specific location for building rubble must be allocated on site, to concentrate and collect the building rubble and cart it to a certified landfill site. The allocated area must be out of sight of neighbouring properties to have a less visual impact.	**None**
Veld fires may cause damage to infrastructure, vegetation and neighbouring properties.	**Medium**	A specific area on site must be allocated, which will have the least impact on the environment and surrounding landowners, for fires of workers. This allocated area must be far from any structures and no fires may be lit except in the designated location.	**None**
The vehicles, the site camp and other decommissioning related facilities will have a negative visual impact during the decommissioning phase.	**Medium**	Before any construction work commence on site, an area on site must be demarcated for a site camp.	**None**
Localised Vibrations			
Noise pollution.	**Medium**	The activities related with	**Low**

		the decommissioning phase will generate noise. Therefore, it must be restricted during working hours.	
Air Pollution			
Nuisance to neighbours in terms of dust generation due to demolishing of buildings.	**High**	The application site must be damped at a regular basis with water (more or less 3 to 4 times on a dry day). A water tanker should be used if possible.	**Low**
Roads & Traffic			
Heavy vehicle traffic increase could disrupt the surrounding landowners' daily routines.	**Medium**	Heavy vehicles must be instructed to only use the main roads during off-peak hours.	**Low**
Restrictions of access to surrounding properties.	**Medium**	• To minimize this impacts or risks, heavy vehicles (trucks, bull dowsers, etc.) 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 heavy 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**
Damage to roads.	**Medium**	Specific roads must be allocated for the use by heavy vehicles and photos must be taken prior to decommissioning in order to determine if any damage has been done.	**None**
Safety & Security			
During the decommissioning phase safety and security	**Medium**	Demolition works must be completed in as short time as possible. No worker or	**Low**

problems (especially for the surrounding residents) are likely to occur.		relative may reside on the site. All workers must leave the site at the end of a days work. A security guard should be appointed on site to prevent any security problems.	
Decommissioning activities could cause danger to children and animals of the surrounding residents.	**Medium**	• Although regarded as a normal practice, it is important to erect proper signs indicating the operations of heavy vehicles in the vicinity of dangerous crossings and access roads or even on the site if necessary; • It is also important to indicate all areas where excavations took place/are taking place and warning signs that clearly indicate areas with excavations must be placed immediately adjacent to excavations; • A barrier should be established around dangerous excavation areas; • With the exception of the appointed security personnel, no other workers, friend or relatives will be allowed to sleep on the site (weekends included), in the public open space or on adjacent properties; and • No workers should be allowed to enter adjacent private properties without written consent of the legal owners to the contractor.	**Low**
Waste Management			
Site office, camp and associated waste (visual, air and soil pollution)	**Medium**	• Temporary waste storage points on site shall be determined. These storage points	**Low**

		shall be accessible by waste removal trucks; • These points should not be located in areas highly visible from the properties of the surrounding land-owners/tenants/in areas where the wind direction will carry bad odours across the properties of adjacent tenants or landowners; • The site camp and the rest of the area should appear neat at all times; • Waste materials should be removed from the site on a regular basis, to a registered dumping site; and • The site camp should not be located in a highly visual area on the site, or a screen or barrier should be erected as not have a negative impact on the sense of place.	
Disposal of building waste & liquids.	**Medium**	• All waste generated must be dumped at a pre-selected area on site to be carted to a registered landfill site. THESE AREAS SHALL BE PREDETERMINED; • Small lightweight waste items should be contained in skips with lids to prevent wind littering; • All waste must be removed to a recognized waste disposal site on a weekly basis. No waste materials may be disposed of on or adjacent to the site; • The storage of solid waste on site, until such time that it may be disposed of, must	**Low**

		be in the manner acceptable to the Local Authority; and • Keep records of waste reuse, recycling and disposal for future reference.	

Alternative 2 – High Density Residential

Potential impacts:	**Significance rating of impacts:**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**
Geology & Soils			
Soil erosion, siltation and gully formation.	**Medium**	Demolition works must be kept to a minimum on site and only be done one section at a time to prevent excessive open soil areas that could lead to soil erosion, siltation and excessive compaction.	**Low**
If not planned and managed correctly, topsoil will be lost.	**Medium**	• A shake down area at the exit of the site should be established where the excessive soil on the tires of vehicles can be brushed off and kept aside for later use during rehabilitation works; • The site should be planned before any decommissioning activities take place on site. The areas where soil will be compacted, heavy vehicle movement (on site construction routes), site camp, material storage areas and stockpiling areas should be marked out and the topsoil should be removed; • The areas where topsoil will not be removed and that will be conserved should be marked with barrier tape to ensure vehicles do not move	**Low**

		across these areas and decommissioning activities do not damage the in situ topsoil; • The removed topsoil should be stored separately from all stockpiled materials and subsoil, according to the stockpiling methods as described below. The stockpiled topsoil should be used for rehabilitation purposes after decommissioning has been completed; and • Rehabilitation works must be done immediately after the involved works in an area is completed to prevent erosion.	
Water seepage at shallow depth could cause instability of soil or water pollution.	**Medium**	Geotechnical and civil engineers must supply mitigation measures and guidelines to prevent problems.	**Low**
Incorrect construction could increase the possibility of doline and sinkhole formation due to the collapsible and compressible conditions in the area.	**High**	Due to the collapsible and compressible conditions it is important that the following be adhered to: • Surface water should be routed away from buildings and soils should be kept dry around buildings. Damming or ponding of water should be prevented; • No irrigation system should be implemented as part of the Formal Landscaping, as this could increase the risk of doline and sinkhole formation; • All dolomite prevention measures should be adhered to as indicated within the Dolomite Stability Report;	**None**

		• Buildings and structures should adhere to the NHBRC standards and norms. • All wet services should be regularly inspected to prevent leaking pipes. • Trees should not be situated in close proximity of any wet services. This will prevent the roots to penetrate the wet service lines and cause water leakage.	
Hydrology & Groundwater			
Vehicle maintenance.	**Medium**	Vehicle maintenance may not be done on the application site. Whenever a vehicle needs maintenance it must be taken to a certified workshop for the maintenance.	**None**
Excavated materials that are stockpiled in the wrong areas can interfere with the natural drainage.	**Medium**	An area must be allocated for stockpiling of topsoil before any demolishing of buildings take place on the site and must be situated from any water source or drainage channels. A sediment fence or barrier must be constructed around the stockpile to prevent soil from washing away by rain or any water.	**Low**
Surface water flows will be altered during the decommissioning phase.	**Medium**	Due to the demolishing that will take place (there will be trenches, topsoil and subsoil mounds in and around the area), the topography of the site will temporarily be altered.	**Low**
The possibility of ground water pollution.	**Medium**	• Develop a central waste temporary holding site to be used during decommissioning (near the access entrance). This site should comply with the following: o Skips for the containment and disposal of all waste	**Low**

		that could cause soil and water pollution, i.e. paint, lubricants, etc.; o Workers will only be allowed to use temporary chemical toilets on the site; o No french drain systems may be installed on site at any time; • No leaking vehicle shall be allowed on site. Before entering the area, all vehicles and equipment shall be inspected for leaks by a qualified mechanic/other suitably qualified person and the environmental officer. The mechanic/ the mechanic of the appointed contractor must supply the environmental officer with a letter of confirmation that the vehicles and equipment are leak proof; and • If maintenance on site is absolutely necessary, it should be conducted on a concrete surface in the site camp. Spilled oil should be cleaned up and disposed off appropriately (not dumped on site). This area may not be washed with soaps and dissolvent and allowed to enter the drainage system.	
Climate			
Work 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	**None**

		impact on the surrounding environment. When necessary, these working areas should be damped down at least twice daily.	
Fauna & Flora			
The clearing of the site will result in the eradication of the existing vegetation.	**Medium**	Vegetation should only be removed one section at a time to ensure that vegetation is not unnecessarily removed and bare soil exposed.	**Low**
Uncontrolled fires may cause damage or loss to vegetation and fauna in the area.	**Medium**	If fires are required for cooking and heating purposes, these fires will only be permitted in designated areas on the site. The fire area should be an exposed area (no natural veld grass should be in close proximity of the fire area). Workers should only be allowed to smoke in the fire area and fires should preferably be prevented while strong winds are blowing.	**None**
Uncontrolled activities and access to sensitive areas in the vicinity.	**Medium**	• Dumping of building rubble and other waste on these areas is strictly prohibited; and • No vehicles must be allowed to move in or across the sensitive areas. This leaves visible scars and destroys habitat.	**Low**
Visual Impact			
Remnants of building structures.	**High**	All building structures must be taken down and dispatched of accordingly.	**Medium**
Dumping of builder's rubble on neighbouring properties.	**Medium**	A specific location for building rubble must be allocated on site, to concentrate and collect the building rubble and cart it to a certified landfill site. The allocated area must be out of sight of neighbouring properties to have a less visual impact.	**None**
Veld fires may cause damage to infrastructure,	**Medium**	A specific area on site must be allocated, which	**None**

vegetation and neighbouring properties.		will have the least impact on the environment and surrounding landowners, for fires of workers. This allocated area must be far from any structures and no fires may be lit except in the designated location.	
The vehicles, the site camp and other decommissioning related facilities will have a negative visual impact during the decommissioning phase.	**Medium**	Before any construction work commence on site, an area on site must be demarcated for a site camp.	**None**
Localized Vibrations			
Noise pollution.	**Medium**	The activities related with the decommissioning phase will generate noise. Therefore, it must be restricted during working hours.	**Low**
Air Pollution			
Nuisance to neighbours in terms of dust generation due to demolishing of buildings.	**High**	The application site must be damped at a regular basis with water (more or less 3 to 4 times on a dry day). A water tanker should be used if possible.	**Low**
Roads & Traffic			
Heavy vehicle traffic increase could disrupt the surrounding landowners' daily routines.	**Medium**	Heavy vehicles must be instructed to only use the main roads during off-peak hours.	**Low**
Restrictions of access to surrounding properties.	**Medium**	• To minimize this impacts or risks, heavy vehicles (trucks, bull dowsers, etc.) 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 heavy vehicles should be planned to minimize the impact on the surrounding network; and • Warning signs should	**Low**

		be erected on the roads that these vehicles will use, at big crossings/ access roads and on the site if needed.	
Damage to roads.	**Medium**	Specific roads must be allocated for the use by heavy vehicles and photos must be taken prior to decommissioning in order to determine if any damage has been done.	**None**
Safety & Security			
During the decommissioning phase safety and security problems (especially for the surrounding residents) are likely to occur.	**Medium**	Work must be completed in as short time as possible. No worker or relative may reside on the site. All workers must leave the site at the end of a days work. A security guard should be appointed on site to prevent any security problems.	**Low**
Decommissioning activities could cause danger to children and animals of the surrounding residents.	**Medium**	• Although regarded as a normal practice, it is important to erect proper signs indicating the operations of heavy vehicles in the vicinity of dangerous crossings and access roads or even on the site if necessary; • It is also important to indicate all areas where excavations took place/are taking place and warning signs that clearly indicate areas with excavations must be placed immediately adjacent to excavations; • A barrier should be established around dangerous excavation areas; • With the exception of the appointed security personnel, no other workers, friend or relatives will be allowed to sleep on the site (weekends	**Low**

		included), in the public open space or on adjacent properties; and • No workers should be allowed to enter adjacent private properties without written consent of the legal owners to the contractor.	
Waste Management			
Site office, camp and associated waste (visual, air and soil pollution)	**Medium**	• Temporary waste storage points on site shall be determined. These storage points shall be accessible by waste removal trucks; • These points should not be located in areas highly visible from the properties of the surrounding land-owners/tenants/in areas where the wind direction will carry bad odours across the properties of adjacent tenants or landowners; • The site camp and the rest of the area should appear neat at all times; • Waste materials should be removed from the site on a regular basis, to a registered dumping site; and • The site camp should not be located in a highly visual area on the site, or a screen or barrier should be erected as not to have a negative impact on the sense of place.	**Low**
Disposal of building waste & liquids.	**Medium**	• All waste generated must be dumped at a pre-selected area on site to be carted to a registered landfill site. THESE AREAS SHALL BE PREDETERMINED;	**Low**

		• Small lightweight waste items should be contained in skips with lids to prevent wind littering; • All waste must be removed to a recognized waste disposal site on a weekly basis. No waste materials may be disposed of on or adjacent to the site; • 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 • Keep records of waste reuse, recycling and disposal for future reference.	

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

Geological Engineering Report (Appendix G1)
Floral, Faunal and Wetland Assessment (Appendix G2)

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.

- Noise pollution may upset residents in the area – to prevent this, construction activities may only take place during the daytime;
- Surface water flows will be altered during the construction phase of the proposed development – a stormwater management plan must therefore be implemented;
- The construction vehicles and facilities will have a negative impact on the study area and surrounding views – this impact may be minimized by locating the site camp in an area with low visibility from surrounding developments and road networks;
- Dust pollution could cause nuisance to surrounding residents – dust can be effectively controlled through the wetting of exposed surfaces, especially in the Winter Months;

- During the construction phase some safety problems (especially for the surrounding residents) are likely to occur – in order to minimise 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.

Subsequently, the above mentioned cumulative impacts can be mitigated if activities are correctly planned and measures are implemented to manage activities which could cause any negative cumulative impacts.

One has to note, that the greatest cumulative impact on the site would be if no development take place. Currently the property is vacant and located in close proximity to informal settlements and therefore prone to illegal dumping, un-controlled activities and degradation of the natural environment on site. Such activities will have a great negative impact on the safety of the surrounding community. It is therefore recommended that the proposed development is allowed to take place. With development, illegal activities on site will not arise and in turn would provide for the safety and wellbeing of the surrounding environment.

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.

Alternative 1 (Proposal)

The major impacts that is likely to occur during the construction and operational phase:

- **<u>Natural Environment</u>**

  The Natural environment will be temporarily affected by the moving of large construction vehicles and the construction of industrial warehouses.

  Valuable topsoil may also be lost during the construction process. The loss of topsoil can however be minimised through the storage of topsoil in designated stockpiles on site and the re-use thereof within the landscape component of the development.

- **The Social Environment**

  The Public Participation were done by means of a newspaper notice, site notices placed on prominent points on the application site, hand delivered notices to surrounding tenants and landowners and the distributing of notices to stakeholders such as the Local Authorities, Councillors by means of faxes and e-mails.

  Dangerous excavations can cause injury/even death to people if proper precautions are not taken. Crime can also impact the surrounding community from the temporary workers. Social importance, new human activity in the area.

  Construction vehicles and equipment can be temporarily visually unpleasant for residents.

  The proposed industrial development will contribute to the upgrading of the existing sub-standard road infrastructure. External services such as the bulk sewage and water supply pipes will also be established and in some instances upgraded in order to support development.

- **Economic Environment**

  The proposed development will create a significant number of employment opportunities for skilled and un-skilled workers;

  Through the development of the study an increase in the rates and taxes for the local authority will take place.

- **Noise**

  The construction phase will cause noise pollution and disturb the receiving community, but can be mitigated with the limitation construction hours from 8:00 to 18:00 to cause minimal disturbance to the community.

- **Visual**

  Construction vehicles and equipment can be visually unpleasant for residents. Furthermore the proposed development should be designed to be aesthetically pleasing and blend in with the adjacent neighbouring properties.

The proposed alternative of an industrial development will fit in with the surrounding environment as it is situated in an area that forms part of

the Mogale City Spatial Development Framework as a Future Transition Zone that is positioned between the N14 Primary Development Corridor and the Urban Support Zone. Thus the proposed industrial development will form part of the proposed nodal development as well as the integration of land-use activities between Mogale City and City of Johannesburg. The proposed development will have a positive impact on the economy as it will open up job opportunities for the local residents including the informal settlements.

Alternative 2

The establishment of a High Density Residential development was considered and after some research it was discovered that it will be less feasible than Industrial 1 uses due to the Nooitgedacht area mainly being earmarked for future Industrial/ Warehousing developments.

A residential development will not fit in with the surrounding land uses as with the Industrial uses as it might be a safety risk as it is not an actual residential area and is surrounded by settlements. After a geotechnical investigation it did not seem feasible for the development of a residential area as a lot more infrastructure is required for residential developments on the specific geology and soil conditions.

It is also important to note that there are currently no services from the local municipality, regarding sanitation, as it is planned that this connection of service might take up to five years. A conservancy tank will be feasible for a small amount of individuals during work hours but it will not sustain an entire residential development.

In light of the above mentioned it is clear that Industrial uses will be more acceptable and feasible in the proposed area than Residential uses.

No-go (compulsory)

The no-go option entails that the development area stay in the current state.

The application site is currently vacant and devoid of any used buildings and/ or structures. The majority of the site is severely disturbed and overgrown by weeds and invaders. Presently no sensitive features such as ridges, wetlands, nor any protected fauna and flora species are present on the area that will developed even though a wetland/stream are found on the larger study area.

No positive impacts are foreseen for the no-go alternative as the study area will stay in its current state. Presently, the application site is disturbed by human activities resulting in disturbance from people that commute to and from large informal settlement and the surrounding industrial area.

If the proposed development would not continue and the no-go option is pursued it will prevent positive socio-economic activities in terms of job creation and investment opportunities from occurring. This is important, as the proposed development will promote significant social and physical land upliftment in surrounding area. Should no development take place, illegal dumping might occur and vagrants may start to use the site, which further pose health and safety risks as well as environmental degradation.

In this instance, it is however not recommended that the No-Go option be followed as the current state of the application site would have a much more detrimental effect on the study area than the preferred development proposal. The construction of the proposed development would provide for some short-term impacts on the Bio-physical and Socio-economic environments of the study area as well as the immediate surrounding environment, but can however in this instance be mitigated to an acceptable level. In the long term, the proposed development would have a positive impact on the Physical and Socio-economic environment of the study area as well as its surroundings, due to that it will promote and contribute towards positive economic growth and provide for clean and safe controlled environments.

6. IMPACT SUMMARY OF PREFERRED PROPOSAL

Identify preferred proposal

Alternative 1 (Proposal)

Having assessed the significance of impacts of the proposal and various alternatives, please provide an overall summary and reasons for selecting the preferred project proposal.

It's evident that based on the biophysical and sociological characteristics, the site is suitable for the proposed development (only if the project is planned and managed in accordance with an approved Environmental Management Plan). The development will create numerous job opportunities during the constructional and operational phases.

As already indicated, most of the construction related activities could

be mitigated to an acceptable level. Furthermore no detrimental ecological impacts are anticipated; in fact the construction and operational activities of the proposed development can lead to an improvement of the ecological conditions on the site as the area to be developed is disturbed. The wetland on the larger study area is not anticipated to be severely impacted by the industrial development.

If the proposed development is managed according to a standard and a quality architectural theme and finishing are proposed for the development it will sufficiently address the potential or possible visual impacts of the development on the receiving environment. If designed with the surrounding environment in mind, it will enhance the "Sense of Place" and overall character of the area.

The proposed development will create several job opportunities during the construction phase and will also promote job opportunities during the operational phase. The proposed development is supported by the Spatial Development Framework of Mogale City.

No Cultural/Historically significant areas were identified on the application site and thus no areas of historical or cultural value will be affected.

If managed correctly, the proposed project could (mainly in the long term) have a significant positive impact on the social and economical environments. The proposed development could also have a positive impact on the ecological environment (especially through the creation of habitats, the re-vegetation of the site, the removal of exotic invaders and weeds from the study area).

In the long term the impact of the proposed development, the impact on the ecological features will be more positive than negative because as the exotic invaders and weeds will be removed from the study area on a continuous basis.

Furthermore, from the findings of this Basic Assessment the following can be concluded:

- The proposed development will fit in with the surrounding land uses and the general character of the area, and will add some diversity to land-uses of the area. Therefore, the proposed development is in line with the policies and legislation and highly compatible with the present and future land uses in the area;
- The mitigations and adaptive monitoring outlined in this Basic Assessment and the EMP with respect to potential adverse impacts should result in limited adverse impacts on local and regional, natural and socio-economic resources. Balanced with

the overall beneficial positive economic and environmental impacts identified, the potential net adverse effects attributable to the proposed development do not constitute a threat to local and regional ecological resources and social systems; and

- No "fatal flaws" or adverse impacts that cannot be mitigated are anticipated to be associated with the proposed industrial development.

As a result of the above mentioned information, Bokamoso is of the opinion that the proposed industrial development (only if planned, implemented and managed correctly) will in the long term have a significant positive impact on the larger regional system to which it is linked. The development will also (mainly in the long and medium term) have a significant positive impact on the social and economical environments (on a local, regional and provincial scale).

It is therefore requested that the development be allowed to proceed, so long as the mitigation measures contained in this report and in the Environmental Management Plan (Annexure H) are implemented, so as to achieve maximum advantage from beneficial impacts, and sufficient mitigation of adverse impacts.

7. RECOMMENDATION OF 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).	**YES X**	NO

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process 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:

As a result of the above mentioned information, Bokamoso request that the above development be approved as long as the following are followed:

- All mitigation measures and recommendations as part of the attached Engineering Geological Investigation report ***(Refer to Appendix G1)*** must be adhered to;
- All mitigation measures and recommendations as part of the attached Floral, Faunal and Wetland Assessment ***(Refer to Appendix G2)*** must be adhered to;
- It is important that a proper stormwater management plan

should be developed by the appointed engineers, and implemented during the construction and operational phases of the proposed development, in order to manage the stormwater effectively as a result of heavy precipitation. The Stormwater Management Plan should be made a condition of the Record of Decision (ROD);

- A section 21 Water Use License should be made a condition of the Record of Decision (ROD);

- The EMP attached and the mitigation measures related to it must be adhered to at all times and the appointed ECO must ensure the developer comply with the EMP.

8. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

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

	YES
EMP attached	X

SECTION F: APPENDIXES

The following appendixes must be attached as appropriate:

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)

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Route position information

Appendix E: Public participation information

Appendix F: Water use license(s), SAHRA information, service letters from municipalities, water supply information

Appendix G: Specialist reports

Appendix H: EMP

Appendix I: Other information

Application Form

Acknowledgement Letter From GDARD

GAUTENG DEPARTMENT AGRICULTURE AND RURAL DEVELOPMENT

Diamond Corner Building, 68 Eloff & Market Street, Johannesburg
P O Box 8769, Johannesburg, 2000

Telephone: (011) 355-1900
Fax: (011) 355-1000

Reference:	Gaut: 002/13-14/E0315
Enquiries:	Faith Mlambo
Telephone:	011 355 1974
Email:	faith.mlambo@gauteng.gov.za

Bokamoso Landscape Architects & Environmental Consultants

Email. lizelleg@mweb.co.za

PER EMAIL

Dear Sir / Madam

Application for Environmental Authorisation: Proposed development of portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City

The Department acknowledges having received the application form for environmental authorisation of the above-mentioned project on 07/05/2013.

The application has been assigned the reference number Gaut: 002/13-14/E0315. Kindly quote this reference number in any future correspondence in respect of the application.

Please circulate the draft report to any state department that administers a law relating to a matter affecting the environment to comment.

You are required to submit two (2) copies (full colour CDs-PDF) of the Draft Basic Assessment Report as well as proof of submission to state departments referred to above.

In order to determine whether a biodiversity assessment is required and, if so, which specialist studies are required, please send a shapefile (WGS84 datum; geographic co-ordinate system) of the application site to our biodiversity information service (GDACE_BiodiversityInfo@gauteng.gov.za), the e-mail clearly indicating the project reference number. Where biodiversity assessment is required; please ensure that it is conducted consistent with the *GDACE Requirements for Biodiversity*

Assessments. A copy of this document can be obtained by e-mailing GDACE_BiodiversityInfo@gauteng.gov.za

In terms of Regulation 67(1) (2) of the NEMA EIA Regulations 2010, this application will lapse should you fail to submit the requested information within 6 months of the date of signature of this letter, except in the case where the Department has received and accepted written explanation for failure to submit such information.

Please draw the applicant's attention to the fact that the activity may not commence prior to an environmental authorisation being granted by the Department.

Yours faithfully

Nhlanhla Makhathini
Assistant Director: Strategic Administration Support
Date: 23/05/2013

CC: Kafue River Trading (Pty) Ltd

Att: Mr D Mitchell
Tel: 0119531082
Email: andre@wesplan.co.za

agriculture and rural development
Department: Agriculture and Rural Development
GAUTENG PROVINCE
Diamond Corner Building, 68 Eloff & Market Street, Johannesburg
P O Box 8769, Johannesburg, 2000

Telephone: (011) 355-1900
Fax: (011) 355-1000
Website: http://www.gdard.gpg.gov.za

Reference:	Gaut: 002/13-14/E0315
Enquiries:	Justine Chan
Telephone:	(011) 355-1256
Email:	Justine.Chan@gauteng.gov.za

Bokamoso Landscape Architects and Environmental Consultants

Email/Fax: lizelleg@mweb.co.za

Dear Sir / Madam

Draft Basic Assessment Report: Proposed development of portion 366 of the farm Nooitgedacht 534 JQ, Mogale City

The Department acknowledges having received the Draft Basic Assessment Report for environmental authorisation of the above-mentioned project on 23/08/2013.

You are required to submit five (5) copies (3 full colour hard copies and 2 CDs-PDF) of the Final Basic Assessment Report.

Please draw the applicant's attention to the fact that the activity may not commence prior to an environmental authorisation being granted by the Department.

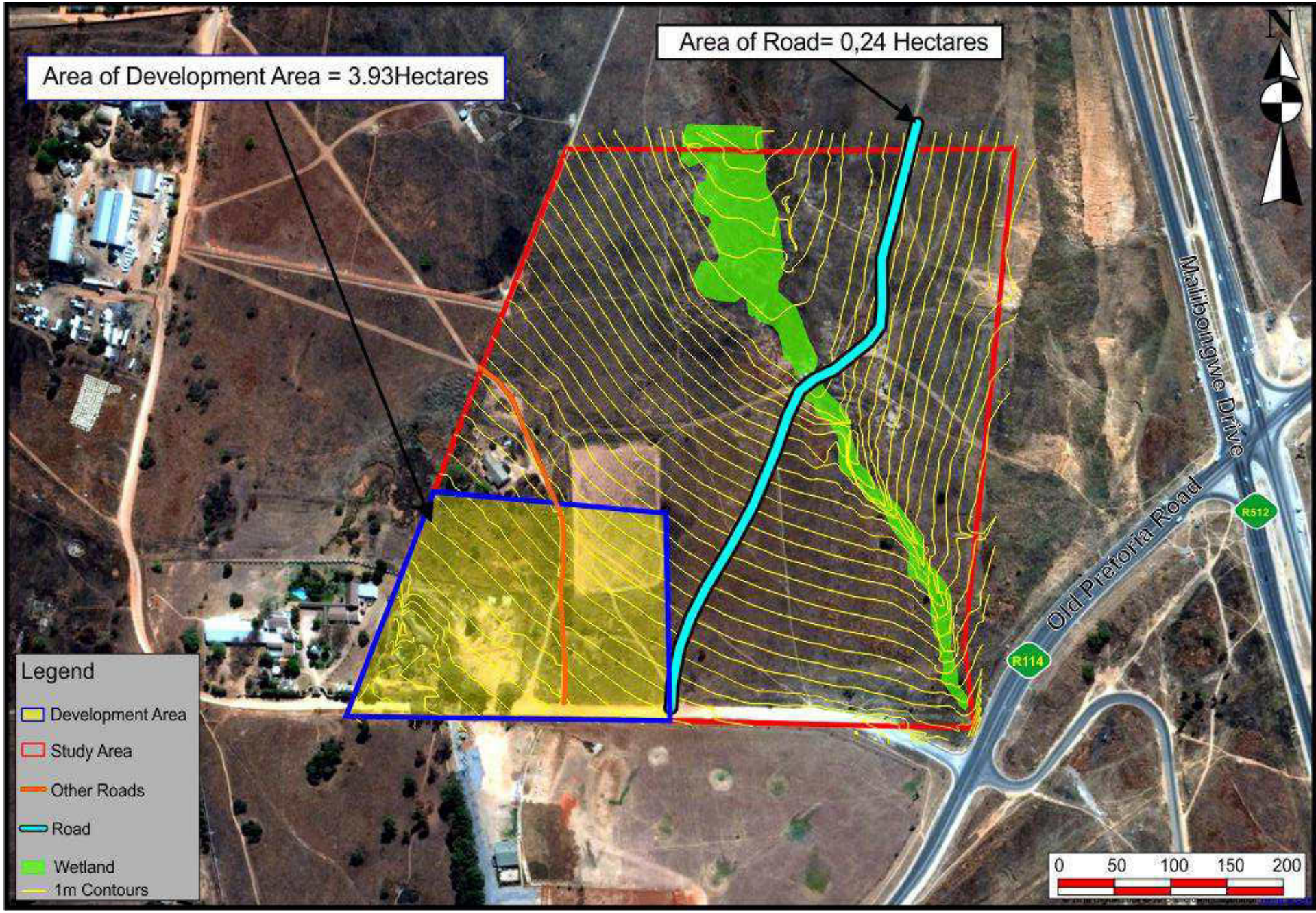
Yours faithfully

Boniswa Belot
Deputy Director: Strategic Administration Support
Date: 17/09/2013

CC: Kafue River Trading (Pty) Ltd Att: D Mitchell
Email/Fax: andre@wesplan.co.za

Basic Assessment

Site plan(s)


Area of Development Area = 3.93Hectares
Area of Road= 0,24 Hectares
N
Malibongwe Drive
Old Pretoria Road
R512
R114
Legend
Development Area
Study Area
Other Roads
Road
Wetland
1m Contours
0
50
100
150
200

Photographs


31 05 2013 10 59


31 05 2013 10 59


31 05 2013 10 59


31 05 2013 10 59


31 05 2013 11 00


31 05 2013 11 00


31 05 2013 11 00

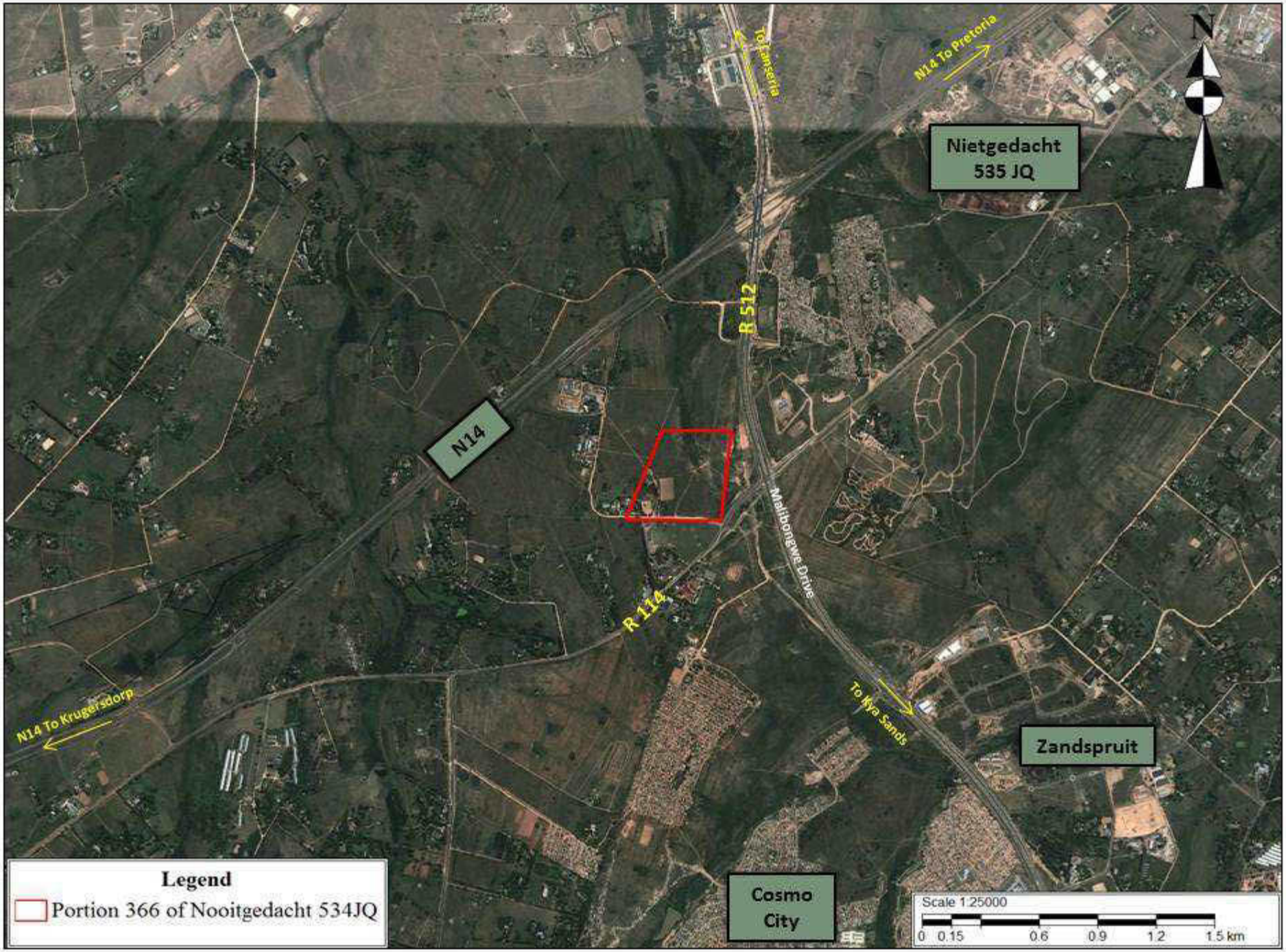

31 05 2013 11 00

Facility Illustration(s)

Not Available

Route Position Information

Appendix D


N
N14 To Pretoria
To Lanseria
Nietgedacht
535 JQ
R 512
N14
Malibongwe Drive
R 114
N14 To Krugersdorp
To Kya Sands
Zandspruit
Cosmo
City
Legend
Portion 366 of Nooitgedacht 534JQ
Scale 1:25000
0 0.15 0.6 0.9 1.2 1.5 km

Public Participation Information

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. R543 published in the Government Notice No. 33306 of 18 June 2010 of the National Environment Management Act, 1998 (Act No. 107 of 1998) governing **Basic Assessment Procedures (Listing Notice: 1 and 3 – Governing Notice R544 & R546)** for the following activity:

Reference No: 002/13-14/E0315

Project Name: Proposed development of Portion 336 of the Farm Nooitgedacht 534 JQ, Mogale City

Property Description: Industrial development on Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City

Proposed Zoning Information: Industrial Purposes to include:

- The assembling of products;
- The re-packaging of products;
- Distribution centres.

Listing Activities Applied for:

GNR 544 (Listing Notice 1), 18 June 2010	Activity 9
GNR 544 (Listing Notice 1), 18 June 2010	Activity 10
GNR 544 (Listing Notice 1), 18 June 2010	Activity 11
GNR 544 (Listing Notice 1), 18 June 2010	Activity 18
GNR 544 (Listing Notice 1), 18 June 2010	Activity 22
GNR 544 (Listing Notice 1), 18 June 2010	Activity 23
GNR 546 (Listing Notice 3), 18 June 2010	Activity 4
GNR 546 (Listing Notice 3), 18 June 2010	Activity 14
GNR 546 (Listing Notice 3), 18 June 2010	Activity 16
GNR 546 (Listing Notice 3), 18 June 2010	Activity 24

Proponent Name: Kafue River Trading (Pty) Ltd

Location: The development is located near the corner of Malibongwe Drive and R512, south of the N14 and Lanseria International Airport, North of Cosmo City and south-west of Diepsloot Township.

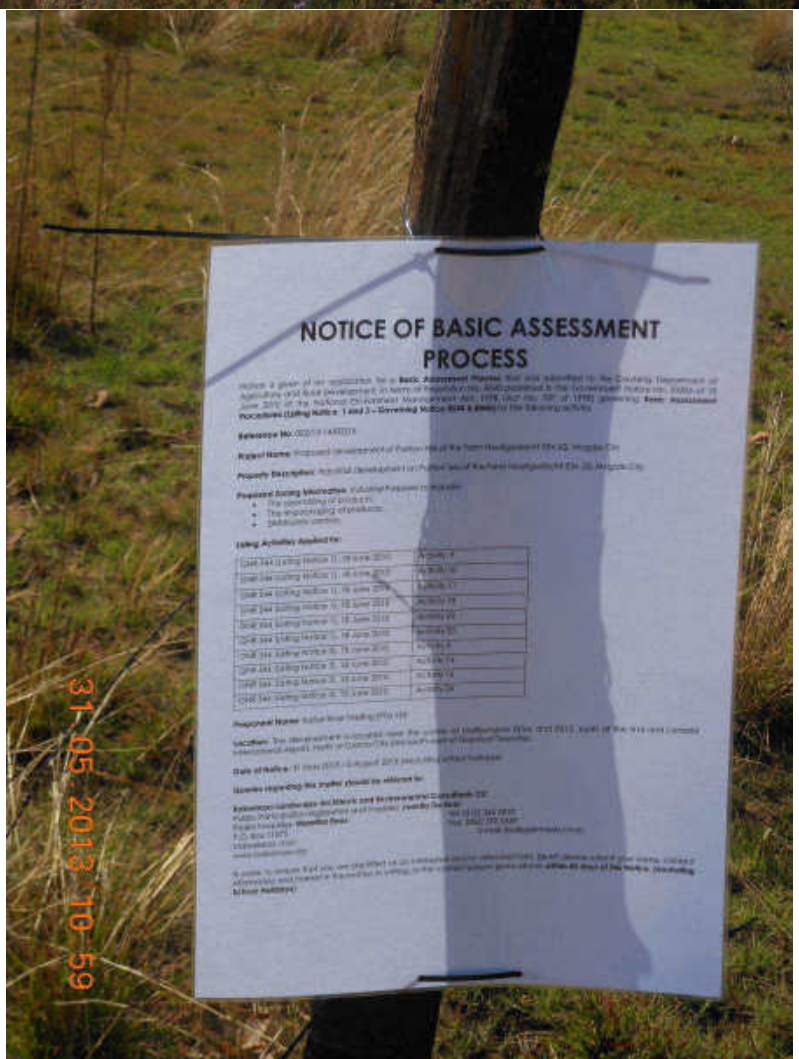
Date of Notice: 31 May 2013 – 5 August 2013 (excluding school holidays)

Queries regarding this matter should be referred to:

Bokamoso Landscape Architects and Environmental Consultants CC
Public Participation registration and inquiries: **Juanita De Beer**
Project Inquiries: **Maretha Roux**
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 40 days of this Notice. (excluding School Holidays)**


31.05.2013 10:59


NOTICE OF BASIC ASSESSMENT PROCESS
31.05.2013 10:59

Written Notices Issued to Those Persons Detailed in 1(b) to 1(f) above

LEBOMBO GARDEN BUILDING
36 LEBOMBO ROAD
ASHLEA GARDENS
0081

P.O. BOX 11375
MAROELANA
0161

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

Bokamoso ENVIRONMENTAL

Dear Landowner/Tenant **31 May 2013**

You are hereby informed that Bokamoso Environmental Consultants were appointed (as EAP) by Kafue River Trading (Pty) Ltd to conduct the Basic Assessment Process in terms of the amended 2010 NEMA EIA Regulations for the proposed development of Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City.

The proposed Land-uses for the study area are as follows:
Industrial Purposes to include:

- The assembling of products;
- The re-packaging of products;
- Distribution centres.

In terms of Regulation No. R543 published in the Government Notice No. 33306 of 18 June 2010 of the National Environment Management Act, 1998 (Act No. 107 of 1998) governing Basic Assessment Procedures (Notice 1 and 3 – Governing Notice R544 & R546) of the 2010 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.

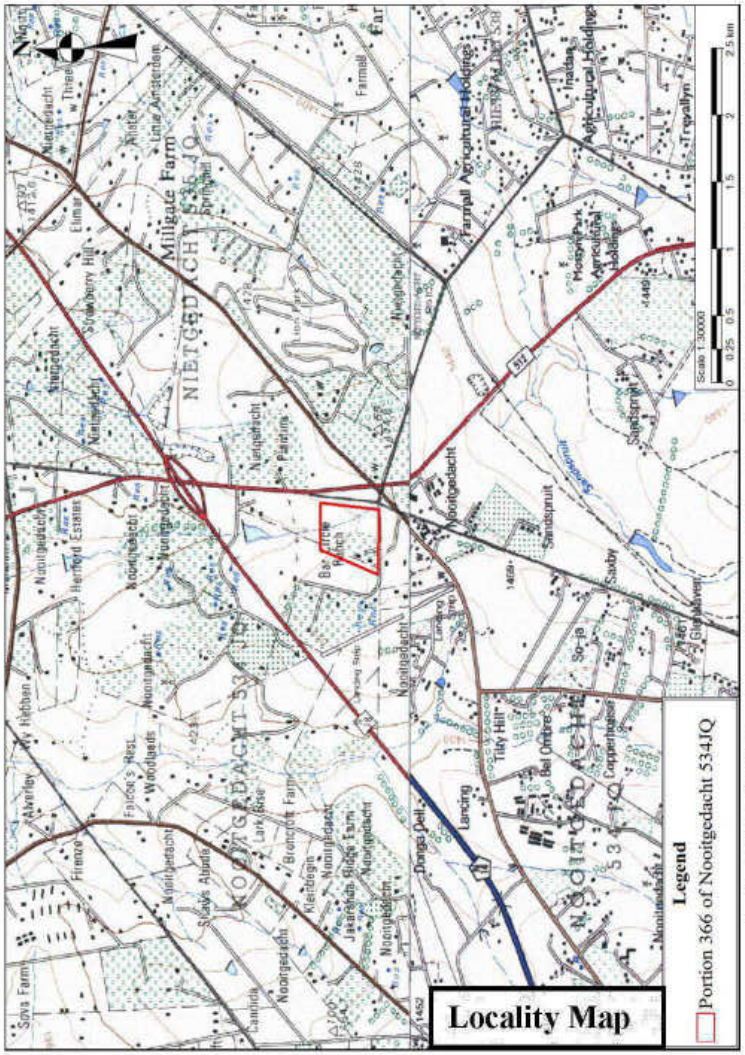
Please confirm (via email/Fax) that you received the Landowners/Tenant Notification and this Letter. Also indicate in this Confirmation Letter whether you have tenants on your property and you're preferred method of tenant/worker notification.

Regards

JdBeer

.....
Lizelle Gregory/Juanita De Beer

Nooitgedacht 366



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. R543 published in the Government Notice No. 33306 of 18 June 2010 of the National Environment Management Act, 1998 (Act No. 107 of 1998) governing **Basic Assessment Procedures (Notice 1 and 3 – Governing Notice R544 & R546)** for the following activity:

Reference No: 002/13-14/E0315

Project Name: Proposed development of Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City

Property Description: Industrial development on Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City

Proposed Zoning Information: Industrial Purposes to include:

- The assembling of products;
- The re-packaging of products;
- Distribution centres.

Proponent Name: Kafue River Trading (Pty) Ltd

Listing Activities Applied: GNR 544 (Listing Notice 1), 18 June 2013 – Activity 9, 10, 11, 18, 22, & 23. GNR 546 (Listing Notice 3), 18 June 2013 – Activity 4, 14, 16 & 24.

Location: The development is located near the corner of Malibongwe Drive and R512, south of the N14 and Lanseria International Airport, North of Cosmo City and south-west of Diepsloot Township.

Date of Notice: 31 May 2013 – 5 August 2013 (excluding school holidays)

Queries regarding this matter should be referred to:

Bokamoso Landscape Architects and Environmental Consultants CC
Public Participation registration and inquiries: **Juanita De Beer**
Project inquiries: **Maretha Roux**
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 40 days of this Notice. (excluding school holidays)**

List of REGISTERED LETTERS
Lys van GEREGISTREERDE BRIEWE
(With an insurance option/met 'n versekeringsopsie)

Post Office

Full tracking and tracing/Volledige volg en spoor

Name and address of sender
Naam en adres van afsender Bokamoso PO Box 11375, Moreleta 0161
Nooitgedacht 366

Enquiries/Navrae
Toll-free number
Tolvry nommer
0800 111 502

No	Name and address of addressee Naam en adres van geadresseerde	Insured amount Versekerde bedrag	Insurance fee Verseke-ringsgeld	Postage Posgeld	Service fee Diensgeld	Affix Track and Trace customer copy Plak Volg-en-Spoor-kliëntafskrif
1	Cosmopolitan Projects Johannesburg P.O. Box 12701, Hatfield, 0028					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RD 605 073 709 ZA CUSTOMER COPY 301028R
2	Kosmos Plant Hire and Demolishers P.O. Box 1755, Florida, 1710					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RD 605 073 712 ZA CUSTOMER COPY 301028R
3	Pro Direct Investments 21 P.O. Box 43171, Industria, 2042					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RD 605 073 726 ZA
4	Cradle Gate P.O. Box 2019, Parklands, 2121					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RD 605 073 730 ZA
5	Elizian P.O. Box 472, Bedfordview, 2008					REGISTERED LETTER (with a domestic insurance option) ShareCall 0860 111 502 www.sapo.co.za RD 605 073 757 ZA CUSTOMER COPY 301028R
6						
7						
8						
9						
10						
	Total Totaal	R	R	R	R	

Number of letters posted
Getal briewe gepos .....

Signature of client
Handtekening van kliënt.....

Signature of accepting officer
Handtekening van aanneembeampte.....

Date stamp
MENLYN
31 MAY 2013
4
0063
Datumstempel

The value of the contents of these letters is as indicated and compensation is not payable for a letter received unconditionally. Compensation is limited to R100,00. No compensation is payable without documentary proof. Optional insurance of up to R2 000,00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie briewe is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100,00. Geen vergoeding is sonder dokumentêre bewys betaalbaar nie. Opsionele versekering van tot R2 000,00 is beskikbaar en is slegs op binnelandse geregistreerde briewe van toepassing.

Companies and Intellectual Property Commission
a member of the dti group

CIPC Company Report

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information is our business

SEARCH DETAILS

Date Requested	2013/05/29 14:33
Reference	-

COMPANY SUMMARY

Name	COSMOPOLITAN PROJECTS JOHANNESBURG
Status	In Business
Registration Number	2005/013577/07
Registration Date	2005/05/06

DIRECTOR LIST (3)

VORSTER, JOHANN MARTINUS (Director - Active)
CROUSE, ANTON (Director - Active)
LUDICK, PIERRE LEON (Director - Active)

AUDITOR(S) LIST (1)

STRACHAN AND CROUSE

COMPANY INFORMATION

Registration No	2005/013577/07	**Registered Office**	G01 HARROGATE PARK 1237 PRETORIUS STREET HATFIELD 0083
Status	In Business		
Enterprise Name	COSMOPOLITAN PROJECTS JOHANNESBURG		
Registration Date	2005/05/06		
Enterprise Type	Private Company		
Conv. Enterprise No		**Postal Address**	P O BOX 12701 HATFIELD 0028
Business Start	2005/05/06		
Old Reg No			
Financial Year End	2	**Region**	Gauteng
Fin Effective Date	2005/05/06	**Country**	Unknown
Tax Number	9332681155	**Country of Origin**	
Short Name		**CK Date**	-
Translated Name		**CK Date Received**	-
Status Date	-	**Date of Type**	2005/05/06
Authorized Shares	1000	**Issued Shares**	100
Authorized Capital	1000	**Issued Capital**	100
Industry	Real estate activities		

DIRECTOR(S)

VORSTER, JOHANN MARTINUS (Director)

ID Number/Passport Number	6805265029088	Initials	J M
Date of Birth	1968/05/26	Member size percentage	0
Status	Active	Member Contribution	0
Resignation Date	-	Residential Address	24 LANZEROTE DERBY ROAD NORTH RIDING 2001
Country of Residence	South Africa	Postal Address	P O BOX 1182 RUSTENBURG 0300
Telephone Number		e-mail Address	
Fax Number		Profession	BUSINESSMAN
Cell Number		Appointment	2005/05/06

CROUSE, ANTON (Director)

ID Number/Passport Number	6705155141003	Initials	
Date of Birth	1967/05/15	Member size percentage	0
Status	Active	Member Contribution	0
Resignation Date	-	Residential Address	103 GEDEELTE 1 ERASMUS STREET RASLOUW 0149
Country of Residence	South Africa	Postal Address	P O BOX 754 AUCKLAND PARK 2006
Telephone Number		e-mail Address	
Fax Number		Profession	BUSINESSMAN
Cell Number		Appointment	2005/05/06

LUDICK, PIERRE LEON (Director)

ID Number/Passport Number	7101095057088	Initials	
Date of Birth	1971/01/09	Member size percentage	0
Status	Active	Member Contribution	0
Resignation Date	-	Residential Address	66 SMAL STREET JOHANNESBURG 2001
Country of Residence	South Africa	Postal Address	P O BOX 754 AUCKLAND PARK 2006
Telephone Number		e-mail Address	
Fax Number		Profession	BUSINESSMAN
Cell Number		Appointment	2005/05/06

AUDITOR(S)

STRACHAN AND CROUSE

Name	STRACHAN AND CROUSE	**Status**	Current
Prof. Code	Chartered Accounts	**Type**	Auditor
Prof. No	955027	**Postal Address**	P O BOX 11035 THE TRAMSHED 0126
Start Date	-		
End Date	-		
Expiry Date	-		
Reg. Entry Date	-		
CM31 Completed	-	**Physical Address**	401 CHURCHILL HOUSE 395 SCHOEMAN STREET PRETORIA
CM31 Received	-		
Ref. No			0002
Fine Letter			
Date of status change (if applicable)	-	**Act Ind Mpy No Sp**	

CAPITAL INFORMATION

Type	No of Shares	Parri Value	Cap. Amount	Cap. Premium
Authorized Ordinary	1000	0	1	0
Authorized Ordinary	100	0	1	0

HISTORY

Eff. Date	Change Type
2005/05/06	Directors/Member Change/Secretary/Trust/Both Dir And Office (Surname=CROUSE Full ForeNames=ANTON Id No=6705155141003 Status :ACTIVENature of Change=NEW APPOINTMENT)
2005/05/06	Directors/Member Change/Secretary/Trust/Both Dir And Office (Surname=LUDICK Full ForeNames=PIERRE LEON Id No=7101095057088 Status :ACTIVENature of Change=NEW APPOINTMENT)
2006/05/25	Directors/Member Change/Secretary/Trust/Both Dir And Office (Surname=VORSTER Full ForeNames=JOHANN MARTINUS Id No=6805265029088 Status :ACTIVENature of Change=NO CHANGE)
2007/01/03	Postal Address Change (P O BOX 12701 HATFIELD 0028)
2007/01/03	Registered Address Change (G01 HARROGATE PARK 1237 PRETORIUS STREET HATFIELD 0083)

Companies and Intellectual Property Commission
a member of the dti group

CIPC Company Report

windeed
information is our business

SEARCH DETAILS

Date Requested	2013/05/29 14:28
Reference	-

COMPANY SUMMARY

Name	KOSMOS PLANT HIRE AND DEMOLISHERS
Status	In Business
Registration Number	1996/011968/23
Registration Date	1996/03/14

MEMBERS LIST (2)

REDELINGHUYS, THOMAS NICOLAAS JOHANNES (Member - Active)
REDELINGHUYS, ANNA CATHARINA (Member - Active)

ACCOUNTING OFFICERS LIST (1)

W A PIETERS

COMPANY INFORMATION

Registration No	1996/011968/23	**Registered Office**	219 BERGHILL 3DE LAAN FLORIDA 1709
Status	In Business		
Enterprise Name	KOSMOS PLANT HIRE AND DEMOLISHERS		
Registration Date	1996/03/14		
Enterprise Type	Close Corporation		
Conv. Enterprise No		**Postal Address**	POSBUS 1755 FLORIDA 1710
Business Start	1996/03/14		
Old Reg No			
Financial Year End	2	**Region**	Gauteng
Fin Effective Date	1996/03/14	**Country**	Unknown
Tax Number	9008005879	**Country of Origin**	
Short Name		**CK Date**	-
Translated Name		**CK Date Received**	-
Status Date	-	**Date of Type**	-
Authorized Shares		**Issued Shares**	
Authorized Capital		**Issued Capital**	
Industry	Contruction		

MEMBER(S)

REDELINGHUYS, THOMAS NICOLAAS JOHANNES

ID Number/Passport Number	5907050270000	Initials	TNJ
Date of Birth	1959/07/05	Member size percentage	50
Status	Active	Member Contribution	50
Resignation Date	-	Residential Address	BOEINGSTRAAT 31 HELDERKRUIN 1724
Country of Residence	Unknown	Postal Address	BOEINGSTRAAT 31 HELDERKRUIN 1724
Telephone Number		e-mail Address	
Fax Number		Profession	
Cell Number		Appointment Date	1996/03/14

REDELINGHUYS, ANNA CATHARINA

ID Number/Passport Number	6409080037002	Initials	AC
Date of Birth	1964/09/08	Member size percentage	50
Status	Active	Member Contribution	50
Resignation Date	-	Residential Address	BOEINGSTRAAT 31 HELDERKRUIN 1724
Country of Residence	Unknown	Postal Address	BOEINGSTRAAT 31 HELDERKRUIN 1724
Telephone Number		e-mail Address	
Fax Number		Profession	
Cell Number		Appointment Date	1996/03/14

REPRESENTATIVE TRUSTEE(S)

No Representative Trustee information to display

INTER VIVOS TRUST(S)

No Inter Vivos Trust information to display

TESTAMENTARY TRUST(S)

No Testamentary Trust information to display

OTHER TRUSTEE(S)

No Trustee information to display

ACCOUNTING OFFICER(S)

W A PIETERS

Name	W A PIETERS	**Status**	Current
Prof. Code	Professional Accountants (SA)	**Type**	Both Director/Officer
Prof. No		**Postal Address**	POSBUS 1755 FLORIDA 1709
Start Date	1996/03/14		
End Date	-		
Expiry Date	-		
Reg. Entry Date	1998/05/06		
CM31 Completed	-	**Physical Address**	
CM31 Received	-		
Ref. No	5463		
Fine Letter			
Date of status change (if applicable)	-	**Act Ind Mpy No Sp**	

CAPITAL INFORMATION

No capital information to display

HISTORY

Eff. Date	Change Type
1996/03/14	Directors/Member Change/Secretary/Trust/Both Dir And Office (No information to display)
1996/03/14	Registered Address Change (219 BERGHILL 3DE LAAN FLORIDA 1709 1709)
1996/03/14	Postal Address Change (POSBUS 1755 FLORIDA 1710)
1998/06/02	Name Change (DIG AND BUILD CONSTRUCTION)

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SEARCH DETAILS

Date Requested	2013/05/29 14:23
Reference	-

COMPANY SUMMARY

Name	PRO DIRECT INVESTMENTS 21
Status	In Business
Registration Number	2001/013090/07
Registration Date	2001/06/21

DIRECTOR LIST (2)

NORTJE, MATTHYS MACHIEL JOHANNESBURG (Director - Active)
GOUWS, CHRISTIAN (Director - Resigned)

AUDITOR(S) LIST (1)

LLOYD VILJOEN

COMPANY INFORMATION

Registration No	2001/013090/07	**Registered Office**	19 MARAISBURG ROAD INDUSTRIA WEST
Status	In Business		
Enterprise Name	PRO DIRECT INVESTMENTS 21		1709
Registration Date	2001/06/21		
Enterprise Type	Private Company		
Conv. Enterprise No		**Postal Address**	P O BOX 43171 INDUSTRIA
Business Start	2001/06/21		
Old Reg No			2042
Financial Year End	2	**Region**	Gauteng
Fin Effective Date	2001/06/21	**Country**	Unknown
Tax Number	9064307144	**Country of Origin**	
Short Name		**CK Date**	-
Translated Name		**CK Date Received**	-
Status Date	-	**Date of Type**	2001/06/21
Authorized Shares	1000	**Issued Shares**	100
Authorized Capital	1000	**Issued Capital**	100
Industry	Real estate activities		

DIRECTOR(S)

NORTJE, MATTHYS MACHIEL JOHANNESBURG (Director)

ID Number/Passport Number	6905255004081	Initials	MJ
Date of Birth	1969/05/25	Member size percentage	0
Status	Active	Member Contribution	0
Resignation Date	-	Residential Address	PLOT 161 NOOITGEDACHT KRUGERSDORP 1739
Country of Residence	Unknown	Postal Address	P O BOX 43171 INDUSTRIA 2042
Telephone Number		e-mail Address	
Fax Number		Profession	BUSINESSMAN
Cell Number		Appointment	2001/07/09

GOUWS, CHRISTIAN (Director)

ID Number/Passport Number	5908285147004	Initials	C
Date of Birth	1959/08/28	Member size percentage	0
Status	Resigned	Member Contribution	0
Resignation Date	2001/07/09	Residential Address	364 BROOKS STREET MENLO PARK 0081
Country of Residence	South Africa	Postal Address	P O BOX 35465 MENLO PARK 0102
Telephone Number		e-mail Address	
Fax Number		Profession	ATTORNEY
Cell Number		Appointment	2001/06/21

AUDITOR(S)

LLOYD VILJOEN

Name	LLOYD VILJOEN	Status	Current
Prof. Code	Chartered Accounts	Type	Auditor
Prof. No	903914A	Postal Address	P O BOX 571 RANDBURG 2125
Start Date	-		
End Date	-		
Expiry Date	-		
Reg. Entry Date	-		
CM31 Completed	-	Physical Address	1ST FLOOR RANDPARK BUILDING 20 DOVER STREET FERNDALE RANDBURG 2194
CM31 Received	-		
Ref. No			
Fine Letter			
Date of status change (if applicable)	-	Act Ind Mpy No Sp	

CAPITAL INFORMATION

Type	No of Shares	Parri Value	Cap. Amount	Cap. Premium
Authorized Ordinary	1000	0	1	0
Authorized Ordinary	100	0	1	0

HISTORY

Eff. Date	Change Type
2001/07/09	Directors/Member Change/Secretary/Trust/Both Dir And Office (Add Record Surname = NORTJE First Names = MATTHYS MACHIEL JOHANNESBURG Status = Active)
2001/07/09	Directors/Member Change/Secretary/Trust/Both Dir And Office (Change Record Surname = GOUWS First Names = CHRISTIAN Status = Resigned)
2001/07/12	Auditor/Acc Officer Change

HISTORY

	(Change Record Name : = MALHERBE LOURENS Status : = Resign)
2001/07/12	Auditor/Acc Officer Change (Add Record Name : = LLOYD VILJOEN Status : = Current)
2001/08/09	Registered Address Change (287 LYNNWOOD ROAD MENLO PARK 0081)
2001/08/09	Postal Address Change (P O BOX 35465 MENLO PARK 0102)

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SEARCH DETAILS

Date Requested	2013/05/29 14:18
Reference	-

COMPANY SUMMARY

Name	CRADLE GATE
Status	In Business
Registration Number	2006/014248/07
Registration Date	2006/05/12

DIRECTOR LIST (10)

HARRIS, CHRISTOPHER VAUSE (Director - Active)
GRUZZET SECRETARIAL AND TRUST COMPANY (PTY) LTD, (Secretary (Companies and CCs) - Active)
MCKENZIE, GREGORY KEITH (Director - Resigned)
VORSTER, ROBIN (Director - Resigned)
GOUWS, CHRISTIAN (Director - Resigned)
VAN SCHAIK, THEODORE (Director - Resigned)
DOTT, ANDREW WILSON (Director - Resigned)
VORSTER, HELLMUT JOHAN (Director - Resigned)
STOREY, JOHN CLIFFORD (Director - Resigned)
DE VILLIERS, GRAHAM HERBER MELT (Director - Resigned)

AUDITOR(S) LIST (2)

MALHERBE LOURENS
GZ & CO

COMPANY INFORMATION

Registration No	2006/014248/07	**Registered Office**	43 CHESTER ROAD PARKWOOD
Status	In Business		
Enterprise Name	CRADLE GATE		2193
Registration Date	2006/05/12		
Enterprise Type	Private Company		
Conv. Enterprise No		**Postal Address**	P O BOX 2019 PARKLANDS
Business Start	2006/05/12		
Old Reg No			2121
Financial Year End	2	**Region**	Gauteng
Fin Effective Date	2006/05/12	**Country**	Unknown
Tax Number	9841744148	**Country of Origin**	
Short Name		**CK Date**	-
Translated Name		**CK Date Received**	-
Status Date	2006/05/12	**Date of Type**	2006/05/12
Authorized Shares	1000	**Issued Shares**	100
Authorized Capital	1000	**Issued Capital**	100
Industry	Private households, exterritorial organisations, representatives of foreign governments and other activities not adequately defined		

DIRECTOR(S)

HARRIS, CHRISTOPHER VAUSE (Director)

ID Number/Passport Number	5806015264083	Initials	
Date of Birth	1958/06/01	Member size percentage	0
Status	Active	Member Contribution	0
Resignation Date	-	Residential Address	19 RIETFONTEIN ROAD RIVONIA Gauteng 2125
Country of Residence	South Africa	Postal Address	P O BOX 651099 BENMORE Gauteng 2010
Telephone Number		e-mail Address	
Fax Number		Profession	BUSINESSMAN
Cell Number		Appointment	2006/07/14

GRUZZET SECRETARIAL AND TRUST COMPANY (PTY) LTD, (Secretary (Companies and CCs))

ID Number/Passport Number		Initials	
Date of Birth	-	Member size percentage	0
Status	Active	Member Contribution	0
Resignation Date	-	Residential Address	
Country of Residence	South Africa	Postal Address	PO BOX 2019 PARKLANDS SOUTH AFRICA 2196
Telephone Number		e-mail Address	
Fax Number		Profession	
Cell Number		Appointment	2006/07/14

MCKENZIE, GREGORY KEITH (Director)

ID Number/Passport Number	5909125170081	Initials	
Date of Birth	1959/09/12	Member size percentage	0
Status	Resigned	Member Contribution	0
Resignation Date	2011/04/04	Residential Address	97 ST AUDLEY ROAD BRYANSTON Gauteng 2191
Country of Residence	South Africa	Postal Address	P O BOX 67130 BRYANSTON Gauteng 2021
Telephone Number		e-mail Address	
Fax Number		Profession	BUSINESSMAN
Cell Number		Appointment	2010/08/01

VORSTER, ROBIN (Director)

ID Number/Passport Number	3508035028082	Initials	
Date of Birth	1935/08/03	Member size percentage	0
Status	Resigned	Member Contribution	0
Resignation Date	2011/04/05	Residential Address	48A TALANA ROAD CLAREMONT Western Cape 7708
Country of Residence	South Africa	Postal Address	48A TALANA ROAD Street address 2 CLAREMONT Western Cape 7708
Telephone Number		e-mail Address	
Fax Number		Profession	DIRECTOR
Cell Number		Appointment	2006/07/14

GOUWS, CHRISTIAN (Director)

ID Number/Passport Number	5908285147087	Initials	C
Date of Birth	1959/08/28	Member size percentage	0
Status	Resigned	Member Contribution	0
Resignation Date	-	Residential Address	329 ANCHELLA STREET FAERIE GLEN 0043
Country of Residence	South Africa	Postal Address	P O BOX 35465 MENLO PARK 0102
Telephone Number		e-mail Address	
Fax Number		Profession	ATTORNEY
Cell Number		Appointment	2006/05/12

VAN SCHAIK, THEODORE (Director)

ID Number/Passport Number	3511255030085	Initials	
Date of Birth	1935/11/25	Member size percentage	0
Status	Resigned	Member Contribution	0
Resignation Date	2011/04/12	Residential Address	15 CORMORANT CRESCENT STEENBERG ESTATE TOKAI Western Cape 7945
Country of Residence	South Africa	Postal Address	11146 STEENBERG ESTATE TOKAI CAPE TOWN Western Cape 7945
Telephone Number		e-mail Address	
Fax Number		Profession	MEMBER
Cell Number		Appointment	2006/07/14

DOTT, ANDREW WILSON (Director)

ID Number/Passport Number	5810145034085	Initials	
Date of Birth	1958/10/14	Member size percentage	0
Status	Resigned	Member Contribution	0
Resignation Date	2011/01/04	Residential Address	PLOT 52 LAMMERMOOR MOGALE CITY Gauteng 1739
Country of Residence	South Africa	Postal Address	P O BOX 4712 CRESTA Gauteng 2118
Telephone Number		e-mail Address	
Fax Number		Profession	TOUR OPERATOR
Cell Number		Appointment	2006/07/14

VORSTER, HELLMUT JOHAN (Director)

ID Number/Passport Number	6411125159080	Initials	
Date of Birth	1964/11/12	Member size percentage	0
Status	Resigned	Member Contribution	0
Resignation Date	-	Residential Address	HAKAHANA FARM PORTION 211 ELANDSFONTEIN 352 JR Other 0000
Country of Residence	South Africa	Postal Address	P O BOX 1125 PRETORIA Gauteng 0001
Telephone Number		e-mail Address	
Fax Number		Profession	BUSINESSMAN
Cell Number		Appointment	2006/09/26

STOREY, JOHN CLIFFORD (Director)

ID Number/Passport Number	6201225048089	Initials	
Date of Birth	1962/01/22	Member size percentage	0
Status	Resigned	Member Contribution	0
Resignation Date	2011/12/05	Residential Address	16 HYDE PLACE TOMAN LANE HYDE PARK Gauteng 2196
Country of Residence	South Africa	Postal Address	P O BOX 41475 CRAIGHALL Gauteng 2024
Telephone Number		e-mail Address	
Fax Number		Profession	DIRECTOR
Cell Number		Appointment	2006/07/19

DE VILLIERS, GRAHAM HERBER MELT (Director)

ID Number/Passport Number	3608195037087	Initials	
Date of Birth	1936/08/19	Member size percentage	0
Status	Resigned	Member Contribution	0
Resignation Date	2011/07/04	Residential Address	2 DOMAINE DES ANGES DIRKIE UYS STREET FRANSCHHOEK Western Cape 7690
Country of Residence	South Africa	Postal Address	2 DOMAINE DES ANGES DIRKIE UYS STREET FRANSCHHOEK Western Cape 7690
Telephone Number		e-mail Address	
Fax Number		Profession	WINE FARM OWNER
Cell Number		Appointment	2006/07/14

AUDITOR(S)

MALHERBE LOURENS

Name	MALHERBE LOURENS	Status	Resign
Prof. Code	Chartered Accounts	Type	Auditor
Prof. No	900636	Postal Address	PO BOX 4590 RANDBURG
Start Date	-		
End Date	2006/07/14		2125
Expiry Date	-		
Reg. Entry Date	-		
CM31 Completed	-	Physical Address	326 RIVONIA BOULEVARD RIVONIA
CM31 Received	-		
Ref. No			2128
Fine Letter			
Date of status change (if applicable)	-	Act Ind Mpy No Sp	

GZ & CO

Name	GZ & CO	**Status**	Current
Prof. Code	The South African Institute of Chartered Accountants	**Type**	Auditor
Prof. No	923877E	**Postal Address**	P O BOX 2019 PARKLANDS SOUTH AFRICA 2121
Start Date	2006/07/14		
End Date	-		
Expiry Date	-		
Reg. Entry Date	2006/07/26		
CM31 Completed	2006/07/26	**Physical Address**	43 CHESTER RD PARKWOOD
CM31 Received	2006/07/26		
Ref. No			2193
Fine Letter			
Date of status change (if applicable)	-	**Act Ind Mpy No Sp**	

CAPITAL INFORMATION

Type	No of Shares	Parri Value	Cap. Amount	Cap. Premium
Authorized Ordinary	1000	0	1	0
Authorized Ordinary	100	0	1	0

HISTORY

Eff. Date	Change Type
2006/07/14	Auditor/Acc Officer Change (P O BOX 2019 PARKLANDS SOUTH AFRICA 2121 Status : Address Change)
2006/07/14	Auditor/Acc Officer Change (No information to display)
2006/07/14	Directors/Member Change/Secretary/Trust/Both Dir And Office (Surname=GOUWS Full ForeNames=CHRISTIAN Id No=5908285147087 Status :RESIGNEDNature of Change=RESIGNED 14/07/2006)
2006/07/14	Directors/Member Change/Secretary/Trust/Both Dir And Office (Surname=VAN SCHAIK Full ForeNames=THEODORE Id No=3511255030085 Status :ACTIVENature of Change=APPOINTED 14/07/2006)
2006/07/14	Directors/Member Change/Secretary/Trust/Both Dir And Office (Surname=HARRIS Full ForeNames=CHRISTOPHER VAUSE Id No=5806015264083 Status :ACTIVENature of Change=APPOINTED 14/07/2006)
2006/07/14	Directors/Member Change/Secretary/Trust/Both Dir And Office (Surname=VORSTER Full ForeNames=ROBIN Id No=3508035028082 Status :ACTIVENature of Change=APPOINTED 14/07/2006)
2006/07/14	Directors/Member Change/Secretary/Trust/Both Dir And Office (Surname=DE VILLIERS Full ForeNames=GRAHAM HERBER MELT Id No=3608195037087 Status :ACTIVENature of Change=APPOINTED 14/07/2006)
2006/07/14	Directors/Member Change/Secretary/Trust/Both Dir And Office (Surname=DOTT Full ForeNames=ANDREW WILSON Id No=5810145034085 Status :ACTIVENature of Change=APPOINTED 14/07/2006)
2006/07/19	Directors/Member Change/Secretary/Trust/Both Dir And Office (Surname=STOREY Full ForeNames=JOHN CLIFFORD Id No=6201225048089 Status :ACTIVENature of Change=APPOINTED 19/07/2006)
2006/08/16	Registered Address Change (2ND FLOOR 3 STURDEE AVENUE ROSEBANK JOHANNESBURG 2196)
2006/08/16	Postal Address Change (P O BOX 2019 PARKLANDS SOUTH AFRICA 2121)
2006/08/28	Directors/Member Change/Secretary/Trust/Both Dir And Office (Surname=VORSTER Full ForeNames=ROBIN Id No=3508035028082 Status :ACTIVENature of Change=NO CHANGE)
2006/10/02	Postal Address Change (SUITE 235 PRIVATE BAG X9916 SANDTON 2146)
2006/10/02	Registered Address Change (9A NORTH ROAD MORNINGSIDE 2146)
2006/10/13	Postal Address Change (P O BOX 2019 PARKLANDS SOUTH AFRICA 2121)
2006/10/13	Registered Address Change (2ND FLOOR 3 STURDEE AVENUE ROSEBANK JOHANNESBURG 2196)

HISTORY

2006/10/30	Name Change (ALPHABET STREET PROPERTIES 32)
2006/10/30	Nature of Business Change (SIC Code) (81)

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SEARCH DETAILS

Date Requested	2013/05/29 14:15
Reference	-

COMPANY SUMMARY

Name	ELIZIAAN
Status	In Business
Registration Number	2003/004711/07
Registration Date	2003/02/28

DIRECTOR LIST (5)

ROTHMAN, ANITA (Director - Active)
GRIFFITH, PHILLIPINA GENA (Director - Active)
GRIFFITH, SCOTT BRIAN (Director - Active)
GRIFFITH, LLOYD MICHAEL (Director - Active)
GRIFFITH, MICHELLE (Director - Active)

AUDITOR(S) LIST (1)

HAIG RANDALL

COMPANY INFORMATION

Registration No	2003/004711/07	**Registered Office**	7 GOLF STREET LINKSFIELD
Status	In Business		
Enterprise Name	ELIZIAAN		2192
Registration Date	2003/02/28		
Enterprise Type	Private Company		
Conv. Enterprise No	B1989017910	**Postal Address**	P O BOX 472 BEDFORDVIEW
Business Start	2003/02/28		
Old Reg No			2008
Financial Year End	2	**Region**	Gauteng
Fin Effective Date	2003/02/28	**Country**	Unknown
Tax Number	9250624641	**Country of Origin**	
Short Name		**CK Date**	-
Translated Name		**CK Date Received**	-
Status Date	-	**Date of Type**	2003/02/28
Authorized Shares		**Issued Shares**	
Authorized Capital		**Issued Capital**	
Industry	Financial intermediation, except insurance and pension funding		

DIRECTOR(S)

ROTHMAN, ANITA (Director)

ID Number/Passport Number	5711110072086	Initials	A
Date of Birth	1957/11/11	Member size percentage	0
Status	Active	Member Contribution	0
Resignation Date	-	Residential Address	10 ELRANE HEIGHTS CRADOCK AVENUE ELDORAIGNE 0157
Country of Residence	South Africa	Postal Address	POSTNET SUITE 195 PRIVATE BAG X3 NORTH RIDING 2162
Telephone Number		e-mail Address	
Fax Number		Profession	DIRECTOR
Cell Number		Appointment	2003/02/28

GRIFFITH, PHILLIPINA GENA (Director)

ID Number/Passport Number	4903120069084	Initials	P G
Date of Birth	1949/03/12	Member size percentage	0
Status	Active	Member Contribution	0
Resignation Date	-	Residential Address	16 FLORA VILLAGE POTGIETER STREET HAMBERG 1724
Country of Residence	South Africa	Postal Address	POSTNET SUITES 195 PRIVATE BAG X3 NORTH RIDING 2162
Telephone Number		e-mail Address	
Fax Number		Profession	DIRECTOR
Cell Number		Appointment	2003/02/28

GRIFFITH, SCOTT BRIAN (Director)

ID Number/Passport Number	7303125149089	Initials	S B
Date of Birth	1973/03/12	Member size percentage	0
Status	Active	Member Contribution	0
Resignation Date	-	Residential Address	8 GREENACRES MAPLE DRIVE NORTHWOLD 2155
Country of Residence	South Africa	Postal Address	POSTNET SUITES 195 PRIVATE BAG X3 NORTH RIDING 2162
Telephone Number		e-mail Address	
Fax Number		Profession	DIRECTOR
Cell Number		Appointment	2003/02/28

GRIFFITH, LLOYD MICHAEL (Director)

ID Number/Passport Number	7203035143083	Initials	L M
Date of Birth	1972/03/03	Member size percentage	0
Status	Active	Member Contribution	0
Resignation Date	-	Residential Address	112 FEATHERBROOK ESTATE RUIMSIG 2162
Country of Residence	South Africa	Postal Address	POSTNET SUITES 195 PRIVATE BAG X3 NORTH RIDING 2162
Telephone Number		e-mail Address	
Fax Number		Profession	DIRECTOR
Cell Number		Appointment	2003/02/28

GRIFFITH, MICHELLE (Director)

ID Number/Passport Number	7901090026081	Initials	M
Date of Birth	1979/01/09	Member size percentage	0
Status	Active	Member Contribution	0
Resignation Date	-	Residential Address	112 FEATHERBROOK ESTATE RUIMSIG 2162
Country of Residence	South Africa	Postal Address	POSTNET SUITES 195 PRIVATE BAG X3 NORTH RIDING 2162
Telephone Number		e-mail Address	
Fax Number		Profession	DIRECTOR
Cell Number		Appointment	2003/02/28

AUDITOR(S)

HAIG RANDALL

Name	HAIG RANDALL	Status	Current
Prof. Code	Chartered Accounts	Type	Auditor
Prof. No	65021	Postal Address	P O BOX 472 BEDFORDVIEW 2008
Start Date	2003/03/01		
End Date	-		
Expiry Date	-		
Reg. Entry Date	-		
CM31 Completed	-	Physical Address	7 GOLF STREET LINKSFIELD
CM31 Received	-		
Ref. No			2192
Fine Letter			
Date of status change (if applicable)	-	Act Ind Mpy No Sp	

CAPITAL INFORMATION

No capital information to display.

HISTORY

No history available.

DISCLAIMER

Proof of Newspaper Advertisement

Communications to and from Persons Detailed in Point 2 and 3 above

From: Juanita [user3@bokamoso.net]
Sent: 30 May 2013 04:02 PM
To: jgrobler@geoscience.org.za; asalomon@sahra.org.za; maphata.ramphele@gauteng.gov.za; justicem@dwaf.gov.za; keetm@dwaf.gov.za; siwelanel@dwa.gov.za; tshifaror@dwa.gov.za; Central@eskom.co.za; paia@eskom.co.za; schmidk@nra.co.za; kumen.govender@gauteng.gov.za; customerservice@randwater.co.za; rudzanim@tshwane.gov.za; daniel.ramokone@transnet.net; casperm@tshwane.gov.za; 'mafokwane.mvg@gmail.com'
Subject: Nooitgedacht 366
Attachments: Public Notice BA.pdf

Dear Interested and/or Affected Party Member,

Please refer to the attached Public Notice regarding the proposed Nooitgedacht 366 Project.

Hope this finds you well.

Kind Regards/Vriendelike Groete

Juanita De Beer

Bokamoso

Landscape Architects &
Environmental Consultants cc.

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

From: Bokamoso [lizelleg@mweb.co.za]
Sent: 03 June 2013 08:20 AM
To: siwelanel@dwa.gov.za
Subject: RE: Nooitgedacht 366

Dear Lilian Siwelane,

Thank you for your response, I have registered Water Affairs as Interested and/or Affected Party Member for the proposed Nooitgedacht 366 Project. I will keep you updated regarding the process in the future.

Hope this finds you well.

Kind Regards/Vriendelike Groete

Juanita De Beer

Landscape Architects &
Environmental Consultants cc.

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

From: Siwelane Lilian (PTA) [mailto:SiwelaneL@dwa.gov.za]
Sent: 31 May 2013 04:59 PM
To: Bokamoso
Subject: RE: Nooitgedacht 366

Good day Lizelle

Please send us the basic assessment report once it is available.

Regards

Lillian

From: Bokamoso [mailto:lizelleg@mweb.co.za]
Sent: Thursday, May 30, 2013 4:02 PM
To: jgrobler@geoscience.org.za; asalomon@sahra.org.za; maphata.ramphele@gauteng.gov.za;

Maluleke Justice; Keet Marius (PTA); Siwelane Lilian (PTA); Tshifaro Rabelani; Central@eskom.co.za; paia@eskom.co.za;schmidk@nra.co.za; kumen.govender@gauteng.gov.za; customerservice@randwater.co.za; rudzanim@tshwane.gov.za; daniel.ramokone@transnet.net ; casperm@tshwane.gov.za; mafokwane.mvg@gmail.com
Subject: Nooitgedacht 366

Dear Interested and/or Affected Party Member,

Please refer to the attached Public Notice regarding the proposed Nooitgedacht 366 Project.

Hope this finds you well.

Kind Regards/Vriendelike Groete

Juanita De Beer

Bokamoso

Landscape Architects &
Environmental Consultants cc.

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

Please consider the environment before printing this email

From: Juanita [user3@bokamoso.net]
Sent: 04 June 2013 10:28 AM
To: 'thys@lavue.co.za'
Subject: RE: Kafue River Trading (PTY) Ltd - Proposed development

Dear Thys Nortje,

Thank you for your response, I have registered you as Interested and/or Affected Party Member for the proposed Nooitgedacht 366 Project. I will keep you updated regarding the process in the future.

Industrial Purposes to include:

- The assembling of products;
- The re-packaging of products;
- Distribution centres.

Hope this finds you well.

Kind Regards/Vriendelike Groete

Juanita De Beer

Landscape Architects &
Environmental Consultants cc.

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

From: Thys Nortje [mailto:thys@lavue.co.za]
Sent: 04 June 2013 09:57 AM
To: lizelleg@mweb.co.za
Subject: Kafue River Trading (PTY) Ltd - Proposed development

Dear Lizelle

As direct neighbour (Western boundary) to the above proposed development, I would like you to register me as interested and affected party. Please add me to your mailing list for future correspondence.

Can you please explain to me exactly what kind of development your customer have in mind. The 'industrial' part of it might be of concern to me as I am operating as a Guest Lodge and Function Venue.

Please find my contact details below.

Kind regards,

Thys Nortje'
+27 (0) 82 807 0963
info@lavue.co.za
www.lavue.co.za

From: Juanita [user3@bokamoso.net]
Sent: 13 June 2013 12:16 PM
To: TaniaB@cosmopro.co.za
Subject: RE: Register as Interested and Affected Party

Dear Tania Barbarovich,

Thank you for your response, I have registered Cosmopolitan Projects Johannesburg (Pty) Ltd as Interested and/or Affected Party Member for the proposed Nooitgedacht Ptn 366 Project. I will keep you updated regarding the process in the future.

Hope this finds you well.

Kind Regards/Vriendelike Groete

Juanita De Beer

Landscape Architects &
Environmental Consultants cc.

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

From: Tania Barbarovich [mailto:TaniaB@cosmopro.co.za]
Sent: 13 June 2013 11:43 AM
To: Lizelle Gregory
Subject: Register as Interested and Affected Party

Dear Juanita de Beer,

Herewith a formal request to be registered as Interested and Affected Party on the proposed development of Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City.

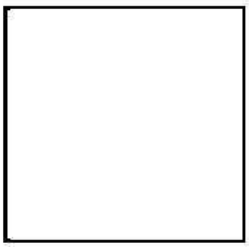
Name:	**Cosmopolitan Projects Johannesburg (Pty) Ltd**
Contact:	**Tania Barbarovich**
Number:	**(011) 541 3800 / 082 922 1951**
Affected:	**Ptn 2 and 21 of the Farm Nooitgedacht (The Lion Park)**

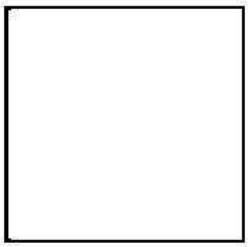
Kind regards

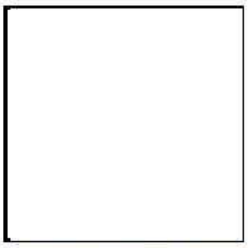
Tania Barbarovich

Land Development - Project Manager

✆: 0829221951 | ☎: +27 11 541 3800 | 🖷: 0866588130 | ✉: TaniaB@cosmopro.co.za
First Floor Engen House | Waterfall Office Park | Bekker Street | Midrand | 1685 & PO Box 754 | Auckland Park | 2006







Please consider the environment before printing this email

From: Bokamoso [lizelleg@mweb.co.za]
Sent: 17 July 2013 09:37 AM
To: Tebogo.Molokomme@gauteng.gov.za
Subject: RE: H50-13. BA notice. Proposed development on portion 366 farm Nooitgedatcht 534 JQ, Mogale City
Attachments: Heritage_Impact_Ass_Feb2013.pdf

Dear Tebogo,

Your email received on 15 July 2013 refers.

Please find the Heritage Impact study attached to this email.

Do not hesitate to contact our office should you have any questions.

Kind Regards,

Mary-Lee Potgieter

Landscape Architects &
Environmental Consultants cc

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

From: User1 [mailto:user1@bokamoso.net]
Sent: 16 July 2013 04:34 PM
To: user2@bokamoso.net
Cc: user3@bokamoso.net
Subject: FW: H50-13. BA notice. Proposed development on portion 366 farm Nooitgedatcht 534 JQ, Mogale City

Hi Mary-Lee/ Juanita

Vind asb. aangeheg die heritage kommentare vir Nooitgedacht 366.

Dankie,

Anè Agenbacht
Tel: 012-346 3810

Cell: 083 533 0420
Email: lizelleg@mweb.co.za (Attention: Anè)

Landscape Architects &
Environmental Consultants

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

From: Bokamoso [mailto:lizelleg@mweb.co.za]
Sent: Tuesday, July 16, 2013 8:10 AM
To: user1@bokamoso.net
Subject: FW: H50-13. BA notice. Proposed development on portion 366 farm Nooitgedatcht 534 JQ, Mogale City

From: Tebogo Molokomme [mailto:Tebogo.Molokomme@gauteng.gov.za]
Sent: 15 July 2013 07:00 PM
To: lizelleg@mweb.co.za
Cc: Ramphele, Maphata (GPSPORTS)
Subject: H50-13. BA notice. Proposed development on portion 366 farm Nooitgedatcht 534 JQ, Mogale City

Dear Sir

Kindly find attached, the response from the Heritage Impact Assessment (HIA) Committee regarding the above-mentioned matter.

Kind Regards,

Tebogo Molokomme

For the HIA Committee

Heritage: Provincial Heritage Resources Authority - Gauteng (PHRA-G)
Department of Sport, Arts, Culture and Recreation
Tel: 011 355 2545 Fax: 011 355 2500
Email: tebogo.molokomme@gauteng.gov.za

Minutes of Any Public and/or Stakeholders Meetings

(Not available)

Comments and Responses Report

COMMENT AND RESPONSE REPORT-
BASIC ASSESSMENT REPORT FOR THE PROPOSED DEVELOPMENT ON PORTION 366 OF THE FARM NOOITGEDACHT 534 JQ
Gaut: 002/13-14/E0315

Issue	Commentator	Date	Response
Please send us the basic assessment report once it is available.	Siwelane Lilian	31 May 2013	Thank you for your response, we have registered Water Affairs as Interested and/or Affected Party Member for the proposed Nooitgedacht 366 Project. We will keep you updated regarding the process in the future.
As direct neighbour (Western boundary) to the above proposed development, I would like you to register me as interested and affected party. Please add me to your mailing list for future correspondence. Can you please explain to me exactly what kind of development your customer have in mind. The 'industrial' part of it might be of concern to me as I am operating as a Guest Lodge and Function Venue.	Thys Nortje	4 June 2013	Thank you for your response, we have registered you as Interested and/or Affected Party Member for the proposed Nooitgedacht 366 Project. We will keep you updated regarding the process in the future. Industrial Purposes to include: • The assembling of products; • The re-packaging of products; • Distribution centers.
Herewith a formal request to be registered as Interested and Affected Party on the proposed development of Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City.	Tania Barbarovich	13 June 2013	Thank you for your response, we have registered Cosmopolitan Projects Johannesburg (Pty) Ltd as Interested and/or Affected Party Member for the proposed Nooitgedacht Ptn 366 Project. We will keep you updated regarding the process in the future.
This serves to confirm that the above-mentioned application was discussed by the PHRA-G Heritage Impact Assessment (HIA) Committee on Friday, 21 June 2013. After reviewing your application, the Committee has made the following recommendations: a) The applicant is hereby requested to conduct a Heritage Impact Assessment and submit the report to the PHRA-G for adjudication. b) The report should amongst other things include the following: - Identify and map the heritage resources on the property;	Tebogo Molokomme	15 July 2013	The Heritage Assessment is attached to the Draft Basic Assessment Report and there were correspondences with Mr Molokomme regarding the Heritage Impact Study. The Heritage Impact study was sent to the PHRA-G office. No further comments were received.

- Clearly indicate which heritage resources are to be impacted by the proposed development; - Give mitigations measures; - Give the Public Participation Report. Here, you are also advised to advertise the proposed work in the local newspaper (for 30 days), calling for comments from the Interested and Affected (I&A) parties; - The advert must include our details as mentioned above plus this e-mail address: tebogo.molokomme@gauteng.gov.za			
This office conducted a site inspection on 23 August 2013, consulted the MCLM's EMF and the findings thereof were discussed at DIEM's Environmental Advisory Task Team (EATT) on 24 August 2013. DIEM therefore comments as follows: • DIEM is satisfied with the report and the conditions contained thereto. This office is of the opinion that all relevant issues were adequately addressed especially the notices and advertisements. • All impacts associated with the proposed development have been identified in terms of scale, severity, certainty, direction and significance. The degree of the impacts with and without mitigation measures has also been addressed. DIEM therefore enforces that the proposed mitigation measures must be implemented to prevent or reduce negative environmental impacts that may result from the proposed development. • Cognizance has been taken that a wetland delineation study has been conducted in order to mitigate the potential impacts of the proposed development. All appropriate buffer zones from the wetland must be maintained. • According to MCLM's Waste Management By-Laws (2007) please be advised that the municipality can render a service for the collection and removal of business,	Mogale City **Local Municipality** Sabinah Nobela Sabinah.nobela@mogalecity.gov.za	19 September 2013	• Noted • The proposed mitigation measures will be implemented to prevent or reduce negative environmental impacts that may result from the proposed development. • All appropriate buffer zones from the wetland will be maintained. • Noted

domestic, garden, builders, dry industrial refuse, bulky mass, special refuse from the premises on payment of a tariff charge. • A copy of the Record of Decision must be forwarded to DIEM for record purposes. In addition to the above, cognizance must be taken that no construction must take place prior to GDARD granting an Environmental Authorization. Non-compliance with the above will result in the relevant authority issuing a directive to address the non-civil proceedings to enforce compliance. In addition, all the statutory requirements including those of National, Provincial Governments and MCLM's by-laws and policies must be adhered to.			• A copy of the ROD will be sent to the DIEM once received. Noted

Comments from I&Ap's on Basic Assessment (BA) Report

MOGALE CITY LOCAL MUNICIPALITY

DIRECTORATE:
INTEGRATED ENVIRONMENTAL MANAGEMENT

Mogale City Local Municipality

Fax: (011) 660-1507

sabinah.nobela@mogalecity.gov.za

FACSIMILE COVER SHEET

TO: Bokamoso Architects	FROM: Sabinah Nobela
Attention: Lizelle Gregory	Date: 19 September 2013
Fax No: 086 570 5659	Fax no: (011) 660-1507
Tel No: 012 346 3810	Tel no: (011) 951 2135
Cc. No of Pages (including this):3	Department: IEM

- Re: *Herewith please find the attached letter for your attention.*

Kind Regards,

Cindy Ramalatswa

Mogale City
Local Municipality

P.O. Box 94
Krugersdorp
1740
Tel: (011) 951-2000
Fax: (011)
Direct:

Reference:
SABINAH NOBELA
Control Sheet No: 57682-17/29/3/2/115

BOKAMOSO ARCHITECTS
PO Box 11375
Maroelana
0161

Tel: (012) 346 3810
Fax: (086)570 5659

Attention: Lizelle Gregory

APPLICATION FOR THE PROPOSED ESTABLISHMENT OF LAND USE RIGHTS FOR INDUSTRIAL PURPOSES, INCLUDING THE ASSEMBLING OF PRODUCTS, THE RE-PACKAGING OF PRODUCTS AND DISTRIBUTION CENTRES ON THE FARM NOOITGEDACHT 534 JQ

The above matter has reference.

The Department: Integrated Environmental Management (DIEM) of Mogale City Local Municipality (MCLM) received your Draft Basic Assessment Report (BAR) for the above-mentioned township development.

This office conducted a site inspection on 23 August 2013, consulted the MCLM's EMF and the findings thereof were discussed at DIEM's Environmental Advisory Task Team (EATT) on 24 August 2013. DIEM therefore comments as follows:

- DIEM is satisfied with the report and the conditions contained thereto. This office is of the opinion that all relevant issues were adequately addressed especially the notices and advertisements.

- All impacts associated with the proposed development have been identified in terms of scale, severity, certainty, direction and significance. The degree of the impacts with and without mitigation measures has also been addressed. DIEM therefore enforces that the proposed mitigation measures must be implemented to prevent or reduce negative environmental impacts that may result from the proposed development.

- Cognisance has been taken that a wetland delineation study has been conducted in order to mitigate the potential impacts of the proposed development. All appropriate buffer zones from the wetland must be maintained.

- According to MCLM's Waste Management By-Laws (2007) please be advised that the municipality can render a service for the collection and removal of business, domestic, garden, builders, dry industrial refuse, bulky mass, special refuse from the premises on payment of a tariff charge.

- A copy of the Record of Decision must be forwarded to DIEM for record purposes.

In addition to the above, cognisance must be taken that no construction must take place prior to GDARD granting an Environmental Authorisation. Non-compliance with the above will result in the relevant authority issuing a directive to address the non-compliance, including an order to stop the activity as well as instituting criminal and/or civil proceedings to enforce compliance. In addition, all the statutory requirements including those of National, Provincial Governments and MCLM's by-laws and policies must be adhered to.

Should you have any queries regarding the above matter, please do not hesitate to contact this office at 011 951 2101.

