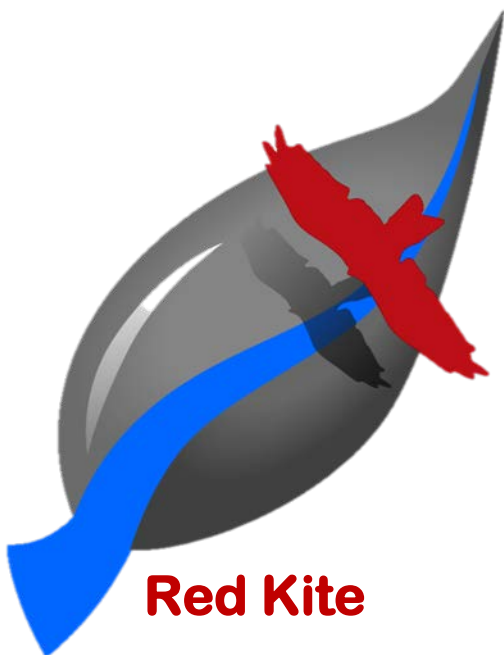


**Ecological Assessment
for
Estate D'Afrique:
Road Development
North West Province**

July 2019



Red Kite

Environmental Solutions

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Executive Summary

Red Kite Environmental Solutions (Pty) Ltd was appointed by Prescali Environmental Consultants (Pty) Ltd to conduct a Fauna and Flora Assessment for the development of a road associated with Estate D'Afrique, located within the Local Municipality of Madibeng (NW372) within the Bojanala District Municipality (DC37), North West Province.

The road is proposed to be constructed between Estate D'Afrique and the Meerhof estate. The proposed road route is approximately 282 m in length.

A desktop study was conducted to establish whether any potentially sensitive fauna and flora species or species of conservation concern may possibly occur on site. The Virtual Museum and Animal Demography Unit (ADU) and SANBI POSA database was used to compile species lists based on the sightings and data gathering from the South African Biodiversity Institute for the 2527DD QDS. The avifaunal species list was obtained from SABAP2 for the 2555_2900 pentad.

According to the National Vegetation Map (2018) the project site falls within the Gold Reef Mountain Bushveld with a small section of the 200 m buffer area representative of the Moot Plains Bushveld. The findings of the site survey in terms of floral species composition and characteristics of the vegetation unit identified, is closely representative of the Gold Reef Mountain Bushveld vegetation type.

Neither the Gold Reef Mountain Bushveld nor the Moot Plains Bushveld are listed in the National List of Threatened Ecosystems.

Information on plant species recorded was extracted from the POSA online database hosted by SANBI. The results indicate that approximately 53 plant species have been recorded within the square. Four species of conservation concern were found to possibly occur in the area. Thirteen exotic plant species are recorded as occurring in the QDS, seven of which are listed as alien and invasive plant species in NEMBA (2004). Of the 53 plant species listed as occurring in the project area, 16 are endemic to South Africa. No protected tree species, as promulgated in terms of the NFA (1998), have been recorded in the QDS. None of the species listed for the QDS are contained in the ToPS list. None of the species of conservation concern listed in for the QDS on the POSA database were identified as occurring on the project site. However, this does not preclude them from possibly occurring on the proposed road route.

The proposed road route is situated across the foot of a ridge of the Witwatersberg, adjacent to the Hartbeespoort Dam. The area surveyed between the two residential areas was found to be moderately impacted due to the proximity of anthropogenic activities. However, the vegetation was found to be in good condition and representative of the vegetation type of the area.

Vegetation units were identified according to plant species composition, previous land use and topography. The state of the vegetation of the proposed road route varies from being natural to completely transformed. The following broad



classification of Vegetation Units (VU) were found to occur on the proposed road route and 200 m buffer: Mountain slopes bushveld (VU1); and Transformed areas (VU2).

A total of 50 plant species were recorded in the studied area during the site survey, none of which are considered to be of conservation concern. None of the floral species recorded during the site survey are listed in the ToPS list or the Protected tree species list (NFA). All species are classified as Least Concern according to the SANBI Red Data List. Two endemic species were identified to occur in the projects site, namely *Cussonia paniculata* (Highveld cabbage tree) and *Searsia zeyheri* (Blue crowberry).

Only four Alien Invasive Plant (AIP) species, as per the NEMBA, were recorded during the site survey. None of the AIP species identified during the site survey occurred in dense clusters, but rather as a few scattered individuals.

Ten species were found to occur on site that have medicinal uses.

Appendix D list the faunal species for the 2527DD QDS and Table 8 lists all fauna species that are of conservation concern which were found during the desktop study. Thirty-three mammalian, amphibian and avifaunal species with a red listed status are known to occur within the specific area where the new road is located.

Eighty-six (86) mammal species were found to possibly occur within the QDS, most of which have a Least Concern Red List Status. Fourteen (14) species is classified within the National Red Data List, but only six (6) of these are expected to potentially occur within the area due to the habitat found within the area.

According to data collected during the Southern African Bird Atlas Project 2 (SABAP2) a total of 311 bird species have been recorded in the pentad (2545_2750). Seventeen (17) birds within pentad has a red listed status, either Regional or Global.

One hundred and thirty-six (136) butterfly species were found for the 2527DD, all of which are categorized as Least Concern by SANBI.

Twenty-seven (27) Dung beetle species were provided on the SANBI database, eight (8) Lacewing species. Forty (40) Odonata species, Fourteen (14) Spiders, Six (6) Scorpions. None of which has a listed status (or has not been assessed) according to SANBI.

Thirty-five (35) reptile species are recorded for the QDS. None of the species have a red listed status.

Seventeen (17) amphibian species were listed within this QDS and one species was red listed for the QDS.

Habitat availability along the footprint is adequate/good due to the nature of the habitat types found along the ridge/koppie. Animal communities expected do not likely use the area as breeding and roosting sites as a result of constant movement and human noise and smells in close proximity of the site.

The area to be developed is located between residential developments set on the banks of the Hartbeespoort dam. The species found here has been impacted by the residential development and constant movement of humans and activities associated with residential areas despite its largely natural setting against the mountains and the species associated with the dam. It is unlikely that sensitive species or red listed animal species occur where the road is proposed although they may occur in the wider region and many red listed birds are known to be associated with the Magaliesberg and the Hartbeespoort dam itself.

Twenty-two faunal species were identified as occurring on the project area, all of which are categorised as Least Concern in terms of the SANBI red list.

Since the development is closely associated with the Hartbeespoort dam, a large amount of water birds of various degrees of sensitivity may be associated with the water body. The waterbirds will not be affected significantly due to the road development and therefore a survey of the biota of the dam itself is not relevant or included within this survey.

Regionally, the area is situated between various formally protected areas (NPAES), such as the Magaliesberg Protected Natural Environment and the Cradle of Humankind World Heritage Site. The area also falls within the transition zone of the Magaliesberg Biosphere Reserve.

Important Birding Areas (IBAs) occur where the road development is proposed, namely the Magaliesberg IBA. Most of the area falls within the Magaliesberg Protected Natural Environment.

Locally, in terms of the North West Conservation Plan, the site is categorised as falling areas characterised as Ecological Support Area 1 (ESA1) and Critical Biodiversity Area 2 (CBA2).

Since natural features will be destroyed and vegetation clearance will take place, the impacts on the natural environment is argued to be medium-high in areas. The sensitivity of the site is High due to the level of specialisation of habitat and the classification of the area as a CBA. Impacts will likely be higher in terms of vegetation since all the vegetation located on the construction footprint will be cleared. Animal species will move away as soon as construction starts and threats associated with the road is based on fragmentation between the dam and the ridge/mountainous area.

It is the opinion of the specialist that the development may continue without severe ecological impacts in terms of the animal species identified in the framework of the study, since animal species will respond by means of temporary movement away from the activities and there are other suitable habitat available during the active phase and construction will be a short term activity. Management of impacts should be initiated from the onset of the project. All management features as prescribed should also adhered to.

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Abbreviations

ADU	Animal Demographic Unit
AIP	Alien Invasive Plant
CITES	Convention on International Trade in Endangered Species
DEA	Department of Environmental Affairs
EIA	Environmental Impact Assessment
NFEPA	National Freshwater Ecosystem Priority Areas
GDARD	Gauteng Department of Agricultural Resources and Development
IUCN	International Union for Conservation of Nature and Natural Resources
LC	Least Concern
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NFA	National Forests Act (Act 84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NWBMA	North West Biodiversity Management Act (Act 4 of 2016)
POSA	Plants of Southern Africa
QDS	Quarter Degree Squares
SABAP2	South African Bird Atlas Project 2
SABCA	South African Butterfly Conservation Assessment
SARCA	South African Reptile Conservation Assessment
SANBI	South African National Biodiversity Institute
ToPS	Threatened or Protected Species List – Government Gazette Notice No. 151 of 2007, promulgated in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004)



Declaration of Independence

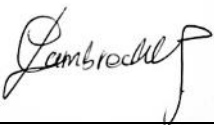
I, Nicole Upton, declare that -

- I act as the independent specialist;
- I will perform the work relating to the project in an objective manner, even if this results in views and findings that are not favourable to the project proponent;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this project, including knowledge of the National Environmental Management Act, 1998 (Act No. 107 of 1998; 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;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the project proponent 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 project; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority or project proponent;
- All the particulars furnished by me in this document are true and correct; 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.

Signature of Specialist	
Name of Company	Red Kite Environmental Solutions (Pty) Ltd ("Red Kite")
Date	30 June 2019

I, Corlien Lambrechts, declare that -

- I act as the independent specialist;
- I will perform the work relating to the project in an objective manner, even if this results in views and findings that are not favourable to the project proponent;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this project, including knowledge of the National Environmental Management Act, 1998 (Act No. 107 of 1998; 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;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the project proponent 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 project; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority or project proponent;
- All the particulars furnished by me in this document are true and correct; 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.

Signature of Specialist	
Name of Company	External for Red Kite Environmental Solutions (Pty) Ltd
Date	24 June 2019



1. INTRODUCTION

Red Kite Environmental Solutions (Pty) Ltd was appointed by Prescali Environmental Consultants (Pty) Ltd to conduct a Fauna and Flora Assessment for the development of a road associated with Estate D'Afrique, located within the Local Municipality of Madibeng (NW372) within the Bojanala District Municipality (DC37), North West Province.

The road is proposed to be constructed between Estate D'Afrique and the Meerhof estate. The proposed road route is approximately 282 m in length.

A desktop study was conducted to establish whether any potentially sensitive faunal or floral species or species of conservation concern may possibly occur on site. The Virtual Museum and Animal Demography Unit (ADU) and POSA were used to compile species lists based on the sightings and data gathering from the South African Biodiversity Institute for the 2527DD QDS.

A site survey was conducted on the 26th of April 2019 to verify or dispute any findings related to the desktop assessment and in terms of habitat available on the relevant footprint of the road and within approximate 200 m surroundings.



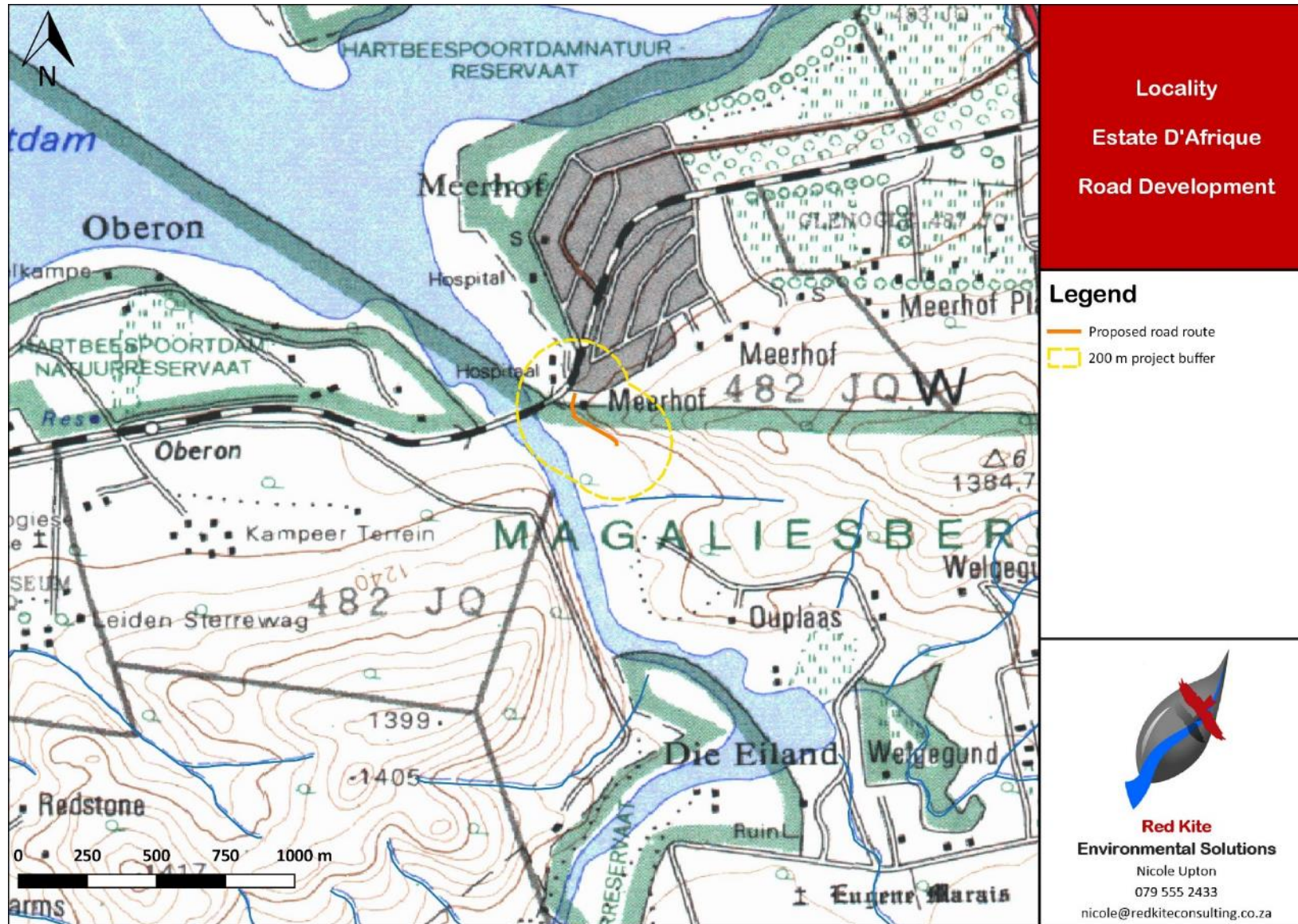


Figure 1: Locality of proposed road

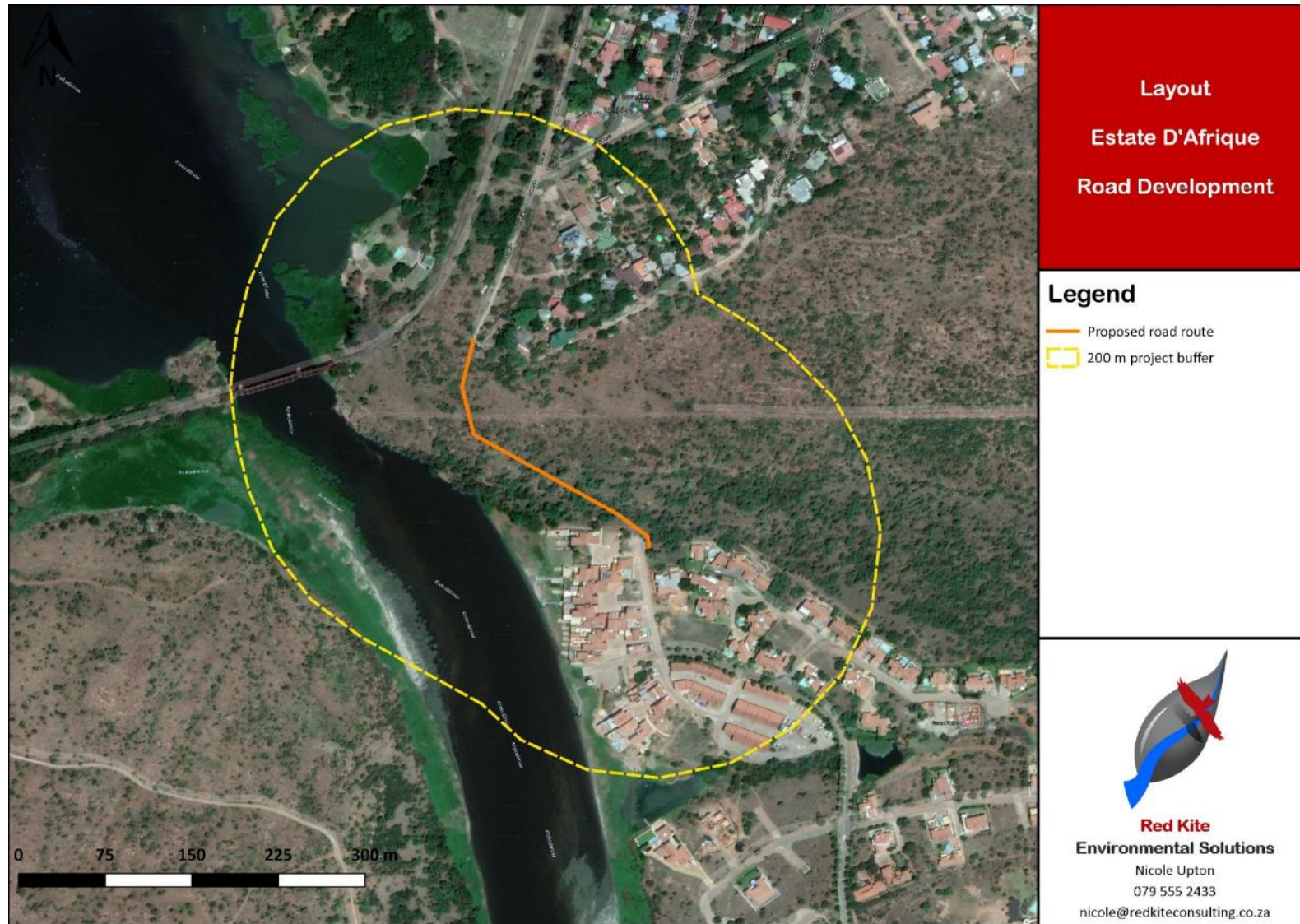


Figure 2: Layout of proposed road route

1.1. Scope of Study

Red Kite Environmental Solutions was appointed to conduct a Fauna and Flora Assessment as one of the specialist studies required for the Environmental Authorisation process for the project. This Flora and Fauna Assessment consist of a desktop study, which includes the following:

- A desktop vegetation study, which included:
 - Classification of the main biome and description of the dominant vegetation type;
 - Investigation of the dominant indigenous species within this region;
 - Listing the endemic species;
 - Listing species of conservation concern; and
 - Determining the medicinal species.

- A desktop invertebrate and mammal study, which included determining the:
 - Endemic species;
 - Baseline occurrences of species within the area;
 - Virtual Museum and Animal Demographic Unit consultation; and
 - Listing species of conservation concern.

The following provincial and national legislation and best-practice documents are relevant to this study:

- National Environmental Management Protected Areas Act, 2003 (Act No. 57 of 2003);
- National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004);
- National Protected Area Expansion Strategy;
- National Biodiversity Assessment;
- National Freshwater Ecosystems Priority Atlas;
- National Forests Act, 1998 (Act No. 84 of 1998); and
- North-West Biodiversity Management Act, 2016 (Act No. 4 of 2016)

The following information resources were consulted in order to ascertain whether any species of conservation concern occur, or could possibly occur within the study area:

- CITES;
- IUCN Red Data List;
- SANBI Virtual Museum Data;
- Mammal Red list of South Africa (2016);
- Eskom Red listed birds (BLSA Checklist 2018); and

- ToPS List – Government Gazette Notice No. 151 of 2007: “National Environmental Management: Biodiversity Act, 2004 (Act 10 Of 2004): Publication Of Lists Of Critically Endangered, Endangered, Vulnerable And Protected Species”.

1.2. Objectives of the study

The objectives of this study include:

- Identify sensitive areas and species and habitat that should be avoided during the proposed development.
- Make use of the South African National Biodiversity Institute Database to obtain specialised information and previous surveys within the area.
- Summarise legislation pertaining to the project with regard to biodiversity.
- Highlight major concern or fatal flaws of the project with regard to biodiversity.
- Provide relevant mitigations and recommendations to the developer to help limit and minimise the impacts they may have on the fauna and flora of the area.

2. LEGISLATION

The aim of this component of the report is to provide a brief overview of the pertinent policies, as well as legal and administrative requirements applicable to biodiversity aspects of the proposed development.

Wetlands, Rivers, Ridges, Caves and Corridors and other known sensitive areas were identified in the study site and were specifically searched for certain species compositions or possible signs of occurrence on site.

The SA Red Data Book (Endangered Wildlife Fund) and the Threatened or Protected Species Regulations published initially in Government Gazette (23 February 2007), National Environmental Management: Biodiversity Act (Act No. 10 of 2004), also known as the TOPS List, was used to determine the degree of protection designated within the Environmental Management Plan.

2.1. The National Environmental Management Act (NEMA) (Act No. 107 of 1998)

This Act embraces all three fields of environmental concern namely: resource conservation and exploitation; pollution control and waste management; and land use planning and development.

2.1.1. National Environmental Management Biodiversity Act (NEMBA: Act 10 of 2004)

The following aspects of the NEMBA (2004) are important to consider in the compilation of an ecological report:

- Lists ecosystems that are threatened or in need of national protection;
- Links to Integrated Environmental Management processes;
- Must be considered in EMP and IDPs;
- The Minister may make regulations to reduce the threats to listed ecosystems.

- ***Threatened or Protected Species List (ToPS List) – Government Gazette Notice No. 389 of 2013***

“Publication of Lists of species that are Threatened or Protected, Activities that are prohibited and Exemption from Restriction”, National Environmental Management: Biodiversity Act (NEMBA), 2004 (Act 10 of 2004).

The status provided by the Government Gazette in terms of Notice 389 implies:

- Critically endangered: Section 56(1)(a) applies to the species awarded this status in terms of NEM:BA4, meaning: “*Critically endangered species, being any indigenous species facing an extremely high risk of extinction in the wild in the immediate future*”



- Endangered species: Section 56(1)(b) applies to the species awarded this status in terms of NEM:BA, meaning: *“Endangered species, being any indigenous species facing a high risk of extinction in the wild in the near future, although they are not a critically endangered species”*
- Vulnerable species: Section 56(1)(c) applies to the species awarded this status in terms of NEM:BA, meaning: *“Vulnerable species, being any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future, although they are not a critically endangered species or an endangered species”*
- Protected species: Section 56(1)(d) applies to the species awarded this status in terms of NEM:BA, meaning: *“Protected species, being any species, which are of such high conservation value or national importance that they require national protection, although they are not listed in terms of paragraph (a), (b) or (c)”*
- ***Alien and Invasive Species List - Government Gazette Notice No. 599 of 2014***

The Department of Environmental Affairs (DEA) manages Invasive Alien Species (IAS) under the NEMBA, 2004 (Act 10 of 2004).

The four different categories that NEMBA classify Alien Invasive Species under are:

- Category 1a: Invasive species that may not be owned, imported into South Africa, grown, moved, sold, given as a gift or dumped in a waterway. These species need to be controlled on your property, and officials from the Department of Environmental Affairs must be allowed access to monitor or assist with control.
- Category 1b: Invasive species that may not be owned, imported into South Africa, grown, moved, sold, given as a gift or dumped in a waterway. Category 1b species are major invaders that may need government assistance to remove. All category 1b species must be contained, and in many cases, they already fall under a government sponsored management programme.
- Category 2: These are invasive species that can remain in your garden, but only with a permit, which is granted under very few circumstances.
- Category 3: These are invasive species that can remain in your garden. However, you cannot propagate or sell these species and must control them in your garden. In riparian zones or wetlands all category 3 plants become category 1b plants.
- ***National List of Threatened Terrestrial Ecosystems (2011)***

The National Environmental Management Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing of threatened or protected ecosystems, in one of four categories:

- Critically Endangered;
- Endangered;
- Vulnerable; or
- Protected.

Threatened ecosystems are listed in order to reduce the rate of ecosystem and species extinction by preventing further degradation and loss of structure, function and composition of threatened ecosystems. The purpose of listing protected ecosystems is primarily to conserve sites of exceptionally high conservation value (SANBI, BGIS).

2.2. The National Forest Act (Act 84 of 1998)

The National Forest Act:

- Promotes the sustainable management and development of forests for the benefit of all;
- Creates the conditions necessary to restructure forestry in State Forests;
- Provide special measures for the protection of certain forests and protected trees;
- Promotes the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes.
- Promotes community forestry.

In terms of section 15(1) of the National Forests Act of 1998, forest trees or protected tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold – except under license granted by the Department of Agriculture, Forestry and Fisheries (DAFF).

The most recent list of Protected Tree species was published under GNR 536 on September 2018.

2.3. Focus Areas for Protected Area Expansion – NPAES (2008)

The goal of the National Protected Area Expansion Strategy (NPAES) is to achieve cost effective protected area expansion for ecological sustainability and adaptation to climate change. The NPAES sets targets for protected area expansion, provides maps of the most important areas for protected area expansion, and makes recommendations on mechanisms for protected area expansion. It deals with land-based and marine protected areas across all of South Africa's territory (SANBI, BGIS).

2.4. National Biodiversity Assessment (NBA; 2011)

The latest National Biodiversity Assessment (2011) provides an assessment of South Africa's biodiversity and ecosystems, including headline indicators and national maps for the terrestrial, freshwater, estuarine and marine environments. The NBA (2011) was led by SANBI in partnership with a range of organisations. It follows on from the National Spatial Biodiversity Assessment (2004), broadening the scope of the assessment to include key thematic issues as well as a spatial assessment. The NBA (2011) includes a summary of spatial biodiversity priority areas that have been identified through systematic biodiversity plans at national, provincial and local levels (SANBI, BGIS).



2.5. The North-West Biodiversity Management Act, 2016 (Act No. 4 of 2016)

The North-West Biodiversity Management Act, 2016 (Act No. 4 of 2016), Provincial Notice 3 of 2017 (GN No. 7721 of 3 January 2017). This Act is proposed to be amended by the North West Biodiversity Amendment Bill, 2017, Government Gazette Notice 171 of 2017 (published August 2017).

The following sections are of importance:

- Schedule 2: Specially Protected Species;
- Schedule 3: List of ordinary species;
- Schedule 4: List of ordinary species to be hunted with landowner's written consent.

3. METHODS AND APPROACH

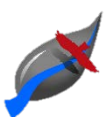
Sites vary in their natural character and uniqueness and the level to which they have been previously disturbed. Assessing the potential impacts of a proposed development often requires evaluating the conservation value of a site relative to other natural areas and relative to the national importance of the site in terms of biodiversity conservation. A simple approach to evaluating the relative importance of a site includes assessing the following:

- Is the site unique in terms of natural or biodiversity features?
- Is the protection of biodiversity features on the site of national/provincial importance?
- Would development of the site lead to contravention of any international, national or provincial legislation, policy, convention or regulation?

Thus, the general approach adopted for this type of study is to identify any critical biodiversity issues that may lead to the decision that the proposed project cannot take place, i.e. to specifically focus on red flags and/or potential fatal flaws. Biodiversity issues are assessed here by documenting whether any important biodiversity features occur on site, including species, ecosystems or processes that maintain ecosystems and/or species. These can be organized in a hierarchical fashion, as follows:

- **Species:**
 1. threatened fauna or flora species;
 2. protected trees;
- **Ecosystems:**
 1. threatened ecosystems;
 2. protected ecosystems;
 3. critical biodiversity areas;
 4. areas of high biodiversity;
 5. centres of endemism;
- **Processes:**
 1. corridors;
 2. mega-conservancy networks;
 3. rivers and wetlands; and
 4. important topographical features.

It is not the intention to provide comprehensive lists of all species that occur on site, since most of the species on these lists are usually common or widespread species. Rare, threatened, protected and conservation-worthy species and habitats are considered to be the highest priority, the presence of which are most likely to be significantly negatively affected if development occurs. The focus on National and Provincial priorities and critical biodiversity issues is in line with National legislation protecting environmental and biodiversity resources.



3.1. Desktop Assessment

A baseline assessment was conducted to establish whether any potentially sensitive species/receptors might occur on site. The South African National Biodiversity Institute's (SANBI) online biodiversity tool was used to query a species list for the 2527DD quarter degree grid cell. This was supplemented by researching all available books and peer reviewed websites.

The importance of a baseline study is to provide a reference condition to determine the current state of the environment and to draw comparisons between the potential of the area and current degradation from surrounding land uses. This will be conducted in terms of the future changes due to the proposed development by the client.

Aerial photographs and satellite imagery were used to delineate potential sensitive habitat types and these were used as suitable method to identify sensitive areas to be surveyed specifically during the field assessment.

3.2. Field Survey

A field investigation was conducted on 26 April 2019. The field survey was undertaken to supplement and confirm several findings indicated during the desktop analysis. This will serve as a fatal flaw analysis to determine whether there are any major ecological concerns with regards to the development.

The site was traversed on foot and species recorded as they were encountered. Specific aspects that were investigated during the field survey were potential impacts of the development the remaining natural environment and the status of the current natural environment within the study area, indicating indigenous nature and habitat integrity.

The following data was recorded during the site survey:

- All identifiable indigenous and exotic flora species in each identified vegetation unit;
- All identifiable fauna species encountered during the site survey; and
- General ecological and habitat data that may assist in the description of the floristic component of the study area.

A plotless sampling method was used to record data. Fauna and flora species observed in the study area during the time of the study were recorded and included in the species lists. The floristic composition of each of the identified broad vegetation units are described and discussed. Plant species identification was done following the checklist of Germishuizen & Meyer (2003).



3.3. Sensitivity Assessment

The purpose of producing a habitat sensitivity map is to provide information on the location of potentially sensitive features in the study area. This was compiled by taking the following into consideration:

1. The general status of the vegetation of the study area was derived by compiling a landcover data layer for the study area (Fairbanks *et al.* 2000) using available satellite imagery and aerial photography. From this it can be seen which areas are likely to be transformed versus those that are still in a natural status. This status stratification was then verified in the field using on-the-ground information on species composition and vegetation structure.
2. Various Provincial, Regional or National level conservation planning studies have been undertaken in the area, e.g. North West Biodiversity Sector Plan. The mapped results from these were taken into consideration in compiling the habitat sensitivity map.
3. Habitats in which various species occur that may be protected or are considered to have high conservation status are considered to be sensitive.

An explanation of the different sensitivity classes is given in Table 1. Areas containing untransformed natural vegetation that is important for Red List organisms are considered potentially sensitive. In contrast, any transformed area that has no importance for the functioning of ecosystems is considered to potentially have low sensitivity.

Table 1: Explanation of sensitivity ratings

Sensitivity	Factors contributing to sensitivity
No-go areas	<p>Indigenous natural areas that are highly positive for the following:</p> <ul style="list-style-type: none"> • Presence of habitats critical for the survival of populations of threatened species (Critically Endangered, Endangered, Vulnerable).
High	<p>Indigenous natural areas that are highly positive for any of the following:</p> <ul style="list-style-type: none"> • Presence of threatened species (Critically Endangered, Endangered, Vulnerable). <p>And may also be positive for the following:</p> <ul style="list-style-type: none"> • High intrinsic biodiversity value (high species richness and/or turnover, unique habitat). • Presence of habitat highly suitable for threatened species (Critically Endangered, Endangered, Vulnerable species). • Low ability to respond to disturbance (low resilience, dominant species very old).
Medium	<ul style="list-style-type: none"> • Other indigenous natural areas in which factors listed above are of no particular concern. • May also include natural buffers around ecologically sensitive areas and natural links or corridors in which natural habitat is still ecologically functional. • Degraded or disturbed indigenous natural vegetation. May also include secondary vegetation in an advanced stage of development in which habitat is still ecologically functional and which could potentially provide habitat for species of concern.
Low	No natural habitat remaining.



3.4. Limitations and Assumptions

Since the development is closely associated with the Hartbeespoort dam, a large amount of water birds of various degrees of sensitivity may be associated with the water body. The waterbirds will not be affected significantly due to the road development and therefore a survey of the biota of the dam itself is not relevant or included within this survey.

The desktop study was conducted with up to date resources. It might however be possible that additional information become available in time, because environmental impact assessments deal with dynamic natural ecosystems. It is therefore important that the report be viewed and acted upon with these limitations in mind. Red Kite Environmental Solutions (Pty) Ltd cannot be held responsible for conclusions and pro-active mitigation measures that are made in good faith based on the available resources and information provided at the time of the study.

In order to obtain a comprehensive understanding of the dynamics of the ecology of the study area, surveys should ideally have been replicated over several seasons and over a number of years. However, due to project time constraints such long-term studies are not feasible and this fauna and flora survey was conducted in one season.

Species flowering only during specific times of the year could be confused with a very similar species of the same genus and some plant species that emerge and bloom during another time of the year or under very specific circumstances may have been missed entirely.

The results, typical herpetofauna, avifauna and mammalian communities found within the study should/can therefore only be used as a general guideline.

No scientific data was collected or analysed for the calculation of ecological veld condition. Any comments or observations made in this regard are based on observations, the expert knowledge and relevant professional experience of the specialist investigator.

Limitations should always be kept in mind and therefore management should focus on pro-active measures and the implementation of the precautionary principle.

The specialist responsible for this study reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.



4. FLORA

4.1. Biomes

The project area lies within the Savanna Biome, which is the largest biome in South Africa, covering 34.3% of the country (about 435 000 km²). It is a mixture of grasses and trees or shrubs. Savanna stretches from the Kalahari in the north-west across to the lowveld in the north-east and southwards to the lowlands of KwaZulu Natal and the Eastern Cape. It is found from sea level to about 2 000 metres above sea level. More than 5 700 plant species grow in the Savanna Biome. They include various types of grasses (e.g. Rooigras) and trees like the Baobab, Mopane, Camel Thorn and Knob Thorn.

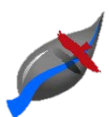
Rain falls in summer and varies greatly across the region, from about 235 mm per year in the Kalahari to over 1000 mm per year in the east.

4.2. Vegetation types

According to the National Vegetation Map (2018) the project site falls within the Gold Reef Mountain Bushveld with a small section of the 200 m buffer area representative of the Moot Plains Bushveld.

A summarised description of the vegetation types, extracted from the CD accompanying Mucina and Rutherford (2006), is presented below.

Note that the Vegetation Type categories of threat given in Mucina & Rutherford (2006), as indicated below, have been superseded by Ecosystem categories of threat contained in the Government Gazette (2011), No. 34809, General Notice 1002. Neither the Gold Reef Mountain Bushveld nor the Moot Plains Bushveld are listed in the National List of Threatened Ecosystems.



4.2.1. Gold Reef Mountain Bushveld (SVcb 9)

The Gold Reef Mountain Bushveld is distributed across the North-West, Gauteng, Free State and Mpumalanga Provinces. The vegetation type occurs along rocky quartzite ridges including the Magaliesberg and the parallel ridge to the south, from around Boshhoek and Koster in the west to near Bronkhorstspruit in the east. The vegetation type is characterised by rocky hills and ridges often west-east trending with more dense woody vegetation often on the south-facing slopes associated with distinct floristic differences (e.g. preponderance of *Acacia caffra* on the southern slopes).

A list of expected common and dominant species in undisturbed vegetation includes the following (those with a "d" are considered to be dominant) (Mucina and Rutherford, 2006):

- **Small Trees:** *Senegalia caffra* (d), *Combretum molle* (d), *Protea caffra* (d), *Celtis africana*, *Dombeya rotundifolia*, *Englerophytum magalimontanum*, *Ochna pretoriensis*, *Searsia leptodictya*, *Vangueria infausta*, *V. parvifolia*, *Ziziphus mucronata*.
- **Tall Shrubs:** *Canthium gilfillanii*, *Ehretia rigida* subsp. *rigida*, *Grewia occidentalis*, *Gymnosporia buxifolia*, *Mystroxydon aethiopicum* subsp. *burkeanum*.
- **Low Shrubs:** *Athrixia elata*, *Pearsonia cajanifolia*, *Searsia magalimontana* subsp. *magalimontana*, *Searsia rigida* var. *rigida*.
- **Woody Climber:** *Ancylobotrys capensis*.
- **Graminoids:** *Loudetia simplex* (d), *Panicum natalense* (d), *Schizachyrium sanguineum* (d), *Trachypogon spicatus* (d), *Alloteropsis semialata* subsp. *eckloniana*, *Bewsia biflora*, *Digitaria tricholaenoides*, *Diheteropogon amplexans*, *Sporobolus pectinatus*, *Tristachya biseriata*, *T. leucothrix*.
- **Herbs:** *Helichrysum nudifolium*, *H. rugulosum*, *Pentanisia angustifolia*, *Senecio venosus*, *Xerophyta retinervis*.
- **Geophytic Herbs:** *Cheilanthes hirta*, *Hypoxis hemerocallidea*, *Pellaea calomelanos*.
- **Endemic Taxa:** *Aloe peglerae* and *Frithia pulchra*.