Yours faithfully,

M MOKOENA
EXECUTIVE MANAGER: INTEGRATED ENVIRONMENTAL MANAGEMENT
DATE: 2013/09/17

LEBOMBO GARDENS BUILDING
36 LEBOMBO ROAD
ASHLEA GARDENS
0081

P.O. BOX 11375
MAROELANA
0161

Tel: (012) 346 3810
Fax: 086 570 5639
E-mail: lizelleg@mweb.co.za
Website: www.Bokamoso.biz

Bokamoso ENVIRONMENTAL

Landscape Architects, Environmental Consultants,
Environmental Auditing, Water License Applications

Department of Water Affairs
Bothongo Plaza East
285 Schoeman Street
Pretoria

ATTENTION: Mr. T.L. Mathebe **26 September 2013**

RE: DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED ESTABLISHMENT TO BE KNOWN AS PORTION 366 NOOITGEDACHT 534 JQ MOGALE CITY (REFERENCE NUMBER: Gaut 002/13-14/E0315).

The Draft Basic Assessment Report for the above mentioned project was submitted to your department on 23 August 2013 for review. The review period will end on 2 October 2013 and no comments have been submitted to our office. We would like to remind you to submit comment on/before 2 October 2013 to our office.

Please do not hesitate to contact our office should you have any questions in this regard.

Sincerely,

Potgieter

Mary-Lee Potgieter
Bokamoso Landscape Architects &
Environmental Consultants CC

From: Mary-Lee [mailto:user2@bokamoso.net]
Sent: 26 September 2013 03:37 PM
To: 'mathebet@dwa.gov.za'
Subject: PORTION 366 NOOITGEDACHT 534 JQ MOGALE CITY (REFERENCE NUMBER: Gaut 002/13-14/E0315)

Good day,

Please find the letter attached regarding the abovementioned project. The review period will end on 2 October 2013, please submit your comments before/on 2 October 2013 to our office.

Please do not hesitate to contact us should you have any questions.

Mary-Lee Potgieter

Bokamoso

Landscape Architects &
Environmental Consultants cc

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

LEBOMBO GARDENS BUILDING
36 LEBOMBO ROAD
ASHLEA GARDENS
0081

P.O. BOX 11375
MAROELANA
0161

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

Bokamoso ENVIRONMENTAL

Landscape Architects, Environmental Consultants, Environmental Auditing, Water License Applications

Department of Water Affairs
Bothongo Plaza East
285 Schoeman Street
Pretoria

ATTENTION: Mr. T.L. Mathebe **3 October 2013**

RE: DRAFT BASIC ASSESSMENT REPORT FOR THE PROPOSED ESTABLISHMENT TO BE KNOWN AS PORTION 366 NOOITGEDACHT 534 JQ MOGALE CITY (REFERENCE NUMBER: Gaut 002/13-14/E0315).

The Draft Basic Assessment Report for the above mentioned project was submitted to your department on 23 August 2013 for review. The review period ended on 2 October 2013 and no comments have been submitted to our office. Extended review time will be allowed for comments until 9 October 2013.

Hope you find the above in order. Please do not hesitate to contact our office should you have any questions in this regard.

Sincerely,

Potgieter

Mary-Lee Potgieter
Bokamoso Landscape Architects & Environmental Consultants CC

From: Mary-Lee [mailto:user2@bokamoso.net]
Sent: 03 October 2013 09:06 AM
To: 'mathebet@dwa.gov.za'
Subject: RE: PORTION 366 NOOITGEDACHT 534 JQ MOGALE CITY (REFERENCE NUMBER: Gaut 002/13-14/E0315)

Good day,

Please find the letter attached regarding the abovementioned project.

The review period for this project ended on 2 October 2013. The period for review has been extended to Wednesday 9 October 2013.

Kind Regards,

Mary-Lee Potgieter

Landscape Architects &
Environmental Consultants cc

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

From: Mary-Lee [mailto:user2@bokamoso.net]
Sent: 26 September 2013 03:37 PM
To: 'mathebet@dwa.gov.za'
Subject: PORTION 366 NOOITGEDACHT 534 JQ MOGALE CITY (REFERENCE NUMBER: Gaut 002/13-14/E0315)

Good day,

Please find the letter attached regarding the abovementioned project. The review period will end on 2 October 2013, please submit your comments before/on 2 October 2013 to our office.

Please do not hesitate to contact us should you have any questions.

Mary-Lee Potgieter

Landscape Architects &
Environmental Consultants cc

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

From: Mary-Lee [mailto:user2@bokamoso.net]
Sent: 07 October 2013 10:49 AM
To: 'mathebet@dwa.gov.za'
Cc: 'siwelanel@dwa.gov.za'
Subject: PORTION 366 NOOITGEDACHT 534 JQ MOGALE CITY (REFERENCE NUMBER: Gaut 002/13-14/E0315)

Good Morning,

We would like to remind you of the extended review time that will end on Wednesday, 9 October 2013. If no comments are received from your office by the end of business on Wednesday the Final Basic Assessment Report will be submitted on Thursday.

Please contact our office should you have any queries in this regard.

Kind Regards,

Mary-Lee Potgieter

Landscape Architects &
Environmental Consultants cc

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

From: Mary-Lee [mailto:user2@bokamoso.net]
Sent: 03 October 2013 09:06 AM
To: 'mathebet@dwa.gov.za'
Subject: RE: PORTION 366 NOOITGEDACHT 534 JQ MOGALE CITY (REFERENCE NUMBER: Gaut 002/13-14/E0315)

Good day,

Please find the letter attached regarding the abovementioned project.

The review period for this project ended on 2 October 2013. The period for review has been extended to Wednesday 9 October 2013.

Kind Regards,

Mary-Lee Potgieter

Landscape Architects &
Environmental Consultants cc

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

From: Mary-Lee [mailto:user2@bokamoso.net]
Sent: 26 September 2013 03:37 PM
To: 'mathebet@dwa.gov.za'
Subject: PORTION 366 NOOITGEDACHT 534 JQ MOGALE CITY (REFERENCE NUMBER: Gaut 002/13-14/E0315)

Good day,

Please find the letter attached regarding the abovementioned project. The review period will end on 2 October 2013, please submit your comments before/on 2 October 2013 to our office.

Please do not hesitate to contact us should you have any questions.

Mary-Lee Potgieter

Landscape Architects &
Environmental Consultants cc

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

Comments from I&Ap's on Amendments to the BA Report

(not available)

Copy of the Register of I&AP's

Nr	Registered Parties	Contact details
	Stakeholders	
1	Council Geo-Science	jgrobler@geoscience.org.za
2	SAHRA Gauteng	asalomon@sahra.org.za
		nndobochani@sahra.org.za
3	PHRAG	maphata.ramphele@gauteng.gov.za
		Tebogo.Molokomme@gauteng.gov.za
4	DWA	justicem@dwaf.gov.za
		keetm@dwaf.gov.za
		siwelanel@dwa.gov.za
		tshifaror@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	customerservice@randwater.co.za
9	City of Tshwane	rudzanim@tshwane.gov.za
10	Spoornet	daniel.ramokone@transnet.net
11	DA Roads	casperm@tshwane.gov.za
12	**Ward Councillor**	
	Matuba Mafokwane	mafokwane.mvg@gmail.com
13	**Ward Councillor**	

	Interested and Affected Parties	
1	Thys Nortje	thys@lavue.co.za
		Cell: 082 807 0963
2	**Cosmopolitan Projects Johannesburg (Pty) Ltd**	TaniaB@cosmopro.co.za
	Tania Barbarovich	Cell: 082 922 1951
		Tel: 011 541 3800

Comments from I&AP's on the Application

(Not available)

Water Use Lisence(s), SAHRA Information, Service Letters from Municipalities & Water Supply Information

PROVINCIAL HERITAGE RESOURCES AUTHORITY - GAUTENG
PRIVATE BAG X33, JOHANNESBURG, 2000
38 RISSIK STREET, NBS BUILDING,
JOHANNESBURG, 2000
TEL: 011 355 2500 – FAX: 011 355 2878

Ref.: *H50/13*

Enquiries: *Ms Tebogo Molokomme*

Date: *21 June 2013*

PHRAG
2013 -07- 15
DATE ISSUED

Bokamoso Landscape Architects
Contact Person: Juanita De Beer
Tel: 012 346 3810

E-mail: lizelleg@mweb.co.za

Dear Sir/Madam

Notice of Basic Assessment Process: Proposed development on portion 366 farm Nooitgedatcht 534 JQ, Mogale City

This serves to confirm that the above-mentioned application was discussed by the PHRA-G Heritage Impact Assessment (HIA) Committee on Friday, 21 June 2013.

After reviewing your application, the Committee has made the following recommendations:

a) The applicant is hereby requested to conduct a Heritage Impact Assessment and submit the report to the PHRA-G for adjudication.
b) The report should amongst other things include the following:
   - ✓ Identify and map the heritage resources on the property
   - ✓ Clearly indicate which heritage resources are to be impacted by the proposed development
   - ✓ Give mitigations measures
   - ✓ Give the Public Participation Report. Here, you are also advised to advertise the proposed work in the local newspaper (for 30 days), calling for comments from the Interested and Affected (I&A) parties.
   - ✓ The advert must include our details as mentioned above plus this e-mail address: tebogo.molokomme@gauteng.gov.za

For further clarity, please do not hesitate to contact us at the above-mentioned details.

Kind Regards

Tebogo Molokomme

For the Heritage Impact Assessment (HIA) Committee
Provincial Heritage Resources Authority – Gauteng (PHRA-G)

Specialist Reports

Appendix G

Engineering Geological Investigation Report

AFRICA EXPOSED

CONSULTING ENGINEERING GEOLOGISTS CC

ENGINEERING GEOLOGICAL INVESTIGATION REPORT OF PORTION 366 OF THE FARM NOOITGEDACHT 534-JQ MOGALE CITY.

Prepared for: **Wesplan and Associates**

P.O. Box 68
Honeydew
2040
Fax (086) 633-7332
Phone (083) 656-0900
E mail: jan@africaexposed.co.za

Report No.4412
Date: December 2012

Member: J.K.A.ARKERT Pr.Sci.Nat BSc (Hons) Eng. Geol. MSAIEG
CK No. 1998/009663/23

CONTENTS

Erf 117 Letamo Estate
Kromdraai Road
Mogale City
P.O.Box 68
Honeydew 2040

Fax: (086) 633-7332
Cell: (083) 656-0900
Email: jan@africaexposed.co.za

ENGINEERING GEOLOGICAL INVESTIGATION REPORT OF PORTION 366 OF THE FARM NOOITGEDACHT 534-JQ MOGALE CITY.

1. INTRODUCTION

1.1 Preamble

On 25th September 2012, Mr. A. Enslin of Wesplan and Associates Town Planners requested that Africa Exposed Consulting Engineering Geologists submit a cost proposal for the completion of a geotechnical investigation of Portion 366 of the farm Nooitgedacht 534-JQ in Mogale City.

Subsequently on 13th November 2012 a letter of appointment was received from Wesplan and Associates, accepting the proposal and instructing Africa Exposed to proceed with the investigation.

1.2 Database

The following information was supplied by Wesplan and Associates;

- The site is approximately 20ha in extent.
- The geotechnical investigation is required for the purposed of township development.

1.3 Objectives

The objectives of the investigation were:

- to identify the soil and rock conditions below the site.
- to recommend suitable foundation systems, and founding depths for the proposed structures.
- to comment on any perceived geotechnical problems which may affect either the design or construction of the project.
- to classify the site in terms of the National Home Builders Registration Council (NHBRC) of 1999.

2. FACTUAL REPORT

2.1 Programme of Work

2.1.1 *Literary Review*

A literary review was conducted in order to obtain data from previous investigations carried out in the area. The 1: 250 000 geological map, No 2626 West Rand and "Soil Engineering Maps" produced by Transvaal Provincial Administration Roads Department (1977) were consulted to determine the regional geology in the vicinity of the site.

2.1.2 *Field Work*

On 29th November 2012, ten test holes were excavated by means of a hand auger at positions that were determined on site. The layout of the test pits are shown on the Site Plan in Appendix 1. Each hole was profiled by an engineering geologist according to the Jennings, Brink and Williams system, sampled as necessary and backfilled. The detailed profile logs are shown in Appendix 2.

2.1.3 *Office and Laboratory Work*

From the soil samples recovered, eight disturbed samples were selected for Foundation Indicator Tests and four undisturbed samples were recovered to determine the collapse potential and consolidation characteristics of the soils. All the individual test results are included in Appendix 3 of this report.

2.2 Site Description

The site, which covers an area of some 20ha, is situated on the southwestern side of the intersection of Malibongwe Drive and the N14 freeway in Nooitgedacht, Mogale City. The site investigated is bound by adjacent agricultural land and the limits of the property are not well defined on site. The site is currently partially developed, with two single storey dwellings located in the southwestern corner of the property.

The site occupies a shallow, north trending valley and the general slope of the site is down towards the north at a gradient of4% to 6%.

The vegetation on the property is characterised by natural veld grassland.

2.3 Site Geology

From the available literature as well as the observations during the site investigation, it is evident that the site is underlain by granitic rocks of the Basement Complex, as exposed in the Johannesburg-Pretoria Dome. Typically, these Archaean intrusive igneous rocks are cross cut by diabase dykes of various ages, and may contain a prominent structural fabric.

By experience it is known that the depth of weathering in granitic rocks is highly variable, with the possibility of corestone remnants. Patches of highly collapsable and kaolinised residual soils are common, particularly in the elevated areas above 1 600 mamsl.

2.4 Hydrology

The average annual rainfall in this area is approximately 750 mm, most of which occurs as heavy, isolated thunder showers between October and March. Stormwater runoff from the site is primarily in the form of sheetwash, towards the northwest and a shallow valley traverses from south to north across the site. The stream is non-perennial, with its source being located in the southeastern corner of the property.

No groundwater seepage was noted in test pits, however the presence of seasonal ground water seepage must be anticipated throughout the site.

2.5 Observations

The test pits were excavated to an average depth of 1.3m and a description of the soils that blanket the site is summarised below.

2.5.1 *Transported Soils*

The entire site is covered by a layer, on average 1.0m thick, of silty sand and gravels, of colluvial (hillwash) origin. The soil is generally of medium dense consistency, and is rich in organic matter. In isolated places the transported soils could be seen to be slightly ferruginised.

2.5.2 *Pebble Marker*

The pebble marker is a horizon consisting of angular quartz gravels, in a matrix of light orangey and reddish brown sand, which demarcates the base of the transported soils. The consistency of the horizon is generally medium dense and it is approximately 0.1m thick.

2.5.3 *Residual Granite*

The residual granite soil which originates from the in-situ weathering of the granite parent rock underlies the entire site. The soil is of medium dense consistency, showing the typical relic joints often seen in granitic soils and can also be seen to be leached and open textured. The horizon consists of silty coarse sand, with scattered angular quartz gravels.

2.5.4 *Granite Bedrock*

No outcrop of granite bedrock was noted on the site, however TP 6 encountered soft rock consistency granite boulders at a depth of 1.5m.

2.6 Laboratory and Field Test Results

2.6.1 *Indicator testing*

For more accurate identification and classification purposes, Particle Size Distribution and Atterberg Limits Tests were carried out on representative samples of the various soil horizons present within the site. The results are shown in Appendix 3 of this report and are summarised in table 1 below.

TABLE 1. Summary of Indicator test results

TP No.	Depth (m)	Material	PI	PI (ws)	LS (%)	GM	Activity
1	1.4-1.5	Silty sand and gravel. Reworked Residual Granite	13	6	5	1.20	low
3	1.4-1.5	Silty sand and gravel. Reworked Residual Granite	16	8	7	1.37	low
4	1.2-1.3	Silty sand and gravel. Reworked Residual Granite	15	14	7	0.27	med
5	1.5-1.6	Silty clayey sand and gravel. Reworked Residual Granite	26	22	12	0.38	med
6	1.1-1.2	Silty sand and gravel. Reworked Residual Granite	19	11	8	1.18	low
8	1.0-1.1	Silty sand and gravel. Reworked Residual Granite	12	6	6	1.56	low
9	1.3-1.4	Silty sand and gravel. Residual Granite	17	9	8	1.15	low
10	1.2-1.3	Silty sand and gravel. Residual Granite	6	2	3	2.02	low

2.6.2 *Consolidation and Collapse Potential Testing*

In order to establish the consolidation characteristics and collapse potential of the reworked residual granite, four undisturbed samples were retrieved from the site and were subjected to Consolidation and Collapse Potential tests. The results are summarised in table 2 below and show that the reworked residual granite is collapsible with a degree of severity ranging from 0.5% to 3.5%. According to Jennings and Knight (1975), this represents "No trouble" to "Moderate trouble".

TABLE 2. Consolidation Test Results

TP No	Depth (m)	Material	Dry Density (kg/m³)	Moisture Content (%)	Collapse Potential (%)	Jennings et.al Classification
1	1.4-1.5	Silty sand and gravel. Reworked Residual Granite	1503	13.5	3.5	Moderate Trouble
3	1.4-1.5	Silty sand and gravel. Reworked Residual Granite	1864	8.9	1.3	Moderate Trouble
6	1.1-1.2	Silty sand and gravel. Reworked Residual Granite	1913	12.9	1.1	No trouble
9	1.3-1.4	Silty sand and gravel. Residual Granite	1807	4.7	0.5	No trouble

3. INTERPRETIVE REPORT

3.1 Discussion of Results

The Collapse Potential test and the Consolidation test results completed on the reworked residual granite indicated that these soils are collapsible and compressible. The magnitudes of the anticipated settlements have been calculated by assuming that 700mm wide strip footings will be placed at an average depth of 0.8m below natural ground surface and the foundations would apply a bearing pressure of 100kPa.

It has been shown that the magnitude of the total collapse and consolidation settlement may be in the order of 5 to 30mm.

3.2 Classification of Site.

In order to classify the geotechnical characteristics of the underlying soils, the geotechnical classification method proposed in the National Home Builders Registration Council (NHBRC) of 1999. has been applied to this site. Table 3 shown below indicates the various geotechnical characteristics and the criteria used to evaluate the soils.

TABLE 3. Residential Site Class Designations
Guidelines for Urban Engineering Geological Investigations SAIEG (1998)

Typical Founding Material	Character of Founding Material	Expected Range of Total Soil Movements (mm)	Assumed Differential Movement (%of Total)	Site Class
Silty sands, sands, sandy and gravelly soils	Compressible and potentially collapsible soils	<5.0 5.0-10 >10	75% 75% 75%	C C1 C2

In terms of the National Home Builders Registration Council (NHBRC) of 1999 site classification system, the site has been classified as shown below.

C1 5 to 10mm consolidation and collapse settlement anticipated.
C2 >10mm consolidation and collapse settlement anticipated.

Note that once the position of the 1 : 50 year flood line of the shallow stream that is located on the site has been determined by an appropriately qualified hydrologist, no construction may take place within the limits of the flood lines.

3.3 Design Solutions

3.3.1 *Structures*

3.3.1.1 *Site Classification C1.*

(5 to 10mm consolidation and collapse settlement anticipated)

Potential founding solutions for all of the units to be constructed within this zone are presented below.

i. *Modified Normal (reinforced) Strip Footings.*
Reinforced strip footings should be placed at a depth of 800mm below ground level, and articulation joints must be included in some internal and external walls. Brick force must be included between each course in the plinth wall for a minimum of 6 courses.The maximum allowable bearing pressures must not exceed 80kPa. Articulation joints must be included at all external and internal doors and openings.

For the surface bed the in-situ soils must be removed to a depth of 450mm, and replaced in 150mm thick layers with the same excavated material, compacted to a minimum density of 93% of Mod AASHTO at -1 to +2% OMC.

Due to the risk of collapse settlement occurring in the natural soils it is imperative that good site drainage is provided around individual structures, and excess moisture should not be allowed to accumulate adjacent to foundations (see section 3.3.4).

3.3.1.2 ***Site Classification C2.***
(>10mm consolidation and collapse settlement anticipated)

Potential founding solutions for all of the units to be constructed within these zones are presented below.

i. *Compaction of soils below individual footing.*
Remove the in-situ soils below the foundations (both internal and external walls) to a depth of 1.5 times the foundation width or to a competent horizon. Replace with the excavated material compacted to 93% Mod AASHTO density at -1% to +2% of optimum moisture content, in layers not exceeding 150mm thick. **Particular attention must be paid to the compaction at the edges of the trenches and at corners**. Nominally reinforced foundations must be placed at a depth of 600mm below the top of the mattress and construction may proceed with brick force included between each course in the plinth wall for a minimum of 6 courses.The maximum allowable bearing pressures must not exceed 100kPa.

For the surface bed the in-situ soils must be removed to a depth of 450mm, and replaced in 150mm thick layers with the same excavated material, compacted to a minimum density of 93% of Mod AASHTO at -1 to +2% OMC.

ii. *Soil raft.*
Remove in situ materials to 1.0m beyond perimeter of building (ie. the foot print of the structure) to a depth of 1.5 times the widest foundation, measured from the underside of the footings. Replace with the excavated material in compacted 150mm thick layers to 93% Mod AASHTO density at -1% to +2% of OMC. Bearing capacity of the soil raft will be in the order of 100kPa. Foundations must be placed at a depth of 600mm below the top of the mattress and normal construction may proceed with brick force included between each course in the plinth wall for a minimum of 6 courses. The surface bed may be constructed directly on the soil raft.

iii. *Modified Normal Strip Footings.*
It is recommended that the external and internal walls of the units are founded on reinforced strip footings placed at an average depth of 1.1m below current ground level. The foundations must be reinforced and construction may proceed with brick force included between each course in the plinth wall for a minimum of 6 courses. Articulation joints must be included at all external and internal doors and openings.

Particular attention must be placed on drainage precautions as well as ensuring the competence of all water bearing services.

For the surface bed preparation, the in-situ soils must be removed to a depth of 450mm, and replaced in 150mm thick layers with inert material, compacted to a minimum density of 93% of Mod AASHTO at -1 to +2% OMC.

The maximum allowable bearing pressures must not exceed 50kPa.

Due to the risk of collapse settlement occurring in the natural soils it is imperative that good site drainage is provided around individual structures, and excess moisture should not be allowed to accumulate adjacent to foundations.

3.3.2 *Roads and Terraces*

The results of the Foundation Indicator Tests have been used to classify the material and to determine the suitability of soil for the construction of terraces and pavement layers. The results of the tests are presented in Appendix 3, and the soils tested are classified as a G8 and G10 materials. The soils may therefore be used in the construction of the terraces and as in-situ sub-grade and lower selected layers, while suitable materials for use in the sub-base and base course layers must be imported from a commercial source.

3.3.3 *Excavation Classification*

It is expected that the excavation class up to a depth of 1.5m, will be "soft" according to SABS 1200 D: Earthworks. Allowance must be made for the possibility that boulders and remnant core stones may also be encountered throughout the site.

3.3.4 *Stormwater Management*

Due to the collapsible fabric present in the soil, it is imperative that sound stormwater management is implemented around each building. It is suggested that the precautions presented below are considered to limit the amount of moisture reaching the foundation and thereby reducing the risk of settlement occurring.

i. All water bearing services must be provided with flexible couplings where pipes enter the buildings.
ii. A 1200mm wide apron paving must be provided around the perimeter of the structures. Joints between the paved areas and the walls of the buildings should be sealed with a flexible sealant to prevent moisture reaching the foundations.

iii. Storm water management around the structures must facilitate the efficient disposal of excess water from the site.

iv. No flower beds, garden taps, trees or down pipe discharge must be allowed adjacent to the structures, and must be placed as far away as possible.

3.4 General

3.4.1 *Ground Water*

No ground water seepage was encountered on the site, and it must be anticipated that shallow ground water may occur in isolated areas throughout the site after periods of sustained rainfall., and appropriate precautions should therefore be implemented beneath all the structures and paved areas.

3.5 Construction Problems

No construction problems are anticipated on this site.

3.6 Additional Investigations

This investigation was completed for the purposes of township proclamation, and whilst the site has been zoned and generalised foundation recommendations have been presented for typical residential structures, the results contained in this report should not be used for site specific foundation design purposes. Additional detailed geotechnical investigations would be required for structures other than single and double storey residential units.

The positions of the 1: 50 year and 1: 100 year flood lines must be determined by an appropriately qualified hydrologist.

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Schwartz K. *"Collapsable Soils"* - Trans. S. Afr. Inst. Civ. Eng., 7. 1985

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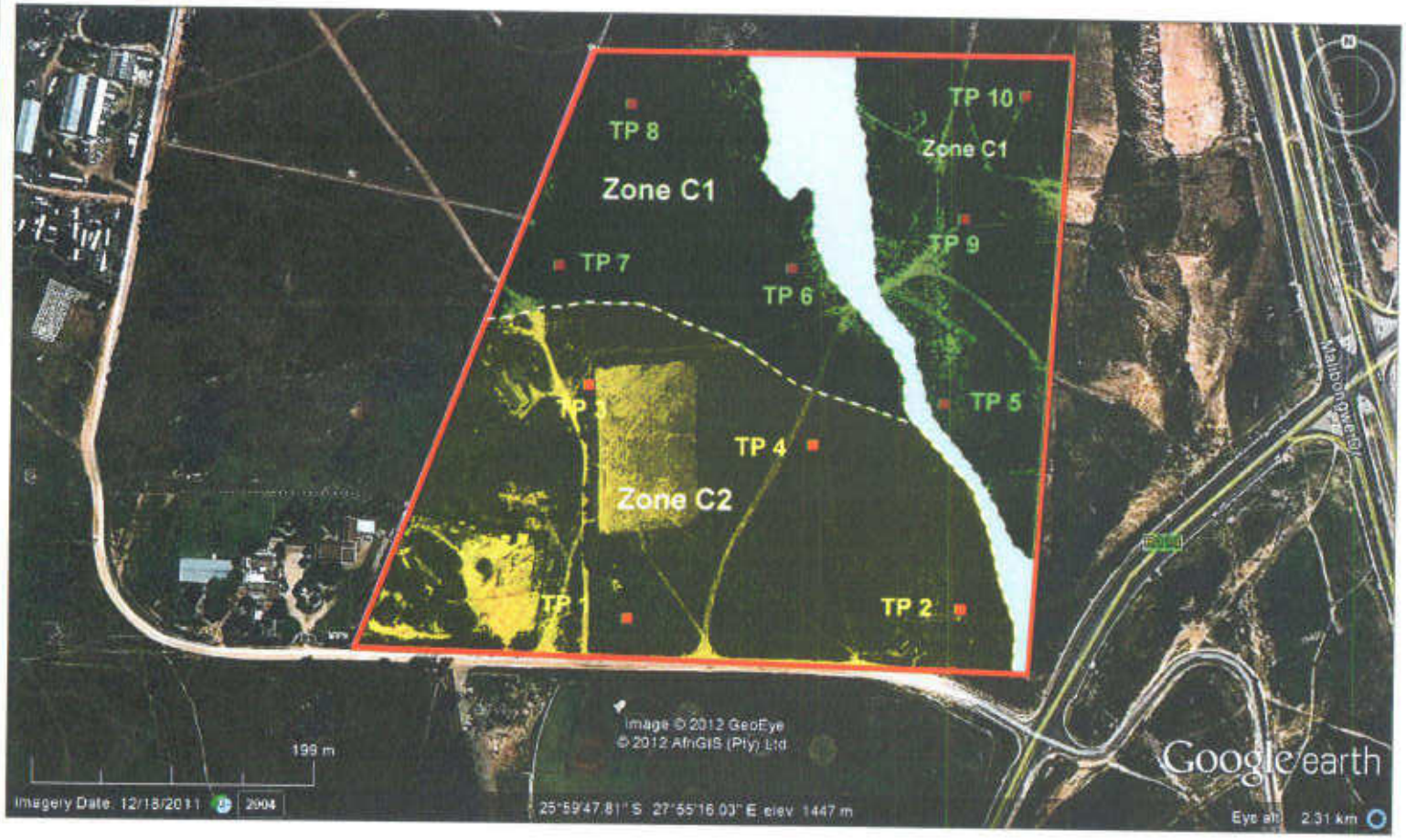
APPENDIX 1

LOCALITY AND SITE MAP

AFRICA EXPOSED CONSULTING ENGINEERING GEOLOGISTS	**WESPLAN AND ASSOCIATES.** PORTION 366 NOOITGEDACHT 534-JQ MOGALE CITY. **LOCALITY MAP**	Job No. 4412 November 2012 Figure No. 1



Legend

- TP 4 Test pit position
- Boundary of site investigated
- Geotechnical Soil Boundary

C1 Area underlain by marginally collapsible and compressible soils with 5-10mm total settlement predicted.

C2 Area underlain by collapsible and compressible soils with greater than 10mm total settlement predicted.

P Area potentially falling within boundaries of 1: 50 year flood line (to be confirmed by hydrologist)

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WESPLAN AND ASSOCIATES

PORTION 366 NOOITGEDACHT 534-JQ
MOGALE CITY

GEOTECHNICAL MAP

Job No. 4412

Date: December 2012

Figure No. 2

APPENDIX 2

TEST PIT PROFILES

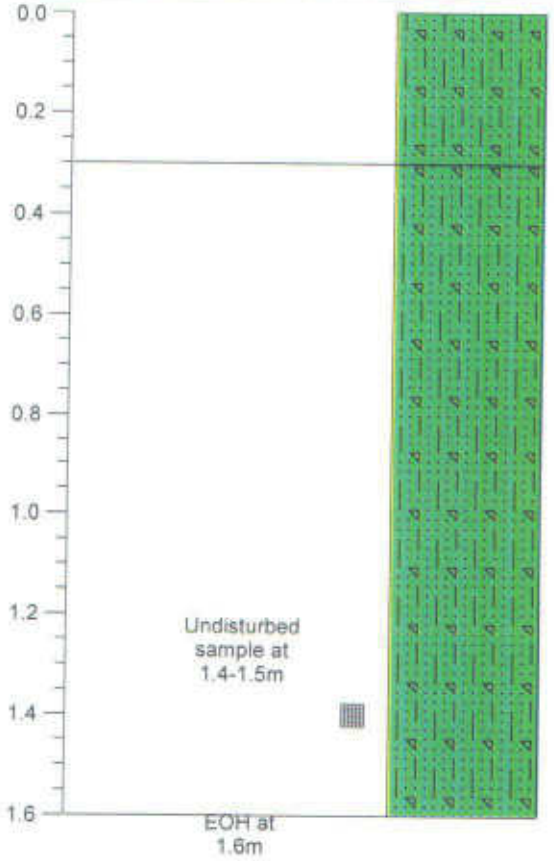
AFRICA EXPOSED
CONSULTING ENGINEERING GEOLOGISTS CC
P.O. Box 68 Honeydew 2040
Tel: (083) 656-0900
Fax: (086) 633-7332

CLIENT: Wesplan and Associates

SITE: Ptn 366 Nooitgedacht 534-JQ

HOLE No.: TP 1

DEPTH (m)	COMMENTS	LITHOLOGY	DESCRIPTIONS



(0.0, 0.3)
SILTY SAND AND GRAVEL: Slightly moist, dark brown, LOOSE TO MEDIUM DENSE, intact silty sand with gravels and many roots. Hillwash

(0.3, 1.6)
SILTY SAND AND GRAVEL: Slightly moist, dark red and brown, intact MEDIUM DENSE, silty sand and gravels. Reworked Residual Granite

NOTES

1. EOH easy dig
2. No ground water seepage
3. Undisturbed sample taken at 1.4 to 1.5m

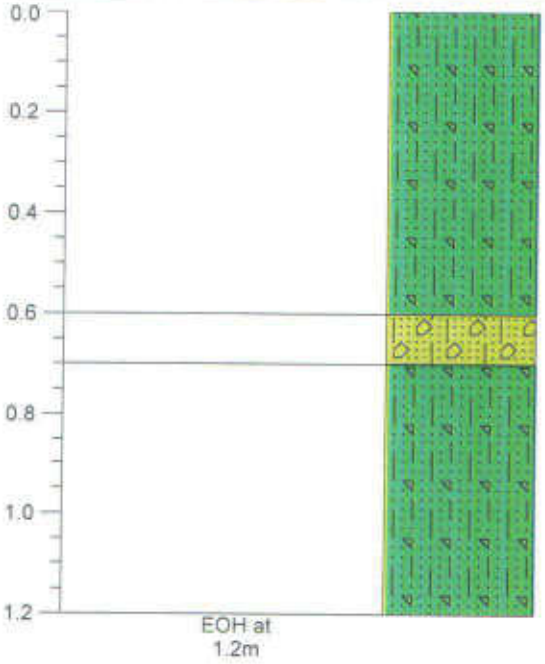
HOLE No.: TP 1

JOB No.:	4412	**MACHINE:**	Auger
DATE:	29 November 2012	**CONTRACTOR:**	Africa Exposed
PROFILED BY:	J. Arkert	**DIAMETER:**	250mm

AFRICA EXPOSED
CONSULTING ENGINEERING GEOLOGISTS CC
P.O. Box 68 Honeydew 2040
Tel: (083) 656-0900
Fax: (086) 633-7332

CLIENT: Wesplan and Associates
SITE: Ptn 366 Nooitgedacht 534-JQ
HOLE No.: TP 2

DEPTH (m)	COMMENTS	LITHOLOGY	DESCRIPTIONS



(0.0, 0.6)
SILTY SAND AND GRAVEL: Slightly moist, dark brown, MEDIUM DENSE, intact silty sand with gravels and many roots. Hillwash

(0.6, 0.7)
GRAVEL AND SILTY SAND: As above, but with many angular gravels. Pebble Marker

(0.7, 1.2)
SILTY SAND AND GRAVEL: Slightly moist, dark red and brown, intact MEDIUM DENSE TO DENSE, silty sand and gravels with granite boulders. Reworked Residual Granite

NOTES

1. EOH medium hard dig
2. No ground water seepage
3. No sample taken

HOLE No.: TP 2

JOB No.:	4412	**MACHINE:**	Auger
DATE:	29 November 2012	**CONTRACTOR:**	Africa Exposed
PROFILED BY:	J. Arkert	**DIAMETER:**	250mm

AFRICA EXPOSED
CONSULTING ENGINEERING GEOLOGISTS CC
P.O. Box 68 Honeydew 2040
Tel: (083) 656-0900
Fax: (086) 633-7332

CLIENT: Wesplan and Associates
SITE: Ptn 366 Nooitgedacht 534-JQ
HOLE No.: TP 3

DEPTH (m)	COMMENTS	LITHOLOGY	DESCRIPTIONS
0.0 – 1.0			(0.0, 1.0) SILTY SAND AND GRAVEL: Slightly moist, dark brown, LOOSE TO MEDIUM DENSE, intact silty sand with gravels and many roots. Hillwash
1.0 – 1.2			(1.0, 1.2) GRAVEL AND SILTY SAND: As above, but with many angular gravels. Pebble Marker
1.2 – 1.6	Undisturbed sample at 1.4-1.5m		(1.2, 1.6) SILTY SAND AND GRAVEL: Slightly moist, dark red and brown, intact MEDIUM DENSE, silty sand and occasional gravels. Reworked Residual Granite
1.6	EOH at 1.6m		

NOTES

1. EOH medium hard dig
2. No ground water seepage
3. Undisturbed sample taken at 1.4-1.5m.

HOLE No.: TP 3

JOB No.:	4412	**MACHINE:**	Auger
DATE:	29 November 2012	**CONTRACTOR:**	Africa Exposed
PROFILED BY:	J. Arkert	**DIAMETER:**	250mm

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CONSULTING ENGINEERING GEOLOGISTS CC
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Tel: (083) 656-0900
Fax: (086) 633-7332

CLIENT: Wesplan and Associates

SITE: Ptn 366 Nooitgedacht 534-JQ

HOLE No.: TP 4

DEPTH (m)	COMMENTS	LITHOLOGY	DESCRIPTIONS
0.0 – 0.9			(0.0, 0.9) SILTY SAND AND GRAVEL: Slightly moist, dark brown, LOOSE TO MEDIUM DENSE, intact silty sand with gravels and many roots. Hillwash
0.9 – 1.0			(0.9, 1.0) GRAVEL AND SILTY SAND: As above, but with many angular gravels. Pebble Marker
1.0 – 1.5	Disturbed sample at 1.2-1.3		(1.0, 1.5) SILTY SAND AND GRAVEL: Slightly moist, dark red and brown, intact MEDIUM DENSE, silty sand and gravels. Reworked Residual Granite
1.5	EOH at 1.5m		

NOTES

1. EOH medium hard dig
2. No ground water seepage
3. Disturbed sample taken at 1.2-1.3m.

HOLE No.: TP 4

JOB No.:	4412	**MACHINE:**	Auger
DATE:	29 November 2012	**CONTRACTOR:**	Africa Exposed
PROFILED BY:	J. Arkert	**DIAMETER:**	250mm

AFRICA EXPOSED
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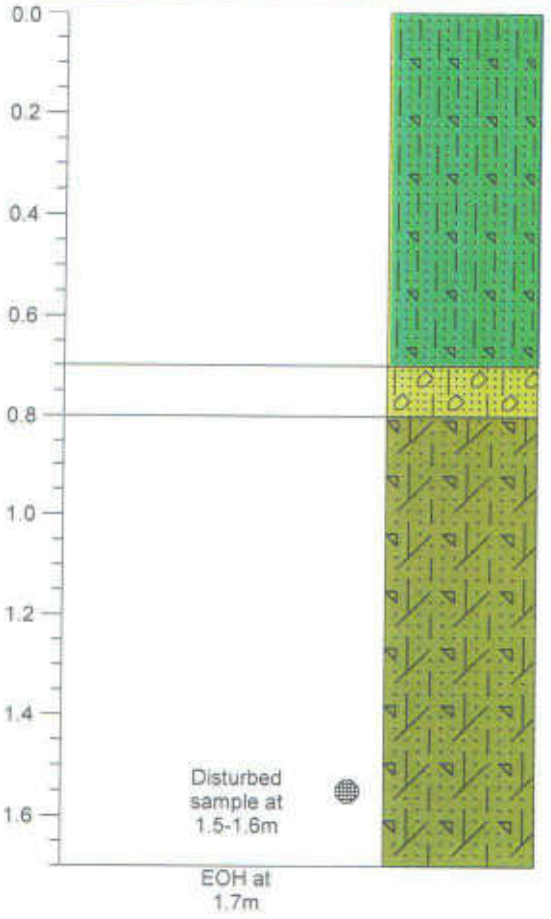
P.O. Box 68 Honeydew 2040
Tel: (083) 656-0900
Fax: (086) 633-7332

CLIENT: Wesplan and Associates
SITE: Ptn 366 Nooitgedacht 534-JQ
HOLE No.: TP 5

DEPTH (m)	COMMENTS	LITHOLOGY	DESCRIPTIONS



(0.0, 0.7)
SILTY SAND AND GRAVEL: Slightly moist, dark brown, LOOSE TO MEDIUM DENSE, intact silty sand with gravels and many roots. Hillwash

(0.7, 0.8)
GRAVEL AND SILTY SAND: As above, but with many angular gravels. Pebble Marker

(0.8, 1.7)
SILTY CLAYEY SAND AND GRAVEL: Slightly moist, dark red and brown, intact MEDIUM DENSE, silty clayey sand and gravels. Reworked Residual Granite

NOTES

1. EOH medium hard dig
2. No ground water seepage
3. Disturbed sample taken at 1.5-1.6m.

HOLE No.: TP 5

JOB No.:	4412	**MACHINE:**	Auger
DATE:	29 November 2012	**CONTRACTOR:**	Africa Exposed
PROFILED BY:	J. Arkert	**DIAMETER:**	250mm

AFRICA EXPOSED
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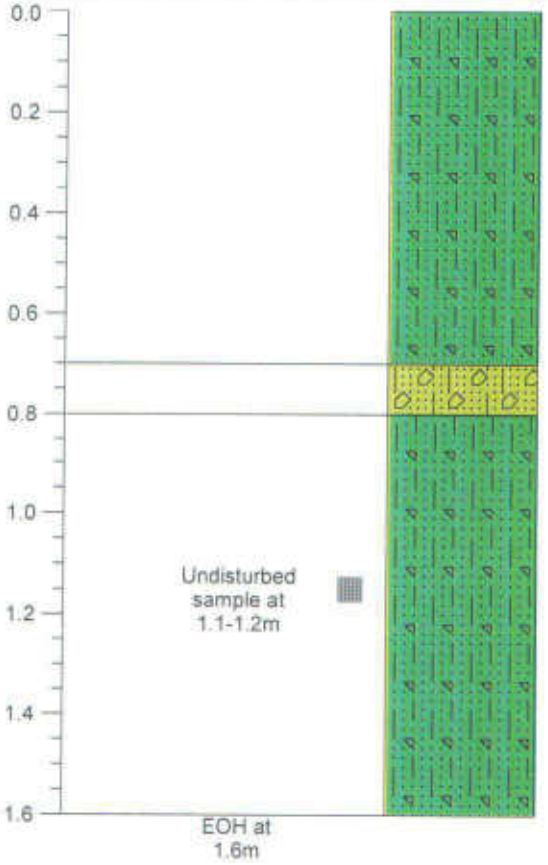
P.O. Box 68 Honeydew 2040
Tel: (083) 656-0900
Fax: (086) 633-7332

CLIENT: Wesplan and Associates
SITE: Ptn 366 Nooitgedacht 534-JQ
HOLE No.: TP 6

DEPTH (m)	COMMENTS	LITHOLOGY	DESCRIPTIONS



(0.0, 0.7)
SILTY SAND AND GRAVEL: Slightly moist, dark brown, MEDIUM DENSE TO DENSE, intact silty sand with gravels and many roots. Hillwash

(0.7, 0.8)
GRAVEL AND SILTY SAND: As above, but with many angular gravels. Pebble Marker

(0.8, 1.6)
SILTY SAND AND GRAVEL: Slightly moist, reddish brown, mottled off white and yellow, MEDIUM DENSE, relic jointed silty sand and gravels. Residual Granite

NOTES

1. EOH hard dig
2. No ground water seepage
3. Undisturbed sample taken at 1.1-1.2m.

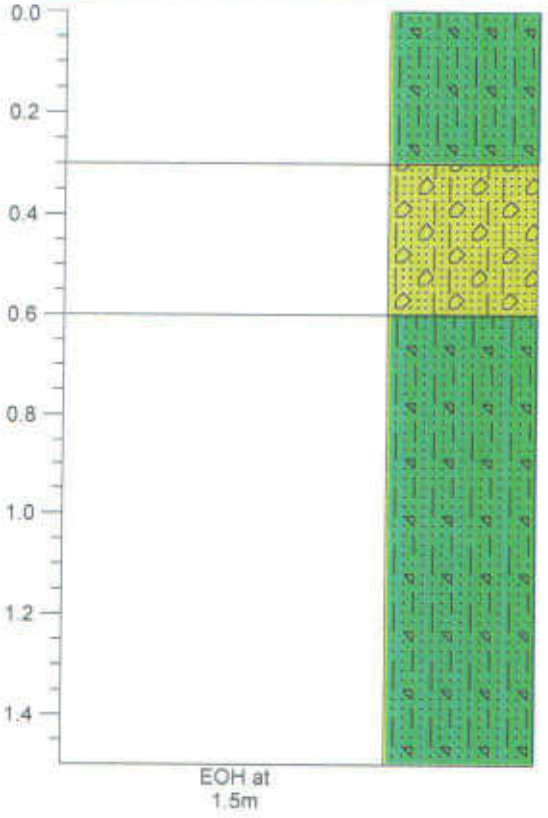
HOLE No.: TP 6

JOB No.:	4412	**MACHINE:**	Auger
DATE:	29 November 2012	**CONTRACTOR:**	Africa Exposed
PROFILED BY:	J. Arkert	**DIAMETER:**	250mm

AFRICA EXPOSED
CONSULTING ENGINEERING GEOLOGISTS CC
P.O. Box 68 Honeydew 2040
Tel: (083) 656-0900
Fax: (086) 633-7332

CLIENT: Wesplan and Associates
SITE: Ptn 366 Nooitgedacht 534-JQ
HOLE No.: TP 7

DEPTH (m)	COMMENTS	LITHOLOGY	DESCRIPTIONS
0.0 – 0.3			(0.0, 0.3) SILTY SAND AND GRAVEL: Slightly moist, dark brown, LOOSE TO MEDIUM DENSE, intact silty sand with gravels and many roots. Hillwash
0.3 – 0.6			(0.3, 0.6) GRAVEL AND SILTY SAND: As above, but with many angular gravels. Pebble Marker
0.6 – 1.5			(0.6, 1.5) SILTY SAND AND GRAVEL: Slightly moist, reddish brown, mottled off white and yellow, MEDIUM DENSE, relic jointed silty sand and gravels. Residual Granite
1.5	EOH at 1.5m		



NOTES

1. EOH medium hard dig
2. No ground water seepage
3. No samples taken.

HOLE No.: TP 7

JOB No.:	4412	**MACHINE:**	Auger
DATE:	29 November 2012	**CONTRACTOR:**	Africa Exposed
PROFILED BY:	J. Arkert	**DIAMETER:**	250mm

AFRICA EXPOSED
CONSULTING ENGINEERING GEOLOGISTS CC
P.O. Box 68 Honeydew 2040
Tel: (083) 656-0900
Fax: (086) 633-7332

CLIENT: Wesplan and Associates
SITE: Ptn 366 Nooitgedacht 534-JQ
HOLE No.: TP 8

DEPTH (m)	COMMENTS	LITHOLOGY	DESCRIPTIONS
0.0 – 0.8			(0.0, 0.8) SILTY SAND: Slightly moist, greyish brown, becoming orangey brown below 0.5m, MEDIUM DENSE, intact and open textured silty sand with many roots. Hillwash
0.8 – 1.0	Disturbed sampe at 1.0-1.1m		(0.8, 1.0) GRAVEL AND SILTY SAND: Many angular and sub rounded (2-50mm) quartz gravels in a matrix (± 50%) as above. Pebble Marker Overall consistency is MEDIUM DENSE
1.0 – 1.3			(1.0, 1.3) SILTY SAND AND GRAVEL: Slightly moist, dark orangey brown, mottled off white, LOOSE TO MEDIUM DENSE, intact and relict jointed silty coarse sand with many angular (up to 100mm) granite and quartz gravels. Reworked Residual Granite
1.3 – 1.6	EOH at 1.6m		(1.3, 1.6) SILTY SAND AND GRAVEL: Slightly moist dark orangey brown, mottled grey and orange, DENSE, relict jointed, silty coarse sand and gravels. Residual Granite.

NOTES

1. EOH easy dig
2. No ground water seepage
3. Disturbed sample taken at 1.0-1.1m.

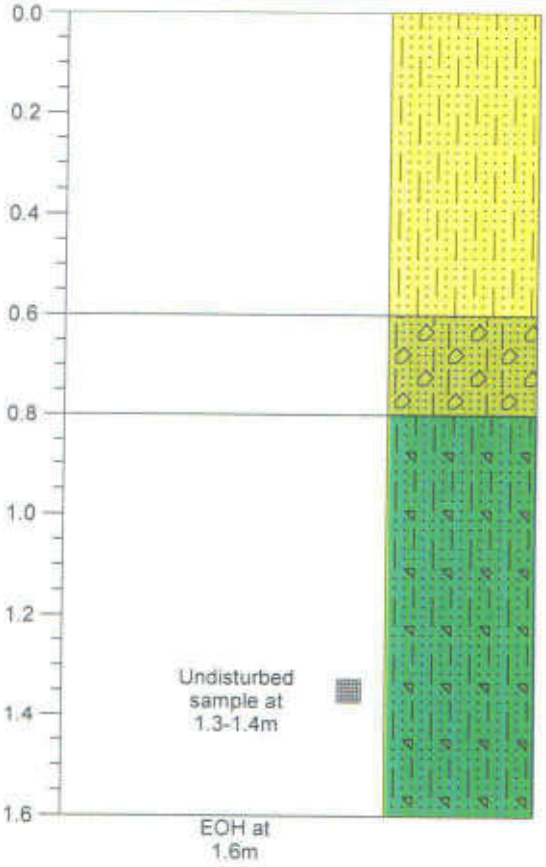
HOLE No.: TP 8

JOB No.:	4412	**MACHINE:**	Auger
DATE:	29 November 2012	**CONTRACTOR:**	Africa Exposed
PROFILED BY:	J. Arkert	**DIAMETER:**	250mm

AFRICA EXPOSED
CONSULTING ENGINEERING GEOLOGISTS CC
P.O. Box 68 Honeydew 2040
Tel: (083) 656-0900
Fax: (086) 633-7332

CLIENT: Wesplan and Associates
SITE: Ptn 366 Nooitgedacht 534-JQ
HOLE No.: TP 9

DEPTH (m)	COMMENTS	LITHOLOGY	DESCRIPTIONS



(0.0, 0.6)
SILTY SAND: Slightly moist, greyish brown, becoming orangey brown below 0.4m, MEDIUM DENSE, intact and open textured silty sand with many roots. Hillwash

(0.6, 0.8)
GRAVEL AND SILTY SAND: Many angular and sub rounded (2-50mm) quartz gravels in a matrix (± 50%) s above. Pebble Marker

(0.8, 1.6)
SILTY SAND AND GRAVEL: Slightly moist, dark orangey brown, mottled off white, MEDIUM DENSE, intact and relict jointed silty coarse sand with many angular (up to 100mm) granite and quartz gravels. Residual Granite

NOTES

1. EOH moderately hard dig by hand
2. No ground water seepage
3. Undisturbed sample taken at 1.3 to 1.4m

HOLE No.: TP 9

JOB No.:	4412	**MACHINE:**	Auger
DATE:	29 November 2012	**CONTRACTOR:**	Africa Exposed
PROFILED BY:	J. Arkert	**DIAMETER:**	250mm

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P.O. Box 68 Honeydew 2040
Tel: (083) 656-0900
Fax: (086) 633-7332

CLIENT: Wesplan and Associates
SITE: Ptn 366 Nooitgedacht 534-JQ
HOLE No.: TP 10

DEPTH (m)	COMMENTS	LITHOLOGY	DESCRIPTIONS
0.0 – 0.8			(0.0, 0.8) SILTY SAND: Slightly moist, greyish brown, becoming orangey brown below 0.5m, MEDIUM DENSE, intact and open textured silty sand with many roots. Hillwash
0.8 – 1.0			(0.8, 1.0) GRAVEL AND SILTY SAND: Many angular and sub rounded (2-50mm) quartz gravels in a matrix (± 50%) s above. Pebble Marker
1.0 – 1.5	Disturbed sample at 1.2-1.3m		(1.0, 1.5) SILTY SAND AND GRAVEL: Slightly moist, dark orangey brown, mottled off white, LOOSE TO MEDIUM DENSE, BECOMING MEDIUM DENSE BELOW 1.3m, intact and relict jointed silty coarse sand with many angular (up to 100mm) granite and quartz gravels. Residual Granite
1.5	EOH at 1.5m		

NOTES

1. EOH easy dig
2. No ground water seepage
3. Disturbed sample taken at 1.2-1.3m.

HOLE No.: TP 10

JOB No.:	4412	**MACHINE:**	Auger
DATE:	29 November 2012	**CONTRACTOR:**	Africa Exposed
PROFILED BY:	J. Arkert	**DIAMETER:**	250mm

APPENDIX 3

LABORATORY TEST RESULTS

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FOUNDATION INDICATOR

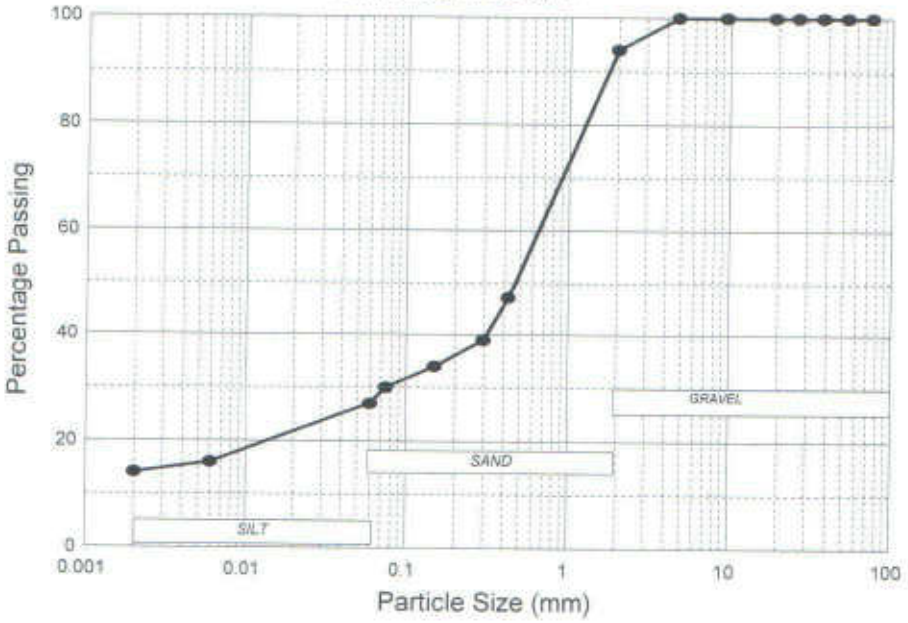
Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 1 @ 1.4-1.5m
Job No	4412	Checked By	JA

SIEVE ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
75.00	100.00
53.00	100.00
37.50	100.00
26.50	100.00
19.00	100.00
9.50	100.00
4.75	100.00
2.00	94.00
0.425	47.00

GRADING ANALYSIS

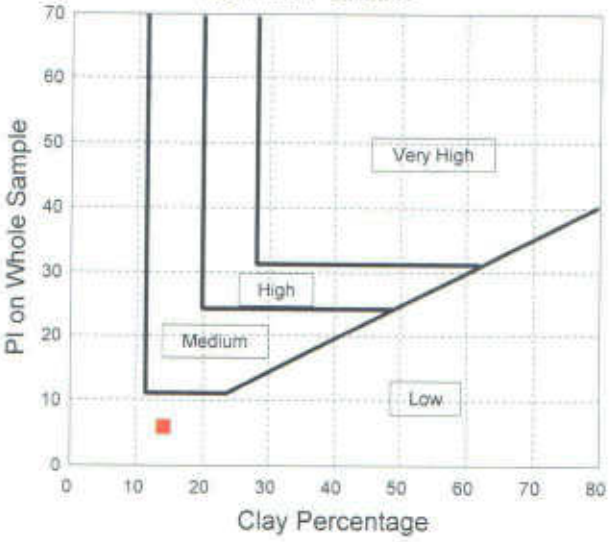


HYDROMETER ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
0.3000	39.00
0.1500	34.00
0.0750	30.00
0.0600	27.00
0.0060	16.00
0.0020	14.00

ACTIVITY CHART



ATTERBERG LIMITS & OTHER VALUES

Liquid Limit	22
Plastic Limit	9
Plastic Index	13
Linear Shrinkage	5
Grading Modulus	1.20
PI on Whole Sample	6

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FOUNDATION INDICATOR

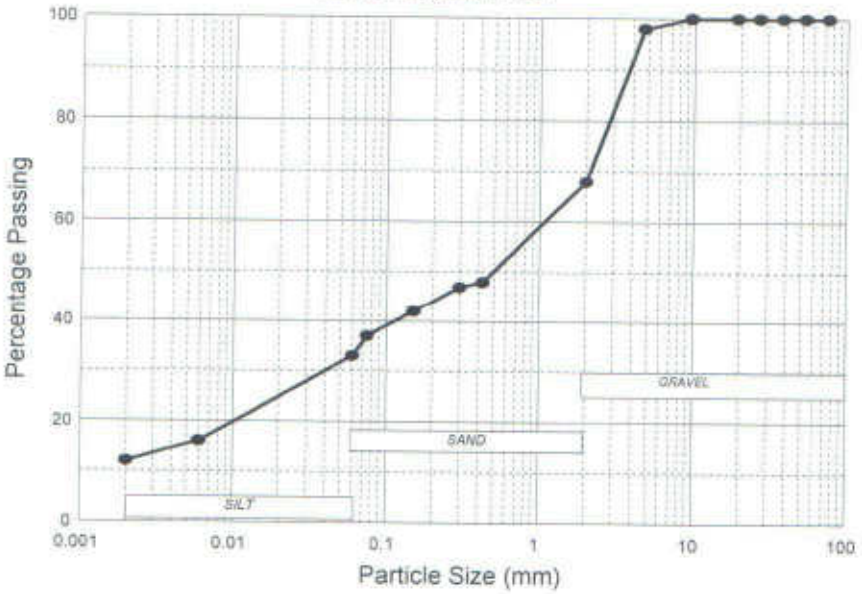
Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 3 @ 1.4-1.5m
Job No	4412	Checked By	JA

SIEVE ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
75.00	100.00
53.00	100.00
37.50	100.00
26.50	100.00
19.00	100.00
9.50	100.00
4.75	98.00
2.00	68.00
0.425	48.00

GRADING ANALYSIS

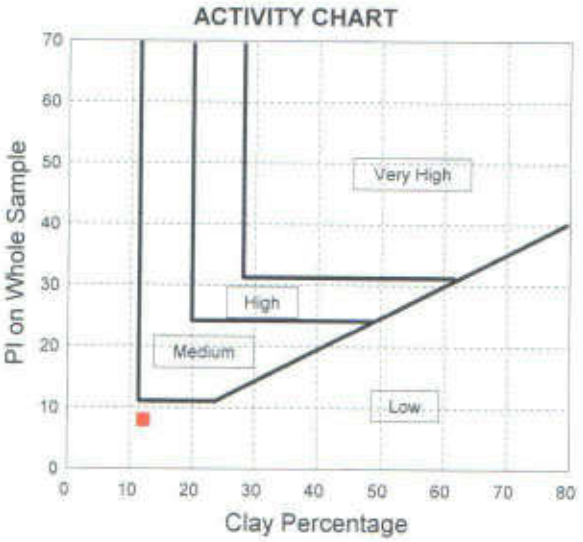


HYDROMETER ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
0.3000	47.00
0.1500	42.00
0.0750	37.00
0.0600	33.00
0.0060	16.00
0.0020	12.00

ACTIVITY CHART



ATTERBERG LIMITS & OTHER VALUES

Liquid Limit	35
Plastic Limit	19
Plastic Index	16
Linear Shrinkage	7
Grading Modulus	1.37
PI on Whole Sample	8

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FOUNDATION INDICATOR

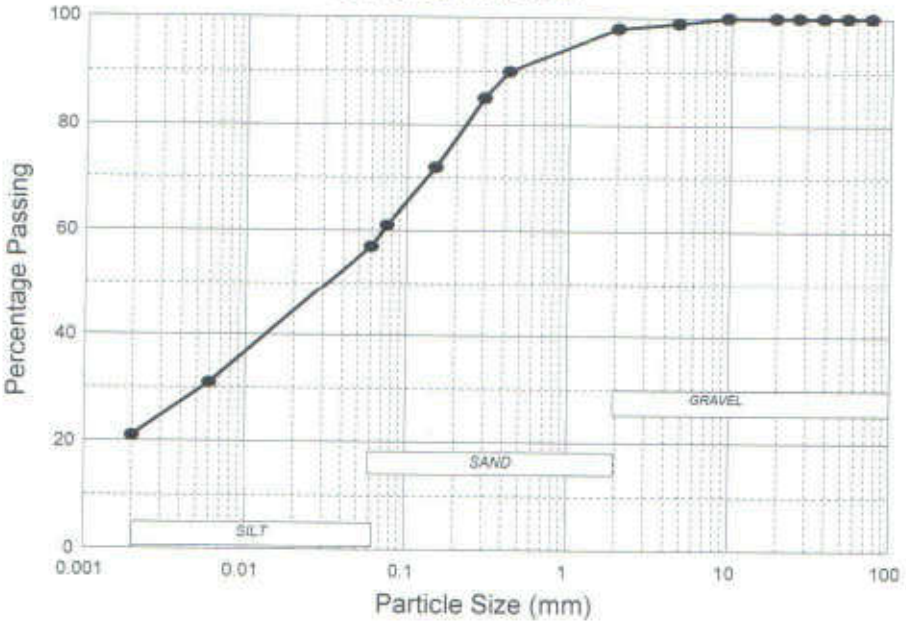
Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 4 @ 1.2-1.3m
Job No	4412	Checked By	JA

SIEVE ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
75.00	100.00
53.00	100.00
37.50	100.00
26.50	100.00
19.00	100.00
9.50	100.00
4.75	99.00
2.00	98.00
0.425	90.00

GRADING ANALYSIS

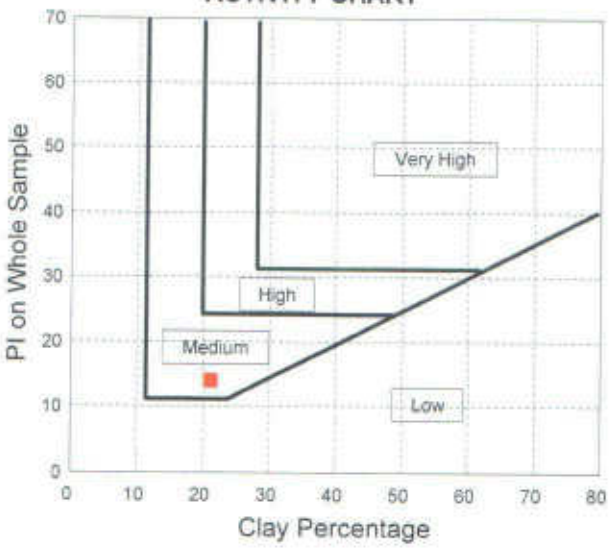


HYDROMETER ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
0.3000	85.00
0.1500	72.00
0.0750	61.00
0.0600	57.00
0.0060	31.00
0.0020	21.00

ACTIVITY CHART



ATTERBERG LIMITS & OTHER VALUES

Liquid Limit	27
Plastic Limit	12
Plastic Index	15
Linear Shrinkage	7
Grading Modulus	0.27
PI on Whole Sample	14

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FOUNDATION INDICATOR

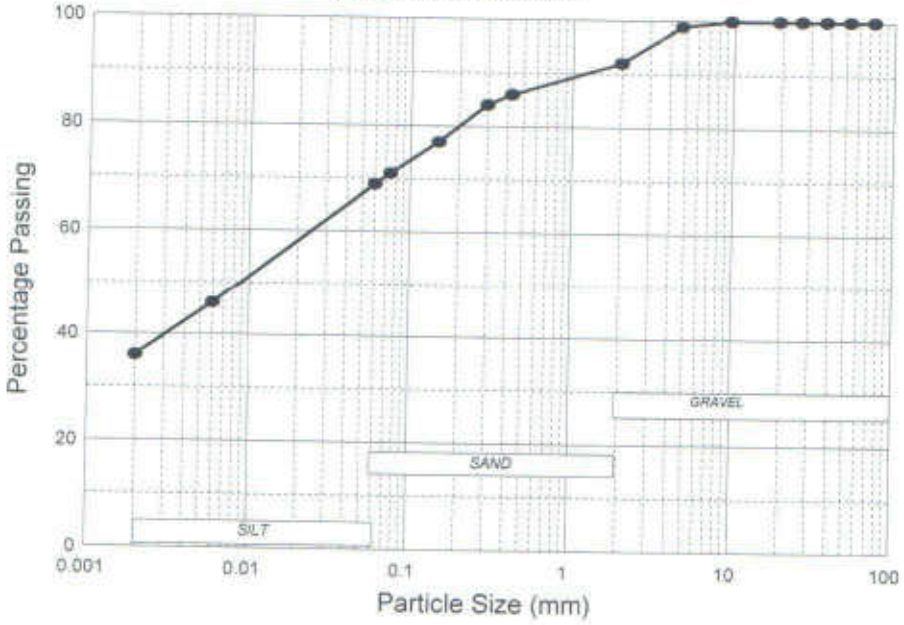
Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 5 @ 1.5-1.6m
Job No	4412	Checked By	JA

SIEVE ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
75.00	100.00
53.00	100.00
37.50	100.00
26.50	100.00
19.00	100.00
9.50	100.00
4.75	99.00
2.00	92.00
0.425	86.00

GRADING ANALYSIS

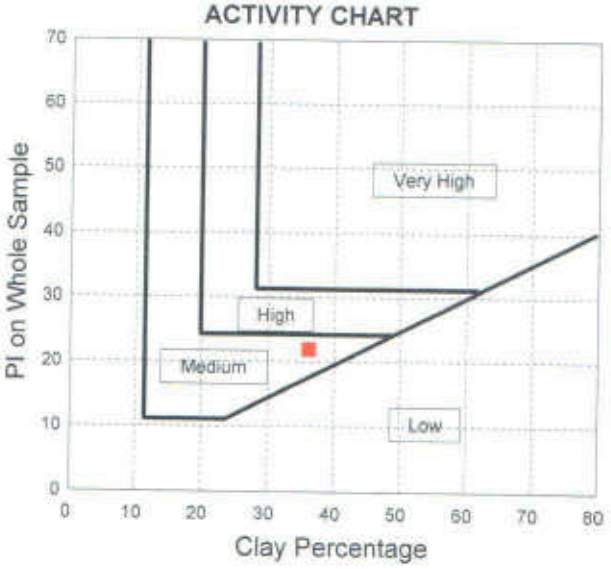


HYDROMETER ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
0.3000	84.00
0.1500	77.00
0.0750	71.00
0.0600	69.00
0.0060	46.00
0.0020	36.00

ACTIVITY CHART



ATTERBERG LIMITS & OTHER VALUES

Liquid Limit	43
Plastic Limit	17
Plastic Index	26
Linear Shrinkage	12
Grading Modulus	0.38
PI on Whole Sample	22

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FOUNDATION INDICATOR

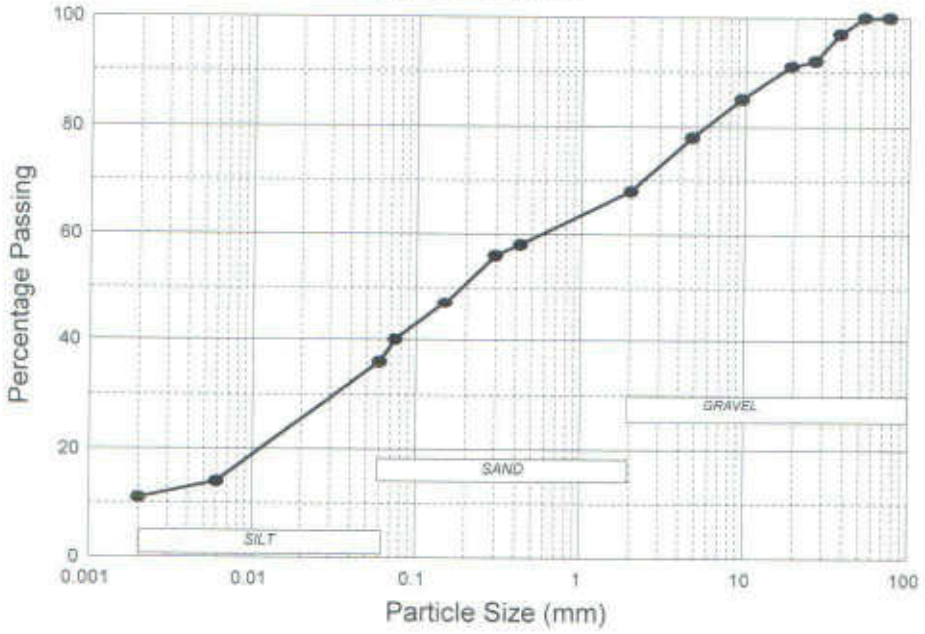
Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 6 @ 1.1-1.2m
Job No	4412	Checked By	JA

SIEVE ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
75.00	100.00
53.00	100.00
37.50	97.00
26.50	92.00
19.00	91.00
9.50	85.00
4.75	78.00
2.00	68.00
0.425	58.00

GRADING ANALYSIS

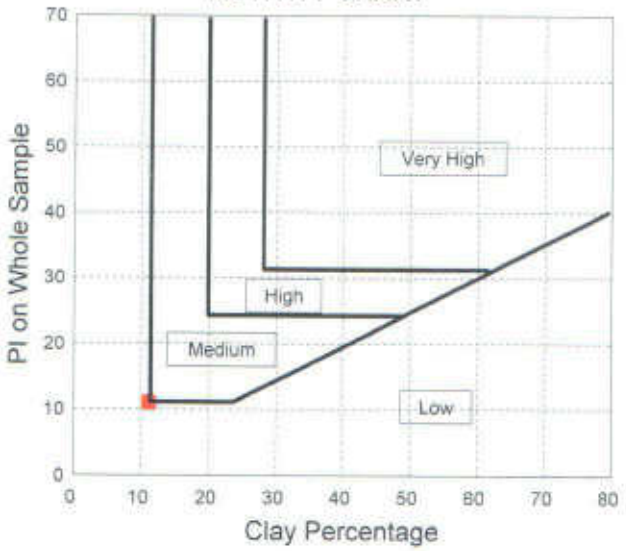


HYDROMETER ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
0.3000	56.00
0.1500	47.00
0.0750	40.00
0.0600	36.00
0.0060	14.00
0.0020	11.00

ACTIVITY CHART



ATTERBERG LIMITS & OTHER VALUES

Liquid Limit	34
Plastic Limit	15
Plastic Index	19
Linear Shrinkage	8
Grading Modulus	1.18
PI on Whole Sample	11

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FOUNDATION INDICATOR

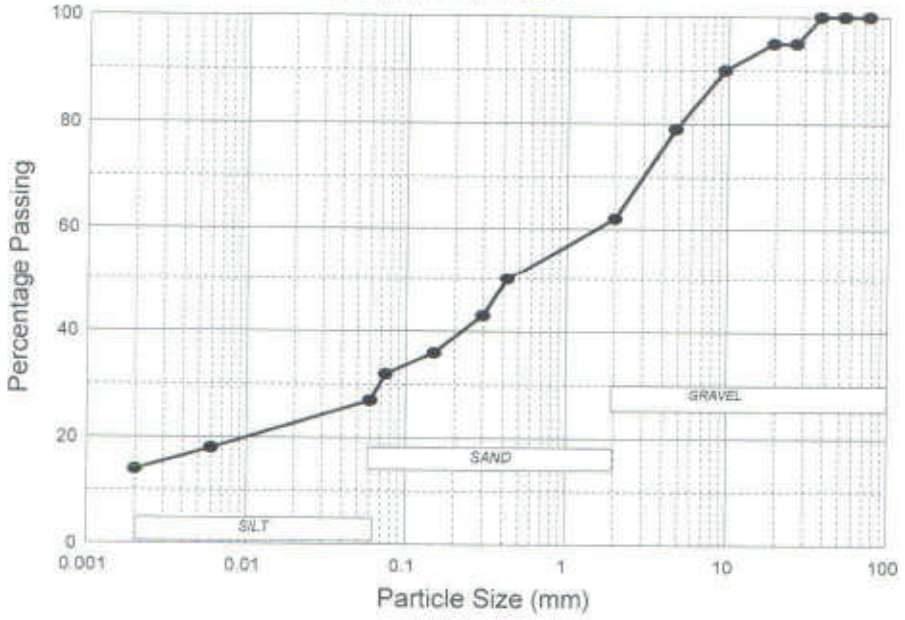
Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 8 @ 1.0-1.1m
Job No	4412	Checked By	JA

SIEVE ANALYSIS

Values are expressed as a percentage of total sa .

Sieve Size (mm)	Total Passing (%)
75.00	100.00
53.00	100.00
37.50	100.00
26.50	95.00
19.00	95.00
9.50	90.00
4.75	79.00
2.00	62.00
0.425	50.00

GRADING ANALYSIS

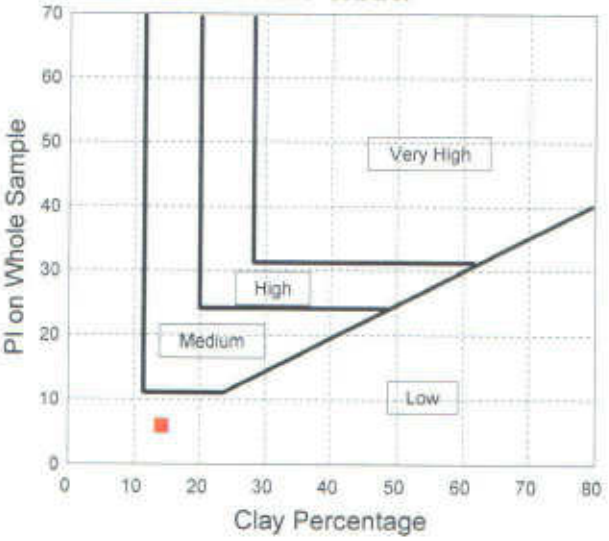


HYDROMETER ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
0.3000	43.00
0.1500	36.00
0.0750	32.00
0.0600	27.00
0.0060	18.00
0.0020	14.00

ACTIVITY CHART



ATTERBERG LIMITS & OTHER VALUES

Liquid Limit	27
Plastic Limit	15
Plastic Index	12
Linear Shrinkage	6
Grading Modulus	1.56
PI on Whole Sample	6

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FOUNDATION INDICATOR

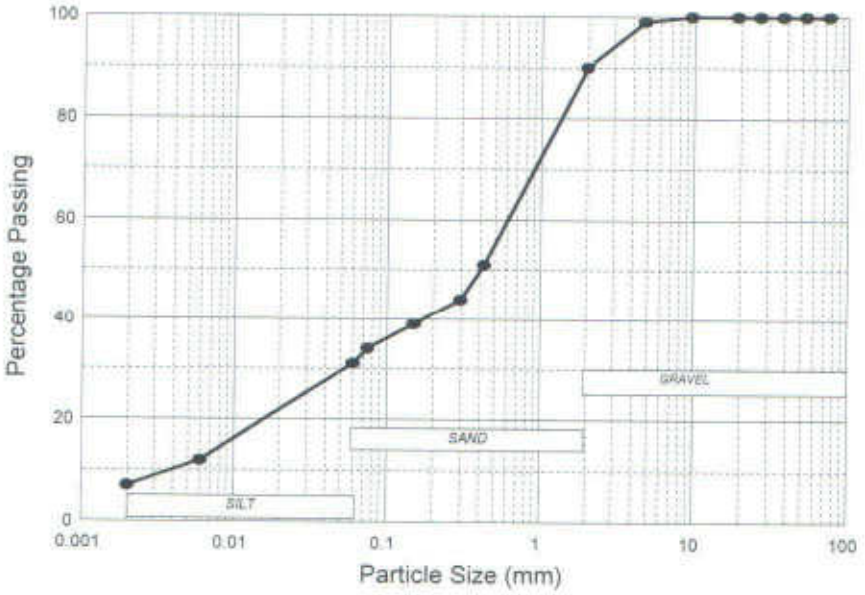
Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 9 @ 1.3-1.4m
Job No	4412	Checked By	JA

SIEVE ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
75.00	100.00
53.00	100.00
37.50	100.00
26.50	100.00
19.00	100.00
9.50	100.00
4.75	99.00
2.00	90.00
0.425	51.00

GRADING ANALYSIS

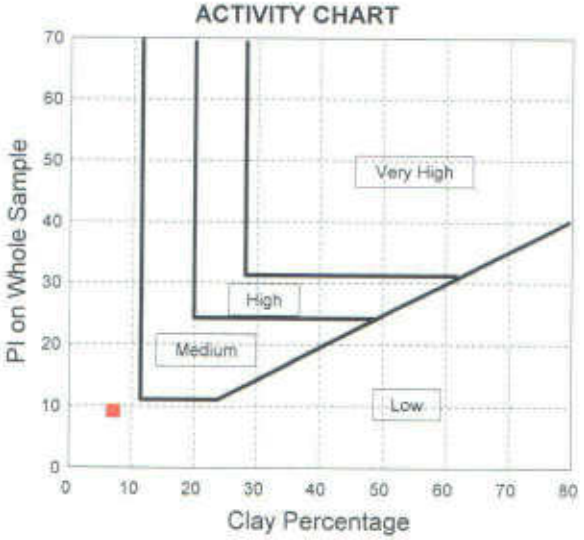


HYDROMETER ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
0.3000	44.00
0.1500	39.00
0.0750	34.00
0.0600	31.00
0.0060	12.00
0.0020	7.00

ACTIVITY CHART



ATTERBERG LIMITS & OTHER VALUES

Liquid Limit	40
Plastic Limit	23
Plastic Index	17
Linear Shrinkage	8
Grading Modulus	1.15
PI on Whole Sample	9

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FOUNDATION INDICATOR

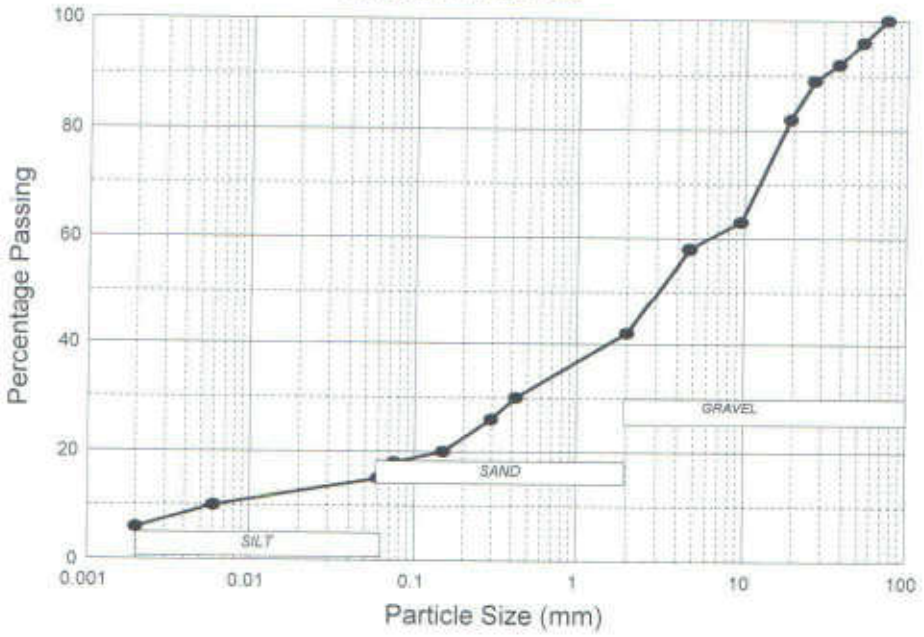
Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 10 @ 1.2-1.3m
Job No	4412	Checked By	JA

SIEVE ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
75.00	100.00
53.00	96.00
37.50	92.00
26.50	89.00
19.00	82.00
9.50	63.00
4.75	58.00
2.00	42.00
0.425	30.00

GRADING ANALYSIS

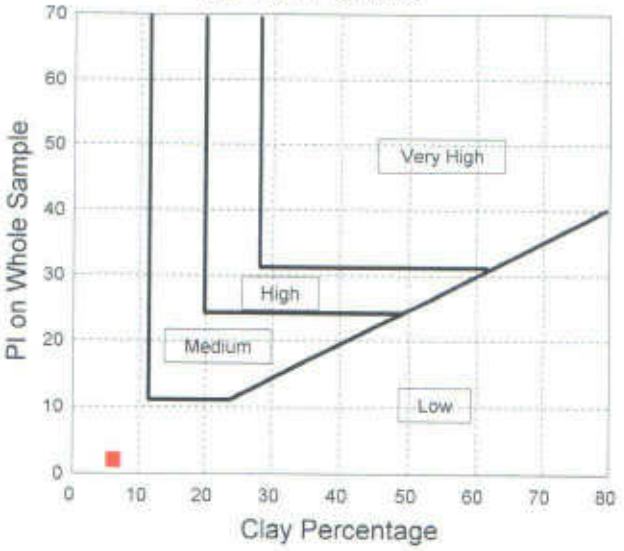


HYDROMETER ANALYSIS

Values are expressed as a percentage of total sample

Sieve Size (mm)	Total Passing (%)
0.3000	26.00
0.1500	20.00
0.0750	18.00
0.0600	15.00
0.0060	10.00
0.0020	6.00

ACTIVITY CHART



ATTERBERG LIMITS & OTHER VALUES

Liquid Limit	21
Plastic Limit	15
Plastic Index	6
Linear Shrinkage	3
Grading Modulus	2.02
PI on Whole Sample	2

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COLLAPSE POTENTIAL at 100 kPa

Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 1 @ 1.4-1.5m
Job No	4412	Checked By	JA

Sample Height (mm)	19.03	Sample Diameter (mm)	75	Sample Specific Gravity	2.71

Sample Preparation	NMC

Effective Stress (kPa)	Consolidation Reading	Voids Ratio	Strain (%)
1	10000	0.740	0.000
10	9964	0.736	0.190
20	9916	0.732	0.440
50	9754	0.717	1.290
100	9584	0.702	2.180
100	8918	0.641	5.690
200	8074	0.564	10.120
400	7216	0.485	14.630
200	7258	0.489	14.410
100	7272	0.490	14.340
50	7310	0.494	14.140
20	7344	0.497	13.960
10	7378	0.500	13.780

Moisture Content Calculations

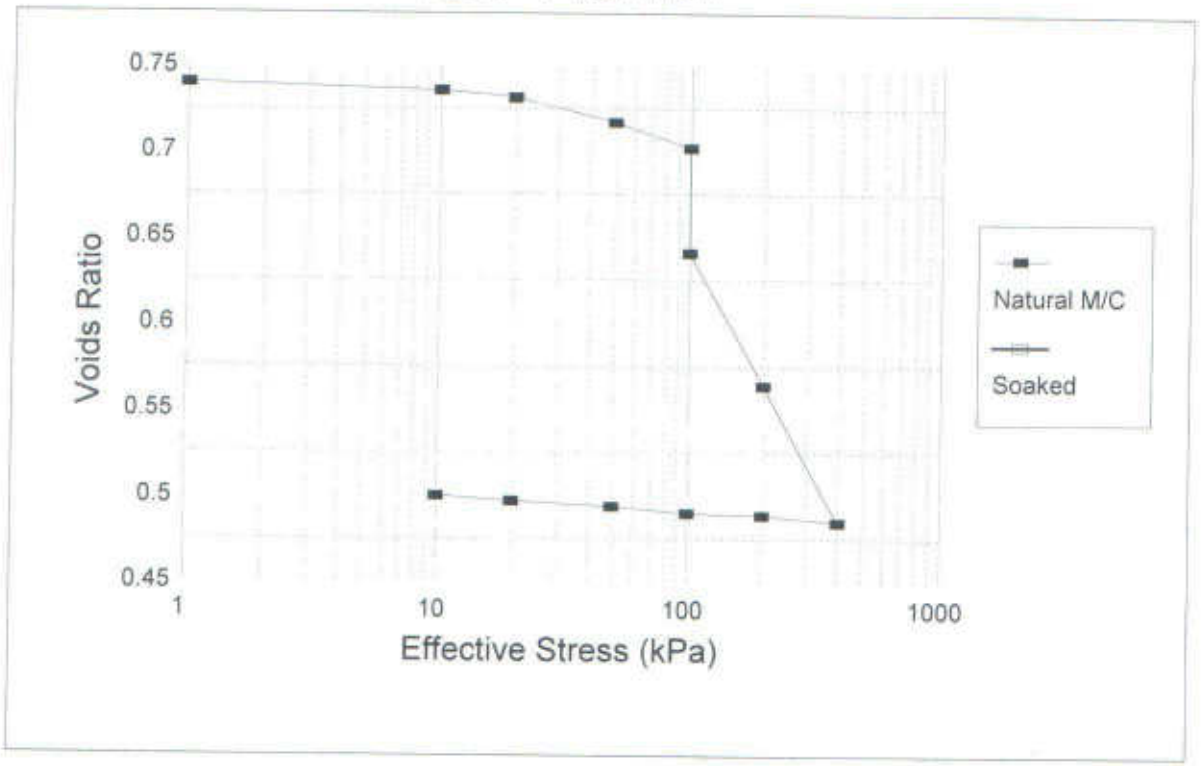
Mass wet sample plus ring before test (gms)	264.70
Mass wet sample plus ring after test (gms)	271.20
Mass dry sample plus ring (gms)	247.00
Mass ring (gms)	115.60
Moisture content before test (%)	**13.47**
Moisture content after test (%)	**18.42**

Other Data

Initial Dry Density (kg/m3)	**1503**
Initial Void Ratio	**0.74**
Collapse Potential (%)	**3.5**

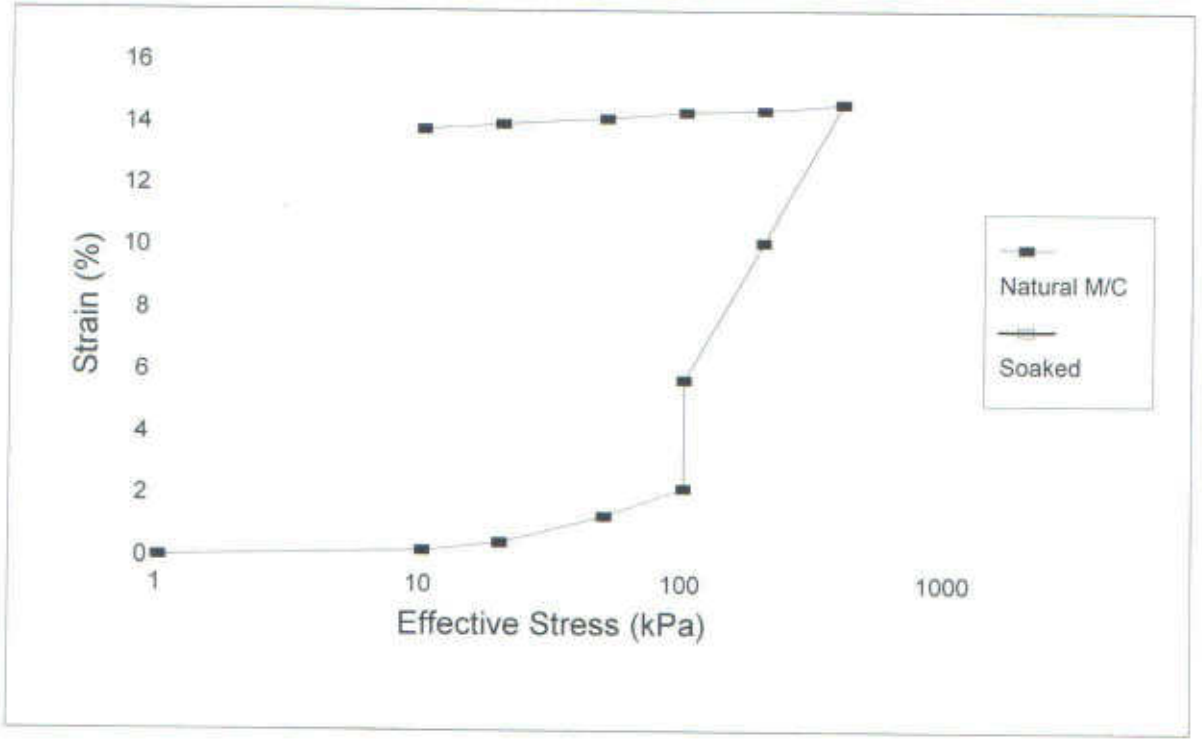
VOIDS RATIO v EFFECTIVE STRESS

Test No: TP 1 @ 1.4-1.5m



STRAIN v EFFECTIVE STRESS

Test No: TP 1 @ 1.4-1.5m



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COLLAPSE POTENTIAL at 100 kPa

Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 3 @ 1.4-1.5m
Job No	4412	Checked By	JA

Sample Height (mm)	19.03	Sample Diameter (mm)	75	Sample Specific Gravity	2.66

Sample Preparation	NMC

Effective Stress (kPa)	Consolidation Reading	Voids Ratio	Strain (%)
1	10000	0.431	0.000
10	9936	0.426	0.340
20	9866	0.421	0.700
50	9738	0.411	1.380
100	9600	0.401	2.100
100	9370	0.383	3.310
200	9126	0.365	4.590
400	8808	0.341	6.260
200	8644	0.344	6.070
100	8878	0.347	5.890
50	8914	0.349	5.700
20	8966	0.353	5.430
10	9002	0.356	5.240

Moisture Content Calculations

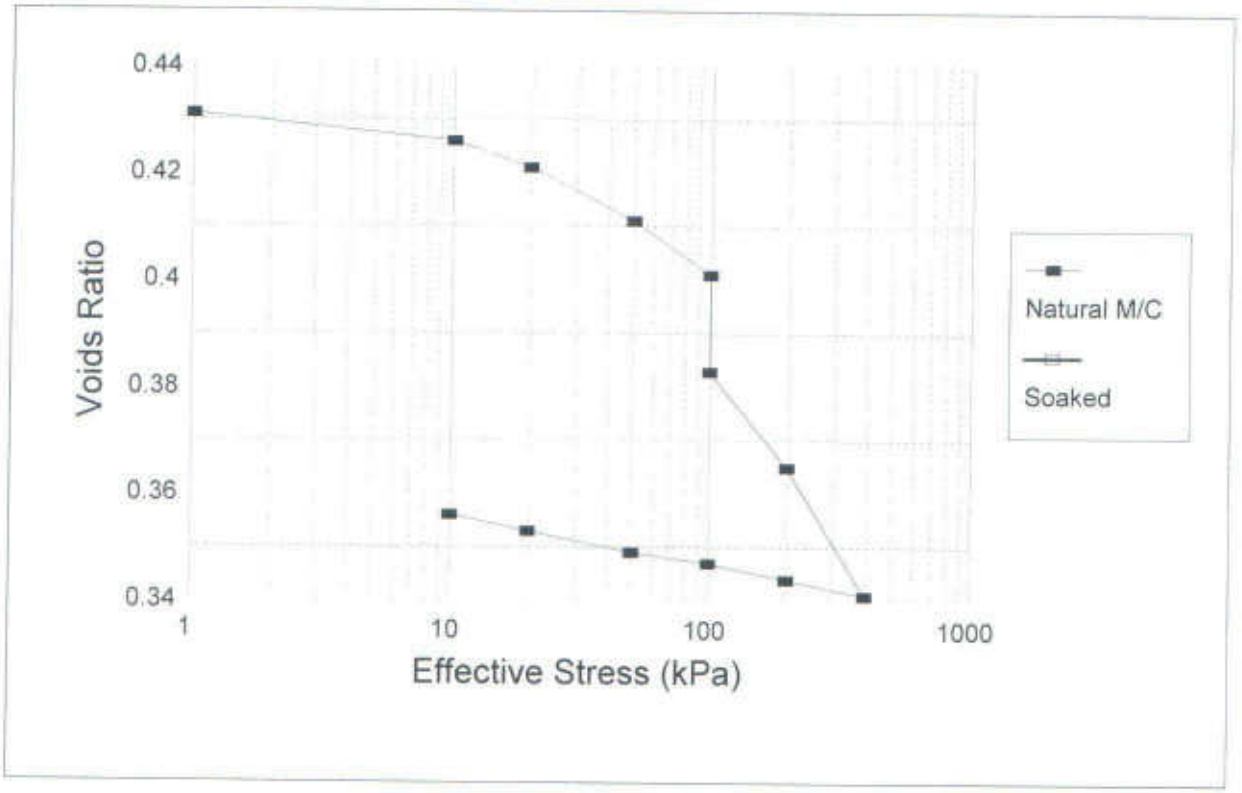
Mass wet sample plus ring before test (gms)	288.00
Mass wet sample plus ring after test (gms)	295.00
Mass dry sample plus ring (gms)	274.00
Mass ring (gms)	117.30
Moisture content before test (%)	**8.93**
Moisture content after test (%)	**13.40**

Other Data

Initial Dry Density (kg/m3)	**1864**
Initial Void Ratio	**0.43**
Collapse Potential (%)	**1.3**

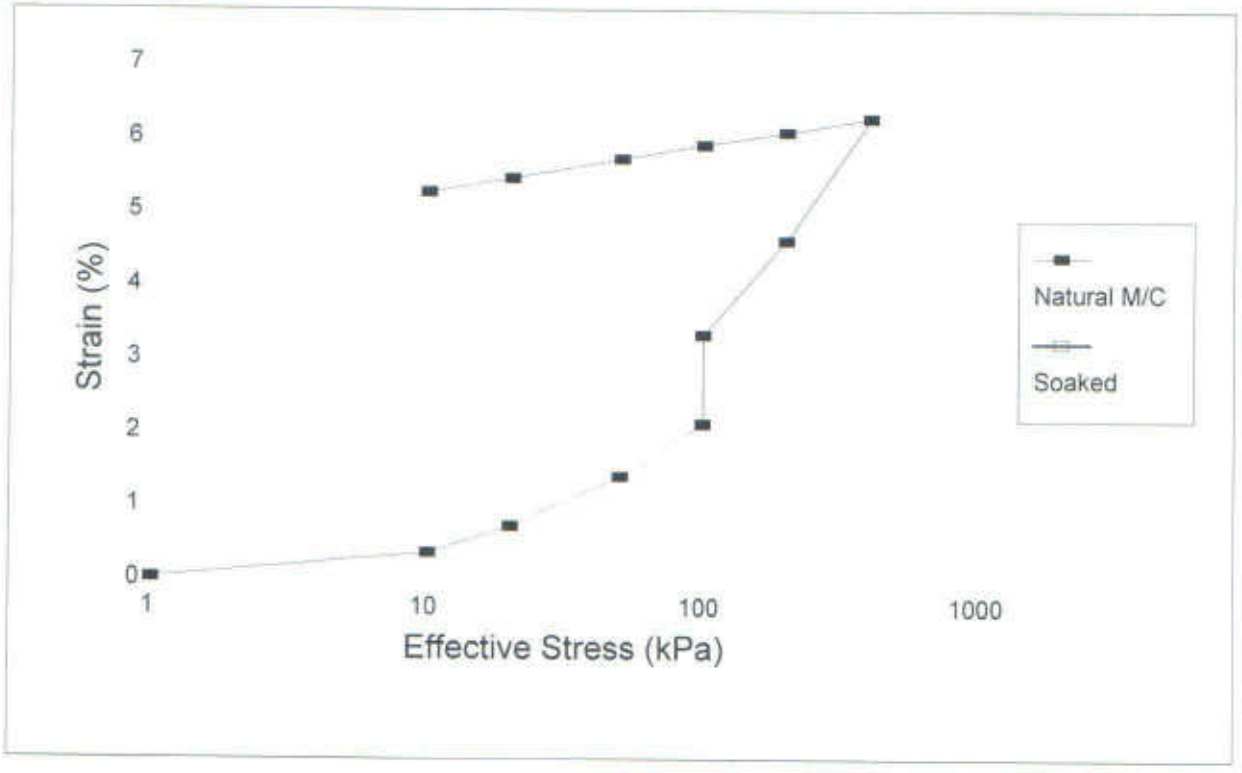
VOIDS RATIO v EFFECTIVE STRESS

Test No: TP 3 @ 1.4-1.5m



STRAIN v EFFECTIVE STRESS

Test No: TP 3 @ 1.4-1.5m



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COLLAPSE POTENTIAL at 100 kPa

Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 6 @ 1.1-1.2m
Job No	4412	Checked By	JA

Sample Height (mm)	19.03	Sample Diameter (mm)	75	Sample Specific Gravity	2.71

Sample Preparation	NMC

Effective Stress (kPa)	Consolidation Reading	Voids Ratio	Strain (%)
1	10000	0.404	0.000
10	9884	0.396	0.610
20	9770	0.387	1.210
50	9602	0.375	2.090
100	9376	0.358	3.280
100	9164	0.343	4.390
200	8914	0.324	5.700
400	8422	0.288	8.280
200	8462	0.291	8.070
100	8500	0.294	7.870
50	8544	0.297	7.640
20	8604	0.301	7.330
10	8646	0.305	7.110

Moisture Content Calculations

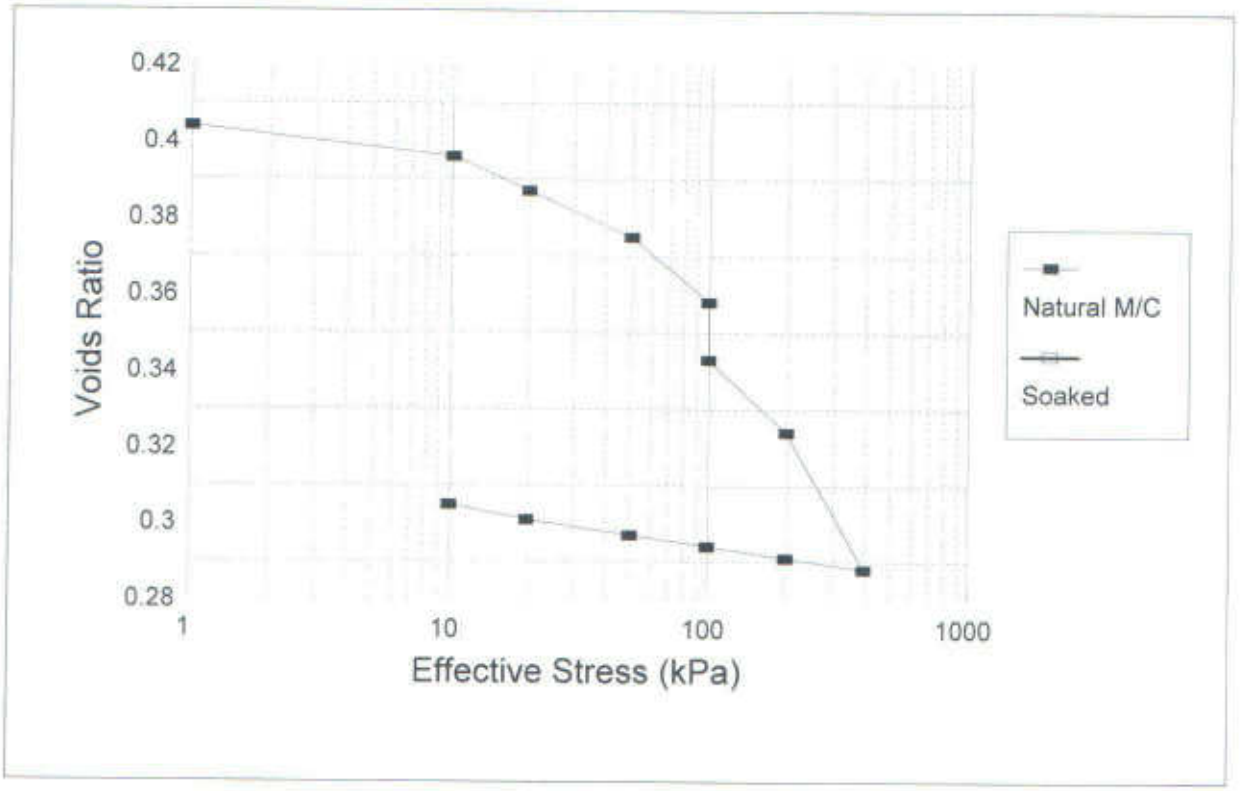
Mass wet sample plus ring before test (gms)	301.30
Mass wet sample plus ring after test (gms)	298.60
Mass dry sample plus ring (gms)	280.50
Mass ring (gms)	119.70
Moisture content before test (%)	**12.94**
Moisture content after test (%)	**11.26**

Other Data

Initial Dry Density (kg/m3)	**1913**
Initial Void Ratio	**0.42**
Collapse Potential (%)	**1.1**

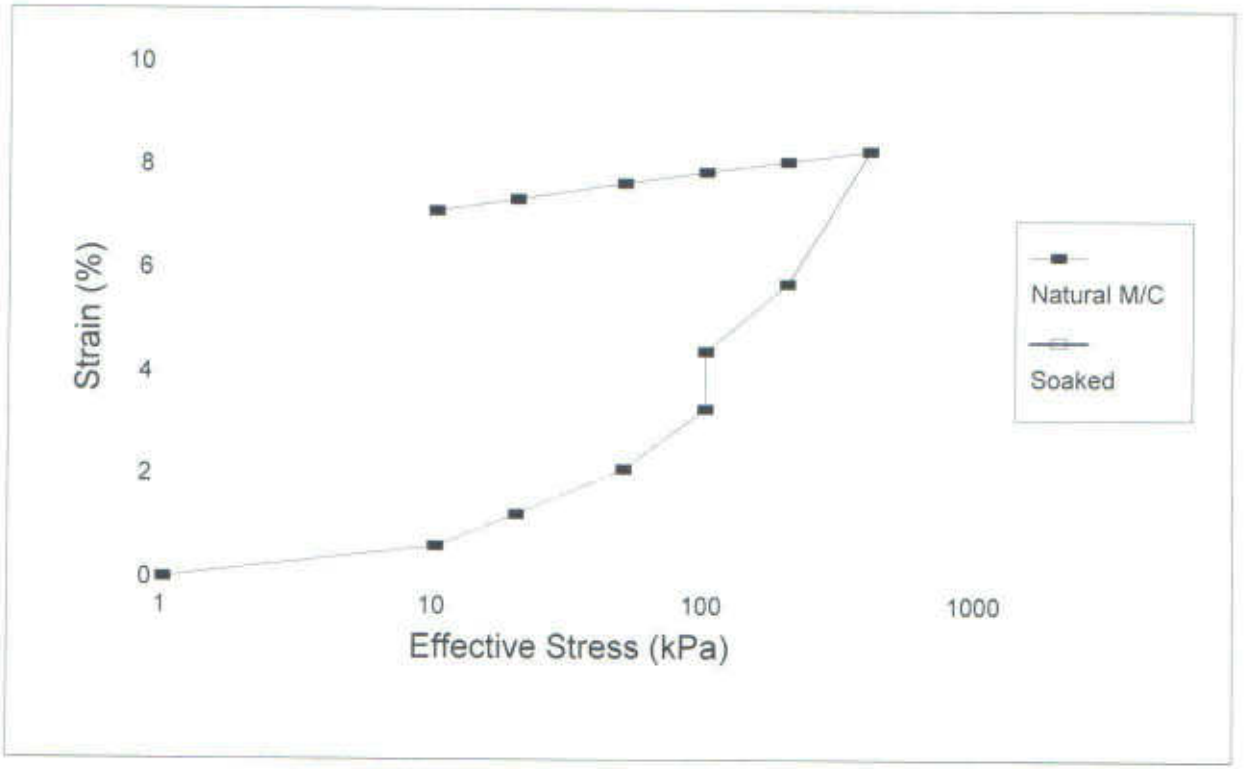
VOIDS RATIO v EFFECTIVE STRESS

Test No: TP 6 @ 1.1-1.2m



STRAIN v EFFECTIVE STRESS

Test No: TP 6 @ 1.1-1.2m



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COLLAPSE POTENTIAL at 100 kPa

Client	WESPLAN AND ASSOCIATES		
Location	PTN 366 NOOITGEDACHT 534-JQ, MOGALE CITY		
Date	2012/11/29	Test No	TP 9 @ 1.3-1.4m
Job No	4412	Checked By	JA

Sample Height (mm)	19.03	Sample Diameter (mm)	75	Sample Specific Gravity	2.71

Sample Preparation	NMC

Effective Stress (kPa)	Consolidation Reading	Voids Ratio	Strain (%)
1	10000	0.497	0.000
10	9964	0.494	0.190
20	9930	0.492	0.370
50	9880	0.488	0.630
100	9826	0.483	0.910
100	9732	0.476	1.410
200	9552	0.462	2.350
400	9304	0.442	3.660
200	9336	0.447	3.330
100	9412	0.451	3.090
50	9474	0.456	2.760
20	9540	0.461	2.420
10	9600	0.466	2.100

Moisture Content Calculations

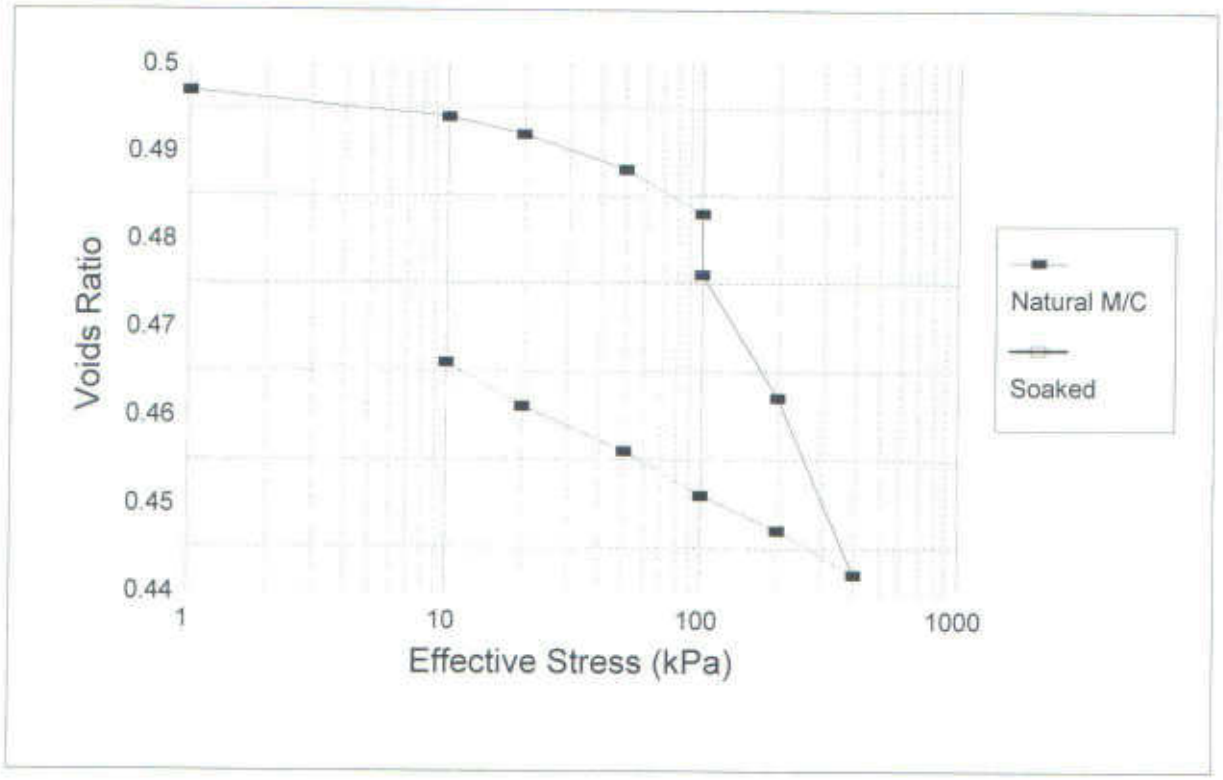
Mass wet sample plus ring before test (gms)	278.80
Mass wet sample plus ring after test (gms)	296.00
Mass dry sample plus ring (gms)	271.60
Mass ring (gms)	119.70
Moisture content before test (%)	**4.74**
Moisture content after test (%)	**16.06**

Other Data

Initial Dry Density (kg/m3)	**1807**
Initial Void Ratio	**0.50**
Collapse Potential (%)	**0.5**

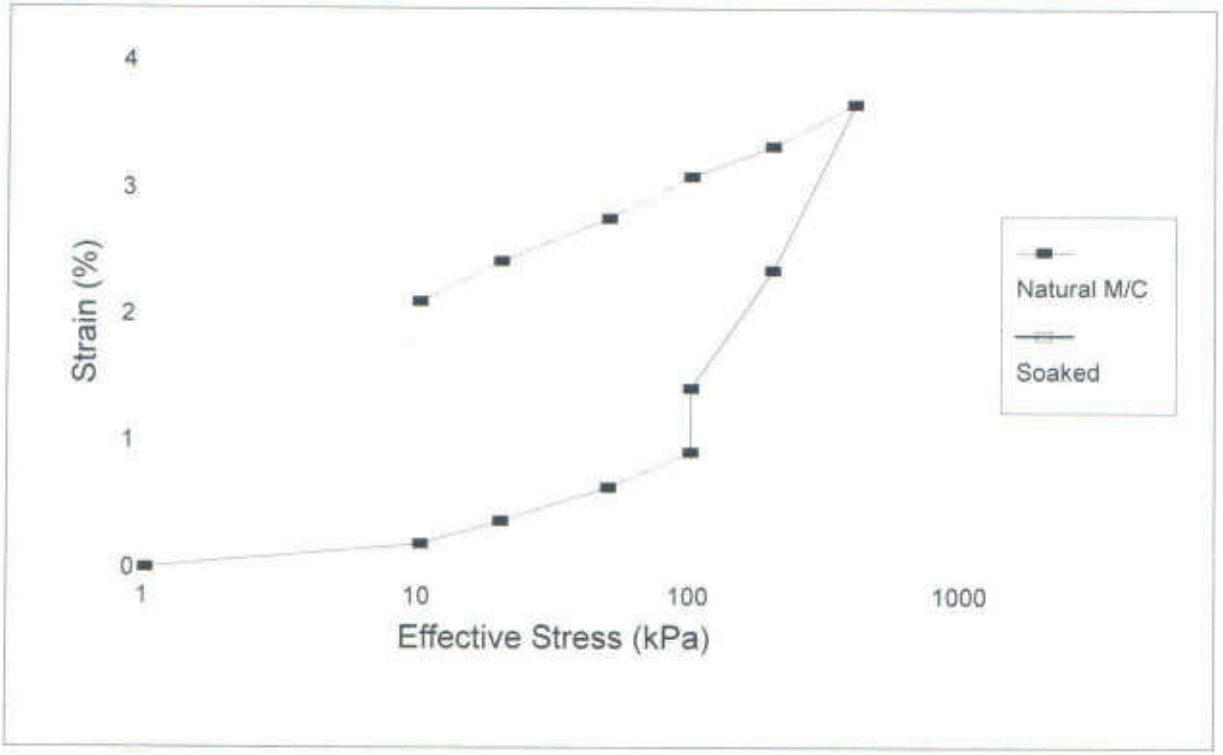
VOIDS RATIO v EFFECTIVE STRESS

Test No: TP 9 @ 1.3-1.4m



STRAIN v EFFECTIVE STRESS

Test No: TP 9 @ 1.3-1.4m



Floral, Faunal and Wetland Assessment

FAUNAL, FLORAL AND WETLAND ASSESSMENT AS PART OF THE ENVIRONMENTAL ASSESSMENT AND AUTHORISATION PROCESS FOR THE PROPOSED DEVELOPMENT ON PORTION 366 OF THE FARM NOOITGEDACHT 534-JQ, MOGALE CITY, GAUTENG PROVINCE.

Prepared for

Bokamoso Environmental Consultants

February 2013

FLORAL, FAUNAL AND WETLAND ASSESSMENT

Prepared by: **Scientific Aquatic Services**
Report author: **S van Staden (Pri.Sci.Nat)**
Report Reference: **SAS 213016**
Date: **February 2013**

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EXECUTIVE SUMMARY

Scientific Aquatic Services (SAS) was appointed to conduct a floral, faunal and wetland ecological assessment as part of the environmental assessment and authorisation process for the proposed development of Portion 366 of the Farm Nooitgedacht 534-JQ within the Muldersdrift area, Gauteng, hereafter referred to as the "subject property". The subject property is located to the south of the N14 highway and to the east of Malibongwe Drive (R512) within an area characterised by agricultural activities and smallholdings, with residential and urban development of increased density to the south.

The following general conclusions were drawn on completion of the field assessment:

Floral Assessment

- The assessment site falls within the Grassland biome, Mesic Highveld Grassland Bioregion and falls within the Egoli Granite Grassland vegetation type (which is considered to be an endangered vegetation type).
- Three habitat units were identified during the assessment, namely the Wetland Habitat Unit, the Open Grassland Habitat Unit and the Transformed Habitat Unit.
- The Wetland Habitat Unit, associated with a drainage line, is located centrally with respect to the subject property, running in a south-north direction. From the assessment, it is evident that some impact on the stream connectivity has occurred due to the presence of earth dams downstream of the subject property and as a result of informal crossings over the wetland. Some further impacts from erosion, an irregular fire regime and solid waste dumping occur in isolated areas along the drainage line course. Throughout the wetland feature, anthropogenic impacts have led to alien and terrestrial vegetation encroachment. The Wetland Habitat Unit does however provide important habitat for a number of orchid species.
- The Open Grassland Habitat Unit is present in the majority of the subject property with the exception of the central wetland area and transformed areas in the southwestern and northeastern portions of the subject property. This Habitat Unit is dominated by *Hyparrhenia hirta*, a grass species associated with historic disturbance. Although the majority of grass species present are representative of the expected Egoli Grassland Vegetation Type, irregular fires as well as localised alien plant species invasion and bush encroachment are evident throughout this Habitat Unit. Edge effects from surrounding residential and infrastructure development have impacted on natural species composition and ecological functioning to some degree. The grassland present is considered to be in a moderate ecological condition as it provides habitat for the orchid species, *Habenaria epipactidea* and potential habitat for other terrestrial orchid species.
- The Transformed Habitat Unit consists of areas with excessive erosion, stands of alien vegetation, bare soil and cleared areas as well as residential dwellings. Further, ornamental plant species associated with residential landscaping dominate the vegetation towards the southwest of the subject property.
- The following scores for each habitat unit were calculated during the VIS calculations:

Habitat unit	Score	Class	Motivation
Wetland Habitat Unit	12	**D – Largely modified**	Some transformation due to historic anthropogenic activities and alien vegetation encroachment.
Open Grassland Habitat Unit	18	**C – Moderately modified**	Some transformation due to historic anthropogenic activities and alien vegetation stands. Localised bush encroachment present.
Transformed Habitat Unit	5	**E - Extensive loss of natural habitat**	Severe transformation due to historic anthropogenic activities and alien vegetation stands

- Edge effects from current and historic anthropogenic activities have led to an increase in alien plant species within all habitat units within the subject property, particularly within the Wetland and Transformed Habitat Units.

- A number of commonly occurring medicinal plant species, as well as *Hypoxis hemerocallidea* and *Boophane disticha* occur throughout the subject property, except within the Transformed Habitat Unit.
- Apart from *Boophane disticha* and *Hypoxis hemerocallidea*, which are Red Data Listed (RDL) by the International Union for Conservation of Nature (IUCN) as 'Declining', no other RDL floral species were noted within the subject property. Both *Boophane disticha* and *Hypoxis hemerocallidea* occur scattered throughout the Wetland and Open Grassland Habitat Units. All *Boophane disticha* and *Hypoxis hemerocallidea* species located within the development footprint should be relocated to areas earmarked as open space or used as part of the landscaping of the proposed development, by means of a rescue and relocation plan to be developed and implemented before construction and earthworks activities take place.
- The orchid species *Habenaria schimperiana, H. nyikana* and *H. filicornis* occur in the Wetland Habitat Unit, while *H. epipactidea* were noted within the Open Grassland Unit. The *Habenaria* spp within the Wetland Habitat Unit should remain undisturbed and development or disturbance due to construction activities within this area and the associated buffer zone should be prevented. In addition to *Habenaria epipactidea*, any other orchid species potentially located within the Open Grassland Habitat Unit should be relocated prior to the commencement of earthworks to suitable open space areas or another safe location with the assistance of a specialised nursery or a local orchid society and permits to relocate these species, if required, should be obtained.
- Due to the presence of a number of *Habenaria* species, the possibility of other orchid species occurring within the subject property, including the RDL *Habenaria mossii*, should not be excluded. During the plant rescue and relocation process, a thorough search must be done to confirm the absence/ presence of these species. These species flower during the late summer months (January – March).

Faunal Assessment

- Suitable habitat to host and provide food for a diverse mammal population is limited within the subject property. Mammal species are likely to be restricted to more common small mammal species which are opportunistic feeders and able to adapt to urban environments. Common small mammal species that might occur within the subject property are the Scrub Hare (*Lepus saxatilis*), the Southern African Spiny Mouse (*Acomys spinosissimus*) and the Yellow Mongoose (*Cynictis penicillata*). These species are not regionally threatened species (GDARD) and are considered as Least Concern by the IUCN.
- It is not likely that any RDL or sensitive mammal species will utilise the area within or directly adjacent to the proposed development area for habitation or foraging purposes due to the moderate levels of transformation and anthropogenic activity. Thus, the proposed development does not pose a threat to mammal conservation in the area, provided that the sensitivity map is adhered to.
- A moderate diversity of avifaunal species was noted in the vicinity of the subject property, with the majority of species observed being adapted to urban environments. The majority of bird species encountered are regarded as common and widespread species, and are likely to remain in the area or move to areas that are more suitable, if any development takes place.
- A possibility exists that some threatened RDL bird species, which occur in the GDARD RDL bird list, may occasionally occur within the subject property under favourable conditions, especially for foraging purposes. Such species may include raptor species such as the Vulnerable Lesser Kestrel (*Falco naumanni*) (GDARD SoER 2004) and the Near Threatened Lanner Falcon (*Falco biarmicus*) (GDARD SoER 2004). It is unlikely that the African Grass Owl (*Tyto capensis*), which has been highlighted by GDARD as being of conservation concern, frequent or inhabit the subject property due to anthropogenic movement through the area. Should these species occur within the subject property, conservation of the wetland area and associated buffer zone will provide adequate habitat for such species. The proposed development does not pose a threat to bird conservation in the area, provided that the recommendations as set out in this report are adhered to.
- Due to historic transformation, nearby informal and formal settlements and lack of suitable rocky habitat, a large diversity of reptile species is unlikely to be present within the subject

property. Only commonly occurring reptile species adapted to urban environments are expected to reside within the subject property.

- The moderate levels of transformation and anthropogenic activity within the subject property also lowers the probability of RDL or threatened reptile species such as the Striped harlequin Snake (*Homoroselaps dorsalis*) and the South African Python (*Python natalensis*) from occurring within the subject property. Therefore, the proposed development is unlikely to pose a significant threat to reptile conservation in the region.
- The wetland feature within the subject property is deemed the most important for conservation of amphibian species. However, perceived impacts on the wetland feature limits the possibility of amphibian species of concern being present and will most probably restrict amphibian diversity occurring within the Wetland Habitat Unit to more common species and species more tolerant of impacted environments such as guttural toads (*Amietophrynus gutturalis*) and common river frogs (*Amietia angolensis*).
- The study area occurs in the distribution range of the Giant African Bullfrog (*Pyxicephalus adspersus*) which is a noted RDL species within the Gauteng Province. Under favourable conditions when high rainfall has occurred, the Giant African Bullfrog (*Pyxicephalus adspersus*) is known to traverse large distances for foraging purposes and has been noted in the larger region. The proposed development may thus pose a threat to migrating bullfrogs. However, this threat may be lowered if mitigation measures and recommendations as listed in this report with respect to conservation of wetland habitat is adhered to as most amphibian species will most likely be restricted to the Wetland Habitat Unit.
- The proposed development is unlikely to pose a threat to invertebrate conservation in the region and no RDL invertebrate species are likely to occur within the proposed development's expected range of influence.
- The proposed development is not expected to pose a threat to arachnid and scorpion conservation in the subject property. No RDL arachnid and scorpion species are likely to occur within the proposed development project area.

Wetland Assessment

- One wetland system has been identified within the study area, which can be defined as an unnamed headwater stream of the Crocodile River. The system is characterised as a valley floor, channelled valley bottom wetland.
- The degree of wetland development present is limited, due to the lack of water that remain within the system beyond rainfall events. As a result, both the soil form and vegetation indicators are weakly developed, with terrestrial vegetation species interspersed with wetland vegetation species within the wetland zone.
- Due to the sandy nature of the soil the area is well drained, limiting the extent to which wetland vegetation have become established away from the main drainage line with little development of hydromorphic soils beyond the seasonal zone.
- The subject property is located in the Highveld Aquatic Ecoregion catchment and falls largely within the A21E quaternary catchment, with a small portion of the wetland being located within the A21C quaternary catchment.
- According to the ecological importance classification for the A21E quaternary catchment, the system can be classified as a Moderately Sensitive system which, in its present state, can be considered a Class C (moderately modified) stream.
- According to the ecological importance classification for the A21C quaternary catchment, the system can be classified as a Moderately Sensitive system which, in its present state, can be considered a Class D (largely modified) stream.
- The National Wetland Inventory (2006) and National Freshwater Ecosystem Priority Areas (NFEPA) (2011) databases were consulted to define the aquatic ecology of the wetland or river systems close to or within the subject property that may be of ecological importance. Aspects applicable to the subject property include:
    - The subject property falls within the Crocodile (west) and Marico Water Management Area (WMA). Each Water Management Area is divided into several sub-Water Management Areas (subWMA), where the catchment or watershed is defined as a topographically defined area which is drained by a stream or river network. The Sub-Water management unit indicated for the subject property is the Upper crocodile sub-WMA;
    - No NFEPA wetlands or flagship rivers were identified within or immediately adjacent to the study area;

- No wetland clusters of conservational importance were indicated within or near the study area;
- The applicable FEPA WMA data do not indicate any riverine resources within the subject property which is of significance in terms of fish conservation;
- Wetlands located within the subject property are not shown to have sighting or breeding areas for cranes;
- No RAMSAR wetlands are located within or close to the subject property; and
- No wetlands are indicated to fall within 500m of an IUCN threatened frog point locality.

- From the assessment, it is evident that the wetland present within the subject property provides a moderately low level of ecological function and service provision. The wetland feature is most important in terms of flood attenuation and streamflow regulation as well as biodiversity maintenance. Limited services are provided in terms of nutrient assimilation, sediment trapping and erosion control and little to no service in terms of socio-cultural and socio-economic ecoservices is provided.
- The PES calculated for the system falls within class C – Moderately Modified. System modifiers, including canalisation and topographic alteration as well as perceived water quality modifications as a result of runoff reaching the wetland from roads to the south have impacted in the wetland. Alien and terrestrial plant species encroachment and the subsequent replacement of indigenous vegetation have also impacted on the system, which has led to a lowered PES of the wetland and affected its natural state.
- The EMC class deemed appropriate to enhance and maintain currently ecology as well as functionality is Class C (Moderately modified).
- Due to the lowered PES of the wetland system, the moderately low levels of ecological function and service provision provided by the wetland system, the close proximity to the existing urban edge and the expected future urbanised environment of this area, a 30 meter wetland buffer is deemed adequate to maintain the PES of this aquatic resource and protect it from the effects of the proposed development. This is possible, provided that runoff and erosion will be suitably managed and that the wetland and associated drainage line area will be suitably protected and any significant current environmental degradation and potential future degradation caused during construction, is rehabilitated.

Sensitivity

The overall vegetation of the subject property has been impacted by current and historic anthropogenic activities and related edge effects, formal and informal road construction within and adjacent to the subject property, erosion, an irregular fire regime and alien floral infestation. Apart from *Boophane disticha* and *Hypoxis hemerocallidea* which are IUCN RDL as 'Declining', no other RDL species were noted within the subject property. These species occur scattered throughout the Wetland and Open Grassland Habitat Units. The orchid species *Habenaria schimperiana, H.nyikana* and *H.filicornis* were noted within the Wetland Habitat Unit and *Habenaria epipactidea* within the Open Grassland Habitat Unit. All orchid species occurring within the Open Grassland Habitat Unit should be relocated prior to commencement of earthworks, as terrestrial orchids in Gauteng are increasingly threatened due to habitat loss and urbanisation.

Due to the presence of various *Habenaria* species, the possibility of other orchid species such as the RDL *Habenaria mossii*, occurring within the subject property, particularly within the Open Grassland Habitat Unit should not be excluded.

Apart from *Pyxicephalus adspersus* (Giant bullfrogs), which have a slight probability of utilising the subject property as a migratory corridor (they are capable of crossing roads) and several RDL avifaunal species potentially utilising the property for foraging purposes, no other RDL faunal species are expected to occur on the subject property.

The Open Grassland Habitat Unit which covers the majority of the subject property is considered to be of a moderate ecological sensitivity. The Wetland Habitat Unit as well as a 30m buffer zone is regarded to be of high ecological sensitivity as a result of ecoservices and ecological functions, as well as faunal and floral habitat (particularly for orchid species) that the wetland system provides. The Transformed Habitat Unit is considered to be of low ecological sensitivity. Development and construction activities within the subject property, provided that the sensitivity map and

management measures as set out in this report are strictly adhered to, are not regarded as a significant threat to overall biodiversity management and conservation within the region.

Upon conclusion of this biodiversity assessment, it is the opinion of the ecologists that from an ecological viewpoint, the proposed development be permitted provided that the recommendations below are strictly adhered to:

Development footprint

- All areas of increased ecological sensitivity should be marked as such. This includes the Wetland area and the associated buffer zone, which is to be indicated as a no-go area for the duration of the construction phase. Ecologically friendly property borders are also recommended in the form of open palisade fencing, as opposed to solid walling. This will allow for freedom of movement of invertebrates and smaller, mobile mammal species that need freedom to migrate to maintain genetic diversity.
- Edge effects of project related activities within these areas of increased ecological sensitivity including erosion and alien floral species establishment need to be strictly managed.
- As much indigenous vegetation growth as possible should be promoted within the proposed development area in order to protect soils and where possible the percentage of the surface area which is paved must be minimised. In this regard special mention is made of the need to use indigenous vegetation species as the first choice during landscaping.
- All *Hypoxis hemerocallidea* and *Boophane disticha* specimens occurring within the Open Grassland Habitat Unit should be relocated to suitable open areas, such as the wetland buffer zone within the subject property through the implementation of a search and rescue plan prior to the commencement of earthworks activities. During the search and rescue operation, all orchid species, including *Habenaria epipactidea*, should be marked and relocated with the assistance of a specialised nursery or local orchid society and permits for their relocation should be obtained, if required.

Wetlands

- An alien removal programme should be implemented within the wetland area whereby alien plant species occurring in this area are manually removed. This may only take place during April to September when orchid species are dormant and should continue at regular intervals throughout the operational phase. The number of people appointed to remove alien plants is to be limited so as to prevent excessive trampling and further disturbance to the wetland area.
- Existing dumping material should also be removed from the wetland area.
- As much of the ecological functioning and migratory connectivity of the drainage feature need to be maintained by ensuring flow connectivity along the drainage line and preventing unnecessary barriers within these areas.
- No topsoil, waste rock or building material should be dumped into the existing drainage line and wetland area and the associated buffer zone, as this area is considered to be of higher ecological importance.
- It must be ensured that construction-related waste and effluent do not affect the wetland resources and associated buffer zones.
- Edge effects of activities, including erosion and alien / weed control, have to be strictly managed in more sensitive wetland areas.
- All construction vehicles should remain on designated roads with no indiscriminate driving through wetlands and riparian areas.
- Adequate stormwater and erosion management measures must be incorporated into the design of the proposed development in order to prevent erosion and sedimentation of the wetland areas.

Alien plant species

- Proliferation of alien and invasive species is expected within disturbed areas such as gravel roads and construction areas. These species should be eradicated and controlled to prevent their spread beyond the site boundary as well as seed dispersal within the top layers of the soil within footprint areas.

- Removal of the alien and weed species encountered on the property in order to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998).

Vehicles
- Where possible, construction vehicles should be restricted to travelling only on the existing roads to limit the ecological footprint of the proposed development activities.
- All construction vehicles should regularly be inspected for leaks.

Dust
- It must be ensured that all roads and construction areas are regularly sprayed with water in order to curb dust generation. This is particularly necessary during the dry season when increased levels of dust generation can be expected.
- It must be ensured that all disturbed and exposed areas are rehabilitated and covered with indigenous vegetation to prevent post-rehabilitation dust generation.

Fires
- No fires should be allowed within the subject property during the construction phase of the development.

Dumping
- No dumping of waste should take place within any area of the subject property. If any spills or waste deposits occur, they should be immediately cleaned up. This includes hydrocarbon spills.

Fauna
- If any threatened RDL faunal species are identified within the subject property during construction activities, the proponent and contractors should ensure effective non direct means of relocation of individuals, such as effective flushing out practices of the bird species.
- No trapping or hunting of fauna is to take place. Access control must be implemented to ensure that no illegal trapping or poaching takes place.

Soils
- To prevent the erosion of top soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas susceptible to erosion. Ensure that topsoil stockpiles are out of any drainage lines and areas susceptible to erosion. Stockpiles should be placed away from areas known to contain hazardous substances and if any soils are contaminated, it should be stripped and disposed of at a registered hazardous waste dumping site;
- All soils compacted as a result of construction activities falling outside development footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all phases of the development;
- Erosion management measures must be implemented to prevent soils from eroding into surface water resources.

Rehabilitation
- As much vegetation growth as possible should be promoted within the proposed development area in order to protect soils. In this regard special mention is made of the need to use indigenous vegetation species where hydroseeding, wetland and rehabilitation planting are to be implemented.
- Upon completion of the project, new indigenous landscaping should be implemented in all affected areas and proper rehabilitation within all impacted areas must take place.
- Banks of disturbed drainage areas must be reprofiled if in any way affected by construction activities.
- Banks and drainage features, if affected by the proposed construction activities, are to be reinforced where necessary with reno mattresses and geotextiles.
- Any areas where earthworks have taken place and soils are exposed, should be reseeded with indigenous vegetation to prevent erosion.

Declaration

This report has been prepared according to the requirements of Section 32 (2) of the Environmental Impact Assessments EIA Regulations, 2010 (GNR 543). We (the undersigned) declare the findings of this report free from influence or prejudice.

Project Manager:

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BSc. Hons (Aquatic Health) (RAU);
M.Sc. Environmental Management (RAU).

Field of expertise:
Wetland, aquatic and terrestrial ecology.

_____ Date: 22/02/2013

Stephen van Staden

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GLOSSARY OF TERMS & ACRONYMS

Alien vegetation	Plants that do not occur naturally within the area but have been introduced either intentionally or unintentionally
Biome	A broad ecological unit representing major life zones of large natural areas – defined mainly by vegetation structure and climate
°C	Degrees Celsius
Decreaser grass	Grass abundant in veldt in good condition, which decreases when veld is under- or over-utilized
DMEC	Desired Ecological Management Class
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
Ecoregion	An ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region
EIS	Ecological Importance and Sensitivity
EMC	Ecological Management Class
Endangered	Organisms in danger of extinction if causal factors continue to operate
Endemic species	Species that are only found within a pre-defined area. There can therefore be sub-continental (e.g. southern Africa), national (South Africa), provincial, regional or even within a particular mountain range
Exotic vegetation	Vegetation species that originate from outside of the borders of the biome -usually international in origin
Ex situ conservation	Where a plant (or community) cannot be allowed to remain in its original habitat and is removed and cultivated to allow for its on-going survival
GDARD	Gauteng Department of Agricultural and Rural Development
ha	Hectares
Indigenous vegetation	Vegetation occurring naturally within a defined area
Increaser 1 grass	Grass species that increase in density when veld is under-

	utilized
Increaser 2 grass	Grass species that increase in density in over-utilized, trampled or disturbed veld.
Increaser 3 grass	Grass species that increase in density in over and under-utilized veld
In situ conservation	Where a plant (or community) is allowed to remain in its natural habitat with an allocated buffer zone to allow for its on-going survival
m	Metres
mm	Millimetres
MAP	Mean annual precipitation
MAPE	Mean annual potential for evaporation
MASMS	Mean annual soil moisture stress
MAT	Mean annual temperature
PEMC	Present Ecological Management Class
PES	Present Ecological State
POC	Probability of Occurrence
PRECIS	Pretoria Computer Information Systems
Pioneer species	A plant species that is stimulated to grow after a disturbance has taken place. This is the first step in natural veld succession after a disturbance has taken place
QDS	Quarter degree square (1:50,000 topographical mapping references)
Rare	Organisms with small populations at present
RDL species	Red Data Listed Species. Organisms that fall into the Extinct in the Wild (EW), critically endangered (CR), Endangered (EN), Vulnerable (VU) categories of ecological status.
RDM	Resource Directed Measures
RDSIS	Red Data Sensitivity Index Score
REC	Recommended Ecological Category
RHP	River Health Program
SANBI	South African National Biodiversity Institute

TSP	Threatened Species Programme
VIS	Vegetation Index Score

1 INTRODUCTION

1.1 Background

Scientific Aquatic Services (SAS) was appointed to conduct a floral, faunal and wetland ecological assessment as part of the environmental assessment and authorisation process for the proposed development of Portion 366 of the Farm Nooitgedacht 354-JQ within the Muldersdrift area, Gauteng, hereafter referred to as the "subject property". The subject property is located to the south of the N14 highway and to the east of Malibongwe Drive (R512) within an area characterised by agricultural activities and smallholdings, with residential and urban development of increased density to the south.

The proposed development will entail the following activities:

- Project planning and development of layout and bulk services plans;
- Site preparation;
- Earthworks (excavations, etc.);
- Construction of facilities, roads and services; and
- Landscaping and rehabilitation of the development site after construction.

This report, after consideration and description of the ecological integrity of the property, must guide the property owner, authorities and potential developers, by means of recommendations as to the viability of the proposed development.

Figure 1: Digital satellite image depicting the location of the subject property in relation to surrounding areas.

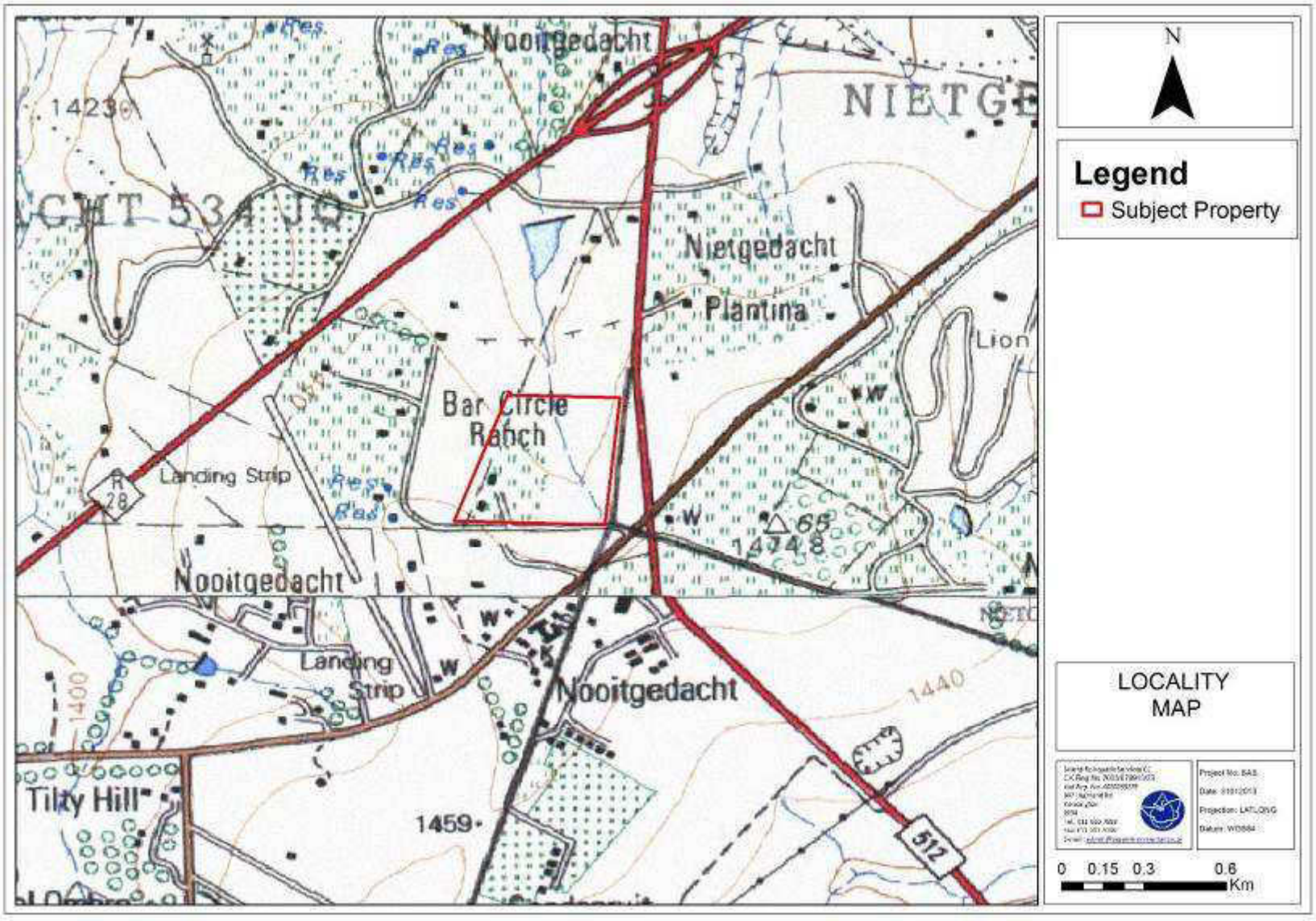

Figure 2: Subject property depicted on a 1:50 000 topographical map in relation to surrounding area.

1.2 Scope

Specific outcomes in terms of this report are as follows:

Terrestrial Assessment

- To conduct a Red Data Listed (RDL) species assessment, including potential for species to occur on the subject property and the implementation of a Red Data Sensitivity Index Score (RDSIS) for the subject property;
- To provide faunal and floral inventories of species as encountered on site;
- To determine and describe habitats, communities and the Present Ecological State (PES) of the subject property; and
- To describe the spatial significance of the subject property with regards to surrounding natural areas and in terms of migratory connectivity.

Wetland Assessment

- To define the Present Ecological State of each wetland system within the subject property;
- To determine the functioning of each system and the environmental and socio-cultural services that the system provide;
- To advocate a Recommended Ecological Category (REC) for each wetland feature; and
- To delineate all wetlands or riparian zones occurring within the assessment site.

1.3 Assumptions and Limitations

The following assumptions and limitations are applicable to this report:

- The ecological assessment is confined to the subject property as per Figures 1 & 2 and does not include the neighbouring and adjacent properties, however, these were considered as part of the desktop assessment.
- Due to the nature and habits of most faunal taxa it is unlikely that all species would have been observed during a site assessment of limited duration. Therefore, site observations were compared with literature studies where necessary.
- With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. A more accurate assessment would require that assessments take place in all seasons of the year. However, it is expected that most faunal and floral communities have been accurately assessed and considered during the study.

- Sampling by its nature, means that not all individuals are assessed and identified. Some species and taxa on the subject property may therefore been missed during the assessment.
- The wetland delineation as presented in this report is regarded as a best estimate of the wetland boundary based on the site conditions present at the time of assessment.
- Wetlands and terrestrial areas form transitional areas where an ecotone is formed as vegetation species change from terrestrial species to facultative and obligate wetland species. Within this transition zone some variation of opinion on the wetland boundary may occur, however if the DWAF 2005 method is followed, all assessors should get largely similar results.

1.4 Legislation

1.4.1 National Environmental Management Act, 1998

- The National Environmental Management Act (Act 107 of 1998) and the associated Regulations (Listing No R. 544, No R. 545 and R. 546) as amended in June 2010, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation process needs to be followed. This could follow either the Basic Assessment process or the EIA process depending on the nature of the activity and scale of the impact.

1.4.2 National Water Act, 1998

- The National Water Act (Act 36 of 1998) recognises that the entire ecosystem and not just the water itself in any given water resource constitutes the resource and as such needs to be conserved.
- No activity may therefore take place within a watercourse unless it is authorised by DWA.

2 ASSESSMENT APPROACH

2.1 General approach

In order to accurately determine the PES of the subject property and capture comprehensive data with respect to faunal and floral taxa, the following methodology was used:

- Maps and digital satellite images were consulted prior to the field assessment in order to determine broad habitats, vegetation types and potentially sensitive areas. An initial visual on-site assessment of the subject property was made in order to confirm the assumptions made during consultation of the maps.
- Literature review with respect to habitats, vegetation types and species distribution was conducted.
- Relevant data bases considered during the assessment of the study area included South African National Biodiversity Institute (SANBI) [Threatened species programme (TSP) and Pretoria Computer Information Systems (PRECIS), 2007], Gauteng Department of Agricultural and Rural Development (GDARD) biodiversity information and the Gauteng Conservation plan Version 3 (C-Plan, 2010).
- Specific methodologies for the assessment of faunal and floral ecological assemblages will be presented in the relevant sections below.

3 GENERAL SITE SURVEY

A field assessment was undertaken in order to determine the ecological status of the subject property. A reconnaissance 'walkabout' was undertaken to determine and verify the general habitat types found throughout the study area as presented in this report and, following this, specific study sites were selected that are considered to be representative of the habitats found within the area and special emphasis was placed on potential areas that may support RDL faunal and floral species. Specific reference was given to biodiversity concerns as presented by GDARD, which include the presence of wetlands, vegetation condition and the occurrence of *Homoroselaps dorsalis* (Striped Harlequin Snake) and *Tyto capensis* (African Grass Owl). The site was investigated on foot to identify the occurrence of the dominant plant species and habitat diversities.

4 FLORAL ASSESSMENT METHODOLOGY

4.1 Habitat Units and Transects

Vegetation surveys were undertaken by first verifying different habitat units identified and then analysing the floral species composition. Different investigation sites were selected within areas that were perceived to best represent the various plant communities. Floral species were recorded and a species list was compiled for each habitat unit. These species lists was then also be compared with the vegetation expected to be found in the Egoli Granite Grassland vegetation type, which serves to provide an accurate indication of the ecological integrity and conservational value of each habitat unit.

For transect analysis, a walking stick was used that was placed at 1m intervals and the plant species or biophysical feature falling closest to the point of the stick was identified. These data points were developed along 100m long transect lines, making for 100 data points along a single transect. Species lists were compiled and species composition was analysed along the selected transect lines, where after the data was analysed and the percentage contribution of the various floral species for each transect line was calculated. These species lists were then compared with the vegetation expected to be found in the Egoli Granite Grassland vegetation type, which further assisted in providing an accurate indication of the ecological integrity and conservational value of each assessment unit.

4.2 Vegetation Index Score

The Vegetation Index Score (VIS) was designed to determine the ecological state of each habitat unit defined within an assessment site. This enables an accurate and consistent description of the present ecological state (PES) concerning the subject property in question. The information gathered during these assessments also significantly contributes to sensitivity mapping, leading to a more truthful representation of ecological value and sensitive habitats.

Each defined habitat unit is assessed using separate data sheets (see Appendix A) and all the information gathered then contributes to the final VIS score. The VIS is derived using the following formulas:

VIS = [(EVC)+((SIxPVC)+(RIS))]

Where:

1. **EVC** is extent of vegetation cover;
2. **SI** is structural intactness;
3. **PVC** is percentage cover of indigenous species and
4. **RIS** is recruitment of indigenous species.

Each of these contributing factors is individually calculated as discussed below. All scores and tables indicated in blue are used in the final score calculation for each contributing factor.

1. *EVC=[(EVC1+EVC2)/2]*

EVC 1 - Percentage natural vegetation cover:

Vegetation cover % Site score	0%	1-5%	6-25%	26-50%	51-75%	76-100%
EVC 1 score	0	1	2	3	4	5

EVC2 - Total site disturbance score:

Disturbance score Site score	0	Very Low	Low	Moderately	High	Very High
EVC 2 score	5	4	3	2	1	0

2. *SI=(SI1+SI2+SI3+SI4)/4)*

	Trees (SI1)		Shrubs (SI2)		Forbs (SI3)		Grasses (SI4)	
Score:	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State
Continuous								
Clumped								
Scattered								
Sparse								

Present State (P/S) = Currently applicable for each habitat unit

Perceived Reference State (PRS) = If in pristine condition

Each SI score is determined with reference to the following scoring table of vegetation distribution for present state versus perceived reference state.

	Present state (P/S)			
Perceived Reference state (PRS)	Continuous	Clumped	Scattered	Sparse
Continuous	3	2	1	0
Clumped	2	3	2	1
Scattered	1	2	3	2

Sparse	0	1	2	3

3. PVC=[(EVC)-((exotic x 0.7) + (bare ground x 0.3))

Percentage vegetation cover (exotic):

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
PVC Score	0	1	2	3	4	5

Percentage vegetation cover (bare ground):

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
PVC Score	0	1	2	3	4	5

4. RIS

Extent of indigenous species recruitment	**0**	**Very Low**	**Low**	**Moderate**	**High**	**Very High**
RIS	**0**	**1**	**2**	**3**	**4**	**5**

The final VIS scores for each habitat unit are then categorised as follows:

Vegetation Index Score	Assessment Class	Description
22 to 25	**A**	Unmodified, natural
18 to 22	**B**	Largely natural with few modifications.
14 to 18	**C**	Moderately modified
10 to 14	**D**	Largely modified
5 to 10	**E**	The loss of natural habitat extensive
<5	**F**	Modified completely

4.3 Red Data Species Assessment

Prior to the field visit, a record of Red Data List plant species and their habitat requirements was acquired from SANBI for the quarter degree grid (QDG) 2527DD. Throughout the floral assessment, special attention was paid to the identification of any of these RDL species as well as identification of suitable habitat that could potentially sustain these species.

The probability of occurrence (POC) for each floral species of concern was determined using the following calculation wherein the habitat requirements and disturbance was considered. The accuracy of the calculation was based on the available knowledge about the species in question, with many of the species lacking in depth habitat research. Therefore, it is important that the literature available is also considered during the calculation.

Each factor contributes an equal value to the calculation.

Literature availability

	No Literature available					Literature available
Site score						
Score	0	1	2	3	4	5

Habitat availability

	No Habitat available					Habitat available
Site score						
Score	0	1	2	3	4	5

Habitat disturbance

	0	Very Low	Low	Moderately	High	Very High
Site score						
Score	5	4	3	2	1	0

(Literature availability + Habitat availability + Habitat disturbance) / 15 x 100 = POC%

5 FAUNAL ASSESSMENT METHODOLOGY

5.1 Desktop Study

Prior to the field assessment being completed, a desktop study was undertaken to gather background information regarding the site and its surrounding areas. This is done because the time constraints of field work and the secretive and nocturnal nature of many faunal species makes it difficult to compile thorough and representative faunal species lists using field observations alone. The desktop study involved:

- Consulting maps, aerial photographs and digital satellite images in order to determine broad habitats and sensitive sites and
- A literature review concerning habitats, vegetation types and faunal species distributions.

5.2 Field Recordings

Larger faunal species were recorded during the subject property assessment through direct visual identification and when spoor, call or dung was positively identified. It is important to note that due to the nature and habits of fauna it is unlikely that all species will have been recorded during the site assessment.

During the field assessment all avifaunal species observed were identified and assessed according to habitat preference. Special attention was paid to the identification of any RDL avifaunal species that may inhabit the study area.

All reptilian, amphibian and invertebrate species encountered within the study area were also identified. Focus was placed on the Wetland and Open Grassland Habitat Units known to potentially support the majority of amphibian and reptile species. This information was then used in the determination of the sensitivity of each habitat unit identified within the study area.

5.3 Red Data Fauna

Given the restrictions of field assessments to identify all the faunal species that possibly occur on a particular property, the RDSIS has been developed to provide an indication of the potential red data faunal species that could reside in the area. It also simultaneously provides a quantitative measure of the study area's value in terms of conserving faunal diversity. The RDSIS is based on the principles that when the knowledge of the specie's historical distribution is combined with a field assessment that identifies the degree to

which the property supports a species habitat and food requirements, inferences can be made about the chances of that particular specie residing on the property. Repeating this procedure for all the potential red data faunal species of the area and collating this information then provides a sensitivity measure of the property that has been investigated. The detailed methodology to determine the RDSIS of the property is presented below:

Probability of Occurrence (POC): Known distribution range (D), habitat suitability of the site (H) and availability of food sources (F) on site were determined for each of the species. Each of these variables is expressed a percentage (where 100% is a perfect score). The average of these scores provided a POC score for each species. The POC value was categorised as follows:

- **0-20% = Low;**
- **21-40% = Low to Medium;**
- **41-60% = Medium;**
- **60-80% = Medium to High; and**
- **81-100% = High**

POC = (D+H+F)/3

Total Species Score (TSS): Species with POC of more than 60% (High-medium) were considered when applying the RDSIS. A weighting factor was assigned to the different IUCN categories providing species with a higher conservation status, a higher score. This weighting factor was then multiplied with the POC to calculate the total species score (TSS) for each species. The weighting as assigned to the various categories is as follows:

- **Data Deficient = 0.2;**
- **Rare = 0.5;**
- **Near Threatened = 0.7;**
- **Vulnerable = 1.2;**
- **Endangered = 1.7; and**
- **Critically Endangered = 2.0**.

TSS = (IUCN weighting*POC) where POC > 60%

Average Total Species (Ave TSS) and Threatened Taxa Score (Ave TT): The average of all TSS potentially occurring on the site is calculated. The average of all the Threatened taxa (TT) (*Near threatened*, *Vulnerable*, *Endangered* and *Critically Endangered)* TSS scores are also calculated. The average of these two scores (Ave TSS and Ave TT) was then calculated in order to add more weight to threatened taxa with POC higher than 60%.

Ave = Ave TSS [TSS/No of Spp] + Ave TT [TT TSS/No of Spp]/2

Red Data Sensitivity Index Score (RDSIS): The average score obtained above and the sum of the percentage of species with a POC of 60% or higher of the total number of Red Data Listed species listed for the area was then calculated. The average of these two scores, expressed as a percentage, gives the RDSIS for the area investigated.

RDSIS = Ave + [Spp with POC>60%/Total no Of Spp*100]/2

RDSIS interpretation:

Table 1: RDSIS value interpretation with regards to RDL importance within the subject property.

RDSIS Score	RDL mammal importance
0-20%	Low
21-40%	Low-Medium
41-60%	Medium
60-80%	High-Medium
81-100%	High

6 WETLAND ASSESSMENT METHODOLOGY

6.1 National Wetland Classification System

All wetland features encountered within the study area were assessed using the *National Wetland Classification System for South Africa* (SANBI, 2009). This was done in order to achieve the Recommended Ecological Category (REC) of the wetland features. The methodology is discussed in the section below.

6.2 Inland systems

For the proposed National Wetland Classification System (NWCS), Inland Systems are ***ecosystems that have no existing connection to the ocean***[1] (i.e. characterised by the complete absence of marine exchange and/or tidal influence) but ***which are inundated or saturated with water, either permanently or periodically.*** It is important to bear in

[1] Most rivers are indirectly connected to the ocean via an estuary at the downstream end, but where marine exchange (i.e. the presence of seawater) or tidal fluctuations are detectable in a river channel that is permanently or periodically connected to the ocean, it is defined as part of the estuary.

mind, however, that certain inland Systems may have had an historical connection to the ocean, which in some cases may have been relatively recent.

Levels 1 to 4 of the proposed NWCS for Inland Systems are presented in **Table 4**, on the following page.

Table 2: Proposed classification structure for Inland Systems, up to Level 4

LEVEL 1: SYSTEM	LEVEL 2: REGIONAL SETTING	LEVEL 3: LANDSCAPE UNIT	LEVEL 4: HYDROGEOMORPHIC (HGM) UNIT			
CONNECTIVITY TO OPEN OCEAN	ECOREGION	LANDSCAPE SETTING	*HGM TYPE*	LONGITUDINAL ZONATION/LANDFORM	DRAINAGE OUTFLOW*	DRAINAGE INFLOW*
			A	**B**	**C**	**D**
INLAND	DWAF Level/Ecoregions	SLOPE	Channel (river)	Mountain headwater stream	(not applicable)	(not applicable)
				Mountain stream	(not applicable)	(not applicable)
				Transitional river	(not applicable)	(not applicable)
				Rejuvenated bedrock fall	(not applicable)	(not applicable)
			Hillslope seep	(not applicable)	With ch. Outflow	(not applicable)
					Without ch. Outflow	(not applicable)
			Depression	(not applicable)	Exorheic	With ch. inflow
						Without ch. inflow
					Endorheic	With ch. inflow
						Without ch. inflow
					Dammed	With ch. inflow
						Without ch. inflow
		VALLEY FLOOR	Channel (river)	Mountain stream	(not applicable)	(not applicable)
				Transitional river	(not applicable)	(not applicable)
				Rejuvenated bedrock fall	(not applicable)	(not applicable)
				Upper foothill river	(not applicable)	(not applicable)
				Lover foothill river	(not applicable)	(not applicable)
				Lowland river	(not applicable)	(not applicable)
				Rejuvenated foothill river	(not applicable)	(not applicable)
				Upland floodplain river	(not applicable)	(not applicable)
			Channelled valley-bottom wetland	Valley-bottom depression	(not applicable)	(not applicable)
				Valley-bottom flat	(not applicable)	(not applicable)
			Unchannelled valley-bottom wetland	Valley-bottom depression	(not applicable)	(not applicable)
				Valley-bottom flat	(not applicable)	(not applicable)
			Floodplain wetland	Valley-bottom depression	(not applicable)	(not applicable)
				Valley-bottom flat	(not applicable)	(not applicable)
			Depression	(not applicable)	Exorheic	With ch. inflow
						Without ch. inflow
					Endorheic	With ch. inflow
						Without ch. inflow
					Dammed	With ch. inflow
						Without ch. inflow
			Valleyhead seep	(not applicable)	(not applicable)	(not applicable)
		PLAIN	Channel (river)	Lowland river	(not applicable)	(not applicable)
				Upland floodplain river	(not applicable)	(not applicable)
			Floodplain wetland	Floodplain depression	(not applicable)	(not applicable)
				Floodplain flat	(not applicable)	(not applicable)
			Unchannelled valley-bottom wetland	Valley-bottom depression	(not applicable)	(not applicable)
				Valley-bottom flat	(not applicable)	(not applicable)
			Depression	(not applicable)	Exorheic	With ch. inflow
						Without ch. inflow
					Endorheic	With ch. inflow
						Without ch. inflow
			Flat	(not applicable)	(not applicable)	(not applicable)
		BENCH (HILLTOP/SADDLE/SHELF)	Depression	(not applicable)	Exorheic	With ch. inflow
						Without ch. inflow
					Endorheic	With ch. inflow
						Without ch. inflow
					(not applicable)	(not applicable)
			Flat	(not applicable)	(not applicable)	(not applicable)

Note: 2nd row of Table provides the criterion for distinguishing between wetland units in each column

*** Ch. = channelled (outflow/inflow)**

6.2.1 Level 2: Ecoregions

For Inland Systems, the regional spatial framework that has been included at Level 2 of the proposed NWCS is that of DWAF's Level 1 Ecoregions for aquatic ecosystems (after Kleynhans *et al.,* 2005). There are a total of 31 Ecoregions, which have been delineated mainly on the basis of physical/abiotic factors. See Figure below.

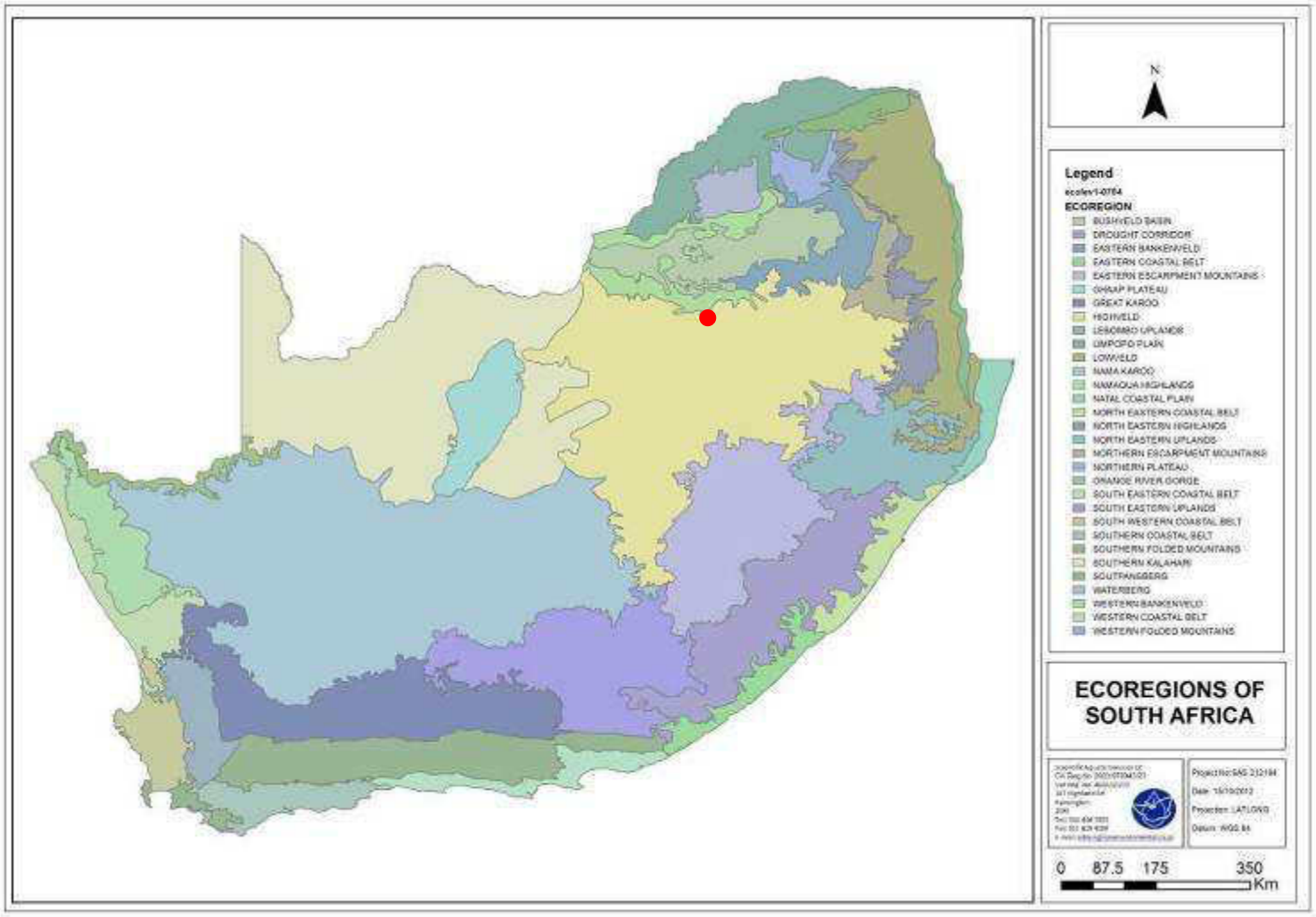

Figure 3: Map of Level 1 Ecoregions of South Africa (approximate location of the subject property indicated in red).

6.2.2 Level 3: Landscape Units

At Level 3 of the proposed NWCS, for Inland Systems, a distinction is made between four Landscape Units (Table 3) on the basis of the landscape setting (i.e. topographical position) within which an HGM Unit is situated, as follows (SANBI, 2009):

- ***Slope*:** an included stretch of ground that is not part of a valley floor, which is typically located on the side of a mountain, hill or valley.
- ***Valley floor:*** the typically gently sloping, lowest surface of a valley[2].
- ***Plain:*** an extensive area of low relief characterised by relatively level, gently undulating or uniformly sloping land.
- ***Bench (hilltop/saddle/shelf):*** an area of mostly level or nearly level high ground (relative to the broad surroundings), including hilltops/crests (areas at the top of a mountain or hill flanked by down-slopes in all directions), saddles (relatively high-lying areas flanked by down-slopes on two sides in one direction and up-slopes on two sides in an approximately perpendicular direction), and shelves/terraces/ledges (relatively high-lying, localised flat areas along a slope, representing a break in slope with an up-slope one side and a down-slope on the other side in the same direction).

In addition, a schematic diagram of the different landscape settings is shown in the figure below.

[2] Valley: an elongated, relatively narrow region of low land between ranges of mountains, hills, or other high areas (such as sand dunes), often having a river or stream running along the bottom.

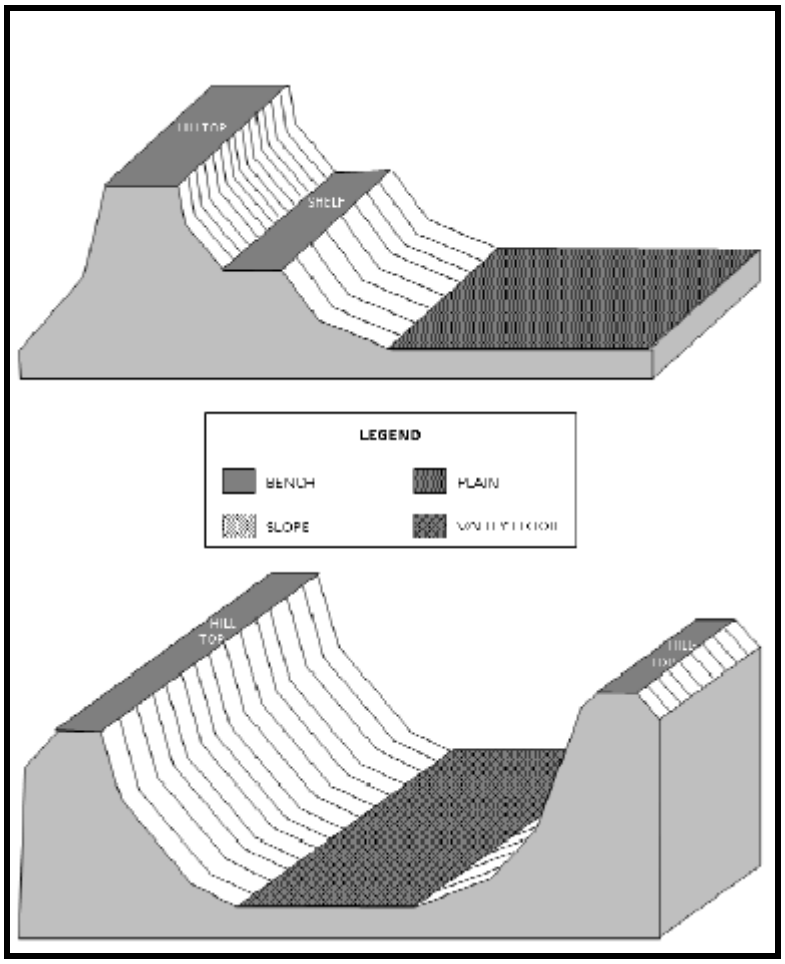

Figure 4: Schematic diagram of the different landscape settings within which an Inland System can occur (Ollis *et al.*, 2009).

6.2.3 Level 4: HGM Units

Eight primary HGM Types are recognised for Inland Systems at Level 4A of the proposed NWCS (Table 5), on the basis of hydrology and geomorphology (SANBI, 2009), namely:

- ***Channel (river, including the banks):*** an open conduit with clearly defined margins that (i) continuously or periodically contains flowing water, or (ii) forms a connecting link between two water bodies.
- ***Channelled valley-bottom wetland:*** a mostly flat valley-bottom wetland dissected by and typically elevated above a channel (see channel).
- ***Unchannelled valley-bottom wetland:*** a mostly flat valley-bottom wetland area within a major channel running through it, characterised by an absence of distinct channel banks and the prevalence of diffuse flows, even during and after high rainfall events.

- ***Floodplain wetland:*** the mostly flat or gently sloping wetland area adjacent to and formed by a **Lowland** or **Upland Floodplain** river, and subject to periodic inundation by overtopping of the channel bank.
- ***Depression:*** a landform with closed elevation contours that increases in depth from the perimeter to a central area of greatest depth, and within which water typically accumulates.
- ***Flat:*** a near-level wetland area (i.e. with little or no relief) with little or no gradient, situated on a plain or a bench in terms of landscape setting.
- ***Hillslope seep:*** a wetland area located on (gently to steeply) sloping land, which is dominated by the colluvial (i.e. gravity-driven), unidirectional movement of material down-slope.
- ***Valleyhead seep:*** a gently-sloping, typically concave wetland area located on a valley floor at the head of a drainage line[3], with water inputs mainly from subsurface flow (although there is usually also a convergence of diffuse overland water flow in these areas during and after rainfall events).

The above terms have been used for the primary HGM Units in the proposed NWCS to try and ensure consistency with the wetland classification terms currently in common usage in South Africa. Similar terminology (but excluding categories for "channel", "flat" and "valleyhead seep") is used, for example, in the recently developed tools produces as part of the Wetland Management Series (Dada *et al.,* 2007), including WET-Health (Macfarlene *et al.,* 2008) and WET-EcoServices (Kotze *et al.,* 2008).

At Level 4B of the classification system, certain of the primary HGM Units can further be divided into sub-categories on the basis of longitudinal geomorphological zonation or localised landform, as follows:

- Channels (including their banks) are divided into six primary longitudinal zones and three zones associated with a rejuvenated longitudinal profile, according to the geomorphological zonation scheme of Rowntree & Wadeson (2000). The sub-categories are *Mountain Headwater Stream, Mountain Stream, Transitional River, Upper Foothill River, Lower Foothill River,* and *Lowland River* (i.e. the primary zones); and *Rejuvenated Bedrock Fall, Rejuvenated Foothill River,* and *Upland Floodplain River* (i.e. the zones associated with a rejuvenated long profile).

[3] Valleyhead seeps tend to occur at relatively high altitudes, often in association with an escarpment. This wetland type is, therefore, relatively common in the Lesotho Highlands and the KwaZulu-Natal Drakensberg area (M.Rountree, Fluvius Environmental Consultants, pers.comm.).

- Channelled and unchannelled valley-bottom wetlands are divided into '*valley-bottom flats'* and *'valley-bottom depressions'*.
- Floodplain wetlands are divided into *'floodplain depressions'* and *'floodplain flats'*.

Table 3: Characteristics of the different Hydrogeomorphic (HGM) Types included in the proposed National Wetland Classification System (NWCS) (SANBI, 2009).

Primary (Level 4A) HGM Type*	Secondary (Level 4B) HGM Units (Longitudinal Zonation/Landform)	Landscape setting/s	Dominant hydrological characteristics			Dominant hydrodynamics
			Inputs	Throughputs	Outputs	
CHANNEL	Mountain Headwater Stream	Slope	Overland flow from catchment runoff, concentrated surface flow from upstream channels and tributaries, diffuse surface flow from an unchannelled upstream drainage line (i.e. an unchannelled valley-bottom wetland), seepage from adjacent hillslope or valleyhead seeps, and/or groundwater (e.g. via inchannel springs)	Concentrated surface flow	Concentrated surface flow, generally, but can be diffuse surface flow (e.g. where a channelled valley-bottom wetland becomes an unchannelled valley-bottom wetland because of a change in gradient or geological control)	Horizontal: unidirectional
	Mountain Stream	Slope/Valley floor				
	Transitional River	Slope/Valley floor				
	Upper Foothill River	Valley floor				
	Lower Foothill River	Valley floor				
	Lowland River	Valley floor/Plain				
	Rejuvenated Foothill Fall (gorge)	Slope/Valley floor				
	Rejuvenated Foothill River	Slope/Valley floor				
	Upland Floodplain River	Valley floor/Plain (specifically a plateau)				
CHANNELLED VALLEY-BOTTOM WETLAND	Valley-bottom flat	Valley floor	Overland flow from adjacent valley-side slopes, lateral seepage (interflow) from adjacent hillslope seeps, channel overspill during flooding	Diffuse surface flow, temporary containment and storage of water in depressional areas, possible short-lived concentrated flows during flooding events	Diffuse surface flow and interflow into adjacent channel, infiltration and evaporation (particularly from depressional areas)	Horizontal: bidirectional; Limited vertical: bidirectional (mostly in depressions)
	Valley-bottom depression	Valley floor				
UNCHANNELLED VALLEY-BOTTOM WETLAND	Valley-bottom flat	Valley floor/Plain	Concentrated or diffuse surface flow from upstream channels and tributaries; overland flow from adjacent valley-side slopes (if present); lateral seepage from adjacent hillslope seeps (if present); groundwater	Diffuse surface flow, interflow, temporary containment and storage of water in depressional areas, possible short-lived concentrated flows during high-flow events	Diffuse or concentrated surface flow, infiltration and evaporation (particularly from depressional areas)	Horizontal: unidirectional; Limited vertical: bidirectional (mostly in depressions)
	Valley-bottom depression	Valley floor/Plain				

Primary (Level 4A) HGM Type*	Secondary (Level 4B) HGM Units (Longitudinal Zonation/Landform)	Landscape setting/s	Dominant hydrological characteristics			Dominant hydrodynamics
			Inputs	Throughputs	Outputs	
FLOODPLAIN WETLAND	Floodplain flat	Valley floor/Plain	Channel overspill during flooding (predominantly), but there could also be some overland flow from adjacent valley-side slopes (if present) and lateral seepage from adjacent hillslope seeps (if present)	Diffuse surface flow, interflow, temporary containment and storage of water in depressional areas, possible short-lived concentrated flows during flooding events	Diffuse surface flow and interflow into adjacent channel, infiltration and evaporation (particularly from depressional areas)	Horizontal: bidirectional; Limited vertical: bidirectional (mostly in depressions)
	Floodplain depression	Valley floor/Plain				
DEPRESSION (EXHORHEIC, with channelled inflow)	n/a	Slope/Valley floor/Plain/Bench	Precipitation, concentrated and (possibly) diffuse surface flow, interflow, groundwater	Containment and storage of water, slow through-flow	Concentrated surface flow	Horizontal: unidirectional; Vertical: bidirectional
DEPRESSION (EXHORHEIC, without channelled inflow)	n/a	Slope/Valley floor/Plain/Bench	Precipitation, diffuse surface flow, interflow, groundwater	Containment and storage of water, slow through-flow	Concentrated surface flow	Horizontal: unidirectional; Vertical: bidirectional
DEPRESSION (ENDORHEIC, with channelled inflow)	n/a	Slope/Valley floor/Plain/Bench	Precipitation, concentrated and (possibly) diffuse surface flow, interflow, groundwater	Containment and storage of water	Evaporation, infiltration	Vertical: bidirectional
DEPRESSION (ENDORHEIC, without channelled inflow)	n/a	Slope/Valley floor/Plain/Bench	Precipitation, diffuse surface flow, interflow, groundwater	Containment and storage of water	Evaporation, infiltration	Vertical: bidirectional
FLAT	n/a	Plain/Bench	Precipitation, groundwater	Containment of water, some diffuse surface flow and/or interflow	Evaporation, infiltration	Vertical: bidirectional Limited horizontal: multidirectional
HILLSLOPE SEEP (with channelled outflow)	n/a	Slope	Groundwater, precipitation (perched)	Diffuse surface flow, interflow	Concentration surface flow	Horizontal: unidirectional
HILLSLOPE SEEP (without channelled outflow)	n/a	Slope	Groundwater, precipitation (perched)	Diffuse surface flow, interflow	Diffuse surface flow, interflow, evaporation, infiltration	Horizontal: unidirectional
VALLEYHEAD SEEP	n/a	Valley Floor	Groundwater surface flow, interflow	Diffuse surface flow, interflow	Concentration surface flow	Horizontal: unidirectional

* **For completeness, in this list a distinction is also made tween *depressions* and *hillslope seeps* with different *drainage (outflow and inflow)* characteristics, as recorded at Levels 4C and 4D of the proposed NWCS (the drainage criteria are not applicable to other HGM Types).**

6.3 Present Ecological State (PES)

After wetland systems have been classified according to the characteristics stipulated above it is important to determine any modifying aspects that may have altered the natural ecological state of the wetland system. *Resource Directed Measures (*RDM) (Dini, J; Cowan, G. & Goodman, P. First Draft: DWAF, *Version 1.0, 1999*) identifies three groups of modifiers: Water Regime Modifiers, Water Chemistry Modifiers, and Artificial Modifiers. A desktop study, as well as the field assessment were used to determine any of these modifiers present at the study area.

All the information gathered as well as hydrology-, hydraulic/geomorphic-, biological criteria and water quality were used to assign a Present Ecological Status (PES) for the wetland feature. The table below lists the attributes as well as criteria assessed during the PES assessment.

Table 4: Criteria and attributes assessed during the determination of the PES.

Criteria and attributes	
Hydrologic	**Hydraulic/Geomorphic**
Flow modification	Canalisation
Permanent Inundation	Topographic Alteration
Water Quality	**Biota**
Water Quality Modification	Terrestrial Encroachment
Sediment load modification	Indigenous Vegetation Removal
	Invasive plant encroachment
	Alien fauna
	Overutilization of biota

Each of the attributes where given a score according to ecological state observed during the site visit, as well as a confidence score to indicate areas of uncertainty (Table 4 below).

Table 5: Scoring guidelines.

Scoring guidelines		Relative confidence score	
Natural, unmodified	5	Very high	4
Largely natural	4	High	3
Moderately modified	3	Moderate	2
Largely modified	2	Low	1
Seriously modified	1		
Critically modified	0		

A mean score for all attributes was then calculated and the final score was used in the Present Ecological Status category determination as indicated in the table below.

Table 6: Present Ecological Status Category descriptions[4]

Score	Class	Description
>4	A	Unmodified, natural
>3 and <=4	B	Largely natural with few modifications
>2 and <=3	C	Moderately modified
2	D	Largely modified
>0 and <2	E	Seriously modified
0	F	Critically modified

6.4 Wetland function assessment

"The importance of a water resource, in ecological social or economic terms, acts as a modifying or motivating determinant in the selection of the management class".[5] The assessment of the ecosystem services supplied by the identified wetland was conducted according to the guidelines as described by Kotze *et* al (2005). The assessment serves to examine and rate the following services according to their degree of importance and the degree to which the service is provided:

- Flood attenuation
- Stream flow regulation
- Sediment trapping
- Phosphate trapping
- Nitrate removal
- Toxicant removal
- Erosion control
- Carbon storage
- Maintenance of biodiversity
- Water supply for human use
- Natural resources
- Cultivated foods
- Cultural significance

[4] Department of Water Affairs and Forestry, South Africa *Version 1.0 of Resource Directed Measures for Protection of Water Resources, 1999* [Table G2].

[5] Department of Water Affairs and Forestry, South Africa *Version 1.0 of Resource Directed Measures for Protection of Water Resources, 1999*

- Tourism and recreation
- Education and research

The characteristics were used to quantitatively determine the value, and by extension sensitivity, of the wetlands. Each characteristic was scored to give the likelihood that the service is being provided. The scores for each service were then averaged to give an overall score to the wetland.

Table 7: Classes for determining the likely extent to which a benefit is being supplied.

Score	Rating of the likely extent to which the benefit is being supplied
<0.5	Low
0.6-1.2	Moderately low
1.3-2	Intermediate
2.1-3	Moderately high
>3	High

6.5 Ecological Management Class

"A high management class relates to the flow that will ensure a high degree of sustainability and a low risk of ecosystem failure. A low management class will ensure marginal maintenance of sustainability, but carries a higher risk of ecosystem failure." [6]

The Ecological Management Class (EMC) was determined based on the results obtained from the PES, reference conditions and Ecological Importance and Sensitivity of the resource (sections above), followed by realistic recommendations, mitigation, and rehabilitation measures to achieve the desired EMC.

A wetland may receive the same class for the PES, as the EMC if the wetland is deemed in good condition, and therefore must stay in good condition. Otherwise, an appropriate EMC should be assigned in order to prevent any further degradation as well as to enhance the PES of the wetland feature.

[6] Department of Water Affairs and Forestry, South Africa *Version 1.0 of Resource Directed Measures for Protection of Water Resources 1999*

Table 8: Description of EMC classes.

Class	Description
A	Unmodified, natural
B	Largely natural with few modifications
C	Moderately modified
D	Largely modified

6.6 Wetland delineation

For the purposes of this investigation, a wetland habitat is defined in the National Water Act (1998) as including the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterized by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent areas.

The wetland zone field verification took place according to the method presented in the final draft of "A practical field procedure for identification and delineation of wetlands and riparian areas" published by the department of Water Affairs in February 2005. The foundation of the method is based on the fact that wetlands and riparian zones have several distinguishing factors including the following:

- The presence of water at or near the ground surface;
- Distinctive hydromorphic soils;
- Vegetation adapted to saturated soils and
- The presence of alluvial soils in stream systems.

By observing the evidence of these features, in the form of indicators, wetlands and riparian zones can be delineated and identified. If the use of these indicators and the interpretation of the findings are applied correctly, then the resulting delineation can be considered accurate (DWAF 2005).

Riparian and wetland zones can be divided into three zones (DWAF 2005). The permanent zone of wetness is nearly always saturated. The seasonal zone is saturated for a significant part of the rainy season and the temporary zone surrounds the seasonal zone and is only saturated for a short period of the year, but is saturated for a sufficient period, under normal circumstances, to allow for the formation of hydromorphic soils and the growth of wetland vegetation. The object of this study was to identify the outer

boundary of the temporary zone and then to identify a suitable buffer zone around the wetland area.

7 LAND USE CHARACTERISTICS OF THE STUDY AREA

7.1 Importance According to Gauteng Conservation Plan

The Gauteng Conservation Plan (C-Plan Version 3) focuses on the mapping of biodiversity priority areas within Gauteng, compiled by GDARD. Therefore, the C-plan was consulted in order to determine site-specific issues and areas within the subject property considered to be sensitive such as ecological support areas, wetland features or ridges. The following matters are applicable to the subject property according to the Gauteng C-plan (Figures 5 – 7):

- A wetland and riparian buffer is designated around the unnamed drainage line, located centrally within the subject property. Ridges and transformed ridges, not affecting the subject property, are located approximately 1 km to the west of the site.
- The C-plan (version 3) indicates portions of the subject property as an “important area” in terms of primary vegetation, extending throughout the northern and eastern portion of the subject property. However, due to the historic and current surrounding anthropogenic activities, large areas of open grassland has experienced vegetation transformation and disturbance; and
- The C-plan indicated that the subject property is located outside the urban edge (C-Plan, 2010), which implies that 50m wetland buffers are recommended around all wetland features according to the GDARD Requirements for Biodiversity Assessment (2012). However, due to the lowered PES of the wetland system, the moderately low levels of ecological function and service provision by the wetland system, the close proximity of the subject property to the existing urban edge and the expected future urbanised environment of this area, a 30 meter wetland buffer is deemed adequate to maintain the PES of this aquatic resource and protect it from the effects of the proposed development.

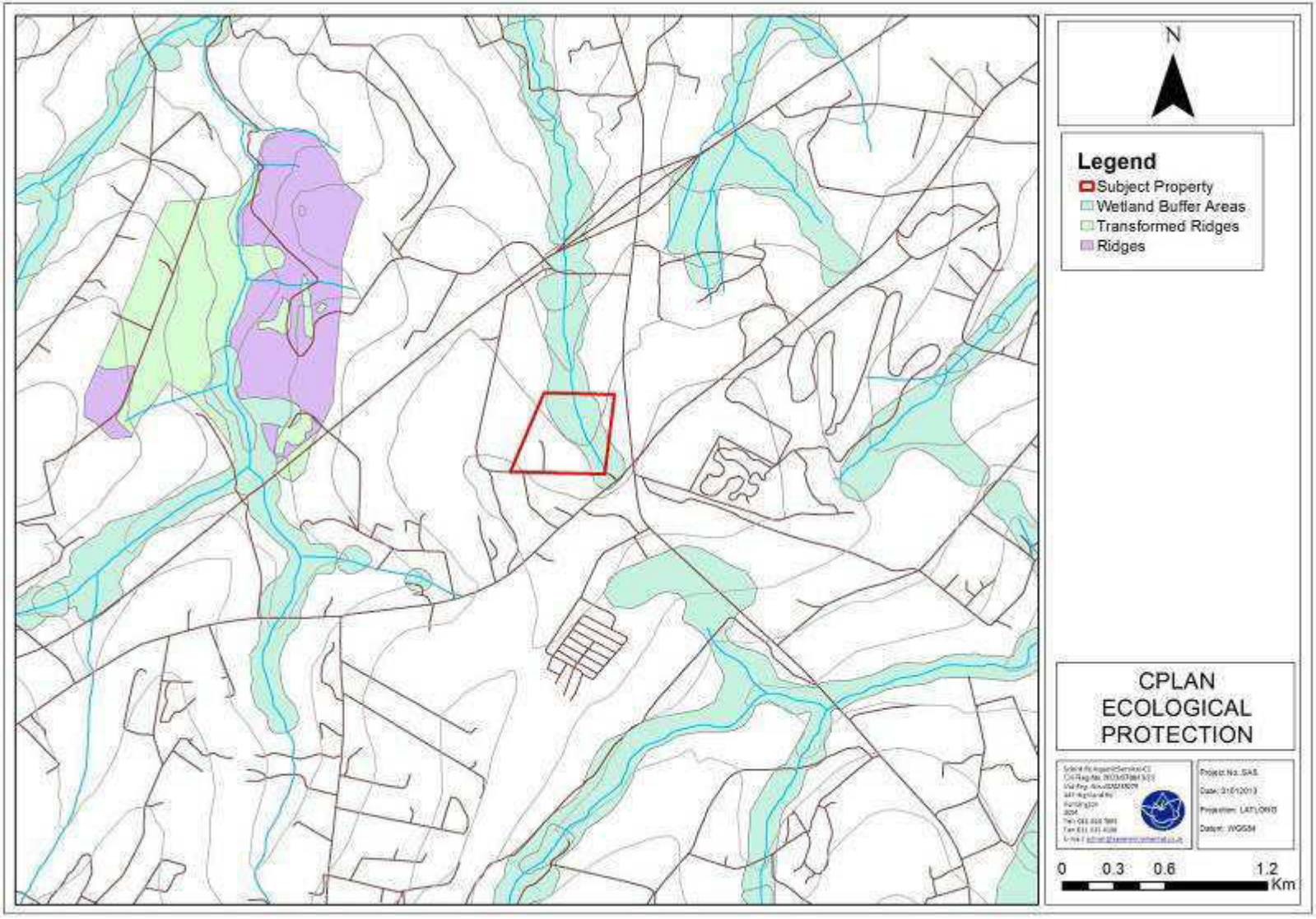

Figure 5: Areas of ecological protection as allocated by the Gauteng conservation plan (version 3).

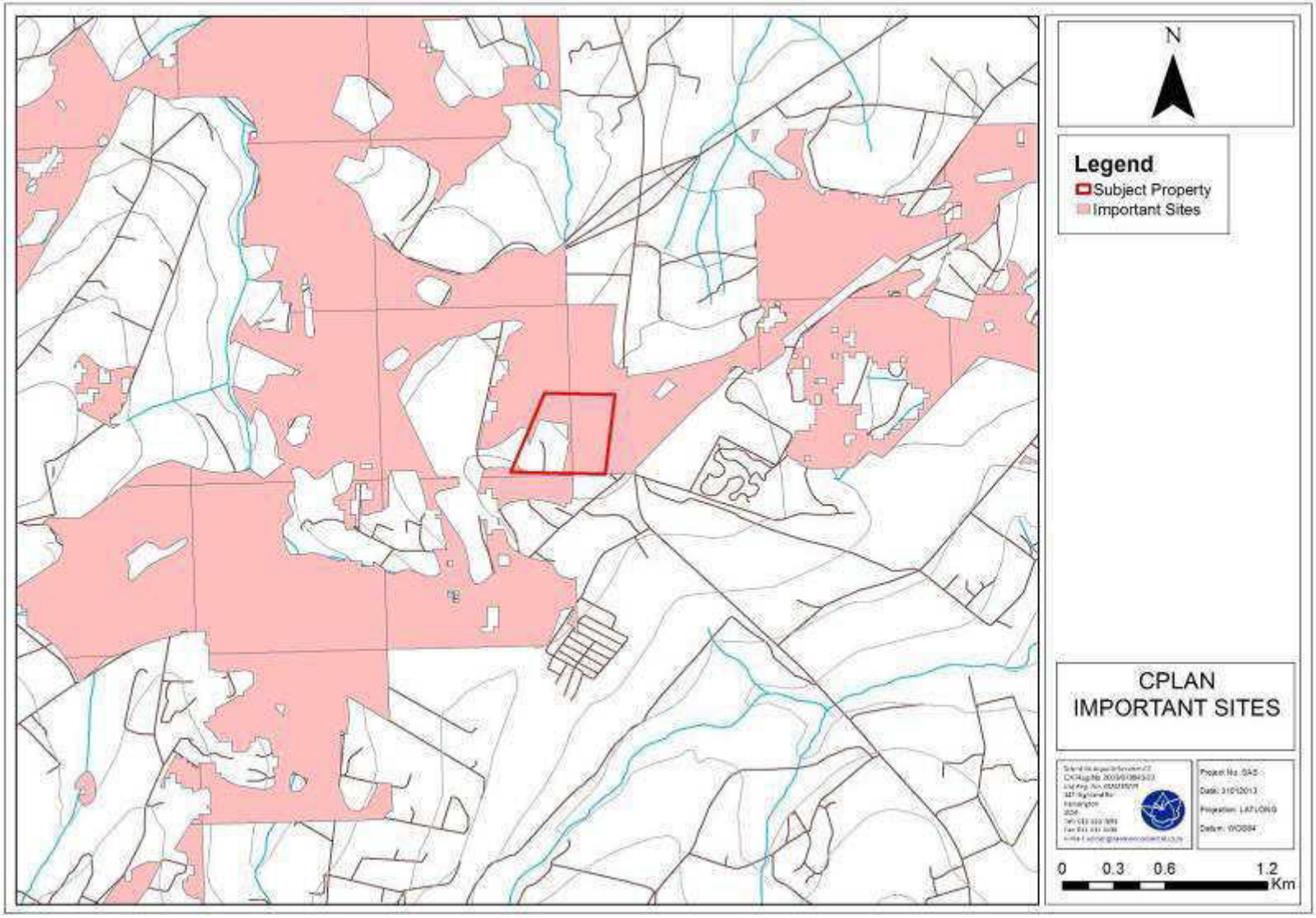

Figure 6: Areas of importance as allocated by the Gauteng conservation plan (version 3).