Mucina and Rutherford (2006) classify the vegetation type's conservation status as "Least threatened", with a conservation target of 24%. The vegetation type is mainly conserved in the Magaliesberg Nature Area and much smaller proportions in the Rustenberg, Wonderboom and Suikerbosrand Nature Reserves. Some areas with dense stands of the alien *Melia azedarach* but which is often associated with drainage lines or alluvia (i.e. azonal vegetation) embedded within this unit.

The findings of the site survey in terms of floral species composition and characteristics of the vegetation unit identified, is closely representative of the Gold Reef Mountain Bushveld vegetation type.



4.2.2. Moot Plains Bushveld (SVcb 8)

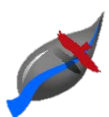
Only a small section of the 200 m project buffer is located in the Moot Plains Bushveld vegetation type. The vegetation unit identified on site is not representative of the Moot Plains Bushveld vegetation type.

The Moot Plains Bushveld is distributed across the North-West and Gauteng Provinces. Main belt occurs immediately south of the Magaliesberg from the Selons River Valley in the west through Maanhaarrand, filling the valley bottom of the Magalies River, proceeding east of the Hartbeespoort Dam between the Magaliesberg and Daspoort mountain ranges to Pretoria. The vegetation type is characterised by open to closed, low, often thorny savanna dominated by various species of *Vachellia* and *Senegalia* in the bottomlands and plains as well as woodlands of varying height and density on the lower hillsides.

A list of expected common and dominant species in undisturbed vegetation includes the following (those with a "d" are considered to be dominant) (Mucina and Rutherford, 2006):

- **Small Trees:** *Vachellia nilotica* (d), *V. tortilis* subsp. *heteracantha* (d), *Searsia lancea* (d).
- **Tall Shrubs:** *Buddleja saligna* (d), *Euclea undulata* (d), *Olea europaea* subsp. *africana* (d), *Grewia occidentalis*, *Gymnosporia polyacantha*, *Mystroxyton aethiopicum* subsp. *burkeanum*.
- **Low Shrubs:** *Aptosimum elongatum*, *Felicia fascicularis*, *Lantana rugosa*, *Teucrium trifidum*.
- **Succulent Shrub:** *Kalanchoe paniculata*.
- **Woody Climber:** *Jasminum breviflorum*.
- **Herbaceous Climber:** *Lotononis bainesii*.
- **Graminoids:** *Heteropogon contortus* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Aristida congesta*, *Chloris virgata*, *Cynodon dactylon*, *Sporobolus nitens*, *Tragus racemosus*.
- **Herbs:** *Achyroasis avicularis*, *Corchorus asplenifolius*, *Evolvulus alsinoides*, *Helichrysum nudifolium*, *H. undulatum*, *Hermannia depressa*, *Osteospermum muricatum*, *Phyllanthus maderaspatensis*.

The conservation status of the Moot Plains Bushveld is categorised as "Vulnerable" by Mucina and Rutherford (2006), with a conservation target of 19%. Some 13% is statutorily conserved mainly in the Magaliesberg Nature Area. Very scattered occurrences to sometimes dense patches in places of various alien plants including *Cereus jamacaru*, *Eucalyptus* species, *Jacaranda mimosifolia*, *Lantana camara*, *Melia azedarach* and *Schinus* species.



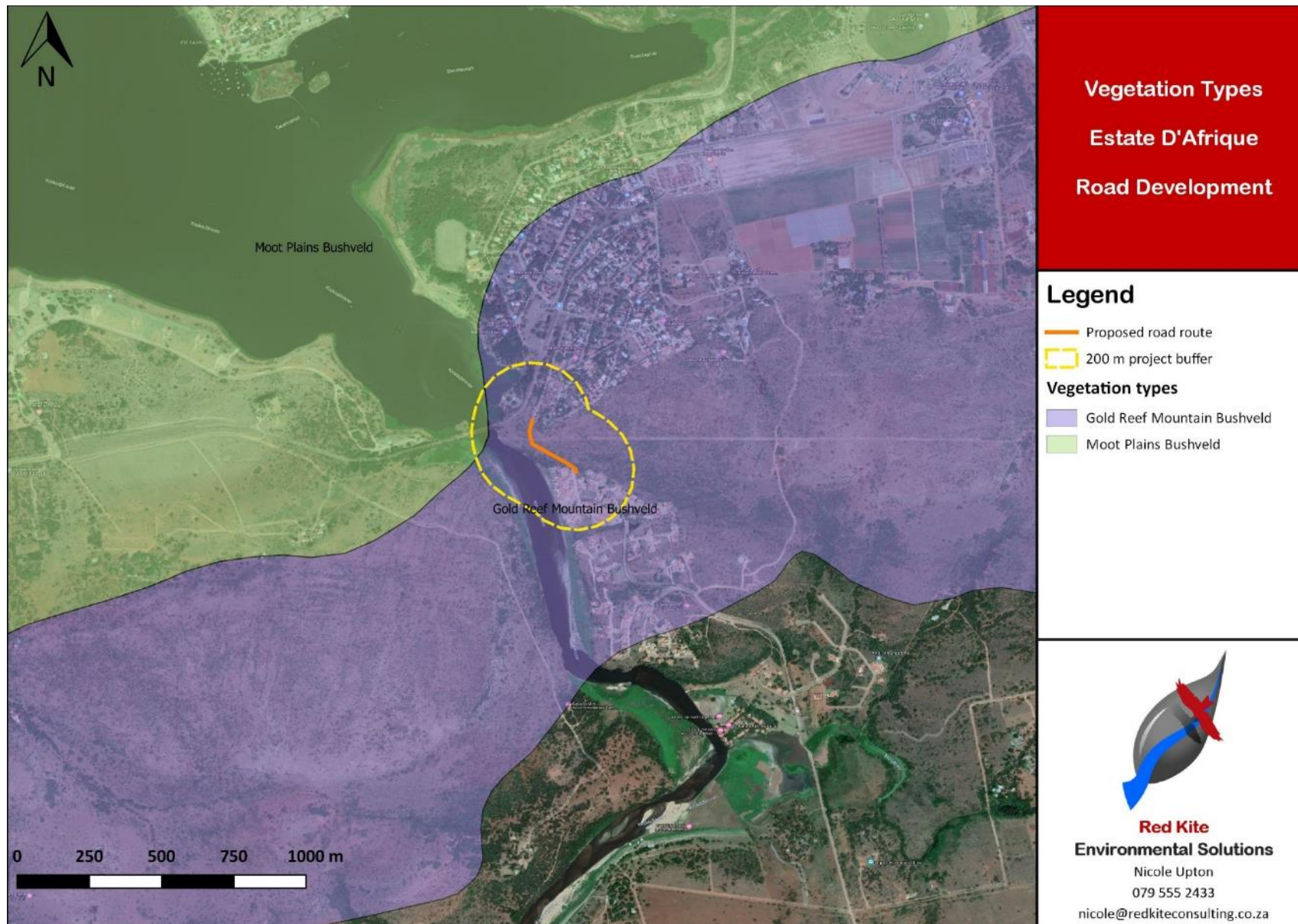


Figure 3: Vegetation types of the project area and 200 m buffer

4.3. POSA Plant Species

The study area falls within the 2527DD Quarter Degree Square. Information on plant species recorded was extracted from the POSA online database hosted by SANBI, based on a 25 km x 25 km square surrounding the project area. A list of plant species that have been recorded for the QDS is provided in Appendix B. The results indicate that approximately 53 plant species have been recorded within the square, consisting of 29 families. The most prominent families are Fabaceae and Asteraceae, with 6 and 8 species each, respectively. Four species of conservation concern were found to possibly occur in the area. Thirteen exotic plant species are recorded as occurring in the QDS. Of the 53 plant species listed as occurring in the project area, 16 are endemic to South Africa (refer to species list in Appendix B).

Table 2: Floral species summary for QDS

Number of Families	Number of species	Species of conservation concern	Endemic	Exotic species
29	53	4	16	13

Table 3: Species of conservation concern recorded in the 2430CA QDS

Species	Common names	Conservation category
<i>Ledebouria atrobrunnea</i>	African hyacinth	Protected i.t.o NWBMA
<i>Nuxia glomerulata</i>	Rock Elder	Protected i.t.o NWBMA
<i>Stenostelma umbelluliferum</i>	N/A	Protected i.t.o NWBMA IUCN Red List: Near threatened
<i>Melolobium subspicatum</i>	N/A	IUCN Red List: Vulnerable

No protected tree species, as promulgated in terms of the NFA (1998), have been recorded in the QDS. None of the species listed for the QDS are contained in the ToPS list.

Although specifically searched for, none of the species of conservation concern listed in **Table 3** were identified as occurring on the project site. However, this does not preclude them from possibly occurring on the proposed road route.

Thirteen plant species not indigenous to South Africa were listed for the project area (refer to Appendix B), seven of which are listed as alien and invasive plant species in NEMBA (2004). Category 1 is the strictest category of species and none of these species are allowed to occur and/or become established on any land area except for the use of a biological control reserve. They possess characteristics that are harmful to humans, animals or the environment. Category 1b is described in NEMBA (2004) as invasive species that may not be owned, imported into South Africa, grown, moved, sold, given as a gift or dumped in a waterway. Category 1b species are major invaders that may need government assistance to remove.



Table 4: AIP species listed for 2527DD QDS

Species	Common name	NEMBA AIP Category
<i>Araujia sericifera</i>	Moth catcher	1b
<i>Argemone ochroleuca</i>	White-flowered Mexican poppy	1b
<i>Iris pseudacorus</i>	Yellow flag	1a
<i>Opuntia engelmannii</i>	Small round-leaved prickly pear	1b
<i>Pennisetum setaceum</i>	Fountain grass	1b
<i>Tithonia rotundifolia</i>	Red sunflower	1b
<i>Verbena bonariensis</i>	Purple top	1b

4.4. Site Survey and Findings

The proposed road route is situated across the foot of a ridge of the Witwatersberg, adjacent to the Hartbeespoort Dam. The area surveyed between the two residential areas was found to be moderately impacted due to the proximity of anthropogenic activities. However, the vegetation was found to be in good condition and representative of the vegetation type of the area.

Vegetation units were identified according to plant species composition, previous land use and topography. The state of the vegetation of the proposed road route varies from being natural to completely transformed. Note that no riparian vegetation unit was identified even though the project area is located across the Hartbeespoort Dam and banks. This is mainly due to no defined riparian vegetation being identified. Flora species representative of Vegetation Unit 1 (mountain slopes bushveld) continued to the edge of the Hartbeespoort Dam waters.

Furthermore, the opposite bank of the Hartbeespoort Dam, within the 200 m project buffer, was not surveyed and therefore was not classified as part of the Vegetation Units.

The following broad classification of Vegetation Units (VU) were found to occur on the proposed road route and 200 m buffer:

1. Mountain slopes bushveld (VU1); and
2. Transformed areas (VU2).

The vegetation units as identified during site visit, databases and aerial imagery are indicated in Figure 7.



4.4.1. Mountain slopes bushveld (VU1)

This vegetation unit occurs on the rocky ridges and slopes of the project area and extend upto the water's edge of the Hartbeespoort Dam. The areas of this VU that are located on the proposed project footprint will be cleared entirely as part of the road construction. The woody structure consists of tall trees and shrubs, with a land use largely related to wilderness and some recreation for residents. Current impacts to the vegetation composition of this VU are from footpaths and occasional human foot traffic. The VU is considered to be largely natural with moderate to low disturbances to the vegetation composition.

A few scattered AIP species were observed to occur in this vegetation unit, namely *Cereus jamacara* (Queen of the night), *Lantana camara* (Lantana), *Melia azedarach* (Seringa) and *Solanum sisymbriifolium* (Dense-thorned bitter apple). A few Seringa trees were found to occur closer to the edge of the dam, but the other AIP species occurred as isolated individuals.

Dominant woody plant species in this VU include: *Senegalia caffra* (Common hook-thorn), *Faurea saligna* (Boekenhout), *Searsia spp.*, *Nuxia congesta* (Wild-elder), *Dombeya rotundifolia* (Wildpear), *Celtis africana* (White stinkwood), and *Euclea crispa* (Blue guarri).

Dominant graminoid species include: *Eragrostis chloromelas* (Curley leaf), *Eragrostis inamoena* (Tite grass), *Hyperthelia dissoluta* (Yellow thatching grass) and *Setaria lindenbergiana* (Mountain bristle grass).

The vegetation unit is classified as having a high sensitivity due to the largely natural state of this vegetation unit and its classification as a CBA (refer to section 1.1).

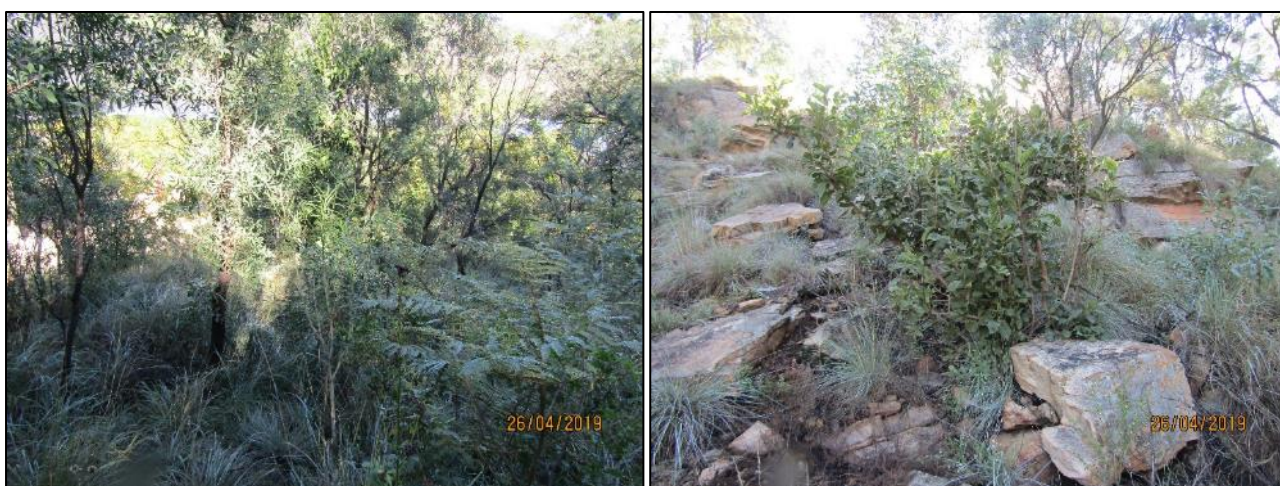


Figure 4: Photograph of VU1



Figure 5: VU1 with the Hartbeespoort Dam in the background

4.4.2. *Transformed areas (VU2)*

Vegetation Unit 2 consists of areas totally transformed by residential developments and associated infrastructure. Very little natural vegetation remains in this VU.

The vegetation unit is classified as having a low sensitivity due to the transformation and absence of natural vegetation.



Figure 6: Photographs of residential areas (VU2) in relation to VU1

Table 5: Species identified during site survey

Species	Common name	Status
<i>Aristida adscensionis</i>	Annual three-awn	
<i>Asparagus suaveolens</i>	Wild asparagus	Medicinal species
<i>Bidens pilosa</i>	Common blackjack	Exotic species
<i>Brachylaena rotundata</i>	Mountain silver-oak	
<i>Burkea africana</i>	Wild seringa	
<i>Celtis africana</i>	White stinkwood	
<i>Cereus jamacaru</i>	Queen of the night	NEMBA Category 1b AIP
<i>Chaenostoma leve</i>	N/A	
<i>Clematis bracteata</i>	Travellers Joy	
<i>Combretum apiculatum</i>	Red bushwillow	
<i>Combretum zeyheri</i>	Large-fruited bushwillow	
<i>Cussonia paniculata</i>	Highveld cabbage tree	South Africa endemic
<i>Cyperus longus</i>	Sweet cyperus	
<i>Cyphostemma sp.</i>		
<i>Diheteropogon amplexans</i>	Broad-leaved bluestem	
<i>Diospyros lycioides</i>	Bushveld bluebush	Medicinal species
<i>Dombeya rotundifolia</i>	Wildpear	Medicinal species
<i>Ehretia rigida</i>	Puzzlebush	Medicinal species
<i>Elephantorrhiza burkei</i>	Elephant-root	
<i>Englerophytum magalismsontanum</i>	Stemfruit	
<i>Eragrostis chloromelas</i>	Curley leaf	
<i>Eragrostis gummiflua</i>	Gum grass	
<i>Eragrostis inamoena</i>	Tite grass	
<i>Euclea crispa</i>	Blue guarri	
<i>Faurea saligna</i>	Boekenhout	
<i>Fimbristylis complanata</i>	Flattened rush	
<i>Gomphocarpus fruticosus</i>	Milkweed	
<i>Hyparrhenia tamba</i>	Blue thatching grass	Medicinal species
<i>Hyperthelia dissoluta</i>	Yellow thatching grass	
<i>Lantana camara</i>	Lantana	NEMBA Category 1b AIP
<i>Ledebouria sp.</i>	Squill	Medicinal species
<i>Loudetia simplex</i>	Russet Grass	
<i>Melia azedarach</i>	Seringa	NEMBA Category 1b AIP
<i>Melinis repens</i>	Natal red-top	
<i>Nuxia congesta</i>	Wild-elder	Medicinal species
<i>Pogonarthria squarrosa</i>	Herringbone grass	
<i>Pupalia lappacea</i>	Burweed	
<i>Rhoicissus tridentata</i>	Bushman's grape	Medicinal species
<i>Rhynchosia altissima</i>	Silver snoutbean	
<i>Searsia lancea</i>	Willow crowberry	
<i>Searsia leptodictya</i>	Mountain karee	
<i>Searsia pyroides</i>	Firethorn crowberry	
<i>Searsia zeyheri</i>	Blue crowberry	South Africa endemic
<i>Senegalia caffra</i>	Common hook-thorn	Medicinal species
<i>Setaria lindenberiana</i>	Mountain bristle grass	
<i>Solanum sisymbriifolium</i>	Dense-thorned bitter apple	NEMBA Category 1b AIP
<i>Stipagrostis uniplumis</i>	Silky bushman grass	
<i>Themeda triandra</i>	Red grass	
<i>Xerophyta retinervis</i>	Monkey's tail	
<i>Ziziphus mucronata</i>	Buffalo-thorn	Medicinal species



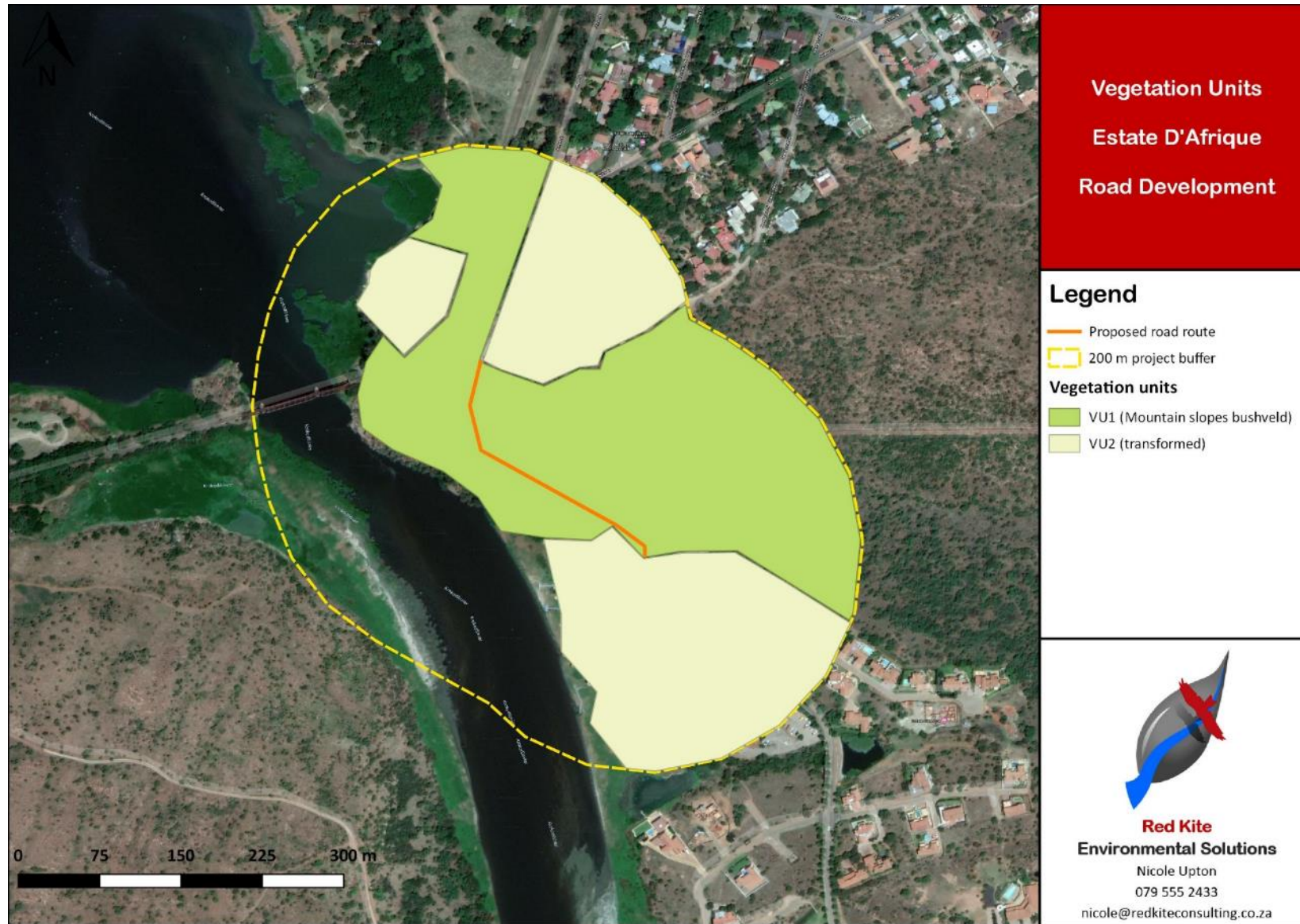


Figure 7: Vegetation Units of the project site

4.4.3. Species of conservation concern

A total of 50 plant species were recorded in the studied area during the site survey, none of which are considered to be of conservation concern. None of the floral species recorded during the site survey are listed in the ToPS list or the Protected tree species list (NFA) All species are classified as Least Concern according to the SANBI Red Data List.

Two endemic species were identified to occur in the projects site, namely *Cussonia paniculata* (Highveld cabbage tree) and *Searsia zeyheri* (Blue crowberry).

4.5. Invasive species

Invasive and exotic species tend to increase in disturbed environments (DEA & DMR, 2013). Therefore, the construction and operational phases of developments can increase the spread and growth of invasive species. Only four Alien Invasive Plant (AIP) species, as per the NEMBA, were recorded during the site survey and are presented in the table below.

None of the AIP species identified during the site survey occurred in dense clusters, but rather as a few scattered individuals. A few Seringa trees were found to occur closer to the edge of the dam, but the other AIP species occurred as isolated individuals.

It will be important to implement an AIP Management Plan during the life of the development, to maintain and restore the ecological integrity of the remaining natural vegetation.

Table 6: NEMBA Category AIP species recorded during site survey

Species	Common name	NEMBA AIP Category
<i>Cereus jamacaru</i>	Queen of the night	NEMBA Category 1b AIP
<i>Lantana camara</i>	Lantana	NEMBA Category 1b AIP
<i>Melia azedarach</i>	Seringa	NEMBA Category 1b AIP
<i>Solanum sisymbriifolium</i>	Dense-thorned bitter apple	NEMBA Category 1b AIP



4.6. Medicinal species

Some of the species that were encountered during the field survey have cultural and/or medicinal use. Various medicinal books and peer-reviewed articles were used to verify whether the species have any medicinal uses. Ten species were found to occur on site that have medicinal uses.

Table 7: Medicinal plant species recorded during site survey

Species	Common name
<i>Asparagus suaveolens</i>	Wild asparagus
<i>Diospyros lycioides</i>	Bushveld bluebush
<i>Dombeya rotundifolia</i>	Wildpear
<i>Ehretia rigida</i>	Puzzlebush
<i>Hyparrhenia tamba</i>	Blue thatching grass
<i>Ledebouria sp.</i>	Squill
<i>Nuxia congesta</i>	Wild-elder
<i>Rhoicissus tridentata</i>	Bushman's grape
<i>Senegalia caffra</i>	Common hook-thorn
<i>Ziziphus mucronata</i>	Buffalo-thorn

These plants are important from a cultural perspective and are used for traditional/cultural purposes. Traditional medicine in South Africa is an important practice on which seventy two percent of the Black African population relies, that accounts for 26.6 million consumers (Mander *et al.*, 2007). Approximately 133 000 people are employed in the trade of traditional medicine, especially rural women (Mander *et al.*, 2007).



5. FAUNA

5.1. Desktop Assessment

A desktop study was conducted to establish whether any potentially sensitive faunal species or species of conservation concern may possibly occur on site. The Virtual Museum and Animal Demography Unit (ADU) was used to compile species lists based on the sightings and data gathering from the South African Biodiversity Institute for the 2527DD QDS. The avifaunal species list was obtained from SABAP2 for the 2555_2900 pentad.

It is important to note that a QDS covers a large area: $\pm 27 \times 25$ km (± 693 km²) and a pentad (SABAP2 Protocol) and area of $\pm 8 \times 7.6$ km (± 60.8 km²) and it is possible that suitable habitat will exist for a certain Red Data avifaunal species within this wider area surrounding the study site. However, the specific habitat(s) found on site may not suit the particular Red Data species, even though it has been recorded for the QDS or pentad.

Species/habitat were identified as possibly sensitive within the framework of this study. Sensitive species were determined according to their close relationship and dependence on the vegetation type and habitat found to occur.

Appendix D list the faunal species for the 2527DD QDS and Table 8 lists all fauna species that are of conservation concern which were found during the desktop study. Mammalian, amphibian and avifaunal species with a red listed status are known to occur within the specific area where the new road is located.

Table 8: Fauna species of conservation concern found in 2527DD QDS that may be relevant to the road development project

Scientific Name	Common Name	Red Listed Status	
<i>Hippotragus equinus</i>	Roan Antelope	Endangered (2016)	
<i>Hippotragus niger niger</i>	Sable antelope	Vulnerable (2016)	
<i>Lycaon pictus</i>	African wild dog	Endangered (2016)	
<i>Loxodonta africana</i>	African Bush Elephant	Vulnerable A2a (2008)	
<i>Equus zebra hartmannae</i>	Hartmann's Zebra	Vulnerable (2016)	
<i>Atelerix frontalis</i>	Southern African Hedgehog	Near Threatened (2016)	
<i>Acinonyx jubatus</i>	Cheetah	Vulnerable (2016)	
<i>Leptailurus serval</i>	Serval	Near Threatened (2016)	
<i>Panthera pardus</i>	Leopard	Vulnerable (2016)	
<i>Cloeotis percivali</i>	Percival's Short-eared Trident Bat	Endangered (2016)	
<i>Hyaena brunnea</i>	Brown Hyena	Near Threatened (2015)	
<i>Otomys auratus</i>	Southern African Vlei Rat	Near Threatened (2016)	
<i>Aonyx capensis</i>	African Clawless Otter	Near Threatened (2016)	
<i>Miniopterus schreibersii</i>	Schreibers's Long-fingered Bat	Near Threatened	
<i>Oxyura maccoa</i>	Duck, Maccoa	NT (Regional)	VU (Global)
<i>Polemaetus bellicosus</i>	Eagle, Martial	EN (Regional)	VU (Global)
<i>Aquila verreauxii</i>	Eagle, Verreaux's	VU (Regional)	LC (Global)



Scientific Name	Common Name	Red Listed Status	
<i>Falco biarmicus</i>	Falcon, Lanner	VU (Regional)	LC (Global)
<i>Phoenicopterus ruber</i>	Flamingo, Greater	NT (Regional)	LC (Global)
<i>Phoenicopterus minor</i>	Flamingo, Lesser	NT (Regional)	NT (Global)
<i>Bucorvus leadbeateri</i>	Ground-hornbill, Southern	EN (Regional)	VU (Global)
<i>Alcedo semitorquata</i>	Kingfisher, Half-collared	NT (Regional)	LC (Global)
<i>Rostratula benghalensis</i>	Painted-snipe, Greater	NT (Regional)	LC (Global)
<i>Pelecanus onocrotalus</i>	Pelican, Great White	VU (Regional)	LC (Global)
<i>Coracias garrulus</i>	Roller, European	NT (Regional)	LC (Global)
<i>Calidris ferruginea</i>	Sandpiper, Curlew	LC (Regional)	NT (Global)
<i>Sagittarius serpentarius</i>	Secretarybird, Secretarybird	VU (Regional)	VU (Global)
<i>Mycteria ibis</i>	Stork, Yellow-billed	EN (Regional)	LC (Global)
<i>Sterna caspia</i>	Tern, Caspian	VU (Regional)	LC (Global)
<i>Gyps coprotheres</i>	Vulture, Cape	EN (Regional)	EN (Global)
<i>Gyps africanus</i>	Vulture, White-backed	CR (Regional)	CR (Global)
<i>Pyxicephalus adspersus</i>	Giant Bull Frog	Near Threatened	

5.1.1. Mammals

Eighty-six (86) mammal species were found to possibly occur within the QDS, most of which have a Least Concern Red List Status. Fourteen (14) species is classified within the National Red Data List, but only six (6) of these are expected to potentially occur within the area due to the habitat found within the area (marked orange).

• <i>Hippotragus equinus</i>	Roan Antelope	Endangered (2016)
• <i>Hippotragus niger niger</i>	Sable antelope	Vulnerable (2016)
• <i>Lycaon pictus</i>	African wild dog	Endangered (2016)
• <i>Loxodonta africana</i>	African Bush Elephant	Vulnerable A2a (2008)
• <i>Equus zebra hartmannae</i>	Hartmann's Zebra	Vulnerable (2016)
• <i>Atelerix frontalis</i>	Southern African Hedgehog	Near Threatened (2016)
• <i>Acinonyx jubatus</i>	Cheetah	Vulnerable (2016)
• <i>Leptailurus serval</i>	Serval	Near Threatened (2016)
• <i>Panthera pardus</i>	Leopard	Vulnerable (2016)
• <i>Cloeotis percivali</i>	Percival's Short-eared Trident Bat	Endangered (2016)
• <i>Hyaena brunnea</i>	Brown Hyena	Near Threatened (2015)
• <i>Otomys auratus</i>	Southern African Vlei Rat	Near Threatened (2016)
• <i>Aonyx capensis</i>	African Clawless Otter	Near Threatened (2016)
• <i>Miniopterus schreibersii</i>	Schreibers's Long-fingered Bat	Near Threatened

The *Atelerix frontalis* (Southern African Hedgehog) are omnivorous, where invertebrates (such as beetles, earwigs, grasshoppers, termites, slugs, snails, centipedes, moths and earthworms) form the bulk of the diet, but they also



consume eggs, mice, lizards, fungus and even dog food (Skinner & Chimimba 2005¹). This species is a delicacy (food source) in some African cultures and is harvested locally. This species is also locally and commercially sold as pets, although many tenrecs are sold masquerading as South African Hedgehogs. Their spines and bones are also sold locally and are commonly seen in muti markets; for example, at Faraday Market in Johannesburg (Whiting et al. 2011²), and in Xhosa-speaking regions (Simelane & Kerley 1998). Similarly, in the Basotho-speaking areas of the eastern Free State and Lesotho, surveys indicate that traditional healers use them when they can find them. Their spines are also often sold ornamentally in curio shops across the country. The effects of these uses are unknown but, when coupled with habitat loss, will likely result in declines in local population numbers (Skinner & Chimimba, 2005).

The *Leptailurus serval* (Serval) is a wetland specialist that historically became regionally extinct in the Eastern Cape Province and most of the Western Cape Province by the 1980's. However, they were successfully reintroduced in several Eastern Cape protected areas in the early 2000's and, although rare, are now regularly seen throughout the Province. Natural range expansion is also evident in the Western Cape. Additionally, several range expansions have been documented in the Free State and the eastern Northern Cape, as well as potentially in North West and Lesotho. Since the cat has been recorded within the QDS and several large drainage structures have been observed to occur during the field assessment on the neighbouring farms, the likelihood of occurrence exist.

The South African Vlei Rat (*Otomys auratus*) is a near-endemic grassland species and becoming increasingly threatened by grassland contraction and wetland loss, with niche modelling showing that it will undergo a 47–61% reduction in suitable habitat between 1975 and 2050 from climate change (6–8% per decade). This species is associated with mesic grasslands and wetlands within alpine, montane and sub-montane regions (Monadjem et al. 2015), typically occurring in dense vegetation in close proximity to water. Vlei Rats are important food for a number of mammalian predators, as well as raptors such as Marsh Owls (*Asio capensis*) and Common Barn Owls (*Tyto alba*) (Red List of Mammals of South Africa, Lesotho and Swaziland 2016).

Six new distribution records for the Short-eared trident bat, *Clootis percivali*, are presented for South Africa: two from Gauteng Province and four from Limpopo Province (African Bat Conservation News, dated January 2016). The new data are noteworthy considering the general scarcity of the species in South Africa, and especially as the Gauteng records are the first published in about six decades. These locations are important roosts. They therefore rank as focal conservation targets for *C. percivali*, in addition to their high species richness. Since mountainous terrain were observed during the field assessment surrounding the Hartbeespoort area, roosting and cave habitat and crevices may be suitable in the wider area and represent potential habitat. The other bat species, The Southern Bent-wing Bat is an insectivorous cave-dwelling bat. The subspecies has dark reddish-brown to dark-brown fur on the back, slightly lighter on the belly. It has a distinctly short muzzle and domed head. The ears are short, rounded and roughly triangular. The last phalanx on the third finger of the wing is about four times the length of the middle phalanx, giving a bent wing

1

² Whiting MJ, Williams VL, Hibbitts TJ. (2011) Animals traded for traditional medicine at the Faraday market in South Africa: species diversity and conservation implications. *Journal of Zoology* 284:84–96.



appearance. Both species are associated with cave dwelling, and therefore may occur in the wider region of the Hartbeespoort Dam (and North-west province).

African clawless otters (*Aonyx capensis*) are extremely elusive animals due to their survival instinct of swimming away from riverbanks at the slightest disturbance. Otters groom and dry themselves by rolling in the grass and rubbing against rocks and the soil. No signs have been recorded during the field assessment, however, the habitat of the surrounding dam may in some areas be suitable for this species.

5.1.2. Avifaunal

According to data collected during the Southern African Bird Atlas Project 2 (SABAP2) <http://sabap2.adu.org.za> a total of 311 bird species have been recorded in the pentad (2545_2750) (Appendix D). Seventeen (17) birds within pentad has a red listed status, either Regional or Global.

Table 9: Red listed bird species thought to occur in the pentad (BLSA 2018)

Common name	Scientific Name	Regional	Global
Duck, Maccoa	<i>Oxyura maccoa</i>	NT	VU
Eagle, Martial	<i>Polemaetus bellicosus</i>	EN	VU
Eagle, Verreaux's	<i>Aquila verreauxii</i>	VU	LC
Falcon, Lanner	<i>Falco biarmicus</i>	VU	LC
Flamingo, Greater	<i>Phoenicopterus ruber</i>	NT	LC
Flamingo, Lesser	<i>Phoenicopterus minor</i>	NT	NT
Ground-hornbill, Southern	<i>Bucorvus leadbeateri</i>	EN	VU
Kingfisher, Half-collared	<i>Alcedo semitorquata</i>	NT	LC
Painted-snipe, Greater	<i>Rostratula benghalensis</i>	NT	LC
Pelican, Great White	<i>Pelecanus onocrotalus</i>	VU	LC
Roller, European	<i>Coracias garrulus</i>	NT	LC
Sandpiper, Curlew	<i>Calidris ferruginea</i>	LC	NT
Secretarybird, Secretarybird	<i>Sagittarius serpentarius</i>	VU	VU
Stork, Yellow-billed	<i>Mycteria ibis</i>	EN	LC
Tern, Caspian	<i>Sterna caspia</i>	VU	LC
Vulture, Cape	<i>Gyps coprotheres</i>	EN	EN
Vulture, White-backed	<i>Gyps africanus</i>	CR	CR

5.1.3. Butterflies

Hundred-thirty-six (136) butterfly species (Appendix D) were found for the 2527DD, all of which are categorized as Least Concern by SANBI (Appendix D).