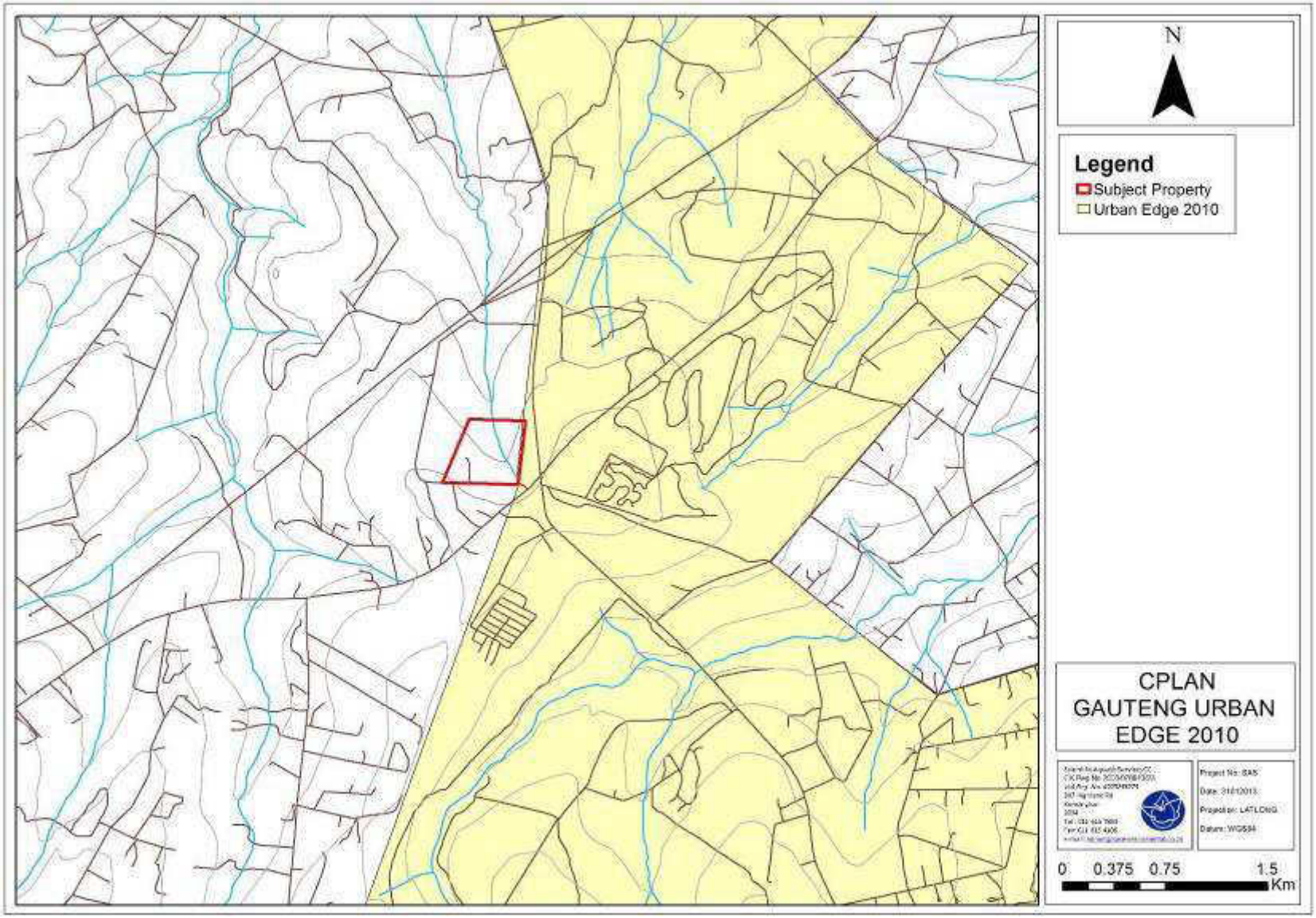

Figure 7: Gauteng Urban Edge 2010 as allocated by the Gauteng conservation plan (version 3).

7.2 Biome and bioregion

Biomes are broad ecological units that represent major life zones extending over large natural areas (Rutherford, 1997). This assessment site falls within the Grassland Biome (Rutherford & Westfall, 1994). Biomes are further divided into bioregions, which are spatial terrestrial units possessing similar biotic and physical features, and processes at a regional scale. This assessment site is situated within the Mesic Highveld Grassland Bioregion (Mucina & Rutherford, 2006).

7.3 Vegetation type and Landscape Characteristics

While biomes and bioregions are valuable as they describe broad ecological patterns, they provide limited information on the actual species that are expected to be found in an area. Knowing which vegetation type an area belongs to provides an indication of the floral composition that would be found if the subject property was in a pristine condition, which can then be compared to the observed floral list and so give an accurate and timely description of the ecological integrity of the subject property. When the boundary of the subject property is superimposed on the vegetation types of the surrounding area (Figure 10, it is evident that it falls within one vegetation type namely Egoli Granite Grassland (Mucina & Rutherford, 2006).

This vegetation type is considered to form part of a National Threatened Ecosystem and Figure 11 indicates areas of this ecosystem perceived to have not yet been transformed, in relation to the subject property. The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems.

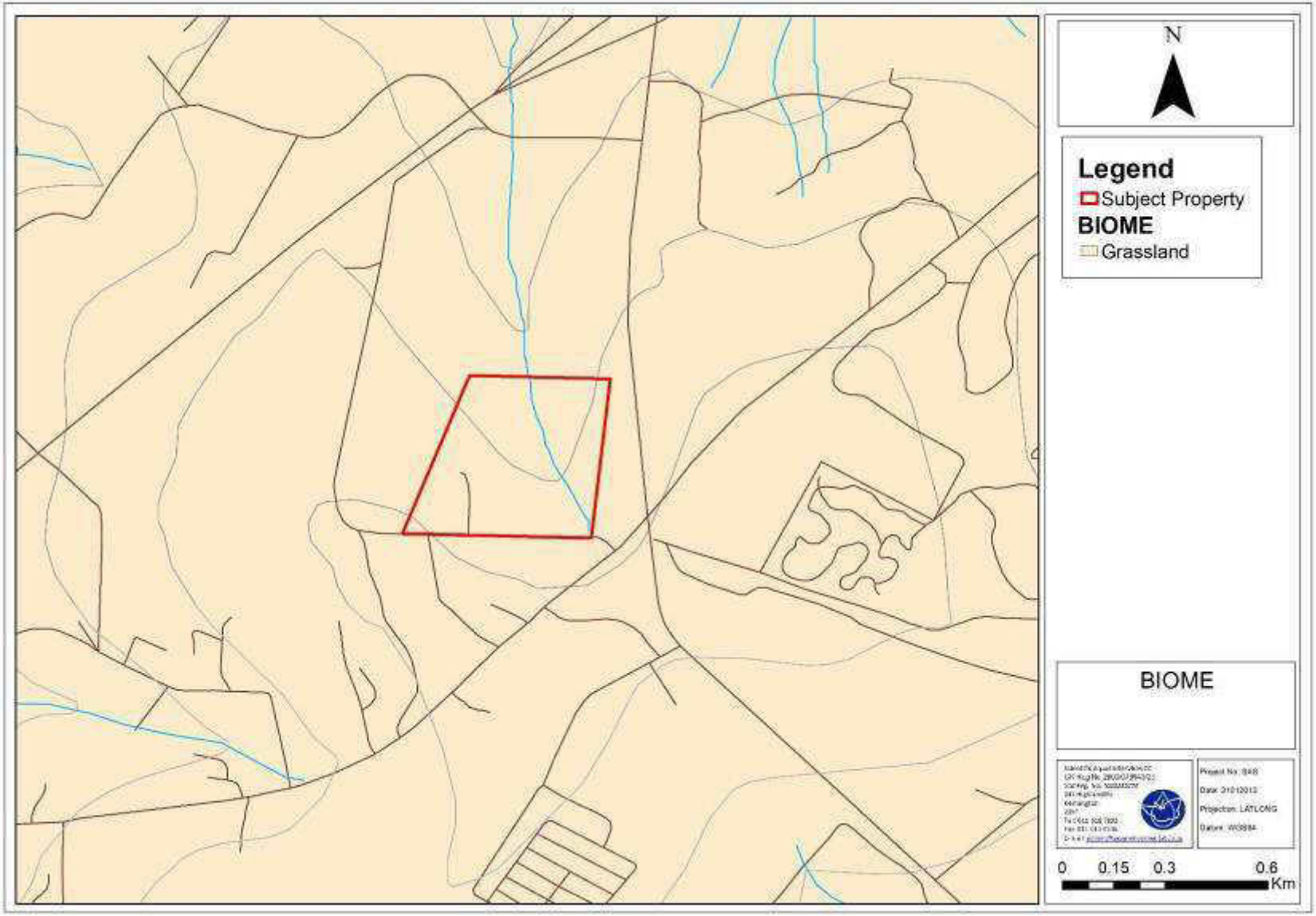

Figure 8: Biome associated with the subject property (Mucina & Rutherford, 2006).

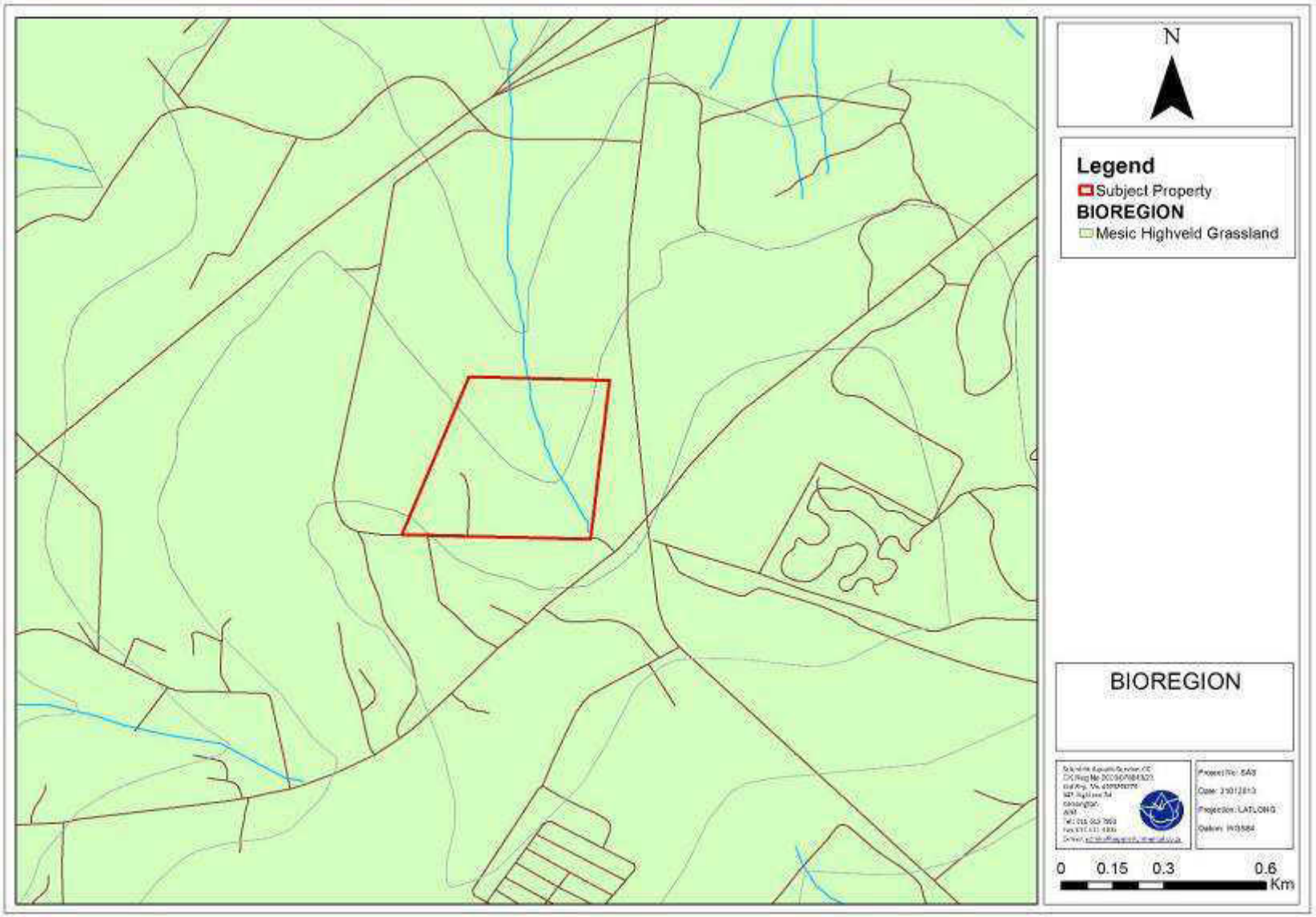

Figure 9: Bioregions associated with the subject property (Mucina & Rutherford, 2006).

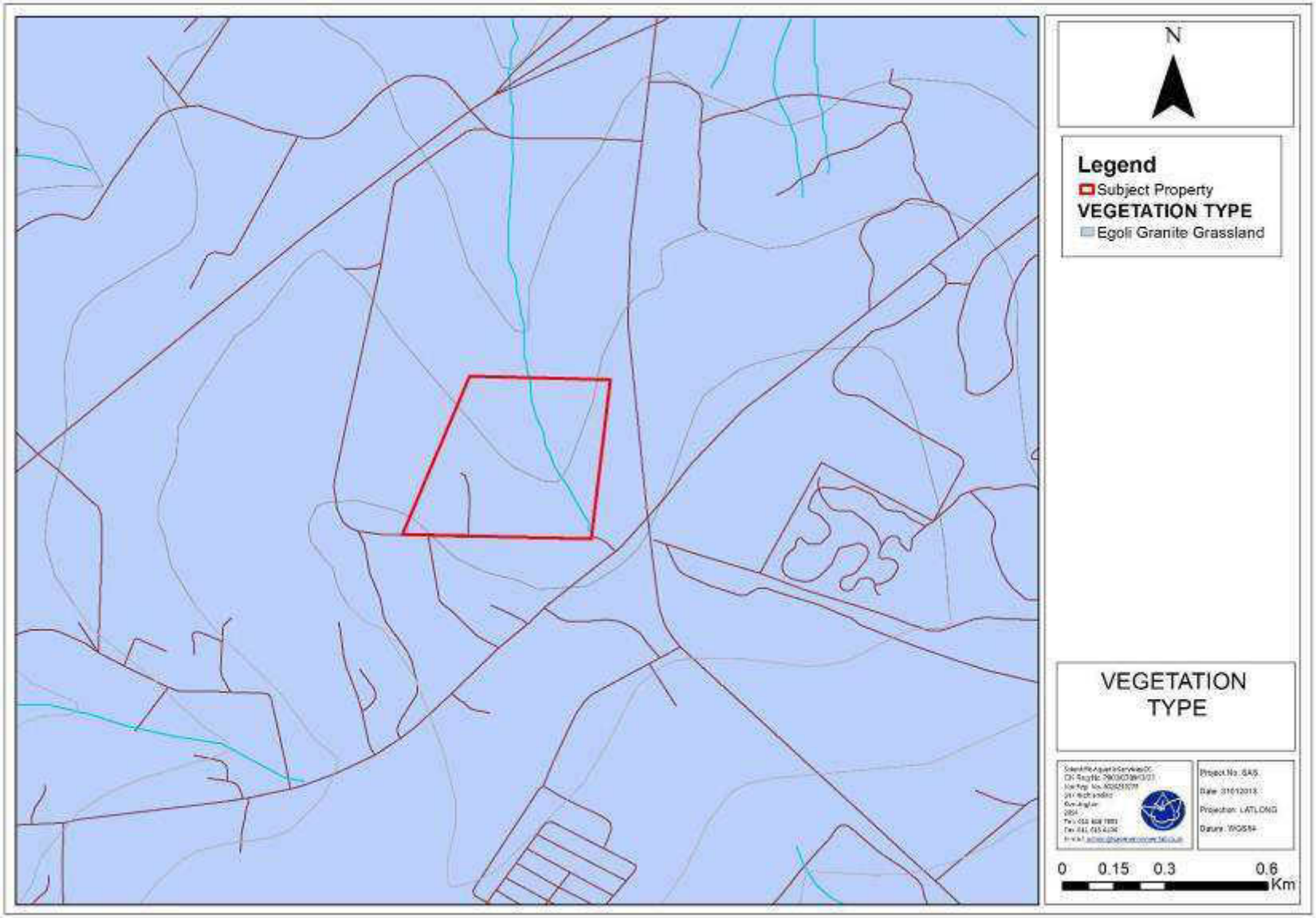

Figure 10: Vegetation type associated with the subject property (Mucina & Rutherford, 2006).

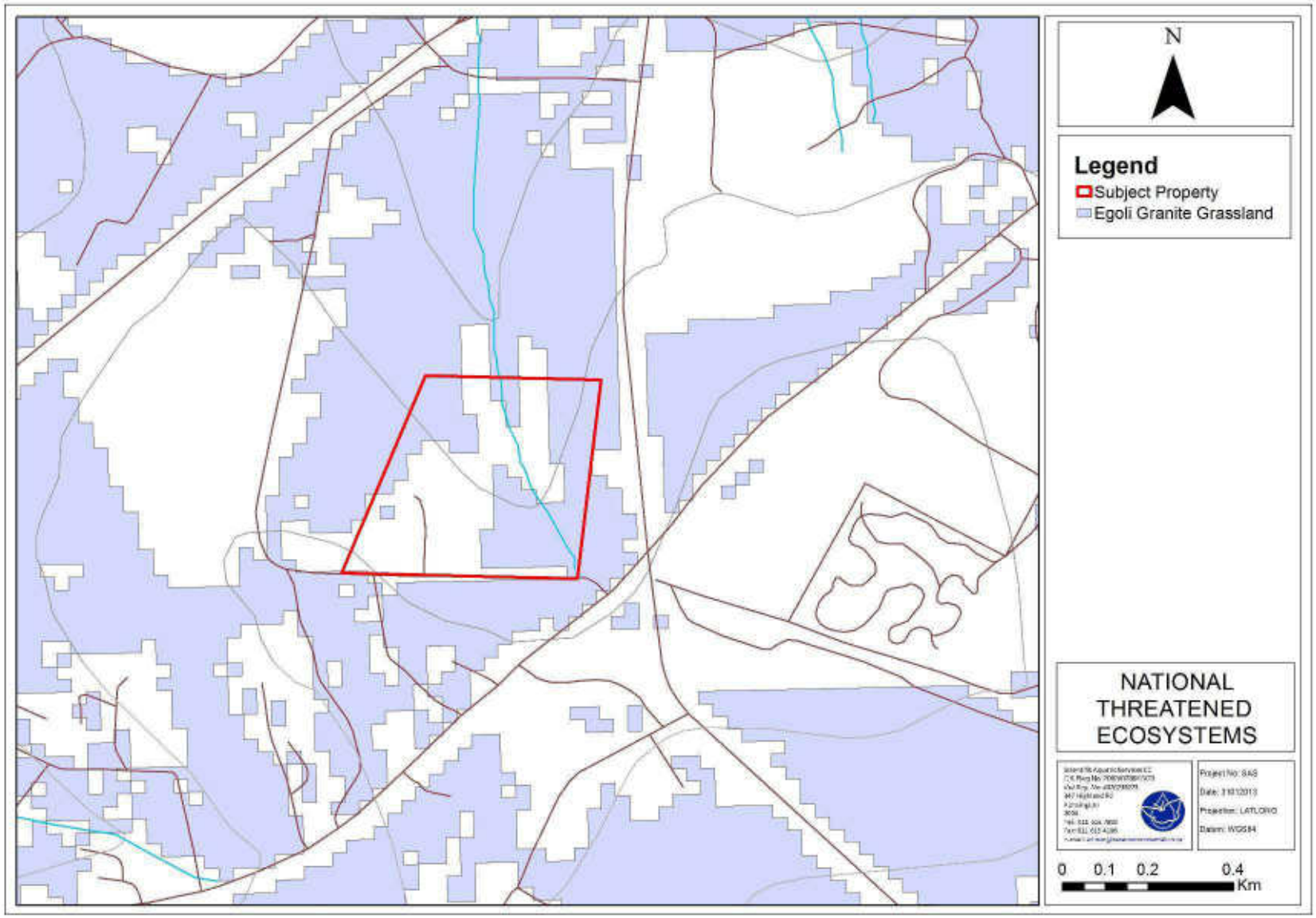

Figure 11: National Threatened ecosystems.

7.3.1 Distribution

The distribution of Egoli Granite Grassland is limited to the Gauteng Province, and occurs within the Johannesburg Dome, extending in the region between northern Johannesburg (in the south), and from near Lanseria Airport and Centurion (south of Pretoria) to the north, westwards to about Muldersdrif and eastwards to Tembisa (Mucina & Rutherford, 2006).

7.3.2 Climate

Egoli Granite Grassland falls within a strongly seasonal summer-rainfall region, with very dry winters. The Mean Annual Precipitation (MAP) is 620-800mm (overall average of 682mm) (Table below). The variation of the MAP is from 24-27% across the unit, showing the variation and unreliability of the rainfall. Incidences of frost are frequent within the vegetation type, being higher in the southern than in the northern areas (Mucina & Rutherford, 2006).

Average climatic values shows the region to have an average precipitation value of 682mm. The Mean Annual Soil Moisture Stress (MASMS) value for the region is 75%. These values, when compared to the Mean Annual Temperature (MAT) and Mean Annual Potential for Evaporation (MAPE) averages of 16.0°C and 2,194mm, respectively, show the region to be a relatively water-stressed area. Conservation of surface and ground water resources is therefore imperative to biodiversity conservation within the region.

Table 9: General climatic information for the *Egoli Granite Grassland* (Mucina & Rutherford, 2006).

Bioregion	Vegetation types	Altitude (m)	MAP (mm)	MAT (°C)	MAPE (mm)	MASMS* (%)
Mesic Highveld Grassland	Egoli Granite Grassland	1280 - 1660	682	16.0	2,194	75

**Mean annual soil moisture stress: (percentage of days when evaporative demand was more than double the soil moisture supply).*

7.3.3 Geology and soils

The geology of Egoli Granite Grassland is dominated by Archaean granite and gneiss of the Halfway House granites at the core of the Johannesburg Dome, supporting leached, shallow, coarsely-grained and sandy soil poor in nutrients of the Glenrosa form. Small areas are built by ultramafics (DEAT, 2001; Mucina & Rutherford, 2006). The lithology for the area is also dominated by Iron, Jaspilite, Syenite, Hornblende Granite, Foskorite, Gabro, Potassic Granite and Dionite (ENPAT, 2001).

7.3.4 Conservation

This vegetation type is formally classified as an Endangered vegetation type that has only approximately 3% (provincial conservation target is 24%) of it conserved in statutory reserves (Diepsloot and Melville Koppies Nature Reserve). Other conserved areas include the Walter Sisulu National Botanical Gardens. More than two thirds of the vegetation unit has already undergone transformation mostly due to urbanisation, cultivation or by road construction. Current rates of transformation threaten most of the remaining unconserved areas. There is no serious alien infestation in this unit, although species such as *Eucalyptus grandis*, *Eucalyptus camaldulensis* and *Eucalyptus sideroxylon*, as well as exotic *Acacia* species, are commonly found. Erosion is moderate to very low.

7.3.5 Dominant Floral Taxa

The proposed development site falls within the Grassland Biome and Mesic Highveld Grassland Bioregion of Gauteng. It is represented by one vegetation unit, namely Egoli Granite Grassland, which is an Endangered vegetation type, which occurs on moderately to strongly undulating plains and low hills supporting tall, usually *Hyparrhenia hirta*-dominated grasslands, with some woody species on rocky outcrops or rock sheets. The rocky habitat show a high diversity of woody species, which occur in the form of scattered shrub groups or solitary small trees. The dominant and typical floral species of Egoli Granite Grassland are presented in the table below.

Table 10: Dominant and typical floristic species of Egoli Granite Grassland (Mucina & Rutherford, 2006).

Grass species	Forb species	Tree/Shrub Species
Aristida canescens (d) *Aristida congesta* (d) *Cynodon dactylon* (d) *Digitaria monodactyla* (d) *Eragrostis capensis* (d) *Eragrostis chloromelas (*d*)* *Eragrostis curvula* (d) *Eragrostis racemosa* (d) *Heteropogon contortus* (d) *Hyparrhenia hirta* (d) *Melinis repens* subsp. *repens* (d) *Monocymbium ceresiiforme* (d) *Setaria sphacelata* (d) *Themeda triandra* (d) *Tristachya leucothrix* (d) *Andropogon eucomus* (c) *Aristida aequiglumis* (c) *Aristida diffusa* (c) *Aristida scabrivalvis* subsp. *borumensis* (c)	*Acalypha angustata* *Acalypha peduncularis* *Becium obovatum* *Berkheya insignis* *Crabbea hirsuta* *Cyanotis speciosa* *Dicoma anomala* *Gnidia capitata* *Helichrysum rugulosum* *Justicia anagalloides* *Kohautia amatymbica* *Nidorella hottentotica* *Pentanisia prunelloides* subsp. *latifolia* *Pseudognaphalium luteo-album* *Senecio venosus* **Geophytic herbs:** *Cheilanthes deltoidea* *Cheilanthes hirta*	*Vangueria infausta* *Rhus pyroides* *Anthospermum hispidulum* *Anthospermum rigidum subsp. pumilum* *Helichrysum kraussii* *Ziziphus zeyheriana* *Lopholaena coriifolia*

Grass species	Forb species	Tree/Shrub Species
Bewsia biflora (c) *Brachiaria serrata* (c) *Bulbostylis burchelli* (c) *Cymbopogon caesius* (c) *Digitaria tricholaeoides* (c) *Diheteropogon amplectens* (c) *Eragrostis gummiflua* (c) *Eragrostis sclerantha* (c) *Panicum natalense* (c) *Schizachyrium sanguineum* (c) *Setaria nigrirostris* (c) *Tristachya rehmannii* (c) *Urelytrum agropyroides* (c)		

*(d) – Dominant species for the vegetation type; (c) – Common species for the vegetation type.

8 RESULTS OF TERRESTRIAL ASSESSMENT

8.1 Surrounding Properties/ Land Uses

The subject property consists mainly of open veld with residential dwellings situated in the southwest. Increasing residential development within the surrounding area to the south of the subject property (Cosmo City), as well as developments towards the north, east and west of the subject property, are currently being planned or has already taken place. Resulting edge effects from historic and current developments, including agricultural activities, such as increased fire occurrence and alien floral infestation from the surrounding areas have transformed the floral communities of the subject property to some degree. Connectivity with adjacent open veld is limited and restricted to a portion of open veld towards the north. Malibongwe Drive limits connectivity towards the west and existing residential developments and smallholdings restrict connectivity towards the south and west. A wetland system is situated centrally with respect to the subject property, which serves as a migratory corridor in a northern direction for faunal species, specifically amphibian and avifaunal species.

8.2 Ecological condition and functioning

Ecological functioning and the condition of the subject property range from moderate in the wetland areas, moderate to moderately high in the open grassland areas and low in areas where past and present anthropogenic activities have taken place. Trampling, informal and formal road construction, vegetation clearance and the presence of residential dwellings have contributed to transformation of the surrounding floral communities through associated edge effects. Due to this, limited natural, untransformed habitat has remained within the subject property, resulting in overall lowered levels of ecological function and ecological condition.

8.3 Floral assessment

8.3.1 Habitat descriptions

Three main preliminary habitat units were identified during the assessment, namely:

- wetland and riparian habitat;
- open grassland habitat; and
- transformed areas, which include areas of excessive erosion, informal road construction, stands of alien vegetation, bare soil and residential dwellings.

Figure 12 illustrates the habitat units identified during the site assessment.

Figure 12: Conceptual illustration of habitat units identified within the subject property.

Habitat Unit 1: Wetland Habitat Unit

Figure 13: Wetland Habitat Unit within the centre of the subject property.

One wetland system, associated with a drainage line, was identified within the subject property (Figure 13), which was delineated during the field assessment and is discussed in detail within the wetland assessment section. The wetland area falls largely within the quaternary catchment A21E, with the south eastern portion thereof falling within the A21C quaternary catchment. The wetland is associated with an unnamed headwater stream of the Crocodile River.

From the field assessment it is evident that some impact on the stream connectivity has occurred due to the presence of earth dams downstream of the subject property and due to informal crossings over the wetland within the centre of subject property. Some further impacts from erosion, fires and solid waste dumping occur in isolated areas along the drainage line course. Throughout the wetland feature, anthropogenic activities have led to vegetation transformation and high levels of alien vegetation encroachment.

The floral species composition within the Wetland Habitat Unit is similar to that of the Open Veld Habitat Unit. Grass species present include *Brachiaria brizantha, Hyparrhenia hirta, Eragrostis racemosa* and *E.gummiflua,* while the tree and shrub layer is dominated by alien floral species and includes *Morus alba*, *Sesbania* spp., *Eucalyptus camaldulensis* as well as various invasive shrubs and forbs such as *Verbena bonariensis, Campuloclinium macrocephalum* and *Lantana camara*. Two plant species of concern, namely *Hypoxis hemerocallidea* and *Boophane disticha* (IUCN RDL listed as 'Declining') were noted within this habitat unit, as well as orchid species, namely *Habenaria*

schimperiana, H. nyikana and *H. filicornis.* Terrestrial orchids in Gauteng are increasingly under threat due to extensive urban expansion in recent years and resultant habitat loss. It is therefore recommended that these species, and other orchid species that may potentially occur within the subject property, be relocated prior to development activities taking place.

The wetland feature in its present state provides potential habitat for various wetland floral and faunal species, with specific mention of various orchid species. A list of dominant floral species encountered within this habitat unit is provided in the table below.

Table 11: Dominant floral species noted within the Wetland Habitat Unit [invader/weed species are marked with an asterisk (*)].

Grass/sedge/reed species	Forb species	Tree/Shrub Species
Aristida congesta var *congesta*	**Araujia serifera*	**Eucalyptus camaldulensis*
Aristida junciformis	**Bidens pilosa*	**Melia azedarach*
Brachiaria brizantha	**Campuloclinium macrocepahlum*	**Morus alba*
Cynodon dactylon	**Ipomoea purpurea*	**Sesbania bispinosa*
Cyperus congestus	**Lantana camara*	**Sesbania punicea*
Cyperus denudatus	**Oenothera rosea*	*Searsia lancea*
Cyperus marginatus	**Opuntia ficus-indica*	*Searsia pyroides*
Digitaria eriantha	**Persicaria lapathifolia*	*Zizphus mucronata*
Eragrostis capensis	**Plantago lanceolata*	
Eragrostis chloromelas	**Solanum mauritianum*	
Eragrostis gummiflua	**Tagetes minuta*	
Eragrostis racemosa	**Verbena bonariensis*	
Hyparrhenia hirta	**Verbena tenuisecta*	
Imperata cylindrica	*Aloe greatheadii* **var** *davyana*	
Kallinga alba	*Berkeya radula*	
Melinis repens	*Boophane disticha*	
Sporobolus africana	*Cheilanthes viridis*	
Themeda triandra	*Habenaria filicornis*	
Typha capensis	*Habenaria schimperiana*	
	Habenaria nyikana	
	Helichrysum aureonitens	
	Helichrysum nudifolium	
	Hermannia depressa	
	Hypoxis argentea	
	Hypoxis hemerocallidea	
	Hypoxis rigidula	
	Ledebouria revoluta	
	Monopsis decipiens	
	Oxalis obliquifolia	
	Polygala hottentotta	
	Seriphium plumosum	
	Vernonia oligocephala	
	Wahlenburgia caledonica	

The Wetland Habitat Unit in its present state has a moderate ecological functionality and moderate habitat integrity, with high levels of terrestrial floral species encroachment. The wetlands

are impacted by invasion from alien plant species, as well as erosion, dumping and ongoing disturbance as a result of anthropogenic activities. However, it should be noted that the wetlands may provide migratory connectivity for faunal species that move through the area, as well as other ecosystem services such as flood attenuation and biodiversity maintenance. The Wetland Habitat Unit therefore warrants conservation and impacts from the proposed development should be prevented or suitably mitigated as far as possible. Although a 50m is advocated around wetlands outside of the urban edge, a 30 meter wetland buffer is deemed adequate to maintain the Present Ecological State (PES) of the Wetland Habitat Unit and protect it from the effects of the proposed development, provided that runoff and erosion are suitably managed, that the wetland area will be protected and that any environmental degradation caused during construction, is rehabilitated. The Wetland Habitat Unit and its associated buffer zone, should be conserved as open space, which can also be used for the relocation of *Hypoxis hemerocallidea* and *Boophane disticha,* which occur within the subject property.

Habitat Unit 2: Open Grassland Habitat Unit

Figure 14: Open Grassland Habitat Unit within the east and west of the subject property.

The Open Grassland Habitat Unit (Figure 14) covers the majority of the subject property to the east and west of the wetland feature, and excludes the transformed areas in the southwestern and northeastern portion of the subject property. Evidence of erosion and irregular fires was noted within this Habitat Unit and the grassland present has been somewhat impacted by anthropogenic disturbances such as road construction and residential development and related edge effects, which in turn have impacted upon plant species composition and on overall ecological functioning.

This habitat unit is dominated by *Hyparrhenia hirta*, which may be indicative of historic disturbance, while a high diversity of other grass species, including *Themeda triandra,*

Eragrotis curvula, E. chloromelas and *Digitaria eriantha* are also present. Forb species are less well represented, but large numbers of both *Hypoxis hemerocallidea* and *Boophane disticha* which are IUCN RDL listed as 'declining', have been noted scattered throughout the habitat unit. These species should be relocated to an area designated as open space or can be incorporated into the proposed development's landscaping and thereby contribute to the ecological integrity of the area, once construction is completed.

The table below lists the dominant floral species encountered within this habitat unit.

Table 12: Dominant species encountered in the Open Grassland Habitat Unit [invader/weed species are marked with an asterisk (*)].

Grass/sedge/reed species	Forb species	Tree/Shrub Species
Andropogon shirensis	**Amaranthus spinosus*	**Melia azedarach*
Aristida congesta var *congesta*	**Conyza bonariensis*	*Acacia karroo*
Cymbopogon excavatus	**Hypochaeris radicata*	*Ehretia rigida*
Cynodon dactylon	**Ipomoea purpurea.*	*Searsia lancea*
Digitaria eriantha	**Schkuhria pinnata*	*Searsia pyroides*
Elionurus muticus	**Solanum sysimbrifolium*	*Ziziphus mucronata*
Eragrostis capensis	**Tagetes minuta*	
Eragrostis chloromelas	**Verbena bonariensis*	
Eragrostis curvula	*Aloe greatheadii* var. *davyana*	
Eragrostis racemosa	*Anthericum cooperi*	
Eustachys paspaloides	*Asclepias fruticosa*	
Hyparrhenia hirta	*Boophane disticha*	
Hyparrhenia tamba	*Chamaecrista mimosoides*	
Melinis nerviglumis	*Crotalaria* sp.	
Melinis repens	*Dicoma anomala*	
Panicum maximum	*Elephantorrhiza elephantina*	
Setaria sphacelata	*Felicia muricata*	
Themeda triandra	*Gladiolus crassifolius*	
Trachypogon spicatus	*Gladiolus permeabilis*	
	Habenaria epipactidea	
	Hypoxis hemerocallidea	
	Hypoxis rigidula	
	Hypoxis iridifolia	
	Indigofera daleoides	
	Ledebouria revoluta	
	Nidorella anomala	
	Pallea calamelanos	
	Pelargonium luridum	
	Pentanisia angustifolia	
	Polygala hottentotta	
	Pygmaeothamnus zeyheri	
	Raphionacme hirsuta	
	Senecio sp.	
	Seriphium plumosum	
	Vernonia oligocephala	
	Ziziphus zeyheriana	

As a result of historic and current anthropogenic disturbances, invasive and alien floral species such as *Verbena bonariensis, Tagetes minuta, Melia azedarach* and other common weed species are present in localised areas. Localised *Acacia karroo* bush encroachment and encroachment by *Seriphium plumosum*, an indigenous, potentially invasive species sometimes indicative of disturbance, were also noted which contributes to the lowered ecological integrity of this habitat unit.

Apart from *Hypoxis hemerocallidea* and *Boophane disticha*, the likelihood of other RDL floral species occurring within this habitat unit is moderate. Terrestrial orchid species namely *Habenari epipactidea* have been noted within the Open Grassland Habitat Unit and therefore the possibility of other orchid species occurring, such as the RDL *Habenaria mossii* should not be excluded. Orchid species located within the Open Grassland Habitat Unit and within the proposed development footprint should be relocated to a suitable open space area or other safe location with the assistance of a specialised nursery or a local orchid society. The necessary permits, if required, have to be obtained prior to relocation.

The overall grass species present are of a high diversity and largely representative of Egoli Granite Grassland floral species, but the forb layer is less diverse than expected, possibly due to the time of assessment. Due to the isolated nature of the open grassland areas with respect to the surrounding properties, localised alien plant species presence and the dominance by *Hyparrhenia hirta,* which may be indicative of historic and current disturbance, this habitat unit is considered to be of moderate ecological sensitivity. Any development activity within this habitat unit is not likely to pose a significant threat to grassland conservation in the region, provided that mitigation measures presented in this report are adhered to and a rehabilitation plan implemented during and upon completion of the construction works.

Habitat Unit 3: Transformed Habitat Unit

Figure 15: The Transformed Habitat Unit within the subject property.

The Transformed Habitat Unit (Figure 15) mainly consists of areas associated with residential dwellings and areas cleared for residential development in the southwest of the subject property, as well as areas impacted by historic road construction within the northeast of the subject property. In these areas, bare soils and erosion are evident and large numbers of alien plant species are present.

The grass species *Cynodon dactylon* and *Pennisetum clandestinum,* as well as alien shrubs and trees associated with residential landscaping, dominates the vegetation towards the southwest of the subject property, while the remainder of the Transformed Habitat Unit consists of bare soils and secondary grassland areas dominated by *Hyparrhenia hirta*.

Table 13: Dominant floral species noted within the Wetland Habitat Unit [invader/weed species are marked with an asterisk (*)].

Grass/sedge/reed species	Forb species	Tree/Shrub Species
Cynodon dactylon	**Bidens pilosa*	**Melia azedarach*
Eragrostis chloromelas	**Campuloclinium macrocephalum*	**Pinus pinaster*
Eragrostis curvula	**Canna indica*	**Tipuana tipu*
Eragrostis pseudosclerantha	**Conyza bonariensis*	*Acacia karroo*
Hyparrhenia hirta	**Lantana camara*	*Euclea crispa*
Melinis repens	**Solanum mauritianum*	*Euclea natalensis*
Panicum maximum	**Solanum sysimbrifolium*	*Searsia lancea*
Themeda triandra	**Tagetes minuta*	*Searsia pyroides*
	**Verbena bonariensis*	
	**Verbena tenuisecta*	
	**Zinnia peruviana*	

The transformed areas consist almost exclusively of areas of altered floral community structure, to the extent that it is probably irreversible. Ecological functioning is very low in most of these areas. As floral community, structure, and habitat characteristics have been altered, the likelihood of RDL floral species occurring in these areas is very low.

This habitat unit is therefore not regarded as sensitive and does not provide an ecologically important function. Development and construction activities within this habitat unit are not regarded as a threat to overall floral biodiversity conservation within the region.

8.4 Floral community assessment

Floral communities can provide information regarding the ecological status of specific areas within a study area. If the species composition is quantitatively determined and characteristics of all components of the floral community are taken into consideration, it is possible to determine the PES of the portion of land represented by the assessment point. Any given grass species is specifically adapted to specific growth conditions. This sensitivity to specific conditions make grasses good indicators of veld conditions. The sections below summarise the dominant floral species identified within the transects with their associated habitats and optimal growth conditions with reference to the tables and figures below. It should be noted that transect locations were chosen within all areas representative of vegetation in a moderately good condition, therefore areas with complete vegetation transformation such as the residentail areas associated with the Transformed Habitat Unit, which has seen previous disturbance that has resulted in alien and invader vegetation proliferation, were not assessed using this method. These transformed areas were however assessed using the Vegetation Index Score (see section below).

Table 14: Grouping of gasses (Van Oudtshoorn, 2006).

Pioneer	Hardened, annual plants that can grow in very unfavourable conditions. In time improves growth conditions for perennial grasses.
Subclimax	Weak perennials denser than pioneer grasses. Protects soils leading to more moisture, which leads to a denser stand, which deposits more organic material on the surface. As growth conditions improve climax grasses are replaced by subclimax grasses.
Climax	Strong perennial plants adapted to optimal growth conditions.
Decreaser	Grasses abundant in good veld.
Increaser I	Grasses abundant in underutilized veld.
Increaser II	Grasses abundant in overgrazed veld.
Increaser III	Grasses commonly found in overgrazed veld.

From the assessment as set out below (Figures 16 – 22) it is evident that the entire Open Grassland Habitat Unit is dominated by *Hyparrhenia hirta*, a grass species typically associated with disturbance as a result of cultivation activities and other anthropogenic disturbances. Although a number of graminoid species representative of the expected Egoli Granite Grassland vegetation type are present, including *Themeda triandra, Eragrosits curvula, Melinis repens* and *Setaria sphacelata*, these species are not dominant in any of the transect locations. Such species are present in higher numbers and diversity within the northern portions of the subject property (Transect 1, 5 and 6) which are considered to be in a better ecological condition than the remainder of the subject property. Although these areas contain a higher diversity of grass

species and a larger proportion of climax Egoli Granite Grassland grass species other than *Hyparrhenia hirta*, the extent of these areas are limited and cannot be considered to be pristine Egoli Granite Grassland.

Figure 16: Digital satellite image depicting location of the transects.

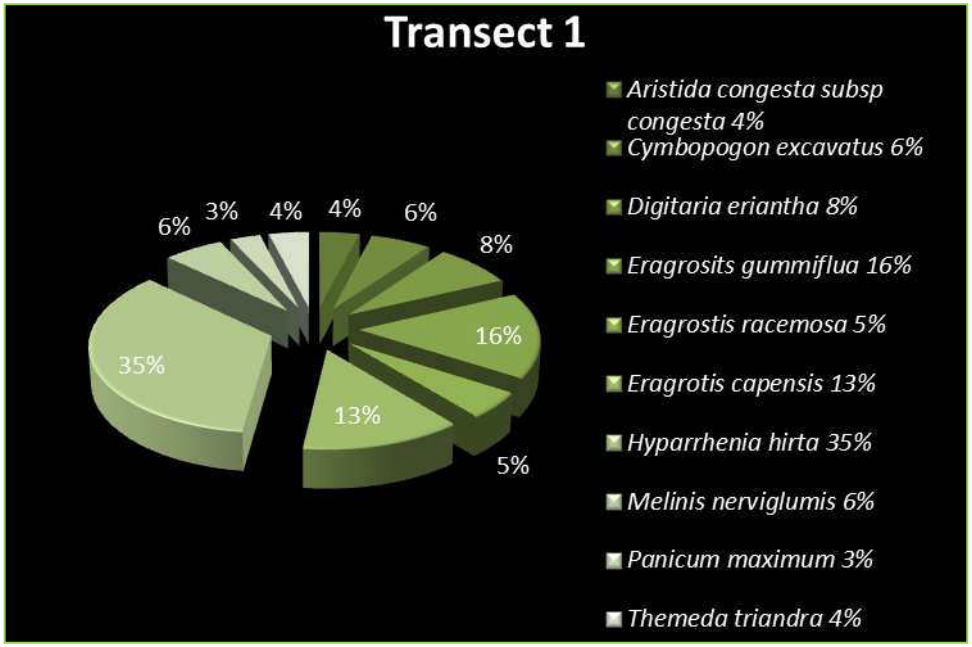

Figure 17: Results from Transect 1.

Transect 1 – Open Grassland

Aristida congesta subsp. *congesta* (Tassel Three-awn) [Pioneer grass, Increaser II]: this grass occurs mostly in disturbed places such as old fields, road reserves and bare patches in overutilised veld. It grows in most soil types, but mostly loam soil.

Cymbopogon excavatus (Broad-leaved turpentine grass) [Climax grass; Increaser I]. Broad-leaved turpentine grass grows in most soil types, but especially in sandy and gravelly soil in disturbed as well as undisturbed veld. It often also grows along roadsides.

Digitaria eriantha (Common finger grass) [Climax grass; Decreaser]. Common finger grass grows in dry areas in sandy and rocky soils and in areas with high rainfall in moist soils next to marshes. Grows mainly in undisturbed veld.

Eragrostis gummiflua (Gum grass) [Subclimax; Increaser II grass]. Gum grass grows in open grassland and bushveld; often in road reserves and in other places where disturbance has taken place. It often grows in damp places such as seepage areas and where water collects. It mostly grows in sandy and gravelly soil.

Eragrostis capensis (Heart-seed love grass) [Subclimax grass; Increaser II]. Heart-seed love grass often grows in vlei areas where soil is moist throughout the year. Also present in disturbed places. Grows in sandy, loam or clay soils.

Eragrostis racemosa (Narrow heart love grass) [Subclimax grass, Increaser II]. Narrow heart love grass grows in a large variety of habitat types, mostly in shallow sandy or gravelly soil in damp places. It is more often found in disturbed places.

Hyparrhenia hirta (Common thatching grass) [Increaser I, Climax grass]. Grows well in drained soil, especially gravelly soil, in open grassland, as well as in bushveld. It is often found in disturbed places such as old cultivated lands and road reserves. It is also sometimes found along riversides on heavier soil.

Melinis nerviglumis (Bristle-leaved Rep Top) [Climax grass, Increaser I]. Bristle-leaved red top grows in undisturbed veld shallow, gravelly soil. It usually grows on slopes.

Panicum maximum (Guinea Grass) [Subclimax/ climax grass, Decreaser]. Guinea grass grows in shade under trees and shrubs. Grows well under moist conditions in fertile soils, often adjacent to streams. Also utilises other growing conditions.

Themeda triandra (Red Grass) [Decreaser; Climax grass]. Red grass is abundant in undisturbed open grassland and bushveld in parts with an average to high rainfall. It grows in any type of soil, but mostly clay soil.

Conclusion: Five species indicative of the vegetation type are present and grass species diversity is high. The dominant grass species is however *Hyparrhenia hirta*, which may be indicatve of past disturbances in this area.

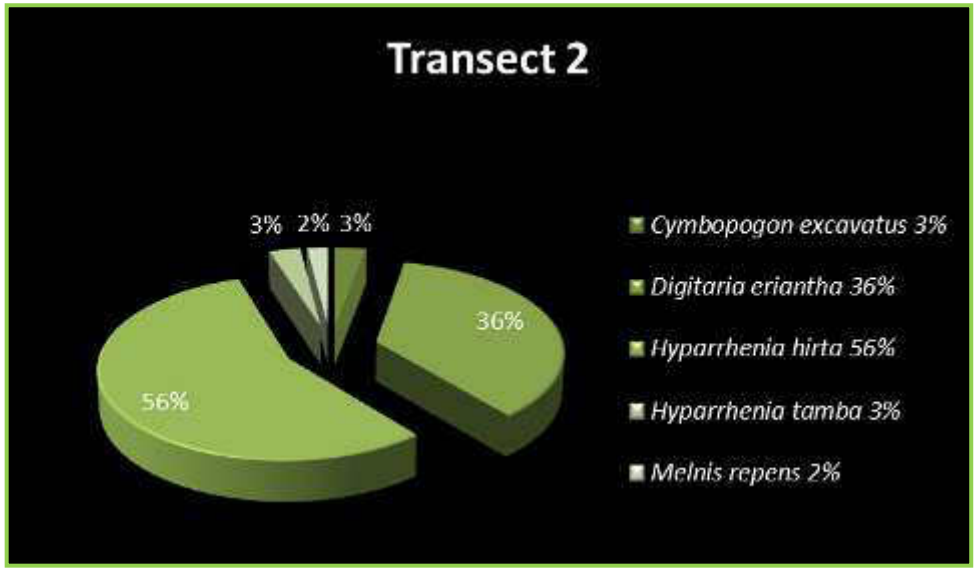

Figure 18: Results from Transect 2.

Transect 2 – Open Grassland/ Transformed area

Cymbopogon excavatus (Broad-leaved turpentine grass) [Climax grass; Increaser I]. Broad-leaved turpentine grass grows in most soil types, but especially in sandy and gravelly soil in disturbed as well as undisturbed veld. It often also grows along roadsides.

Digitaria eriantha (Common finger grass) [Climax grass; Decreaser]. Common finger grass grows in dry areas in sandy and rocky soils and in areas with high rainfall in moist soils next to marshes. Grows mainly in undisturbed veld.

Hyparrhenia hirta (Common thatching grass) [Increaser I, Climax grass]. Grows well in drained soil, especially gravelly soil, in open grassland, as well as in bushveld. It is often found in disturbed places such as old cultivated lands and road reserves. It is also sometimes found along riversides on heavier soil.

Hyparrhenia tamba (Blue thatching grass) [Climax grass; Increaser I]. Blue thatching grass usually grows in road reserves, especially where water collects; otherwise in damp soil next to rivers and vleis.

*Melinis repens (*Natal Red top) [Subclimax grass, Increaser II]. Natal red top grows in disturbed places such as roadsides and old cultivated lands (subsp. *repens*) or in sunny dry places (subsp. *grandiflora*), in all soil types, but especially in well drained soil.

Egoli Granite Grassland Indicator Grasses:

Aristida canescens (d), *Aristida congesta* (d), *Cynodon dactylon* (d)
Digitaria monodactyla (d) *Eragrostis capensis* (d) *Eragrostis chloromelas (*d) *Eragrostis curvula* (d) *Eragrostis racemosa* (d) *Heteropogon contortus* (d)
Hyparrhenia hirta (d) *Melinis repens* subsp. *repens* (d)
Monocymbium ceresiiforme (d) *Setaria sphacelata* (d) *Themeda triandra* (d) *Tristachya leucothrix* (d)

Conclusion: Two species representive of the vegetation type are present, both of which may also be indicative of disturbance. The transect site is strongly dominated by *Hyparrhenia hirta*. From historic aerial photographs it is evident that excessive trampling has occured in this area.

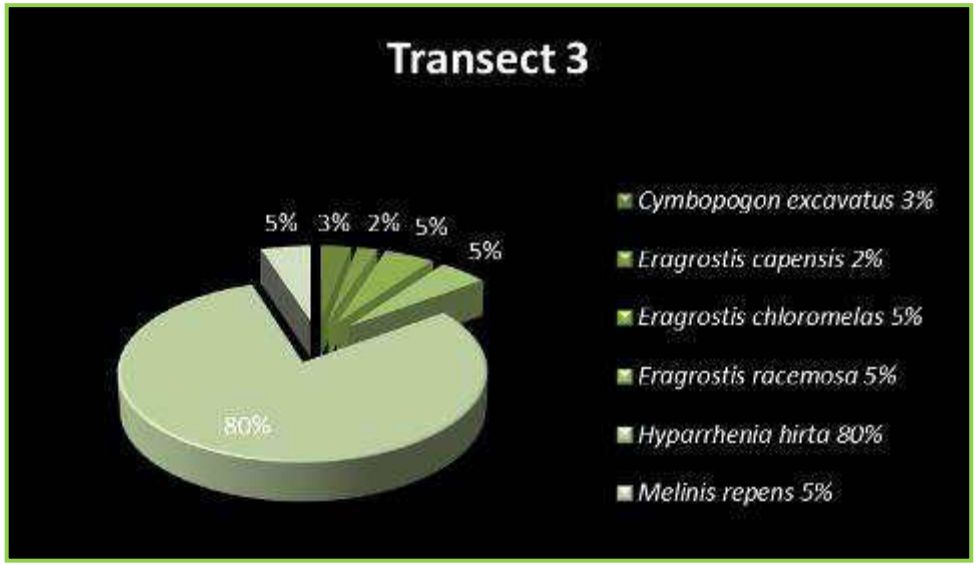

Figure 19: Results from Transect 3.

Transect 3 – Open Grassland

Cymbopogon excavatus (Broad-leaved turpentine grass) [Climax grass; Increaser I]. Broad-leaved turpentine grass grows in most soil types, but especially in sandy and gravelly soil in disturbed as well as undisturbed veld. It often also grows along roadsides.

Eragrostis capensis (Heart-seed love grass) [Subclimax grass; Increaser II]. Heart-seed love grass often grows in vlei areas where soil is moist throughout the year. Also present in disturbed places. Grows in sandy, loam or clay soils.

Eragrostis chloromelas (Narrow curly leaf) [Increaser II, subclimax and climax grass]. Curly leaf grows on stony slopes in sandy and loam soil. It is more common in open grassland than in the bushveld.

Eragrostis racemosa (Narrow heart love grass) [Subclimax grass, Increaser II]. Narrow heart love grass grows in a large variety of habitat types, mostly in shallow sandy or gravelly soil in damp places. It is more often found in disturbed places.

Hyparrhenia hirta (Common thatching grass) [Increaser I, Climax grass]. Grows well in drained soil, especially gravelly soil, in open grassland, as well as in bushveld. It is often found in disturbed places such as old cultivated lands and road reserves. It is also sometimes found along riversides on heavier soil.

*Melinis repens (*Natal Red top) [Subclimax grass, Increaser II]. Natal red top grows in disturbed places such as roadsides and old cultivated lands (subsp. *repens*) or in summy dry places (subsp. *grandiflora*), in all soil types, but especially in well drained soil.

Egoli Granite Grassland Indicator Grasses:

Aristida canescens (d), *Aristida congesta* (d), *Cynodon dactylon* (d)
Digitaria monodactyla (d) *Eragrostis capensis* (d) *Eragrostis chloromelas (*d) *Eragrostis curvula* (d) *Eragrostis racemosa* (d) *Heteropogon contortus* (d)
Hyparrhenia hirta (d) *Melinis repens* subsp. *repens* (d)
Monocymbium ceresiiforme (d) *Setaria sphacelata* (d) *Themeda triandra* (d) *Tristachya leucothrix* (d)

Conclusion: Five species indicative of the vegetation type are present. The dominant grass species is however *Hyparrhenia hirta*, which may be indicatve of past disturbances in this area.

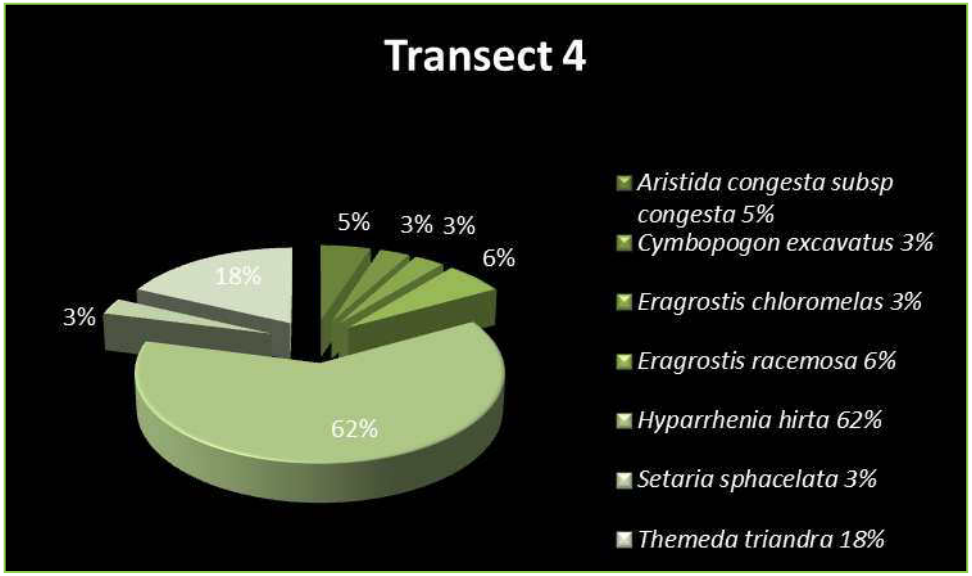

Figure 20: Results from Transect 4.

Transect 4 – Open Grassland

Aristida congesta subsp. *congesta* (Tassel Three-awn) [Pioneer grass, Increaser II]: this grass occurs mostly in disturbed places such as old fields, road reserves and bare patches in overutilised veld. It grows in most soil types, but mostly loam soil.

Cymbopogon excavatus (Broad-leaved turpentine grass) [Climax grass; Increaser I]. Broad-leaved turpentine grass grows in most soil types, but especially in sandy and gravelly soil in disturbed as well as undisturbed veld. It often also grows along roadsides.

Eragrostis chloromelas (Narrow curly leaf) [Increaser II, subclimax and climax grass]. Curly leaf grows on stony slopes in sandy and loam soil. It is more common in open grassland than in the bushveld.

Eragrostis racemosa (Narrow heart love grass) [Subclimax grass, Increaser II]. Narrow heart love grass grows in a large variety of habitat types, mostly in shallow sandy or gravelly soil in damp places. It is more often found in disturbed places.

Hyparrhenia hirta (Common thatching grass) [Increaser I, Climax grass]. Grows well in drained soil, especially gravelly soil, in open grassland, as well as in bushveld. It is often found in disturbed places such as old cultivated lands and road reserves. It is also sometimes found along riversides on heavier soil.

Setaria sphacelata var. sericea (Golden bristle grass) [Climax grass, Decreaser grass]. Golden bristle grass grows in mountainous grassland in parts with a high rainfall; damp places such as in vleis and marshes; mostly in clay soil. It is often also found in damp places in old cultivated lands, roads reserves and other disturbed places.

Themeda triandra (Red Grass) [Decreaser; Climax grass]. Red grass is abundant in undisturbed open grassland and bushveld in parts with an average to high rainfall. It grows in any type of soil, but mostly clay soil.

Egoli Granite Grassland Indicator Grasses:

Aristida canescens (d), *Aristida congesta* (d), *Cynodon dactylon* (d)
Digitaria monodactyla (d) *Eragrostis capensis* (d) *Eragrostis chloromelas* (d) *Eragrostis curvula* (d) *Eragrostis racemosa* (d) *Heteropogon contortus* (d)
Hyparrhenia hirta (d) *Melinis repens* subsp. *repens* (d)
Monocymbium ceresiiforme (d) *Setaria sphacelata* (d) *Themeda triandra* (d) *Tristachya leucothrix* (d)

Conclusion: Six species representative of the vegetation type are present. The dominant grass species is however *Hyparrhenia hirta*, which may be indicatve of past disturbances in this area.

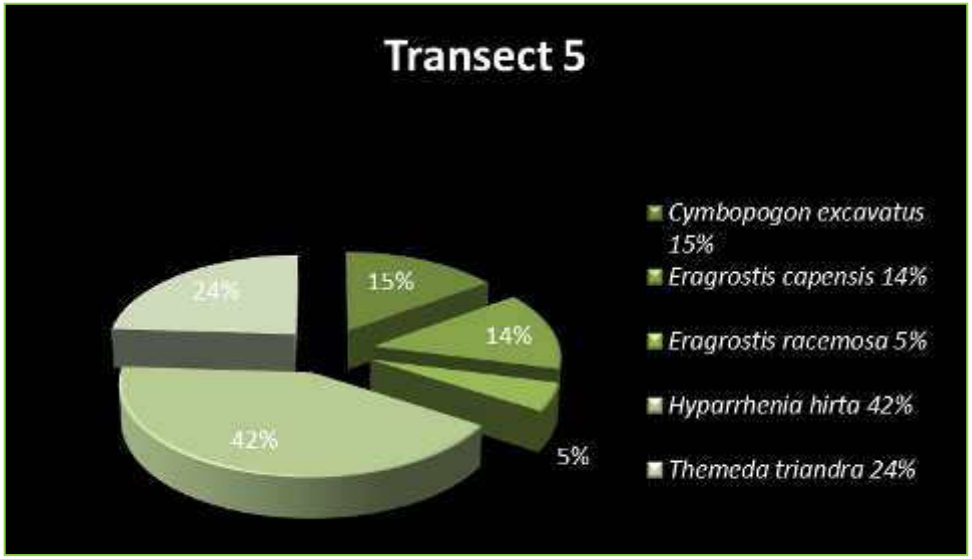

Figure 21: Results from Transect 5.

Transect 5 – Open Grassland

Cymbopogon excavatus (Broad-leaved turpentine grass) [Climax grass; Increaser I]. Broad-leaved turpentine grass grows in most soil types, but especially in sandy and gravelly soil in disturbed as well as undisturbed veld. It often also grows along roadsides.

Eragrostis capensis (Heart-seed love grass) [Subclimax grass; Increaser II]. Heart-seed love grass often grows in vlei areas where soil is moist throughout the year. Also present in disturbed places. Grows in sandy, loam or clay soils.

Eragrostis racemosa (Narrow heart love grass) [Subclimax grass, Increaser II]. Narrow heart love grass grows in a large variety of habitat types, mostly in shallow sandy or gravelly soil in damp places. It is more often found in disturbed places.

Hyparrhenia hirta (Common thatching grass) [Increaser I, Climax grass]. Grows well in drained soil, especially gravelly soil, in open grassland, as well as in bushveld. It is often found in disturbed places such as old cultivated lands and road reserves. It is also sometimes found along riversides on heavier soil.

Themeda triandra (Red Grass) [Decreaser; Climax grass]. Red grass is abundant in undisturbed open grassland and bushveld in parts with an average to high rainfall. It grows in any type of soil, but mostly clay soil.

Egoli Granite Grassland Indicator Grasses:

Aristida canescens (d), *Aristida congesta* (d), *Cynodon dactylon* (d)
Digitaria monodactyla (d) *Eragrostis capensis* (d) *Eragrostis chloromelas* (d) *Eragrostis curvula* (d) *Eragrostis racemosa* (d) *Heteropogon contortus* (d)
Hyparrhenia hirta (d) *Melinis repens* subsp. *repens* (d)
Monocymbium ceresiiforme (d) *Setaria sphacelata* (d) *Themeda triandra* (d) *Tristachya leucothrix* (d)

Conclusion: Four species representative of the vegetation type are present. The dominant grass species is however *Hyparrhenia hirta*, which may be indicatve of past disturbances in this area.

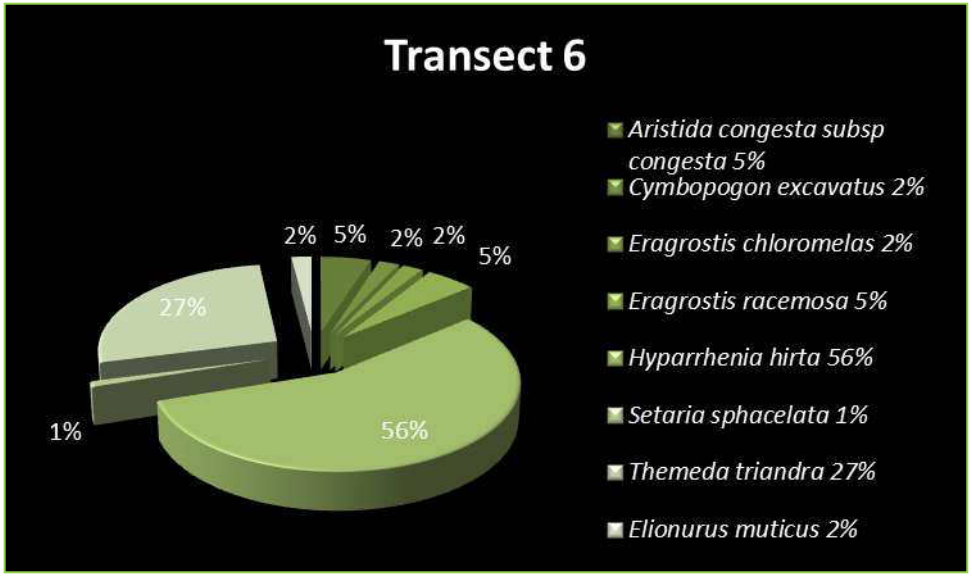

Figure 22: Results from Transect 6.

Transect 6 – Open Grassland

Aristida congesta subsp. *congesta* (Tassel Three-awn) [Pioneer grass, Increaser II]: this grass occurs mostly in disturbed places such as old fields, road reserves and bare patches in overutilised veld. It grows in most soil types, but mostly loam soil.

Cymbopogon excavatus (Broad-leaved turpentine grass) [Climax grass; Increaser I]. Broad-leaved turpentine grass grows in most soil types, but especially in sandy and gravelly soil in disturbed as well as undisturbed veld. It often also grows along roadsides.

Eragrostis chloromelas (Narrow curly leaf) [Increaser II, subclimax and climax grass]. Curly leaf grows on stony slopes in sandy and loam soil. It is more common in open grassland than in the bushveld.

Eragrostis racemosa (Narrow heart love grass) [Subclimax grass, Increaser II]. Narrow heart love grass grows in a large variety of habitat types, mostly in shallow sandy or gravelly soil in damp places. It is more often found in disturbed places.

Hyparrhenia hirta (Common thatching grass) [Increaser I, Climax grass]. Grows well in drained soil, especially gravelly soil, in open grassland, as well as in bushveld. It is often found in disturbed places such as old cultivated lands and road reserves. It is also sometimes found along riversides on heavier soil.

Setaria sphacelata (Golden bristle grass) [Climax grass, Decreaser grass]. Golden bristle grass grows in mountainous grassland in parts with a high rainfall; damp places such as in vleis and marshes; mostly in clay soil. It is often also found in damp places in old cultivated lands, roads reserves and other disturbed places.

Themeda triandra (Red Grass) [Decreaser; Climax grass]. Red grass is abundant in undisturbed open grassland and bushveld in parts with an average to high rainfall. It grows in any type of soil, but mostly clay soil.

Egoli Granite Grassland Indicator Grasses:

Aristida canescens (d), *Aristida congesta* (d), *Cynodon dactylon* (d)
Digitaria monodactyla (d) *Eragrostis capensis* (d) *Eragrostis chloromelas* (d) *Eragrostis curvula* (d) *Eragrostis racemosa* (d) *Heteropogon contortus* (d)
Hyparrhenia hirta (d) *Melinis repens* subsp. *repens* (d)
Monocymbium ceresiiforme (d) *Setaria sphacelata* (d) *Themeda triandra* (d) *Tristachya leucothrix* (d)

Conclusion: Six species representative of the vegetation type are present. The dominant grass species is however *Hyparrhenia hirta*, which may be indicatve of past disturbances in this area.

8.5 Vegetation Index Score

The information gathered during the assessment of the subject property was used to determine the Vegetation Index Score (VIS) - see Appendix A for calculations. Due to variation between the different habitat units within each site, all habitat units were assessed separately. The table below lists the results of each habitat unit.

Table 15: Scoring for the Vegetation Index Score

Vegetation Index Score	Assessment Class	Description
22 to 25	**A**	Unmodified, natural
18 to 22	**B**	Largely natural with few modifications.
14 to 18	**C**	Moderately modified
10 to 14	**D**	Largely modified
5 to 10	**E**	The loss of natural habitat extensive
<5	**F**	Modified completely

Table 16: Vegetation Index Score

Habitat unit	Score	Class	Motivation
Wetland Habitat Unit	12	**D – Largely modified**	Some transformation due to historic anthropogenic activities and alien vegetation encroachment.
Open Grassland Habitat Unit	18	**C – Moderately modified**	Some transformation due to historic anthropogenic activities and alien vegetation stands. Localised bush encroachment present.
Transformed Habitat Unit	5	**E - Extensive loss of natural habitat**	Severe transformation due to historic anthropogenic activities and alien vegetation stands

From the VIS assessment, it is evident that both the Wetland and Open Grassland Habitat Unit have undergone some levels of vegetation transformation and achieved scores of 12 and 18 respectively. The score for the Wetlands Habitat Unit falls within Class D – Largely modified, as the vegetation in this area is dominated by alien plant species. The score for the Open Grassland Habitat Unit falls within Class C- Moderately modified mainly due to localised alien plant species and bush encroachment, and the overall dominance of *Hyparrhenia hirta*. The Transformed Habitat Unit, which include areas of extensive vegetation loss and the presence of alien plant species, is designated a VIS score of 5 (Extensive loss of natural habitat).

8.6 Exotic and Invader Species

Alien invaders are plants that are of exotic origin and are invading previously pristine areas or ecological niches (Bromilow, 2001). Not all weeds are exotic in origin but, as these exotic plant species have very limited natural "check" mechanisms within the natural environment, they are often the most opportunistic and aggressively growing species within the ecosystem. Therefore, they are often the most dominant and noticeable within an area. Disturbances of the ground through trampling, excavations or landscaping often leads to the dominance of exotic pioneer species that rapidly dominate the area. Under natural conditions, these pioneer species are overtaken by sub-climax and climax species through natural veld succession. This process, however, takes many years to occur, with the natural vegetation never reaching the balanced, pristine species composition prior to the disturbance. There are many species of indigenous pioneer plants, but very few indigenous species can out-compete their more aggressively growing exotic counterparts.

Alien vegetation invasion causes degradation of the ecological integrity of an area, causing (Bromilow, 2001):

- A decline in species diversity;
- Local extinction of indigenous species;
- Ecological imbalance;
- Decreased productivity of grazing pastures and
- Increased agricultural input costs.

During the floral study of each site, all alien and weed species were identified and are listed in the table below. The majority of alien plant species are present within the Wetland Habitat Unit.

Table 17: Dominant invader/weed vegetation species identified during the general area assessment.

Species	English name	Origin	Category*
Trees/ shrubs			
Melia azedarach	Syringa	India	3
Pinus pinaster	Cluster pine	Mediterranean	2
Eucalyptus camaldulensis	Red River Gum	Australia	2
Opuntia ficus indica	Prickly pear	Mexico	1
Tipuana tipu	Tipu tree	Bolivia , Brazil	3
Morus alba	White mulberry	China	3
Sesbania bispinosa	Spiny sesbania	Asia, North Africa	N/A
Sesbania punicea	Red sesbania	South America	1
Solanum muritianum	Bugweed	Asia	1

Species	English name	Origin	Category*
Forbs			
Ipomoea purpurea	Common morning glory	Tropical and subtropical America	3
Verbena bonariensis	Purple top	South America	1
Lantana camara	Common lantana	Tropical America	1
Tagetes minuta	Tall khakiweed	South America	N/A
Araujia sericifera	Moth catcher	South America	1
Bidens pilosa	Common blackjack	South America	N/A
Persicaria lapathifolia	Spotted knotweed	Europe	N/A
Schkuhria pinnata	Dwarf marigold	South America	N/A
Amaranthus spinosus	Thorny pigweed	Central America	N/A
Campuloclinium macrocephalum	Pompom weed	Argentina, Brazil	1
Conyza bonariensis	Flax-leaf fleabane	Americas	N/A
Hypochaeris radicata	Hairy wild lettuce	Europe	N/A
Schkuhria pinnata	Dwarf marigold	South America	N/A
Canna indica	Garden canna	Central America	1
Oenothera rosea	Rose evening primrose	Central America	3
Plantago lanceolata	Buckhorn plantain	Europe	N/A
Grass			
Pennisetum clandestinum	Kikuyu	East Africa	2

Category 1 – Declared weeds. Prohibited plants, which must be controlled or eradicated.
Category 2 – Declared invader plants with a value. "Invaders" with certain useful qualities (i.e. commercial). Only allowed in controlled, demarcated areas.
Category 3 – Mostly ornamental plants. Alien plants presently growing in, or having escaped from, areas such as gardens, but are proven invaders. No further planting or trade in propagative material is allowed (Bromilow, 2001).

Alien species located within the subject property needs to be removed during and after construction, on a regular basis and form part of the rehabilitation plan according to the Conservation of Agricultural Resources Act (CARA) 43 of 1983.

8.7 Medicinal Plant Species

Medicinal plant species are not necessarily indigenous species, with many of them regarded as alien invasive weeds. The medicinal species are all commonly occurring species and are not confined to the subject property, with the exception of *Hypoxis hemerocallidea* and *Boophane disticha*.

The table below presents a list of plant species occurring within the subject property with traditional medicinal value, plant parts traditionally used and their main applications.

Table 18: Traditional medicinal plants identified during the field assessment. Medicinal applications and application methods are also presented (van Wyk, et al., 1997; van Wyk and Gericke, 2000; van Wyk and Wink, 2004; van Wyk, Oudtshoorn, Gericke, 2009).

Species	Name	Plant parts used	Medicinal uses
Acacia karroo	Sweet thorn	Bark, leaves and gum	Remedy for diarrhoea and dysentery
Aloe greatheadii var *davyana*		Stems and leaves	Decoction of powdered stems and leaf bases is taken orally twice a day after delivery to cleanse the system.
Aslepias fruticosa	Milkweed	Leaves, sometimes roots	Used as snuff to treat headaches and tuberculosis.
Boophane disticha	Bushman poison bulb	Bulb scales	Dry outer scales of the bulb are used as an outer dressing after circumcision and are applied to boils or septic wounds to alleviate pain. Weak decoctions are administered by mouth or as and enema for various complaints such as headaches, abdominal pain, weakness and eye conditions.
Elephantorrhiza elephantina	Elandsbean	Underground rhizomes	Traditional remedy for a wide range of ailments, including diarrhoea and dysentery, stomach disorders, haemorrhoids and perforated peptic ulcers, and as emetics. It is popular for the treatment of skin diseases and acne.
Helichrysum nudifolium	Everlasting	Leaves, twigs and sometimes the roots	Many ailments are treated, including coughs, colds, fever, infections, headache and menstrual pains. It is a popular ingredient in wound dressing.
Hypoxis hemerocallidea	African potato	Rootstock	Infusions of corm are used as emetics to treat dizziness, bladder disorders and insanity. Decoctions have been given to weak children as a tonic and the juice is reported to be applied to burns.
Pallaea calomelanos	Hard fern	Leaves and rhizomes	Leaves are smoked for head olds, chest olds and asthma.
Tagetes minuta	Tall khaki bush	Leaves, flowers	The repellent properties of essential oil have been known for a long time and were found to be effective in preventing sheep from becoming infected with blow-fly larvae. Many gardeners use warm water extracts of the fresh plant to keep roses and other garden plants free from insects and fungal diseases. The essential oil is used in perfumery and as a flavourant in food, beverages and tobacco.
Typha capensis	Bulrush	Rhizomes	Used for venereal diseases during pregnancy to ensure an easy delivery, and for dysmennorhoea, diarrhoea, dysentery and to enhance male potency and libido.
Vernonia oligocephala	Groenamara	Leaves and twigs	Infusions are taken as stomach bitters to treat abdominal pain and colic
Ziziphus mucronata	Buffalo thorn	Roots, bark or leaves used separately or in combination.	Warm bark infusions (sometimes together with roots or leaves added) are used as expectorants (also as emetics) in cough and chest problems, while root infusions are a popular remedy for diarrhoea and dysentery. Decoctions of roots and leaves (or chewed leaves) are applied externally to boils, sores and glandular swellings, to promote healing and as an analgesic.

Of these medicinal species occurring within the subject property, all are regarded as common and widespread species, with the exception of *Hypoxis hemerocallidea* and

Boophane disticha which are listed as "declining" in the Pretoria Computer Information Systems (PRECIS) Red Data plant list. Should these species occur within the development footprint areas, they should be rescued and relocated to suitable areas earmarked as open space, such as the wetland area and associated buffer zone.

8.8 RDL Floral Status Assessments

An assessment considering the presence of any plant species of concern, as well as suitable habitat to support any such species, was undertaken. The complete PRECIS Red Data plant list for the grid references (*2627BB*) was enquired from SANBI (South African National Biodiversity Institute) - see table below.

Table 19: IUCN Red Data List Categories – Version 3.1 as supplied by SANBI

Category	Definition
EX	Extinct
EW	Extinct in the wild
CR	Critically endangered
EN	Endangered
VU	Vulnerable
NT	Near threatened
LC	Least concern
DD	Data deficient
NE	Not evaluated

Table 20: PRECIS plant list for the QDS 2527DD (Raimondo et al., 2009; SANBI, www.sanbi.org).

Family	Species	Threat status	Growth forms
AMARYLLIDACEAE	*Boophone disticha*	Declining	Geophyte, succulent
AQUIFOLIACEAE	*Ilex mitis* var. *mitis*	Declining	Shrub, tree
ASTERACEAE	*Callilepis leptophylla*	Declining	Herb
CAPPARACEAE	*Cleome conrathii*	NT	Herb
FABACEAE	*Melolobium subspicatum*	VU	Dwarf shrub
GUNNERACEAE	*Gunnera perpensa*	Declining	Herb, hydrophyte
HYACINTHACEAE	*Bowiea volubilis* subsp. *volubilis*	VU	Climber, geophyte, succulent
HYACINTHACEAE	*Drimia sanguinea*	NT	Geophyte
HYPOXIDACEAE	*Hypoxis hemerocallidea*	Declining	Geophyte
ORCHIDACEAE	*Habenaria mossii*	EN	Geophyte, herb

The POC of each of the species listed above was calculated (table below) with reference to habitat suitability within the subject property.

Table 21: POC for floral species of concern.

Species	Habitat	POC	Motivation
Boophone disticha	Grassland, often rocky places.	100%	Occur throughout the subject property.
Ilex mitis var. *mitis*	Along streams in sheltered kloofs.	19%	Wetland feature on subject property not sheltered.
Callilepis leptophylla	Grassland, often rocky ridges.	33%	If present, will be restricted to less disturbed Open Grassland areas.
Cleome conrathii	On stony slopes, usually on sandy soil, open to closed deciduous woodland, quartzites, red sandy soil	33%	If present, will be restricted to less disturbed Open Grassland areas.
Melolobium subspicatum	Grassland hillsides.	26%	Limited literature available. Will also be restricted to the Open Grassland Habitat Unit if present.
Gunnera perpensa	In cool continually moist localities, mainly along upland streambanks.	33%	If present, will be restricted to the Wetland Habitat Unit.
Bowiea volubilis subsp. *volubilis*	Shady places, steep rocky slopes and in open woodland, under large boulders in bush or low forest.	20%	No suitable habitat likely to be available.
Drimia sanguinea	Open veld and scrubby woodland in a variety of soil types.	20%	Doubtful if suitable habitat exists on the subject property.
Hypoxis hemerocallidea	Occurs in a wide range of habitats, from sandy hills on the margins of dune forests to open rocky grassland; also grows on dry, stony, grassy slopes, mountain slopes and plateaux; appears to be drought and fire tolerant.	100%	Occur throughout the subject property.
Habenaria mossii	Open grassland on dolomite or in black sandy soil	46%	If present, will be restricted to Open Grassland areas.

It is evident from the table above that although the species *Hypoxis hemerocallidea* and *Boophane disticha* are present on the subject property, some suitable habitat exists for some other RDL plant species to occur on site, particularly orchid species such as *Habenaria mossii*. Should *Boophane disticha* and *Hypoxis hemerocallidea* occur within the development footprint, a rescue and relocation plan must be developed and implemented before construction activities take place.

Several terrestrial orchid species namely *Habenaria schimperiana, H. nyikana* and *H. filicornis* have been noted within the Wetland Habitat Unit and *H.epidactidea* within the Open Grassland Habitat Unit and therefore the possibility of other orchid species such as the RDL *Habenaria mossii* occurring should not be excluded. Where possible, orchid species located within the Open Grassland should be relocated to suitable open space areas or other safe locations during the rescue and relocation procedure with the assistance of a specialist nursery or a local orchid society, any other orchid species present should also be searched for and relocated.

8.9 Faunal Assessment

The faunal assessment included field observations (visual identification, spoor, call or dung) in conjunction with an extensive literature referencing. This is done due to the fact that many faunal species are nocturnal or climatic conditions during the assessment may not be suitable to enable observations to occur. In addition, the high levels of anthropogenic activity in the subject property and surrounding area may determine whether species will be observed.

8.9.1 Mammals

The transformed nature of large portions of available habitat within the subject property, limited migratory connectivity due to surrounding highways and development and moderate to high levels of anthropogenic activities within the subject property have likely limited the potential of direct observation of mammals during the field assessment. Furthermore, the lack of suitable habitat sites to host and provide food for a diverse mammal population is limited within the subject property. Mammal species are likely to be restricted to more common small mammal species which are opportunistic feeders and able to adapt to urbanised environments. Common small mammal species that might occur within the subject property are the Scrub Hare (*Lepus saxatilis*), the Southern African Spiny Mouse (*Acomys spinosissimus*) and the Yellow Mongoose (*Cynictis penicillata*). These species are not regionally threatened species (GDARD) and are considered as Least Concern by the IUCN.

It is not likely that any RDL or sensitive mammal species will utilise the area within or directly adjacent to the proposed development area for habitation or foraging purposes due to the moderate to high levels of transformation and anthropogenic activity. Thus, the proposed development is unlikely to pose a threat to mammal conservation in the area, provided that the sensitivity map is adhered to.

8.9.2 Avifauna

All bird species seen or heard during the time of the assessment have been recorded. The table below lists all the bird species noted within the immediate vicinity of the subject property during the field assessment.

Table 22: Bird species recorded during the bird survey.

Scientific name	Common Name	IUCN Red List Status
Indian myna	*Acridotheres tristis*	LC
Common Swift	*Apus apus*	LC
Hadeda ibis	*Bostrychia hagedash*	LC
Rock dove	*Columba livia*	LC
Go away bird	*Corythaixoides concolor*	LC
Common house Swallow	*Delichon urbicum*	LC
Barn Swallow	*Hirundo rustica*	LC
Common Fiscal Shrike	*Lanius collaris*	LC
House sparrow	*Passer domesticus*	LC
Southern masked weaver	*Ploceus velatus*	LC
Tawny flanked prina	*Prinia subflava*	LC
Dark-capped bulbul	*Pycnonotus tricolor*	LC
Cape Turtle-Dove	*Streptopelia capicola*	LC
Blacksmith Lapwing	*Vanellus armatus*	LC
Crowned Lapwing	*Vanellus coronatus*	LC

LC – Least concern;

A moderate to low diversity of bird species has been observed during the assessment, with the majority of species being adapted to urban environments. Bird species encountered are common and widespread species, and are likely to remain in the area or move to areas that are more suitable if any development takes place.

It is considered unlikely that any RDL or protected bird species will utilise the area within or directly adjacent to the proposed development area for habitation or foraging purposes due to the moderate to high levels of transformation and anthropogenic activity within and surrounding the subject property. Since birds are highly mobile, they are capable of moving away from unfavourable areas and habitats. They are therefore not directly affected by localised developments unless they are directly dependent on the habitat that will be subjected to development.

There is however, a possibility that some threatened RDL bird species, which occur in the GDARD RDL bird list, may occasionally occur within the subject property under favourable conditions especially in search for food. These include raptor species such as the Lesser Kestrel (*Falco naumanni*) (Vulnerable), the Lanner Falcon (*Falco biarmicus*) (Near threatened) and specifically the African Grass Owl (*Tyto Capensis*), which has been highlighted by GDARD as avifaunal species of conservation concern. Should these species occur within the subject property, conservation of the wetland area and associated buffer zone will provide adequate habitat for such species. Therefore, the proposed development does not pose a threat to bird conservation in the area, provided that the recommendations as set out in this report are adhered to.

8.9.3 Reptiles

Due to historic transformation, nearby informal and formal settlements and lack of suitable rocky habitat, a large diversity of reptile species is unlikely to be present within the subject property. No reptile species were noted during the site assessment.

Common species that might be present include the Brown House Snake (*Lamprophis capensis*), the Tropical House Gecko (*Hemidactylus mabouia*), Aurora snake (*Lamprophis aurora*), Spotted Sandveld Lizard (*Nucras intertexta*) and other species adapted to urban environments. The above mentioned reptile species are not Gauteng RDL threatened species (GDARD SoER, 2004) and are all considered to be of Least Concern by the IUCN.

The high levels of transformation and anthropogenic activity within the subject property also lowers the probability of these threatened species such as the Striped harlequin Snake (*Homoroselaps dorsalis*) and the South African Python (*Python natalensis*) from occurring within the subject property. The proposed development is unlikely to pose a significant threat to reptile conservation in the region.

8.9.4 Amphibians

The wetland feature within the subject property is deemed the most important for conservation of amphibian species. However, impacts on the wetland feature, and the seasonal nature thereof limit the possibility of amphibian species of concern occurring and restrict amphibian diversity utilising the Wetland Habitat Unit to more common species

and species more tolerant of impacted environments such as guttural toads (*Amietophrynus gutturalis*) and common river frogs (*Amietia angolensis*).

The subject property occurs in the distribution range of the Giant African Bullfrog (*Pyxicephalus adspersus*) which is a noted RDL species within the Gauteng Province. Suitable *Pyxicephalus adspersus* habitat comprises of shallow pans or depressions surrounded by areas of open grassland for foraging and migration. The subject property has very little potential to support this species in terms of breeding, habitat and foraging suitability because of the transformed wetland conditions and the limited water availability and quality.

However, under favourable conditions when high rainfall has been noted, the Giant African Bullfrog (*Pyxicephalus adspersus*) is known to traverse large distances for foraging purposes and has been noted in the larger region.

Thus, the proposed development may pose a threat to migrating bullfrogs. However, this threat may be lowered and decreased provided that the mitigation measures and recommendations is adhered to as most amphibian species will most likely be restricted to the Wetland Habitat Unit.

8.9.5 Invertebrates

The invertebrate assessment conducted was a general assessment with the purpose of identifying common species and taxa in the study area. As such, the invertebrate assessment will not be an indication of the complete invertebrate diversity potential of the proposed development site and surrounding area. Representatives of commonly encountered families in the Insecta class that was observed during the assessment are listed in the table below. No invertebrate species of concern were identified and it is doubtful that any of these species will reside within the subject property due to the vegetation transformation limiting breeding and foraging habitat.

Table 23: General results from invertebrates observed during the assessment of the subject property.

Insect species	Comments
Order: Lepidoptera (Butterflies & Moths) Family: Nymphalidae Subfamily Danainae *Danaus chrysippus aegyptius* (African monarch) Subfamily: Nymphalinae *Junonia hierta cebrene* (Yellow pansy)	Visual observations.
Order: Lepidoptera (Butterflies & Moths) Family: Pieridae *Eurema brigitta* (Broad-bordered Grass Yellow) *Pontia helice* (Meadow White)	Visual observation
Order: Orthoptera (Grasshoppers, Crickets & Locusts) Family: Acrididae Family: Gryllidae	Visual observations.

No RDL threatened invertebrates were found in the subject property. The proposed development will not pose a threat to invertebrate conservation in the region and no RDL invertebrate species are likely to occur within the range of influence of the proposed development project.

8.9.6 Arachnids and Scorpions

No evidence of the Mygalomorph arachnids (Trapdoor and Baboon spiders) and RDL scorpions was encountered within the subject property, although it should be noted that these species are notoriously difficult to detect. During the field assessment specific attention was paid to the identification of suitable habitat for spiders and scorpions. After thoroughly searching, no scorpions were found and no spider burrows were identified.

Funnel web spider (*Angelena* sp) individuals were encountered during the site survey. These species are considered common and not threatened.

The proposed development is unlikely to pose a threat to arachnid and scorpion conservation in the subject property and no RDL arachnid and scorpion species are likely to occur within the proposed development project area.

8.10 Faunal red data species assessment

No threatened RDL faunal species were identified during the site surveys which are included in the Gauteng Province State of the Environment Reports. Four threatened RDL species are however expected to have a 60% or greater probability of being encountered on the subject property and are presented in the table below. These species have a high probability of utilising the subject property as a migration corridor and an area to forage and possibly breed if the conditions are favourable.

Table 24: Threatened faunal species with a 60% or greater Probability of Occurrence (POC) on the subject property.

Common Name	Scientific Name	IUCN	GDARD Status	POC %
Lanner Falcon	*Falco biarmicus*	LC	NT	72
Lesser Kestrel	*Falco naumanni*	LC	VU	66
African Grass Owl	*Tyto capensis*	LC	VU	60
African Giant Bullfrog	*Pyxicephalus adspersus*	LC	LC	66

LC = Least Concerned, R = Rare, DD = Data Deficient, NT = Near Threatened and VU = Vulnerable.

The species presented in the table above were then used to calculate the RDSIS for the site, the results of which are presented in the following table.

Table 25: Red Data Sensitivity Index Score calculated for the subject property.

Red Data Sensitivity Index Score	
Average Total Species Score	**66**
Average Threatened Taxa Score	**64**
Average (Ave TSS + Ave TT/2)	**65**
% Species greater than 60% POC	**4%**
RDSIS of Site	**28%**

The RDSIS assessment of the property yielded a low score of 28%, indicating a low to medium importance with regards to RDL faunal species conservation within the region. In terms of the proposed project, the subject property, with specific reference to the centrally

located wetland system, could be utilised by faunal species such as the Giant African Bullfrog (*Pyxicephalus adspersus*) and the Lanner Falcon (*Falco biarmicus*) as a migratory corridor or for foraging purposes. Should these species occur within the subject property, conservation of the wetland area and associated buffer zone will provide adequate habitat for such species.

9 RESULTS OF WETLAND ASSESSMENT

9.1 Aquatic Ecoregions

When assessing the ecology of any area (aquatic or terrestrial), it is important to know which ecoregion the study area is located within. This knowledge allows for improved interpretation of data to be made, since reference information and representative species lists are often available on this level of assessment, which aids in guiding the assessment.

The subject property is located in the Highveld Aquatic Ecoregion catchment and falls largely within the A21E quaternary catchment, with a small portion of the wetland being located within the A21C quaternary catchment.

Figure 23 below indicates the aquatic ecoregion and quaternary catchments associated with the subject property.