5.1.4. Other Invertebrates

Twenty-seven (27) Dung beetle species were provided on the SANBI database, eight (8) Lacewing species. Forty (40) Odonata species, Fourteen (14) Spiders, Six (6) Scorpions. None of which has a listed status (or has not been assessed) according to SANBI.

5.1.5. Reptiles

Thirty-five (35) reptile species are recorded for the QDS, the list of species that may possibly occur in the QDS are presented in Appendix D. None of the species have a red listed status.

5.1.6. Amphibians

Seventeen (17) species was listed within this QDS (Appendix D) and one species were red listed for the QDS:

- *Pyxicephalus adspersus* - Giant Bull Frog - Near Threatened

5.2. Site Evaluation (Field Survey)

The site associated with the road development were investigated in terms of possible sensitivity due to location (with regards to the proposed development) or habitat type. The road itself is located along a sensitive area since it is proposed over the ridge stretch towards another residential development.

Since the development is closely associated with the Hartbeespoort dam, a large amount of water birds of various degrees of sensitivity may be associated with the water body. The waterbirds will not be affected significantly due to the road development and therefore a survey of the biota of the dam itself is not relevant or included within this survey.

5.2.1. Summaries of Site Results and Species Recorded

The site is fairly natural and although patrolled by security personnel, the steep slope of the ridge prevents other activities associated with the residential lodgings to occur here. Habitat availability along the footprint is adequate/good due to the nature of the habitat types found along the ridge/koppie.

Animal communities expected do not likely use the area as breeding and roosting sites as a result of constant movement and human noise and smells in close proximity of the site.





Figure 8: Habitat type found along the road development across the ridge (next to Hartbeespoort dam)

The area to be developed is located between residential areas set on the banks of the Hartbeespoort dam. The species found here has been impacted by the residential development and constant movement of humans and activities associated with residential areas despite its largely natural setting against the mountains and the species associated with the dam. It is unlikely that sensitive species or red listed animal species occur where the road is proposed although they may occur in the wider region and many red listed birds are known to be associated with the Magaliesberg and the Hartbeespoort dam itself.

Other species of concern may be that of Arachnida, specifically Baboon spiders. The habitat found along the ridge formations where the road is proposed may be ideal for this kind of species. If these are encountered, a specialist should be contacted to conduct a specific investigation for the possible relocation of these species.

Since the development is closely associated with the Hartbeespoort Dam, a large amount of water birds of various degrees of sensitivity may be associated with the water body. The waterbirds will not be affected significantly due to the road development and therefore a survey of the biota of the dam itself is not relevant or included within this survey.



Table 10: Species observed at and around the footprint of the road

Family	Species	Common Name	Sighting/Finding	Status and IUCN
Invertebrate species				
Nymphalidae	<i>Danaus chrysippus</i>	African Monarch	Sighting	Least Concern
Nymphalidae	<i>Junonia orithya madagascariensis</i>	Eyed Pansy	Sighting	Least Concern
Nymphalidae	<i>Junonia hierta</i>	Yellow Pansy	Sighting	Least Concern
Nymphalidae	<i>Telchinia rahira rahira</i>	Marsh Acraea	Sighting	Least Concern
Reptilian species				
Order Squamata	Species unknown	Snakes	Snake holes	Unknown, depending on species
Varanidae	<i>Varanus niloticus</i>	Monitor water lizard	Sighting	Least Concern
Mammalian species				
Leporidae	<i>Lepus saxatilis</i>	Scrub Hare	Droppings	Least Concern
Viverridae	<i>Genetta tigrina</i>	Large spotted Genet	Droppings	Least Concern
Felidae	<i>Caracal caracal</i>	Caracal	Sightings reported by staff on premises – Scat found	Least Concern
Hystricidae	<i>Hystrix africae australis</i>	Porcupine	Signs and quills	Least Concern
Procaviidae	<i>Procavia capensis</i>	Rock Hyrax	Sighted	Least Concern
Cercopithecidae	<i>Papio ursinus</i>	Chacma baboon	Droppings and calls	Least Concern
Avi-fauna				
Malaconotidae	<i>Laniarius atrococcineus</i>	Crimson-breasted shrike	Sighting	Least Concern
Psittaculidae	<i>Agapornis roseicollis</i>	Rosy-faced love bird	Sighting	Out of natural range - Presumed domestic pets that had escaped - introduced
Rallidae	<i>Fulica cristata</i>	Red-knobbed coot	Sightings in shallow waters	Least Concern
Columbidae	<i>Turtur chalcospilos</i>	Emerald-spotted wood dove	Sightings	Least Concern
Nectariniidae	<i>Chalcomitra amethystina</i>	Amethyst sunbird	Sighting	Least Concern
Muscicapidae	<i>Thamnolaea cinnamomeiventris</i>	Mocking cliff chat	Sighting	Least Concern
Sturnidae	<i>Onychognathus mori</i>	Red-winged Starling	Sighted	Least Concern
Estrildidae	<i>Estrilda astrild</i>	Common waxbill	Sightings	Least Concern
Viduidae	<i>Vidua funerea</i>	Dusky Indigobird	Sightings	Least Concern
Malaconotidae	<i>Malaconotus blanchoti</i>	Grey-headed bushshrike	Sighting	Least Concern



6. HABITAT SENSITIVITY AND CONSERVATION STATUS

6.1. Habitat sensitivity

According to the findings of the desktop and field assessment, two broad vegetation units were identified in the study area. The first is bushveld habitat associated with mountain slopes and the second consist of areas transformed by residential developments.

Refer to Section 4 for the methodology used to assign sensitivity ratings to project area.

- The mountain slope bushveld vegetation unit (VU1) was rated as having a High sensitivity, based on the relatively undisturbed condition of the vegetation and that the vegetation unit is categorised as a Critical Biodiversity Area.
- Transformed areas (VU2) are totally disturbed and cannot be considered sensitive. Therefore, a low sensitivity was assigned to this vegetation unit.



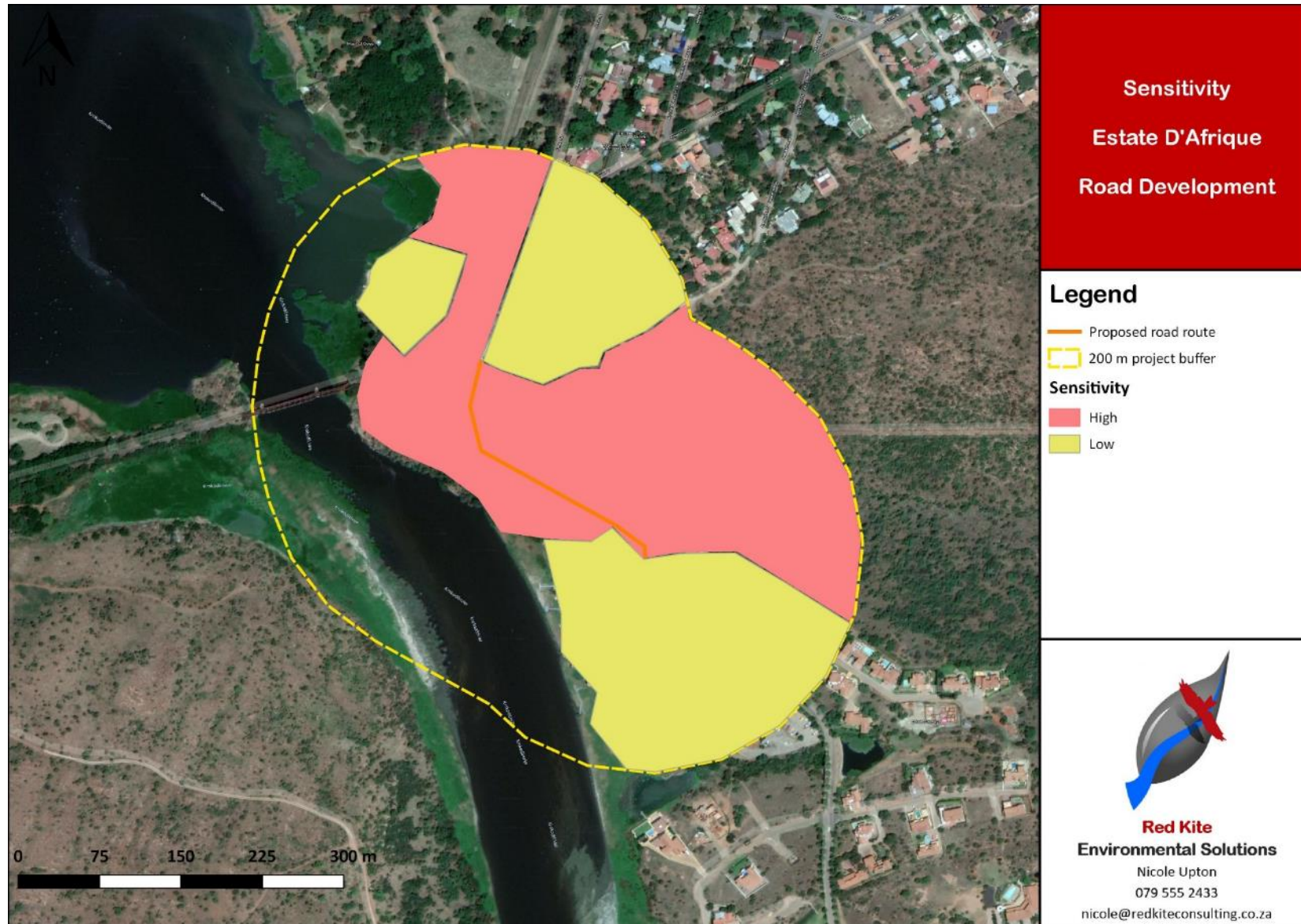


Figure 9: Sensitivity rating of the project area

6.2. Conservation status

Regionally, the area is situated between various formally protected areas (NPAES), such as the Magaliesberg Protected Natural Environment (local nature reserve managed by the North West Parks Board – Formal B) and the Cradle of Humankind World Heritage Site (Formal A) as managed by the Gauteng Provincial Government. The area east of the Cradle of Humankind World Heritage Site is listed as a Focus area for possible expansion due to the importance of Vaal Grasslands which occur within the area earmarked. The area also falls within the Magaliesberg Biosphere Reserve transition zone.

Important Birding Areas (IBAs) occur where the road development is proposed (and Estate D'Afrique is located), namely the Magaliesberg IBA. The Diepsloot Nature Reserve, controlled by the Johannesburg Municipality, lies 10 km south of Hartbeespoort Dam. Other protected areas within the IBA include Rustenburg Nature Reserve, 2 km south-west of the town, Mountain Sanctuary Park and Hartbeespoort Dam Nature Reserve as well as several private reserves and conservancies.

There is widespread, indiscriminate use of poison by small-stock farmers in the area to combat mammalian predators such as jackals, caracals and domestic dogs. Poisonings pose a major threat to the vulture colonies as hundreds of birds, which scavenge on carcasses set for vermin, can be unintentionally killed in a single poisoning incident. Most natural populations of large ungulates, and their associated predators, have disappeared from the Magaliesberg. It is hypothesized that depleted food supply, and the loss of vital nutrients in the diet, have resulted in increased vulture mortalities as a result of metabolic bone disease, osteodystrophy, and other physiological abnormalities.

The Vulture Monitoring Project, through the Vulture Study Group, counts nestlings annually as a measure of breeding success, which can fluctuate alarmingly in this population. The Magaliesberg vultures forage quite widely, some travelling to the Pilanesberg (IBA ZA017) nearly 100 km away. Several vulture restaurants have been established near the colonies to provide a regular food supply to breeding birds.

Table 11: Populations of IBA trigger species

Species	Current IUCN Red List Category	Season
Blue Crane - <i>Anthropoides paradiseus</i>	VU	resident
Black Stork - <i>Ciconia nigra</i>	LC	non-breeding
Cape Vulture - <i>Gyps coprotheres</i>	EN	resident
Cape Vulture - <i>Gyps coprotheres</i>	EN	non-breeding

Locally, in terms of the North West Conservation Plan, the site is categorised as falling areas characterised as Ecological Support Area 1 (ESA1) and Critical Biodiversity Area 2 (CBA2).