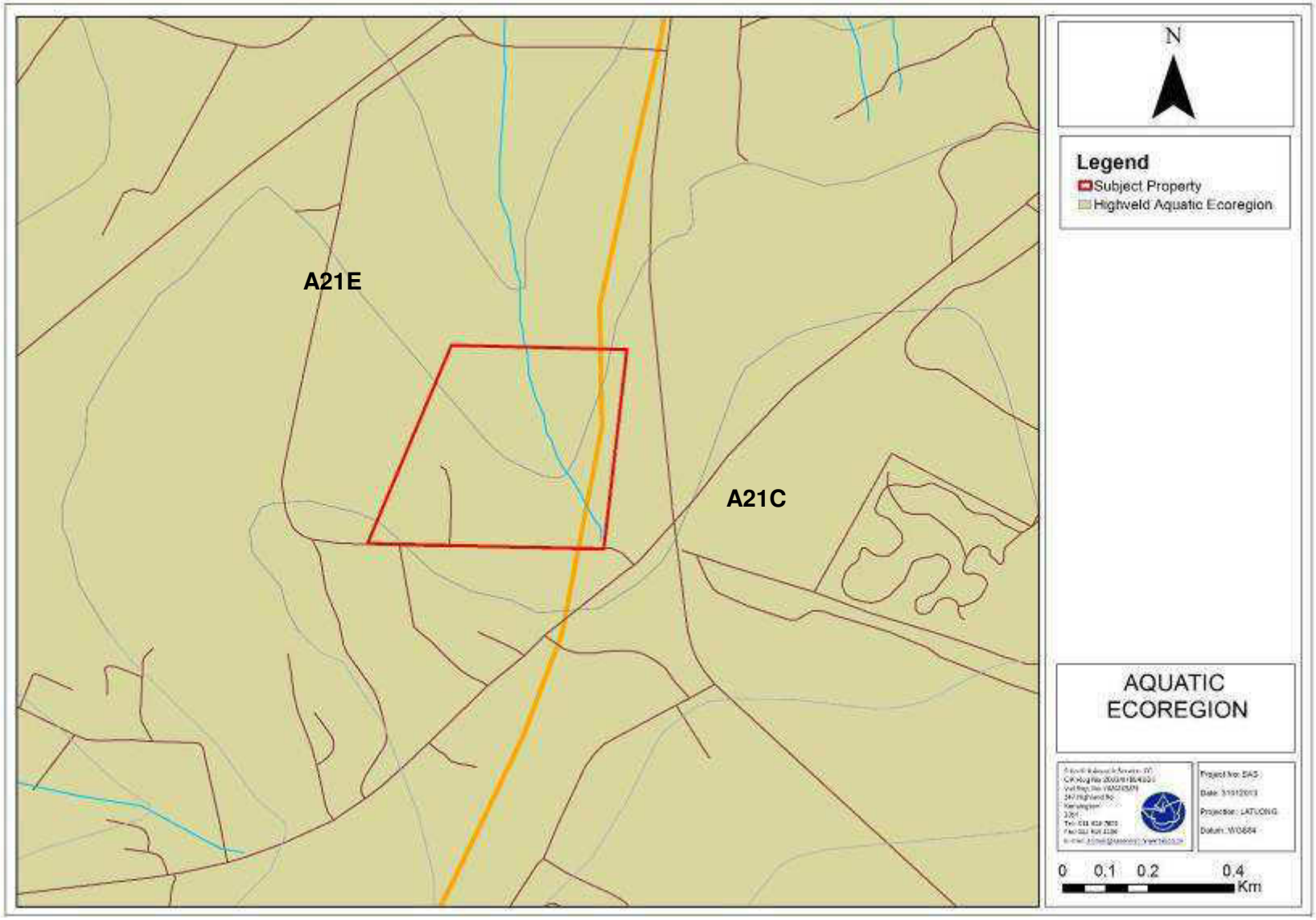

Figure 23: Ecoregion and quaternary catchments associated with the study area (Mucina and Rutherford, 2006)

9.2 Ecostatus

Water resources are generally classified according to the degree of modification or level of impairment. The classes, used by the South African River Health Program (RHP), are presented in the table below and will be used as the basis of classification of the system in this field and desktop study.

Table 26: Classification of river health assessment classes in line with the RHP

Class	Description
A	Unmodified, natural.
B	Largely natural, with few modifications.
C	Moderately modified.
D	Largely modified.
E	Extensively modified.
F	Critically modified.

Studies undertaken by the Institute for Water Quality Studies assessed all quaternary catchments as part of the Resource Directed Measures for Protection of Water Resources. In these assessments, the Ecological Importance and Sensitivity (EIS), Present Ecological Management Class (PEMC) and Desired Ecological Management Class (DEMC) were defined and serve as a useful guideline in determining the importance and sensitivity of aquatic ecosystems, prior to assessment or as part of a desktop assessment.

This database was searched for the two catchments of concern in order to define the EIS, PEMC and DEMC. The results of the assessment are summarised in the table below.

Table 27: Summary of the ecological status of quaternary catchments A21E based on Kleynhans 1999

Catchment	Resource	EIS	PESC	DEMC
A21E	Crocodile	MODERATE	CLASS C	C: Moderately sensitive systems

A21E

According to the ecological importance classification for the quaternary catchment, the system can be classified as a Moderately Sensitive system, which in its present state, can be considered a Class C (moderately modified) stream.

The points below summarise the impacts on the aquatic resources in the quaternary catchment A21E (Kleynhans 1999):

- The aquatic resources within this quaternary catchment have been moderately affected by streambed modification.
- High levels of flow modifications have occurred.
- Moderate impacts have occurred as a result of introduced aquatic biota, such as *Eichhornia crassipes* (Common water hyacinth).
- Impacts due to inundation as a result of the construction of weirs in the catchment are moderate.
- Riparian zones and stream bank conditions are considered to be moderately impacted by alien plant species, such as *Populus* spp. and *Eucalyptus* spp.
- Water quality modification is of a moderate degree.

In terms of ecological functions, importance and sensitivity, the following points summarise the conditions in this catchment:

- The riverine systems in this catchment have a moderate diversity of habitat types, which include waterfalls, riffles and pools.
- The quaternary catchment has a low importance in terms of conservation.
- Species utilising this quaternary catchment has a moderate intolerance to flow and flow related water quality, with specific reference to *Opsaridium peringueyi* (Southern barred minnow), *Amphilius uranoscopus* (Stargazer mountain catfish) and *Chiloglanis pretoriea* (Shortspine suckermouth).
- The quaternary catchment has moderate importance as a migration route for aquatic species in the instream and riparian environments.
- The quaternary catchment is regarded as having high importance for rare and endangered species conservation, with specific reference to *Opsaridium peringueyi* (Southern barred minnow).
- The quaternary catchment has a moderate importance in terms of providing refugia for aquatic community members.
- The quaternary catchment can be considered to have a moderate sensitivity to changes in water quality and a high sensitivity to changes in water flow.
- The quaternary catchment is of low importance in terms of species richness.
- The quaternary catchment is of low importance in terms of endemic and isolated species.

Table 28: Summary of the ecological status of quaternary catchments A21C based on Kleynhans 1999.

Catchment	Resource	EIS	PESC	DEMC
A21C	Jukskei	MODERATE	CLASS D	C: Moderately sensitive systems

A21C

According to the ecological importance classification for the quaternary catchment, the system can be classified as a Moderately Sensitive system, which in its present state, can be considered a Class D (largely modified) stream.

The points below summarise the impacts on the aquatic resources in this quaternary catchment (Kleynhans 1999):

- The aquatic resources within this quaternary catchment have been greatly affected by bed modification with the main causes being sediment and scouring algal growth.
- Very high levels of flow modifications have taken place in areas assessed downstream from the Hartebeespoort dam due to water regulation.
- A high impact from the introduced fish species, including *Cyprinus carpio* and introduced plant species, including *Eichhornia crassipes* (Common water hyacinth), exists, which is likely to affect populations of smaller fish species and possibly the invertebrate community.
- A very high impact from inundation as a result of weir construction is likely.
- Riparian zones and stream bank conditions are considered to be impacted due to alien vegetation encroachment and the presence of cultivated lands.
- A high impact due to water quality modification is deemed likely, due to agricultural and return water, as well as eutrophication within the system.

In terms of ecological functions, importance and sensitivity, the following points summarise the conditions in this catchment:

- The riverine systems in this catchment have a moderate diversity of habitat types.
- The system has a low importance in terms of conservation.
- The system has a high intolerance to flow requirements and flow related water quality changes.
- In terms of instream and riparian function as a migration route/ corridor, the system is moderately important, specifically in terms of fish and birds migratory corridors.
- In terms of rare and endangered species importance, the system is not important.

- The riverine resources are moderately sensitive to changes in water quality and moderately sensitive to changes in flow.
- The area has a high importance in terms of species and taxon richness.
- The system hosts a moderate number of unique species, with specific reference to *Aplocheilichthys johnstoni* and *Chiloglanis pretoriae*.
- The area has a moderate importance as a source of refugia for aquatic species.

9.3 General importance of the study area with regards to watercourse conservation

9.3.1 Importance according to SANBI Wetlands

The SANBI Wetland Inventory (2006) and National Freshwater Ecosystem Priority Areas (NFEPA) (2011) databases were consulted to define the aquatic ecology of the wetland or river systems close to or within the subject property that may be of ecological importance. Aspects applicable to the subject property and surroundings are discussed below:

- The subject property falls within the Crocodile (west) and Marico Water Management Area (WMA). Each Water Management Area is divided into several sub-Water Management Areas (subWMA), where the catchment or watershed is defined as a topographically defined area that is drained by a stream or river network. The Sub-Water management unit indicated for the subject property is the Upper crocodile sub-WMA;
- No NFEPA wetlands or flagship rivers were identified within or immediately adjacent to the study area;
- No wetland clusters of conservational importance were indicated within or near the study area;
- The applicable FEPA WMA data do not indicate any riverine resources within the subject property which is of significance in terms of fish conservation;
- Wetlands located within the subject property are not shown to have sighting or breeding areas for cranes;
- No RAMSAR wetlands are located within or close to the subject property; and
- No wetlands are indicated to fall within 500m of an IUCN threatened frog point locality

9.4 Wetland System Characterisation

9.4.1 Wetland Systems

One wetland system has been identified within the study area (Figure 24), which can be defined as an unnamed headwater stream of the Crocodile River. The system is characterised as a channelled valley bottom wetland.

The degree of wetland development present is limited, due to the lack of water in the system beyond periods after rainfall events. Both the soil form and vegetation indicators are weakly developed with terrestrial vegetation species interspersed with wetland vegetation species within the wetland areas. Due to the sandy nature of the soil the area is well drained, limiting the extent to which wetland vegetation have become established away from the main drainage line with little development of hydromorphic soils beyond the seasonal zone of the main drainage line present.

The wetland system was categorised with the use of the National Wetland Classification System Methodology, as described in Section 6. The results are illustrated in the table below.

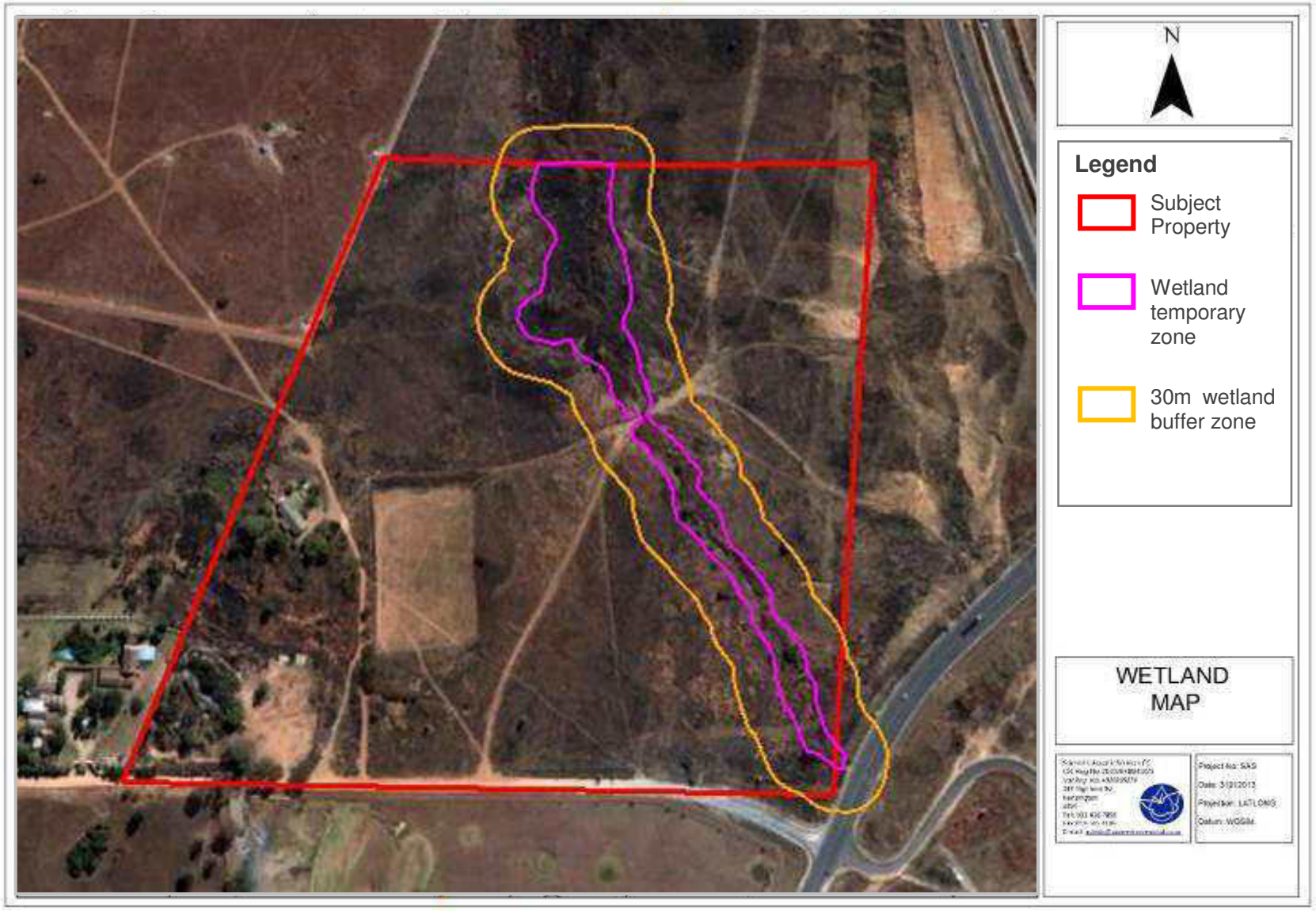

Figure 24: Wetland identified centrally within the subject property.

Table 29: SANBI National Wetland Classification for the Wetland feature.

Level 1: System	Level 2: Regional Setting	Level 3: Landscape unit	Level 4: Hydrogeomorphic (HGM) unit	
			HGM Type	Longitudinal zonation / landform
Inland: An ecosystem that has no existing connection to the ocean but which is inundated or saturated with water, either permanently or periodically.	The study area falls largely within the **Highveld Aquatic Ecoregion**.	**Valley floor:** The typically gently sloping, lowest surface of a valley.	**Channelled valley bottom**: a mostly flat valley-bottom wetland dissected by and typically elevated above a channel.	**Valley bottom flat:** A near-level wetland area (i.e. with little or no relief) with little or no gradient, situated on a plain or a bench in terms of landscape setting.

9.5 Wetland Function Assessment

Wetland function and service provision were assessed for the Western Wetland Feature. The average score for the wetland is presented in the following table as well as the radar plot in the figure that follows the table.

Table 30: Wetland functions and service provision.

Ecosystem service	Wetland
Flood attenuation	1.8
Streamflow regulation	1.7
Sediment trapping	1.2
Phosphate assimilation	1
Nitrate assimilation	1.1
Toxicant assimilation	1.2
Erosion control	1.2
Biodiversity maintenance	2.2
Carbon Storage	0.9
Water Supply	0.7
Harvestable resources	0.3
Cultivated foods	0.3
Cultural Significance	0.3
Tourism and recreation	0.3
Education and resource	0.3
SUM	**14.5**
Average score	**1.0**

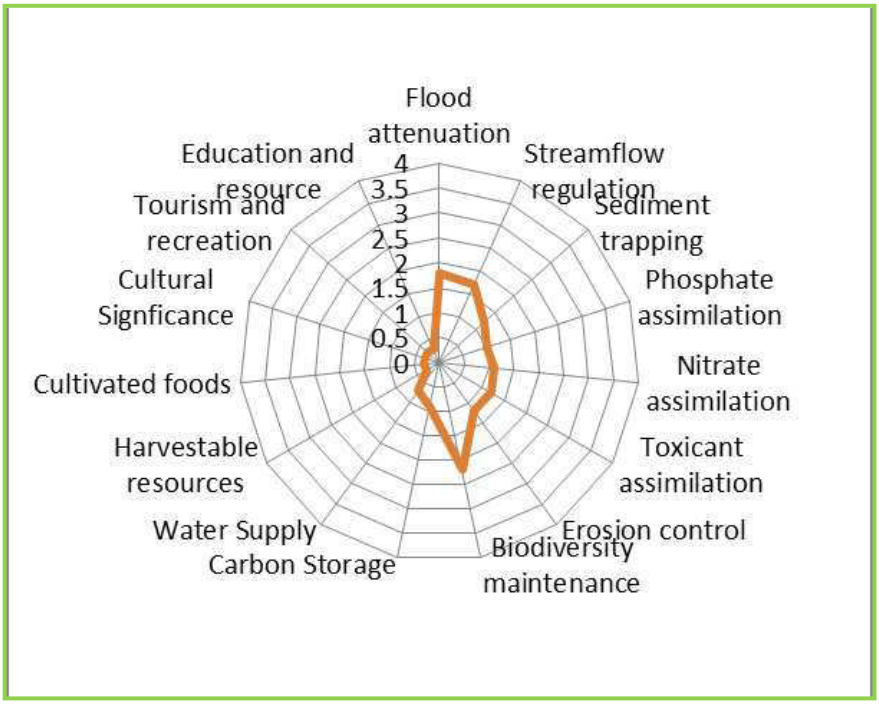

Figure 25: Radar plot of wetland services provided.

From the assessment, it is evident that the wetland present within the subject property provides a moderately low level of ecological function and service provision. The wetland feature is most important in terms of flood attenuation and streamflow regulation as well as biodiversity maintenance. Limited services are provided in terms of nutrient assimilation, sediment trapping and erosion control and little to no service in terms of socio-cultural and socio-economic ecoservices is provided.

9.6 Present Ecological State

The result for the criteria and attributes used for the calculation of the PES is stipulated in the table below.

Table 31: Criteria and attributes assessed during the determination of the PES.

Criteria and attributes	Score	Confidence
Hydrological		
Flow modification	**3**	3
Permanent inundation	**3**	2
Water Quality		
Water Quality Modification	**3**	3
Sediment load modification	**3**	3
Hydraulic/ Geomorphic		

Canalisation	**2**	2
Topographic Alteration	**3**	3
Biota		
Terrestrial Encroachment	**2**	4
Indigenous Vegetation Removal	**4**	2
Invasive plant encroachment	**2**	4
Alien fauna	**4**	2
Overutilisation of biota	**4**	2
Total	33	
Mean	3	

The mean score was calculated as 3, indicating the PES falls within class C – Moderately Modified. System modifiers, including canalisation and topographic alteration as well as perceived water quality modifications as a result of runoff reaching the wetland from roads to the south have impacted on the wetland. Alien and terrestrial plant species encroachment and the subsequent replacement of indigenous vegetation have also impacted on the system, which has led to a lowered PES of the wetland and affected its natural state.

9.7 Wetland vegetation

Upon the assessment of the study area, the various wetland vegetation components have been assessed. Dominant species have been characterised as either wetland or terrestrial species. The wetland species will then been further categorised as temporary, seasonal and temporary zone species. A plant species list associated with the wetland feature is provided in the table below.

Table 32: Dominant floral species noted within the wetland [invader/weed species are marked with an asterisk (*)].

Terrestrial zone species	Seasonal zone species	Temporary zone species	Permanent zone species
**Morus alba*	*Hypoxis hemerocallidea*	**Araujia serifera*	*Digitaria eriantha*
**Melia azedarach*	*Hyparrhenia hirta*	**Campuloclinium macrocephalum*	**Campuloclinium macrocephalum*
**Sesbania punicea*	*Themeda triandra*	**Persicaria lapathifolia*	*Searsia pyroides*
**Araujia serifera*	*Vernonia oligocephala*	**Tagetes minuta*	*Themeda triandra*
**Campuloclinium macrocephalum*	**Verbena bonariensis*	*Aristida congesta*	*Imperata cylindrica*
Aristida congesta	**Oenothera rosea*	*Boophane disticha*	*Typha capensis*
Boophane disticha	*Eragrostis chloromelas*	*Cynodon dactylon*	**Sesbania punicea*

Terrestrial zone species	Seasonal zone species	Temporary zone species	Permanent zone species
Eragrostis chloromelas	**Ipomoea purpurea*	*Eragrostis chloromelas*	*Brachiaria brizantha*
Monopsis decipiens	*Ledebouria revoluta*	*Eragrostis gummiflua*	**Morus alba*
Polygala hottentotta	*Aloe greatheadii*	*Hyparrhenia hirta*	**Melia azedarach*
Seriphium plumosum	*Hermannia depressa*	*Monopsis decipiens*	*Kallinga alba*
**Opuntia ficus-indica*	*Hypoxis argentea*	*Polygala hottentotta*	*Cyperus congestus*
Vernonia oligocephala	**Eucalyptus camaldulensis*	*Searsia lancea*	*Cyperus denudatus*
**Eucalyptus camaldulensis*	*Melinis repens*	*Seriphium plumosum*	*Cyperus marginatus*
Melinis repens	*Aristida congesta*	*Eragrotis capensis*	
Eragrostis racemosa	*Eragrostis racemosa*	*Berkeya radula*	
**Lantana camara*	*Digitaria eriantha*	**Opuntia ficus-indica*	
**Bidens pilosa*	*Wahlenburgia caledonica*	*Aristida junciformis*	
**Sesbania bispinosa*	*Cynodon dactylon*	*Themeda triandra*	
Wahlenburgia caledonica	*Oxalis obliquifolia*		
	**Lantana camara*		
	**Verbena tenuisecta*		
	Sporobolus africana		
	**Bidens pilosa*		
	**Sesbania bispinosa*		

9.8 Ecological Management Class

All results obtained from the South African Wetland Assessment Classification System that was used in the determination of the appropriate EMC class, is indicated in the table below. The results obtained from the wetland assessment indicate moderate to high transformation on all levels of ecology and functionality. Therefore, the EMC class deemed appropriate to enhance and maintain currently ecology as well as functionality is Class C (Moderately modified). Mitigation measures and recommendations stipulated by the ecologists for this project, if followed, are deemed adequate to reach this goal.

9.9 Wetland delineation and sensitivity mapping

During the assessment, the following temporary zone indicators were used:

- The vegetation indicator was used as the primary indicator of the wetland temporary zone boundary.

- Terrain units were used to identify parts of the landscape where wetland conditions have formed along the weakly developed drainage line. The degree to which the well-defined drainage line forms increases in a down gradient direction with a concomitant increase in the width of the wetland and riparian zones.
- The soil form was used as the secondary indicator of the wetland areas. For the soil form indicator the presence of gleyed soils (most of the iron has been leached out of the soil leading to a greyish/greenish/bluish colour) and mottling (the formation of iron oxide nodules) have been investigated to aid in identifying areas with wetland characteristics where the grassland vegetation was unable to clearly indicate the wetland boundary. The soils of the area are fairly sandy and well drained thereby limiting the width of the wetland areas adjacent to the drainage line channel.
- Soil wetness and the presence of surface water were used as a wetland indicator where disturbance of wetland vegetation has led to the boundary being unclear.

The wetland feature is considered to be of high ecological sensitivity, as a result of ecoservices and ecological functions provided by the system, as well as the faunal and floral habitat that the wetland system provides. However, due to the lowered PES of the wetland system and the moderately low levels of ecological function and service provision provided by the wetland system, a 30 meter wetland buffer is deemed adequate to maintain the PES of this aquatic resource and protect it from the effects of the proposed development. This is possible, provided that runoff and erosion is suitably managed and that any significant current environmental degradation and potential future degradation caused during construction, is rehabilitated. In addition the subject property borders the 2010 Gauteng urban edge and considering the rate of development in the region, is likely to soon be urbanised as well. The wetland system as well as the 30m buffer zone has to remain conserved within the subject property in order to prevent loss of the system.

10 SENSITIVITY MAPPING

A sensitivity map has been developed for the subject property and is included as Figure 26. The vegetation of the subject property is largely impacted due to current and historic anthropogenic activities and related edge effects, formal and informal road construction within and adjacent to the subject property, erosion, unplanned fire occurrence and alien floral infestation. Apart from *Boophane disticha* and *Hypoxis hemerocallidea* which are IUCN RDL as 'Declining', no other RDL were noted within the subject property. These species occur scattered throughout the Wetland and Open Grassland Habitat Units. The orchid species *Habenaria schimperiana, H.nyikana* and *H.epipactidea* were noted within

the Wetland Habitat Unit and *Habenaria epipactidea* within the Open Grassland Habitat Unit. All orchid species occurring within the Open Grassland Habitat Unit should be relocated prior to commencement of earthworks, as terrestrial orchids in Gauteng are increasingly threatened due to habitat loss and urbanisation.

Due to the presence of various *Habenaria* species, the possibility of other orchid species such as the RDL *Habenaria mossii*, occurring within the subject property, particularly within the Open Grassland Habitat Unit should not be excluded.

Apart from *Pyxicephalus adspersus* (Giant bullfrogs), which have a slight probability of utilising the subject property as a migratory corridor and several RDL avifaunal species potenially utilising the property for foraging purposes, no other RDL faunal species are expected to occur on the subject property.

The Open Grassland Habitat Unit which covers the majority of the subject property is considered to be of a moderate ecological sensitivity. The Wetland Habitat Unit as well as a 30m buffer zone is regarded to be of high ecological sensitivity as a result of ecoservices and ecological functions, as well as faunal and floral habitat that the wetland system provides. Development and construction activities within the subject property, provided that the sensitivity map is strictly adhered to, are not regarded as a threat to overall biodiversity management and conservation within the region.

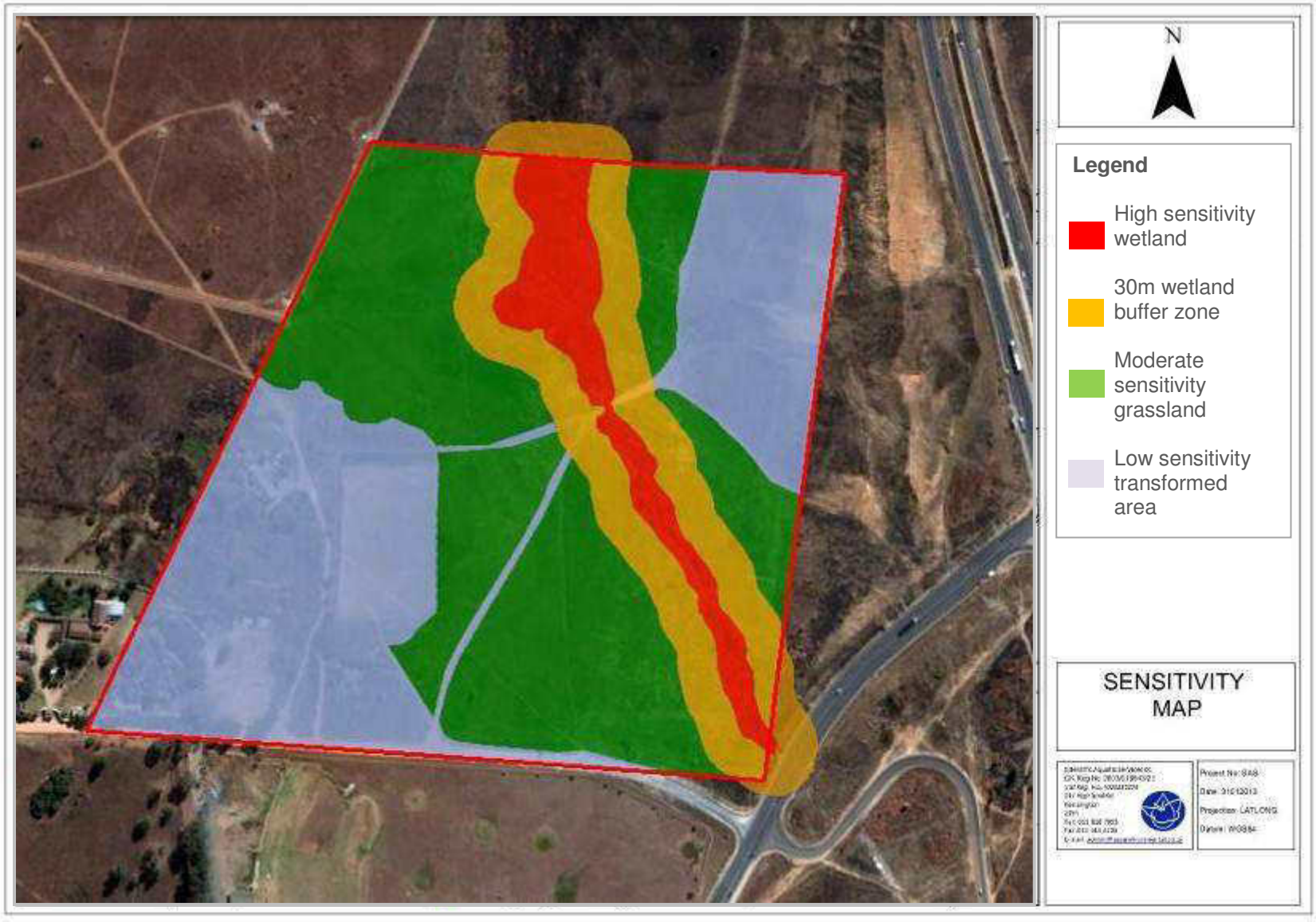

Figure 26: Overall conceptual sensitivity map of the subject property.

11 CONCLUSIONS & RECOMMENDATIONS

The following general conclusions were drawn on completion of the field assessment:

Floral Assessment

- The assessment site falls within the Grassland biome, Mesic Highveld Grassland Bioregion and falls within the Egoli Granite Grassland vegetation type (which is considered to be an endangered vegetation type).
- Three habitat units were identified during the assessment, namely the Wetland Habitat Unit, the Open Grassland Habitat Unit and the Transformed Habitat Unit.
- The Wetland Habitat Unit, associated with a drainage line, is located centrally with respect to the subject property, running in a south-north direction. From the assessment, it is evident that some impact on the stream connectivity has occurred due to the presence of earth dams downstream of the subject property and as a result of informal crossings over the wetland. Some further impacts from erosion, an irregular fire regime and solid waste dumping occur in isolated areas along the drainage line course. Throughout the wetland feature, anthropogenic impacts have led to alien and terrestrial vegetation encroachment. The Wetland Habitat Unit does however provide important habitat for a number of orchid species.
- The Open Grassland Habitat Unit is present in the majority of the subject property with the exception of the central wetland area and transformed areas in the southwestern and northeastern portions of the subject property. This Habitat Unit is dominated by *Hyparrhenia hirta*, a grass species associated with historic disturbance. Although the majority of grass species present are representative of the expected Egoli Grassland Vegetation Type, irregular fires as well as localised alien plant species invasion and bush encroachment are evident throughout this Habitat Unit. Edge effects from surrounding residential and infrastructure development have impacted on natural species composition and ecological functioning to some degree. The grassland present is considered to be in a moderate ecological condition as it provides habitat for the orchid species, *Habenaria epipactidea* and potential habitat for other terrestrial orchid species.
- The Transformed Habitat Unit consists of areas with excessive erosion, stands of alien vegetation, bare soil and cleared areas as well as residential dwellings. Further, ornamental plant species associated with residential landscaping dominate the vegetation towards the southwest of the subject property.
- The following scores for each habitat unit were calculated during the VIS calculations:

Habitat unit	Score	Class	Motivation
Wetland Habitat Unit	12	**D – Largely modified**	Some transformation due to historic anthropogenic activities and alien vegetation encroachment.
Open Grassland Habitat Unit	18	**C – Moderately modified**	Some transformation due to historic anthropogenic activities and alien vegetation stands. Localised bush encroachment present.
Transformed Habitat Unit	5	**E - Extensive loss of natural habitat**	Severe transformation due to historic anthropogenic activities and alien vegetation stands

- Edge effects from current and historic anthropogenic activities have led to an increase in alien plant species within all habitat units within the subject property, particularly within the Wetland and Transformed Habitat Units.
- A number of commonly occurring medicinal plant species, as well as *Hypoxis hemerocallidea* and *Boophane disticha* occur throughout the subject property, except within the Transformed Habitat Unit.
- Apart from *Boophane disticha* and *Hypoxis hemerocallidea*, which are Red Data Listed (RDL) by the International Union for Conservation of Nature (IUCN) as 'Declining', no other RDL floral species were noted within the subject property. Both *Boophane disticha* and *Hypoxis hemerocallidea* occur scattered throughout the Wetland and Open Grassland Habitat Units. All *Boophane disticha* and *Hypoxis hemerocallidea* species located within the development footprint should be relocated to areas earmarked as open space or used as part of the landscaping of the proposed development, by means of a rescue and relocation plan to be developed and implemented before construction and earthworks activities take place.
- The orchid species *Habenaria schimperiana, H. nyikana* and *H. filicornis* occur in the Wetland Habitat Unit, while *H. epipactidea* were noted within the Open Grassland Unit. The *Habenaria* spp within the Wetland Habitat Unit should remain undisturbed and development or disturbance due to construction activities within this area and the associated buffer zone should be prevented. In addition to *Habenaria epipactidea*, any other orchid species potentially located within the Open Grassland Habitat Unit should be relocated prior to the commencement of earthworks to suitable open space areas or another safe location with the assistance of a specialised nursery or a local orchid society and permits to relocate these species, if required, should be obtained.
- Due to the presence of a number of *Habenaria* species, the possibility of other orchid species occurring within the subject property, including the RDL *Habenaria mossii*, should not be excluded. During the plant rescue and relocation process, a

thorough search must be done to confirm the absence/ presence of these species. These species flower during the late summer months (January – March).

Faunal Assessment

- Suitable habitat to host and provide food for a diverse mammal population is limited within the subject property. Mammal species are likely to be restricted to more common small mammal species which are opportunistic feeders and able to adapt to urban environments. Common small mammal species that might occur within the subject property are the Scrub Hare (*Lepus saxatilis*), the Southern African Spiny Mouse (*Acomys spinosissimus*) and the Yellow Mongoose (*Cynictis penicillata*). These species are not regionally threatened species (GDARD) and are considered as Least Concern by the IUCN.
- It is not likely that any RDL or sensitive mammal species will utilise the area within or directly adjacent to the proposed development area for habitation or foraging purposes due to the moderate levels of transformation and anthropogenic activity. Thus, the proposed development does not pose a threat to mammal conservation in the area, provided that the sensitivity map is adhered to.
- A moderate diversity of avifaunal species was noted in the vicinity of the subject property, with the majority of species observed being adapted to urban environments. The majority of bird species encountered are regarded as common and widespread species, and are likely to remain in the area or move to areas that are more suitable, if any development takes place.
- A possibility exists that some threatened RDL bird species, which occur in the GDARD RDL bird list, may occasionally occur within the subject property under favourable conditions, especially for foraging purposes. Such species may include raptor species such as the Vulnerable Lesser Kestrel (*Falco naumanni*) (GDARD SoER 2004) and the Near Threatened Lanner Falcon (*Falco biarmicus*) (GDARD SoER 2004). It is unlikely that the African Grass Owl (*Tyto capensis*), which has been highlighted by GDARD as being of conservation concern, frequent or inhabit the subject property due to anthropogenic movement through the area. Should these species occur within the subject property, conservation of the wetland area and associated buffer zone will provide adequate habitat for such species. The proposed development does not pose a threat to bird conservation in the area, provided that the recommendations as set out in this report are adhered to.
- Due to historic transformation, nearby informal and formal settlements and lack of suitable rocky habitat, a large diversity of reptile species is unlikely to be present

within the subject property. Only commonly occurring reptile species adapted to urban environments are expected to reside within the subject property.

- The moderate levels of transformation and anthropogenic activity within the subject property also lowers the probability of RDL or threatened reptile species such as the Striped harlequin Snake (*Homoroselaps dorsalis*) and the South African Python (*Python natalensis*) from occurring within the subject property. Therefore, the proposed development is unlikely to pose a significant threat to reptile conservation in the region.
- The wetland feature within the subject property is deemed the most important for conservation of amphibian species. However, perceived impacts on the wetland feature limits the possibility of amphibian species of concern being present and will most probably restrict amphibian diversity occurring within the Wetland Habitat Unit to more common species and species more tolerant of impacted environments such as guttural toads (*Amietophrynus gutturalis*) and common river frogs (*Amietia angolensis*).
- The study area occurs in the distribution range of the Giant African Bullfrog (*Pyxicephalus adspersus*) which is a noted RDL species within the Gauteng Province. Under favourable conditions when high rainfall has occurred, the Giant African Bullfrog (*Pyxicephalus adspersus*) is known to traverse large distances for foraging purposes and has been noted in the larger region. The proposed development may thus pose a threat to migrating bullfrogs. However, this threat may be lowered if mitigation measures and recommendations as listed in this report with respect to conservation of wetland habitat is adhered to as most amphibian species will most likely be restricted to the Wetland Habitat Unit.
- The proposed development is unlikely to pose a threat to invertebrate conservation in the region and no RDL invertebrate species are likely to occur within the proposed development's expected range of influence.
- The proposed development is not expected to pose a threat to arachnid and scorpion conservation in the subject property. No RDL arachnid and scorpion species are likely to occur within the proposed development project area.

Wetland Assessment

- One wetland system has been identified within the study area, which can be defined as an unnamed headwater stream of the Crocodile River. The system is characterised as a valley floor, channelled valley bottom wetland.
- The degree of wetland development present is limited, due to the lack of water that remain within the system beyond rainfall events. As a result, both the soil form and

vegetation indicators are weakly developed, with terrestrial vegetation species interspersed with wetland vegetation species within the wetland zone.

- Due to the sandy nature of the soil the area is well drained, limiting the extent to which wetland vegetation have become established away from the main drainage line with little development of hydromorphic soils beyond the seasonal zone.
- The subject property is located in the Highveld Aquatic Ecoregion catchment and falls largely within the A21E quaternary catchment, with a small portion of the wetland being located within the A21C quaternary catchment.
- According to the ecological importance classification for the A21E quaternary catchment, the system can be classified as a Moderately Sensitive system which, in its present state, can be considered a Class C (moderately modified) stream.
- According to the ecological importance classification for the A21C quaternary catchment, the system can be classified as a Moderately Sensitive system which, in its present state, can be considered a Class D (largely modified) stream.
- The National Wetland Inventory (2006) and National Freshwater Ecosystem Priority Areas (NFEPA) (2011) databases were consulted to define the aquatic ecology of the wetland or river systems close to or within the subject property that may be of ecological importance. Aspects applicable to the subject property include:
    - The subject property falls within the Crocodile (west) and Marico Water Management Area (WMA). Each Water Management Area is divided into several sub-Water Management Areas (subWMA), where the catchment or watershed is defined as a topographically defined area which is drained by a stream or river network. The Sub-Water management unit indicated for the subject property is the Upper crocodile sub-WMA;
    - No NFEPA wetlands or flagship rivers were identified within or immediately adjacent to the study area;
    - No wetland clusters of conservational importance were indicated within or near the study area;
    - The applicable FEPA WMA data do not indicate any riverine resources within the subject property which is of significance in terms of fish conservation;
    - Wetlands located within the subject property are not shown to have sighting or breeding areas for cranes;
    - No RAMSAR wetlands are located within or close to the subject property; and
    - No wetlands are indicated to fall within 500m of an IUCN threatened frog point locality.
- From the assessment, it is evident that the wetland present within the subject property provides a moderately low level of ecological function and service

provision. The wetland feature is most important in terms of flood attenuation and streamflow regulation as well as biodiversity maintenance. Limited services are provided in terms of nutrient assimilation, sediment trapping and erosion control and little to no service in terms of socio-cultural and socio-economic ecoservices is provided.

- The PES calculated for the system falls within class C – Moderately Modified. System modifiers, including canalisation and topographic alteration as well as perceived water quality modifications as a result of runoff reaching the wetland from roads to the south have impacted in the wetland. Alien and terrestrial plant species encroachment and the subsequent replacement of indigenous vegetation have also impacted on the system, which has led to a lowered PES of the wetland and affected its natural state.
- The EMC class deemed appropriate to enhance and maintain currently ecology as well as functionality is Class C (Moderately modified).
- Due to the lowered PES of the wetland system, the moderately low levels of ecological function and service provision provided by the wetland system, the close proximity to the existing urban edge and the expected future urbanised environment of this area, a 30 meter wetland buffer is deemed adequate to maintain the PES of this aquatic resource and protect it from the effects of the proposed development. This is possible, provided that runoff and erosion will be suitably managed and that the wetland and associated drainage line area will be suitably protected and any significant current environmental degradation and potential future degradation caused during construction, is rehabilitated.

Sensitivity

The overall vegetation of the subject property has been impacted by current and historic anthropogenic activities and related edge effects, formal and informal road construction within and adjacent to the subject property, erosion, an irregular fire regime and alien floral infestation. Apart from *Boophane disticha* and *Hypoxis hemerocallidea* which are IUCN RDL as 'Declining', no other RDL species were noted within the subject property. These species occur scattered throughout the Wetland and Open Grassland Habitat Units. The orchid species *Habenaria schimperiana, H.nyikana* and *H.filicornis* were noted within the Wetland Habitat Unit and *Habenaria epipactidea* within the Open Grassland Habitat Unit. All orchid species occurring within the Open Grassland Habitat Unit should be relocated prior to commencement of earthworks, as terrestrial orchids in Gauteng are increasingly threatened due to habitat loss and urbanisation.

Due to the presence of various *Habenaria* species, the possibility of other orchid species such as the RDL *Habenaria mossii*, occurring within the subject property, particularly within the Open Grassland Habitat Unit should not be excluded.

Apart from *Pyxicephalus adspersus* (Giant bullfrogs), which have a slight probability of utilising the subject property as a migratory corridor (they are capable of crossing roads) and several RDL avifaunal species potentially utilising the property for foraging purposes, no other RDL faunal species are expected to occur on the subject property.

The Open Grassland Habitat Unit which covers the majority of the subject property is considered to be of a moderate ecological sensitivity. The Wetland Habitat Unit as well as a 30m buffer zone is regarded to be of high ecological sensitivity as a result of ecoservices and ecological functions, as well as faunal and floral habitat (particularly for orchid species) that the wetland system provides. The Transformed Habitat Unit is considered to be of low ecological sensitivity. Development and construction activities within the subject property, provided that the sensitivity map and management measures as set out in this report are strictly adhered to, are not regarded as a significant threat to overall biodiversity management and conservation within the region.

Upon conclusion of this biodiversity assessment, it is the opinion of the ecologists that from an ecological viewpoint, the proposed development be permitted provided that the recommendations below are strictly adhered to:

Development footprint

- All areas of increased ecological sensitivity should be marked as such. This includes the Wetland area and the associated buffer zone, which is to be indicated as a no-go area for the duration of the construction phase. Ecologically friendly property borders are also recommended in the form of open palisade fencing, as opposed to solid walling. This will allow for freedom of movement of invertebrates and smaller, mobile mammal species that need freedom to migrate to maintain genetic diversity.
- Edge effects of project related activities within these areas of increased ecological sensitivity including erosion and alien floral species establishment need to be strictly managed.
- As much indigenous vegetation growth as possible should be promoted within the proposed development area in order to protect soils and where possible the

percentage of the surface area which is paved must be minimised. In this regard special mention is made of the need to use indigenous vegetation species as the first choice during landscaping.

- All *Hypoxis hemerocallidea* and *Boophane disticha* specimens occurring within the Open Grassland Habitat Unit should be relocated to suitable open areas, such as the wetland buffer zone within the subject property through the implementation of a search and rescue plan prior to the commencement of earthworks activities. During the search and rescue operation, all orchid species, including *Habenaria epipactidea*, should be marked and relocated with the assistance of a specialised nursery or local orchid society and permits for their relocation should be obtained, if required.

Wetlands

- An alien removal programme should be implemented within the wetland area whereby alien plant species occurring in this area are manually removed. This may only take place during April to September when orchid species are dormant and should continue at regular intervals throughout the operational phase. The number of people appointed to remove alien plants is to be limited so as to prevent excessive trampling and further disturbance to the wetland area.
- Existing dumping material should also be removed from the wetland area.
- As much of the ecological functioning and migratory connectivity of the drainage feature need to be maintained by ensuring flow connectivity along the drainage line and preventing unnecessary barriers within these areas.
- No topsoil, waste rock or building material should be dumped into the existing drainage line and wetland area and the associated buffer zone, as this area is considered to be of higher ecological importance.
- It must be ensured that construction-related waste and effluent do not affect the wetland resources and associated buffer zones.
- Edge effects of activities, including erosion and alien / weed control, have to be strictly managed in more sensitive wetland areas.
- All construction vehicles should remain on designated roads with no indiscriminate driving through wetlands and riparian areas.
- Adequate stormwater and erosion management measures must be incorporated into the design of the proposed development in order to prevent erosion and sedimentation of the wetland areas.

Alien plant species

- Proliferation of alien and invasive species is expected within disturbed areas such as gravel roads and construction areas. These species should be eradicated and controlled to prevent their spread beyond the site boundary as well as seed dispersal within the top layers of the soil within footprint areas.
- Removal of the alien and weed species encountered on the property in order to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998).

Vehicles

- Where possible, construction vehicles should be restricted to travelling only on the existing roads to limit the ecological footprint of the proposed development activities.
- All construction vehicles should regularly be inspected for leaks.

Dust

- It must be ensured that all roads and construction areas are regularly sprayed with water in order to curb dust generation. This is particularly necessary during the dry season when increased levels of dust generation can be expected.
- It must be ensured that all disturbed and exposed areas are rehabilitated and covered with indigenous vegetation to prevent post-rehabilitation dust generation.

Fires

- No fires should be allowed within the subject property during the construction phase of the development.

Dumping

- No dumping of waste should take place within any area of the subject property. If any spills or waste deposits occur, they should be immediately cleaned up. This includes hydrocarbon spills.

Fauna

- If any threatened RDL faunal species are identified within the subject property during construction activities, the proponent and contractors should ensure effective non direct means of relocation of individuals, such as effective flushing out practices of the bird species.

- No trapping or hunting of fauna is to take place. Access control must be implemented to ensure that no illegal trapping or poaching takes place.

Soils

- To prevent the erosion of top soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas susceptible to erosion. Ensure that topsoil stockpiles are out of any drainage lines and areas susceptible to erosion. Stockpiles should be placed away from areas known to contain hazardous substances and if any soils are contaminated, it should be stripped and disposed of at a registered hazardous waste dumping site;
- All soils compacted as a result of construction activities falling outside development footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all phases of the development;
- Erosion management measures must be implemented to prevent soils from eroding into surface water resources.

Rehabilitation

- As much vegetation growth as possible should be promoted within the proposed development area in order to protect soils. In this regard special mention is made of the need to use indigenous vegetation species where hydroseeding, wetland and rehabilitation planting are to be implemented.
- Upon completion of the project, new indigenous landscaping should be implemented in all affected areas and proper rehabilitation within all impacted areas must take place.
- Banks of disturbed drainage areas must be reprofiled if in any way affected by construction activities.
- Banks and drainage features, if affected by the proposed construction activities, are to be reinforced where necessary with reno mattresses and geotextiles.
- Any areas where earthworks have taken place and soils are exposed, should be reseeded with indigenous vegetation to prevent erosion.

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APPENDIX A

Vegetation Index Score

Vegetation Index Score – Wetland Habitat Unit

1. *EVC=[(EVC1+EVC2)/2]*

EVC 1 - Percentage natural vegetation cover:

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Site score					X	
EVC 1 score	0	1	2	3	4	5

EVC2 - Total site disturbance score:

Disturbance score	0	Very Low	Low	Moderately	High	Very High
Site score					X	
EVC 2 score	5	4	3	2	1	0

2. *SI=(SI1+SI2+SI3+SI4)/4)*

	Trees (SI1)		Shrubs (SI2)		Forbs (SI3)		Grasses (SI4)	
Score:	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State
Continuous								X
Clumped			X			X		
Scattered	X	X		X	X		X	
Sparse								

Present State (P/S) = Currently applicable for each habitat unit

Perceived Reference State (PRS) = If in pristine condition

Each SI score is determined with reference to the following scoring table of vegetation distribution for present state versus perceived reference state.

	Present state (P/S)			
Perceived Reference state (PRS)	Continuous	Clumped	Scattered	Sparse
Continuous	3	2	1	0
Clumped	2	3	2	1
Scattered	1	2	3	2
Sparse	0	1	2	3

3. PVC=[(EVC)-(exotic x 0.7) + (bare ground x 0.3)]

Percentage vegetation cover (exotic):

	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Vegetation cover %					X	
PVC Score	0	1	2	3	4	5

Percentage vegetation cover (bare ground):

	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Vegetation cover %			X			
PVC Score	0	1	2	3	4	5

4. RIS

Extent of indigenous species recruitment	**0**	**Very Low**	**Low**	**Moderate**	**High**	**Very High**
				X		
RIS	**0**	**1**	**2**	**3**	**4**	**5**

VIS = [(EVC)+(SI x PVC)+(RIS)] = 12

The final VIS scores for each habitat unit are then categorised as follows:

Vegetation Index Score	Assessment Class	Description
22 to 25	**A**	Unmodified, natural
18 to 22	**B**	Largely natural with few modifications.
14 to 18	**C**	Moderately modified
10 to 14	**D**	Largely modified
5 to 10	**E**	The loss of natural habitat extensive
<5	**F**	Modified completely

Vegetation Index Score – Open Grassland Habitat Unit

1. *EVC=[(EVC1+EVC2)/2]*

EVC 1 - Percentage natural vegetation cover:

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Site score						X
EVC 1 score	0	1	2	3	4	5

EVC2 - Total site disturbance score:

Disturbance score	0	Very Low	Low	Moderately	High	Very High
Site score				X		
EVC 2 score	5	4	3	2	1	0

2. *SI=(SI1+SI2+SI3+SI4)/4)*

	Trees (SI1)		Shrubs (SI2)		Forbs (SI3)		Grasses (SI4)	
Score:	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State
Continuous							X	X
Clumped			X			X		
Scattered	X			X	X			
Sparse		X						

Present State (P/S) = Currently applicable for each habitat unit

Perceived Reference State (PRS) = If in pristine condition

Each SI score is determined with reference to the following scoring table of vegetation distribution for present state versus perceived reference state.

	Present state (P/S)			
Perceived Reference state (PRS)	Continuous	Clumped	Scattered	Sparse
Continuous	3	2	1	0
Clumped	2	3	2	1
Scattered	1	2	3	2
Sparse	0	1	2	3

3. *PVC=[(EVC)-(exotic x 0.7) + (bare ground x 0.3)]*

Percentage vegetation cover (exotic):

	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Vegetation cover %			X			
PVC Score	0	1	2	3	4	5

Percentage vegetation cover (bare ground):

	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Vegetation cover %			X			
PVC Score	0	1	2	3	4	5

4. *RIS*

Extent of indigenous species recruitment	**0**	**Very Low**	**Low**	**Moderate**	**High**	**Very High**
					X	
RIS	**0**	**1**	**2**	**3**	**4**	**5**

VIS = [(EVC)+(SI x PVC)+(RIS)] = 18

The final VIS scores for each habitat unit are then categorised as follows:

Vegetation Index Score	Assessment Class	Description
22 to 25	**A**	Unmodified, natural
18 to 22	**B**	Largely natural with few modifications.
14 to 18	**C**	Moderately modified
10 to 14	**D**	Largely modified
5 to 10	**E**	The loss of natural habitat extensive
<5	**F**	Modified completely

Vegetation Index Score – Transformed Habitat Unit

1. *EVC=[(EVC1+EVC2)/2]*

EVC 1 - Percentage natural vegetation cover:

Vegetation cover %	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Site score			X			
EVC 1 score	0	1	2	3	4	5

EVC2 - Total site disturbance score:

Disturbance score	0	Very Low	Low	Moderately	High	Very High
Site score					X	
EVC 2 score	5	4	3	2	1	0

2. *SI=(SI1+SI2+SI3+SI4)/4)*

	Trees (SI1)		Shrubs (SI2)		Forbs (SI3)		Grasses (SI4)	
Score:	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State	Present State	Perceived Reference State
Continuous								X
Clumped	X						X	
Scattered			X			X		
Sparse		X		X	X			

Present State (P/S) = Currently applicable for each habitat unit

Perceived Reference State (PRS) = If in pristine condition

Each SI score is determined with reference to the following scoring table of vegetation distribution for present state versus perceived reference state.

	Present state (P/S)			
Perceived Reference state (PRS)	Continuous	Clumped	Scattered	Sparse
Continuous	3	2	1	0
Clumped	2	3	2	1
Scattered	1	2	3	2

Sparse	0	1	2	3	

3. PVC=[(EVC)-(exotic x 0.7) + (bare ground x 0.3)]

Percentage vegetation cover (exotic):

	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Vegetation cover %					X	
PVC Score	0	1	2	3	4	5

Percentage vegetation cover (bare ground):

	0%	1-5%	6-25%	26-50%	51-75%	76-100%
Vegetation cover %				X		
PVC Score	0	1	2	3	4	5

4. RIS

Extent of indigenous species recruitment	**0**	**Very Low**	**Low**	**Moderate**	**High**	**Very High**
			X			
RIS	**0**	**1**	**2**	**3**	**4**	**5**

VIS = [(EVC)+(SI x PVC)+(RIS)] = 5

The final VIS scores for each habitat unit are then categorised as follows:

Vegetation Index Score	Assessment Class	Description
22 to 25	**A**	Unmodified, natural
18 to 22	**B**	Largely natural with few modifications.
14 to 18	**C**	Moderately modified
10 to 14	**D**	Largely modified
5 to 10	**E**	The loss of natural habitat extensive
<5	**F**	Modified completely

APPENDIX B

Expected floral species list for the QDS 2527DD

Table 33: Expected floral species list for the quarter degree grid 2527DD supplied by Sanbi Precis Database.

Family	Species	Threat status	Growth forms
ACANTHACEAE	*Barleria lancifolia T.Anderson subsp. lancifolia*	LC	Dwarf shrub, herb, shrub
ACANTHACEAE	*Barleria macrostegia Nees*	LC	Herb
ACANTHACEAE	*Barleria obtusa Nees*	LC	Dwarf shrub, herb, shrub
ACANTHACEAE	*Barleria pretoriensis C.B.Clarke*	LC	Dwarf shrub, herb
ACANTHACEAE	*Blepharis innocua C.B.Clarke*	LC	Herb
ACANTHACEAE	*Blepharis squarrosa (Nees) T.Anderson*	LC	Dwarf shrub, herb
ACANTHACEAE	*Chaetacanthus burchellii Nees*	LC	Dwarf shrub, herb
ACANTHACEAE	*Chaetacanthus costatus Nees*	LC	Dwarf shrub, herb
ACANTHACEAE	*Chaetacanthus setiger (Pers.) Lindl.*	LC	Dwarf shrub, herb, shrub
ACANTHACEAE	*Crabbea angustifolia Nees*	LC	Herb
ACANTHACEAE	*Dicliptera eenii S.Moore*	LC	Dwarf shrub, herb
ACANTHACEAE	*Isoglossa grantii C.B.Clarke*	LC	Dwarf shrub, herb, shrub
ACANTHACEAE	*Ruellia cordata Thunb.*	LC	Dwarf shrub, herb
ACANTHACEAE	*Ruellia patula Jacq.*	LC	Herb
ACANTHACEAE	*Thunbergia atriplicifolia E.Mey. ex Nees*	LC	Dwarf shrub, herb
ACHARIACEAE	*Kiggelaria africana L.*	LC	Shrub, tree
AMARANTHACEAE	*Achyranthes aspera L. var. sicula L.*		Herb
AMARANTHACEAE	*Alternanthera pungens Kunth*		Herb
AMARANTHACEAE	*Gomphrena celosioides Mart.*		Herb
AMARYLLIDACEAE	*Ammocharis coranica (Ker Gawl.) Herb.*	LC	Geophyte
AMARYLLIDACEAE	*Boophone disticha (L.f.) Herb.*	Declining	Geophyte, succulent
AMARYLLIDACEAE	*Brunsvigia natalensis Baker*	LC	Geophyte
AMARYLLIDACEAE	*Brunsvigia radulosa Herb.*	LC	Geophyte
AMARYLLIDACEAE	*Cyrtanthus tuckii Baker var. tuckii*	LC	Geophyte
AMARYLLIDACEAE	*Haemanthus humilis Jacq. subsp. humilis*	LC	Geophyte
AMARYLLIDACEAE	*Scadoxus puniceus (L.) Friis & Nordal*	LC	Geophyte, herb
ANACARDIACEAE	*Lannea discolor (Sond.) Engl.*	LC	Tree
ANACARDIACEAE	*Lannea edulis (Sond.) Engl. var. edulis*	LC	Dwarf shrub
ANACARDIACEAE	*Ozoroa insignis Delile subsp. reticulata (Baker f.) J.B.Gillett*		Shrub, tree
ANACARDIACEAE	*Ozoroa paniculosa (Sond.) R.& A.Fern. var. paniculosa*	LC	Shrub, tree
ANACARDIACEAE	*Ozoroa paniculosa (Sond.) R.& A.Fern. var. salicina (Sond.) R.& A.Fern.*	LC	Shrub, tree
ANACARDIACEAE	*Ozoroa sphaerocarpa R.Fern. & A.Fern.*	LC	Shrub, tree
ANACARDIACEAE	*Searsia dentata (Thunb.) F.A.Barkley*	LC	Shrub, tree
ANACARDIACEAE	*Searsia discolor (E.Mey. ex Sond.) Moffett*	LC	Dwarf shrub, shrub
ANACARDIACEAE	*Searsia lancea (L.f.) F.A.Barkley*	LC	Shrub, tree

Family	Species	Threat status	Growth forms
ANACARDIACEAE	*Searsia leptodictya (Diels) T.S.Yi, A.J.Mill. & J.Wen forma leptodictya*		Shrub, tree
ANACARDIACEAE	*Searsia magalismontana (Sond.) Moffett subsp. magalismontana*	LC	Dwarf shrub
ANACARDIACEAE	*Searsia pallens (Eckl. & Zeyh.) Moffett*	LC	Shrub, tree
ANACARDIACEAE	*Searsia pyroides (Burch.) Moffett var. gracilis (Engl.) Moffett*	LC	Shrub, tree
ANACARDIACEAE	*Searsia pyroides (Burch.) Moffett var. pyroides*	LC	[No lifeform defined]
ANACARDIACEAE	*Searsia rigida (Mill.) F.A.Barkley var. dentata (Engl.) Moffett*	LC	Shrub, tree
ANACARDIACEAE	*Searsia rigida (Mill.) F.A.Barkley var. margaretae (Burtt Davy ex Moffett) Moffett*	LC	Shrub
ANACARDIACEAE	*Searsia rigida (Mill.) F.A.Barkley var. rigida*	LC	Shrub
ANACARDIACEAE	*Searsia undulata (Jacq.) T.S.Yi, A.J.Mill. & J.Wen*	LC	Shrub
ANACARDIACEAE	*Searsia zeyheri (Sond.) Moffett*	LC	Shrub
ANEMIACEAE	*Mohria vestita Baker*	LC	Geophyte, herb, lithophyte
ANTHERICACEAE	*Chlorophytum bowkeri Baker*	LC	Herb
ANTHERICACEAE	*Chlorophytum cooperi (Baker) Nordal*	LC	Herb
ANTHERICACEAE	*Chlorophytum fasciculatum (Baker) Kativu*	LC	Herb
ANTHERICACEAE	*Chlorophytum trichophlebium (Baker) Nordal*	LC	Herb
APIACEAE	*Afrosciadium magalismontanum (Sond.) P.J.D.Winter*		Herb
APIACEAE	*Alepidea setifera N.E.Br.*	LC	Herb
APIACEAE	*Annesorhiza flagellifolia Burtt Davy*	LC	Herb
APIACEAE	*Berula thunbergii (DC.) H.Wolff*		Herb, hydrophyte
APIACEAE	*Centella asiatica (L.) Urb.*	LC	Climber, herb
APIACEAE	*Cyclospermum leptophyllum (Pers.) Sprague ex Britton & P.Wilson*		Herb
APIACEAE	*Heteromorpha arborescens (Spreng.) Cham. & Schltdl. var. abyssinica (Hochst. ex A.Rich.) H.Wolff*	LC	Shrub, tree
APIACEAE	*Pastinaca sativa L.*		Herb
APOCYNACEAE	*Acokanthera oppositifolia (Lam.) Codd*	LC	Shrub, tree
APOCYNACEAE	*Ancylobotrys capensis (Oliv.) Pichon*	LC	Climber, shrub
APOCYNACEAE	*Asclepias albens (E.Mey.) Schltr.*	LC	Herb
APOCYNACEAE	*Asclepias brevipes (Schltr.) Schltr.*	LC	Herb
APOCYNACEAE	*Asclepias eminens (Harv.) Schltr.*	LC	Herb
APOCYNACEAE	*Aspidoglossum biflorum E.Mey.*	LC	Herb, succulent

Family	Species	Threat status	Growth forms
APOCYNACEAE	*Brachystelma oianthum Schltr.*	LC	Geophyte, succulent
APOCYNACEAE	*Carissa bispinosa (L.) Desf. ex Brenan*	LC	Shrub
APOCYNACEAE	*Ceropegia multiflora Baker subsp. multiflora*	LC	Climber, succulent
APOCYNACEAE	*Cryptolepis cryptolepidioides (Schltr.) Bullock*	LC	Climber, shrub
APOCYNACEAE	*Cryptolepis oblongifolia (Meisn.) Schltr.*	LC	Scrambler, shrub
APOCYNACEAE	*Cynanchum ellipticum (Harv.) R.A.Dyer*	LC	Climber
APOCYNACEAE	*Gomphocarpus fruticosus (L.) Aiton f. subsp. fruticosus*		Herb, shrub
APOCYNACEAE	*Gomphocarpus glaucophyllus Schltr.*	LC	Herb
APOCYNACEAE	*Orbea lutea (N.E.Br.) Bruyns subsp. lutea*	LC	Succulent
APOCYNACEAE	*Pachycarpus schinzianus (Schltr.) N.E.Br.*	LC	Herb, succulent
APOCYNACEAE	*Pentarrhinum insipidum E.Mey.*	LC	Climber
APOCYNACEAE	*Raphionacme galpinii Schltr.*	LC	Geophyte, herb, succulent
APOCYNACEAE	*Raphionacme hirsuta (E.Mey.) R.A.Dyer*	LC	Geophyte, herb, succulent
APOCYNACEAE	*Rauvolfia caffra Sond.*	LC	Tree
APOCYNACEAE	*Riocreuxia burchellii K.Schum.*	LC	Climber
APOCYNACEAE	*Sarcostemma viminale (L.) R.Br. subsp. viminale*	LC	Climber, succulent
APOCYNACEAE	*Secamone alpini Schult.*	LC	Climber
APOCYNACEAE	*Stapelia gigantea N.E.Br.*	LC	Succulent
AQUIFOLIACEAE	*Ilex mitis (L.) Radlk. var. mitis*	Declining	Shrub, tree
ARALIACEAE	*Cussonia paniculata Eckl. & Zeyh. subsp. sinuata (Reyneke & Kok) De Winter*	LC	Succulent, tree
ASPARAGACEAE	*Asparagus angusticladus (Jessop) J.-P.Lebrun & Stork*	LC	Climber
ASPARAGACEAE	*Asparagus asparagoides (L.) Druce*	LC	Climber, succulent
ASPARAGACEAE	*Asparagus cooperi Baker*	LC	Dwarf shrub, shrub
ASPARAGACEAE	*Asparagus flavicaulis (Oberm.) Fellingham & N.L.Mey. subsp. flavicaulis*	LC	Shrub
ASPARAGACEAE	*Asparagus setaceus (Kunth) Jessop*	LC	Shrub
ASPARAGACEAE	*Asparagus suaveolens Burch.*	LC	Shrub
ASPARAGACEAE	*Asparagus transvaalensis (Oberm.) Fellingham & N.L.Mey.*	LC	Shrub
ASPARAGACEAE	*Asparagus virgatus Baker*	LC	Shrub
ASPHODELACEAE	*Aloe greatheadii Schönland var. davyana (Schönland) Glen & D.S.Hardy*	LC	Herb, succulent
ASPHODELACEAE	*Aloe marlothii A.Berger subsp. marlothii*	LC	Succulent, tree
ASPHODELACEAE	*Bulbine capitata Poelln.*	LC	Geophyte, herb, succulent
ASPHODELACEAE	*Trachyandra saltii (Baker) Oberm. var. saltii*	LC	Geophyte, succulent
ASPLENIACEAE	*Asplenium aethiopicum (Burm.f.) Bech.*	LC	Epiphyte, geophyte, herb,

Family	Species	Threat status	Growth forms
			lithophyte
ASPLENIACEAE	*Asplenium capense (Kunze) Bir, Fraser-Jenk. & Lovis*		[No lifeform defined]
ASPLENIACEAE	*Asplenium varians Wall. ex Hook. & Grev. subsp. fimbriatum (Kunze) Schelpe*	LC	Geophyte, herb, lithophyte
ASTERACEAE	*Acanthospermum glabratum (DC.) Wild*		Herb
ASTERACEAE	*Acanthospermum hispidum DC.*		Herb
ASTERACEAE	*Adenostemma caffrum DC. var. caffrum*	LC	Herb, hydrophyte
ASTERACEAE	*Ageratina adenophora (Spreng.) R.M.King & H.Rob.*		Herb, shrub
ASTERACEAE	*Ambrosia artemisiifolia L.*		Herb
ASTERACEAE	*Artemisia afra Jacq. ex Willd. var. afra*	LC	Herb, shrub
ASTERACEAE	*Aster harveyanus Kuntze*	LC	Herb
ASTERACEAE	*Athrixia elata Sond.*	LC	Dwarf shrub
ASTERACEAE	*Berkheya carlinopsis Welw. ex O.Hoffm. subsp. magalismontana (Bolus) Roessler*	LC	Shrub
ASTERACEAE	*Berkheya zeyheri Oliv. & Hiern subsp. zeyheri*	LC	Herb
ASTERACEAE	*Bidens bipinnata L.*		Herb
ASTERACEAE	*Bidens pilosa L.*		Herb
ASTERACEAE	*Brachylaena rotundata S.Moore*	LC	Shrub, tree
ASTERACEAE	*Callilepis leptophylla Harv.*	Declining	Herb
ASTERACEAE	*Callilepis salicifolia Oliv.*	LC	Herb
ASTERACEAE	*Cineraria aspera Thunb.*	LC	Herb, suffrutex
ASTERACEAE	*Conyza podocephala DC.*	LC	Herb
ASTERACEAE	*Conyza scabrida DC.*	LC	Shrub
ASTERACEAE	*Conyza sumatrensis (Retz.) E.Walker var. sumatrensis*		Herb
ASTERACEAE	*Cotula anthemoides L.*	LC	Herb
ASTERACEAE	*Cotula nigellifolia (DC.) K.Bremer & Humphries var. nigellifolia*	LC	Herb, hydrophyte
ASTERACEAE	*Denekia capensis Thunb.*	LC	Herb
ASTERACEAE	*Dicoma anomala Sond. subsp. gerrardii (Harv. ex F.C.Wilson) S.Ortíz & Rodr.Oubiña*	LC	Herb
ASTERACEAE	*Dimorphotheca spectabilis Schltr.*	LC	Herb
ASTERACEAE	*Felicia fascicularis DC.*	LC	Shrub
ASTERACEAE	*Felicia muricata (Thunb.) Nees subsp. muricata*	LC	Shrub
ASTERACEAE	*Flaveria bidentis (L.) Kuntze*		Herb
ASTERACEAE	*Galinsoga parviflora Cav.*		Herb
ASTERACEAE	*Gazania krebsiana Less. subsp. serrulata (DC.) Roessler*	LC	Herb
ASTERACEAE	*Geigeria burkei Harv. subsp. burkei var. burkei*	LC	Herb

Family	Species	Threat status	Growth forms
	Geigeria burkei Harv. subsp. burkei var. zeyheri		
ASTERACEAE	*(Harv.) Merxm.*	LC	Herb
ASTERACEAE	*Gerbera ambigua (Cass.) Sch.Bip.*	LC	Herb
ASTERACEAE	*Gerbera piloselloides (L.) Cass.*	LC	Herb
ASTERACEAE	*Helichrysum caespititium (DC.) Harv.*	LC	Herb
ASTERACEAE	*Helichrysum callicomum Harv.*	LC	Herb
ASTERACEAE	*Helichrysum cerastioides DC. var. cerastioides*	LC	Herb
ASTERACEAE	*Helichrysum chionosphaerum DC.*	LC	Herb
ASTERACEAE	*Helichrysum harveyanum Wild*	LC	Herb
ASTERACEAE	*Helichrysum nudifolium (L.) Less. var. nudifolium*	LC	Herb
	Helichrysum nudifolium (L.) Less. var.		
ASTERACEAE	*oxyphyllum (DC.) Beentje*	LC	Herb
ASTERACEAE	*Helichrysum rugulosum Less.*	LC	Herb
ASTERACEAE	*Helichrysum setosum Harv.*	LC	Herb, shrub
ASTERACEAE	*Helichrysum stenopterum DC.*	LC	Herb
ASTERACEAE	*Hilliardiella aristata (DC.) H.Rob.*		Herb
ASTERACEAE	*Lactuca inermis Forssk.*	LC	Herb
ASTERACEAE	*Laggera decurrens (Vahl) Hepper & J.R.I.Wood*	LC	Herb
	Macledium zeyheri (Sond.) S.Ortíz subsp.		
ASTERACEAE	*zeyheri*	LC	Herb
ASTERACEAE	*Nidorella hottentotica DC.*	LC	Herb
ASTERACEAE	*Nolletia rarifolia (Turcz.) Steetz*	LC	Suffrutex
	Osteospermum muricatum E.Mey. ex DC. subsp.		
ASTERACEAE	*muricatum*	LC	Herb
ASTERACEAE	*Pentzia monocephala S.Moore*	LC	Dwarf shrub
ASTERACEAE	*Phymaspermum bolusii (Hutch.) Källersjö*	LC	Shrub
	Pseudognaphalium oligandrum (DC.) Hilliard &		
ASTERACEAE	*B.L.Burtt*	LC	Herb
ASTERACEAE	*Psiadia punctulata (DC.) Vatke*	LC	Shrub
	Schistostephium crataegifolium (DC.) Fenzl ex		
ASTERACEAE	*Harv.*	LC	Herb, suffrutex
ASTERACEAE	*Schkuhria pinnata (Lam.) Kuntze ex Thell.*		Herb
ASTERACEAE	*Senecio affinis DC.*	LC	Herb
	Senecio albanensis DC. var. doroniciflorus (DC.)		
ASTERACEAE	*Harv.*	LC	Herb
ASTERACEAE	*Senecio barbertonicus Klatt*	LC	Shrub, succulent
ASTERACEAE	*Senecio coronatus (Thunb.) Harv.*	LC	Herb
ASTERACEAE	*Senecio erubescens Aiton var. erubescens*	LC	Herb

Family	Species	Threat status	Growth forms
ASTERACEAE	*Senecio hieracioides DC.*	LC	Herb
ASTERACEAE	*Senecio lydenburgensis Hutch. & Burtt Davy*	LC	Herb
ASTERACEAE	*Senecio oxyriifolius DC. subsp. oxyriifolius*	LC	Herb, succulent
ASTERACEAE	*Senecio pentactinus Klatt*	LC	Herb, shrub
ASTERACEAE	*Senecio striatifolius DC.*	LC	Herb
ASTERACEAE	*Senecio venosus Harv.*	LC	Herb
ASTERACEAE	*Seriphium plumosum L.*	LC	Shrub
ASTERACEAE	*Sonchus dregeanus DC.*	LC	Herb
ASTERACEAE	*Tagetes minuta L.*		Herb
ASTERACEAE	*Tarchonanthus camphoratus L.*	LC	Shrub, tree
ASTERACEAE	*Tarchonanthus parvicapitulatus P.P.J.Herman*	LC	Shrub, tree
ASTERACEAE	*Tolpis capensis (L.) Sch.Bip.*	LC	Herb
ASTERACEAE	*Tripteris aghillana DC. var. aghillana*	LC	Herb, succulent
ASTERACEAE	*Vernonia galpinii Klatt*	LC	Herb
ASTERACEAE	*Vernonia staehelinoides Harv.*	LC	Shrub, suffrutex
ASTERACEAE	*Vernonia sutherlandii Harv.*	LC	Herb
ASTERACEAE	*Zinnia peruviana (L.) L.*		Herb
AYTONIACEAE	*Mannia capensis (Steph.) S.W.Arnell*		Bryophyte
AYTONIACEAE	*Plagiochasma appendiculatum Lehm. & Lindenb.*		Bryophyte
AYTONIACEAE	*Plagiochasma microcephalum (Steph.) Steph. var. microcephalum*		Bryophyte
AYTONIACEAE	*Plagiochasma rupestre (J.R.& G.Forst.) Steph. var. rupestre*		Bryophyte
AYTONIACEAE	*Plagiochasma rupestre (J.R.& G.Forst.) Steph. var. volkii Bischl.*		Bryophyte
BARTRAMIACEAE	*Philonotis dregeana (Müll.Hal.) A.Jaeger*		Bryophyte
BARTRAMIACEAE	*Philonotis falcata (Hook.) Mitt.*		Bryophyte
BARTRAMIACEAE	*Philonotis hastata (Duby) Wijk & Margad.*		Bryophyte
BORAGINACEAE	*Ehretia rigida (Thunb.) Druce subsp. rigida*	LC	Shrub, tree
BORAGINACEAE	*Heliotropium ciliatum Kaplan*	LC	Herb
BRACHYTHECIACEAE	*Brachythecium implicatum (Hornsch. ex Müll.Hal.) A.Jaeger*		Bryophyte, epiphyte
BRASSICACEAE	*Diplotaxis muralis (L.) DC.*		Herb
BRASSICACEAE	*Lepidium africanum (Burm.f.) DC. subsp. africanum*	LC	Herb
BRASSICACEAE	*Lepidium bonariense L.*		Herb
BRASSICACEAE	*Lepidium transvaalense Marais*	LC	Herb
BRASSICACEAE	*Nasturtium officinale R.Br.*		Herb
BRASSICACEAE	*Sisymbrium officinale (L.) Scop.*		Herb
BRYACEAE	*Bryum argenteum Hedw.*		Bryophyte

Family	Species	Threat status	Growth forms
BRYACEAE	*Bryum pycnophyllum (Dixon) Mohamed*		Bryophyte, epiphyte
BUDDLEJACEAE	*Buddleja saligna Willd.*	LC	Shrub, tree
BUDDLEJACEAE	*Buddleja salviifolia (L.) Lam.*	LC	Shrub, tree
BUDDLEJACEAE	*Gomphostigma virgatum (L.f.) Baill.*	LC	Dwarf shrub, herb, shrub
BUDDLEJACEAE	*Nuxia congesta R.Br. ex Fresen.*	LC	Shrub, tree
BUDDLEJACEAE	*Nuxia glomerulata (C.A.Sm.) I.Verd.*	LC	Shrub, tree
CAMPANULACEAE	*Wahlenbergia banksiana A.DC.*	LC	Herb
CAMPANULACEAE	*Wahlenbergia magaliesbergensis Lammers*	LC	Dwarf shrub
CAMPANULACEAE	*Wahlenbergia undulata (L.f.) A.DC.*	LC	Herb
CANNABACEAE	*Cannabis sativa L. var. sativa*		Herb
CAPPARACEAE	*Boscia albitrunca (Burch.) Gilg & Gilg-Ben.*	LC	Shrub, tree
CAPPARACEAE	*Cleome conrathii Burtt Davy*	NT	Herb
CAPPARACEAE	*Cleome gynandra L.*	LC	Herb
CAPPARACEAE	*Cleome maculata (Sond.) Szyszyl.*	LC	Herb
CAPPARACEAE	*Cleome monophylla L.*	LC	Herb
CAPPARACEAE	*Maerua cafra (DC.) Pax*	LC	Shrub, tree
CAPPARACEAE	*Maerua juncea Pax subsp. crustata (Wild) Wild*	LC	Climber, shrub
CARYOPHYLLACEAE	*Dianthus mooiensis F.N.Williams subsp. mooiensis var. mooiensis*		Herb
CELASTRACEAE	*Gymnosporia buxifolia (L.) Szyszyl.*	LC	Shrub, tree
CELASTRACEAE	*Gymnosporia tenuispina (Sond.) Szyszyl.*	LC	Shrub
CELASTRACEAE	*Maytenus undata (Thunb.) Blakelock*	LC	Shrub, tree
CELASTRACEAE	*Pterocelastrus echinatus N.E.Br.*	LC	Shrub, tree
CELASTRACEAE	*Salacia rehmannii Schinz*	LC	Dwarf shrub
CELTIDACEAE	*Celtis africana Burm.f.*	LC	Shrub, tree
CHENOPODIACEAE	*Chenopodium carinatum R.Br.*		Herb
CHRYSOBALANACEAE	*Parinari capensis Harv. subsp. capensis*	LC	Dwarf shrub
COLCHICACEAE	*Gloriosa modesta (Hook.) J.C.Manning & Vinn.*	LC	Climber, geophyte
COLCHICACEAE	*Ornithoglossum vulgare B.Nord.*	LC	Geophyte
COMBRETACEAE	*Combretum apiculatum Sond. subsp. apiculatum*	LC	Shrub, tree
COMBRETACEAE	*Combretum erythrophyllum (Burch.) Sond.*	LC	Shrub, tree
COMBRETACEAE	*Combretum molle R.Br. ex G.Don*	LC	Tree
COMBRETACEAE	*Combretum zeyheri Sond.*	LC	Shrub, tree
COMBRETACEAE	*Terminalia sericea Burch. ex DC.*	LC	Tree
COMMELINACEAE	*Commelina africana L. var. krebsiana (Kunth) C.B.Clarke*	LC	Herb
COMMELINACEAE	*Commelina africana L. var. lancispatha C.B.Clarke*	LC	Herb

Family	Species	Threat status	Growth forms
COMMELINACEAE	*Commelina modesta Oberm.*	LC	Herb
COMMELINACEAE	*Cyanotis speciosa (L.f.) Hassk.*	LC	Herb, succulent
CONVOLVULACEAE	*Convolvulus ocellatus Hook.f. var. ocellatus*	LC	Herb
CONVOLVULACEAE	*Convolvulus sagittatus Thunb.*	LC	Herb
CONVOLVULACEAE	*Convolvulus thunbergii Roem. & Schult.*	LC	Herb
CONVOLVULACEAE	*Cuscuta campestris Yunck.*		Herb, parasite
CONVOLVULACEAE	*Dichondra micrantha Urb.*		Herb
CONVOLVULACEAE	*Evolvulus alsinoides (L.) L.*	LC	Herb
CONVOLVULACEAE	*Ipomoea bathycolpos Hallier f.*	LC	Herb
CONVOLVULACEAE	*Ipomoea bolusiana Schinz*	LC	Dwarf shrub, herb, succulent
CONVOLVULACEAE	*Ipomoea crassipes Hook. var. crassipes*	LC	Herb, succulent
CONVOLVULACEAE	*Ipomoea gracilisepala Rendle*	LC	Herb
CONVOLVULACEAE	*Ipomoea oblongata E.Mey. ex Choisy*	LC	Herb, succulent
CONVOLVULACEAE	*Ipomoea obscura (L.) Ker Gawl. var. obscura*	LC	Herb
CONVOLVULACEAE	*Ipomoea ommanneyi Rendle*	LC	Herb, succulent
CONVOLVULACEAE	*Ipomoea transvaalensis A.Meeuse*	LC	Herb, succulent
CONVOLVULACEAE	*Merremia verecunda Rendle*	LC	Herb
CONVOLVULACEAE	*Xenostegia tridentata (L.) D.F.Austin & Staples subsp. angustifolia (Jacq.) Lejoly & Lisowski*	LC	Herb
CRASSULACEAE	*Crassula lanceolata (Eckl. & Zeyh.) Endl. ex Walp. subsp. transvaalensis (Kuntze) Toelken*	LC	Herb, succulent
CRASSULACEAE	*Crassula setulosa Harv. var. jenkinsii Schönland*	LC	Herb, lithophyte, succulent
CRASSULACEAE	*Crassula setulosa Harv. var. setulosa forma setulosa*		Herb, succulent
CRASSULACEAE	*Kalanchoe paniculata Harv.*	LC	Shrub, succulent
CRASSULACEAE	*Kalanchoe rotundifolia (Haw.) Haw.*	LC	Dwarf shrub, succulent
CRASSULACEAE	*Kalanchoe thyrsiflora Harv.*	LC	Lithophyte, shrub, succulent
CUCURBITACEAE	*Cucumis africanus L.f.*	LC	Herb
CUCURBITACEAE	*Cucumis anguria L. var. longaculeatus J.H.Kirkbr.*	LC	Climber, herb
CUCURBITACEAE	*Cucumis myriocarpus Naudin subsp. myriocarpus*	LC	Herb
CUCURBITACEAE	*Cucumis zeyheri Sond.*	LC	Herb
CUCURBITACEAE	*Zehneria marlothii (Cogn.) R.& A.Fern.*	LC	Climber
CYPERACEAE	*Abildgaardia ovata (Burm.f.) Kral*	LC	Cyperoid, helophyte, herb, mesophyte
CYPERACEAE	*Bulbostylis burchellii (Ficalho & Hiern) C.B.Clarke*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Bulbostylis humilis (Kunth) C.B.Clarke*	LC	Cyperoid, herb, mesophyte

Family	Species	Threat status	Growth forms
CYPERACEAE	*Bulbostylis oritrephes (Ridl.) C.B.Clarke*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Carex acutiformis Ehrh.*		Cyperoid, emergent hydrophyte, helophyte, herb
CYPERACEAE	*Carex austro-africana (Kük.) Raymond*	LC	Cyperoid, emergent hydrophyte, helophyte, herb
CYPERACEAE	*Carex cognata Kunth*	LC	Cyperoid, helophyte, herb
CYPERACEAE	*Cladium mariscus (L.) Pohl subsp. jamaicense (Crantz) Kük.*	LC	Cyperoid, emergent hydrophyte, helophyte, herb
CYPERACEAE	*Cyperus albostriatus Schrad.*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Cyperus congestus Vahl*	LC	Cyperoid, helophyte, herb
CYPERACEAE	*Cyperus esculentus L. var. esculentus*	LC	Cyperoid, geophyte, herb, mesophyte
CYPERACEAE	*Cyperus fastigiatus Rottb.*	LC	Cyperoid, helophyte, herb
CYPERACEAE	*Cyperus leptocladus Kunth*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Cyperus margaritaceus Vahl var. margaritaceus*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Cyperus obtusiflorus Vahl var. obtusiflorus*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Cyperus rupestris Kunth var. rupestris*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Cyperus sexangularis Nees*	LC	Cyperoid, emergent hydrophyte, helophyte, herb
CYPERACEAE	*Fimbristylis dichotoma (L.) Vahl subsp. dichotoma*	LC	Cyperoid, helophyte, herb, mesophyte
CYPERACEAE	*Fuirena stricta Steud. var. stricta*	LC	Cyperoid, helophyte, herb, sudd hydrophyte
CYPERACEAE	*Isolepis cernua (Vahl) Roem. & Schult. var. cernua*	LC	Cyperoid, helophyte, herb
CYPERACEAE	*Kyllinga alba Nees*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Kyllinga melanosperma Nees*	LC	Cyperoid, helophyte, herb
CYPERACEAE	*Mariscus dregeanus Kunth*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Mariscus uitenhagensis Steud.*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Pycreus unioloides (R.Br.) Urb.*	LC	Cyperoid, helophyte, herb
CYPERACEAE	*Schoenoplectus brachyceras (Hochst. ex A.Rich.) Lye*	LC	Cyperoid, emergent hydrophyte, helophyte, herb
CYPERACEAE	*Schoenoxiphium lehmannii (Nees) Steud.*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Schoenoxiphium sparteum (Wahlenb.) C.B.Clarke*	LC	Cyperoid, herb, mesophyte
CYPERACEAE	*Scleria bulbifera Hochst. ex A.Rich.*	LC	Cyperoid, geophyte, herb, mesophyte
CYPERACEAE	*Scleria dregeana Kunth*	LC	Cyperoid, helophyte, herb

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DIPSACACEAE	*Cephalaria zeyheriana Szabó*	LC	Herb
DIPSACACEAE	*Scabiosa columbaria L.*	LC	Herb
DRYOPTERIDACEAE	*Dryopteris athamantica (Kunze) Kuntze*	LC	Geophyte, herb, lithophyte
DRYOPTERIDACEAE	*Dryopteris inaequalis (Schltdl.) Kuntze*	LC	Geophyte, herb
EBENACEAE	*Diospyros lycioides Desf. subsp. guerkei (Kuntze) De Winter*	LC	Shrub, tree
EBENACEAE	*Diospyros lycioides Desf. subsp. lycioides*	LC	Shrub
EBENACEAE	*Diospyros whyteana (Hiern) F.White*	LC	Shrub, tree
EBENACEAE	*Euclea crispa (Thunb.) Gürke subsp. crispa*	LC	Shrub, tree
EBENACEAE	*Euclea natalensis A.DC. subsp. angustifolia F.White*	LC	Shrub, tree
ENTODONTACEAE	*Entodon cymbifolius Wager & Dixon*		Bryophyte, epiphyte
ENTODONTACEAE	*Entodon macropodus (Hedw.) Müll.Hal.*		Bryophyte, epiphyte
EQUISETACEAE	*Equisetum ramosissimum Desf. subsp. ramosissimum*	LC	Herb, hydrophyte
ERICACEAE	*Erica woodii Bolus var. woodii*	LC	Dwarf shrub
ERIOSPERMACEAE	*Eriospermum cooperi Baker var. cooperi*	LC	Geophyte
ERIOSPERMACEAE	*Eriospermum flagelliforme (Baker) J.C.Manning*	LC	Geophyte
ERPODIACEAE	*Aulacopilum trichophyllum Ångstr.*		Bryophyte, epiphyte
ERPODIACEAE	*Erpodium coronatum (Hook.f. & Wilson) Mitt. subsp. transvaaliense (Broth. & Wager) Magill*		Bryophyte, epiphyte
EUPHORBIACEAE	*Acalypha angustata Sond.*	LC	Dwarf shrub, herb
EUPHORBIACEAE	*Acalypha glabrata Thunb. var. glabrata*	LC	Shrub, tree
EUPHORBIACEAE	*Acalypha glabrata Thunb. var. pilosa Pax*	LC	Shrub, tree
EUPHORBIACEAE	*Acalypha villicaulis Hochst.*	LC	Dwarf shrub, herb, shrub
EUPHORBIACEAE	*Clutia pulchella L. var. pulchella*	LC	Dwarf shrub, herb, shrub
EUPHORBIACEAE	*Croton gratissimus Burch. var. subgratissimus (Prain) Burtt Davy*	LC	Shrub, tree
EUPHORBIACEAE	*Euphorbia cooperi N.E.Br. ex A.Berger var. cooperi*	LC	Succulent, tree
EUPHORBIACEAE	*Euphorbia epicyparissias E.Mey. ex Boiss.*	LC	Dwarf shrub, herb
EUPHORBIACEAE	*Euphorbia inaequilatera Sond. var. inaequilatera*	LC	Dwarf shrub, herb
EUPHORBIACEAE	*Euphorbia indica Lam.*		Herb
EUPHORBIACEAE	*Euphorbia pseudotuberosa Pax*	LC	Dwarf shrub, succulent
EUPHORBIACEAE	*Euphorbia pubescens Vahl*	LC	Herb
EUPHORBIACEAE	*Euphorbia rhombifolia Boiss.*	LC	Shrub, succulent
EUPHORBIACEAE	*Euphorbia schinzii Pax*	LC	Dwarf shrub, shrub, succulent
EUPHORBIACEAE	*Ricinus communis L. var. communis*		Shrub, tree

Family	Species	Threat status	Growth forms
EUPHORBIACEAE	*Tragia rupestris Sond.*	LC	Climber, dwarf shrub, herb, shrub
FABACEAE	*Acacia ataxacantha DC.*	LC	Climber, shrub, tree
FABACEAE	*Acacia caffra (Thunb.) Willd.*	LC	Shrub, tree
FABACEAE	*Acacia dealbata Link*		Shrub, tree
FABACEAE	*Acacia hebeclada DC. subsp. hebeclada*	LC	Shrub, tree
FABACEAE	*Acacia karroo Hayne*	LC	Shrub, tree
FABACEAE	*Acacia nilotica (L.) Willd. ex Delile subsp. kraussiana (Benth.) Brenan*	LC	Tree
FABACEAE	*Acacia tortilis (Forssk.) Hayne subsp. heteracantha (Burch.) Brenan*	LC	Shrub, tree
FABACEAE	*Alysicarpus zeyheri Harv.*	LC	Herb
FABACEAE	*Burkea africana Hook.*	LC	Tree
FABACEAE	*Chamaecrista biensis (Steyaert) Lock*	LC	Herb
FABACEAE	*Chamaecrista mimosoides (L.) Greene*	LC	Herb
FABACEAE	*Chamaecrista stricta E.Mey.*	LC	Herb
FABACEAE	*Crotalaria barkae Schweinf. subsp. barkae*	LC	Herb
FABACEAE	*Crotalaria brachycarpa (Benth.) Burtt Davy ex I.Verd.*	LC	Herb
FABACEAE	*Crotalaria lotoides Benth.*	LC	Herb
FABACEAE	*Crotalaria sphaerocarpa Perr. ex DC. subsp. sphaerocarpa*	LC	Herb
FABACEAE	*Dolichos angustifolius Eckl. & Zeyh.*	LC	Herb
FABACEAE	*Elephantorrhiza elephantina (Burch.) Skeels*	LC	Dwarf shrub, shrub, suffrutex
FABACEAE	*Eriosema burkei Benth. ex Harv. var. burkei*	LC	Herb
FABACEAE	*Eriosema cordatum E.Mey.*	LC	Herb
FABACEAE	*Erythrina lysistemon Hutch.*	LC	Tree
FABACEAE	*Indigastrum burkeanum (Benth. ex Harv.) Schrire*	LC	Herb
FABACEAE	*Indigastrum costatum (Guill. & Perr.) Schrire subsp. macrum (E.Mey.) Schrire*	LC	Herb
FABACEAE	*Indigofera comosa N.E.Br.*	LC	Shrub
FABACEAE	*Indigofera confusa Prain & Baker f.*	LC	Herb
FABACEAE	*Indigofera frondosa N.E.Br.*	LC	Shrub
FABACEAE	*Indigofera hedyantha Eckl. & Zeyh.*	LC	Herb
FABACEAE	*Indigofera heterotricha DC.*	LC	Dwarf shrub, herb
FABACEAE	*Indigofera hilaris Eckl. & Zeyh. var. hilaris*	LC	Herb
FABACEAE	*Indigofera melanadenia Benth. ex Harv.*	LC	Herb, shrub