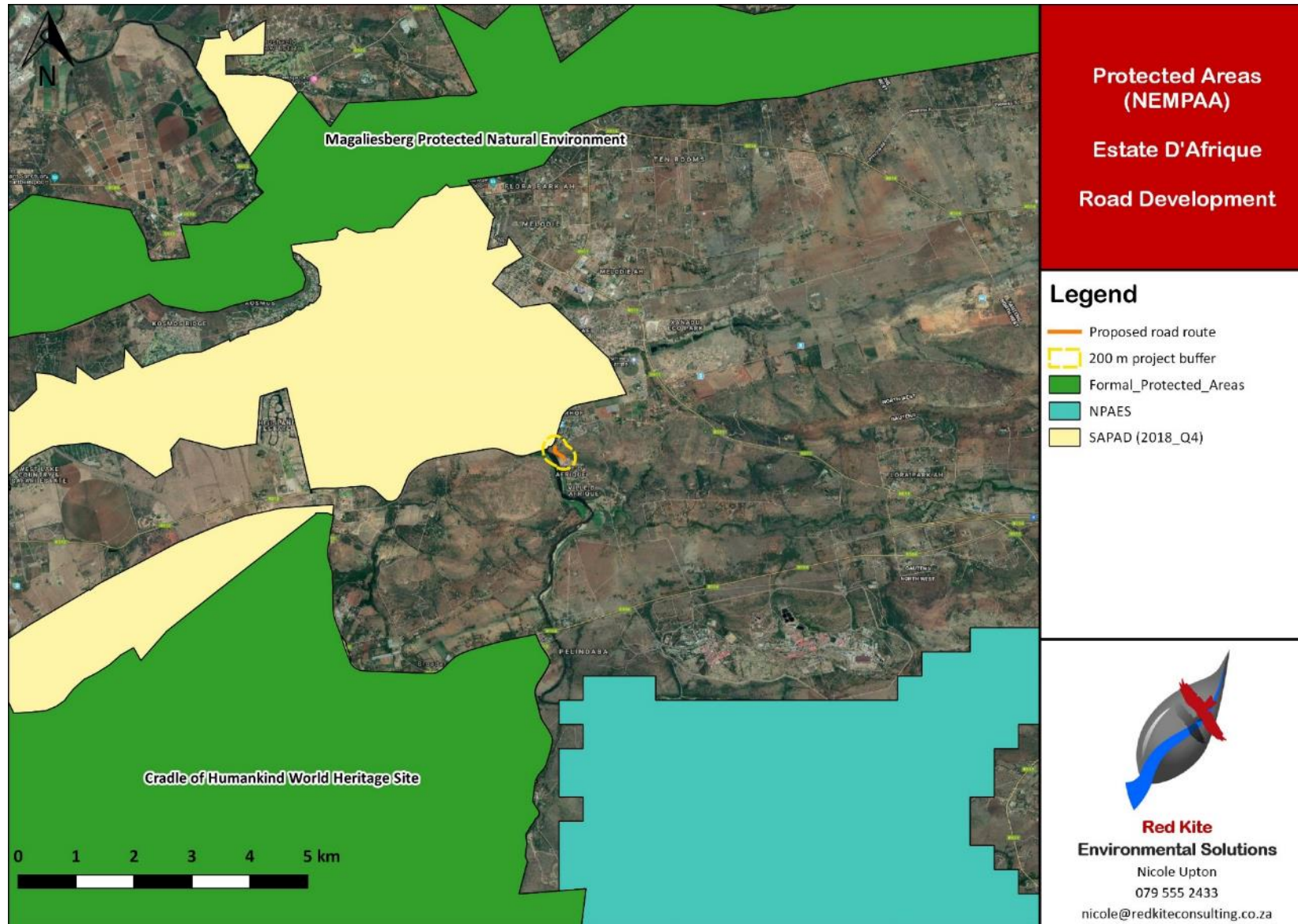


Figure 10: Protected Areas in the vicinity of the project site

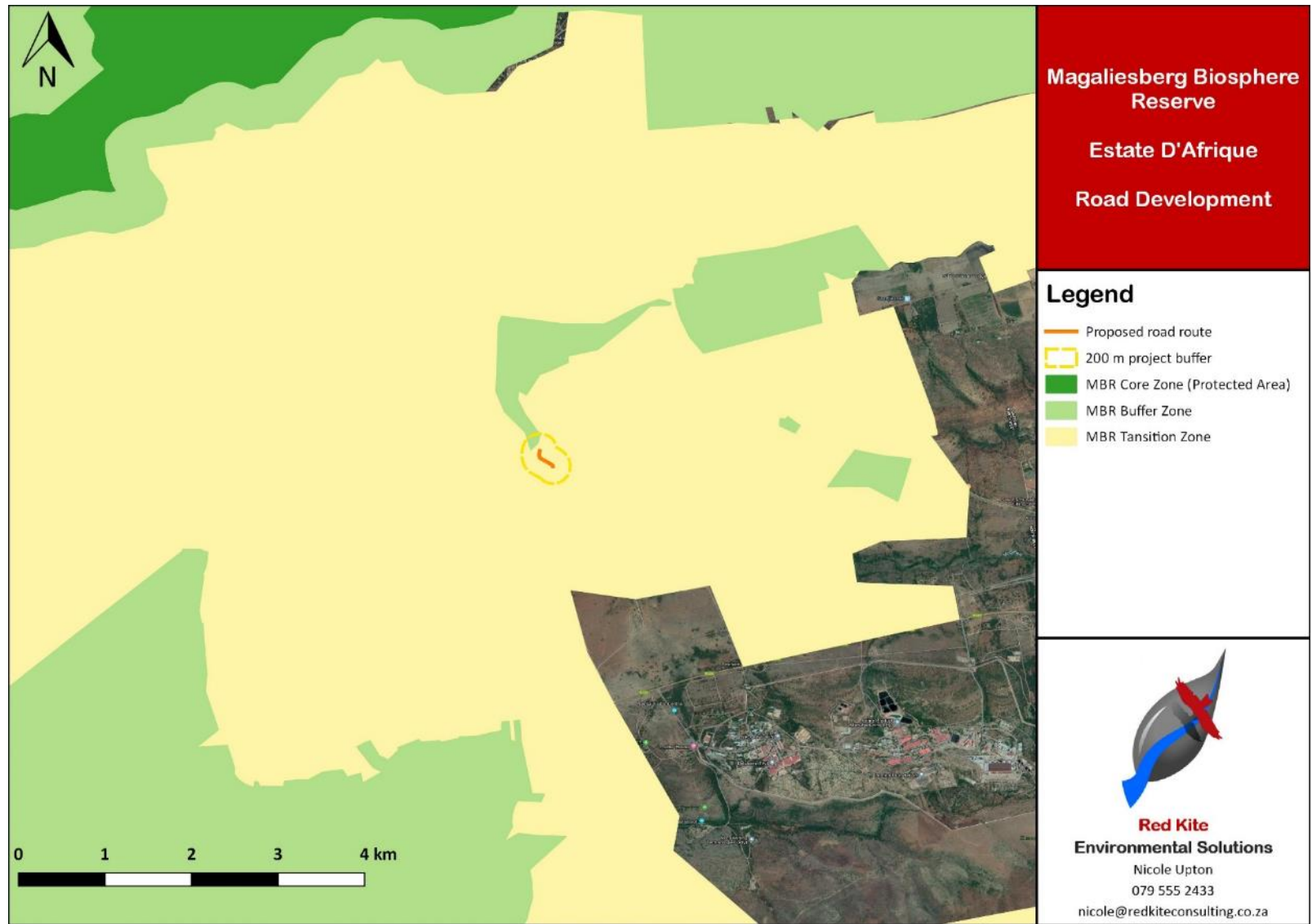


Figure 11: Magaliesberg Biosphere zones in relation to the project site

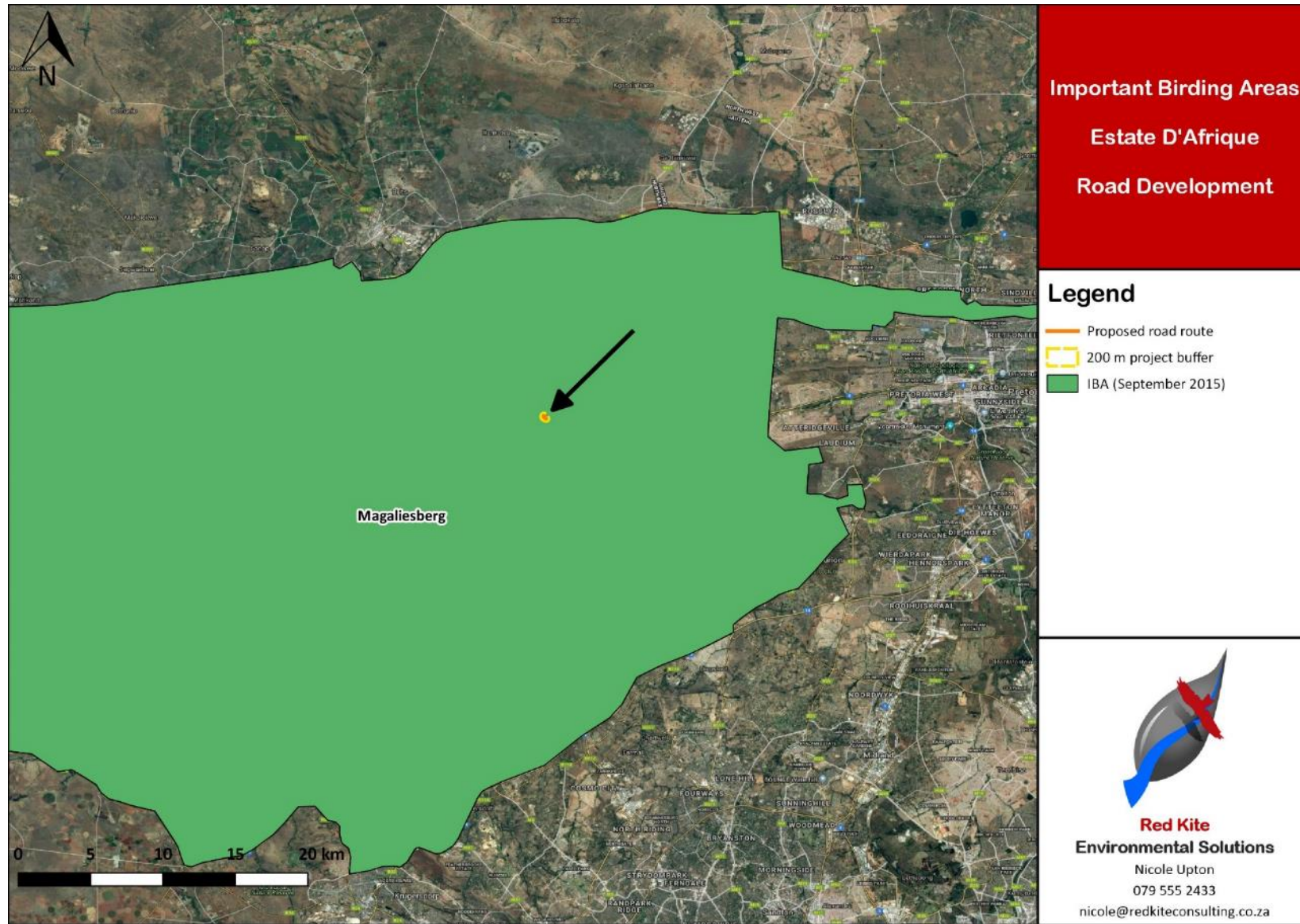


Figure 12: Important Birding Areas

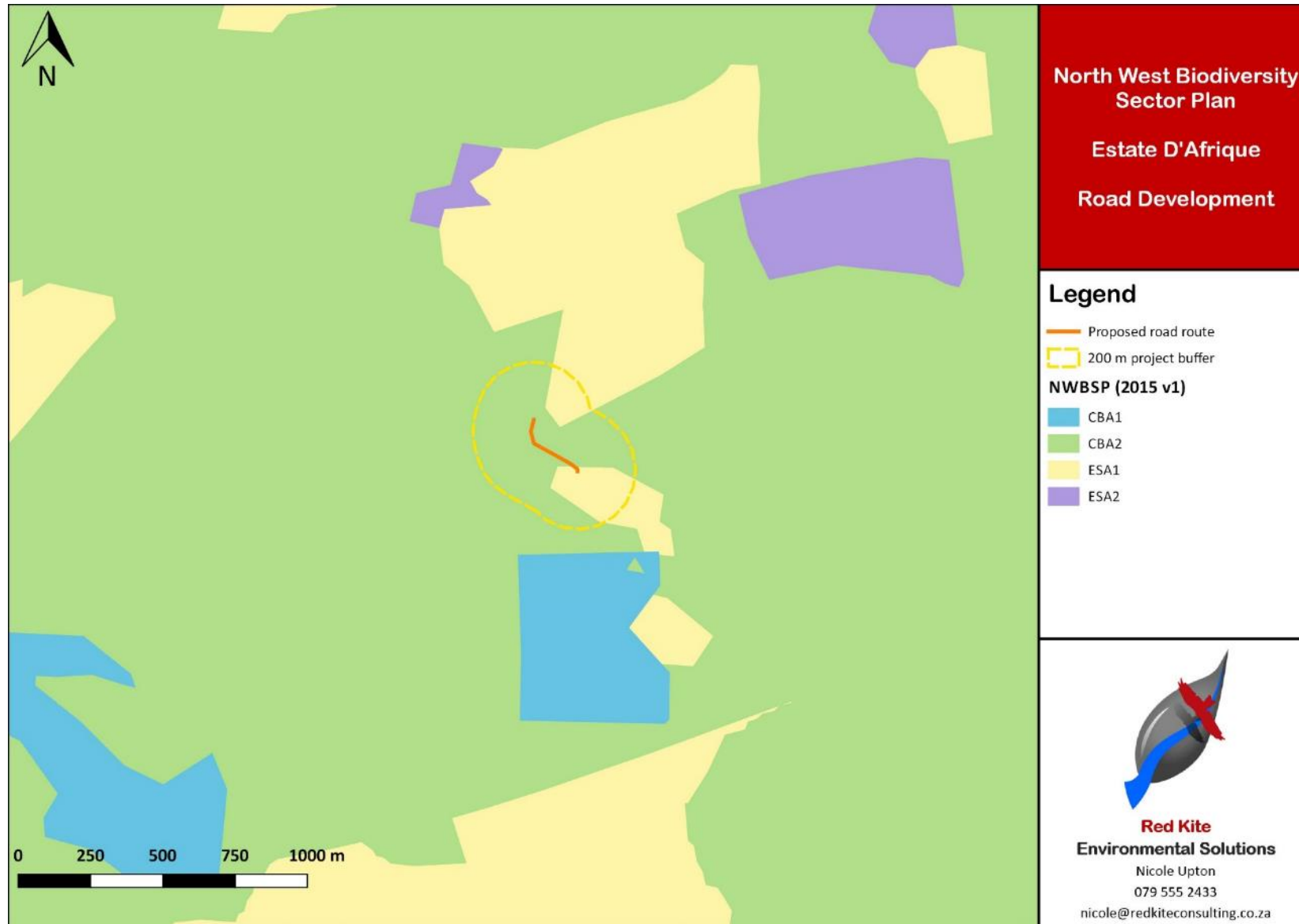


Figure 13: North West Biodiversity Sector Plan biodiversity areas

7. IMPACT ASSESSMENT

All forms of development, albeit for mining, industrial, urban or residential purposes, will have an immediate effect on the natural environment. It is therefore of utmost importance to provide information on the environmental consequences these activities will have and to inform the decision-makers thereof.

7.1. Methodology

Table 12: Explanation of the EIA criteria

Extent	
Classification of the physical and spatial scale of the impact	
Footprint (F)	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
Site (S)	The impact could affect the whole, or a significant portion of the site.
Regional (R)	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
National (N)	The impact could have an effect that expands throughout the country (South Africa).
International (I)	Where the impact has international ramifications that extend beyond the boundaries of South Africa.
Duration	
The lifetime of the impact that is measured in relation to the lifetime of the proposed development.	
Short (ST)	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
Short to Medium (S-M)	The impact will be relevant through to the end of a construction phase (1.5 years)
Medium (M)	The impact will last up to the end of the development phases, where after it will be entirely negated.
Long (LT)	The impact will continue or last for the entire operational lifetime i.e. exceed 30 years of the development but will be mitigated by direct human action or by natural processes thereafter.
Permanent (P)	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
Intensity	
The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself. The intensity is rated as	
Low (L)	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
Medium (M)	The affected environment is altered, but functions and processes continue, albeit in a modified way.
High (H)	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
Probability	



This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:

Probable (Pr)	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0 %).
Possible (Po)	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25 %.
Likely (L)	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50 %.
Highly Likely (HL)	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.
Definite (D)	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.

To assess each of these factors for each impact, the ranking scales as depicted in **Table 22** will be used.

Table 13: Assessment Criteria: Ranking Scales

PROBABILITY		MAGNITUDE / INTENSITY	
Description / Meaning	Score	Description / Meaning	Score
Definite/don't know	5	Very high/don't know	10
Highly likely	4	High	8
Likely	3	Moderate	6
Possible	2	Low	4
Improbable	1	Insignificant	2
DURATION		SPATIAL SCALE / EXTEND	
Description / Meaning	Score	Description / Meaning	Score
Permanent	5	International	5
Long Term	4	National	4
Medium Term	3	Regional	3
Short term	2	Local	2
Temporary	1	Footprint	1/0

7.1.1. Determination of Significance

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. The Significance Rating (SR) is determined as follows:

Equation 1: Significance Rating (SR) = (Extent + Intensity + Duration) x Probability

Other aspects to take into consideration in the specialist studies are:

- Impacts should be described both before and after the proposed mitigation and management measures have been implemented.



- All impacts should be evaluated for the full-lifecycle of the proposed development, including construction, operation and decommissioning.
- The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region.
- The specialist studies must attempt to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

7.1.2. Identifying Potential Impacts without Mitigation Measures (WOM)

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned probabilities, resulting in a value for each impact (prior to the implementation of mitigation measures). Significance without mitigation is rated on the scale in **Table 14**.

Table 14: Significance Rating Scales without mitigation

SR < 30	Low (L)	Impacts with little real effect and which should not have an influence on or require modification of the project design or alternative mitigation. No mitigation is required.
30 > SR < 60	Medium (M)	Where it could have an influence on the decision unless it is mitigated. An impact or benefit which is sufficiently important to require management. Of moderate significance - could influence the decisions about the project if left unmanaged.
SR > 60	High (H)	Impact is significant, mitigation is critical to reduce impact or risk. Resulting impact could influence the decision depending on the possible mitigation. An impact which could influence the decision about whether or not to proceed with the project.

7.1.3. Identifying Potential Impacts with Mitigation Measures (WM)

To gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it will be necessary to re-evaluate the impact. Significance with mitigation is rated on the following scale as contemplated in the table below.

Table 15: Significance Rating Scales with mitigation

SR < 30	Low (L)	The impact is mitigated to the point where it is of limited importance.
30 > SR < 60	Medium (M)	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
SR > 60	High (H)	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.



7.2. Nature of Impact Identified

The following section focuses on the potential impacts that the proposed road development project and associated activities may have on the fauna and flora in the area.

Potential impacts as a result of the proposed activities will be investigated for three phases of development: construction phase, operational phase and rehabilitation phase. The proposed road is associated with a residential development and thus a closure / decommissioning phase is not envisioned.

Since natural features will be destroyed and vegetation clearance will take place, the impacts on the natural environment is argued to be medium-high. The sensitivity of the site is High due to the level of specialisation of habitat as well as the classification of the area as a CBA. Impacts will likely be higher in terms of vegetation since all the vegetation will be cleared for the construction of the road. Animal species will move away as soon as construction starts and threats associated with the road is based on fragmentation between the dam and the ridge/mountainous area.

- **Construction:**
 - Most of the impacts on plant species will occur during the construction phase when removal of plant communities will take place on site.
 - Vegetation clearance will likely destroy habitats and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding the new road. Sensitive areas may become vulnerable to Alien and Invasive species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.
 - Fragmentation of habitat areas by the linear development (the road): this activity will fragment ranges that certain animals may need to sustain adequate foraging area and breeding grounds. This is relevant since the current habitat have value as foraging grounds and corridors for movement between other natural areas.
 - Possible impacts on Species of Conservation Concern (SCC).
- **Operational:**
 - Continuous human activity over a longer-term period may further impact on the faunal communities within the area. Associated noise, waste, the smell of humans, human movement in sensitive zones and natural areas are problematic and may lead to ever declining populations (where the disturbance of habitat has caused habitat remaining to become unfavorable).
 - Invasive plant species may increase during the operational phase of the project. This will mostly take place in the remaining natural areas. Removal of these species is an ongoing process and if not managed regularly could result in severe changes and competition in plant communities.
 - Possible impacts on Species of Conservation Concern (SCC).



- Flora could be damaged by staff, residents and contractors if they are allowed to access certain natural areas that should be indicated as no-go zones.

7.3. Fauna Impact Assessment and Risk Evaluation

7.3.1. Construction and Operational phase

Impact

- Vegetation clearance will likely destroy habitats and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding the new road. Sensitive areas may become vulnerable to Alien and Invasive species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.
- Fragmentation of habitat areas by the linear development (the road) and this activity will fragment ranges that certain animals may need to sustain adequate foraging area and breeding grounds. This is relevant since the current habitat have value as foraging grounds and corridors for movement between other natural areas. The Hartbeespoort dam is also an important aspect since the road will serve as a fragmentation barrier between the dam and the ridge formation within this area.
- Possible impacts on Species of Conservation Concern (SCC).

Mitigation

- Any construction camps or stockyard areas should be located on already impacted areas within the Estate, such as at the beginning of the road footprint. Do not establish additional construction related areas on the ridge.
- Ensure adequate stormwater management as to ascertain that potentially polluted water do not enter the natural environment surrounding the footprint area, specifically the Hartbeespoort dam, which is already impacted by various nutrient enrichment impacts;
- To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled, removed, killed or interfered with by the Contractor, his employees, his Sub-Contractors or his Sub-Contractors' employees;
- Activities on site must comply with the regulations of the Animal Protection Act 1962 (Act No. 71 of 1962). Workers should also be advised on the penalties associated with the needless destruction of wildlife, as set out in this act;
- Appoint an ECO to oversee the activities and ensure that ecological aspects are kept in mind;
- Priority species, specifically nests if encountered, should be identified first and a management plan should be established for each of the priority species if these are encountered during any phase of the activity;
- Continuous rehabilitation and clean-up of the area should be implemented during both the construction and operational phase;
- Keep activities (transport etc.) to the smallest area possible, as shown on the civil designs approved for the road. This is to prevent other unintended fragmentation that may have irreversible changes to faunal communities. It also increases the invasion of alien/foreign species. At all times keep to the road as approved and prevent unauthorized access into other surrounding areas;



- If areas adjacent to the road suffers impacts during construction, these should be rehabilitated immediately and completely where required;
- A management plan for the control of invasive and exotic plant species needs to be implemented and since the development likely already has an AIP Programme, this should extend to the area where the road is proposed;
- It is also vital that no additional fragmentation occur and that all roads are clearly demarcated and kept to a minimum without any exceptions. No vehicles or personnel are permitted outside of these demarcated roads.
- It is vital that if any endemic, rare or vulnerable species occurs on the proposed site that these species should be protected and/or left undisturbed. Only as an exception can these species be relocated to favourable sites with the use of a specialist prior to vegetation and habitat removal. Threatened species are not allowed to be disturbed in any way. If at any point any red listed species is encountered, a specialist should be consulted as to determine the best way forward and a permit should be obtained if any intervention is required.
- Avoid and keep to a designated buffer in relation to the Hartbeespoort Dam.

Mitigation	Extent	Duration	Intensity	Probability	Significance
Without	2	3	4	5	Medium
With	1	3	2	4	Low

Impact

- Continuous human activity over a longer-term period may further impact on the faunal communities within the area. Associated noise, waste, the smell of humans, physical penetration into sensitive zones and natural areas are problematic and may lead to ever declining populations (where the disturbance of habitat has caused habitat remaining to become unfavorable).
- Possible impacts on Species of Conservation Concern (SCC) associated with the Hartbeespoort Dam.

Mitigation

- Maintain the integrity and drainage of the road proposed as to ensure no additional sediment or erosional effects impact on the Hartbeespoort Dam and keep to adequate buffer away from the Dam.
- Staff/Contractors are prohibited from entering and disturbing the surrounding natural areas. Management systems should be set in place to prevent any form of additional disturbance from occurring.
- The natural areas should be managed to prevent further degradation. No staff, contractors or visitors should be allowed to access these areas.
- The activity area should be well demarcated and workers should not enter into adjacent areas.
- The SHEQ, ECO (or appoint a suitable contractor) should ensure that all ecological management features are being implemented and monitoring is being conducted as specified within the Environmental Management Plan (EMP).
- Implement all management features as prescribed.