Family	Species	Threat status	Growth forms
FABACEAE	*Indigofera oxalidea Welw. ex Baker*	LC	Herb
FABACEAE	*Lablab purpureus (L.) Sweet subsp. uncinatus Verdc.*	LC	Climber, herb
FABACEAE	*Lotononis calycina (E.Mey.) Benth.*	LC	Herb
FABACEAE	*Lotononis eriantha Benth.*	LC	Herb
FABACEAE	*Lotononis listii Polhill*	LC	Creeper, herb
FABACEAE	*Lotononis pulchra Dummer*	LC	Herb
FABACEAE	*Lotononis tenella (E.Mey.) Eckl. & Zeyh.*	LC	Herb
FABACEAE	*Melolobium subspicatum Conrath*	VU	Dwarf shrub
FABACEAE	*Mundulea sericea (Willd.) A.Chev. subsp. sericea*	LC	Shrub, tree
FABACEAE	*Neonotonia wightii (Wight. ex Arn.) J.A.Lackey*	LC	Climber
FABACEAE	*Neorautanenia ficifolia (Benth. ex Harv.) C.A.Sm.*	LC	Climber, herb, succulent
FABACEAE	*Ophrestia oblongifolia (E.Mey.) H.M.L.Forbes var. oblongifolia*	LC	Herb
FABACEAE	*Pearsonia bracteata (Benth.) Polhill*	LC	Herb
FABACEAE	*Pearsonia cajanifolia (Harv.) Polhill subsp. cajanifolia*	LC	Herb, shrub
FABACEAE	*Pearsonia sessilifolia (Harv.) Dummer subsp. sessilifolia*	LC	Dwarf shrub, herb
FABACEAE	*Pearsonia uniflora (Kensit) Polhill*	LC	Herb
FABACEAE	*Rhynchosia caribaea (Jacq.) DC.*	LC	Climber, herb
FABACEAE	*Rhynchosia minima (L.) DC. var. prostrata (Harv.) Meikle*	LC	Climber, herb
FABACEAE	*Rhynchosia nervosa Benth. ex Harv. var. nervosa*	LC	Herb
FABACEAE	*Rhynchosia nitens Benth. ex Harv.*	LC	Shrub
FABACEAE	*Rhynchosia totta (Thunb.) DC. var. totta*	LC	Climber, herb
FABACEAE	*Rhynchosia venulosa (Hiern) K.Schum.*	LC	Climber, herb
FABACEAE	*Senna italica Mill. subsp. arachoides (Burch.) Lock*	LC	Herb
FABACEAE	*Sphenostylis angustifolia Sond.*	LC	Dwarf shrub, herb
FABACEAE	*Stylosanthes fruticosa (Retz.) Alston*	LC	Dwarf shrub, herb
FABACEAE	*Sutherlandia microphylla Burch. ex DC.*	LC	Shrub
FABACEAE	*Tephrosia elongata E.Mey. var. elongata*	LC	Dwarf shrub, herb, shrub
FABACEAE	*Tephrosia longipes Meisn. subsp. longipes var. longipes*	LC	Dwarf shrub, herb, shrub
FABACEAE	*Tephrosia multijuga R.G.N.Young*	LC	Dwarf shrub, herb, shrub

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	Tephrosia rhodesica Baker f. var. evansii (Hutch. & Burtt Davy) Brummitt	LC	Dwarf shrub, shrub
FABACEAE	*Tephrosia rhodesica Baker f. var. rhodesica*	LC	Dwarf shrub, herb, shrub
FABACEAE	*Tephrosia semiglabra Sond.*	LC	Herb
FABACEAE	*Teramnus labialis (L.f.) Spreng. subsp. labialis*	LC	Climber, herb
FABACEAE	*Vigna unguiculata (L.) Walp. subsp. stenophylla (Harv.) Maréchal, Mascherpa & Stainier*	LC	Climber, herb
FABACEAE	*Vigna vexillata (L.) A.Rich. var. vexillata*	LC	Climber, herb
FABACEAE	*Zornia linearis E.Mey.*	LC	Herb
FABACEAE	*Zornia milneana Mohlenbr.*	LC	Herb
FABRONIACEAE	*Fabronia pilifera Hornsch.*		Bryophyte, epiphyte
FISSIDENTACEAE	*Fissidens bogosicus Müll.Hal.*		Bryophyte
FISSIDENTACEAE	*Fissidens palmifolius (P.Beauv.) Broth.*		Bryophyte, hydrophyte
FISSIDENTACEAE	*Fissidens rufescens Hornsch.*		Bryophyte
FISSIDENTACEAE	*Fissidens submarginatus Bruch*		Bryophyte
FOSSOMBRONIACEAE	*Fossombronia gemmifera Perold*		Bryophyte
FUNARIACEAE	*Funaria hygrometrica Hedw.*		Bryophyte
GENTIANACEAE	*Chironia palustris Burch. subsp. palustris*	LC	Herb
GENTIANACEAE	*Chironia palustris Burch. subsp. transvaalensis (Gilg) I.Verd.*	LC	Herb
GENTIANACEAE	*Sebaea grandis (E.Mey.) Steud.*	LC	Herb
GERANIACEAE	*Monsonia angustifolia E.Mey. ex A.Rich.*	LC	Herb
GERANIACEAE	*Monsonia burkeana Planch. ex Harv.*	LC	Herb
GERANIACEAE	*Monsonia grandifolia R.Knuth*	LC	Herb
GERANIACEAE	*Pelargonium luridum (Andrews) Sweet*	LC	Geophyte, succulent
GISEKIACEAE	*Gisekia pharnacioides L. var. pharnacioides*	LC	Herb
GUNNERACEAE	*Gunnera perpensa L.*	Declining	Herb, hydrophyte
HYACINTHACEAE	*Albuca setosa Jacq.*	LC	Geophyte
HYACINTHACEAE	*Bowiea volubilis Harv. ex Hook.f. subsp. volubilis*	VU	Climber, geophyte, succulent
HYACINTHACEAE	*Dipcadi marlothii Engl.*	LC	Geophyte
HYACINTHACEAE	*Dipcadi viride (L.) Moench*	LC	Geophyte
HYACINTHACEAE	*Drimia calcarata (Baker) Stedje*	LC	Geophyte
HYACINTHACEAE	*Drimia elata Jacq.*	DDT	Geophyte
HYACINTHACEAE	*Drimia sanguinea (Schinz) Jessop*	NT	Geophyte
HYACINTHACEAE	*Eucomis autumnalis (Mill.) Chitt. subsp. autumnalis*		Geophyte
HYACINTHACEAE	*Ledebouria cooperi (Hook.f.) Jessop*	LC	Geophyte
HYACINTHACEAE	*Ledebouria inquinata (C.A.Sm.) Jessop*	LC	Geophyte
HYACINTHACEAE	*Ledebouria luteola Jessop*	LC	Geophyte

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HYACINTHACEAE	*Ledebouria marginata (Baker) Jessop*	LC	Geophyte
HYACINTHACEAE	*Ledebouria ovatifolia (Baker) Jessop*	LC	Geophyte
HYACINTHACEAE	*Ornithogalum tenuifolium F.Delaroche subsp. tenuifolium*	LC	Geophyte
HYACINTHACEAE	*Schizocarphus nervosus (Burch.) Van der Merwe*	LC	Geophyte
HYPERICACEAE	*Hypericum aethiopicum Thunb. subsp. sonderi (Bredell) N.Robson*	LC	Herb
HYPOXIDACEAE	*Hypoxis argentea Harv. ex Baker var. argentea*	LC	Geophyte
HYPOXIDACEAE	*Hypoxis hemerocallidea Fisch., C.A.Mey. & Avé-Lall.*	Declining	Geophyte
HYPOXIDACEAE	*Hypoxis iridifolia Baker*	LC	Geophyte
HYPOXIDACEAE	*Hypoxis rigidula Baker var. pilosissima Baker*	LC	Geophyte
HYPOXIDACEAE	*Hypoxis rigidula Baker var. rigidula*	LC	Geophyte, herb
ICACINACEAE	*Apodytes dimidiata E.Mey. ex Arn. subsp. dimidiata*	LC	Shrub, tree
ICACINACEAE	*Cassinopsis ilicifolia (Hochst.) Kuntze*	LC	Shrub, tree
IRIDACEAE	*Freesia grandiflora (Baker) Klatt*	LC	Geophyte, herb
IRIDACEAE	*Gladiolus permeabilis D.Delaroche subsp. edulis (Burch. ex Ker Gawl.) Oberm.*	LC	Geophyte, herb
IRIDACEAE	*Gladiolus pretoriensis Kuntze*	LC	Geophyte, herb
IRIDACEAE	*Gladiolus sericeovillosus Hook.f. subsp. calvatus (Baker) Goldblatt*	LC	Geophyte, herb
IRIDACEAE	*Hesperantha longicollis Baker*	LC	Geophyte, herb
IRIDACEAE	*Moraea stricta Baker*	LC	Geophyte, herb
IRIDACEAE	*Tritonia nelsonii Baker*	LC	Geophyte, herb
JUBULACEAE	*Frullania ericoides (Nees) Mont.*		Bryophyte, epiphyte
JUNCACEAE	*Juncus effusus L.*	LC	Helophyte, herb
JUNCACEAE	*Juncus exsertus Buchenau*	LC	Helophyte, herb
JUNCACEAE	*Juncus punctorius L.f.*	LC	Helophyte, herb
LAMIACEAE	*Acrotome hispida Benth.*	LC	Herb
LAMIACEAE	*Clerodendrum glabrum E.Mey.*	LC	Shrub, tree
LAMIACEAE	*Leucas martinicensis (Jacq.) R.Br.*	LC	Herb
LAMIACEAE	*Ocimum angustifolium Benth.*	LC	Herb, shrub
LAMIACEAE	*Ocimum obovatum E.Mey. ex Benth. subsp. obovatum var. obovatum*	LC	Herb
LAMIACEAE	*Plectranthus cylindraceus Hochst. ex Benth.*	LC	Herb, succulent
LAMIACEAE	*Plectranthus grallatus Briq.*	LC	Herb

Family	Species	Threat status	Growth forms
LAMIACEAE	*Plectranthus hereroensis Engl.*	LC	Herb
LAMIACEAE	*Rotheca hirsuta (Hochst.) R.Fern.*	LC	Herb
LAMIACEAE	*Rotheca louwalbertsii (P.P.J.Herman) P.P.J.Herman & Retief*	LC	Herb
LAMIACEAE	*Salvia reflexa Hornem.*		Herb
LAMIACEAE	*Salvia repens Burch. ex Benth. var. repens*	LC	Herb
LAMIACEAE	*Salvia runcinata L.f.*	LC	Herb
LAMIACEAE	*Satureja biflora (Buch.-Ham. ex D.Don) Briq.*	LC	Herb
LAMIACEAE	*Scutellaria racemosa Pers.*		Herb
LAMIACEAE	*Stachys natalensis Hochst. var. galpinii (Briq.) Codd*	LC	Herb
LAMIACEAE	*Stachys natalensis Hochst. var. natalensis*	LC	Herb
LAMIACEAE	*Tetradenia brevispicata (N.E.Br.) Codd*	LC	Shrub, succulent, tree
LAMIACEAE	*Teucrium trifidum Retz.*	LC	Herb
LAMIACEAE	*Vitex zeyheri Sond.*	LC	Tree
LEMNACEAE	*Lemna gibba L.*	LC	Herb, hydrophyte, pleustophyte
LEMNACEAE	*Spirodela punctata (G.Mey.) C.H.Thomps.*	LC	Herb, hydrophyte, pleustophyte
LESKEACEAE	*Pseudoleskea leskeoides (Paris) Müll.Hal.*		Bryophyte, epiphyte
LINACEAE	*Linum thunbergii Eckl. & Zeyh.*	LC	Herb
LOBELIACEAE	*Cyphia assimilis Sond.*	LC	Climber, herb
LOBELIACEAE	*Cyphia stenopetala Diels*	LC	Climber, herb
LOBELIACEAE	*Lobelia erinus L.*	LC	Herb
LOBELIACEAE	*Lobelia thermalis Thunb.*	LC	Herb
LORANTHACEAE	*Agelanthus natalitius (Meisn.) Polhill & Wiens subsp. zeyheri (Harv.) Polhill & Wiens*	LC	Parasite, shrub, succulent
LORANTHACEAE	*Tapinanthus quequensis (Weim.) Polhill & Wiens*	LC	Parasite, shrub
LORANTHACEAE	*Tapinanthus rubromarginatus (Engl.) Danser*	LC	Parasite, shrub, succulent
MALPIGHIACEAE	*Sphedamnocarpus pruriens (A.Juss.) Szyszyl. subsp. galphimiifolius (A.Juss.) P.D.de Villiers & D.J.Botha*	LC	Climber, shrub
MALPIGHIACEAE	*Sphedamnocarpus pruriens (A.Juss.) Szyszyl. subsp. pruriens*	LC	Climber, shrub
MALVACEAE	*Abutilon piloso-cinereum A.Meeuse*	LC	Herb, shrub
MALVACEAE	*Abutilon pycnodon Hochr.*	LC	Herb, shrub
MALVACEAE	*Abutilon sonneratianum (Cav.) Sweet*	LC	Shrub
MALVACEAE	*Corchorus asplenifolius Burch.*	LC	Herb

Family	Species	Threat status	Growth forms
MALVACEAE	*Corchorus confusus Wild*	LC	Herb
MALVACEAE	*Corchorus trilocularis L.*		Herb
MALVACEAE	*Dombeya rotundifolia (Hochst.) Planch. var. rotundifolia*	LC	Shrub, tree
MALVACEAE	*Grewia flava DC.*	LC	Shrub
MALVACEAE	*Grewia monticola Sond.*	LC	Shrub, tree
MALVACEAE	*Grewia occidentalis L. var. occidentalis*	LC	Shrub, tree
MALVACEAE	*Hermannia boraginiflora Hook.*	LC	Dwarf shrub
MALVACEAE	*Hermannia burkei Burtt Davy*	LC	Climber, herb
MALVACEAE	*Hermannia cordata (E.Mey. ex E.Phillips) De Winter*	LC	Herb
MALVACEAE	*Hermannia depressa N.E.Br.*	LC	Herb
MALVACEAE	*Hermannia floribunda Harv.*	LC	Dwarf shrub, shrub
MALVACEAE	*Hermannia grandifolia N.E.Br.*	LC	Herb
MALVACEAE	*Hermannia lancifolia Szyszyl.*	LC	Herb
MALVACEAE	*Hibiscus aethiopicus L. var. ovatus Harv.*	LC	Herb
MALVACEAE	*Hibiscus calyphyllus Cav.*	LC	Dwarf shrub, herb
MALVACEAE	*Hibiscus engleri K.Schum.*	LC	Herb
MALVACEAE	*Hibiscus lunarifolius Willd.*	LC	Herb
MALVACEAE	*Hibiscus microcarpus Garcke*	LC	Herb
MALVACEAE	*Hibiscus subreniformis Burtt Davy*	LC	Dwarf shrub, herb
MALVACEAE	*Hibiscus trionum L.*		Herb
MALVACEAE	*Melhania transvaalensis Szyszyl.*	LC	Dwarf shrub
MALVACEAE	*Pavonia burchellii (DC.) R.A.Dyer*	LC	Dwarf shrub
MALVACEAE	*Sida chrysantha Ulbr.*	LC	Dwarf shrub
MALVACEAE	*Sida dregei Burtt Davy*	LC	Dwarf shrub, herb
MALVACEAE	*Sida rhombifolia L. subsp. rhombifolia*	LC	Dwarf shrub, herb, shrub
MALVACEAE	*Sida spinosa L. var. spinosa*	LC	Dwarf shrub, herb
MALVACEAE	*Sida ternata L.f.*	LC	Herb
MALVACEAE	*Triumfetta sonderi Ficalho & Hiern*	LC	Dwarf shrub
MARCHANTIACEAE	*Marchantia debilis K.I.Goebel*		Bryophyte
MELIACEAE	*Turraea obtusifolia Hochst.*	LC	Climber, shrub, tree
MENISPERMACEAE	*Antizoma angustifolia (Burch.) Miers ex Harv.*	LC	Climber
MESEMBRYANTHEMACEAE	*Aptenia cordifolia (L.f.) Schwantes*	LC	Succulent
MOLLUGINACEAE	*Psammotropha mucronata (Thunb.) Fenzl var. mucronata*	LC	Herb
MOLLUGINACEAE	*Psammotropha myriantha Sond.*	LC	Herb
MORACEAE	*Ficus abutilifolia (Miq.) Miq.*	LC	Shrub, tree

Family	Species	Threat status	Growth forms
MORACEAE	*Ficus ingens (Miq.) Miq.*	LC	Tree
MORACEAE	*Ficus salicifolia Vahl*	LC	Tree
MYRICACEAE	*Morella serrata (Lam.) Killick*	LC	Shrub, tree
MYROTHAMNACEAE	*Myrothamnus flabellifolius Welw.*	DDT	Dwarf shrub, shrub
MYRSINACEAE	*Myrsine africana L.*	LC	Shrub
OCHNACEAE	*Ochna pulchra Hook.f.*	LC	Shrub, tree
OLACACEAE	*Ximenia caffra Sond. var. caffra*	LC	Shrub, tree
OLEACEAE	*Jasminum quinatum Schinz*	LC	Climber, dwarf shrub
OLEACEAE	*Menodora africana Hook.*	LC	Dwarf shrub, herb
OLEACEAE	*Olea europaea L. subsp. africana (Mill.) P.S.Green*	LC	Shrub, tree
OLEANDRACEAE	*Oleandra distenta Kunze*	LC	Herb, lithophyte
OLINIACEAE	*Olinia emarginata Burtt Davy*	LC	Tree
ONAGRACEAE	*Epilobium hirsutum L.*	LC	Herb
ONAGRACEAE	*Oenothera affinis Cambess.*		Herb
ONAGRACEAE	*Oenothera rosea L'Hér. ex Aiton*		Herb
ONAGRACEAE	*Oenothera tetraptera Cav.*		Herb
OPHIOGLOSSACEAE	*Ophioglossum polyphyllum A.Braun*	LC	Geophyte, herb
ORCHIDACEAE	*Bonatea antennifera Rolfe*		[No lifeform defined]
ORCHIDACEAE	*Bonatea polypodantha (Rchb.f.) L.Bolus*	LC	Geophyte, herb
ORCHIDACEAE	*Disa aconitoides Sond. subsp. aconitoides*	LC	Geophyte, herb
ORCHIDACEAE	*Eulophia ovalis Lindl. var. bainesii (Rolfe) P.J.Cribb & la Croix*	LC	Geophyte, herb
ORCHIDACEAE	*Eulophia streptopetala Lindl.*	LC	Geophyte, herb, succulent
ORCHIDACEAE	*Habenaria mossii (G.Will.) J.C.Manning*	EN	Geophyte, herb
ORCHIDACEAE	*Habenaria tridens Lindl.*	LC	Geophyte, herb
OROBANCHACEAE	*Alectra orobanchoides Benth.*	LC	[No lifeform defined]
OROBANCHACEAE	*Cycnium adonense E.Mey. ex Benth.*	LC	Herb, parasite
OROBANCHACEAE	*Cycnium tubulosum (L.f.) Engl. subsp. tubulosum*	LC	Herb
OROBANCHACEAE	*Graderia subintegra Mast.*	LC	Herb, parasite, suffrutex
OROBANCHACEAE	*Harveya pumila Schltr.*	LC	Herb, parasite
OROBANCHACEAE	*Striga asiatica (L.) Kuntze*	LC	Herb, parasite
OROBANCHACEAE	*Striga elegans Benth.*	LC	Herb, parasite
OROBANCHACEAE	*Striga gesnerioides (Willd.) Vatke*	LC	Herb, parasite
OXALIDACEAE	*Oxalis corniculata L.*		Herb
OXALIDACEAE	*Oxalis depressa Eckl. & Zeyh.*	LC	Geophyte, succulent
OXALIDACEAE	*Oxalis latifolia Kunth*		Geophyte

Family	Species	Threat status	Growth forms
OXALIDACEAE	*Oxalis obliquifolia Steud. ex A.Rich.*	LC	Geophyte
PAPAVERACEAE	*Papaver aculeatum Thunb.*	LC	Herb
PEDALIACEAE	*Harpagophytum zeyheri Decne. subsp. zeyheri*	LC	Herb
PEDALIACEAE	*Sesamum triphyllum Welw. ex Asch. var. triphyllum*	LC	Herb
PHYLLANTHACEAE	*Bridelia mollis Hutch.*	LC	Shrub, tree
PHYLLANTHACEAE	*Phyllanthus incurvus Thunb.*	LC	Dwarf shrub, herb
PHYLLANTHACEAE	*Phyllanthus parvulus Sond. var. garipensis (E.Mey. ex Drège) Radcl.-Sm.*	LC	Dwarf shrub, herb
PHYLLANTHACEAE	*Phyllanthus parvulus Sond. var. parvulus*	LC	Dwarf shrub, herb
PHYTOLACCACEAE	*Phytolacca heptandra Retz.*	LC	Herb
PITTOSPORACEAE	*Pittosporum viridiflorum Sims*	LC	Shrub, tree
PLANTAGINACEAE	*Plantago longissima Decne.*	LC	Herb
PLANTAGINACEAE	*Plantago major L.*		Herb
PLUMBAGINACEAE	*Plumbago zeylanica L.*		Shrub
POACEAE	*Agrostis lachnantha Nees var. lachnantha*	LC	Graminoid
POACEAE	*Alloteropsis semialata (R.Br.) Hitchc. subsp. eckloniana (Nees) Gibbs Russ.*	LC	Graminoid
POACEAE	*Alloteropsis semialata (R.Br.) Hitchc. subsp. semialata*	LC	Graminoid
POACEAE	*Andropogon schirensis Hochst. ex A.Rich.*	LC	Graminoid
POACEAE	*Anthephora pubescens Nees*	LC	Graminoid
POACEAE	*Aristida aequiglumis Hack.*	LC	Graminoid
POACEAE	*Aristida bipartita (Nees) Trin. & Rupr.*	LC	Graminoid
POACEAE	*Aristida canescens Henrard subsp. canescens*	LC	Graminoid
POACEAE	*Aristida congesta Roem. & Schult. subsp. barbicollis (Trin. & Rupr.) De Winter*	LC	Graminoid
POACEAE	*Aristida congesta Roem. & Schult. subsp. congesta*	LC	Graminoid
POACEAE	*Aristida diffusa Trin. subsp. burkei (Stapf) Melderis*	LC	Graminoid
POACEAE	*Aristida junciformis Trin. & Rupr. subsp. junciformis*	LC	Graminoid
POACEAE	*Aristida scabrivalvis Hack. subsp. scabrivalvis*	LC	Graminoid
POACEAE	*Aristida spectabilis Hack.*	LC	Graminoid
POACEAE	*Aristida stipitata Hack. subsp. graciliflora (Pilg.) Melderis*	LC	Graminoid
POACEAE	*Aristida transvaalensis Henrard*	LC	Graminoid

Family	Species	Threat status	Growth forms
POACEAE	*Bewsia biflora (Hack.) Gooss.*	LC	Graminoid
POACEAE	*Bothriochloa bladhii (Retz.) S.T.Blake*	LC	Graminoid
POACEAE	*Bothriochloa insculpta (Hochst. ex A.Rich.) A.Camus*	LC	Graminoid
POACEAE	*Brachiaria brizantha (A.Rich.) Stapf*	LC	Graminoid
POACEAE	*Brachiaria nigropedata (Ficalho & Hiern) Stapf*	LC	Graminoid
POACEAE	*Brachiaria serrata (Thunb.) Stapf*	LC	Graminoid
POACEAE	*Briza minor L.*		Graminoid
POACEAE	*Chrysopogon serrulatus Trin.*	LC	Graminoid
POACEAE	*Cymbopogon nardus (L.) Rendle*	LC	Graminoid
POACEAE	*Cynodon dactylon (L.) Pers.*	LC	Graminoid
POACEAE	*Digitaria brazzae (Franch.) Stapf*	LC	Graminoid
POACEAE	*Digitaria diagonalis (Nees) Stapf var. diagonalis*	LC	Graminoid
POACEAE	*Digitaria eriantha Steud.*	LC	Graminoid
POACEAE	*Digitaria longiflora (Retz.) Pers.*	LC	Graminoid
POACEAE	*Digitaria monodactyla (Nees) Stapf*	LC	Graminoid
POACEAE	*Digitaria ternata (A.Rich.) Stapf*	LC	Graminoid
POACEAE	*Digitaria tricholaenoides Stapf*	LC	Graminoid
POACEAE	*Diheteropogon amplectens (Nees) Clayton var. amplectens*	LC	Graminoid
POACEAE	*Echinochloa colona (L.) Link*	LC	Graminoid
POACEAE	*Echinochloa jubata Stapf*	LC	Graminoid
POACEAE	*Ehrharta erecta Lam. var. erecta*	LC	Graminoid
POACEAE	*Elionurus muticus (Spreng.) Kunth*	LC	Graminoid
POACEAE	*Enneapogon pretoriensis Stent*	LC	Graminoid
POACEAE	*Enneapogon scoparius Stapf*	LC	Graminoid
POACEAE	*Eragrostis barbinodis Hack.*	LC	Graminoid
POACEAE	*Eragrostis capensis (Thunb.) Trin.*	LC	Graminoid
POACEAE	*Eragrostis chloromelas Steud.*	LC	Graminoid
POACEAE	*Eragrostis curvula (Schrad.) Nees*	LC	Graminoid
POACEAE	*Eragrostis gummiflua Nees*	LC	Graminoid
POACEAE	*Eragrostis heteromera Stapf*	LC	Graminoid
POACEAE	*Eragrostis lehmanniana Nees var. lehmanniana*	LC	Graminoid
POACEAE	*Eragrostis nindensis Ficalho & Hiern*	LC	Graminoid
POACEAE	*Eragrostis patentipilosa Hack.*	LC	Graminoid
POACEAE	*Eragrostis racemosa (Thunb.) Steud.*	LC	Graminoid
POACEAE	*Eragrostis rigidior Pilg.*	LC	Graminoid
POACEAE	*Eragrostis sclerantha Nees subsp. sclerantha*	LC	Graminoid

Family	Species	Threat status	Growth forms
POACEAE	*Eragrostis superba Peyr.*	LC	Graminoid
POACEAE	*Eriochloa fatmensis (Hochst. & Steud.) Clayton*	LC	Graminoid
POACEAE	*Eustachys paspaloides (Vahl) Lanza & Mattei*	LC	Graminoid
POACEAE	*Fingerhuthia africana Lehm.*	LC	Graminoid
POACEAE	*Hemarthria altissima (Poir.) Stapf & C.E.Hubb.*	LC	Graminoid
POACEAE	*Heteropogon contortus (L.) Roem. & Schult.*	LC	Graminoid
POACEAE	*Hyparrhenia hirta (L.) Stapf*	LC	Graminoid
POACEAE	*Hyparrhenia tamba (Steud.) Stapf*	LC	Graminoid
POACEAE	*Imperata cylindrica (L.) Raeusch.*	LC	Graminoid
POACEAE	*Koeleria capensis (Steud.) Nees*	LC	Graminoid
POACEAE	*Leersia hexandra Sw.*	LC	Graminoid
POACEAE	*Loudetia flavida (Stapf) C.E.Hubb.*	LC	Graminoid
POACEAE	*Loudetia simplex (Nees) C.E.Hubb.*	LC	Graminoid
POACEAE	*Melica racemosa Thunb.*	LC	Graminoid
POACEAE	*Melinis nerviglumis (Franch.) Zizka*	LC	Graminoid
POACEAE	*Melinis repens (Willd.) Zizka subsp. repens*	LC	Graminoid
POACEAE	*Microchloa caffra Nees*	LC	Graminoid
POACEAE	*Panicum coloratum L. var. coloratum*	LC	Graminoid
POACEAE	*Panicum maximum Jacq.*	LC	Graminoid
POACEAE	*Panicum natalense Hochst.*	LC	Graminoid
POACEAE	*Paspalum distichum L.*	LC	Graminoid
POACEAE	*Paspalum scrobiculatum L.*	LC	Graminoid
POACEAE	*Paspalum urvillei Steud.*		Graminoid
POACEAE	*Phragmites australis (Cav.) Steud.*	LC	Graminoid
POACEAE	*Pogonarthria squarrosa (Roem. & Schult.) Pilg.*	LC	Graminoid
POACEAE	*Schizachyrium sanguineum (Retz.) Alston*	LC	Graminoid
POACEAE	*Setaria lindenbergiana (Nees) Stapf*	LC	Graminoid
POACEAE	*Setaria megaphylla (Steud.) T.Durand & Schinz*	LC	Graminoid
POACEAE	*Setaria plicatilis (Hochst.) Hack. ex Engl.*	LC	Graminoid
POACEAE	*Setaria pumila (Poir.) Roem. & Schult.*	LC	Graminoid
POACEAE	*Setaria sphacelata (Schumach.) Stapf & C.E.Hubb. ex M.B.Moss var. torta (Stapf) Clayton*	LC	Graminoid
POACEAE	*Sorghum versicolor Andersson*	LC	Graminoid
POACEAE	*Sporobolus discosporus Nees*	LC	Graminoid
POACEAE	*Sporobolus fimbriatus (Trin.) Nees*	LC	Graminoid
POACEAE	*Sporobolus nitens Stent*	LC	Graminoid
POACEAE	*Sporobolus stapfianus Gand.*	LC	Graminoid

Family	Species	Threat status	Growth forms
POACEAE	*Stipa dregeana Steud. var. elongata (Nees) Stapf*	LC	Graminoid
POACEAE	*Stipagrostis uniplumis (Licht.) De Winter var. neesii (Trin. & Rupr.) De Winter*	LC	Graminoid
POACEAE	*Stipagrostis zeyheri (Nees) De Winter subsp. sericans (Hack.) De Winter*	LC	Graminoid
POACEAE	*Themeda triandra Forssk.*	LC	Graminoid
POACEAE	*Trachypogon spicatus (L.f.) Kuntze*	LC	Graminoid
POACEAE	*Tragus berteronianus Schult.*	LC	Graminoid
POACEAE	*Trichoneura grandiglumis (Nees) Ekman*	LC	Graminoid
POACEAE	*Tripogon minimus (A.Rich.) Steud.*	LC	Graminoid
POACEAE	*Triraphis andropogonoides (Steud.) E.Phillips*	LC	Graminoid
POACEAE	*Tristachya rehmannii Hack.*	LC	Graminoid
POACEAE	*Urelytrum agropyroides (Hack.) Hack.*	LC	Graminoid
POACEAE	*Urochloa panicoides P.Beauv.*		Graminoid
POLYGALACEAE	*Polygala albida Schinz subsp. albida*	LC	Herb
POLYGALACEAE	*Polygala hottentotta C.Presl*	LC	Dwarf shrub, herb
POLYGALACEAE	*Polygala krumanina Burch. ex Ficalho & Hiern*	LC	Shrub
POLYGALACEAE	*Polygala producta N.E.Br.*	LC	Dwarf shrub, herb
POLYGALACEAE	*Polygala transvaalensis Chodat subsp. transvaalensis*	LC	Herb
POLYGONACEAE	*Oxygonum dregeanum Meisn. subsp. canescens (Sond.) Germish. var. canescens*	LC	Herb
PORTULACACEAE	*Anacampseros subnuda Poelln. subsp. subnuda*	LC	Herb, succulent
PORTULACACEAE	*Portulaca quadrifida L.*	LC	Herb, succulent
POTAMOGETONACEAE	*Potamogeton pusillus L.*	LC	Herb, hydrophyte
POTAMOGETONACEAE	*Potamogeton schweinfurthii A.Benn.*	LC	Herb, hydrophyte
POTTIACEAE	*Barbula bolleana (Müll.Hal.) Broth.*		Bryophyte
POTTIACEAE	*Didymodon tophaceus (Brid.) Lisa*		Bryophyte
POTTIACEAE	*Timmiella pelindaba Magill*		Bryophyte
POTTIACEAE	*Tortella humilis (Hedw.) Jenn.*		Bryophyte, epiphyte
POTTIACEAE	*Tortella xanthocarpa (Schimp. ex Müll.Hal.) Broth.*		Bryophyte, epiphyte
POTTIACEAE	*Trichostomum brachydontium Bruch*		Bryophyte
PROTEACEAE	*Faurea saligna Harv.*	LC	Tree
PROTEACEAE	*Protea caffra Meisn. subsp. caffra*	LC	Shrub, tree
PROTEACEAE	*Protea gaguedi J.F.Gmel.*	LC	Shrub, tree
PROTEACEAE	*Protea roupelliae Meisn. subsp. roupelliae*	LC	Tree
PROTEACEAE	*Protea welwitschii Engl.*	LC	Dwarf shrub, shrub

Family	Species	Threat status	Growth forms
PTERIDACEAE	*Adiantum capillus-veneris L.*	LC	Geophyte, herb, lithophyte
PTERIDACEAE	*Pteris cretica L.*	LC	Geophyte, herb, lithophyte
PTERIDACEAE	*Pteris vittata L.*	LC	Geophyte, herb, lithophyte
RACOPILACEAE	*Racopilum capense Müll.Hal. ex Broth.*		Bryophyte, epiphyte
RANUNCULACEAE	*Clematis brachiata Thunb.*	LC	Climber
RANUNCULACEAE	*Ranunculus multifidus Forssk.*		Herb
RHAMNACEAE	*Berchemia zeyheri (Sond.) Grubov*	LC	Tree
RHAMNACEAE	*Helinus integrifolius (Lam.) Kuntze*	LC	Climber, shrub
RHAMNACEAE	*Rhamnus prinoides L'Hér.*	LC	Shrub, tree
RHAMNACEAE	*Ziziphus mucronata Willd. subsp. mucronata*	LC	Shrub, tree
RHAMNACEAE	*Ziziphus zeyheriana Sond.*	LC	Dwarf shrub
RICCIACEAE	*Riccia albolimbata S.W.Arnell*		Bryophyte
RICCIACEAE	*Riccia atropurpurea Sim*		Bryophyte
RICCIACEAE	*Riccia congoana Steph.*		Bryophyte
RICCIACEAE	*Riccia okahandjana S.W.Arnell*		Bryophyte
RICCIACEAE	*Riccia simii Perold*		Bryophyte
ROSACEAE	*Agrimonia procera Wallr.*	LC	Herb
ROSACEAE	*Duchesnea indica (Andrews) Focke*		Herb
ROSACEAE	*Rubus rigidus Sm.*	LC	Shrub
RUBIACEAE	*Afrocanthium gilfillanii (N.E.Br.) Lantz*	LC	[No lifeform defined]
RUBIACEAE	*Anthospermum hispidulum E.Mey. ex Sond.*	LC	Dwarf shrub
RUBIACEAE	*Anthospermum rigidum Eckl. & Zeyh. subsp. pumilum (Sond.) Puff*	LC	Dwarf shrub
RUBIACEAE	*Anthospermum rigidum Eckl. & Zeyh. subsp. rigidum*	LC	Dwarf shrub
RUBIACEAE	*Kohautia amatymbica Eckl. & Zeyh.*	LC	Herb
RUBIACEAE	*Kohautia caespitosa Schnizl. subsp. brachyloba (Sond.) D.Mantell*	LC	Herb
RUBIACEAE	*Kohautia cynanchica DC.*	LC	Herb
RUBIACEAE	*Kohautia virgata (Willd.) Bremek.*	LC	Herb
RUBIACEAE	*Oldenlandia herbacea (L.) Roxb. var. herbacea*	LC	Herb
RUBIACEAE	*Otiophora calycophylla (Sond.) Schltr. & K.Schum. subsp. calycophylla*	LC	Herb
RUBIACEAE	*Pavetta gardeniifolia A.Rich. var. gardeniifolia*	LC	Shrub, tree
RUBIACEAE	*Pavetta gardeniifolia A.Rich. var. subtomentosa K.Schum.*	LC	Shrub, tree
RUBIACEAE	*Pavetta zeyheri Sond. subsp. zeyheri*	LC	Shrub, tree
RUBIACEAE	*Pentanisia angustifolia (Hochst.) Hochst.*	LC	Herb

Family	Species	Threat status	Growth forms
	Pygmaeothamnus zeyheri (Sond.) Robyns var. zeyheri	LC	Dwarf shrub
RUBIACEAE	*Richardia brasiliensis Gomes*		Herb
RUBIACEAE	*Rubia horrida (Thunb.) Puff*	LC	Herb
RUBIACEAE	*Rubia petiolaris DC.*	LC	Scrambler
RUBIACEAE	*Spermacoce senensis (Klotzsch) Hiern*	LC	Herb
RUBIACEAE	*Tricalysia lanceolata (Sond.) Burtt Davy*	LC	Shrub, tree
RUBIACEAE	*Vangueria infausta Burch. subsp. infausta*	LC	Tree
RUBIACEAE	*Vangueria parvifolia Sond.*		Tree
RUTACEAE	*Calodendrum capense (L.f.) Thunb.*	LC	Tree
RUTACEAE	*Zanthoxylum capense (Thunb.) Harv.*	LC	Shrub, tree
SALICACEAE	*Dovyalis zeyheri (Sond.) Warb.*	LC	Shrub, tree
SALICACEAE	*Salix babylonica L. var. babylonica*		Tree
SALICACEAE	*Salix mucronata Thunb. subsp. woodii (Seemen) Immelman*	LC	Tree
SALICACEAE	*Scolopia zeyheri (Nees) Harv.*	LC	Shrub, tree
SANTALACEAE	*Osyris lanceolata Hochst. & Steud.*	LC	Shrub
SANTALACEAE	*Thesium costatum A.W.Hill var. costatum*	LC	Herb, parasite
SANTALACEAE	*Thesium transvaalense Schltr.*	LC	Dwarf shrub, herb, parasite
SAPINDACEAE	*Pappea capensis Eckl. & Zeyh.*	LC	Shrub, tree
SAPOTACEAE	*Englerophytum magalismontanum (Sond.) T.D.Penn.*	LC	Shrub, tree
SAPOTACEAE	*Mimusops zeyheri Sond.*	LC	Shrub, tree
SCROPHULARIACEAE	*Chaenostoma floribundum Benth.*	LC	Herb
SCROPHULARIACEAE	*Chaenostoma leve (Hiern) Kornhall*	LC	Herb
SCROPHULARIACEAE	*Diclis petiolaris Benth.*	LC	Herb
SCROPHULARIACEAE	*Halleria lucida L.*	LC	Shrub, tree
SCROPHULARIACEAE	*Jamesbrittenia atropurpurea (Benth.) Hilliard subsp. atropurpurea*	LC	Dwarf shrub, shrub
SCROPHULARIACEAE	*Nemesia fruticans (Thunb.) Benth.*	LC	Dwarf shrub, suffrutex
SCROPHULARIACEAE	*Nemesia rupicola Hilliard*	LC	Herb
SCROPHULARIACEAE	*Selago densiflora Rolfe*	LC	Herb
SCROPHULARIACEAE	*Veronica anagallis-aquatica L.*	LC	Herb, hydrophyte
SCROPHULARIACEAE	*Zaluzianskya elongata Hilliard & B.L.Burtt*	LC	Herb
SELAGINELLACEAE	*Selaginella caffrorum (Milde) Hieron. var. caffrorum*	LC	Geophyte, herb, lithophyte
SELAGINELLACEAE	*Selaginella mittenii Baker*	LC	Geophyte, herb, lithophyte
SINOPTERIDACEAE	*Cheilanthes dolomiticola (Schelpe) Schelpe &*	LC	Herb, lithophyte

Family	Species	Threat status	Growth forms
	N.C.Anthony		
SINOPTERIDACEAE	*Cheilanthes eckloniana (Kunze) Mett.*	LC	Geophyte, herb, lithophyte
SINOPTERIDACEAE	*Cheilanthes hirta Sw. var. hirta*	LC	Geophyte, herb, lithophyte
SINOPTERIDACEAE	*Cheilanthes inaequalis (Kunze) Mett. var. inaequalis*	LC	Geophyte, herb, lithophyte
SINOPTERIDACEAE	*Cheilanthes involuta (Sw.) Schelpe & N.C.Anthony var. obscura (N.C.Anthony) N.C.Anthony*	LC	Geophyte, herb, lithophyte
SINOPTERIDACEAE	*Cheilanthes marlothii (Hieron.) Domin*	LC	Geophyte, herb, lithophyte
SINOPTERIDACEAE	*Cheilanthes pentagona Schelpe & N.C.Anthony*	LC	Herb, lithophyte
SINOPTERIDACEAE	*Cheilanthes viridis (Forssk.) Sw. var. glauca (Sim) Schelpe & N.C.Anthony*	LC	Geophyte, herb, lithophyte
SINOPTERIDACEAE	*Cheilanthes viridis (Forssk.) Sw. var. viridis*	LC	Geophyte, herb, lithophyte
SINOPTERIDACEAE	*Pellaea calomelanos (Sw.) Link var. calomelanos*	LC	Geophyte, herb, lithophyte
SOLANACEAE	*Lycium cinereum Thunb.*	LC	Dwarf shrub, shrub
SOLANACEAE	*Nicotiana glauca Graham*		Shrub, tree
SOLANACEAE	*Solanum lichtensteinii Willd.*	LC	Dwarf shrub, shrub
SOLANACEAE	*Solanum panduriforme E.Mey.*	LC	Dwarf shrub, herb, shrub
SOLANACEAE	*Solanum retroflexum Dunal*	LC	Herb
SOLANACEAE	*Solanum rigescens Jacq.*	LC	[No lifeform defined]
SOLANACEAE	*Solanum sisymbriifolium Lam.*		Herb, shrub
SOLANACEAE	*Withania somnifera (L.) Dunal*	LC	Dwarf shrub, herb, shrub
STRYCHNACEAE	*Strychnos usambarensis Gilg*	LC	Climber, shrub, tree
TARGIONIACEAE	*Targionia hypophylla L.*		Bryophyte
TECOPHILAEACEAE	*Walleria nutans J.Kirk*	LC	Geophyte
THELYPTERIDACEAE	*Christella dentata (Forssk.) Brownsey & Jermy*	LC	Geophyte, herb
THELYPTERIDACEAE	*Thelypteris confluens (Thunb.) C.V.Morton*	LC	Geophyte, herb, hydrophyte
THYMELAEACEAE	*Gnidia capitata L.f.*	LC	Dwarf shrub, shrub
THYMELAEACEAE	*Gnidia microcephala Meisn.*	LC	Dwarf shrub, shrub
THYMELAEACEAE	*Gnidia sericocephala (Meisn.) Gilg ex Engl.*	LC	Dwarf shrub, shrub
TYPHACEAE	*Typha capensis (Rohrb.) N.E.Br.*	LC	Herb, hydrophyte, hyperhydate
URTICACEAE	*Obetia tenax (N.E.Br.) Friis*	LC	Shrub, succulent, tree
URTICACEAE	*Pouzolzia mixta Solms var. mixta*	LC	Shrub, succulent, tree
VALERIANACEAE	*Valeriana capensis Thunb. var. capensis*	LC	Herb
VELLOZIACEAE	*Xerophyta humilis (Baker) T.Durand & Schinz*	LC	Herb
VELLOZIACEAE	*Xerophyta retinervis Baker*	LC	Herb

Family	Species	Threat status	Growth forms
VELLOZIACEAE	*Xerophyta viscosa Baker*	LC	Herb
VERBENACEAE	*Chascanum hederaceum (Sond.) Moldenke var. hederaceum*	LC	Herb
VERBENACEAE	*Chascanum pinnatifidum (L.f.) E.Mey. var. pinnatifidum*	LC	Herb
VERBENACEAE	*Duranta erecta L.*		Shrub
VERBENACEAE	*Lantana rugosa Thunb.*	LC	Shrub
VERBENACEAE	*Lippia javanica (Burm.f.) Spreng.*	LC	Shrub
VERBENACEAE	*Priva meyeri Jaub. & Spach var. meyeri*	LC	Herb
VERBENACEAE	*Verbena aristigera S.Moore*		Herb
VERBENACEAE	*Verbena officinalis L.*		Herb
VERRUCARIACEAE	*Catapyrenium lachneum (Ach.) R.Sant. var. lachneum*		Lichen
VISCACEAE	*Viscum combreticola Engl.*	LC	Parasite, shrub, succulent
VISCACEAE	*Viscum rotundifolium L.f.*	LC	Parasite, shrub, succulent
VISCACEAE	*Viscum verrucosum Harv.*	LC	Parasite, shrub, succulent
VITACEAE	*Cyphostemma lanigerum (Harv.) Desc. ex Wild & R.B.Drumm.*	LC	Climber, succulent
VITACEAE	*Cyphostemma sulcatum (C.A.Sm.) J.J.M.van der Merwe*	LC	Scrambler, succulent
VITACEAE	*Cyphostemma woodii (Gilg & M.Brandt) Desc.*	LC	Herb, succulent
VITACEAE	*Rhoicissus tridentata (L.f.) Wild & R.B.Drumm. subsp. cuneifolia (Eckl. & Zeyh.) Urton*		Climber
VITACEAE	*Rhoicissus tridentata (L.f.) Wild & R.B.Drumm. subsp. tridentata*		Shrub
ZYGOPHYLLACEAE	*Tribulus terrestris L.*	LC	Herb

APPENDIX C

RDL Faunal Species for Gauteng Province

Table 34: Wild Mammals of Gauteng considered to be threatened according to the IUCN Species Survival Commission and species that are endemic to South Africa (GDARD SoER, 2004) Updated list of February 2011 according to Lihle Dumalishile from GDARD.

Species	English Name	IUCN Status	South African Red Data Book Status
Neamblysomus julianae	Juliana's golden mole	VU [B2 ab (ii,iii)]	CR [B1 ab (iii,iv) + 2ab (iii,iv)]
Chrysospalax villosus	Rough-haired golden mole	VU B2 ab (I,ii,iii,iv)	CR
Cloeotis percivali	Short-eared Trident bat	LC	CR
Ourebia ourebi	Oribi	LC	EN
Mystromys albicaudatus	White-tailed mouse	EN (A3c)	EN
Damaliscus lunatus lunatus	Tsessebe	LC	EN
Crocidura maquassiensis	Maquassie musk shrew	LC	VU
Rhinolophus blasii	Peak-saddle horseshoe bat	LC	VU
Hippotragus equinus	Roan antelope	LC	VU
Hippotragus niger	Sable antelope	LC	VU
Hyaena brunnea	Brown hyaena	NT	NT
Rhinolophus darlingi	Darling's horseshoe bat	LC	NT
Rhinolophus clivosus	Geoffroy's horseshoe bat	LC	NT
Mellivora capensis	Honey badger	LC	NT
Pipistrellus rusticus	Rusty bat	LC	NT
Miniopterus schreibersii	Schreibers' long-fingered bat	NT	NT
Leptailurus serval	Serval	LC	NT
Atelerix frontalis	Southern African hedgehog	LC	NT
Lutra maculicollis	Spotted-necked otter	LC	NT
Myotis tricolor	Temminck's hairy bat	LC	NT
Dasymys incomtus	African marsh rat	LC	NT
Myotis welwitschii	Welwitsch's hairy bat	LC	NT

Table 35: Threatened bird species that are priorities in Gauteng (GDARD SoER, 2004; Avibase, 2006)

English name	Species	Threatened Status
Cape Vulture	*Gyps coprotheres*	VU
Blue Crane	*Anthropoides paradiseus*	VU
Lesser Kestrel	*Falco naumanni*	VU
Grass Owl	*Tyto capensis*	VU
African Marsh Harrier	*Circus ranivorus*	VU
White-backed Night Heron	*Gorsachius leuconotus*	VU
White-bellied Korhaan	*Eupodotis cafra*	VU
Martial Eagle	*Polemaetus bellicosus*	VU
African Finfoot	*Podica senegalensis*	VU
Blue Korhaan	*Eupodotis caerulescens*	NT
Melodious Lark	*Mirafra cheniana*	NT
Lesser Flamingo	*Phoenicopterus minor*	NT
Secretary bird	*Sagittarius serpentarius*	NT
Black Stork	*Ciconia nigra*	NT
Lanner Falcon	*Falco biarmicus*	NT
Half-collared Kingfisher	*Alcedo semitorquata*	NT
Greater Flamingo	*Phoenicopterus ruber*	NT
Yellow-billed Stork	*Mycteria ibis*	NT

Red-billed Oxpecker	*Buphagus erythrorhynchus*	NT
Maccoa duck	*Oxyura maccoa*	NT
Bald ibis	*Geronticus calvus*	VU
White-backed vulture	*Gyps africanus*	NT
Cape griffon	*Gyps coprotheres*	VU
Black Harrier	*Circus maurus*	VU
Pallid Harrier	*Circus macrourus*	NT
Red-footed Falcon	*Falco vespertinus*	NT
Stanley Bustard	*Neotis denhami*	NT
Blue Bustard	*Eupodotis caerulescens*	NT
White-winged Fluff tail	*Sarothrura ayresi*	EN
Corn Crake	*Crex crex*	NT
Wattled Crane	*Bugeranus carunculatus*	VU
Chestnut-banded Plover	*Charadrius pallidus*	NT
Eurasian Curlew	*Numenius arquata*	NT
Black-tailed Godwit	*Limosa limosa*	NT
Black-winged Pratincole	*Glareola nordmanni*	NT
African Skimmer	*Rynchops flavirostris*	NT
European Roller	*Coracias garrulus*	NT
Rudd's Lark	*Heteromirafra rudd*	VU
Botha's Lark	*Spizocorys fringillaris*	NT
Blue Swallow	*Hirundo atrocaerulea*	VU
Bush Blackcap	*Lioptilus nigricapillus*	NT

Table 36: RDL Reptile species that occur in the Gauteng Province (GDARD SoER, 2004).

English Name	Species	Current IUCN Status
Striped harlequin Snake	*Homoroselaps dorsalis*	R
South African Python	*Python natalensis*	V
Blunt tailed worm lizard	*Dalophi apistillum*	DD
Nile Crocodile	*Crocodylus niloticus*	V

Table 37: RDL Amphibians species that occur in the Gauteng Province (GDARD SoER, 2004).

English Name	Species	Current Status
African Giant Bullfrog	*Pyxicephalas adspersus*	NT

Table 38: Gauteng Province Threatened, Rare and of conservation concern Invertebrates including Spiders and Scorpions (GDARD SoER, 2004)

Species	Taxon	IUCN Red List Status	SA Red Data Book Status*	Preliminary Regional Assessment	Gauteng endemic
			Butterflies		
Aloeides dentatis dentatis	Butterfly	VUD2	Endangered/CD		Yes
Chrysoritis aureus	Butterfly	LR/nt	Endangered/CD		Near (Gauteng, OFS)
Metisella meninx	Butterfly	NE	Vulnerable		No

Species	Taxon	IUCN Red List Status	SA Red Data Book Status*	Preliminary Regional Assessment	Gauteng endemic
Gegenes hottentota	Butterfly	NE	Data deficient		No
			Spiders		
Harpactirella flavipilosa	Baboon spider	NE	NE	Data Deficient	No
Harpactira hamiltoni	Baboon spider	NE	NE: In Nature Conservation Ordinance 1983	Rare	Near (Gauteng, OFS, KZN)
Pycnacantha tribulus	Spider	NE	NE	Very Rare	No
Brachionopus pretoriae	Trapdoor spider	NE	NE	Data Deficient	Yes
Idiops fryi	Trapdoor spider	NE	NE	Rare	Near (Gauteng, OFS)
Idiops pretoriae	Trapdoor spider	NE	NE	Rare	Yes
Idiops gunningi	Trapdoor spider	NE	NE	Rare	Yes
Homostola pardalina	Trapdoor spider	NE	NE	Rare	Near (Gauteng, Mpumalanga)
Homostola zebrina	Trapdoor spider	NE	NE	Data Deficient	No
Galeosoma hirsutum	Trapdoor spider	NE	NE	Rare	Yes
Galeosoma pilosum	Trapdoor spider	NE	NE	Rare	Yes
Galeosoma robertsi	Trapdoor spider	NE	NE	Rare	Yes
Galeosoma planiscutatum	Trapdoor spider	NE	NE	Rare	Yes
Galeosoma pallidum	Trapdoor spider	NE	NE	Rare	Yes
Galeosoma scutatum	Trapdoor spider	NE	NE	Rare	Yes
Segregara monticola	Trapdoor spider	NE	NE	Rare	Yes
Segregara transvaalensis	Trapdoor spider	NE	NE	Rare	No
Moggridgea paucispina	Trapdoor spider	NE	NE	Rare	No
Ancylotrypa nuda	Trapdoor spider	NE	NE	Data deficient	Near (Gauteng, NW province)
Ancylotrypa rufescens	Trapdoor spider	NE	NE	Rare	Yes
Ancylotrypa brevipalpis	Trapdoor spider	NE	NE	Rare	Near (Gauteng, NW province)
Ancylotrypa pretoriae	Trapdoor spider	NE	NE	Data deficient	Near (Gauteng, NW province)
Gorgyrella schreineri minor	Trapdoor spider	NE	NE	Data deficient	Yes
Stasimopus robertsi	Trapdoor spider	NE	NE	Rare	No
Stasimopus suffucus	Trapdoor spider	NE	NE	Rare	Yes
Stasimopus oculatus	Trapdoor spider	NE	NE	Rare	No
Calommata simoni	Trapdoor spider	NE	NE	Very Rare	Yes
			Scorpions		
Hadogenes gunningi	Scorpion	NE	NE	Threatened	Near (Gauteng, NW province)
Hadogenes gracilis	Scorpion	NE	NE	Threatened	Marginal in Gauteng (NW province species)
Hadogenes longimanus	Scorpion	NE		Threatened	Marginal in Gauteng (Mpumalanga species)

Species	Taxon	IUCN Red List Status	SA Red Data Book Status*	Preliminary Regional Assessment	Gauteng endemic
Opistophthalmus pugnax	Scorpion	NE	NE	Endangered	Near (Gauteng, NW province)

NE = Not Evaluated – these species have not yet been assessed against the criteria for extinction risk (IUCN Red List or SA Red Data Book).

Data Deficient: Insufficient data to determine the degree of threat/extinction risk.

Preliminary Regional Assessment: These species depict the preliminary assessment of extinction risk regionally done by Gauteng Nature Conservation/ Specialists using the Global IUCN Red List Criteria as guidelines.

APPENDIX D

Expected avifaunal species list for the QDS 2527DD

Table 39: Roberts Multimedia Birds of Southern Africa listing bird species expected to occur in the QDS 2527DD.

R=Resident ; **E**=Endemic ; **BM**=Breeding Migrant ; **NBM**=Non breeding Migrant; **V**=Vagrant ; **A**=Abundant ; **VC**=Very Common ; **C**=Common ; **U**=Uncommon ; **R**=Rare ; **#**=Rare bird Record

Map Status	English Name	Scientific
R-U	Little Banded Goshawk	*Accipiter badius*
R-U	Black Sparrowhawk	*Accipiter melanoleucus*
R-U	Little Sparrowhawk	*Accipiter minullus*
R-U	Ovambo Sparrowhawk	*Accipiter ovampensis*
R-VC	Indian Myna	*Acridotheres tristis*
NBM-U	Great Reed Warbler	*Acrocephalus arundinaceus*
BM-C	African Marsh Warbler	*Acrocephalus baeticatus*
R-C	Cape Reed Warbler	*Acrocephalus gracilirostris*
NBM-U	Eurasian Marsh Warbler	*Acrocephalus palustris*
NBM-U	Eurasian Sedge Warbler	*Acrocephalus schoenobaenus*
V #	Eurasian Reed Warbler	*Acrocephalus scirpaceus*
NBM-C	Common Sandpiper	*Actitis hypoleucos*
R-U	African Jacana	*Actophilornis africanus*
R-U	Malachite Kingfisher	*Alcedo cristata*
R-U	Halfcollared Kingfisher	*Alcedo semitorquata*
R-VC	Egyptian Goose	*Alopochen aegyptiacus*
E-U/VC	Redheaded Finch	*Amadina erythrocephala*
R-C	Cutthroat Finch	*Amadina fasciata*
R-C	Orangebreasted Waxbill	*Amandava subflava*
R-C	Black Crake	*Amaurornis flavirostris*
R-U	Thickbilled Weaver	*Amblyospiza albifrons*
R-U	Redheaded Weaver	*Anaplectes rubriceps*
R-U	Cape Teal	*Anas capensis*
R-C	Redbilled Teal	*Anas erythrorhyncha*
R-U/C	Hottentot Teal	*Anas hottentota*
E-VC	Cape Shoveller	*Anas smithii*
R-C	African Black Duck	*Anas sparsa*
R-VC	Yellowbilled Duck	*Anas undulata*
R-C	Darter	*Anhinga rufa*
BM-U	Cuckoofinch	*Anomalospiza imberbis*
E-U	Cape Penduline Tit	*Anthoscopus minutus*
E-U	Blue Crane	*Anthropoides paradisea*
R-VC	Grassveld Pipit	*Anthus cinnamomeus*
R-U	Plainbacked Pipit	*Anthus leucophrys*

Map Status	English Name	Scientific
R-U	Striped Pipit	*Anthus lineiventris*
R-U	Longbilled Pipit	*Anthus similis*
NBM-U	Tree Pipit	*Anthus trivialis*
R-U	Buffy Pipit	*Anthus vaalensis*
R-U	Barthroated Apalis	*Apalis thoracica*
R-VC	Little Swift	*Apus affinis*
NBM-U	Eurasian Swift	*Apus apus*
BM-U	Black Swift	*Apus barbatus*
BM-C	Whiterumped Swift	*Apus caffer*
BM-U	Horus Swift	*Apus horus*
NBM-U	Steppe Eagle	*Aquila nipalensis*
R-C	Black Eagle	*Aquila verreauxii*
BM-U	Wahlberg's Eagle	*Aquila wahlbergi*
R-C	Grey Heron	*Ardea cinerea*
R-C	Goliath Heron	*Ardea goliath*
R-VC	Blackheaded Heron	*Ardea melanocephala*
R-C	Purple Heron	*Ardea purpurea*
R-C	Squacco Heron	*Ardeola ralloides*
NBM-U	Ruddy Turnstone	*Arenaria interpres*
R-C	Marsh Owl	*Asio capensis*
R-U	Cuckoo Hawk	*Aviceda cuculoides*
R-U	Cape Batis	*Batis capensis*
R-C	Chinspot Batis	*Batis molitor*
R-A	Hadeda Ibis	*Bostrychia hagedash*
R-U	Bittern	*Botaurus stellaris*
E-C/VC	Marico Flycatcher	*Bradornis mariquensis*
R-C	Pallid Flycatcher	*Bradornis pallidus*
R-C	African Sedge Warbler	*Bradypterus baboecala*
R-C	Spotted Eagle Owl	*Bubo africanus*
R-U	Cape Eagle Owl	*Bubo capensis*
R-U	Giant Eagle Owl	*Bubo lacteus*
R-A	Cattle Egret	*Bubulcus ibis*
R-C	Spotted Dikkop	*Burhinus capensis*
E-U	Jackal Buzzard	*Buteo rufofuscus*
NBM-C	Steppe Buzzard	*Buteo vulpinus*
R-U	Greenbacked Heron	*Butorides striatus*
E-U	Desert Barred Warbler	*Calamonastes fasciolatus*
R-C	Redcapped Lark	*Calandrella cinerea*
R-U	Fawncoloured Lark	*Calendulauda africanoides*

Map Status	English Name	Scientific
E-U	Sabota Lark	*Calendulauda sabota*
NBM-U	Sanderling	*Calidris alba*
NBM-C	Curlew Sandpiper	*Calidris ferruginea*
NBM-C	Little Stint	*Calidris minuta*
R-VC	Greybacked BleatingWarbler	*Camaroptera brevicaudata*
R-C	Black Cuckooshrike	*Campephaga flava*
R-U	Goldentailed Woodpecker	*Campethera abingoni*
R-U	Bennett's Woodpecker	*Campethera bennettii*
NBM-U	Eurasian Nightjar	*Caprimulgus europaeus*
R-C	Fierynecked Nightjar	*Caprimulgus pectoralis*
BM-C	Rufouscheeked Nightjar	*Caprimulgus rufigena*
R-VC	Freckled Nightjar	*Caprimulgus tristigma*
R-VC	Burchell's Coucal	*Centropus burchellii*
R-C	Familiar Chat	*Cercomela familiaris*
R-U	Whitebrowed Robin	*Cercotrichas leucophrys*
E-VC	Kalahari Robin	*Cercotrichas paena*
E-U	Eastern Longbilled Lark	*Certhilauda semitorquata*
R-C	Pied Kingfisher	*Ceryle rudis*
R-VC	Black Sunbird	*Chalcomitra amethystina*
NBM-U	Caspian Plover	*Charadrius asiaticus*
NBM-U	Ringed Plover	*Charadrius hiaticula*
R-U	Chestnutbanded Plover	*Charadrius pallidus*
R-C	Kittlitz's Plover	*Charadrius pecuarius*
R-VC	Threebanded Plover	*Charadrius tricollaris*
E-VC	Spikeheeled Lark	*Chersomanes albofasciata*
BM-C	Whiskered Tern	*Chlidonias hybridus*
NBM-C	Whitewinged Tern	*Chlidonias leucopterus*
BM-C	Diederik Cuckoo	*Chrysococcyx caprius*
BM-U	Klaas's Cuckoo	*Chrysococcyx klaas*
NBM-U	Abdim's Stork	*Ciconia abdimii*
NBM-C	White Stork	*Ciconia ciconia*
R-U/C	Black Stork	*Ciconia nigra*
BM-U/VC	Plumcoloured Starling	*Cinnyricinclus leucogaster*
E-U	Greater Doublecollared Sunbird	*Cinnyris afra*
R-VC	Marico Sunbird	*Cinnyris mariquensis*
R-VC	Whitebellied Sunbird	*Cinnyris talatala*
R-C	Brown Snake Eagle	*Circaetus cinereus*
R-C	Blackbreasted Snake Eagle	*Circaetus pectoralis*
NBM-U	Eurasian Marsh Harrier	*Circus aeruginosus*

Map Status	English Name	Scientific
NBM-U	Pallid Harrier	*Circus macrourus*
NBM-U	Black Harrier	*Circus maurus*
NBM-U	Montagu's Harrier	*Circus pygargus*
R-U	African Marsh Harrier	*Circus ranivorus*
R-U	Lazy Cisticola	*Cisticola aberrans*
R-C	Desert Cisticola	*Cisticola aridulus*
R-U	Ayres' Cisticola	*Cisticola ayresii*
R-C	Rattling Cisticola	*Cisticola chinianus*
R-C	Neddicky	*Cisticola fulvicapillus*
R-C	Fantailed Cisticola	*Cisticola juncidis*
R-C	Wailing Cisticola	*Cisticola lais*
R-C	Cloud Cisticola	*Cisticola textrix*
R-VC	Levaillant's Cisticola	*Cisticola tinniens*
BM-U	Great Spotted Cuckoo	*Clamator glandarius*
BM-C	Jacobin Cuckoo	*Clamator jacobinus*
BM-U	Striped Cuckoo	*Clamator levaillantii*
E-C	Whitebacked Mousebird	*Colius colius*
R-VC	Speckled Mousebird	*Colius striatus*
R-U/C	Rameron Pigeon	*Columba arquatrix*
R-VC	Rock Pigeon	*Columba guinea*
R-C	Feral Pigeon	*Columba livia*
NBM-U	Eurasian Roller	*Coracias garrulus*
R-C	Purple Roller	*Coracias naevia*
R-U/VC	Longtailed Shrike	*Corvinella melanoleuca*
R-A	Pied Crow	*Corvus albus*
R-VC	Black Crow	*Corvus capensis*
R-A	Grey Lourie	*Corythaixoides concolor*
R-VC	Cape Robin	*Cossypha caffra*
E-C	Whitethroated Robin	*Cossypha humeralis*
R-U	Common Quail	*Coturnix coturnix*
BM-U	Harlequin Quail	*Coturnix delegorguei*
R-U/VC	Wattled Starling	*Creatophora cinerea*
BM-U	African Crake	*Crecopsis egregia*
NBM-U	Corncrake	*Crex crex*
NBM-U	Eurasian Cuckoo	*Cuculus canorus*
BM-U	Black Cuckoo	*Cuculus clamosus*
BM-C	Redchested Cuckoo	*Cuculus solitarius*
R-U	Temminck's Courser	*Cursorius temminckii*
R-C	Palm Swift	*Cypsiurus parvus*

Map Status	English Name	Scientific
NBM-U	House Martin	*Delichon urbica*
R-U	Fulvous Duck	*Dendrocygna bicolor*
R-VC	Whitefaced Duck	*Dendrocygna viduata*
R-U/C	Crested Francolin	*Dendroperdix sephaena*
R-U/C	Cardinal Woodpecker	*Dendropicos fuscescens*
R-U	Bearded Woodpecker	*Dendropicos namaquus*
R-VC/A	Forktailed Drongo	*Dicrurus adsimilis*
R-A	Puffback	*Dryoscopus cubla*
R-C	Great White Egret	*Egretta alba*
R-C	Black Egret	*Egretta ardesiaca*
R-C	Little Egret	*Egretta garzetta*
R-C	Yellowbilled Egret	*Egretta intermedia*
R-VC	Blackshouldered Kite	*Elanus caeruleus*
R-U	Cape Bunting	*Emberiza capensis*
R-U/VC	Goldenbreasted Bunting	*Emberiza flaviventris*
E-U	Larklike Bunting	*Emberiza impetuani*
R-VC	Rock Bunting	*Emberiza tahapisi*
R-C	Yellowbellied Eremomela	*Eremomela icteropygialis*
R-C	Burntnecked Eremomela	*Eremomela usticollis*
R-C	Chestnutbacked Finchlark	*Eremopterix leucotis*
R-VC	Common Waxbill	*Estrilda astrild*
R-U/C	Blackcheeked Waxbill	*Estrilda erythronotos*
E-U	Swee Waxbill	*Estrilda melanotis*
R-C	Golden Bishop	*Euplectes afer*
R-C	Whitewinged Widow	*Euplectes albonotatus*
R-VC	Redcollared Widow	*Euplectes ardens*
R-U	Yellowrumped Widow	*Euplectes capensis*
R-VC	Red Bishop	*Euplectes orix*
R-VC/A	Longtailed Widow	*Euplectes progne*
E-VC	Whitewinged Korhaan	*Eupodotis afraoides*
E-U/C	Whitebellied Korhaan	*Eupodotis barrowii*
E-VC	Redcrested Korhaan	*Eupodotis ruficrista*
NBM-U/C	Eastern Redfooted Kestrel	*Falco amurensis*
R-U	Lanner Falcon	*Falco biarmicus*
NBM-U	Lesser Kestrel	*Falco naumanni*
NBM-U	Peregrine Falcon	*Falco peregrinus*
R-U	Rock Kestrel	*Falco rupicolis*
R-U	Greater Kestrel	*Falco rupicoloides*
NBM-U	Northern Hobby Falcon	*Falco subbuteo*

Map Status	English Name	Scientific
NBM-U	Western Redfooted Kestrel	*Falco vespertinus*
R-VC	Redknobbed Coot	*Fulica cristata*
R-C	Ethiopian Snipe	*Gallinago nigripennis*
R-C	Common Moorhen	*Gallinula chloropus*
NBM-C	Blackwinged Pratincole	*Glareola nordmanni*
R-C	Pearlspotted Owl	*Glaucidium perlatum*
R-U	Whitebacked Night Heron	*Gorsachius leuconotus*
E-U	Violeteared Waxbill	*Granatina granatina*
R-U	Whitebacked Vulture	*Gyps africanus*
E-U/C	Cape Vulture	*Gyps coprotheres*
R-VC	Brownhooded Kingfisher	*Halcyon albiventris*
R-VC	Striped Kingfisher	*Halcyon chelicuti*
BM-U	Woodland Kingfisher	*Halcyon senegalensis*
R-U	African Fish Eagle	*Haliaeetus vocifer*
NBM-U	Ayres' Eagle	*Hieraaetus ayresii*
NBM-U	Booted Eagle	*Hieraaetus pennatus*
R-C	African Hawk Eagle	*Hieraaetus spilogaster*
R-C	Blackwinged Stilt	*Himantopus himantopus*
NBM-U	Icterine Warbler	*Hippolais icterina*
BM-VC	Lesser Striped Swallow	*Hirundo abyssinica*
BM-C	Whitethroated Swallow	*Hirundo albigularis*
BM-VC	Greater Striped Swallow	*Hirundo cucullata*
R-U	Pearlbreasted Swallow	*Hirundo dimidiata*
R-VC	Rock Martin	*Hirundo fuligula*
NBM-VC	Eurasian Swallow	*Hirundo rustica*
BM-C	Redbreasted Swallow	*Hirundo semirufa*
BM-C	South African Cliff Swallow	*Hirundo spilodera*
R-C	Greater Honeyguide	*Indicator indicator*
R-U	Lesser Honeyguide	*Indicator minor*
BM-C	Pygmy Kingfisher	*Ispidina picta*
R-U	Little Bittern	*Ixobrychus minutus*
R-U/C	Redthroated Wryneck	*Jynx ruficollis*
R-C	Lizard Buzzard	*Kaupifalco monogrammicus*
R-U/C	Jameson's Firefinch	*Lagonosticta rhodopareia*
R-U	Bluebilled Firefinch	*Lagonosticta rubricata*
R-U/C	Redbilled Firefinch	*Lagonosticta senegala*
E-VC	Burchell's Starling	*Lamprotornis australis*
E-VC	Glossy Starling	*Lamprotornis nitens*
E-VC	Crimsonbreasted Shrike	*Laniarius atrococcineus*

Map Status	English Name	Scientific
E-VC	Southern Boubou	*Laniarius ferrugineus*
R-A	Fiscal Shrike	*Lanius collaris*
NBM-VC	Redbacked Shrike	*Lanius collurio*
NBM-U/C	Lesser Grey Shrike	*Lanius minor*
R-C	Greyheaded Gull	*Larus cirrocephalus*
V #	Blackheaded Gull	*Larus ridibundus*
R-U	Marabou Stork	*Leptoptilos crumeniferus*
Rare	Blacktailed Godwit	*Limosa limosa*
R-U/VC	Bronze Mannikin	*Lonchura cucullata*
R-VC	Blackcollared Barbet	*Lybius torquatus*
E-VC	Orangethroated Longclaw	*Macronyx capensis*
R-VC	Greyheaded Bush Shrike	*Malaconotus blanchoti*
R-U	Giant Kingfisher	*Megaceryle maxima*
R-C	Black Flycatcher	*Melaenornis pammelaina*
E-U	Pale Chanting Goshawk	*Melierax canorus*
R-U	Gabar Goshawk	*Melierax gabar*
NBM-VC	Eurasian Bee-eater	*Merops apiaster*
R-C	Whitefronted Bee-eater	*Merops bullockoides*
R-U	Swallowtailed Bee-eater	*Merops hirundineus*
NBM-U	Bluecheeked Bee-eater	*Merops persicus*
R-VC	Little Bee-eater	*Merops pusillus*
BM-U	Yellowbilled Kite	*Milvus aegyptius*
NBM-U	Black Kite	*Milvus migrans*
R-VC	Rufousnaped Lark	*Mirafra africana*
E-U	Melodious Lark	*Mirafra cheniana*
E-U	Eastern Clapper Lark	*Mirafra fasciolata*
E-U	Monotonous Lark	*Mirafra passerina*
R-U	Flappet Lark	*Mirafra rufocinnamomea*
E-U/C	Shorttoed Rockthrush	*Monticola brevipes*
E-C	Cape Rockthrush	*Monticola rupestris*
R-U	African Pied Wagtail	*Motacilla aguimp*
R-VC	Cape Wagtail	*Motacilla capensis*
NBM-C	Yellow Wagtail	*Motacilla flava*
NBM-C	Spotted Flycatcher	*Muscicapa striata*
NBM-U	Yellowbilled Stork	*Mycteria ibis*
R-U	Fantailed Flycatcher	*Myioparus plumbeus*
E-U	Anteating Chat	*Myrmecocichla formicivora*
R-U	Malachite Sunbird	*Nectarinia famosa*
R-C	Southern Pochard	*Netta erythrophthalma*

Map Status	English Name	Scientific
R-U	Brubru	*Nilaus afer*
NBM-U	Whimbrel	*Numenius phaeopus*
R-VC	Helmeted Guineafowl	*Numida meleagris*
R-U	Blackcrowned Night Heron	*Nycticorax nycticorax*
R-VC	Namaqua Dove	*Oena capensis*
E-C/VC	Mountain Chat	*Oenanthe monticola*
R-U/C	Capped Wheatear	*Oenanthe pileata*
R-VC	Redwinged Starling	*Onychognathus morio*
R-VC	Blackheaded Oriole	*Oriolus larvatus*
NBM-U	Eurasian Golden Oriole	*Oriolus oriolus*
R-C	Quail Finch	*Ortygospiza atricollis*
R-C	African Scops Owl	*Otus senegalensis*
R-U	Maccoa Duck	*Oxyura maccoa*
NBM-U	Osprey	*Pandion haliaetus*
E-C	Titbabbler	*Parisoma subcaeruleum*
E-C	Ashy Tit	*Parus cinerascens*
E-VC	Southern Black Tit	*Parus niger*
E-VC	Southern Greyheaded Sparrow	*Passer diffusus*
R-VC	House Sparrow	*Passer domesticus*
E-A	Cape Sparrow	*Passer melanurus*
R-C	Great Sparrow	*Passer motitensis*
R-U	White Pelican	*Pelecanus onocrotalus*
R-U	Pinkbacked Pelican	*Pelecanus rufescens*
R-C	Coqui Francolin	*Peliperdix coqui*
NBM-U #	Honey Buzzard	*Pernis apivorus*
R-C	Yellowthroated Sparrow	*Petronia superciliaris*
R-VC	Reed Cormorant	*Phalacrocorax africanus*
R-VC	Whitebreasted Cormorant	*Phalacrocorax lucidus*
NBM-U/C	Ruff	*Philomachus pugnax*
R-C	Lesser Flamingo	*Phoenicopterus minor*
R-U	Greater Flamingo	*Phoenicopterus ruber*
R-VC	Redbilled Woodhoopoe	*Phoeniculus purpureus*
NBM-C	Willow Warbler	*Phylloscopus trochilus*
R-U/C	African Spoonbill	*Platalea alba*
R-VC	Spurwinged Goose	*Plectropterus gambensis*
R-C	Glossy Ibis	*Plegadis falcinellus*
R-U	Whitebrowed Sparrowweaver	*Plocepasser mahali*
E-VC	Cape Weaver	*Ploceus capensis*
R-U	Spottedbacked Weaver	*Ploceus cucullatus*

Map Status	English Name	Scientific
R-U	Lesser Masked Weaver	*Ploceus intermedius*
R-VC	Masked Weaver	*Ploceus velatus*
NBM-U	Grey Plover	*Pluvialis squatarola*
R-U	African Finfoot	*Podica senegalensis*
R-C	Great Crested Grebe	*Podiceps cristatus*
R-U	Blacknecked Grebe	*Podiceps nigricollis*
R-VC	Yellowfronted Tinker Barbet	*Pogoniulus chrysoconus*
R-U	Martial Eagle	*Polemaetus bellicosus*
R-C	Gymnogene	*Polyboroides typus*
R-C	Purple Gallinule	*Porphyrio madagascariensis*
Rare	Spotted Crake	*Porzana porzana*
R-U	Baillon's Crake	*Porzana pusilla*
E-VC	Blackchested Prinia	*Prinia flavicans*
R-VC	Tawnyflanked Prinia	*Prinia subflava*
R-VC	White Helmetshrike	*Prionops plumatus*
R-U	Sharpbilled Honeyguide	*Prodotiscus regulus*
R-U	Roseringed Parakeet	*Psittacula krameri*
R-VC	Groundscraper Thrush	*Psophocichla litsipsirupa*
E-U	Natal Francolin	*Pternistis natalensis*
E-VC	Swainson's Francolin	*Pternistis swainsonii*
R-U	Yellowthroated Sandgrouse	*Pterocles gutturalis*
R-U	Whitefaced Owl	*Ptilopsus granti*
E-VC	Redeyed Bulbul	*Pycnonotus nigricans*
R-A	Blackeyed Bulbul	*Pycnonotus tricolor*
R-U	Melba Finch	*Pytilia melba*
R-VC	Redbilled Quelea	*Quelea quelea*
R-C	African Rail	*Rallus caerulescens*
R-U/C	Pied Avocet	*Recurvirostra avosetta*
R-VC	Scimitarbilled Woodhoopoe	*Rhinopomastus cyanomelas*
BM-C	Banded Martin	*Riparia cincta*
R-C	Brownthroated Martin	*Riparia paludicola*
NBM-U	Sand Martin	*Riparia riparia*
R-C	Old World Painted Snipe	*Rostratula benghalensis*
R-U/C	Secretarybird	*Sagittarius serpentarius*
R-U	Knobbilled Duck	*Sarkidiornis melanotos*
R-U	Redchested Flufftail	*Sarothrura rufa*
R-VC	Stonechat	*Saxicola torquata*
R-U	Redwing Francolin	*Scleroptila levaillantii*
R-U	Orange River Francolin	*Scleroptila levaillantoides*

Map Status	English Name	Scientific
R-C	Shelley's Francolin	*Scleroptila shelleyi*
R-VC	Hamerkop	*Scopus umbretta*
R-VC	Blackthroated Canary	*Serinus atrogularis*
R-U	Cape Canary	*Serinus canicollis*
R-C	Streakyheaded Canary	*Serinus gularis*
R-U/VC	Yelloweyed Canary	*Serinus mozambicus*
E-VC	Fiscal Flycatcher	*Sigelus silens*
E-C	Grassbird	*Sphenoeacus afer*
E-C	Pinkbilled Lark	*Spizocorys conirostris*
E-VC	Scalyfeathered Finch	*Sporopipes squamifrons*
E-C	Pied Starling	*Spreo bicolor*
NBM-C	Fairy Flycatcher	*Stenostira scita*
R-U	Caspian Tern	*Sterna caspia*
R-A	Cape Turtle Dove	*Streptopelia capicola*
R-VC	Redeyed Dove	*Streptopelia semitorquata*
R-A	Laughing Dove	*Streptopelia senegalensis*
R-C	Ostrich	*Struthio camelus*
NBM-U	Garden Warbler	*Sylvia borin*
NBM-U	Whitethroat	*Sylvia communis*
R-VC	Longbilled Crombec	*Sylvietta rufescens*
R-VC	Dabchick	*Tachybaptus ruficollis*
BM-U	Alpine Swift	*Tachymarptis melba*
E-U	South African Shelduck	*Tadorna cana*
R-U	Threestreaked Tchagra	*Tchagra australis*
R-VC	Blackcrowned Tchagra	*Tchagra senegala*
R-U	Orangebreasted Bush Shrike	*Telophorus sulfureopectus*
E-VC	Bokmakierie	*Telophorus zeylonus*
BM-VC	Paradise Flycatcher	*Terpsiphone viridis*
R-U	Whitebacked Duck	*Thalassornis leuconotus*
R-C	Mocking Chat	*Thamnolaea cinnamomeiventris*
R-VC	Sacred Ibis	*Threskiornis aethiopicus*
R-VC	Redbilled Hornbill	*Tockus erythrorhynchus*
E-VC	Southern Yellowbilled Hornbill	*Tockus leucomelas*
R-C/VC	Grey Hornbill	*Tockus nasutus*
R-C	Lappetfaced Vulture	*Torgos tracheliotus*
R-VC	Crested Barbet	*Trachyphonus vaillantii*
R-U	African Green Pigeon	*Treron calva*
E-U	Pied Barbet	*Tricholaema leucomelas*
NBM-C	Wood Sandpiper	*Tringa glareola*

Map Status	English Name	Scientific
NBM-C	Greenshank	*Tringa nebularia*
NBM-U	Green Sandpiper	*Tringa ochropus*
NBM-C	Marsh Sandpiper	*Tringa stagnatilis*
V #	Redshank	*Tringa totanus*
E-VC	Pied Babbler	*Turdoides bicolor*
R-VC	Arrowmarked Babbler	*Turdoides jardineii*
R-U/VC	Kurrichane Thrush	*Turdus libonyanus*
E-VC	Karoo Thrush	*Turdus smithi*
R-U	Kurrichane Buttonquail	*Turnix sylvatica*
R-A	Greenspotted Dove	*Turtur chalcospilos*
R-C	Barn Owl	*Tyto alba*
R-U	Grass Owl	*Tyto capensis*
R-VC	African Hoopoe	*Upupa africana*
R-VC/A	Blue Waxbill	*Uraeginthus angolensis*
R-VC	Redfaced Mousebird	*Urocolius indicus*
R-VC	Blacksmith Plover	*Vanellus armatus*
R-VC	Crowned Plover	*Vanellus coronatus*
R-VC	Wattled Plover	*Vanellus senegallus*
R-U	Steelblue Widowfinch	*Vidua chalybeata*
R-U	Black Widowfinch	*Vidua funerea*
R-VC	Pintailed Whydah	*Vidua macroura*
R-VC	Paradise Whydah	*Vidua paradisaea*
R-U	Purple Widowfinch	*Vidua purpurascens*
E-U	Shafttailed Whydah	*Vidua regia*
E-VC	Cape White-eye	*Zosterops virens*

Heritage Impact Assessment

PHASE 1 HERITAGE IMPACT ASSESSMENT: PORTION 366 OF THE FARM NOOITGEDACHT 534-JQ

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ABOUT THIS REPORT

The heritage report must reflect that consideration has been given to the history and heritage significance of the study area and that the proposed work is sensitive towards the heritage resources and does not alter or destroy the heritage significance of the study area.

The heritage report must refer to the heritage resources currently in the study area.

The opinion of an independent heritage consultant is required to evaluate if the proposed work generally follows a good approach that will ensure the conservation of the heritage resources.

The National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998) are the guideline documents for a report of this nature.

Leonie Marais-Botes was appointed by Bokamoso Landscape Architects and Environmental Consultants to carry out a Phase 1 Heritage Impact Assessment (HIA) for the proposed development on Portion 366 of the Farm Nooitgedacht 534-JQ. The site investigation was conducted on 31 January 2013.

EXECUTIVE SUMMARY

This project may impact on any types and ranges of heritage resources that are outlined in Section 3 of the National Heritage Resources Act (Act 25 of 1999). Consequent a Heritage Impact Assessment was commissioned by Bokamoso Landscape Architects and Environmental Consultants and conducted by Leonie Marais-Botes.

It is important to note that all graves and cemeteries are of high significance and are protected by various laws. Legislation with regard to graves includes the National Heritage Resources Act (Act 25 of 1999) whenever graves are 60 years and older. Other legislation with regard to graves includes those when graves are exhumed and relocated, namely the Ordinance on Exhumations (no 12 of 1980) and the Human Tissues Act (Act 65 of 1983 as amended).

1.1 INTRODUCTION

The site earmarked for development is located just north of the R 512 near the N14 highway in the Gauteng Province.

Activities in the greater study area include:

- Small Holdings (grazing, crop, fruit)
- Informal and Formal Housing
- Retail
- Tourism

1.2 DESCRIPTION OF THE GREATER STUDY AREA

The greater study area is an agricultural holdings area, on the border between Johannesburg's north-western areas and Centurion's rural areas in the Gauteng Province. It is also home to the Lanseria Airport.

1.3 METHOD

The objective of this Phase 1 Heritage Impact Assessment (HIA) was to gain an overall understanding of the heritage sensitivities of the area and indicate how they may be impacted on through development activities. The survey took place on 31 January 2013.

In order to establish heritage significance the following method was followed:

- Investigation of primary resources (archival information)
- Investigation of secondary resources (literature and maps)
- Physical evidence (site investigation)
- Determining Heritage Significance

1.4 PHOTOGRAPHIC RECORD OF SITE EARMARKED FOR DEVELOPMENT

The structures located in the specific study is not yet sixty years old (cc 1970's) and thus not protected by the National Heritage Resources Act (Act 25 of 1999)




2. FINDINGS

2.1 PRE-COLONIAL HERITAGE SITES

Possibilities: Greater study area taken into account.

Stone Age

The Stone Age is the period in human history when stone material was mainly used to produce tools[1]. In South Africa the Stone Age can be divided in three periods[2];

- Early Stone Age 2 000 000 – 150 000 years ago
- Middle Stone Age 150 000 – 30 000 years ago
- Late Stone Age 40 000 years ago - +/- 1850 AD

[1] P. J. Coertze & R.D. Coertze, Verklarende vakwoordeboek vir Antropologie en Argeologie.
[2] S.A. Korsman & A. Meyer, *Die Steentydperk en rotskuns* in J.S. Bergh (red) Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies.

Iron Age

The Iron Age is the period in human history when metal was mainly used to produce artefacts[3]. In South Africa the Iron Age can be divided in three periods;

- Early Iron Age 250-900 AD
- Middle Iron Age 900-1300 AD
- Late Iron Age 1300-1840 AD[4]

There are no pre-colonial heritage sites evident in the study area. This can be attributed to large scale infra-structure development activities in the greater study area.

2.2 HISTORICAL PERIOD HERITAGE SITES

Possibilities: Greater study area taken into account.

- Pioneer sites (Voortrekker sites cc 1836-1850's)
- Anglo-Boer War (1899-1902) sites.

No historical period sites evident in the study area.

2.3 ORIGINAL LANDSCAPE

Infrastructure and other development have altered the original landscape in most of the greater study area.

2.4 INTANGIBLE HERITAGE

The intangible heritage of the greater study area can be found in the stories of past and present inhabitants.

3 CATEGORIES OF HERITAGE VALUE (ACT 25 OF 1999)

The National Heritage Resources Act (Act 25 of 1999) identifies the following categories of value under section 3(1) and (2) of the Act under the heading "National Estate":

"3 (1) For the purpose of this Act, those heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations must be considered part of the national estate and fall within the sphere of operations of heritage resources authorities.

[3] P.J. Coertze & R.D. Coertze, Verklarende vakwoordeboek vir Antropologie en Argeologie.
[4] M.M. van der Ryst & A Meyer. *Die Ystertydperk* in J.S. Bergh (red) Geskidenisatlas van Suid-Afrika. Die vier noordelike provinsies and T.N Huffman, A Handbook to the Iron Age: The **Archaeology** of Pre-Colonial Farming Societies in Southern Africa.

(2) Without limiting the generality of subsection (1), the national estate may include-
    (a) places, buildings, structures and equipment of cultural significance;
    (b) places which oral traditions are attached or which are associated with living heritage;
    (c) historical settlements and townscapes;
    (d) landscapes and natural features of cultural significance;
    (e) geological sites of scientific or cultural importance;
    (f) archaeological and palaeontological sites;
    (g) graves and burial grounds, including-
        (i) ancestral graves;
        (ii) royal graves and graves of traditional leaders;
        (iii) graves of victims of conflict;
        (iv) graves of individuals designated by the Minister by notice in the Gazette
        (v) historical graves and cemeteries; and
        (vi) other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
    (h) sites of significance relating to the history in South Africa;
    (i) movable objects, including-
        (i) objects recovered from the soil or waters of South Africa including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
        (ii) objects to which oral traditions are attached or which are associated with living heritage;
        (iii) ethnographic art and objects;
        (iv) military objects
        (v) objects of decorative or fine art;
        (vi) objects of scientific or technological interests; and
        (vii) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section I (xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

(3) Without limiting the generality of the subsections (1) and (2), a place or object is to be considered part of the national estate if it has cultural significance or other special value because of-
    (a) It is importance in the community, or pattern of South Africa's history;
    (b) Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
    (c) Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
    (d) Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural objects;
    (e) Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
    (f) Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
    (g) Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
    (h) Its strong or special association with the life and work of a person, group or organisation of importance in the history of South Africa; and
    (i) Sites of significance relating to the history of slavery in South Africa."

3.1 HERITAGE VALUE OF WEIGHED AGAINST CULTURAL SIGNIFICANCE CATEGORIES

3.1.1 Spiritual value

During the site visit/field work no indication of any spiritual activity was observed on/near the proposed site. Thus no sites of spiritual value will be impacted on by the proposed project.

3.1.2 Scientific value

No sites of scientific value was observed on or near the site earmarked for development.

3.1.3 Historical value

No historical value associated with the proposed site could be found in primary and secondary sources.[5]

3.1.4 Aesthetic value

No heritage item with exceptional aesthetic (architectural) value was identified in the study area.

3.1.5 Social value

Social value is attributed to sites that are used by the community for recreation and formal and informal meetings regarding matters that are important to the community. These sites include parks, community halls, sport fields etc. Visually none of the above is evident in the study area.

3.2 SPECIFIC CATEGORIES INVESTIGATED AS PER SECTION 3 (1) AND (2) OF THE NATIONAL HERITAGE LEGISLATION (ACT 25 OF 1999)

3.2.1 Does the site/s provide the context for a wider number of places, buildings, structures and equipment of cultural significance?

The study area does not provide context for a wider number of places, buildings, structures and equipment of cultural significance. The reason is the low density of heritage structures/sites in the study area, near or on the proposed site.

3.2.2 Does the site/s contain places to which oral traditions are attached or which are associated with living heritage?

Places to which oral traditions are attached or associated with living heritage are usually find in conjunction with traditional settlements and villages which still practises age old traditions. None of these are evident near or on the proposed site.

[5] Standard Encyclopaedia of Southern Africa and the Transvaalse Argiefbewaarplek (TAB) database at the National Archives, Pretoria;
J.S. Bergh (red), Geskiedenisatlas van Suid-Afrika: Die Vier Noordelike Provinsies.

3.2.3 Does the site/s contain historical settlements?

No historical settlements are located on or near the proposed site.

3.2.4 Does the site/s contain landscapes and natural features of cultural significance?

Due to large scale infra-structure development the original Highveld character have been altered significantly in the study area.

3.2.5 Does the site/s contain geological sites of cultural importance?

Geological sites of cultural importance include meteorite sites (Tswaing Crater and Vredefort Dome), fossil sites (Karoo and Krugersdorp area), important mountain ranges or ridges (Magaliesburg, Drakensberg etc.). The proposed site is not located in an area known for sites of this importance.

3.2.6 Does the site/s contain a wide range of archaeological sites?

The proposed site does not contain any surface archaeological deposits, the reason being the large scale alteration of the original landscape through infra-structure development.

The possibility of sub-surface findings always exists and should be taken into consideration in the Environmental Management Plan.

If sub-surface archaeological material is discovered work must stop and a heritage practitioner preferably an archaeologist contacted to assess the find and make recommendations.

3.2.7 Does the site/s contain any marked graves and burial grounds?

The site does not contain any marked graves or burial grounds. The possibility of graves not visible to the human eye always exists and this should be taken into consideration in the Environmental Management Plan.

It is important to note that all graves and cemeteries are of high significance and are protected by various laws. Legislation with regard to graves includes the National Heritage Resources Act (Act 25 of 1999) whenever graves are 60 years and older. Other legislation with regard to graves includes those when graves are exhumed and relocated, namely the Ordinance on Exhumations (no 12 of 1980) and the Human Tissues Act (Act 65 of 1983 as amended).

If sub-surface graves are discovered work should stop and a professional preferably an archaeologist contacted to assess the age of the grave/graves and to advice on the way forward.

3.2.8 Does the site/s contain aspects that relate to the history of slavery?

This is not an area associated with the history of slavery like the Western Cape Province.

3.2.9 Can the place be considered as a place that is important to the community or in the pattern of South African history?

In primary and secondary sources the proposed site is not described as important to the community or in the pattern of South African history.[6]

3.2.10 Does the site/s embody the quality of a place possessing uncommon or rare endangered aspects of South Africa's natural and cultural heritage?

The proposed site does not possess uncommon, rare or endangered aspects of South Africa's natural and cultural heritage. These sites are usually regarded as Grade 1 or World Heritage Sites.

3.2.11 Does the site/s demonstrate the principal characteristics of South Africa's natural or cultural places?

The proposed site does not demonstrate the principal characteristics of South Africa's natural or cultural places. These characteristics are usually associated with aesthetic significance.

3.2.12 Does the site/s exhibit particular aesthetic characteristics valued by the community or cultural groups?

This part of the greater study area does not exhibit particular aesthetic characteristics valued by the community or cultural groups. The reason being the low density of heritage buildings and structures located in the greater study area.

3.2.13 Does the site/s contain elements, which are important in demonstrating a high degree of creative technical achievement?

The site does not contain elements which are important in demonstrating a high degree of creative technical achievement. Reason being none of the above evident on site.

3.2.14 Does the site/s have strong and special associations with particular communities and cultural groups for social, cultural and spiritual reasons?

The proposed site does not have a strong or special association with particular communities and cultural groups for social, cultural and spiritual reasons, the reason being that the particular site is located on mainly developed land and it is evident that the site is not utilised for social, cultural or spiritual reasons.

[6] Standard Encyclopaedia of Southern Africa and the Transvaalse Argiefbewaarplek (TAB) database at the National Archives, Pretoria.
J.S. Bergh (red), Geskiedenisatlas van Suid-Afrika. Die Vier Noordelike Provinsies.