Mitigation	Extent	Duration	Intensity	Probability	Significance
Without	2	5	4	5	Medium
With	1	5	2	4	Medium



7.4. Flora Impact Assessment and Risk Evaluation

7.4.1. Construction and Operational phase

Impact

- Vegetation clearing is likely to be the greatest impact on the vegetation communities affected by the proposed road development. Ecological integrity and conservation importance (i.e. habitat sensitivity) of the areas that will be affected by this impact is moderate to high.
- Vegetation clearance will likely destroy habitats and lead to possible invasive and/or exotic species establishing in the area and edge-effects occurring surrounding the new road. Sensitive areas may become vulnerable to Alien and Invasive species and these may compete with indigenous species, likely leading to the migration of sensitive species from the site to a more favourable habitat.
- Fragmentation of habitat areas by the linear development (the road).
- Possible impacts on Species of Conservation Concern (SCC).

Mitigation

- The area cleared of vegetation must be kept to a minimum.
- Ensure adequate stormwater management as to ascertain that potentially polluted water do not enter the natural environment surrounding the footprint area,
- Appoint an ECO to oversee the activities and ensure that ecological aspects are kept in mind;
- Continuous rehabilitation and clean-up of the area should be implemented during both the construction and operational phase;
- Keep activities (transport etc.) to the smallest area possible, as shown on the civil designs approved for the road. This is to prevent other unintended fragmentation that may have irreversible changes to fauna and flora communities. It also increases the invasion of alien/foreign species. At all times keep to the road as approved and prevent unauthorized access into other surrounding areas;
- If areas adjacent to the road suffers impacts during construction, these should be rehabilitated immediately and completely where required;
- A management plan for the control of invasive and exotic plant species needs to be implemented;
- It is vital that if any endemic, rare or vulnerable species occurs on the proposed site that these species should be protected and/or left undisturbed. Only as an exception can these species be relocated to favourable sites with the use of a specialist prior to vegetation and habitat removal. If at any point any red listed species is encountered, a specialist should be consulted as to determine the best way forward and a permit should be obtained if any intervention is required.

Mitigation	Extent	Duration	Intensity	Probability	Significance
Without	2	4	6	5	High
With	1	4	4	5	Medium



Impact

- Construction and introduction of foreign material e.g. soils may lead to the further introduction of alien invader species, impacting on the floral characteristics of the subject property.
- Ineffective removal of alien invader species and exposed areas could lead to re-establishment of invasive species, impacting on floral community rehabilitation efforts.
- Development related activities could lead to the vegetation disturbance that may result in proliferation of exotic and invasive species.

Mitigation

- A bi-annual alien invader eradication programme should be implemented during construction in order to clear the property of existing invasive species and prevent the further establishment of alien flora. An annual eradication programme will be sufficient for the life of the development.

Mitigation	Extent	Duration	Intensity	Probability	Significance
Without	2	4	4	4	Medium
With	1	1	2	2	Low



8. RECOMMENDATIONS FOR ECOLOGICAL MANAGEMENT PLAN

8.1. Pre-Construction Phase

- Relevant Authorisation needed for all protected species, in terms of NEMBA (TOPS List) and the National Forests Act, 1998 (Act No. 84 of 1998), will be necessary if any species need to be relocated during any phase of the development.

8.2. Construction and Operational Phases

8.2.1. Aim and Objectives

- Since most of the sensitive faunal species are mammalian and avi-fauna, care should be taken as to prevent impacts on these species.
- Prevent the needless loss of or damage to fauna and flora particularly with regard to protected, endemic, near-endemic and rare species.
- Prevent death, injury or hindrance to fauna particularly with regard to protected species.
- Prevent significant alteration to the ecosystems in the area.
- Control the introduction of alien invasive plant species to the area.
- Establish a monitoring programme for early detection of alien invasive species and establish an alien invasive eradication and control programme as part of the flora objectives.
- Any construction camps or stockyard areas should be located on already impacted areas within the Estate, such as at the beginning of the road footprint. Do not establish additional construction related areas on the ridge.

8.2.2. Mitigation and Management measures

- Maintain the integrity and drainage of the road proposed as to ensure no additional sediment or erosional effects impact on the Hartbeespoort Dam and maintain suitable buffers.
- Ensure adequate stormwater management as to ascertain that potentially polluted water does not enter the natural environment surrounding the footprint area;
- To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled, removed, killed or interfered with by the Contractor, his employees, his Sub-Contractors or his Sub-Contractors' employees;
- Activities on site must comply with the regulations of the Animal Protection Act 1962 (Act No. 71 of 1962). Workers should also be advised on the penalties associated with the needless destruction of wildlife, as set out in this act;
- Appoint an ECO to oversee the activities and ensure that ecological aspects are kept in mind;



- Priority species, specifically nests if encountered, should be identified first and a management plan should be established for each of the priority species if these are encountered during any phase of the activity;
- Continuous rehabilitation and clean-up of the area should be implemented during both the construction and operational phase;
- Keep activities (transport etc.) to the smallest area possible. This is to prevent other unintended fragmentation that may have irreversible changes to fauna and flora communities. It also increases the invasion of alien/foreign species. No vehicles or personnel are permitted outside of these demarcated roads.
- If areas adjacent to the road suffers impacts during construction, these should be rehabilitated immediately and completely where required;
- A management plan for the control of invasive and exotic plant species needs to be implemented and since the Estate likely already has an AIP Programme, this should extend to the road;
- It is vital that if any endemic, rare or vulnerable species occurs on the proposed site that these species should be protected and/or left undisturbed. Only as an exception can these species be relocated to favourable sites with the use of a specialist prior to vegetation and habitat removal. If at any point any red listed species is encountered, a specialist should be consulted as to determine the best way forward and a permit should be obtained if any intervention is required.
- Staff/Contractors are prohibited from entering and disturbing the surrounding natural areas. Management systems should be set in place to prevent any form of additional disturbance from occurring.
- All noisy equipment utilized to construct the road should be mitigated to lessen the sound levels as well as vibration levels should be controlled to limit impact on biodiversity and sensitive species.
- Avoid night time movement or activities associated the construction of the road. If possible, keep construction activities during the day-time hours to avoid impacts on nocturnal animals and to prevent 24-hour human activity in a short, intensified space.
- Ensure speed limits are set on all roads and enforce speed limits. Ensure all drivers at the site are informed about speed limits.

8.3. Monitoring

Monitoring of the ecological aspects should be done on a continual basis to assess whether there are any concerns regarding the flora. Monitoring of the biodiversity should start as soon as the construction phase of the development commences. Monitoring should be undertaken annually.

The monitoring of biodiversity should include the following:

- Annual visual assessment of surrounding areas to determine if vegetation in undisturbed areas is being impacted. The visual assessment can be undertaken by the ECO.
- Continue with alien invasive monitoring, eradication and control programme.
- Implement an Observe and Report approach which will enable employees to report any disturbance of fauna or degradation that they encounter during the operational phase.



10. DISCUSSION AND FINDINGS

The road is proposed to be constructed between Estate D'Afrique and the Meerhof estate. The proposed road route is approximately 282 m in length.

A desktop study was conducted to establish whether any potentially sensitive fauna and flora species or species of conservation concern may possibly occur on site. The Virtual Museum and Animal Demography Unit (ADU) and SANBI POSA database was used to compile species lists based on the sightings and data gathering from the South African Biodiversity Institute for the 2527DD QDS. The avifaunal species list was obtained from SABAP2 for the 2555_2900 pentad.

According to the National Vegetation Map (2018) the project site falls within the Gold Reef Mountain Bushveld with a small section of the 200 m buffer area representative of the Moot Plains Bushveld. The findings of the site survey in terms of floral species composition and characteristics of the vegetation unit identified, is closely representative of the Gold Reef Mountain Bushveld vegetation type.

Neither the Gold Reef Mountain Bushveld nor the Moot Plains Bushveld are listed in the National List of Threatened Ecosystems.

Information on plant species recorded was extracted from the POSA online database hosted by SANBI. The results indicate that approximately 53 plant species have been recorded within the square. Four species of conservation concern were found to possibly occur in the area. Thirteen exotic plant species are recorded as occurring in the QDS, seven of which are listed as alien and invasive plant species in NEMBA (2004). Of the 53 plant species listed as occurring in the project area, 16 are endemic to South Africa. No protected tree species, as promulgated in terms of the NFA (1998), have been recorded in the QDS. None of the species listed for the QDS are contained in the ToPS list. None of the species of conservation concern listed in for the QDS on the POSA database were identified as occurring on the project site. However, this does not preclude them from possibly occurring on the proposed road route.

The proposed road route is situated across the foot of a ridge of the Witwatersberg, adjacent to the Hartbeespoort Dam. The area surveyed between the two residential areas was found to be moderately impacted due to the proximity of anthropogenic activities. However, the vegetation was found to be in good condition and representative of the vegetation type of the area.

Vegetation units were identified according to plant species composition, previous land use and topography. The state of the vegetation of the proposed road route varies from being natural to completely transformed. The following broad classification of Vegetation Units (VU) were found to occur on the proposed road route and 200 m buffer: Mountain slopes bushveld (VU1); and Transformed areas (VU2).



A total of 50 plant species were recorded in the studied area during the site survey, none of which are considered to be of conservation concern. None of the floral species recorded during the site survey are listed in the ToPS list or the Protected tree species list (NFA). All species are classified as Least Concern according to the SANBI Red Data List. Two endemic species were identified to occur in the projects site, namely *Cussonia paniculata* (Highveld cabbage tree) and *Searsia zeyheri* (Blue crowberry).

Only four Alien Invasive Plant (AIP) species, as per the NEMBA, were recorded during the site survey. None of the AIP species identified during the site survey occurred in dense clusters, but rather as a few scattered individuals.

Ten species were found to occur on site that have medicinal uses.

Appendix D list the faunal species for the 2527DD QDS and Table 8 lists all fauna species that are of conservation concern which were found during the desktop study. Thirty-three mammalian, amphibian and avifaunal species with a red listed status are known to occur within the specific area where the new road is located.

Eighty-six (86) mammal species were found to possibly occur within the QDS, most of which have a Least Concern Red List Status. Fourteen (14) species is classified within the National Red Data List, but only six (6) of these are expected to potentially occur within the area due to the habitat found within the area.

According to data collected during the Southern African Bird Atlas Project 2 (SABAP2) a total of 311 bird species have been recorded in the pentad (2545_2750). Seventeen (17) birds within pentad has a red listed status, either Regional or Global.

One hundred and thirty-six (136) butterfly species were found for the 2527DD, all of which are categorized as Least Concern by SANBI.

Twenty-seven (27) Dung beetle species were provided on the SANBI database, eight (8) Lacewing species. Forty (40) Odonata species, Fourteen (14) Spiders, Six (6) Scorpions. None of which has a listed status (or has not been assessed) according to SANBI.

Thirty-five (35) reptile species are recorded for the QDS. None of the species have a red listed status.

Seventeen (17) amphibian species were listed within this QDS and one species was red listed for the QDS.

Habitat availability along the footprint is adequate/good due to the nature of the habitat types found along the ridge/koppie. Animal communities expected do not likely use the area as breeding and roosting sites as a result of constant movement and human noise and smells in close proximity of the site.



The area to be developed is located between residential developments set on the banks of the Hartbeespoort dam. The species found here has been impacted by the residential development and constant movement of humans and activities associated with residential areas despite its largely natural setting against the mountains and the species associated with the dam. It is unlikely that sensitive species or red listed animal species occur where the road is proposed although they may occur in the wider region and many red listed birds are known to be associated with the Magaliesberg and the Hartbeespoort dam itself.

Twenty-two faunal species were identified as occurring on the project area, all of which are categorised as Least Concern in terms of the SANBI red list.

Since the development is closely associated with the Hartbeespoort dam, a large amount of water birds of various degrees of sensitivity may be associated with the water body. The waterbirds will not be affected significantly due to the road development and therefore a survey of the biota of the dam itself is not relevant or included within this survey.

Regionally, the area is situated between various formally protected areas (NPAES), such as the Magaliesberg Protected Natural Environment and the Cradle of Humankind World Heritage Site. The area also falls within the transition zone of the Magaliesberg Biosphere Reserve.

Important Birding Areas (IBAs) occur where the road development is proposed, namely the Magaliesberg IBA. Most of the area falls within the Magaliesberg Protected Natural Environment.

Locally, in terms of the North West Conservation Plan, the site is categorised as falling areas characterised as Ecological Support Area 1 (ESA1) and Critical Biodiversity Area 2 (CBA2).

Since natural features will be destroyed and vegetation clearance will take place, the impacts on the natural environment is argued to be medium-high in areas. The sensitivity of the site is High due to the level of specialisation of habitat and the classification of the area as a CBA. Impacts will likely be higher in terms of vegetation since all the vegetation located on the construction footprint will be cleared. Animal species will move away as soon as construction starts and threats associated with the road is based on fragmentation between the dam and the ridge/mountainous area.

It is the opinion of the specialist that the development may continue without severe ecological impacts in terms of the animal species identified in the framework of the study, since animal species will respond by means of temporary movement away from the activities and there are other suitable habitat available during the active phase and construction will be a short term activity. Management of impacts should be initiated from the onset of the project. All management features as prescribed should also adhered to.



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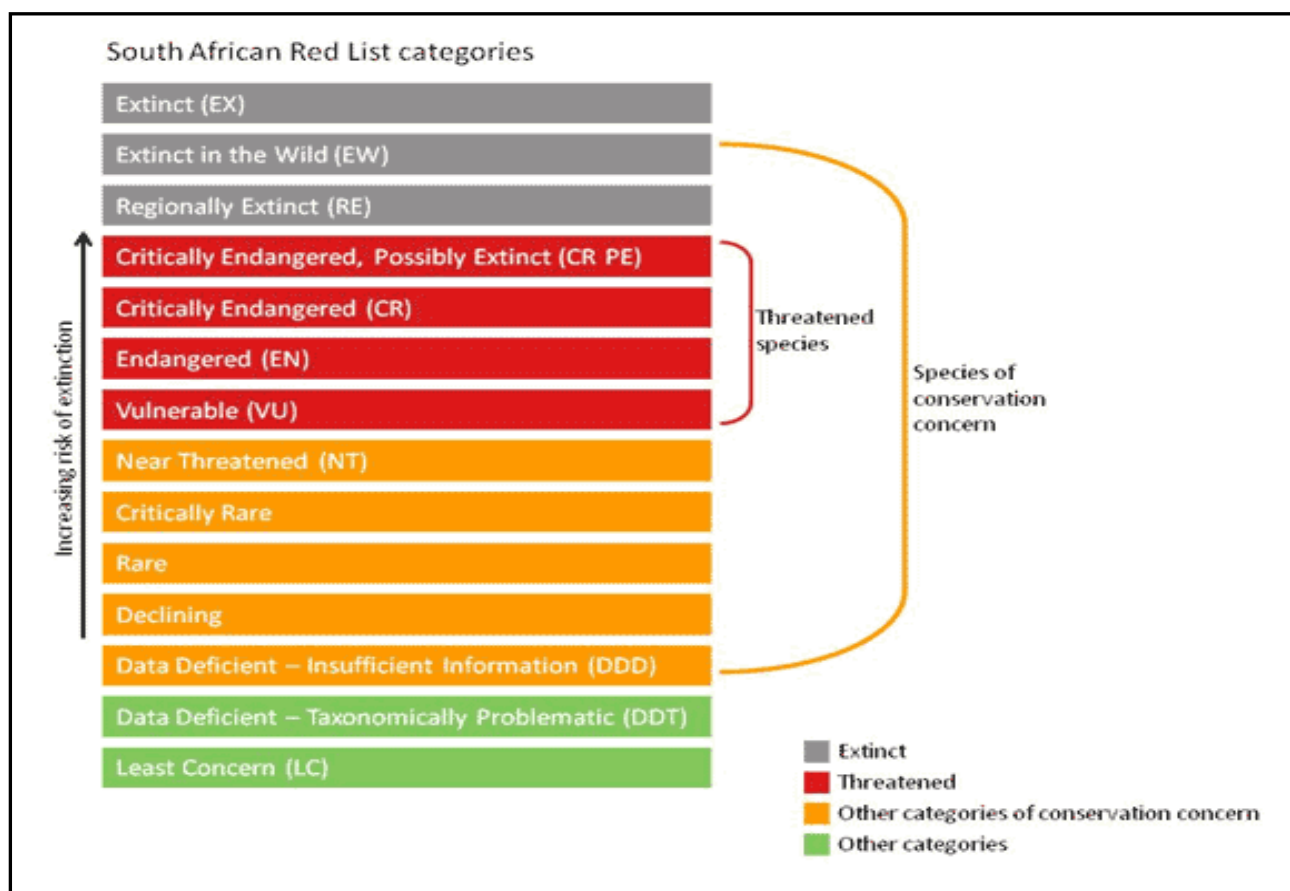
APPENDIX A: IUCN RED LIST DEFINITIONS

Categories marked with ^N are non-IUCN, national Red List categories for species not in danger of extinction but considered of conservation concern. The IUCN equivalent of these categories is Least Concern (LC).