3.2.15 Does the site/s have a strong and special association with the life or work of a person, group or organisation?

No indication of the above could be found in primary and secondary research sources.[7]

4. OPPORTUNITIES, RESTRICTIONS, IMPACTS

- There are no visible restrictions or negative impacts in terms of heritage associated with the site. In terms of heritage this project can proceed.
- 3.2.6 and 3.2.7 must be taken into account in the Environmental Management Plan.

5. THE WAY FORWARD

- **Submit a Section 38 application to the Provincial Heritage Resources Authority of the Gauteng Province for comment/approval.**

[7] Dictionary of South African Biography (vol I-V) and the Transvaalse Argiefbewaarplek database at the National Archives, Pretoria

Services Report - Civil

WESPLAN & ASSOCIATES

Proposed Development of Portion 366 – Nooitgedacht Farm 534-JQ

Civil Engineering Services - Outline Scheme Report

APRIL 2013

Prepared for:

Wesplan & Associates
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Compiled by:

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Report No: 2043/00/IR01

WESPLAN & ASSOCIATES

PROPOSED DEVELOPMENT OF PORTION 366 – NOOITGEDACHT FARM 534-JQ

CIVIL ENGINEERING SERVICES OUTLINE SCHEME REPORT

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WESPLAN & ASSOCIATES

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WESPLAN & ASSOCIATES

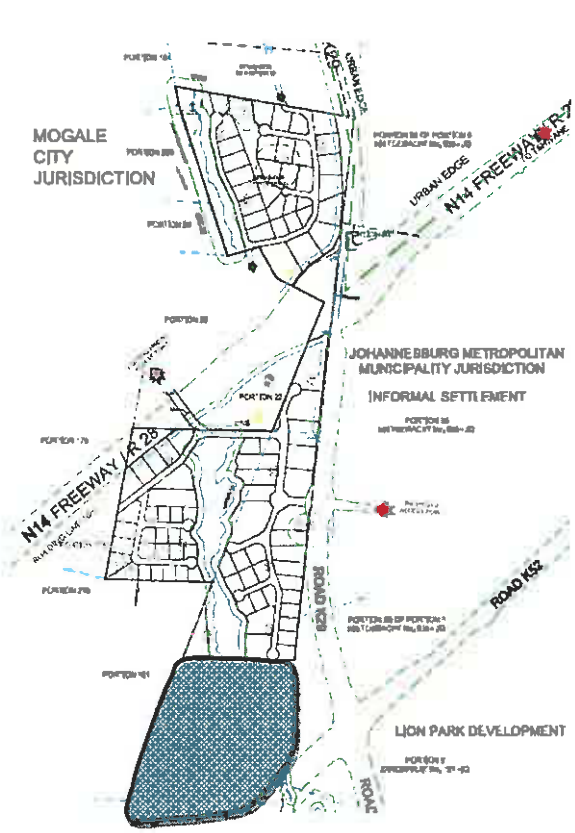
PROPOSED DEVELOPMENT OF PORTION 366 – NOOITGEDACHT 534 JQ

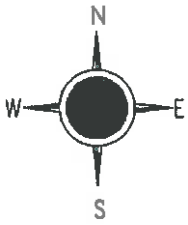
ENGINEERING SERVICES OUTLINE SCHEME REPORT

1. INTRODUCTION

Wesplan & Associates on behalf of the developer and land owner (Kafue River Trading (Pty) Ltd) appointed Bigen Africa Services (Pty) Ltd to prepare the outline scheme report for the proposed development of Portion 366 of the farm Nooitgedacht 534 JQ.

Portion 366 amounts to a total size of 19.30 hectares, with the first stage of the proposed development comprising a 28,000 m^2 distribution warehouse.





This report serves to provide engineering service input for planning processes of the proposed development. This includes highlighting existing infrastructure, proposed future infrastructure and possible interim arrangements.

2. LOCALITY

The Site is located approximately 200 meters northeast of the R512 (Malibongwe Drive) – R114 intersection and 1.4 kilometres southwest of the N14 – Malibongwe Drive interchange.

Refer to the Locality Plan bound in Annexure A of this report.

3. Site Description

Portion 366 of the farm Nooitgedacht 534 JQ, falls within the jurisdiction of Mogale City Local Municipality and borders the City of Johannesburg Metropolitan Municipality on its western boundary.

The proposed site is currently developed with a number of farm houses and ruined structures present.

In terms of the Krugersdorp Town Planning Scheme 1980, the existing zoning of the property is agricultural. The site is surrounded with small farm portions used for rural residency and variable commercial activities. South of the site along Malibongwe Drive is the residential township of Cosmo City and the industrial townships of Mostyn Park and Kya Sands while Lanseria International Airport is situated north of the site along with a small shopping centre and industrial activities.

Stormwater outlets from high lying areas discharges onto the property: largely due to the depression through the middle of the property along with the natural stream flowing north through the site. An environmental specialist study was completed resulting in a demarcated wetland area and the associated buffer strip, regarded as environmentally sensitive and should be isolated from any developmental endeavours.

Available geological maps indicate that the area of investigation is underlain by Granite of the Johannesburg Granite Dome. The granite has been intruded by diabase in places. The geotechnical investigation carried out indicated the soil composition of the site is suitable for the proposed development and no major concerns regarding soil integrity have been identified.

4. PROPOSED DEVELOPMENT

The increasing fuel costs, implementation of the e-toll system on Gauteng Freeways and the increasing capacity of Lanseria International Airport, favours large retail businesses to establish distribution warehouses on the western side of Johannesburg.

Portion 366 of the Nooitgedacht farm forms the basis of this application and is ideally situated in terms of the N14, Malibongwe Drive and Lanseria International Airport. The site further favours

the distribution sector by providing easy access to Western Johannesburg (Roodepoort and Randburg) and Pretoria.

The developer/owner intends establishing a distribution warehouse that will cover 15% of the total farm portion. To establish and operate the warehouse successfully, the retail companies require a minimum storage area of 28 000m^2 as previously stated.

Further to the proposed development, the distribution warehouse adheres to the Spatial Development Framework by reconciling with the existing developments around Portion 366. The land use will also refrain from establishing any noxious industries posing harmful to both the environment and surrounding developments. Service industries have already coined the area appropriate for storage facilities as a vital and economical hub for establishing distribution networks.

5. EXISTING INFRASTRUCTURE

5.1 Water Supply

The proposed development can be provided with existing water services directly from the Mogale City Local Municipality (the Water Authority and Water Service Provider of the area). Two connection points exists; one to the far north close to the N14 and another south of the R114.

Detailed information relating to the exact position and residual pressures of the two connection points could not be obtained from independent consultants, Messrs. Pro Plan, previously appointed by the Municipality for its water and sanitation master planning in the region prior to conclusion of this report.

Both the Municipality and the master planners confirmed that the residual pressure in the existing pipelines will probably necessitate on-site storage and possibly pumping to the storage facility. The exact connection point is unclear, with Municipal officials claiming same to be adjacent to the development site and the master planners claiming same to be approximately 1000m from the development site.

5.2 Sewerage

There is no existing available bulk sewerage infrastructure (under the control of the Mogale City Local Municipality) near the development site.

The City of Johannesburg's Water Service Provider (Johannesburg Water) possess, operate and maintain internal, link and regional sanitation infrastructure in areas adjacent to the municipal boundary. A natural watershed separates the development site from this infrastructure.

5.3 *Road and Stormwater infrastructure*

The main access to the development site is currently from the R114 approximately 340 meters west from the Malibongwe Drive and R114 intersection. According to discussions held with the Gauteng Provincial Department of Roads and Public Transport's (Gautrans') Intersection and Access Committee the current alignment of the R114 is labeled as a holding strategy, with development approvals being based on its revised/future alignment.

Multiple stormwater culvert crossings exist across both the R512 and the R114, all draining north towards Portion 366.

5.4 *Electricity*

The availability of existing electrical infrastructure and any additional infrastructure that may be required for the proposed development is addressed in a separate report prepared by independently appointed electrical engineers.

6. PROPOSED FUTURE BULK SERVICES

Mogale City Local Municipality is currently reviewing their master planning for the area which includes the proposed development site. The future bulk servicing (addressed in this section of the report) is taken from the master planning completed to date by the Municipality. Other possibilities were investigated and mentioned. Most upgrade projects remain long term future objectives.

6.1 *Water Supply*

As previously stated, Mogale City local municipality contains two bulk supply lines exist to the north and south of the development site. It was understood from the Municipality that the two supplies will in the future be connected to form a ring feed in the area.

The proposed development for a distribution warehouse is classified by the Guidelines for Engineering Services and Amenities in Residential Township Development ("Red Book") as a high risk development. Similarly, in accordance with the SANS 10090 Code of Practice a minimum fire hydrant flow of 9 000 liters per minute (33.33 lt/sec) will be required.

The code of practice also specifies required on-site storage equivalent to 6 hours fire flow. It is therefore proposed that a storage tank of 55 000 liters (55.0m^3) be erected on the development site. The required storage facility will include 1,000 liters storage for human consumption (estimated at 100lt/capita/day for 10 No. personnel).

Currently the storage facility is estimated to cost R 400,000.00 excluding VAT, this amount excludes foundations, pipework and pumping equipment (should this be required).

6.2 *Sanitation*

The Municipality's sanitation master planning for the area aims to have a Mogale City owned and operated wastewater treatment works (WWTW) operational by 2018, with environmental authorization processes already underway. The capital cost of the proposed WWTW is currently estimated to be R280 million.

The Municipality is not investigating the provision of any interim services in this regard. The Municipality has also indicated that it will not consider/approve the establishment of package plants (due to failed plants installed in other developments within their area of jurisdiction).

Johannesburg Water was contacted to investigate the possibility of connecting to CoJ owned infrastructure. Johannesburg Water is not in favour of "single developer" cross border agreements but advised that it may consider same if several developers were found to require same. Johannesburg Water confirmed that in any event such agreement would need to be initiated by and signed with the Mogale City Local Municipality.

Based on the proposed land use (and associated sewage discharge from the development site) the use of a conservancy tank was proposed and accepted (in principle) by Municipal officials. Based on a daily discharge of 700 lt a conservancy tank of 6000 liters is proposed. Based on current tanker sizes this with require de-sludging of the conservancy tank three times a month. The current operational cost of same is estimated at approximately R5,700.00 per month.

Currently, a pre-manufactured PVC conservancy tank is estimated to cost R31,000.00 excluding VAT. This amount excludes installation as well as any adverse site conditions.

6.3 *Road and Stormwater infrastructure*

The development site is situated at the north-east corner of the Malibongwe Drive (R512) - R114 intersection. Previously mentioned in section 5.3, the current alignment of the R114 in accordance to Gautrans is labeled as a holding strategy and destined to change with all upgrades or extensions to the R114 to be conducted in accordance with Gautrans' regional planning. (See Annexure C).

As mentioned previously under point No.3, multiple stormwater culvert crossings exist across both the R512 and the R114, all draining north towards Portion 366.

Any development should take the 1:100 year recurrence interval flood into consideration, providing appropriate stormwater crossings where required.

Gautrans' Intersection and Access Committee has indicated that should the farm portion be developed under a formal townplanning application that access will need to be obtained from the existing approved access point on the R512.

An independent study with further input from Gautrans was conducted under a separate appointment made with regards to access to the proposed development.

6.4 Electricity

As previously stated, the availability of existing electrical infrastructure and any additional infrastructure that may be required for the proposed development is addressed in a separate report prepared by independently appointed electrical engineers.

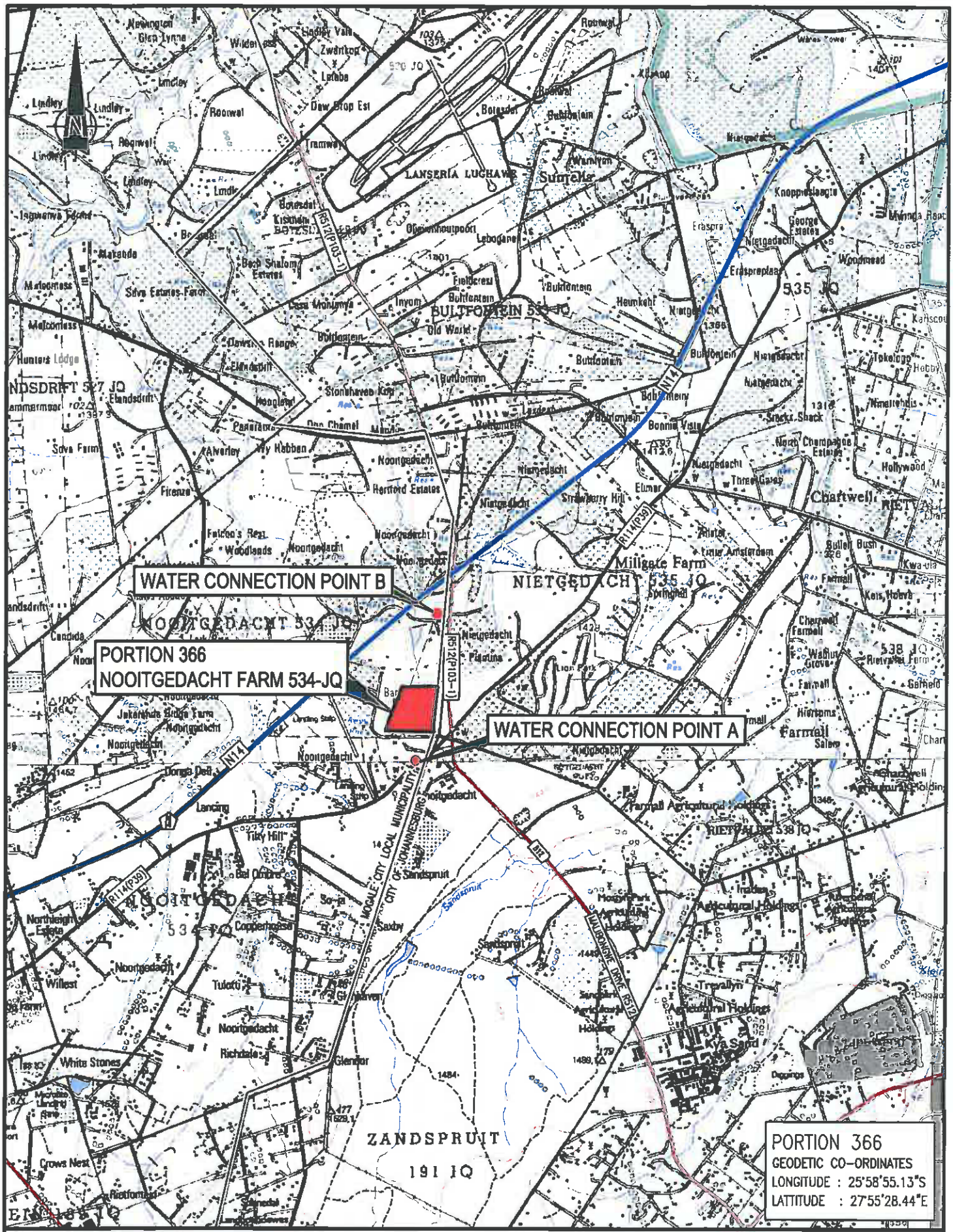
7. CONCLUSION

Bulk services to the proposed development are generally not available and planned ultimate solutions to same will cost substantial amounts to implement. These services will be covered by bulk service contributions to be paid by the developer and other developers in the area.

Interim service solutions for provision of water and sewer infrastructure have been proposed in this report, (which have been discussed with Municipal officials) can be implemented pending the completion of the planned bulk infrastructure.

ANNEXURE A

Locality Plan



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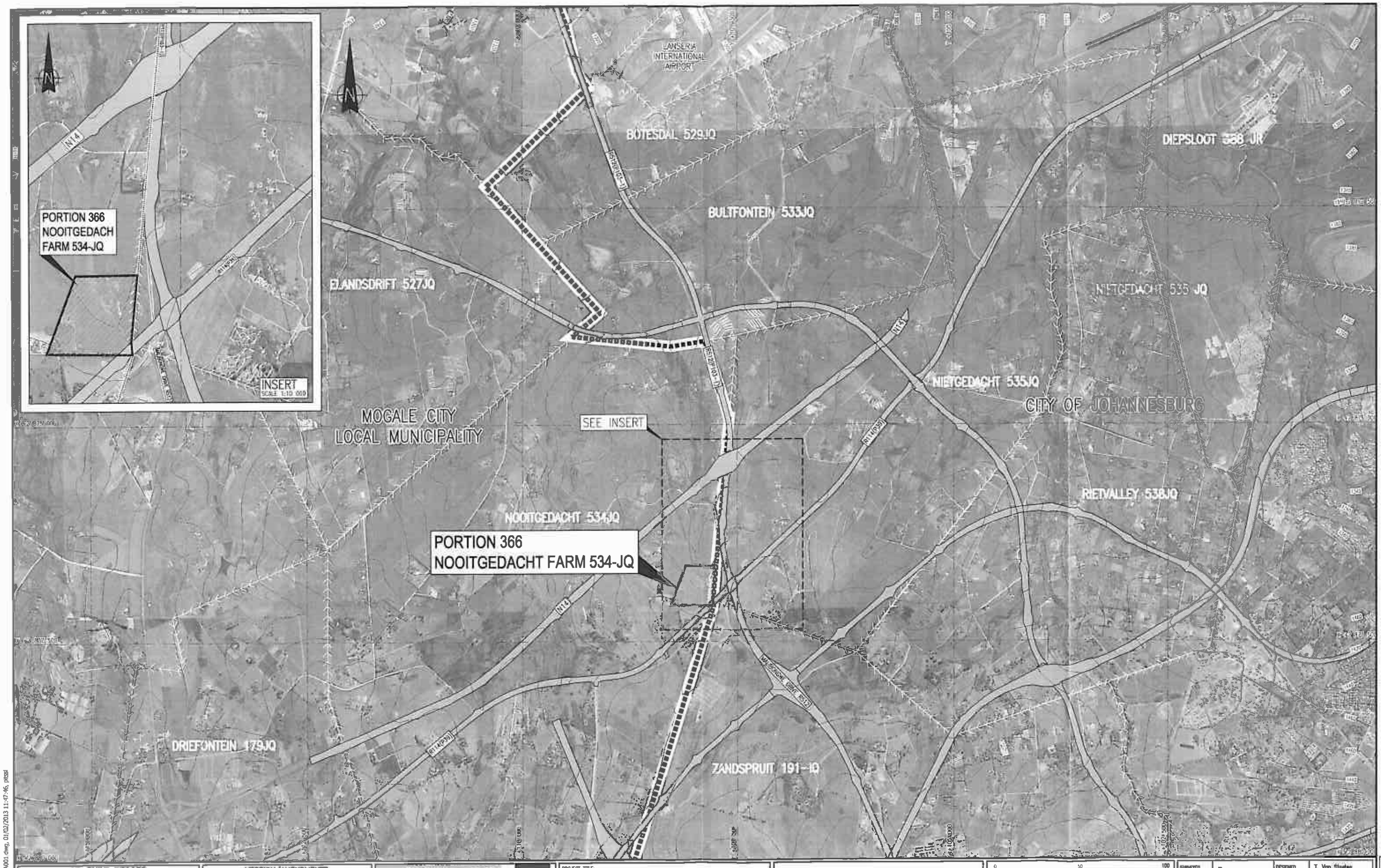
PROJECT:
PROPOSED DEVELOPMENT OF PORTION 366

DWG TITLE:
LOCALITY PLAN

DRAWN:	CHECKED:	APPROVED:	SCALE:	DATE:	DWG No:	VER:
S.L. Pitse	T. van Straten	D.O. Storbeck	1:50 000	January 2013	2043.00.ZA.01.S001	1.0

ANNEXURE B

Regional Road Context Plan



AS-BUILT RECORD			
CONTRACT No.	DESCRIPTION	CERTIFIED BY	DATE

CERTIFIED AS-BUILT FOR CONTRACT :

ENGINEER DATE

VERSION/AMENDMENTS			
No.	DATE	DESCRIPTION	AUTHORISED BY

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BIGEN AFRICA

PROJECT TITLE:
PROPOSED DEVELOPMENT OF PORTION 366

DRAWING TITLE:
REGIONAL ROAD CONTEXT PLAN

WESPLAN & ASSOCIATES
KONSULTANT STADS- EN STREEKBEPLANNERS
TOWN AND REGIONAL PLANNING CONSULTANTS
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ORIGINAL DRAWING SCALE:	1:20 000	ORIGINAL DRAWING SHEET SIZE:	A1
SURVEYED	–	DESIGNED	T. Van Straten
DRAWN	S.L. Pitso	CHECKED	D.O. Sterbeck
CO-ORDINATE SYSTEM:	WGS Lo29	DATE:	January 2013

APPROVED:
CLIENT OR ASSIGNEE: DATE:
CLIENT DRAWING No.: CLIENT REF No.:

APPROVED ON BEHALF OF BIGEN AFRICA:
ENGINEER: DATE:
DRAWING No.: 2043.00.ZA.03.A001
VERSION: A.0

2043.00.ZA.03.A001

ANNEXURE C

Correspondence with External Parties

van Straten, Tertius

From: Storbeck, Dieter
Sent: 20 February 2013 05:35 PM
To: Andre(Wesplan) (andre@wesplan.co.za)
Cc: van Straten, Tertius
Subject: FW: 2043-20-00 Nooitgedacht Water & Sanitation Information

Hi Andre,

I hope you are well.

Further to our telephonic discussion w.r.t. the Nooitgedacht project and the client's request for a land use change to 30,000m2 warehousing.

As discussed previously the Municipality's sanitation master planning in the area aims to have a Mogale City WWTW operational by 2017/2018. Until then, it each man for himself. The size of plant their looking to construction will cost in the order of R 250 million.

In previous discussions, we've used 500lt/100m2 of office space to determine the sewer discharge for the development. For warehousing there are not guidelines w.r.t. sanitation discharges. We have therefore opted to used 70 lt/person/day which we think we can get past the municipality. This brings the need for infrastructure down to a conservancy tank with "honey suckers" removing the effluent once a month (depending on the size of tank installed). The operational cost as shown below is negligible.

What we need to note is that warehousing is considered a high risk category i.t.o. fire fighting standards. As mentioned earlier, from discussions with the municipality, there is water in the area but the pressure will not suffice/permit direct draw-off for instantaneous demands or for fire flow. On-site storage will be needed. A 55m3 tank will probably cost in the order of R400k excluding foundations and pipework.

We will make a point of jotting down all the discussions held with the municipality to date in a draft services report to assist in further decision making on the project.

I trust the above is in order.

Regards

Dieter Storbeck Pr Eng
Principal
Bigen Africa Services (Pty) Ltd

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Persequor, Pretoria

Postal Address:
PO Box 29
The Innovation Hub
Pretoria, 0087

From: van Straten, Tertius
Sent: 20 February 2013 04:02 PM
To: Storbeck, Dieter
Subject: 2043-20-00 Nooitgedacht Sanitation Information

Dieter,

SANITATION

Based on our calculations this morning:

70 l/person per day @ 10 people = 700l/day equates to 18 200 l/month [26-days]

Average industry Tanker removal size = 6000L

Thus 18200/6000 = 3/month, with a rate of R1640.00 for 6000 L – excluding vat

Total Cost/ month = R4 920.00 or **R5 608.80** incl. VAT

The Quote is from **Septic Tank Cleaners** based in Mogale City

Disposal site is Sutherland Reach.

WATER

Referring to SANS 10090

- High Risk Development
- Required 9000L/min = 150l/sec
- Min Hydrant flow = 2000L/min or 33.33L/sec
- Fire Flow Duration for high risk environments = 6-hours
- Storage Tank Required incl. 1000l for consumption = 55 000 l tank or 55m^3 [6-hour fire flow duration]

Kind Regards

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Please consider the environment before printing this email

van Straten, Tertius

From: Storbeck, Dieter
Sent: 05 February 2013 09:28 PM
To: Andre (Wesplan)
Cc: 'Bokamoso'; van Straten, Tertius
Subject: RE: Ptn 366 Nooitgedacht

Hi Andre,

We've estimated that a 1.5ML/day WWTW will be required to treat the discharge from Dave's development and the development directly north, i.e. Mogale X5. An activated sludge WWTW to accommodate this discharge is estimated to cost R15 million excluding contingencies, fees and VAT. Approximately R22.0 million all inclusive.

We will engage with Johan van Eck w.r.t. the apparent sanitation upgrading works you mentioned yesterday. We hope to see him tomorrow and will then also ask him if he is aware of any other developments in the area that will possible drain to a local WWTW.

I'm not sure if the town planning processes will have any effect on the engineering infrastructure required, i.e. I think we will still need to provide service connections to each "erf" or sub-portion. We will check this with Johan too.

Regards

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From: Andre (Wesplan) [mailto:andre@wesplan.co.za]
Sent: 04 February 2013 03:07 PM
To: Storbeck, Dieter
Cc: 'Bokamoso'
Subject: Ptn 366 Nooitgedacht

Dieter,

I had a discussion with Dave Mitchell on my way back from Pretoria. He sees the requirement of a sewerage treatment works as an opportunity to open up the area for development. He feels that if he provides a wwtw, other developers can pay him to link to his wwtw. I don't know how feasible or affordable this might be.

Can you please investigate and provide us with information about the following by the end of the week:

1. What will the cost be to establish a wwtw for his development and other developments in the area?
2. Is there any Mogale City sewer line in the close proximity of the site that his development can link to, because according to the town planning section there is.
3. How many developers would be sufficient to request Mogale City to negotiate a cross border arrangement with JHB Water?
4. If we only go the route of a consent land use on the property, instead of a full township, what will the requirement of Council be to deal with the sewer and should we then still link with municipal water?

I will try again to obtain a copy of the report that I believe Bigen Africa did for the old application on Mogale Ext 5. If we have the above information we can take an informed decision regarding the way forward for this application.

Regards

Andre Enslin
Wesplan & Associates
0824169323
0119531082

van Straten, Tertius

From:	van Straten, Tertius
Sent:	18 March 2013 04:49 PM
To:	'Arno Coetzer (arno@proplansa.co.za)'
Cc:	Storbeck, Dieter
Subject:	2043-00-00 Nooitgedacht Farm 534-JQ, Portion 366 Distribution Warehouse, Water Connection Points
Attachments:	2043.00.ZA.01.S001.pdf; Water Connection Points Arial Photo.pdf

Tracking:	**Recipient**	**Read**
	'Arno Coetzer (arno@proplansa.co.za)'	
	Storbeck, Dieter	Read: 2013/03/18 10:08 PM

Hi Arno,

The following project applies:

PROPOSED DEVELOPMENT OF PORTION 366 OF THE FARM NOOITGEDACHT NO 534 JQ, MOGALE CITY

Background:

Our client Wesplan & Associates are in the process of establishing a distribution warehouse of 28 000 m^2 on Portion 366 of the Nooitgedacht Farm 534-JQ.

The proposed development is located approximately 200-meters north-east of the R512 (Malibongwe Drive) – R114 interchange and 1.4 kilometres south-west of the N14 – Malibongwe Drive interchange. The Lanseria airport is situated north of the Site.

Bigen Africa is appointed by Wesplan & Associates to prepare an outline scheme report for the development with regards to services available in the area.

We had a meeting with Johann van Eck and Org from Mogale City Municipality on the 14th February 2013, we understand you compiled the master planning for Mogale City?

We kindly require the available water pressures in the area shown as water connection point A and point B. [As indicated on the attached locality plan and Arial Photo Plan]

We further understood from the Municipality that two connection water points exist within the designated area, one north toward Lanseria and the N14 and one south of the R114 (P39) all respectively in relation to our development.

We will appreciate any assistance you can give on this matter.

Kind Regards

Tertius van Straten
Engineer (Candidate Techn.)
Bigen Africa Services (Pty) Ltd
Tel: +27 (0)12 842 8763
Fax: +27 (0)12 843 9001
Mobile: +27 (0)84 267 5574
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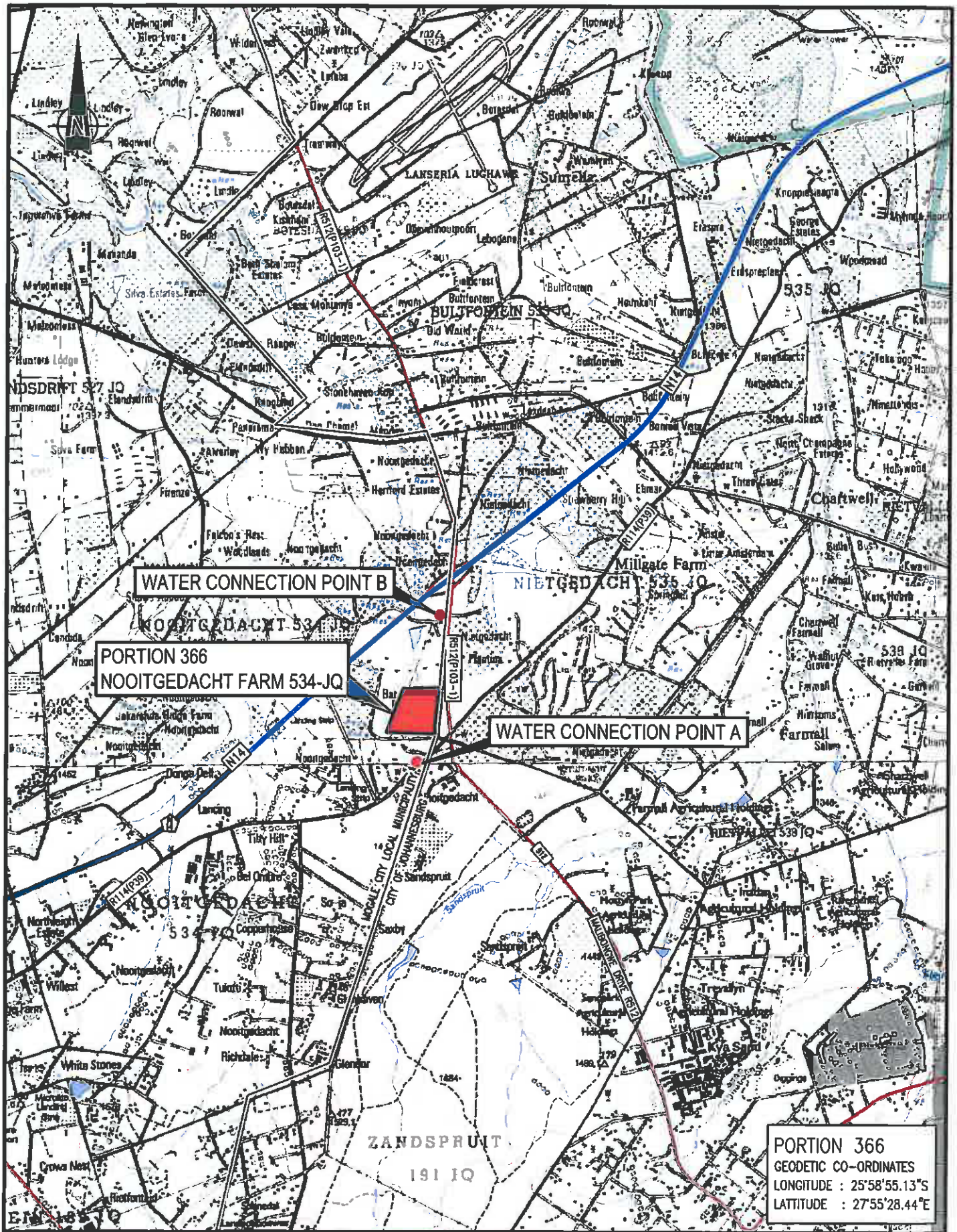
PO Box 29, Innovation Hub, 0087, South Africa

Please consider the environment before printing this email



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PROJECT: PROPOSED DEVELOPMENT OF PORTION 366

DWG TITLE: LOCALITY PLAN

DRAWN:	CHECKED:	APPROVED:	SCALE:	DATE:	DWG No:	VER:
S.L. Pitse	T. van Straten	D.O. Storbeck	1:50 000	January 2013	2043.00.ZA.01.S001	1.0

Distribution Warehouse Development of Portion 366 – Nooitgedacht Farm 534-JQ

van Straten, Tertius

From: van Straten, Tertius
Sent: 08 February 2013 10:29 AM
To: Storbeck, Dieter
Subject: 2043-00-00 Nooitgedacht Portion 366 Development

Dieter,

A quick breakdown of the telephonic discussion with Johann van Eck this morning;

Sewer:

- No sewer upgrades, bulk services planned or currently implemented including the area between the N14 and R114.
- Johan reinforced the issue on not allowing/approving package plants or something similar.
- He is in favour of the WWTW especially if developers opt to build it (not surprized at all), and naturally a 2 Ml sized works was what "they had in mind".....quick thinking from his side after my 1.5Ml comment.....
- They will also consider maintenance contracts with the developers, and what I failed to ask or understand; this contract agreement; will the municipality maintain the WWTW or does that unfairly fall on the developer's shoulders too.
- He also mentioned that he would want developments to the north, also to drain to this WWTW.
- We can find out from the local city planners about developments approved or in process of approval; Johann said he can supply us with the town planner info.

Water:

- The water won't be a problem, bulk connection points exist in the area and Johann or Org, will identify the reservoirs and overall water infrastructure in the area.

Johann also requested that I phone him around 12 on Monday to finalise the meeting preferably for Tuesday, 12 February 2013, 8 to 9, alternatively later in the week. He is not in favour of a Monday afternoon meeting but will tolerate it.

Kind Regards

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PO Box 29, Innovation Hub, 0087, South Africa

Town Planning Memorandum

MEMORANDUM

PROPOSED SPECIAL CONSENT ON PORTION 366 OF THE FARM NOOITGEDACHT 534 JQ, MOGALE CITY

1. **INTRODUCTION**

The purpose of this application is for the Special Consent from the Mogale City Local Municipality on **Portion 366 of the farm Nooitgedacht 534 JQ, Mogale City** for the establishment of **a distribution warehouse.**

This application is lodged in terms of Clause 14 of Krugersdorp Town Planning Scheme, 1980 and will be advertised in the Beeld and Star newspapers on **12 and 19 March 2013.**

2. **PARTICULARS OF THE PROPERTY**

2.1 **Locality of the property**
The property is located on the corner of Malibongwe Drive (R512) and the old Krugersdorp / Pretoria Road (R114) just south of the N14 Highway between Krugersdorp and Pretoria. (See Locality map).

2.2 **Access to the property**
Access to the property is obtained from a right-of-way servitude from the R114.

2.3 **Size of property**
The property is **19,2852ha** in extent.

2.4 **Owner of property**
The property is registered in the name of **Kafue River Trading (Pty) Ltd.**

2.5 **Deeds of Transfer**
The property is held under Deed of Transfer **T003541/2008.**

3. EXISTING ZONING AND USE OF THE PROPERTIES

3.1 Existing zoning

In terms of the Krugersdorp Town Planning Scheme 1980, the existing zoning of the property is **"Agricultural".**

3.2 Adjoining land uses

The property is surrounded with small farm portions that are used for rural residency and a variety of commercial activities. To the south of the property along Malibongwe Drive are the residential township of Cosmo City and the industrial townships of Mostyn Park and Kya Sands. North of the property along Malibongwe Drive are a small shopping centre, industrial activities and the Lanseria International Airport. East of the property is a large informal settlement and the Lion Park Nature Reserve.

3.3 Existing use of the property

The property is currently developed with one dwelling house and outbuildings.

4. APPLICATION

Application requested

This application is for the Special Consent of the Council to establish **a distribution warehouse on Portion 366 of the farm Nooitgedacht 534 JQ, Mogale City.**

5. NECESSITY AND DESIRABILITY OF THE APPLICATION

This application can be motivated as necessary and desirable by the following:

5.1 The owners of the property has become aware of the new trend of large retail businesses to establish distribution warehouses on the western side of the City of Johannesburg, as a result of increased fuel cost, the e-toll system on Gauteng Freeways, the increased capacity of Lanseria International Airport and more affordable land costs on the outskirts of the City of Johannesburg.

5.2 The property that forms the basis of this application is ideally situated in terms of the N14, Malibongwe Drive and Lanseria International Airport to be very accessible to the far West Rand (Krugersdorp and Randfontein), the western part of Johannesburg (Randburg and Roodepoort) and Pretoria in terms of a distribution network.

5.3 It is the intention of the owners of the property to establish a distribution warehouse on the property that will cover 15% of the area of the property as the retail companies require a minimum area of 28 000m^2 for distribution warehouses in order to establish and operate the warehouses successfully.

5.4 The property can be provided with the required 2,5MVA electricity from Eskom for the proposed distribution warehouse. An electrical outline scheme report in this regard will be provided to the Council shortly.

5.5 The proposed development can be provided with water services directly from the Mogale City Local Municipality and the required water reservoirs will be constructed to cater for the required minimum fire flow storage of water on-site.

5.6 Sanitation services will be handled by means of a conservancy tank system that will be emptied on a regular basis as and when required until the Mogale City Local Municipality can provide sanitation services to the newly planned waste water treatment works in Lindley. An outline scheme report regarding water & sanitation services and storm water management will be provided to the Council shortly.

5.7 Access to the property will take place from the existing gravel road from the R114, although this road will be upgraded to the requirements of the Council. A Section 7 Report regarding access to the property will be submitted to the Council and the Gauteng Department of Roads and Transport, as two provincial roads will influence the access to the property.

5.8 An application for environmental authorization for the proposed development is in process and the Record of Decision from the Gauteng Department of Agriculture and Rural Development will be provided to the Council as soon as it becomes available.

5.9 The purpose of this application is to go through an uncomplicated process to obtain the required consent use rights for a distribution warehouse within a short period of time, to enable the land owner to accommodate one of the large retail groups to establish their distribution warehouse on the property. If required by the Council, a process of township establishment will follow on the successful consent use application in order to secure the land use rights and engineering services through a more formal process.

5.10 As a result of the minimum requirements of the large retail groups, this application is for an allowable overage of 15% on the property, instead of the “normal” 10% coverage. It is believed that due to the size of the property, the availability of engineering services and access to the property the proposed coverage can easily be accommodated on the property without a negative influence on the property itself or any of the surrounding properties.

5.11 From the environmental specialist studies that was done, only the demarcated wetland area and its associated buffer strip is regarded as environmentally sensitive and should be kept isolated from the proposed development. The cultural heritage study did not indicate anything of cultural heritage importance on the property to be protected. This means that the majority of the property is suitable for the proposed development of a distribution warehouse.

5.12 The geotechnical investigation that was completed indicated that the soil composition of the property is suitable for the proposed development of a distribution warehouse and that no major concerns regarding the soil integrity have been identified.

5.13 The property is situated within an area that has been identified in the Mogale City Spatial Development Framework to be a Future Transition Zone, which is situated between the N14 Primary Development Corridor and the Urban Support Zone. This means that the property will form part of the proposed nodal development at the intersection of the N14 Highway and Malibongwe Drive and will also form part of the integration of land use activities between Mogale City and the City of Johannesburg.

5.14 In terms of the SDF, the proposed land uses should be reconcilable with the existing character of the area and no noxious industries or any land use that will be detrimental to the natural environment will be allowed. The proposed distribution warehouse will fit in with the character of the area that is earmarked by service industries and

storage facilities. The proposed development will not be in any way detrimental to the natural environment.

5.15 The positive development of this largely vacant property will not only create economic development with the establishment of a large retail group establishing a distribution warehouse within the boundaries of Mogale City, but will also contribute to the general appearance of the area, act as a catalyst for further development of the node, and prohibit the potential location of an informal settlement on the property.

5.16 The proposed development is in line with the Chapter 1 development principles of the Development Facilitation Act, 1995 in that it will create economic development, create employment and residential activities in close proximity to each other, make maximum use of existing infrastructure and concentrate non-residential uses within identified nodal areas.

Seen against the above motivation and the contribution the proposed development can make to the local economy of Mogale City, the Council is requested to give this application their favorable consideration.

Electrical supply

TEL: (016) 981 6270 / FAX: (016) 933 0277
P O BOX 3925 / VANDERBIJLPARK / 1900

LYON VENNOTE PARTNERS

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CESA

RAADGEWENDE ELEKTRIESE INGENIEURS & PROJEKBESTUURDERS
CONSULTING ELECTRICAL ENGINEERS & PROJECT MANAGERS

Our ref.: B 1265 1 July 2013

Wesplan & Associates
P O Box 7149
KRUGERSDORP
1741

For the attention of: Mr Andre Enslin

Sir

PORTION 366, NIETGEDACHT 534 JQ

With reference to the Electrical Bulk supply for Portion 366 Nietgedacht 534 JQ, I herewith confirm my discussion with Mr. Siphesihle Satimburwa of Eskom on 26 June 2013, as follows:

1. From the existing line, a 2 000 kVA supply can be made available immediately as indicated on the picture below:
2. The final 5 000 kVA supply required for the development, can be made available in 2015/16 with a new line to be build from Cosmo substation as indicated below.

We can therefore confirm that a 5 000 kVA supply will be available for the proposed development.

Eskom will only be able to give a feasibility cost for the supplies after 18 July 2013 when the project will be submitted to the Planning Review Meeting.
Yours faithfully

LYON & PARTNERS (Pty) Ltd

H STORM Pr Techni Eng, Pr CPM

Copy to:

F:\BROOD\Brood 2012\B 1265 Ptn 366, Nietgedacht 534 JQ\Korrespondensie\Brief Wesplan - Andre Enslin 2013.07.01.doc

Environmental Management Plan (EMP)

October
2013

Final Environmental Management Plan (EMP) for the Proposed Development of Portion 366 of the Farm Nooitgedacht 534 JQ; Mogale City

Ref No. GAUT: 002/13-14/E0315

BOKAMOSO
LANDSCAPE ARCHITECTS &
ENVIRONMENTALCONSULTANTS CC
P.O. BOX 11375
MAROELANA
0161
TEL: (012) 346 3810
Fax: 086 570 5659
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1 Project Outline

1.1 Background

Bokamoso Environmental Consultants was appointed by ***Kafue River Trading (Pty) Ltd*** to compile a basic assessment report for the proposed development on **Portion 366 of the Farm Nooitgedacht 534 JQ, Mogale City** as well as its associated activities.

1.2 Project description

The proposed development of **Nooitgedacht 534 JQ Portion 366, Mogale City** is situated in the Mogale City area.

This property will be developed as an industrial and commercial development zone.

The establishment of land use rights for Industrial Purposes includes the assembling of products, the re-packaging of products and as distribution centres.

The Total extent of the proposed development area is approximately **4.2 ha** and is located in the area of jurisdiction of the **Mogale City Local Municipality** in **Gauteng Province**.

(Refer to Figure 1 for the Locality Map and Figure 2 for the Aerial Map)

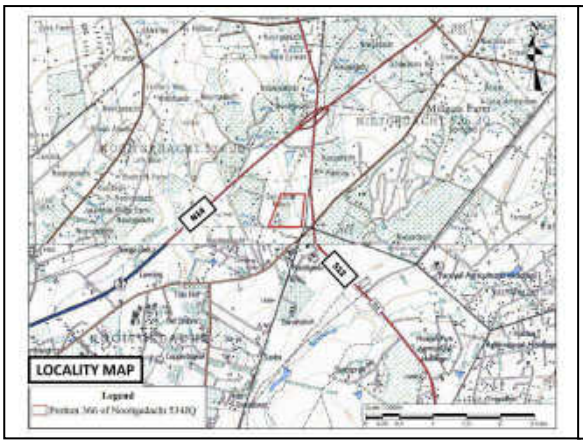


Figure 1: Locality Map

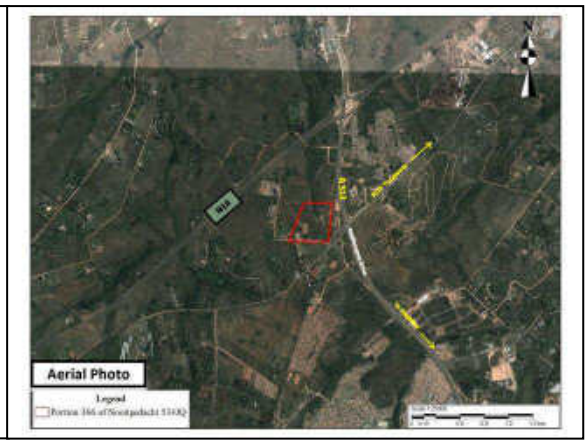


Figure 2: Aerial Map

Timeframe for construction:

Construction will commence as soon as the amendment application for Environmental Authorization has been concluded. The developer will be responsible for the on-site activities. The EMP will be a binding document for purposes of compliance.

1.3 Receiving Environment

Hydrology:

The study area falls within the Crocodile (west) and Marico Water Management Area (WMA). A shallow valley, comprising of a non-perennial stream, traverses the site from north to south. No groundwater seepage was noted in all the test pits.

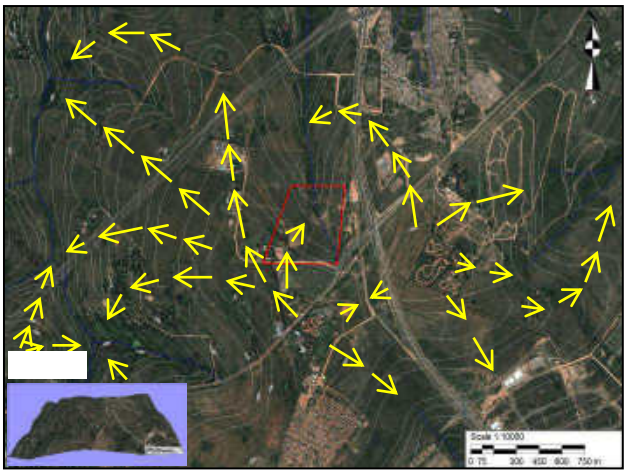


Figure 3: Hydrology Map

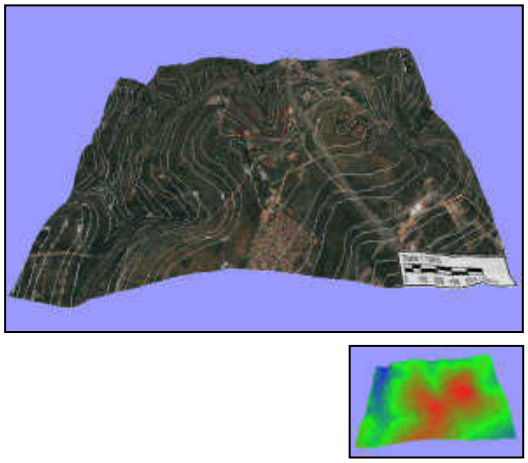


Figure 4: 3D Map

Fauna and flora:

Plants

The application site falls within the Grassland biome, Mesic Highveld Grassland Bioregion and falls within the Egoli Granite Grassland vegetation type (which is considered as an endangered vegetation type). According to a desktop study, three preliminary habitat units were identified namely the Wetland Habitat Unit, the Open Grassland Habitat Unit and the Transformed Habitat Unit. Throughout the wetland feature, anthropogenic activities have likely lead to vegetation transformation and alien vegetation encroachment.

Evidence of trampling, erosion and irregular fires is evident throughout the Open Grassland Habitat Unit and the grassland present is not expected to be in a very good ecological condition due to disturbances and related edge effects likely to have affected plant species composition and ecological functioning. Grassland areas are expected to be of a rocky nature.

Alien plant species associated with residential landscaping are likely to dominate. Medicinal plant species are expected to occur within the subject property.

Mammals & Birds

Common small mammal species like the Scrub Hare, Southern African Spiny Mouse and the Yellow Mongoose might occur within the subject property, which are not regionally threatened species (GDARD) and are considered as least concern by the IUCN.

It is not likely that any RDL or sensitive mammal species will utilise the area within or directly adjacent to the proposed development area for habitation or foraging purposes due to the high levels of transformation and anthropogenic activity. Thus, the proposed development does not pose a threat to mammal conservation in the area.

The majority of bird species adapted to urban environments and is regarded as common and widespread species which are likely to remain in the area or move to areas that are more suitable if any development takes place.

The proposed development does not pose a threat to bird, some reptile, arachnid and scorpion conservation in the range of the proposed development project. **(Refer to Figure 5: C-Plan Map below)**

Figure 5: C-Plan Map

Cultural /Historical:

No pre-colonial heritage sites, cultural significance, restrictions or negative impacts were found on the site.

Visual:

The construction phase will cause a visual impact and must be mitigated accordingly.

Geology:

The site is underlain by granitic rocks and typically these Archaean intrusive igneous rocks are cross cut by diabase dykes of various ages, and may contain a prominent structural fabric.

Depth of weathering in granitic rocks is highly variable, with the possibility of corestone remnants. Patches of highly collapsible and kaolinised residual soils are common, particularly in the elevated areas above 1600 mamsl. **(Refer to Figure 6: Soils Map below)**

Figure 6: Soils Map

Wetlands:

A wetland habitat unit was identified which falls mainly within the A21E quaternary catchment and the south eastern section falls within the A21C quaternary catchment. The specialist suggested a 30m buffer around the delineated wetland. The wetland area and suggested open space should be regarded as open space. There seems to be existing crossings over the wetland stream and therefore there is some impact on the stream connectivity. Due to these impacts, mainly anthropogenic, it is likely that alien plant infestations have already occurred.

As mentioned earlier, the wetland habitat comprises of two quaternary catchments, namely A21E and A21C. The A21E quaternary catchment on site is of moderate ecological importance and sensitivity as it is considered Class C present ecological status, hence a moderately modified stream. The A21C catchment on the site is of moderate ecological importance and sensitivity as it is considered Class D present ecological status, thus a largely modified steam. According to the databases used for aquatic ecology the followings findings were made:

- The proposed developments site falls within the Crocodile (west) and Marico Water Management Area (WMA);

- No NFEPA wetlands are identified within the study area;
- No wetland clusters of conservation importance within the study area; and
- No RAMSAR wetlands within or close to the study area.

EMP context

This EMP fits into the overall planning process of the project by carrying out the conditions of consent set out by the Gauteng Department of Agriculture and Rural Development. In addition, all mitigation measures recommended in the Basic Assessment report are included in the EMP.

This EMP addresses the following three phases of the development:

- Pre-construction planning phase;
- Construction phase; and
- Operational phase.

2 Monitoring

In order for the EMP to be successfully implemented all the role players involved must have a clear understanding of their roles and responsibilities in the project.

These role players may include the Authorities (A), other Authorities (OA), Developer/proponent(D), Environmental Control Officer (ECO), Project Manager (PM), Contractors (C), Environmental Assessment Practitioner (EAP) and Environmental Site Officer (ESO). Landowners interested and affected parties and the relevant environmental and project specialist's area also important role players.

3 Roles and responsibilities

3.1 Developer (D)

The developer is ultimately accountable for ensuring compliance with the EMP and conditions contained in the ROD. The developer must appoint an independent Environmental Control Officer (ECO), for the duration of the pre-construction and construction phases, to ensure compliance with the requirements of this EMP. The developer must ensure that the ECO is integrated as part of the project team. The responsibility of compliance will be carried across to the individual property ownersas soon as transfer of the erven has taken place. It will be ensured that a copy of this document accompanies the purchase agreements for the erven.

3.2 Project Manager (PM)

The project Manager is responsible for the coordination of various activities and ensures compliance with this EMP through delegation of the EMP to the contractors and monitoring of performance as per the Environmental Control Officer's monthly reports.

3.3 Environmental Control Officer (ECO)

An independent Environmental Control Officer (ECO) shall be appointed, for the duration of the pre-construction and construction phase of the services and bulk infrastructure, by the developer to ensure compliance with the requirements of this EMP. Thereafter the individual property owners will be responsible for the further appointment of the ECO.

- The Environmental Control Officer shall ensure that the contractor is aware of all the specifications pertaining to the project;
- Any damage to the environment must be repaired as soon as possible after consultation between the Environmental Control Officer, Consulting Engineer and Contractor;
- The Environmental Control Officer shall ensure that the developer staff and/or contractor are adhering to all stipulations of the EMP;

- The Environmental Control Officer shall be responsible for monitoring the EMP throughout the project by means of site visits and meetings. This should be documented as part of the site meeting minutes;
- The Environmental Control Officer shall be responsible for the environmental training program;
- The Environmental Control Officer shall ensure that all clean up and rehabilitation or any remedial action required, are completed prior to transfer of properties;
- A post construction environmental audit is to be conducted to ensure that all conditions in the EMP have been adhered to.

3.4 Contractor (C):

The contractors shall be responsible for ensuring that all activities on site are undertaken in accordance with the environmental provisions detailed in this document and that sub-contractor and laborers are duly informed of their roles and responsibilities in this regard.

The contractor will be required, where specified to provide Method Statements setting out in detail how the management actions contained in the EMP will be implemented.

The contractors will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the environmental regulations.

3.5 Environmental Site Officer (ESO):

The ESO is appointed by the developer and then finally the owners of the individual properties as his/her environmental representative to monitor, review and verify compliance with the EMP by the contractor. The ESO is not an independent appointment but must be a member of the contractor's management team. The ESO must ensure that he/she is involved at all phases of the construction (from site clearance to rehabilitation).

3.6 Authority (A):

The authorities are the relevant environmental department that has issued the Environmental Authorisation. The authorities are responsible for ensuring that the monitoring of the EMP and other authorization documentation is carried out by means of reviewing audit reports submitted by the ECO and conducting regular site visits.

3.7 Other Authorities (OA):

Other authorities are those that may be involved in the approval process of the EMP.

3.8 Environmental Assessment Practitioner (EAP):

According to section 1 of NEMA the definition of an environmental assessment practitioner is "the individual responsible for the planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management plans or any other appropriate environmental instruments through regulations".

4 Lines of Communication

The Environmental Control Officer in writing should immediately report any breach of the EMP to the Project Manager. The Project Manager should then be responsible for rectifying the problem on-site after discussion with the contractor. Should this require additional cost, then the developer should be notified immediately before any additional steps are taken.

5 Reporting Procedures to the Developer

Any pollution incidents must be reported to the Environmental Control Officer immediately (within 12 hours). The Environmental Control Officer shall report to the Developer on a regular basis (site meetings).

6 Site Instruction Entries

The site instruction book entries will be used for the recording of general site instructions as they relate to the works on site. There should be issuing of stop work order for the purposes of immediately halting any activities of the contractor that may pose environmental risk.

7 ESA/ESO (Environmental Site Officer) Diary Entries

Each of these books must be available in duplicate, with copies for the Engineer and Environmental Site Officer. These books should be available to the authorities for inspection or on request. All spills are to be recorded in the ESA/Environmental Site Officer's dairy.

8 Methods Statements

Methods statements from the contractor will be required for specific sensitive actions on request of the authorities or ESA/ESO (Environmental Site Officer). All method statements will form part of the EMP documentation and are subject to all terms and conditions contained within the EMP document. For each instance wherein it is requested that the contractor submit a method statement to the satisfaction of ESA/ESO, the format should clearly indicate the following:

- What – a brief description of the work to be undertaken
- How- a detailed description of the process of work, methods and materials
- Where- a description / sketch map of the locality of work; and
- When- the sequencing of actions with due commencement dates and completion date estimate.

The contractor must submit the method statement before any particular construction activity is due to start. Work may not commence until the method statement has been approved by the ESA/ESO.

9 Record Keeping

All records related to the implementation of this management plan (e.g. site instruction book, ESA/ESO dairy, methods statements etc.) must be kept together in an office where it is safe and can be retrieved easily. These records should be kept for two years at any time be available for scrutiny by any relevant authorities.

10 Acts

10.1 The National Water Act, 1998 (Act No: 36 of 1998)

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.

Impact on proposed Development:

Significant – It will be necessary to obtain a Section 21 Water-Use License for works within the wetland area or for the removal of the wetland where the road crossing of the access road will be situated.

10.2 National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004)

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'
- 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.

Impact on proposed Development:

Not significant – The Act have relevance to the proposed development during the construction phase. Dust pollution could be a concern primarily during the construction phase of the proposed project. Dust control would be adequately minimised during this phase by way of water spraying and possible dust-nets, when working close to existing residential dwellings.

Air pollution due to additional vehicles generated by the proposed development can be regarded as insignificant.

10.3 National Environmental Management Act (Act 107 of 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 principles in essence state that environmental management must place people and their needs at the forefront of its concern and that development must be socially, environmentally and economically sustainable.

Impact on proposed Development:

Significant – Section 28 (1) of NEMA stated that every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.

The EMP is compiled in terms of Section 28 of NEMA.

10.4 The National Environmental Management: Waste Act (Act 59 of 2008)

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 others, the classification of waste, waste service delivery, and tariffs for such waste services;
- Addressing reduction, reuse, recycling and recovery of waste;
- The requirement 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 licence, 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 3 July 2009 the Minister of Environmental Affairs and Tourism promulgated a list of waste management activities that might have a detrimental effect on the environment. These listed activities provide the activities that require a Waste Management License. Two Categories is specified: Category A and Category B. As part of Category A Waste Management License application a Basic Assessment in terms of Section 24(5) of the National Environmental Management Act (Act 107 of 1998) must be submitted to the relevant Authority. As part of a Category B Waste Management License a Scoping and EIA process in terms of Section 24(5) of the National Environmental Management Act (Act 107 of 1998) must be followed and submitted to the relevant Authority.

Impact on proposed Development:

Not Significant – No Waste Management License will be required during the construction phase of the proposed development. One should however note that this development

will be a full title light Industrial Park. Individual owners of the industrial properties will be responsible for the designs of their own industrial structures and facilities. Although Light Industrial uses do not provide for noxious industries or activities that require effluent pits and air and water pollution monitoring, the Waste Act could become applicable during the operational phase of some of the individual industrial uses. The developer must warn the potential tenants of this new Act.

10.5 The Municipal Systems Act (Act 32 of 2000)

This Act was introduced to provide for the core principles, mechanisms and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of local communities, and ensure universal access to essential services that are affordable to all.

The proposed development will support the local authority in complying with the principles of the Municipal Systems Act, by assisting in providing the community with essential services, such as water and sewage infrastructure.

Impact on proposed Development:

Significant – The proposed development will promote the Municipal System with in the area, as the proposed development will upgrade, and improve the essential services such as water and sewage reticulation networks, therefore contributing to the social and Economic upliftment of the involved Mogale City Local Municipality.

10.6 National Veld and Forrest Fire Act, 1998 (Act No. 101, 1998)

The purpose of this Act is to prevent and combat veld, forest and mountain fires throughout the Republic. Furthermore the Act provides for a variety of institutions, methods and practices for achieving the prevention of fires.

Impact on proposed Development:

Significant – Fires of construction workers may only be lit in the designated site camp as indicated in assistance with the ECO. It is important that a site development camp be located on a part of the application site that is already disturbed.

10.7 National Heritage Resources Act, 1999 (Act No. 25 of 1999)

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

Impact on proposed Development:

Not significant – No cultural/historical significant areas were identified with in the application site and thus no areas of historical or cultural value will be affected.

10.8 Conservation of Agricultural Resources Act (Act No. 43 of 1983)

This Act provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

Impact on proposed Development:

Not Significant – According to the Gauteng Agriculture Potential Atlas (GAPA 3) some areas of the application site is located on high potential Agriculture land. In addition, the study area is located outside the Gauteng Urban Edge, and does not fall within any of the seven Agriculture Hubs identified for the Gauteng Province. Based on the available information, Bokamoso were of the opinion that no Agriculture Potential Study was required for the application site.

10.9 National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004)

The purpose of the Biodiversity Act is to provide for the management of South Africa's biodiversity within the Framework of the NEMA and the protection of species and ecosystems that warrant National protection. As part of the implementation strategy, the National Spatial Biodiversity Assessment was developed.

Impact on proposed Development:

Not Significant – According to the specialist's report the Open Grassland is regarded as moderately sensitive while the Wetland habitat is highly sensitive. The 30m buffer around the Wetland habitat is also regarded as highly sensitive. However, the Transformed areas are assigned with a low sensitivity value. There is also a probability that the Giant Bullfrog might use the study area as a migratory corridor as well as several Red Listed avifaunal species for foraging purposes.

10.10 Water Services Act, 1997 (Act No. 108 of 1997)

This Act provides for the minimum standards and measures of which the following Water Services should adhere to:

- Basic sanitation
- Basic water supply
- Interruption in provision of water services
- Quality of potable water
- Control of objectionable substances
- Disposal of grey water
- Use of effluent
- Quantity and quality of industrial effluent discharged into a sewerage system
- Water services audit as a component in the Water Services Development Plan
- Water and effluent balance analysis and determination of water losses
- Repair of leaks
- Consumer installations other than meters

- Pressure in reticulation system

Impact on proposed Development:

Significant – The application will need to adhere to the water services act.

10.11 National Spatial Biodiversity assessment

The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels.

Impact on proposed Development:

Not Significant – No irreplaceable sites exist on the study area. On the study area sensitive habitats have been allocated according to the GDARD C-Plan however, this will not form part of the development area.

10.12 Protected Species – Provincial Ordinances

Provincial ordinances were developed to protect particular plant species within specific provinces. The protection of these species is enforced through permitting requirements associated with provincial lists of protected species. Permits are administered by the Provincial Departments of Environmental Affairs.

Impact on proposed Development:

Not Significant – Ten Red List plant species are known to occur in the 2527DD quarter degree grid cell. *Hypoxis hemerocallidea* and *Boophane disticha* are the most likely Red Listed plant species to occur on the study site.

10.13 National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 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.

Impact on proposed Development:

Not Significant – The study area is not located within any conservancy or protected area.

10.14 National Road Traffic Act, 1996 (Act No. 93 of 1996)

This Act provides for all road traffic matters which shall apply uniformly throughout the Republic and for matters connected therewith.

Impact on proposed Development:

Not significant – Not Applicable.

11 Project activities

11.1 Pre-Construction Phase

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
General	**Project contract**	To make the EMP enforceable under the general conditions of the contract.	The EMP document must be included as part of the tender documentation	The EMP is included as part of the tender documentation	Developer	-
	Surrounding Residents	Service Interruption.	Contractor should inform all residents, landowners and tenants at least 48hours before the proposed interruption.		Developer Contractor	
Design and planning	**Geology-** **Stability of structures and restriction of land use due to geology**	To ensure stability of structures	-Standard Precautionary Measures and founding recommendations should be made by Geotechnical Engineers for the establishment of structures on collapsible and compressible soils; -The wet services engineer must recommend very strict precautionary measures for the establishment of services on collapsible and compressible soils; - The layout and land must correspond to the stability zonation and development types recommended by the geotechnical engineer; -The Structural/Geotechnical Engineer should stipulate and list the NHBRC precautionary measures (Buildings and Structures should adhere to the NHBRC Standards and Norms); -More detailed foundation investigations should be done for each of the structures		Geotechnical Engineer, Structural Engineer, Wet Services Engineer	-

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			prior to construction.			
	Erosion and Siltation	To prevent the unnecessary loss of soil through bad management	All surface run-offs should be managed in such a way so as to ensure erosion of soil does not occur. Provisions should be made for the development of a rehabilitation plan, prior to construction, to ensure that all the areas which are susceptible to erosion shall be covered with a suitable vegetative cover as soon as construction is completed.	Rehabilitation Plan are developed prior to construction to be implemented during and after construction	Landscape Architect, Environmental Consultants, Flora Specialist	-
	Compaction	To prevent the compaction of valuable soils due to traffic and equipment	Designated routes shall be determined prior to construction for movement of construction vehicles and areas for the storage of equipment; All the areas that are compacted by machinery shall be ripped prior to them being rehabilitated.		ECO, Site Supervisor, Contractor	
			The site access point should be clearly marked as well as routes designated to be used by construction vehicles and pedestrians.		ECO, Site Supervisor Contractor	
	Topsoil	To Prevent the loss of valuable topsoil	Designated areas should be identified prior to construction for the stockpile of stripped topsoil. The stockpile areas should be designated were the material will not be damaged, removed or compacted. The stockpiled topsoil shall be used for the rehabilitation of the site during and after construction and for landscaping purposes.	Designated stockpile areas identified prior to construction for the storage of Topsoil	ECO, Site Supervisor, Contractor	
			When the stripping of topsoil takes place,		Contractor	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			the grass component shall be included in the stripped topsoil. The soil will contain a natural grass seed mixture that may assist in the re-growth of grass once the soil is used for backfilling and landscaping.			
	Storm water design- -Environmental Damage due to erosion, water pollution, gully formation and siltation;	To prevent and restrict erosion, siltation and groundwater pollution, through the design of a proper Storm water management system	-A proper storm water management plan should be developed, to be implemented during the construction and operational phases of the proposed Light Industrial Development; -Stormwater outlets shall be correctly designed to prevent erosion; -Construction guidelines should be provided for the prevention and restriction of erosion and siltation; - It is important to note the trenches for the water pipeline and even those for sewage lines do not need to be wide, which means that the environmental damage caused by the actual digging can be reduced to a minimum. However, while they are open, their presence will mean that herpetofauna of any size may fall into them, from where it will be difficult to escape and death may cause by drowning, excessive exposure to the sun or by being buried alive during the final construction work; - The design of the storm water lines is not known. If cement pipes of large diameter are used and the trenches are filled in again, potential danger is substantially	Compilation and approval of storm water management plan	Civil Engineer	

TYPE	Environmental risk or issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of Action
			reduced. Open storm water channels are dangerous, as they will continuously contribute to herpetofauna destruction.			
		To ensure the sustainability of the drainage and the open space systems lower down in the catchment area	-The Stormwater design for the proposed development must be designed to: ➢ Reduce and/or prevent siltation, erosion and water pollution. Stormwater runoff should not be concentrated as far as possible and sheet flow should be implemented; ➢ Run-off from paved surfaces should be slowed down through the strategic placement of berms; ➢ Attenuation ponds and energy dissipaters must be installed on the study area to break the speed of the water and to act as siltation ponds where required; ➢ Sheet runoff from paved surfaces and access roads needs to be curtailed; ➢ Surface storm water generated as a result of the development must not be channeled directly into any natural drainage system or wetland; ➢ The storm water management plan should be designed in a way that aims to ensure that post		Civil Engineer	

TYPE	Environmental risk or issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of Action
			development runoff does not exceed predevelopment values in: -Peak discharge for any given storm; -Total volume of runoff for any given storm; -Frequency of run-off; -Pollutants and debris reaching watercourses; ➢ As much of the vegetation should be retained as far as possible and rehabilitated if disturbed by construction activities to endure that erosion and siltation does not take place; ➢ No Trees should be planted with in tree meters form water bearing services.			
	Waste storage	To control the temporary storage of waste.	Temporary waste storage points on site shall be determined. These storage points shall be accessible by waste removal trucks and these points should not be located in sensitive areas/areas highly visible from the properties of the surrounding land-owners/tenants/in areas where the wind direction will carry bad odours across the properties of adjacent tenants or landowners.		Contractor ESO	-
		Ensure waste storage area does	Build a bund around waste storage area to avoid occurrence of pollution.		Contractor	-

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		not generate pollution.				
		To control the temporary storage of waste	No waste materials shall at any stage be disposed off in the open veld of adjacent properties or in sensitive areas. Temporary waste storage points should be determined prior to construction on site. These storage points shall be accessible by waste removal trucks. Such areas should not be located in areas highly visible from the properties of the surrounding land-owners/tenants.	Designated areas determined prior to construction for the storage of waste on site.	ECO, Contractor	
		To ensure that the waste storage area does not generate any pollution	-The area designated for the storage of waste on site should be located in non-sensitive areas and areas where it would not be able to contaminate storm water. -In order to prevent any visual pollution, as well as mitigate anticipated visual impacts, the area designated for the storage of waste should be located in an area that is not highly visible.		Site Supervisor	
	Waste Generation, and air, water and noise pollution	Best Practice to minimise environmental impacts and ensure efficient management	Coordinate with other trades working on site regarding, site management, timing of works and waste management (recycling and reuse potential).		Project Manager	
			Plan the activities on site prior to construction - for access, deliveries, construction areas, washout area, waste stockpiles, and chemical storage.		Environmental Site Officer. Occupational Health and Safety officer etc.	
		Solid Waste	Solid waste shall be disposed off in a		Contractor	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		Disposal	manner approved by the relevant local authorities, and at a registered land-fill site.			
	Fauna and Flora and Ecological Heath	To give smaller birds, mammals and reptiles a chance to move into other undisturbed areas close to their natural territories	Construction work should be planned beforehand and restricted to one area at a time.		Contractor	
		To ensure that the species introduced to the area, are compatible with the current and future quality of the ecological processes.	-The Landscape development plan for the proposed development shall be submitted to the local authority for approval; -It is important that all the plant positions, quantities and coverage per m² be indicated on a plan; -The proposed planting materials for the areas to be landscaped shall be non-invasive, and preferably indigenous and /or endemic; -Where possible, trees naturally growing on the site should be retained as part of the landscaping; - Staff should be trained not to destroy herpetological specimens unnecessarily. Herpetofauna that are exposed during the construction phase should be removed and translocated; - It is important to note the tenches for the water pipeline and even those for sewage lines do not need to be wide, which	The landscape development plan submitted to the local authority for approval.	Landscape Architect	-

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			means that the environmental damage caused by the actual digging can be reduced to a minimum. However, while they are open, their presence will mean that herpetofauna of any size may fall into them, from where it will be difficult to escape and death may cause by drowning, excessive exposure to the sun or by being buried alive during the final construction work; -Environmental damage caused by these trenches may be kept to a minimum by good forward planning and thereby reducing the actual length of time that trenches are left open. Possible damage to herpetofauna is in direct proportion to the time that these trenches are left open and may destroy amphibian and reptilian species; - The design of the storm water lines is not known. If cement pipes of large diameter are used and the trenches are filled in again, potential danger is substantially reduced. Open storm water channels are dangerous, as they will continuously contribute to herpetofauna destruction.			
		To ensure the removal of all the Declared weeds and invaders from the site	All the Declared weeds and Invaders should be removed from site prior to construction.		Flora Specialist /Contractor	
Other Design Requiremen	**Extreme change in micro climate temperatures**	To prevent the extreme change in micro climate	Where open parking bays are involved, one tree for every two parking bays shall be indicated on Landscape Development	Landscape Development Plan complies	Landscape Architect	-

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
ts		temperatures	Plan which shall be approved by the Design Review Committee / Local Authority.			
	Light Pollution	To prevent excessive light pollution through ineffective design	The generation of light through security lighting and other lighting should be effectively designed to not spill unnecessary outward into the oncoming traffic, or into the yards of the neighbouring properties or open spaces.		Architect, Landscape Architect/ Contractor	
	Visual Impact	To minimize the visual impact of the proposed development.	Architectural guidelines should be compiled for the proposed development and the styles used must promote unity through the use of certain street furniture, planting and paving patterns, colours and textures that do not only blend in tastefully with the character of the area, but are also functional and easy to maintain.		Architect Contractor.	

11.2 Construction Phase

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
General	**Surrounding Residents**	Service Interruption.	Contractor should inform all residents, landowners and tenants at least 48hours before the proposed interruption.		Developer Contractor	
Contractors Camp	**Vegetation and topsoil**	To minimize damage to and loss of vegetation and	-Site to be established under supervision of ECO; - Clearing and relocation of plants to be	Minimal vegetation removed/ damaged during	Contractor	As and when required

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		retain quality of Topsoil.	undertaken in accordance with site specific requirements; -The Clearing of the Site Should take place with in phases to prevent large areas exposed which could be prone to erosion; -The Contractor's Camp should not be established in areas which are deemed to be sensitive. Areas with low Sensitivity such as degraded areas should rather be considered for the establishment of the contractor's Site Camp; -Valuable Topsoil that is cleared should be retained in designated stockpiles and used again during rehabilitation works.	site activities.		
	Surface and ground water pollution	To minimize pollution of surface and groundwater resources.	1) Sufficient and temporary facilities including ablution facilities must be provided for construction workers operating on the site; 2) A minimum of one chemical toilet shall be provided per 10 persons. The contractor shall keep the toilets in a clean, neat and hygienic condition. Toilets provided by the contractor must be easily accessible and a maximum of 50m from the works area to ensure they are utilized. The contractor (who must use reputable toilet-servicing company) shall be responsible for the cleaning, maintenance and servicing of the toilets. The contractor (using reputable toilet-servicing company) shall ensure that all toilets are cleaned and emptied before the	Effluents managed Effectively. No pollution of water resources from site. Workforce use toilets provided.	Contractor ESO	As and when required

TYPE	Environmental risk or issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of Action
			builders' or other public holidays; 3) No person is allowed to use any other area than chemical toilets; 4) No French drain systems may be installed; 5) No chemical or waste water must be allowed to contaminate the run-off on site; 6) Avoid the clearing of the site camp (of specific phase) or paved surfaces with soap.			
		To minimize pollution of surface and groundwater resources due to spilling of materials.	1) Drip trays and/ or lined earth bunds must be provided under vehicles and equipment, to contain spills of hazardous materials such as fuel, oil and cement; 2) Repair and storage of vehicles only within the demarcated site area; 3) Spill kits must be available on site; 4) Oils and chemicals must be confined to specific secured areas within the site camp. These areas must be bunded with adequate containment (at least 1.5 times the volume of the fuel) for potential spills or leaks; 5) All spilled hazardous substances must be contained in impermeable containers for removal to a licensed hazardous waste site;	No pollution of the environment	Contractor ESO	Daily

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			6) No leaking vehicle shall be allowed on site. The mechanic/ the mechanic of the appointed contractor must supply the environmental officer with a letter of confirmation that the vehicles and equipment are leak proof; 7) No bins containing organic solvents such as paints and thinners shall be cleaned on site, unless containers for liquid waste disposal are placed for this purpose on site.			
		To minimize pollution of surface and groundwater resources by cement	The mixing of concrete shall only be done at specifically selected sites, as close as possible to the entrance, on mortar boards or similar structures to prevent run-off into drainage lines, streams and natural vegetation.	No evidence of contaminated soil on the construction site.	Contractor ESO	Daily
		To minimize pollution of surface and groundwater resources due to effluent.	No effluent (including effluent from any storage areas) may be discharged into any water surface or ground water resource.	No evidence of contaminated water resources.	Contractor ESO	Daily
	Pollution of the environment	To prevent unhygienic usage on the site and pollution of the natural assets.	1) Weather proof waste bins must be provided and emptied regularly; 2) The contractor shall provide laborers to clean up the contractor's camp and construction site on a daily basis; 3) Temporary waste storage points on the site should be determined. THESE AREAS SHALL BE PREDETERMINED AND LOCATED IN AREAS THAT IS ALREADY DISTURBED. These storage points should be accessible by	No waste bins overflowing No litter or building waste lying in or around the site	Contractor ESO	Daily Weekly

TYPE	Environmental risk or issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of Action
			waste removal trucks and these points should be located in already disturbed areas /areas not highly visible from the properties of the surrounding land-owners/ in areas where the wind direction will not carry bad odours across the properties of adjacent landowners. This site should comply with the following: • Skips for the containment and disposal of waste that could cause soil and water pollution, i.e. paint, lubricants, etc.; • Small lightweight waste items should be contained in skips with lids to prevent wind littering; • Bunded areas for containment and holding of dry building waste. 4) No solid waste may be disposed of on the site; 5) No waste materials shall at any stage be disposed of in the open veld of adjacent properties; 6) The storage of solid waste on the site, until such time as it may be disposed of, must be in a manner acceptable to the local authority and DWA; 7) Cover any wastes that are likely to wash away or contaminate storm water.			
		Recycle material where possible and correctly dispose of	1) Waste shall be separated into recyclable and non-recyclable waste, and shall be separated as follows: • General waste: including (but not	Sufficient containers available on site	Contractor ESO	Daily Weekly

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		unusable wastes	limited to) construction rubble, • Reusable construction material. 2) Recyclable waste shall preferably be deposited in separate bins; 3) All solid waste including excess spoil (soil, rock, rubble etc) must be removed to a permitted waste disposal site on a weekly basis; 4) No bins containing organic solvents such as paints and thinners shall be cleaned on site, unless containers for liquid waste disposal are placed for this purpose on site; 5) Keep records of waste reuse, recycling and disposal for future reference. Provide information to ECO.	No visible signs of pollution		
	Increased fire risk to site and surrounding areas	To decrease fire risk.	1) Fires shall only be permitted in specifically designated areas and under controlled circumstances; 2) Food vendors shall be allowed within specified areas; 3) Fire extinguishers to be provided in all vehicles and fire beaters must be available on site; 4) Emergency numbers/ contact details must be available on site, where applicable.	No open fires on site that have been left unattended	Contractor	Monitor daily
Constructio n site	**Geology and soils-**	To ensure the stability of	-The Standard Precautionary measures and founding recommendations made during	To ensure that all the precautionary	Contractor, Consulting	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
	***Unstable structured due to the underlying geotechnical conditions of the site;** ***Loss of valuable Topsoil**	structures	the design and planning phase by the Geotechnical/Structural Engineers should be implemented during construction; -The Precautionary measures made by the Wet Services Engineer for the establishment of services on collapsible and compressible soils should be implemented during construction; -The NHBRC precautionary measures for the establishment of structures on collapsible and compressible should be implemented during construction.	measures has been taken and implemented during construction	Engineers	
		To prevent the damaging of the existing soils and geology.	1) The top layer of all areas to be excavated for the purposes of construction shall be stripped and stockpiled in areas where this material will not be damaged, removed or compacted; 2) All surfaces that are susceptible to erosion, shall be protected either by cladding with biodegradable material or with the top layer of soil being seeded with grass seed/planted with a suitable groundcover.	Excavated materials correctly stockpiled No signs of erosion	Contractor	Monitor daily
		To prevent the loss of topsoil To prevent siltation & water pollution.	1) Stockpiling will only be done in designated places where it will not interfere with the natural drainage paths of the environment; 2) In order to minimize erosion and siltation and disturbance to existing vegetation, it is recommended that stockpiling be done/ equipment is stored in already	Excavated materials correctly stockpiled No visible signs of erosion and sedimentation Minimal invasive	Contractor of the Individual Developer	Monitor daily

TYPE	Environmental risk or issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of Action
			disturbed/exposed areas; 3) Cover stockpiles and surround downhill sides with a sediment fence to stop materials washing away; 4) Remove vegetation only in areas designated during the planning stage; 5) Rehabilitation/ landscaping are to be done immediately after the involved works are completed; 6) All compacted areas should be ripped prior to them being rehabilitated/landscaped by the contractor as appointed by the individual erf owner; 7) The top layer of all areas to be excavated must be stripped and stockpiled in areas where this material will not be damaged, removed or compacted. This stockpiled material should be used for the rehabilitation of the site and for landscaping purposes; 8) Strip topsoil at start of works and store in stockpiles no more than 1,5 m high in designated materials storage area; 9) During the laying of any cables, pipelines or infrastructure (on or adjacent to the site) topsoil shall be kept aside to cover the disturbed areas immediately after such activities are completed.	weed growth Vegetation only removed in designated areas		

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
	Erosion and siltation	To prevent erosion and siltation	1) It is recommended that the construction of the development be done in phases; 2) Each phase should be rehabilitated immediately after the construction for that phase has been completed. The rehabilitated areas should be maintained by the appointed rehabilitation contractor until a vegetative coverage of at least 80% has been achieved as appointed by the individual erf owner; 3) Mark out the areas to be excavated; 4) Large exposed areas during the construction phases should be limited. Where possible areas earmarked for construction during later phases should remain covered with vegetation coverage until the actual construction phase. This will prevent unnecessary erosion and siltation in these areas; 5) Unnecessary clearing of flora resulting in exposed soil prone to erosive conditions should be avoided; 6) All embankments must be adequately compacted and planted with grass to stop any excessive soils erosion and scouring of the landscape if required; 7) The eradication of alien vegetation should be followed up as soon as possible by replacement with indigenous vegetation to ensure quick and sufficient coverage of exposed areas by the individual erf owner;	No erosion scars No loss of topsoil All damaged areas successfully rehabilitated	Contractor ESO	Monitor daily

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			8) Storm water outlets shall be correctly designed to prevent any possible soil erosion; 9) All surface run-offs shall be managed in such a way so as to ensure erosion of soil does not occur; 10) Implementation of temporary storm water management measures that will help to reduce the speed of surface water by the individual erf owner / developer; 11) All surfaces that are susceptible to erosion shall be covered with a suitable vegetative cover as soon as construction is completed by the individual erf owner / developer.			
	Hydrology	To ensure that: -Construction works and structures are not flooded during heavy precipitation; -To minimise potential significant environmental damage due to extensive soil erosion, saltation and water	The stormwater management plan which has been developed prior to construction should be implemented on a continuous basis.	-No damage caused to construction works and structures due to the effective management of floodwater; -No visible signs of Environmental damage in the form of erosion, water pollution etc.	Contractor, Civil Engineers	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		pollution				
		To minimise pollution of soil, surface and groundwater	-Increased run-off during construction must be managed using berms and other suitable structures as required to ensure flow velocities are reduced; -The contractor shall ensure that excessive quantities of sand, silt and silted water do not enter the storm water system.	No visible signs of erosion. No visible signs of pollution	Contractor	Monitor daily
	Fauna and Flora	To protect the existing fauna and flora.	1) All exotic invaders and weeds must be eradicated on a continuous basis; 2) Exotic invaders must be included in an alien management program for the site. Eradication must occur every 3 months; 3) No plants not indigenous to the area, or exotic plant species, especially lawn grasses and other ground-covering plants, should be introduced in the communal landscaping of the proposed site, as they will drastically interfere with the nature of the area; 4) Where possible, trees naturally growing on the site should be retained as part of the landscaping; 5) Only indigenous plant species, preferably species that are indigenous to the natural vegetation of the area, should be used for landscaping in communal areas. As far as possible, plants naturally growing on the development site, but would otherwise be destroyed during clearing for development purposes, should be incorporated into	No exotic plants used for landscaping	Contractor ESO / Home Owners Association / Design Review Committee	As and when required Every 6 months

TYPE	Environmental risk or issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of Action
			landscaped areas. Forage and host plants required by pollinators should be planted in landscaped areas; 6) Alien and invasive species must be removed.			
		To protect the existing fauna and flora.	1) Trees that are intended to be retained shall be clearly marked on site; 2) Snaring and hunting of fauna by construction workers on or adjacent to the study area are strictly prohibited and the Council shall prosecute offenders; 3) All mitigation measures for impacts on the indigenous flora of the area should be implemented in order to limit habitat loss as far as possible and maintain and improve available habitat, in order to maintain and possibly increase numbers and species of indigenous fauna; 4) Wood harvesting of any trees or shrubs on the study area or adjacent areas shall be prohibited; 5) Where possible, work should be restricted to one area at a time; 6) Noise should be kept to a minimum and the development should be done in phases to allow faunal species to temporarily migrate into the conservation areas in the vicinity; 7) The integrity of remaining wildlife should	No measurable signs of habitat destruction	Contractor ESO	As and when required

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			be upheld, and no trapping or hunting by construction personnel should be allowed. Caught animals should be relocated to the conservation areas in the vicinity; 8)Where possible, work should be restricted to one area at a time, as this will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories.			
			All Declared weeds and invaders should be removed from the open spaces on an ongoing basis.			
		To mitigate the negative impact on the ecological environment due to the installation of services	Rehabilitate areas which were disturbed by the instillation of services immediately after works have been completed.	Disturbed areas successfully rehabilitated	Site Supervisor, Contractor	
	Social, safety and Security	To ensure the safety of the public	Although regarded as a normal practice, it is important to erect proper signs indicating the operations of heavy machinery in the vicinity of dangerous crossings and access roads or erven in the development site if necessary.	Visible signs erected	Contractor	
			With the exemption of the appointed security personnel, no other workers, friend or relatives will be allowed to sleep on the construction site (weekends included).		Security Personal, contractor	
			-Heavy construction vehicles should avoid using the local road network during peak			

TYPE	Environmental risk or issue	Objective or requirement	Mitigation measure	Performance indicator	Responsibility	Frequency of Action
			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 construction vehicles should be planned to minimize the impact on the surrounding road network ; -Warning signs should be erected on the roads if needed.			
			The following actions would assist in the management of safety along the road: -Adequate road marking; -Adequate roadside recovery areas; -Allowance for pedestrians and cyclists.		Project Manager, Environmental Site officer, Heath and Safety officer	
		To mitigate localized vibration	Activities that cause localised vibration should be limited to normal working hours only, between 07h00 and 18h00 on weekdays and between 08h00 and 13h00 on Saturdays. No construction activities will be allowed on Sundays, and public holidays.			
		Noise Impact- To maintain noise levels below "disturbing" as defined in the National Noise Regulations.	- Site workers must comply with the Provincial noise requirements; -Construction will only be permitted during working hours of between 07h00 and 18h00 on weekdays, and between 08h00 and 13h00 on Saturdays. No construction activities will be allowed on Sundays and Public Holidays;	No complaints from surrounding residents and I & AP	Contractor	Monitored daily

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			-The surrounding residents must be notified of blasting activities in advance. The necessary safety measures must also be implemented.			
		Dust Impact- Minimise dust from the site. To ensure the adequate protection of construction workers against dust pollution	-Dust pollution could occur during the construction works, especially during the dry months. 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; -Stockpiles of fine material should be wetted and/or covered during windy conditions; -Workers on site should wear dust masks during dry and windy conditions; - During the construction phase, noise must be kept to a minimum to reduce the impact of the development on the fauna residing on the site.	No visible signs of dust pollution No complaints from surrounding residents and I & AP	Contractor	Monitored daily
		Visual Impact- In order to minimise the visual impact.	The disturbed areas shall be rehabilitated immediately after the involved construction works are completed as the construction vehicle and equipments will be causing visual impact during construction phase.	Visual impacts minimized	Contractor ESO	Monitor daily
		To mitigate the inconvenience of temporary power failures, disconnection of	There should be consulted with affected parties to determine the most convenient times for service disruptions. The interested and affected parties should also be notified in advance of dates that services will be		Project Manager, Contractor	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		water and sewage, and telecommunication	disrupted.			
		Increased fire risk to site and surrounding areas-To decrease fire risk.	-Fires shall only be permitted in specifically designated areas and under controlled circumstances. -Food vendors shall be allowed within specified areas. - Fire extinguishers to be provided in all vehicles and fire beaters must be available on site. -Emergency numbers/contact details must be available on site, where applicable.	No open fires on site that have been left unattended.	Contractor	Monitor daily
	Infrastructure and services	Installation of services	Determine areas where services will be upgraded and relocated well in advance. Discuss possible disruptions with affected parties to determine most convenient times for service disruptions and warn affected parties well in advance of dates that service disruptions will take place.	No complaints from I & AP	Contractor ESO	When required
	Cultural Resources	To ensure the protection of heritage resources if exposed during construction	If any graves or archaeological sites are exposed during construction work it should immediately be reported to a museum. The report from the archaeologist must be provided to GDARD if any graves are recovered.	No destruction of or damage to graves or known archaeological sites	Contractor ESO	Monitor daily
	Vegetation	Landscaping	1) When planting trees, care should be taken to avoid the incorrect positioning of trees and other plants, to prevent the roots of trees planted in close proximity to the line of water-bearing services from causing leaking in, or malfunctioning of the services;	Landscaping done according to landscape development plan	Landscape architect Contractor / Individual Developer	When required

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			2) The proposed planting materials for the areas to be landscaped should preferably be endemic and indigenous; 3) All new trees and shrubs to be planted on the study area shall be inspected for pests and diseases prior to them being planted; 4) The inspection shall be carried out by the maintenance contractor at the property of the supplier and not on the study area; 5) All trees to be planted shall be in 20L containers with a height of approximately 1.8 metres and a main stem diameter of approximately 300 mm.			
		Loss of plants	1) Aerate compacted soil and check and correct pH for soils affected by construction activities; 2) Make sure plant material will be matured enough and hardened off ready for planting. Water in plants immediately as planting proceeds; 3) Alien and invasive plants must be removed.	Landscaping done according to landscape development plan	Landscape architect Contractor/ Individual Developer	When required
		Spread of weeds	Ensure that materials used for mulching and topsoil/ fertilisers are certified weed free. Collect certifications where available. Control weeds growth that appears during construction.	Weed growth controlled	Landscape architect Contractor	When required
		To ensure	1) Compacted soils shall be ripped at least	Grass have	Landscape	Once a

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		rehabilitation of the site	200mm; 2) All clumps and rocks larger than 30mm diameter shall be removed from the soil to be rehabilitated; 3) The soil shall be leveled before seeding; 4) Hydroseed the soil with Potch mixture; 5) Watering shall take place at least once per day for the first 14 days until germination of seeds have taken place; 6) Thereafter watering should take place at least for 20 minutes every 4 days until grass have hardened off.	hardened off	architect Contractor	day Then every 4 days

11.3 Operational Phase

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Responsibility*	*Frequency of Action*
SITE CLEAN UP AND PREPARED FOR USE	**Storm water pollution**	Do not allow any materials to wash into the storm water system.	Remove erosion and sediment controls only if all bare soil is sealed, covered or re-vegetate. Sweep roadways clean and remove all debris from kerb and gutter areas. Do not wash into drains.	Contractor	-
		Minimise waste	Decontaminate and collect waste in storage area ready for off-site recycling or disposal Arrange for final collection and removal of excess and waste materials.	Contractor	-
ESTABLISHING PLANTS	**Slow or no re-vegetation to**	To ensure re-vegetation to	Agreed schedule for regular follow-up watering, weed control, mulch supplements and amenity	Contractor	To be agreed

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Responsibility*	*Frequency of Action*
	stabilise soil; loss or degradation of habitat	stabilize soil	pruning, if needed. Replace all plant failures within three month period after planting.		
MATERIALS FAILURE	***Structural damage. Loss of site materials.***		Inspect all structures monthly to detect any cracking or structural problems. Confirm with designer if there are design problems. Rectify with materials to match, or other agreed solution.	Contractor	-
DRAINAGE FAILURE	**The flooding of structures and basements etc, due to drainage failure**	To ensure effective stormwater management on site during the operational phase	All site drainage works should be inspected and maintained on a continuous basis.	Maintenance contractor	
SITE AUDIT	***Eventual project failure***	Successful project establishment	Routinely audit the works and adjust maintenance schedule accordingly.	Contractor	-
GENERAL			Open fires and smoking during maintenance works are strictly prohibited.	Contractor Maintenance Contractor	-
			No waste material shall at any stage be disposed off in the adjacent open spaces.	Contractor, Maintenance Contractor	
			Disturbed areas will be rehabilitated and re-vegetated. All declared weeds and invaders should be removed from the open space areas on an ongoing basis.	Landscape Contractor	
			The Open Space areas should be effectively managed (Eradication of exotics, removal of water etc.	Facility Manager Maintenance Contractors Landscape Maintenance Contractors	

12 Procedures for environmental incidents

12.1 Leakages & spills

- Identify source of problem.
- Stop goods leaking, if safe to do so.
- Contain spilt material, using spills kit or sand.
- Notify Environmental Control Officer
- Remove spilt material and place in sealed container for disposal (if possible).
- Environmental Control Officer to follow Incident Management Plan.

12.2 Failure of erosion/sediment control devices

- Prevent further escape of sediment.
- Contain escaped material using silt fence, hay bales, pipes, etc.
- Notify ECO.
- Repair or replace failed device as appropriate.
- Dig/scrape up escaped material; take care not to damage vegetation.
- Remove escaped material from site.
- ECO to follow Incident Management plan.
- Monitor for effectiveness until re-establishment.

12.3 Bank/slope failure

- Stabilize toe of slope to prevent sediment escape using aggregate bags, silt fence, logs, hay bales, pipes, etc.
- Notify ECO.
- ECO to follow Incident Management plan.
- Divert water upslope from failed fence.
- Protect area from further collapse as appropriate.
- Restore as advised by ECO.
- Monitor for effectiveness until stabilized.

12.4 Discovery of rare or endangered species

- Stop work.
- Notify ECO.
- If a plant is found, mark location of plants.
- If an animal, mark location where sighted.
- ECO to identify or arrange for identification of species and or the relocation of the species if possible.
- If confirmed significant, ECO to liaise with Endangered Wildlife Trust.
- Recommence work when cleared by ECO.

12.5 Discovery of archeological or heritage items

- Stop work.
- Do not further disturb the area.
- Notify ECO.
- ECO to arrange appraisal of specimen.
- If confirmed significant, ECO to liaise with National, Cultural and History Museum.
  P.O. Box 28088
  SUNNYSIDE
  0132
  Contact Mr. J. van Schalkwyk
  or
  Mr. Naude
- Recommence work when cleared by ECO.

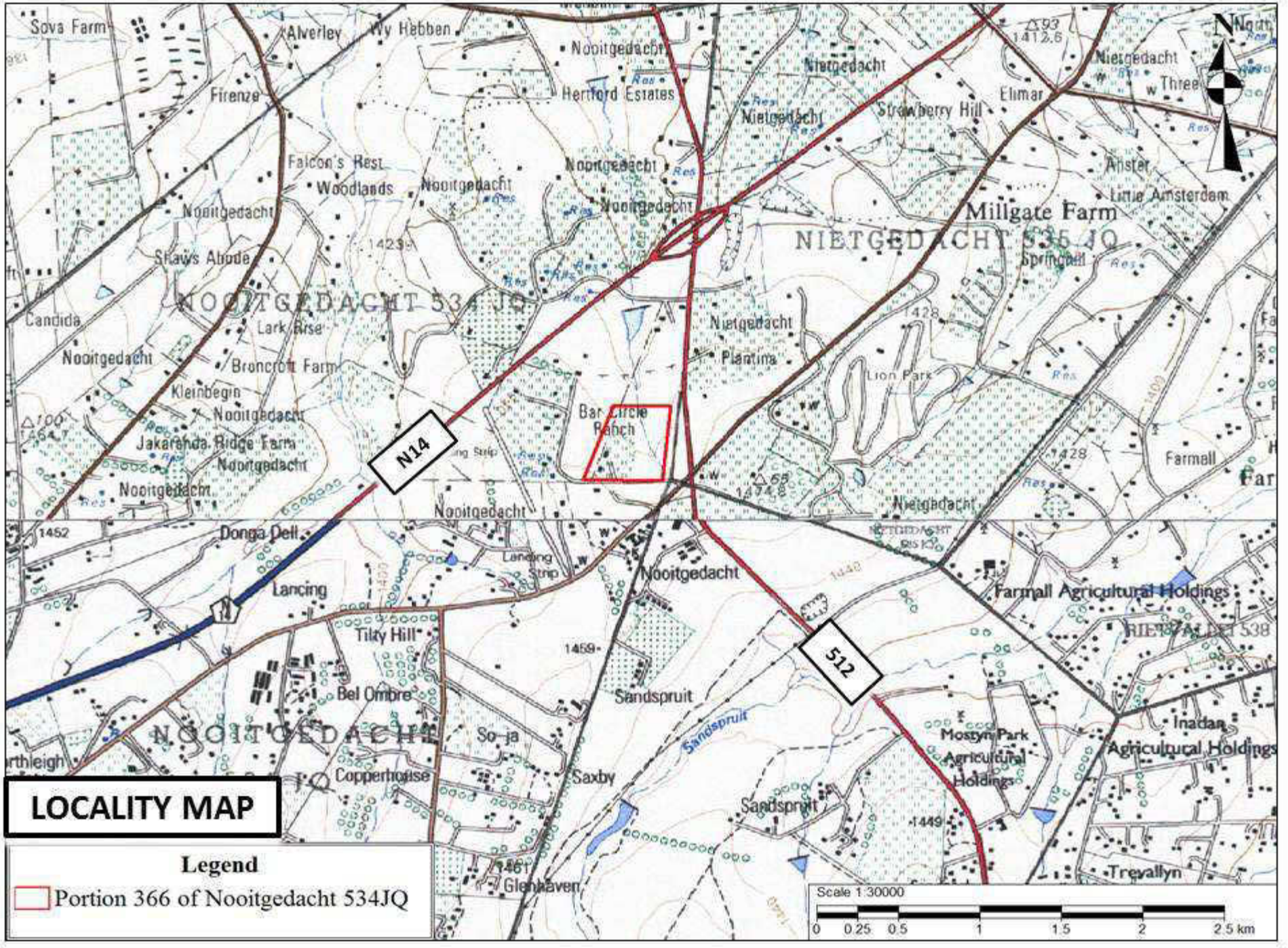
13 EMP review

a. The Site supervisor is responsible to ensure the work crew is complying with procedures, and for informing the work crew of any changes. The site supervisor is responsible for ensuring the work crew is aware of changes that may have been implemented by the Mpumalanga Department of Economic Development, Environment and Tourism before starting any works.

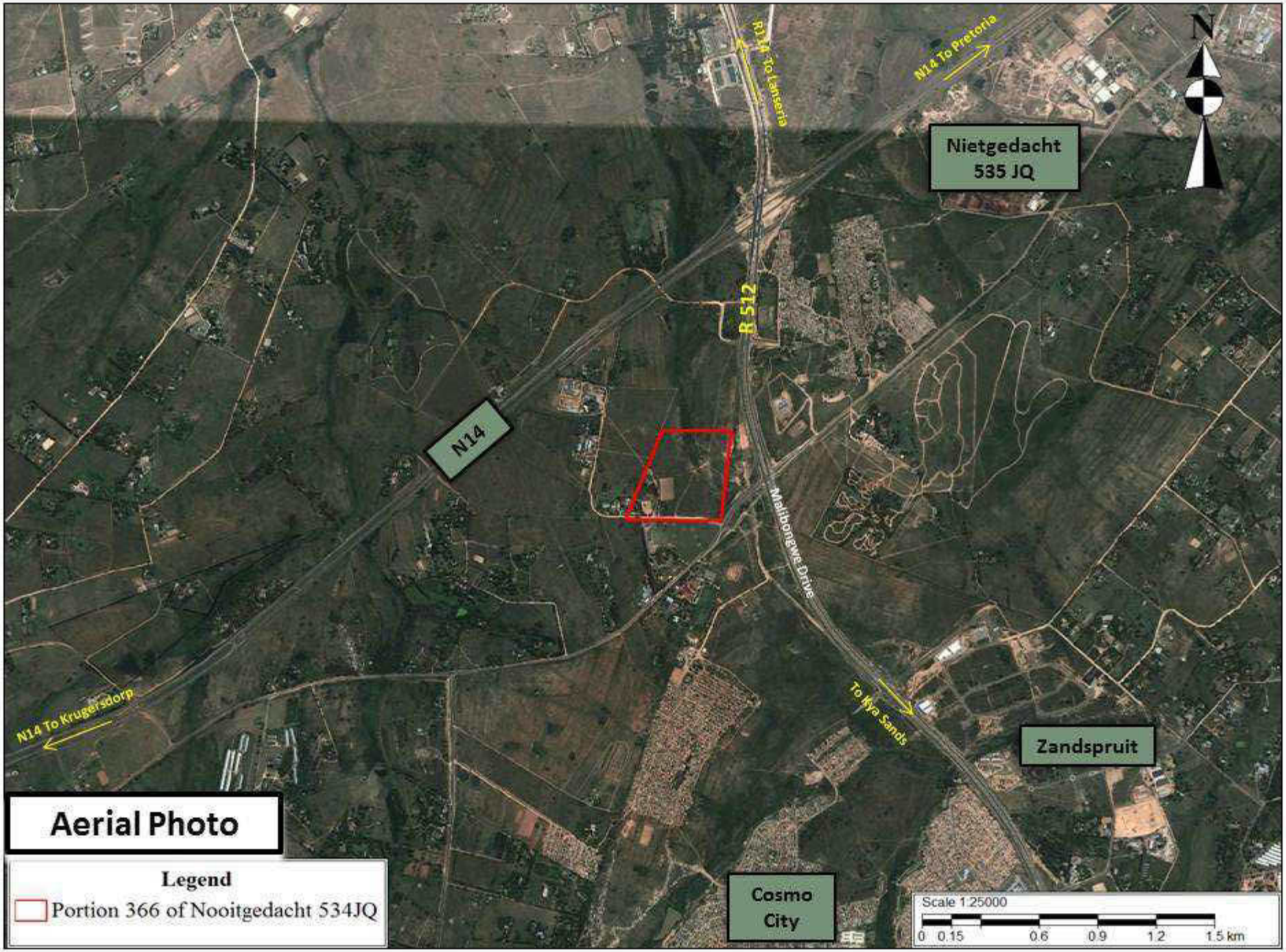
b. If the contractor cannot comply with any of the activities as described above, they should inform the ECO with reasons within 7 working day

Enlarged Figures

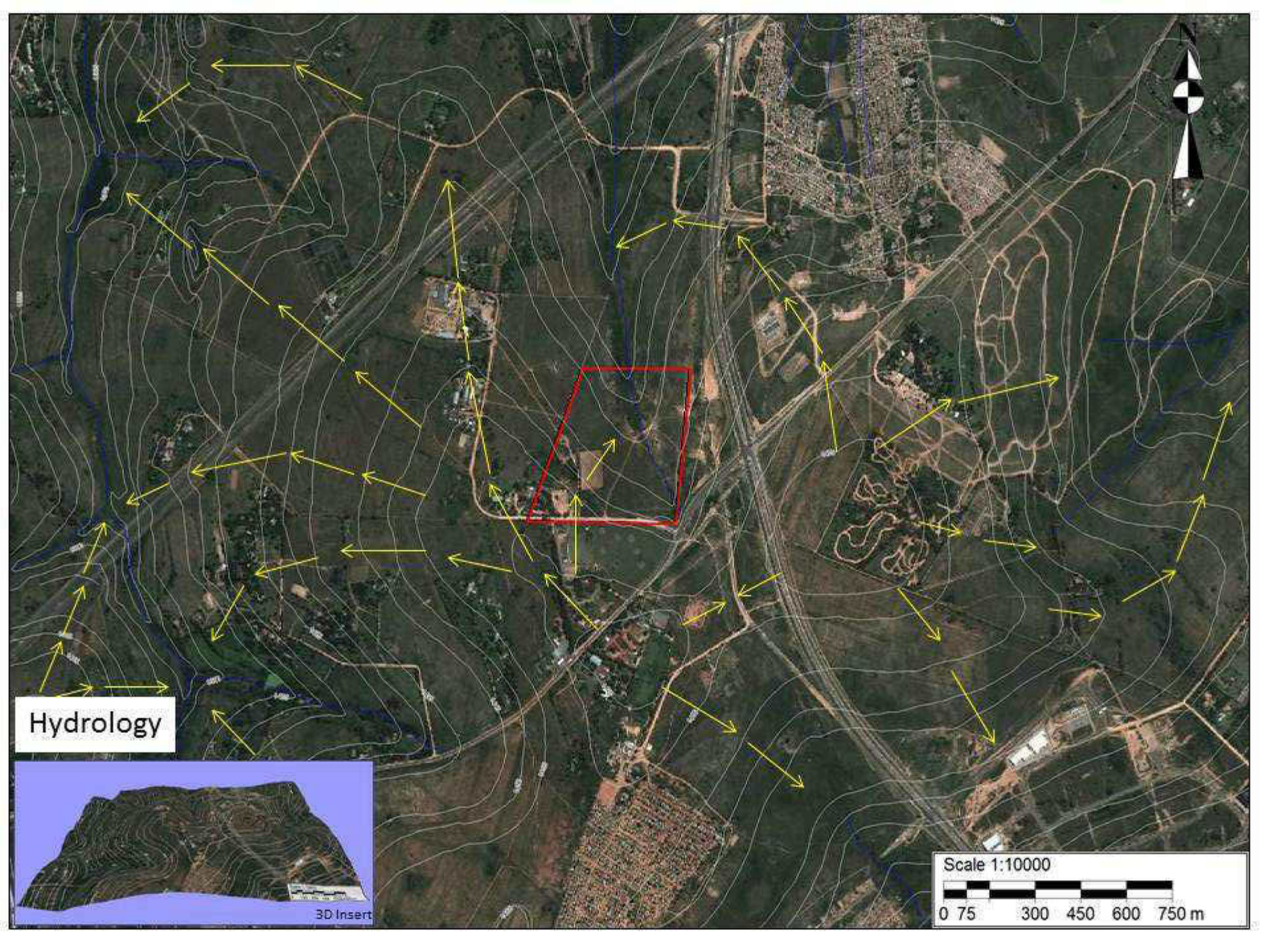
Locality Map


LOCALITY MAP
Legend
Portion 366 of Nooitgedacht 534JQ
N14
512
N
Scale 1:30000
0 0.25 0.5 1 1.5 2 2.5 km
Sova Farm
Alverley
Wy Hebben
Firenze
Hertford Estates
Nietgedacht
Strawberry Hill
Elimar
Falcon's Rest
Woodlands
Nooitgedacht
Millgate Farm
NIETGEDACHT 535 JQ
Anster
Little Amsterdam
Springhill
Shavs Abode
NOOITGEDACHT 534 JQ
Candida
Lark Rise
Broncroft Farm
Kleinbegin
Jakarenda Ridge Farm
Bar Circle Ranch
Plantina
Lion Park
Farmall
Donga Dell
Landing Strip
Lancing
Tilly Hill
Bel Ombre
Sandspruit
Farmall Agricultural Holdings
Mostyn Park Agricultural Holdings
Inadan Agricultural Holdings
Copperhouse
Saxby
Trevallyn
Glenhaven

Aerial Map

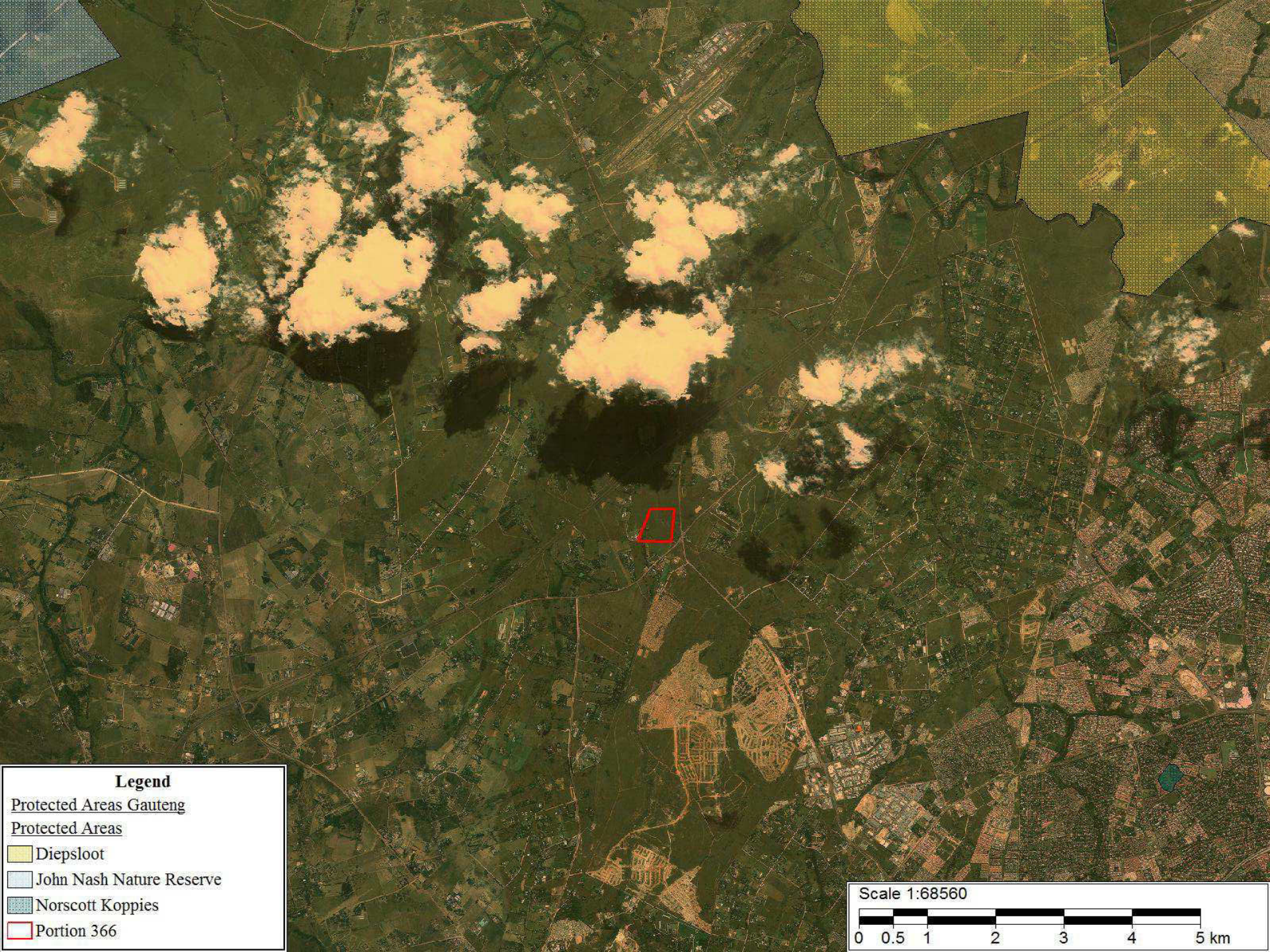

R114 To Lanseria
N14 To Pretoria
N
Nietgedacht
535 JQ
R 512
N14
Malibongwe Drive
To Kya Sands
Zandspruit
N14 To Krugersdorp
Cosmo
City
Aerial Photo
Legend
Portion 366 of Nooitgedacht 534JQ
Scale 1:25000
0 0.15 0.6 0.9 1.2 1.5 km

Hydrology Map


Hydrology
3D Insert
Scale 1:10000
0 75 300 450 600 750 m


N
Legend
Rivers
Non-Perennial River
Perennial River
Portion 366
Inland water
Dam
Water source
Reservoir
Scale 1:10000
0 100 200 300 400 500 m

Protected Areas


Legend
Protected Areas Gauteng
Protected Areas
Diepsloot
John Nash Nature Reserve
Norscott Koppies
Portion 366
Scale 1:68560
0 0.5 1 2 3 4 5 km

GDARD Sensitivity

Appendix I5


N
Legend
C Plan
Sensitivity
Prim veg
Bioclim zone, Prim veg
OL plant hab, Prim veg
OL plant hab, RL mammal hab, Prim veg
RL plant hab, Prim veg
RL plant hab, OL plant hab, Prim veg
RL plant hab, RL bird hab, Prim veg
RL plant hab, OL plant hab, RL bird hab, Prim veg
RL plant hab, OL plant hab, RL bird hab, Bioclim zone, Prim veg
Bioclim zone
RL plant hab, OL plant hab, RL mammal hab, Prim veg
OL plant hab, RL mammal hab
Portion 366
Scale 1:10000
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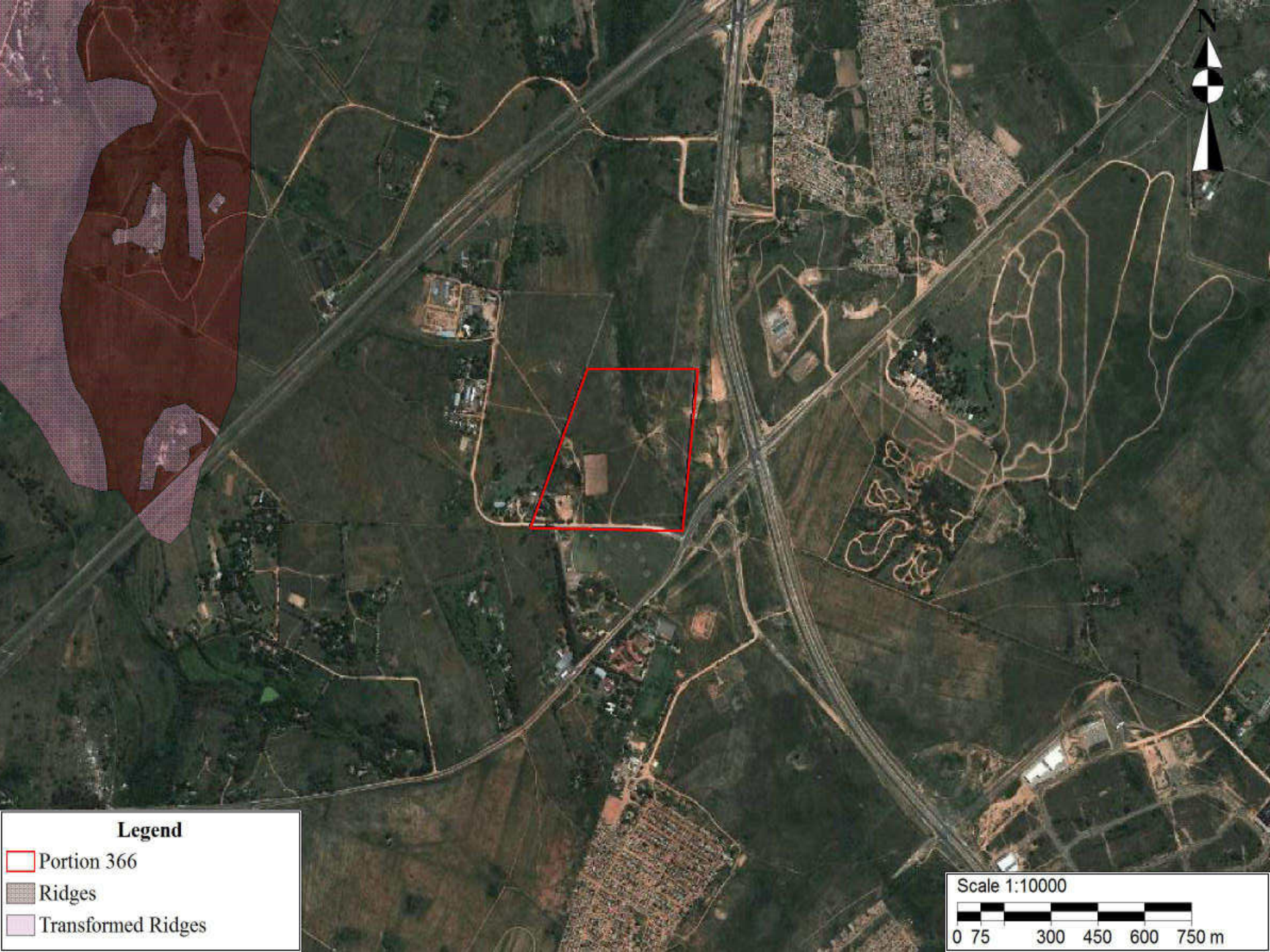
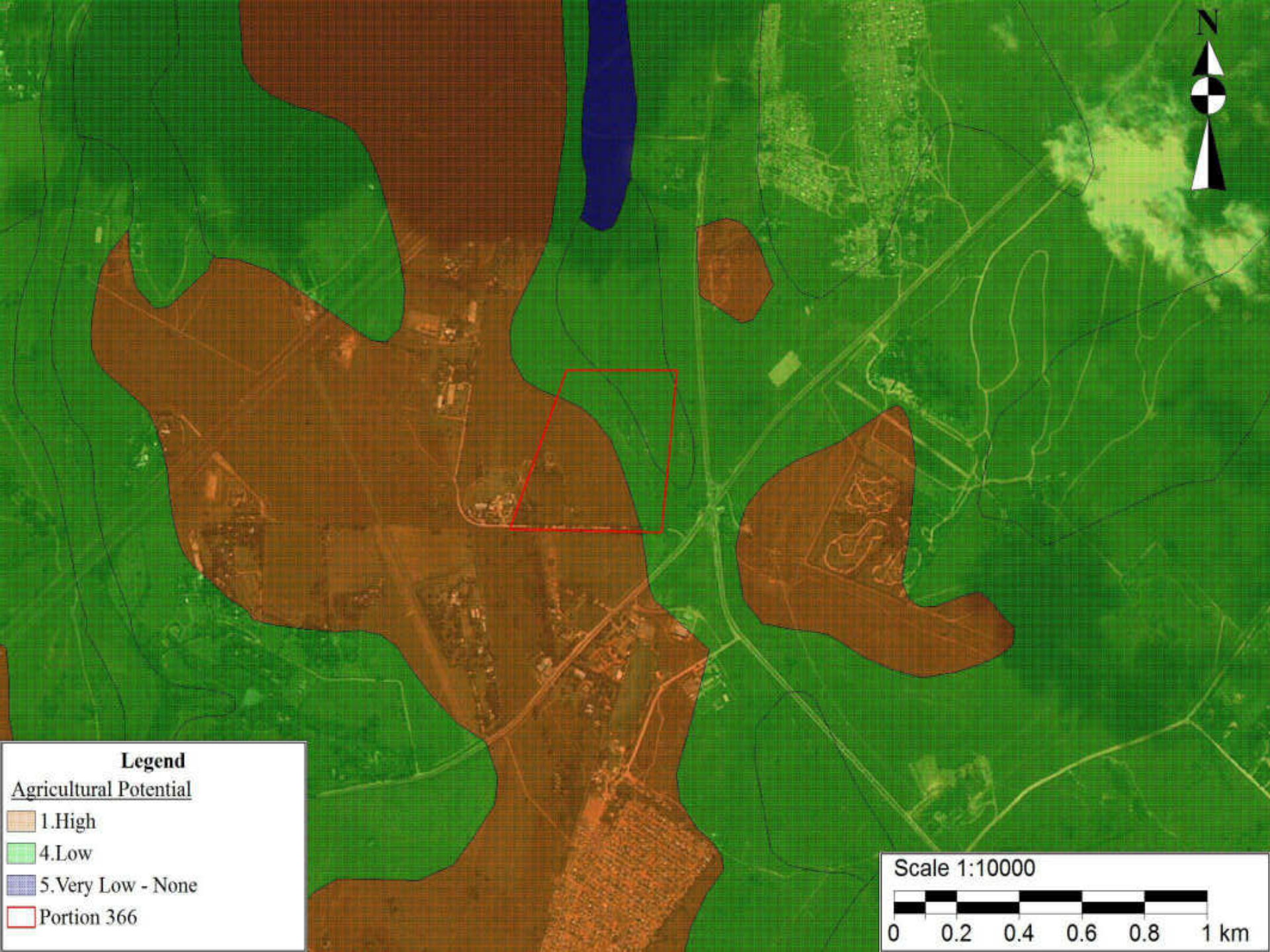
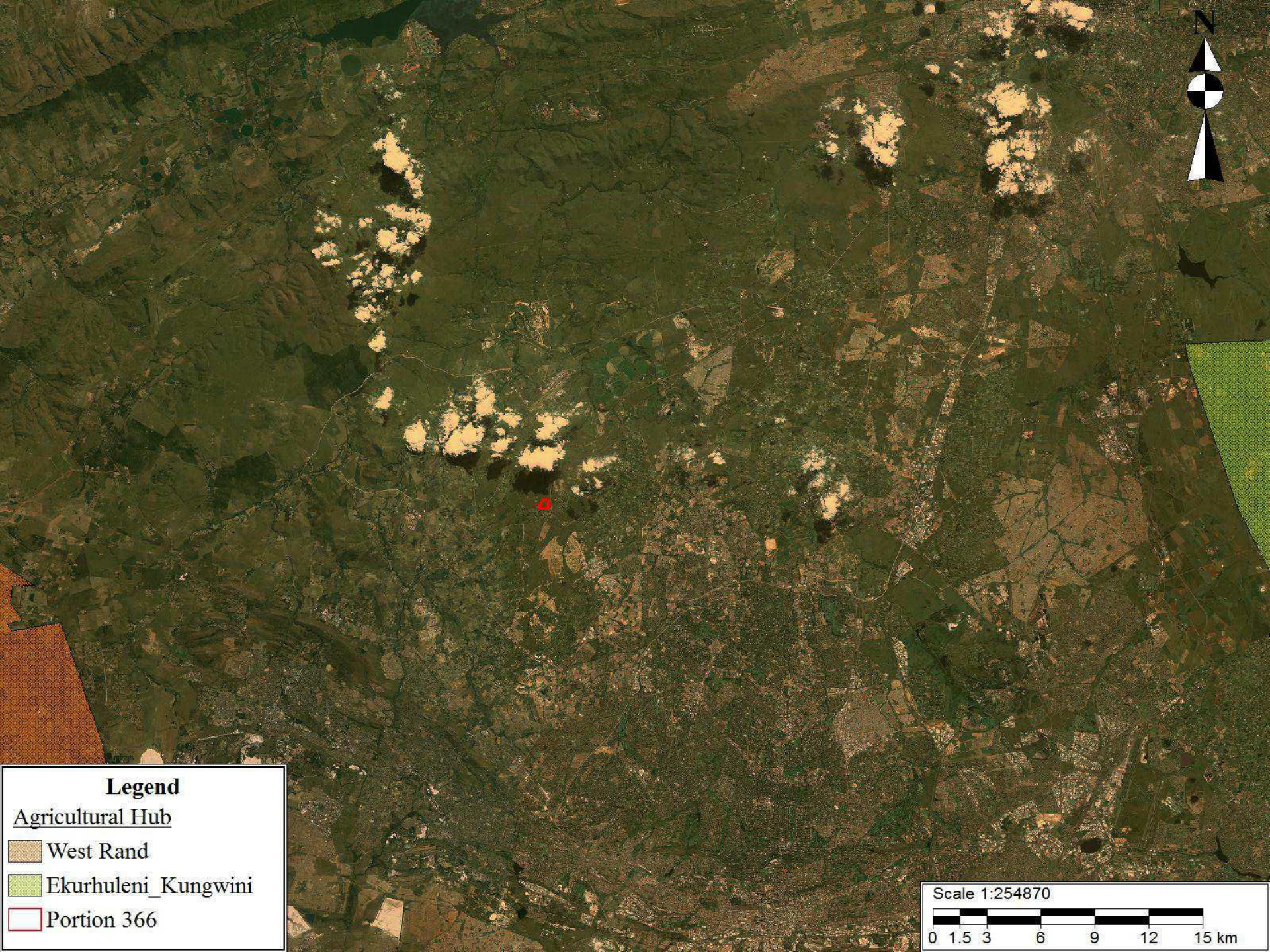
Ridges


N
Legend
Portion 366
Ridges
Transformed Ridges
Scale 1:10000
0 75 300 450 600 750 m

Agricultural Potential


N
Legend
Agricultural Potential
1.High
4.Low
5.Very Low - None
Portion 366
Scale 1:10000
0
0.2
0.4
0.6
0.8
1 km

Agricultural Hubs


N
Legend
Agricultural Hub
West Rand
Ekurhuleni_Kungwini
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Scale 1:254870
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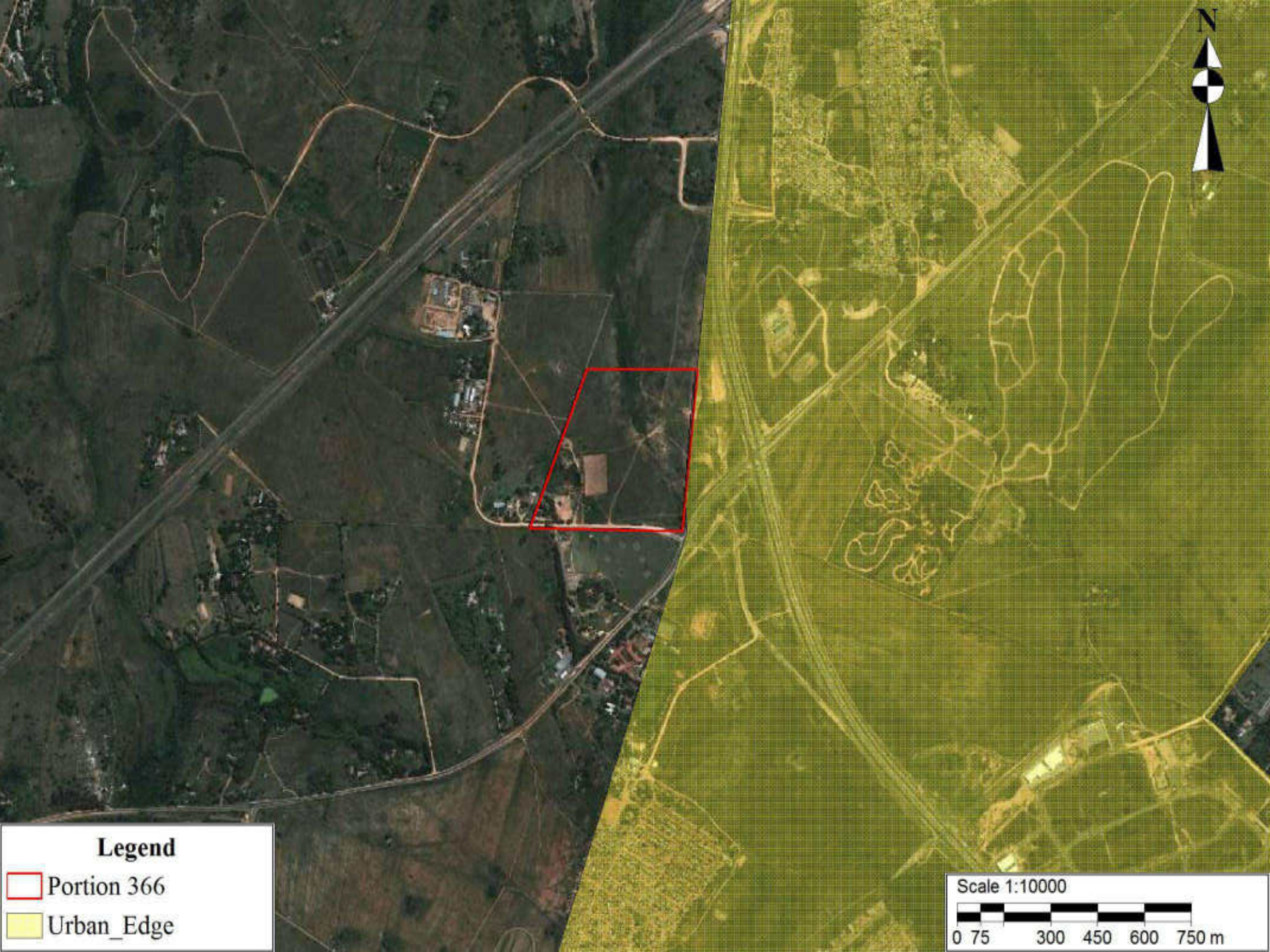
Urban Edge Map


N
Legend
Portion 366
Urban_Edge
Scale 1:10000
0 75 300 450 600 750 m

Roads and Railways


Malibongwe Drive
R28
295
N14
R512
R114
Howard Ave
Lion Park
Old Pretoria Rd
Rietvallei Road
0
250
500
750
1000

Soils Map


N
Legend
Soils
Impeded internal drainage, limiting soil depth
Impeded internal drainage, limiting soil depth, low clay content, difference in clay conte
Impeded internal drainage, low clay content
Limiting soil depth
Limiting soil depth, impeded internal drainage in subsoil
Limiting soil depth, rock outcrops
Rock outcrops, limiting soil depth
Portion 366
Scale 1:10000
0
0.2
0.4
0.6
0.8
1 km

Sensitivity Map

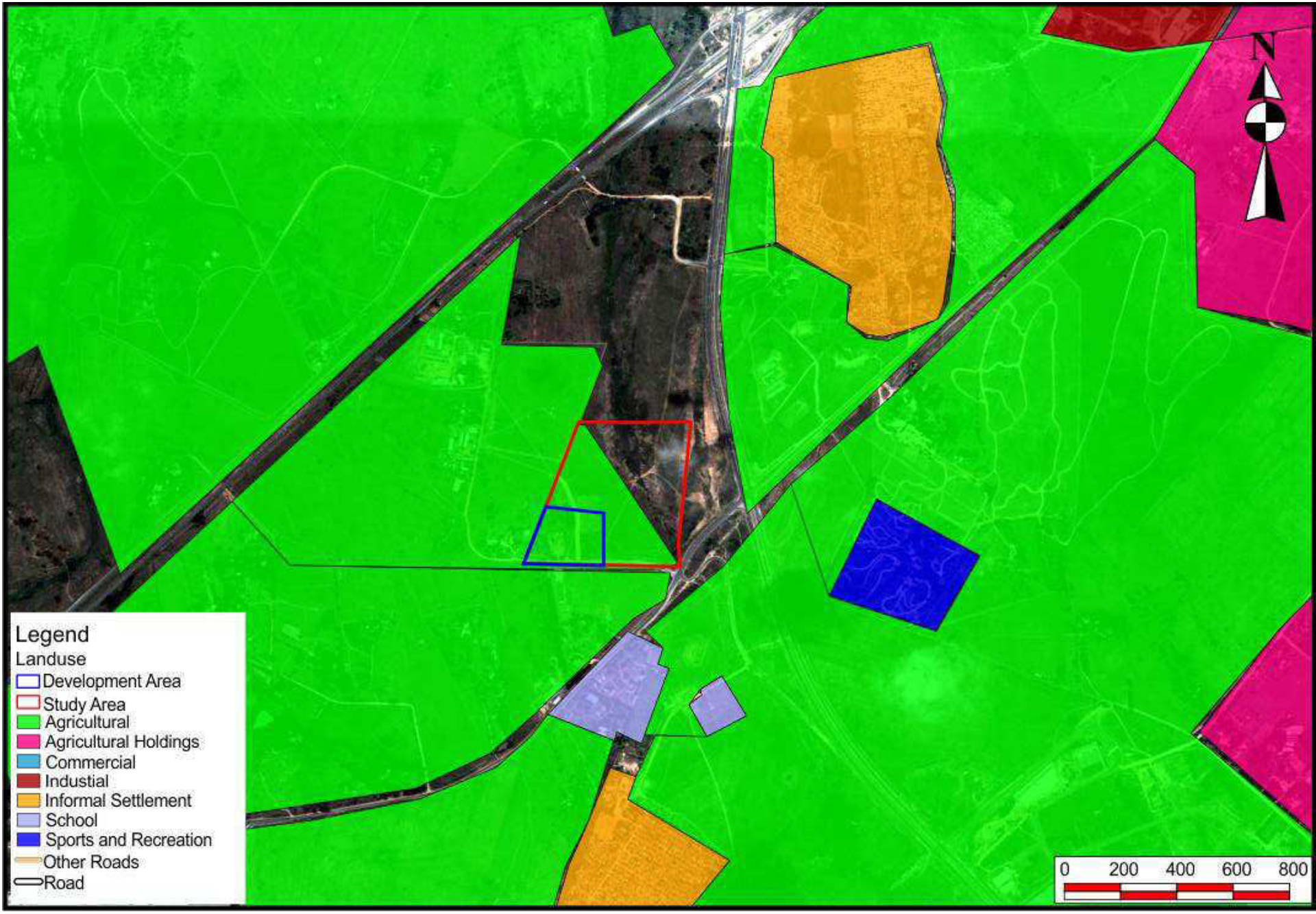
N

Legend

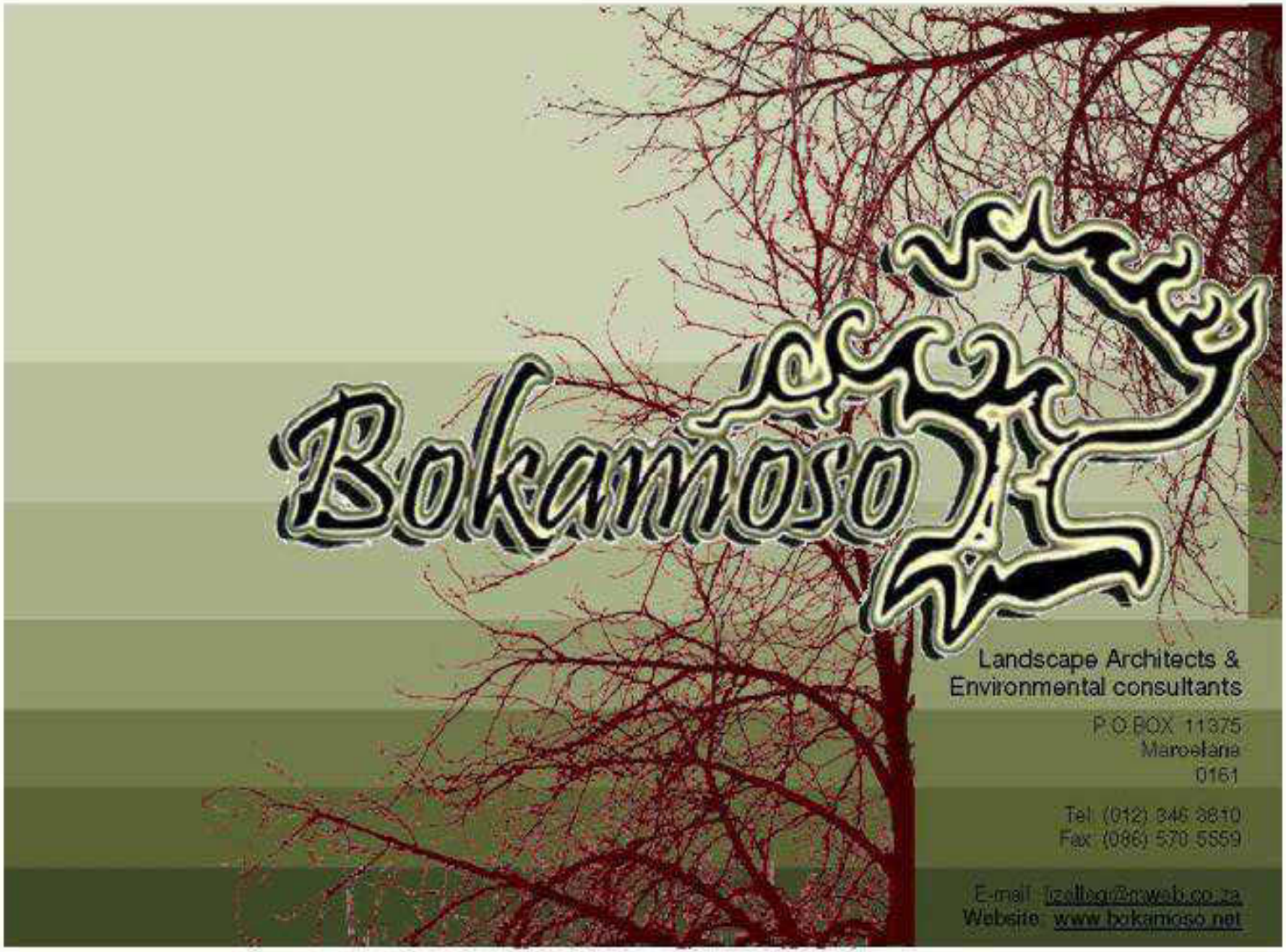
- High sensitivity wetland
- 30m wetland buffer zone
- Moderate sensitivity grassland
- Low sensitivity transformed area

SENSITIVITY MAP

Surrounding Land Use Map


N
Legend
Landuse
Development Area
Study Area
Agricultural
Agricultural Holdings
Commercial
Industrial
Informal Settlement
School
Sports and Recreation
Other Roads
Road
0
200
400
600
800

Company Profile & CV of Lizelle Gregory (Environmental Assessment Practitioner)


Bokamoso
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Environmental consultants
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Fax (086) 570 5559
E-mail tzolbe@mweb.co.za
Website www.bokamoso.net

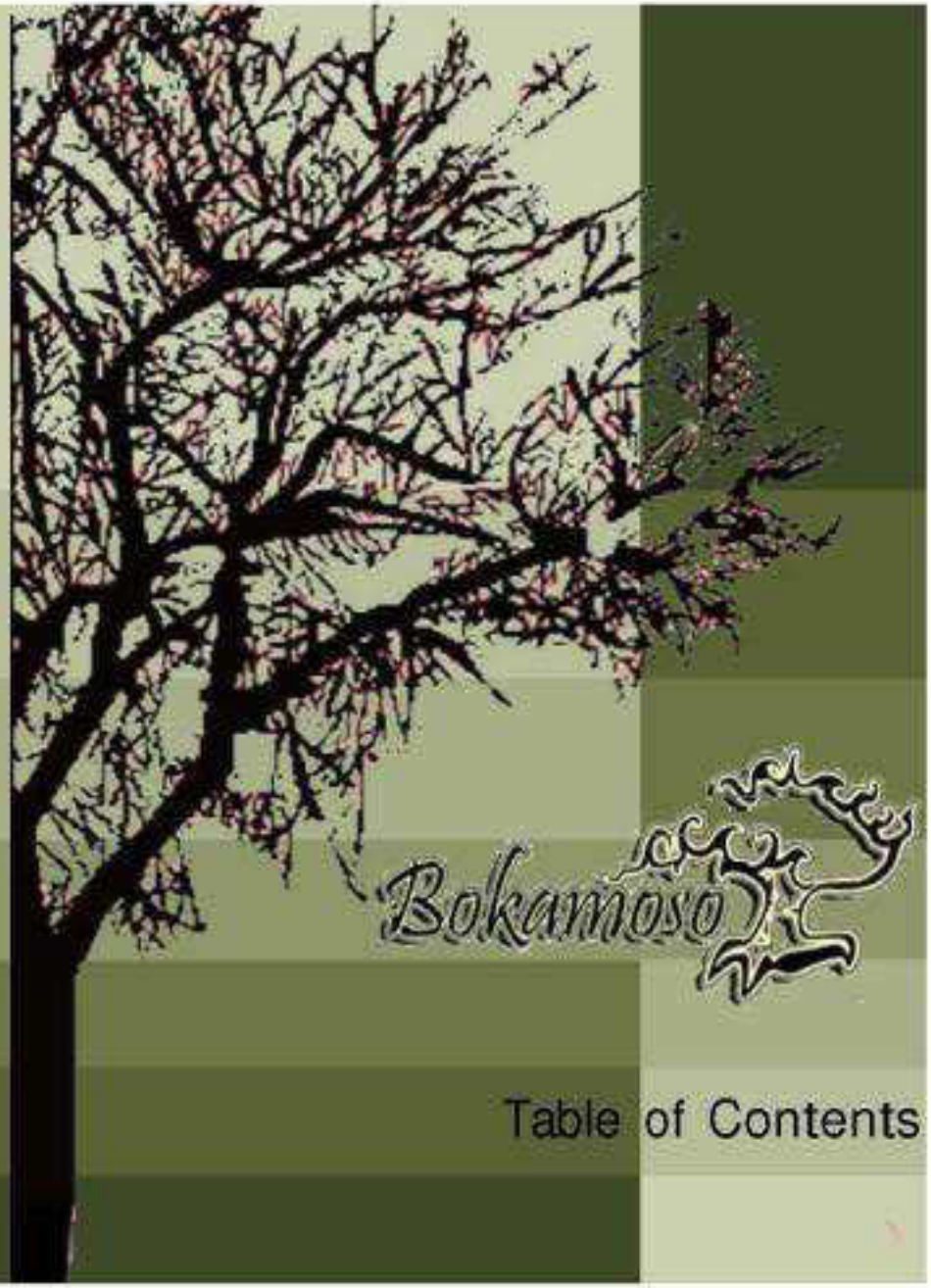


Table of Contents

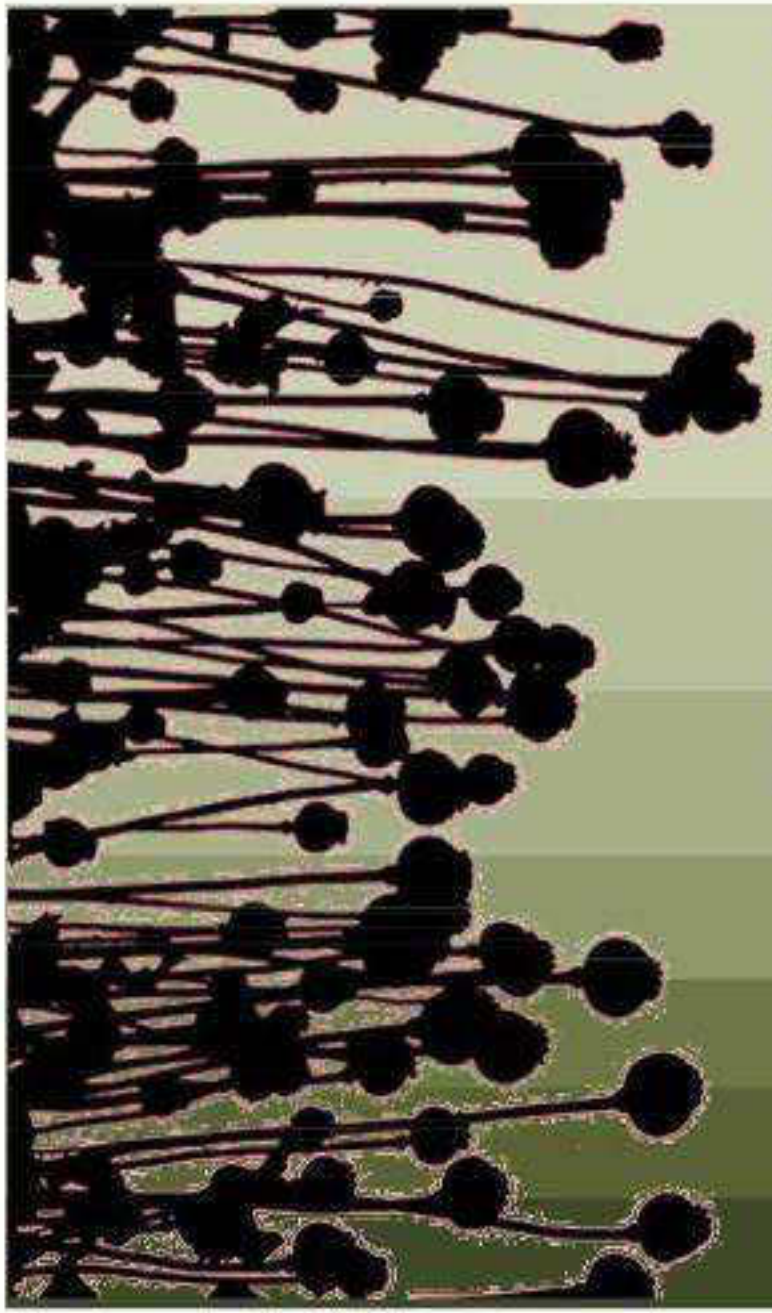
Bokamoso specialises in the fields of Landscape Architecture and all aspects of Environmental Management and Planning. Bokamoso was founded in 1992 and has shown growth by continually meeting the needs of our clients. Our area of expertise stretches throughout the whole of South Africa. Our projects reflect the competence of our well compiled team. The diversity of our members enables us to tend to a variety of needs. Our integrated approach establishes a basis for outstanding quality. We are well known to clients in the private, commercial as well as governmental sector.

At Bokamoso we stand on a firm basis of environmental investigation in order to find unique solutions to the requirements of our clients and add value to their operations.

Bokamoso

01 Executive Summary

011 Company Overview



Vision:

At Bokamoso we strive to find the best planning solutions by taking into account the functions of a healthy ecosystem. Man and nature should be in balance with each other.

Mission:

We design according to our ethical responsibility, take responsibility for successful completion of projects and constitute a landscape that contributes to a sustainable environment. We add value to the operations of our clients and build long term relationships that are mutually beneficial.

Values:

Integrity

Respect

Bokamoso

Bokamoso stands on the basis of fairness. This include respect within our multicultural team and equal opportunities in terms of gender, nationality and race.

We have a wide variety of projects to tend to, from complicated reports to landscape installation. This wide range of projects enables us to combine a variety of professionals and skilled employees in our team.

Bokamoso further aids in the development of proficiency within the working environment. Each project, whether in need of skilled or unskilled tasks has its own variety of facets to bring to the table.

We are currently in the process of receiving our BEE scorecard. We support transformation in all areas of our company dynamics.

Bokamoso

03 Human Resources

031 Employment Equity

Lizelle Gregory (100% interest)

Lizelle Gregory obtained a degree in Landscape Architecture from the University of Pretoria in 1992 and passed her board exam in 1995.
Her professional practice number is PrLArch 97078.

Ms. Gregory has been a member of both the Institute for Landscape Architecture in South Africa (ILASA) and South African Council for the Landscape Architecture Profession (SACLAP), since 1995.

Although the existing Environmental Legislation doesn't yet stipulate the academic requirements of an Environmental Assessment Practitioner (EAP), it is recommended that the Environmental Consultant be registered at the International Association of Impact Assessments (IAIA). Ms. Gregory has been registered as a member of IAIA in 2007.

Ms. Gregory attended and passed an International Environmental Auditing course in 2008.
She is a registered member of the International Environmental Management and Assessment Council (IEMA).

She has lectured at the Tshwane University of Technology (TUT) and the University of Pretoria (UP). The lecturing included fields of Landscape Architecture and Environmental Management.

Ms. Gregory has more than 18 years experience in the compilation of Environmental Evaluation Reports:
Environmental Management Plans (EMP);
Strategic Environmental Assessments;
All stages of Environmental input ;
EIA under ECA and the new and amended NEMA regulations and various other Environmental reports and documents.

Ms. Gregory has compiled and submitted more than 600 Impact Assessments within the last 5-6 years. Furthermore, Ms. L. Gregory is also familiar with all the GDARD/Provincial Environmental policies and guidelines. She assisted and supplied GAUTRANS/former PWV Consortium with Environmental input and reports regarding road network plans, road determinations, preliminary and detailed designs for the past 12 years.

Bokamoso

Consulting

Mientjie Coetzee	**MSc Medical Sciences (US)** **BSc (Hons) Medical Sciences (US)** More than 8 years experience in the compilation of various environmental reports
Ane Agenbacht	**Introduction to Sustainable Environmental Management—An overview of Principles, Tools,& Issues (Potch 2006)** **Leadership Training School (Lewende Woord 2010)** **BA Environmental Management (UNISA 2011)** **PGCE Education (Unisa 2013)** Project Manager More than 10 years experience in the compilation of various environmental reports
Qiqa Nkangana	**BA Environmental Management (UNISA)** Specialises in compiling various environmental reports.
Nicolene Lotter	**BSc (Hons) Environmental Science (NWU)** **BSc Tourism (NWU)** 1 year 4 months experience in the field of Environmental Sciences. Specialises in Water Use License Applications
Ben Bhukwana	**BSc Landscape Architecture (UP)** More than 4 years experience in the field of Landscape Architecture. Specialises in Landscape Design, ECO,& Environmentalist in training.
Marli Burger	**B-Tech Nature Conservation (TUT)** **N. Dip.Nature Conservation (TUT)** EMI Training (GDARD/University of Pretoria) 5years Biodiversity Enforcement& Awareness Training experience Specialises in Water Use Licences

Bokamoso

Anton Nel	B-Tech Landscape Technology (TUT) N Dip Landscape Technology (TUT) 1 year experience in ECO Specialises in Basic Assessment Reports.
Juanita de Beer	Events Management and Marketing (Damelin) Specializes in Public relations and public participation processes
Mary-Lee Potgieter	Msc Plant Science (UP) BSc (Hons) Plant Science (UP) BSc Ecology (UP) 1year 5months working experience in the Environmental field Specialises in ECO works, Basic Assessments, EIA's, and Flora Reports
Alfred Thomas	CIW Foundation & Internet Marketing (IT Academy) 12 years experience in GIS and IT in general. GIS Operator and Multimedia Specialist.
Maretha Roux	Effective People Management (UCT) 18 years management experience Specializes in AutoCAD, Visio, Accounting, and Administration Compiling of various Environmental Reports/ Assisting Project Management Photographer

Elsa Viviers

Interior Decorating (Centurion College)
(Accounting/ Receptionist) and Secretary to Lizelle Gregory

Loura du Toit

N. Dip. Professional Teacher (Heidelberg Teachers Training College)
Librarian and PA to Project Manager

Merriam Mogalaki

Administration Assistant with in-house training in bookkeeping

Landscape Contracting

Elias Maloka

Site manager overseeing landscape installations.
Irrigation design and implementation.
Landscape maintenance
18 years experience in landscape contracting works.

The contracting section compromises of six permanently employed black male workers. In many cases the team consists of up to 12 workers, depending on the quantity of work.

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01 Environmental Management Services

- Basic Assessment Reports
- EIA & Scoping Reports
- Environmental Management Plans
- Environmental Scans
- Strategic Environmental Assessments
- EMP for Mines
- Environmental Input and Evaluation of Spatial Development Frameworks
- State of Environmental Reports
- Compilation of Environmental Legislation and Policy Documents
- Environmental Auditing and Monitoring
- Environmental Control Officer (ECO)
- Visual Impact assessments
- Specialist Assistance with Environmental Legislation Issues and Appeals
- Development Process Management
- Water Use License applications to DWA
- Waste License Application

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04 Services

041 Consulting Services

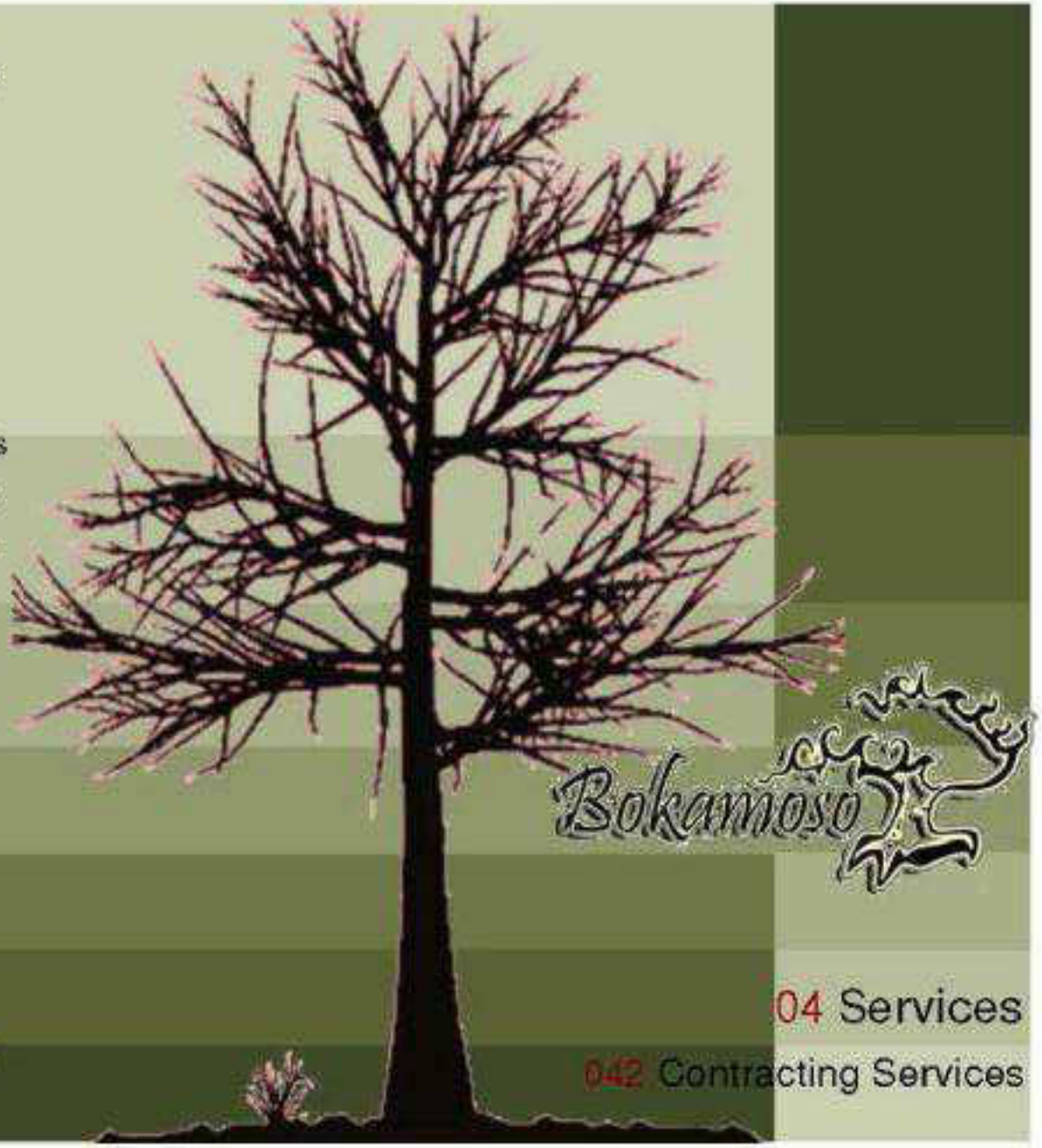
02 Landscape Architecture

- Master Planning
- Sketch Plans
- Planting Plans
- Working Drawings
- Furniture Design
- Detail Design
- Landscape Development Frameworks
- Landscape Development Plans (LDP)
- Contract and Tender Documentation
- Landscape Rehabilitation Works

03 Landscape Contracting

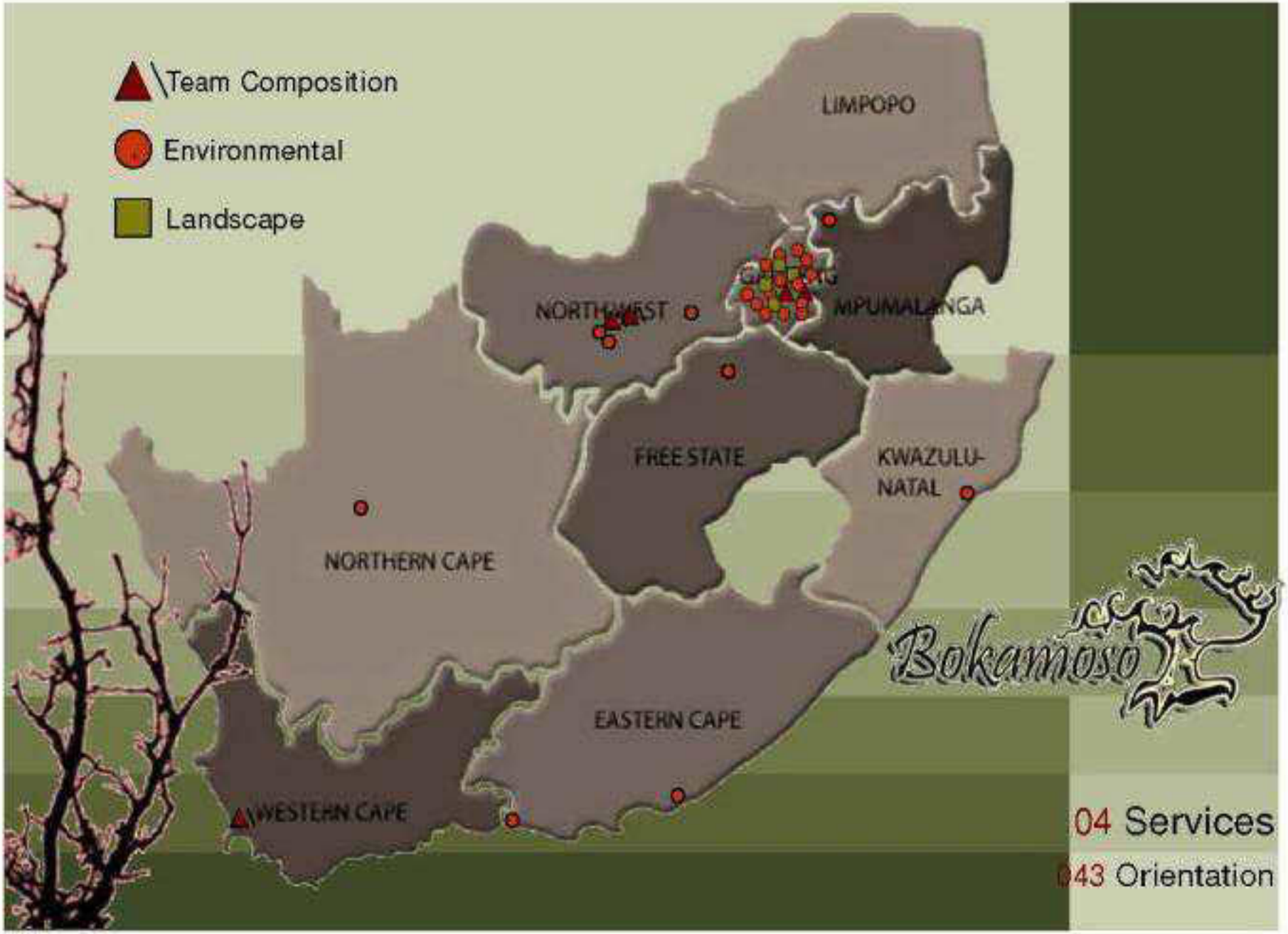
Implementation of Plans for:

- Office Parks
- Commercial/ Retail / Recreational Development
- Residential Complexes
- Private Residential Gardens
- Implementation of Irrigation systems



04 Services

042 Contracting Services


Team Composition
Environmental
Landscape
LIMPOPO
NORTH WEST
MPUMALANGA
FREE STATE
KWAZULU-NATAL
NORTHERN CAPE
EASTERN CAPE
WESTERN CAPE
Bokamoso
04 Services
043 Orientation


01 Valpre Bottling Plant, Heidelberg
project
site plan
Bokamoso
05 Landscape Projects- Current
051 Commercial

01 Valpre Bottling Plant, Heidelberg

Bokamoso

05 Landscape Projects– Current

051 Commercial

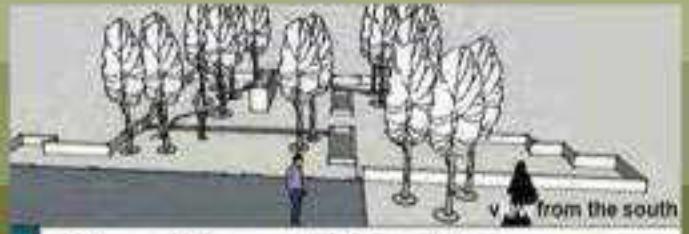
01 Valpre Bottling Plant,Heidelberg

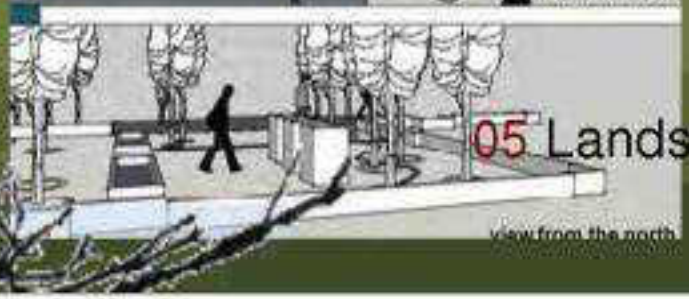
Bokamoso

05 Landscape Projects– Current

051 Commercial

01 Valpre Bottling Plant, Heidelberg





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05 Landscape Projects- Current

051 Commercial

02 Melodie Waters, Hartebeespoortdam

Spatial Planning

Streetscape

Indigenous Planting

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Landscape Projects – Current

02 Commercial/Recreational

02 Melodie waters, Hartebeestpoortdam

Development Framework

Rehabilitation

Area Layout

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05 Landscape Projects- Current

052 Commercial/Recreational

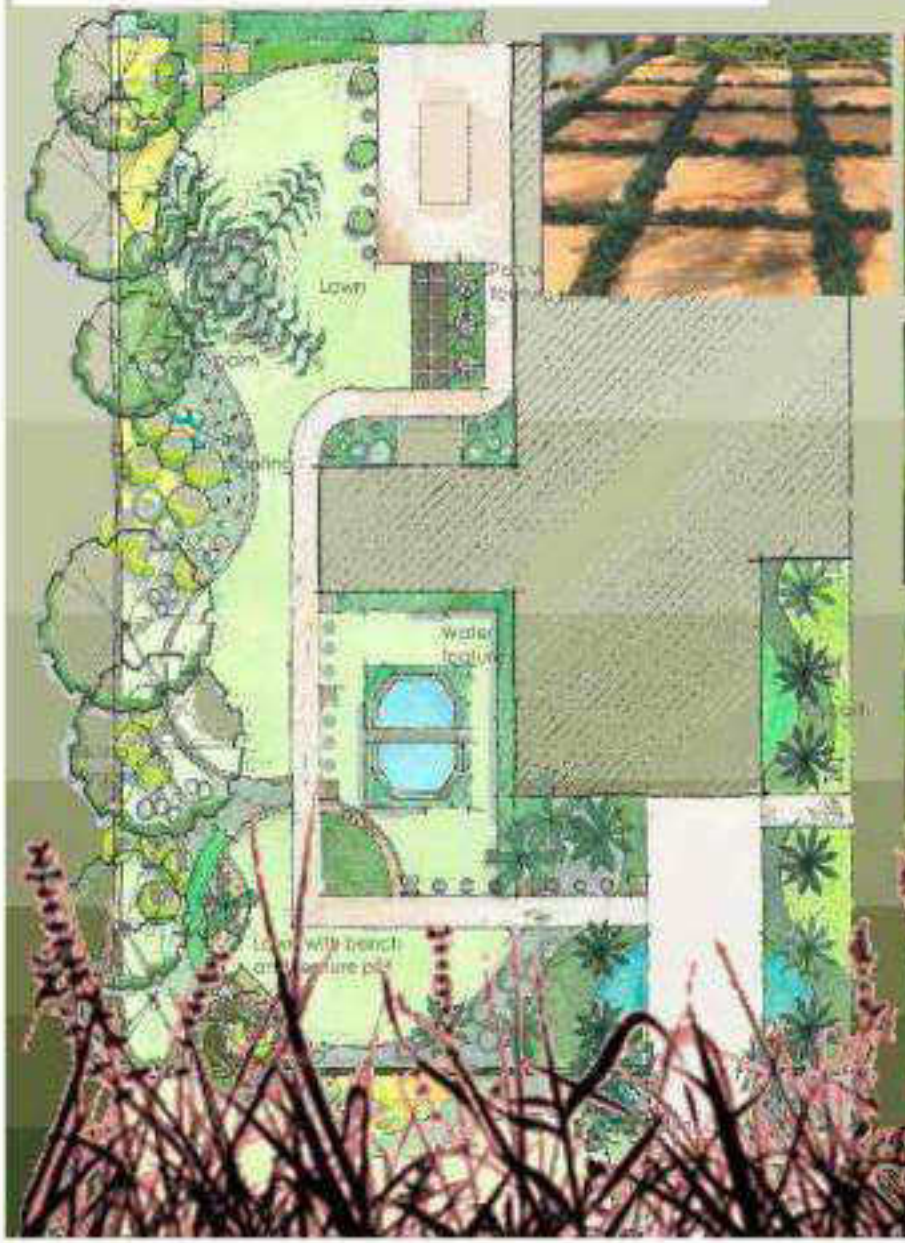
03 Grain Building, Pretoria

Bokamoso

05 Landscape Projects- Completed

053 Offices

04 Ismail Dawson offices, Pretoria



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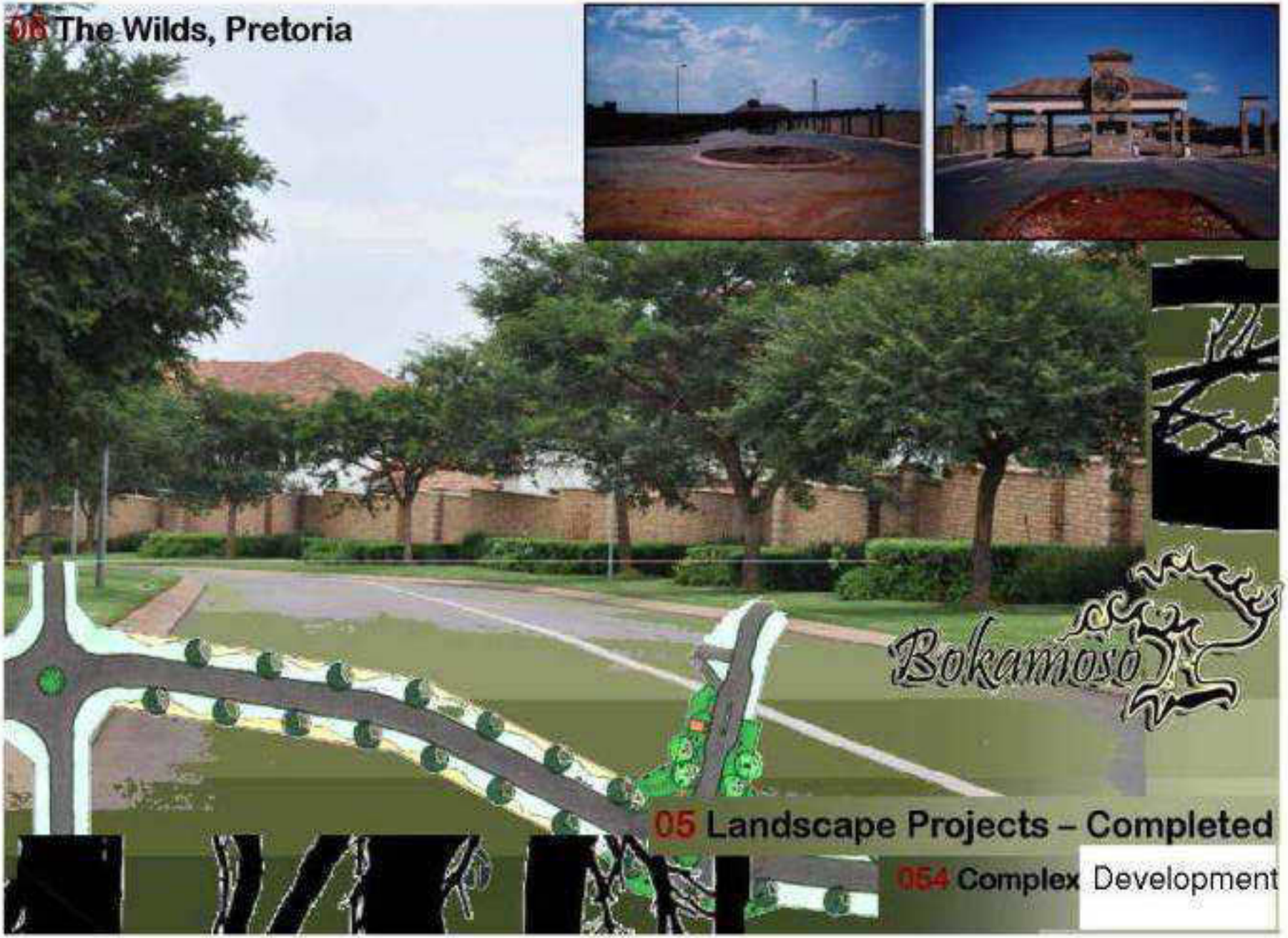
05 Landscape Projects – Conceptual

053 Offices


05 Celtic Manor, Pretoria
Bokamoso
05 Landscape Projects -Completed
054 Complex Development


06 The Wilds, Pretoria
Bokamoso
05 Landscape Projects – Completed
054 Complex Development

07 The Wilds, Pretoria

05 Landscape Projects – Completed

055 Residential

08 The Wilds, Pretoria

Bokamoso

05 Landscape Projects – Completed

055 Residential

09 The Wilds,Pretoria _

Bokamoso

05 Landscape Projects – Completed

055 Residential

010 The Wilds, Pretoria

Bokamoso

05 Landscape Projects Completed

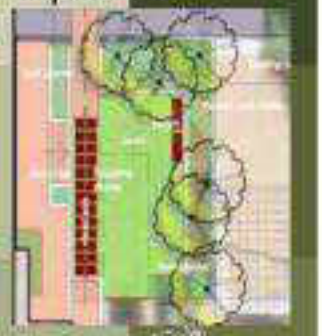
055 Residential

011 Governor of Reserve Bank's Residence, Pretoria

Plant Palette

Option 1

Option 2



Bokamoso

05 Landscape Projects – Conceptual

055 Residential

012 House Ismail, Pretoria

Front Garden

Back Garden

Bokamoso

05 Landscape Projects - Conceptual

055 Residential

013 Forest Garden, Pretoria

Bokamoso

05 Landscape Projects – Completed

055 Residential

016 Forest Garden,Pretoria

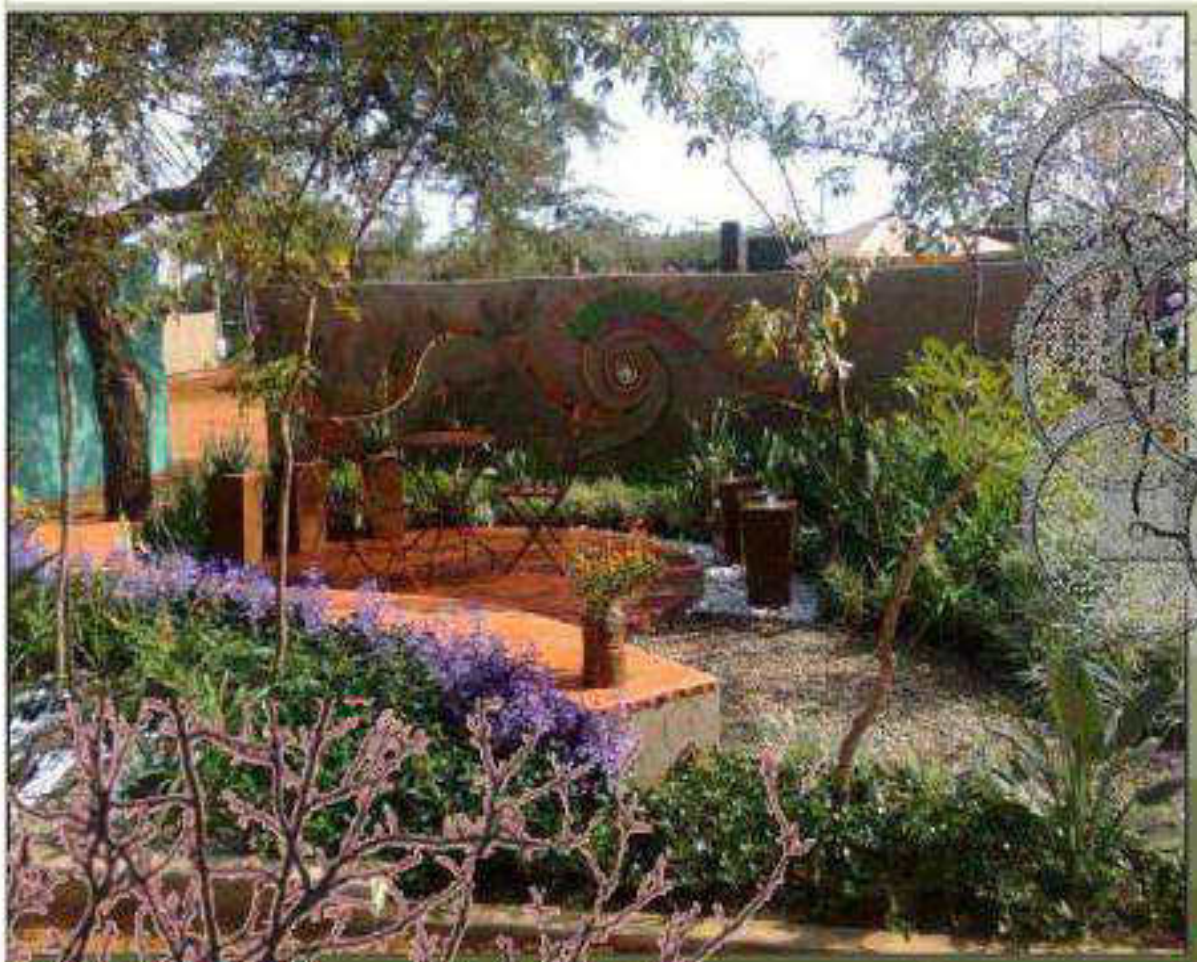
Bokamoso

05 Landscape Projects -Completed

055 Residential

01 Safari Garden Expo

Received a Silver Certificate at the Safari Garden Expo, 2010



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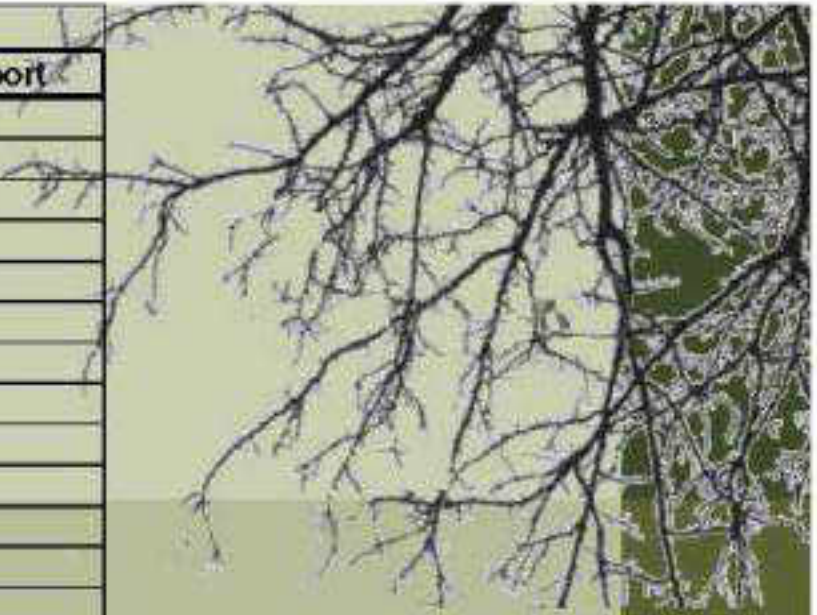
02 UNISA Sunnyside Campus, Pretoria

Best Commercial Paving Plan in Gauteng. 1997

Project Name	Status	Project
Environmental Impact Assessment(EIA) and Scoping Report		
Junction 21	ROD	EIA
5 O'clock site access	In Progress	EIA
Bokamoso X1	In Progress	Scoping & EIA
Doornvallei Phase 6 & 7	In Progress	EIA
Engen Interchange	In Progress	Scoping & EIA
Erasmia X15	In Progress	EIA
Franschkloof	In Progress	EIA
K113	Amendment of ROD	EIA
K220 East	ROD	EIA
K220 West	ROD	EIA
K54 ROD conditions	In Progress	EIA
Knopjeslaagte 95/Peachtree	ROD	EIA
Knopjeslaagte portion 20 & 21	ROD	EIA
Lilliesliet/Nooitgedacht	In Progress	EIA
Mooiplaats 70 (Sutherland)	In Progress	EIA
Naauwpoort 1 - 12/Valley View	In Progress	EIA
PeachTree X5	In Progress	EIA
Strydfontein 60	In Progress	EIA
Thabo Motswere	In Progress	Scoping & EIA
Vlakplaats	In Progress	EIA
Waterval Valley	In Progress	EIA
Environmental Opinion		
Doornkloof 68 (Ross)	In Progress	Opinion
Monavoni X 53	In Progress	BA & Opinion
Mooikloof (USN)	In Progress	Opinion
Norwood Mall/Sandspruit	In Progress	Opinion
Riversong X 9	In Progress	Opinion
Sud Chemie	In Progress	Opinion
USN Bench Fishing Resort	In Progress	Opinion



The adjacent list host the status of our current projects. Only a selected amount of projects are displayed.

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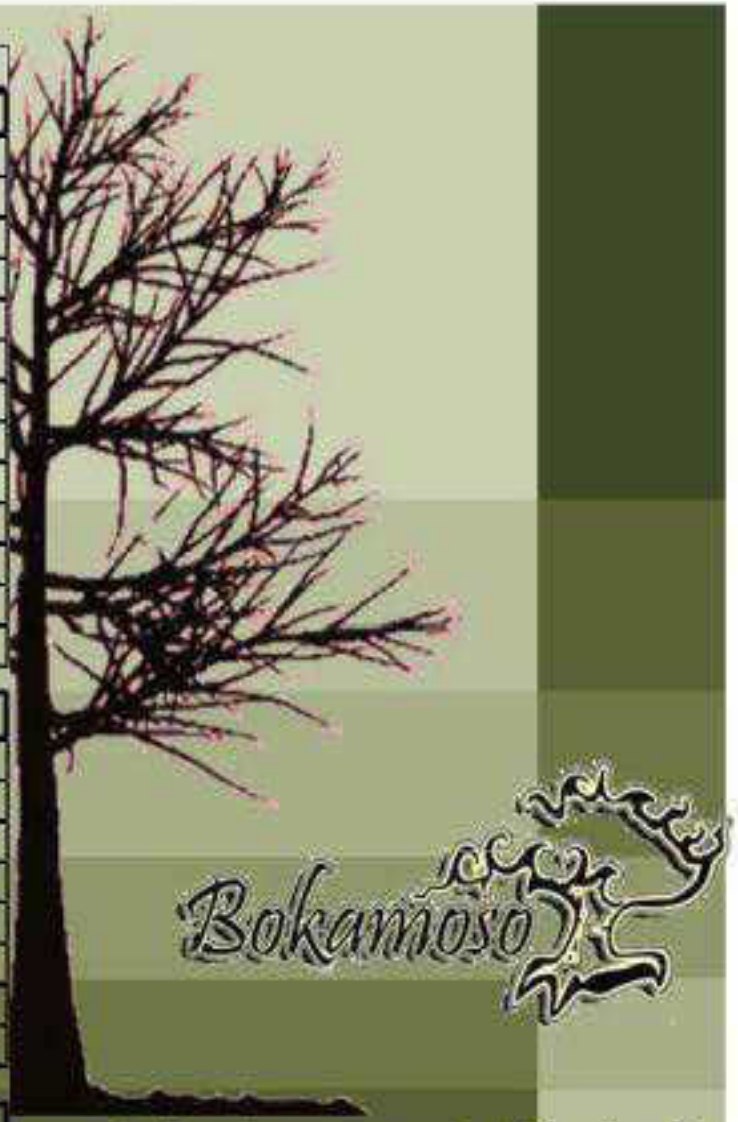
07 Current Environmental Projects

071 EIA, Scoping& Opinion

Project Name	Status	Project
Basic Assessment(BA)		
Annlin X 138	In Progress	BA
Clubview X 29	ROD	BA
Darrenwood Dam	In Progress	BA
Durley Holding 90 & 91	In Progress	BA
Elim	In Progress	BA
Fochville X 3	In Progress	BA
Hartebeeshoek 251	In Progress	BA
Klerksdorp (Matlosana Mall)	In Progress	BA
Monavoni External Services	ROD	BA
Monavoni X 45	Amendment of ROD	BA
Montana X 146	In Progress	BA
Rooihuiskraal X29	In Progress	BA
Thorntree Mall	In Progress	BA
Environmental control officer (ECO)		
Grace Point Church	In Progress	ECO
R 81	In Progress	ECO
Highveld X 61	In Progress	ECO
Mall of the North	In Progress	ECO
Olievenhoutbosch Road	In Progress	ECO
Orchards 39	In Progress	ECO
Pierre van Ryneveld Reservoir	In Progress	ECO
Project Shelter	In Progress	ECO
S24 G		
Wonderboom	In Progress	S24 G
Mogwasi Guest houses	Completed	S24 G



07 Current Environmental Projects

072 BA, ECO & S24 G

Project Name	Status	Project
Objection		
Colesberg WWTW	In Progress	Objection
Nigel Steelmill	Completed	Objection
Chantilly Waters	Completed	Objection
Development facilitation Act- Input (DFA)		
Burgersfort	In Progress	DFA & BA
Doornpoort Filling Station	In Progress	DFA & EIA & Scoping
Eastwood Junction	In Progress	DFA
Ingersol Road (Erf 78, 81 - 83)	In Progress	DFA
Roos Senekal	In Progress	DFA & EIA & Scoping
Thaba Meetse 1	In Progress	DFA & EIA & Scoping
Water Use License Act (WULA)		
Britstown Bulk Water Supply	In Progress	WULA
Celery Road / Green Channel	In Progress	WULA
Clayville X 46	In Progress	WULA
Dindingwe Lodge	In Progress	WULA
Doornpoort Filling Station	In Progress	WULA+DFA+EIA+SC
Eco Park Dam	In Progress	WULA
Groote Drift Potch	In Progress	WULA
Jozini Shopping Centre	In Progress	WULA+BA
K60	Completed	WULA
Maloto Roads	In Progress	WULA
Kwazele Sewage Works	In Progress	WULA
Monavoni External Services	In Progress	WULA+BA
Nyathi Eco Estate	In Progress	WULA
Prairie Giants X 3	In Progress	WULA
Waverids Water Bottling Plant	Completed	WULA

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07 Current Environmental Projects

073 Objection, DFA & WULA

Project Name	Status	Project
Environmental Management Plan(EMP)		
Heidelberg X 12	ROD	EMP
Mbhavoni Shopping Centre	Completed	EMP
Forest Hill Development	Completed	EMP
Weltevreden Farm 105KQ	Completed	EMP+EIA
Raslouw Holding 93	Completed	EMP+BA
Durley Development	Completed	EMP+BA
Rooihuiskraal North X 28	Completed	EMP

Rehabilitation Plan		
Norwood Mall/Sandspruit	In Progress	Rehabilitation
Project Shelter Heidelberg	In Progress	Rehabilitation
Sagewood Attenuation Pond	ROD	Rehabilitation
Velmore Hotel	Completed	Rehabilitation
Grace Point Church	Completed	Rehabilitation
Mmamelodi Pipeline	Completed	Rehabilitation

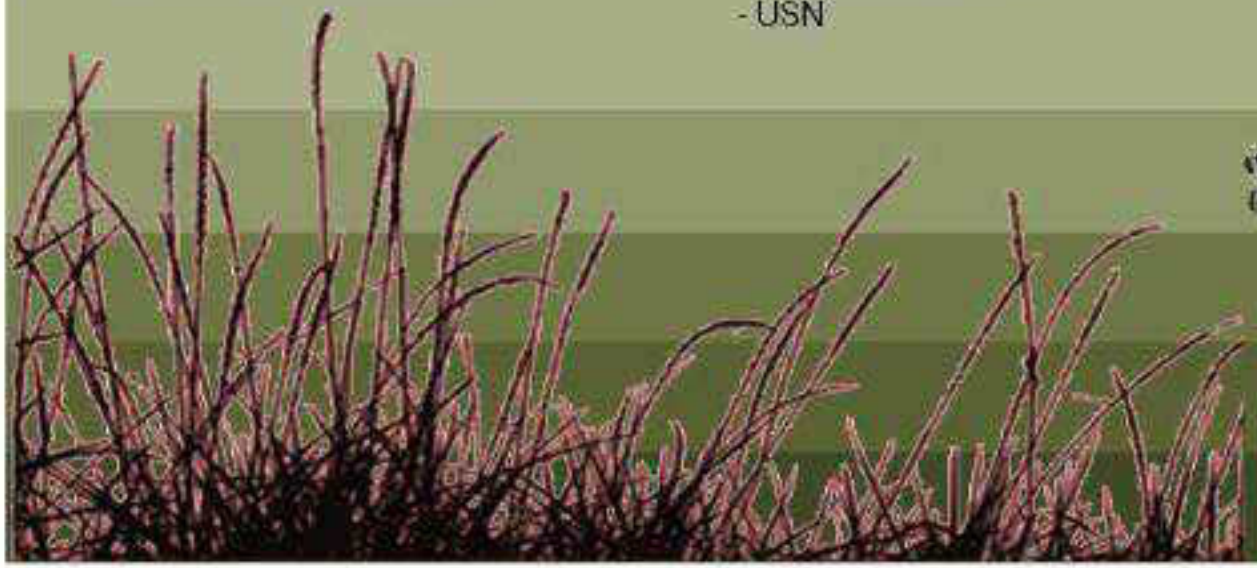
Visual Impact Assessment		
Swatzkop Industrial Developme	Completed	Assessment +DFA
Erasmia	Completed	Assessment

Signage Application		
Merlyn Advertising	Completed	Signage
The Villa Mall	Completed	Signage+EMP+BA

07 Current Environmental Projects

074 EMP, Rehabilitation , Waste Management & Signage Application

- Billion Property Group
- Cavaleros Developments
- Centro Developers
- Chaimberlains
- Chieftain
- Century Property Group
- Coca Cola
- Elmado Property Development
- Flanagan & Gerard
- Gautrans
- Hartland Property Group
- Moolman Group
- MTN
- M&T Development
- Old Mutual
- Property Investment Company
- Petroland Developments
- RSD Construction
- SAND
- Stephan Parsons
- Twin City Developments
- Urban Construction
- USN



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08 Indicative Clients