Categories	Definition
Extinct (EX)	A species is Extinct when there is no reasonable doubt that the last individual has died. Species should be classified as Extinct only once exhaustive surveys throughout the species' known range have failed to record an individual.
Extinct in the Wild (EW)	A species is Extinct in the Wild when it is known to survive only in cultivation or as a naturalized population (or populations) well outside the past range.
Regionally Extinct (RE)	A species is Regionally Extinct when it is extinct within the region assessed (in this case South Africa), but wild populations can still be found in areas outside the region.
Critically Endangered, Possibly Extinct (CR PE)	Possibly Extinct is a special tag associated with the category Critically Endangered, indicating species that are highly likely to be extinct, but the exhaustive surveys required for classifying the species as Extinct has not yet been completed. A small chance remains that such species may still be rediscovered.
Critically Endangered (CR)	A species is Critically Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Critically Endangered, indicating that the species is facing an extremely high risk of extinction.
Endangered (EN)	A species is Endangered when the best available evidence indicates that it meets at least one of the five IUCN criteria for Endangered, indicating that the species is facing a very high risk of extinction.
Vulnerable (VU)	A species is Vulnerable when the best available evidence indicates that it meets at least one of the five IUCN criteria for Vulnerable, indicating that the species is facing a high risk of extinction.
Near Threatened (NT)	A species is Near Threatened when available evidence indicates that it nearly meets any of the IUCN criteria for Vulnerable and is therefore likely to become at risk of extinction in the near future.
^N Critically Rare	A species is Critically Rare when it is known to occur at a single site but is not exposed to any direct or plausible potential threat and does not otherwise qualify for a category of threat according to one of the five IUCN criteria.
^N Rare	A species is Rare when it meets at least one of four South African criteria for rarity but is not exposed to any direct or plausible potential threat and does not qualify for a category of threat according to one of the five IUCN criteria. The four criteria are as follows: <ul style="list-style-type: none"> • Restricted range: Extent of Occurrence <500 km², OR • Habitat specialist: Species is restricted to a specialized microhabitat so that it has a very small Area of Occupancy, typically smaller than 20 km², OR • Low densities of individuals: Species always occurs as single individuals or very small subpopulations (typically fewer than 50 mature individuals) scattered over a wide area, OR • Small global population: Less than 10 000 mature individuals.
^N Declining	A species is Declining when it does not meet or nearly meet any of the five IUCN criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near



Categories	Definition
	Threatened, but there are threatening processes causing a continuing decline of the species.
Least Concern (LC)	A species is Least Concern when it has been evaluated against the IUCN criteria and does not qualify for any of the above categories. Species classified as Least Concern are considered at low risk of extinction. Widespread and abundant species are typically classified in this category.
Data Deficient - Insufficient Information (DDD)	A species is DDD when there is inadequate information to make an assessment of its risk of extinction, but the species is well defined. Listing of species in this category indicates that more information is required, and that future research could show that a threatened classification is appropriate.
Data Deficient - Taxonomically Problematic (DDT)	A species is DDT when taxonomic problems hinder the distribution range and habitat from being well defined, so that an assessment of risk of extinction is not possible.
Not Evaluated (NE)	A species is Not Evaluated when it has not been evaluated against the criteria. The national Red List of South African plants is a comprehensive assessment of all South African indigenous plants, and therefore all species are assessed and given a national Red List status. However, some species included in Plants of southern Africa: an online checklist are species that do not qualify for national listing because they are naturalized exotics, hybrids (natural or cultivated), or synonyms. These species are given the status Not Evaluated and the reasons why they have not been assessed are included in the assessment justification.



APPENDIX B: FLORA SPECIES LIST FOR 2527DD QDS

Family	Species	Diagnostic	Ecology	IUCN Red List Status	Conservation status
Loranthaceae	<i>Agelanthus natalitius</i>	succulent; parasite; shrub;	Indigenous		
Apocynaceae	<i>Araujia sericifera</i>	climber;	Not indigenous; Naturalised; Invasive		NEMBA AIP Category 1b
Papaveraceae	<i>Argemone ochroleuca</i>	herb;	Not indigenous; Naturalised; Invasive		NEMBA AIP Category 1b
Amaryllidaceae	<i>Boophone disticha</i>	succulent; geophyte;	Indigenous	LC	Medicinal
Apocynaceae	<i>Carissa bispinosa</i>	shrub;	Indigenous	LC	
Poaceae	<i>Cenchrus ciliaris</i>	graminoid;	Indigenous	LC	
Commelinaceae	<i>Commelina erecta</i>	herb;	Indigenous	LC	
Asteraceae	<i>Conyza podocephala</i>	herb;	Indigenous; Endemic		
Apocynaceae	<i>Cryptolepis oblongifolia</i>	scrambler; shrub;	Indigenous	LC	
Cyperaceae	<i>Cyperus fastigiatus</i>	helophyte; cyperoid; herb;	Indigenous; Endemic	LC	
Cyperaceae	<i>Cyperus textilis</i>	helophyte; emergent hydrophyte; cyperoid; herb;	Indigenous; Endemic	LC	
Asteraceae	<i>Dicoma anomala</i>	herb;	Indigenous	LC	
Amaranthaceae	<i>Gomphrena celosioides</i>	herb;	Not indigenous; Naturalised		
Gunneraceae	<i>Gunnera perpensa</i>	hydrophyte; herb;	Indigenous	LC	Medicinal
Asteraceae	<i>Helianthus annuus</i>	herb;	Not indigenous; Naturalised; Invasive		
Malvaceae	<i>Hibiscus trionum</i>	herb;	Not indigenous; Naturalised		
Apocynaceae	<i>Huernia transvaalensis</i>	succulent;	Indigenous; Endemic	LC	
Aquifoliaceae	<i>Ilex mitis</i>	shrub; tree;	Indigenous	LC	Medicinal
Fabaceae	<i>Indigofera heterotricha</i>	herb; dwarf shrub;	Indigenous	LC	
Fabaceae	<i>Indigofera spicata</i>	creeper; herb; shrub;	Indigenous	LC	
Iridaceae	<i>Iris pseudacorus</i>		Not indigenous; Cultivated; Naturalised; Invasive		NEMBA AIP Category 1a
Scrophulariaceae	<i>Jamesbrittenia aurantiaca</i>	herb;	Indigenous	LC	
Euphorbiaceae	<i>Jatropha schlechteri</i>	succulent; herb; dwarf shrub;	Indigenous	LC	
Hyacinthaceae	<i>Ledebouria atrobrunnea</i>	geophyte;	Indigenous; Endemic		NWBMA Protected species
Fabaceae	<i>Melolobium subspicatum</i>	dwarf shrub;	Indigenous; Endemic	VU	
Geraniaceae	<i>Monsonia angustifolia</i>	herb;	Indigenous	LC	
Asteraceae	<i>Nidorella hottentotica</i>	herb;	Indigenous; Endemic	LC	



Family	Species	Diagnostic	Ecology	IUCN Red List Status	Conservation status
Asteraceae	<i>Nolletia jeanettae</i>	herb;	Indigenous; Endemic	LC	
Stilbaceae	<i>Nuxia glomerulata</i>	tree; shrub;	Indigenous; Endemic	LC	NWBMA Protected species
Cactaceae	<i>Opuntia engelmannii</i>	succulent;	Not indigenous; Cultivated; Naturalised; Invasive		NEMBA AIP Category 1b
Poaceae	<i>Panicum subalbidum</i>	graminoid;	Indigenous	LC	
Poaceae	<i>Pennisetum setaceum</i>	graminoid;	Not indigenous; Naturalised; Invasive	NE	NEMBA AIP Category 1b
Solanaceae	<i>Physalis viscosa</i>	herb;	Not indigenous; Naturalised; Invasive		
Plantaginaceae	<i>Plantago longissima</i>	herb;	Indigenous; Endemic	LC	
Proteaceae	<i>Protea roupelliae</i>	tree;	Indigenous; Endemic	LC	
Asteraceae	<i>Psiadia punctulata</i>	shrub;	Indigenous	LC	
Fabaceae	<i>Rhynchosia albissima</i>	herb; dwarf shrub;	Indigenous	LC	
Fabaceae	<i>Rhynchosia minima</i>	climber; herb;	Indigenous	NE	
Anacardiaceae	<i>Searsia lancea</i>	shrub; tree;	Indigenous		
Scrophulariaceae	<i>Selago densiflora</i>	herb;	Indigenous; Endemic	LC	
Asteraceae	<i>Senecio rhomboideus</i>	succulent; herb;	Indigenous; Endemic	LC	
Solanaceae	<i>Solanum nigrum</i>	herb;	Not indigenous; Naturalised		
Apocynaceae	<i>Stenostelma umbelluliferum</i>	succulent; geophyte; herb;	Indigenous; Endemic	NT	NWBMA Protected species
Lamiaceae	<i>Syncolostemon pretoriae</i>	herb;	Indigenous	LC	
Talinaceae	<i>Talinum paniculatum</i>	succulent; dwarf shrub;	Not indigenous; Cultivated; Naturalised		
Lamiaceae	<i>Teucrium trifidum</i>	herb;	Indigenous; Endemic	LC	
Santalaceae	<i>Thesium magalismontanum</i>	shrub; parasite; herb;	Indigenous; Endemic	LC	
Asteraceae	<i>Tithonia rotundifolia</i>	herb;	Not indigenous; Naturalised; Invasive		NEMBA AIP Category 1b
Euphorbiaceae	<i>Tragia incisifolia</i>	herb;	Indigenous	LC	
Poaceae	<i>Urochloa mosambicensis</i>	graminoid;	Indigenous	LC	
Fabaceae	<i>Vachellia karroo</i>		Indigenous	LC	
Rubiaceae	<i>Vangueria infausta</i>	tree;	Indigenous	LC	
Verbenaceae	<i>Verbena bonariensis</i>	herb;	Not indigenous; Naturalised; Invasive		NEMBA AIP Category 1b



APPENDIX C: FAUNA SPECIES LIST FOR 2527DD QDS

Table 16: Mammal species found in QDS 2527DD (MammalMAP)

Family	Scientific name	Common name	Red list category
Bathyergidae	<i>Cryptomys hottentotus</i>	Southern African Mole-rat	Least Concern (2016)
Bovidae	<i>Aepyceros melampus</i>	Impala	Least Concern
Bovidae	<i>Alcelaphus buselaphus</i>	Hartebeest	
Bovidae	<i>Antidorcas marsupialis</i>	Springbok	Least Concern (2016)
Bovidae	<i>Connochaetes gnou</i>	Black Wildebeest	Least Concern (2016)
Bovidae	<i>Connochaetes taurinus</i>	Blue Wildebeest	Least Concern (ver 3.1, 2017)
Bovidae	<i>Connochaetes taurinus taurinus</i>		Least Concern (2016)
Bovidae	<i>Damaliscus sp.</i>	Damalisks	
Bovidae	<i>Damaliscus pygargus phillipsi</i>	Blesbok	Least Concern (2016)
Bovidae	<i>Hippotragus equinus</i>	Roan Antelope	Endangered (2016)
Bovidae	<i>Hippotragus niger</i>	Sable Antelope	Least Concern (ver 3.1, 2017)
Bovidae	<i>Hippotragus niger niger</i>		Vulnerable (2016)
Bovidae	<i>Kobus ellipsiprymnus</i>	Waterbuck	Least Concern (ver 3.1, 2016)
Bovidae	<i>Kobus ellipsiprymnus</i>		Least Concern (2016)
Bovidae	<i>Oryx sp.</i>	Oryxes	
Bovidae	<i>Oryx gazella</i>	Gemsbok	Least Concern (2016)
Bovidae	<i>Raphicerus campestris</i>	Steenbok	Least Concern (2016)
Bovidae	<i>Redunca fulvorufula</i>	Mountain Reedbuck	Least Concern
Bovidae	<i>Sylvicapra grimmia</i>	Bush Duiker	Least Concern (2016)
Bovidae	<i>Syncerus caffer</i>	African Buffalo	Least Concern (2008)
Bovidae	<i>Taurotragus oryx</i>	Common Eland	Least Concern (2016)
Bovidae	<i>Taurotragus oryx oryx</i>	Cape eland	Least Concern (2016)
Bovidae	<i>Tragelaphus angasii</i>	Nyala	Least Concern (2016)
Bovidae	<i>Tragelaphus scriptus</i>	Bushbuck	Least Concern
Bovidae	<i>Tragelaphus strepsiceros</i>	Greater Kudu	Least Concern (2016)
Canidae	FAMILY Canidae	Unidentified Canidae	
Canidae	<i>Canis sp.</i>	Jackals and Wolves	
Canidae	<i>Canis mesomelas</i>	Black-backed Jackal	Least Concern (2016)
Canidae	<i>Lycaon pictus</i>	African wild dog	Endangered (2016)
Canidae	<i>Otocyon megalotis</i>	Bat-eared Fox	Least Concern (2016)
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet Monkey	Least Concern (2016)
Cercopithecidae	<i>Chlorocebus pygerythrus</i>	Vervet Monkey (subspecies <i>pygerythrus</i>)	Least Concern (2008)
Cercopithecidae	<i>Papio ursinus</i>	Chacma Baboon	Least Concern (2016)
Elephantidae	<i>Loxodonta africana</i>	African Bush Elephant	Vulnerable A2a (2008)
Equidae	<i>Equus quagga</i>	Plains Zebra	Least Concern (2016)
Equidae	<i>Equus zebra hartmannae</i>	Hartmann's Zebra	Vulnerable (2016)
Erinaceidae	<i>Atelerix frontalis</i>	Southern African Hedgehog	Near Threatened (2016)
Felidae	<i>Acinonyx jubatus</i>	Cheetah	Vulnerable (2016)
Felidae	<i>Caracal caracal</i>	Caracal	Least Concern (2016)
Felidae	<i>Felis sp.</i>	Small Cats	
Felidae	<i>Felis catus</i>	Domestic Cat	Introduced
Felidae	<i>Leptailurus serval</i>	Serval	Near Threatened (2016)
Felidae	<i>Panthera leo</i>	Lion	Least Concern (2016)
Felidae	<i>Panthera pardus</i>	Leopard	Vulnerable (2016)
Giraffidae	<i>Giraffa giraffa giraffa</i>	South African Giraffe	Least Concern (2016)



Family	Scientific name	Common name	Red list category
Gliridae	<i>Graphiurus (Graphiurus) murinus</i>	Forest African Dormouse	Least Concern
Herpestidae	<i>Atilax paludinosus</i>	Marsh Mongoose	Least Concern (2016)
Herpestidae	<i>Cynictis penicillata</i>	Yellow Mongoose	Least Concern (2016)
Herpestidae	<i>Herpestes sanguineus</i>	Slender Mongoose	Least Concern (2016)
Hippopotamidae	<i>Hippopotamus amphibius</i>	Common Hippopotamus	Least Concern (2016)
Hipposideridae	<i>Cloeotis percivali</i>	Percival's Short-eared Trident Bat	Endangered (2016)
Hyaenidae	<i>Hyaena brunnea</i>	Brown Hyena	Near Threatened (2015)
Hystricidae	<i>Hystrix africaeaustralis</i>	Cape Porcupine	Least Concern
Macroscelididae	<i>Elephantulus sp.</i>	Elephant Shrews	
Molossidae	<i>Mops sp.</i>	Tadarine Free-tailed Bats	
Molossidae	<i>Mops (Mops) condylurus</i>	Angolan Free-tailed Bat	Least Concern
Molossidae	<i>Mops (Mops) midas</i>	Midas' Free-tailed Bat	Least Concern
Molossidae	<i>Tadarida aegyptiaca</i>	Egyptian Free-tailed Bat	Least Concern (2016)
Muridae	<i>Aethomys ineptus</i>	Tete Veld Aethomys	Least Concern (2016)
Muridae	<i>Aethomys namaquensis</i>	Namaqua Rock Mouse	Least Concern
Muridae	<i>Mastomys sp.</i>	Multimammate Mice	
Muridae	<i>Mastomys natalensis</i>	Natal Mastomys	Least Concern (2016)
Muridae	<i>Mus (Nannomys) minutoides</i>	Southern African Pygmy Mouse	Least Concern
Muridae	<i>Otomys angoniensis</i>	Angoni Vlei Rat	Least Concern (2016)
Muridae	<i>Otomys auratus</i>	Southern African Vlei Rat	Near Threatened (2016)
Muridae	<i>Rhabdomys pumilio</i>	Xeric Four-striped Grass Rat	Least Concern (2016)
Muridae	<i>Tatera sp.</i>		
Mustelidae	<i>Aonyx capensis</i>	African Clawless Otter	Near Threatened (2016)
Mustelidae	<i>Mellivora capensis</i>	Honey Badger	Least Concern (2016)
Nycteridae	<i>Nycteris thebaica</i>	Egyptian Slit-faced Bat	Least Concern (2016)
Procaviidae	<i>Procavia capensis</i>	Cape Rock Hyrax	Least Concern (2016)
Rhinolophidae	<i>Rhinolophus sp.</i>	Horseshoe Bats	
Rhinolophidae	<i>Rhinolophus capensis</i>	Cape Horseshoe Bat	Least Concern (2016)
Rhinolophidae	<i>Rhinolophus clivus</i>	Geoffroy's Horseshoe Bat	Least Concern (2016)
Rhinolophidae	<i>Rhinolophus simulator</i>	Bushveld Horseshoe Bat	Least Concern (2016)
Sciuridae	<i>Xerus inauris</i>	South African Ground Squirrel	Least Concern
Soricidae	<i>FAMILY Soricidae</i>	Unidentified Soricidae (Shrew)	
Suidae	<i>Phacochoerus africanus</i>	Common Warthog	Least Concern (2016)
Suidae	<i>Potamochoerus porcus</i>	Red River Hog	
Vespertilionidae	<i>Miniopterus natalensis</i>	Natal Long-fingered Bat	Least Concern (2016)
Vespertilionidae	<i>Miniopterus schreibersii</i>	Schreibers's Long-fingered Bat	Near Threatened
Vespertilionidae	<i>Myotis tricolor</i>	Temminck's Myotis	Least Concern (2016)
Vespertilionidae	<i>Neoromicia capensis</i>	Cape Serotine	Least Concern (2016)
Vespertilionidae	<i>Scotophilus dinganii</i>	Yellow-bellied House Bat	Least Concern (2016)
Viverridae	<i>Genetta genetta</i>	Common Genet	Least Concern (2016)
Viverridae	<i>Genetta tigrina</i>	Cape Genet (Cape Large-spotted Genet)	Least Concern (2016)

Table 17: Avifaunal species found in pentad 2545_2750 (SABAP2)

Common name	Scientific Name	Regional	Global
Apalis, Bar-throated	<i>Apalis thoracica</i>		
Avocet, Pied	<i>Recurvirostra avosetta</i>		
Babbler, Arrow-marked	<i>Turdoides jardineii</i>		
Barbet, Acacia Pied	<i>Tricholaema leucomelas</i>		
Barbet, Black-collared	<i>Lybius torquatus</i>		
Barbet, Crested	<i>Trachyphonus vaillantii</i>		
Batis, Chinspot	<i>Batis molitor</i>		
Bee-eater, European	<i>Merops apiaster</i>		
Bee-eater, Little	<i>Merops pusillus</i>		



Common name	Scientific Name	Regional	Global
Bee-eater, White-fronted	<i>Merops bullockoides</i>		
Bishop, Southern Red	<i>Euplectes orix</i>		
Bishop, Yellow-crowned	<i>Euplectes afer</i>		
Bittern, Little	<i>Ixobrychus minutus</i>		
Bokmakierie, Bokmakierie	<i>Telophorus zeylonus</i>		
Boubou, Southern	<i>Laniarius ferrugineus</i>		
Brubru, Brubru	<i>Nilaus afer</i>		
Bulbul, Dark-capped	<i>Pycnonotus tricolor</i>		
Bunting, Cinnamon-breasted	<i>Emberiza tahapisi</i>		
Bunting, Golden-breasted	<i>Emberiza flaviventris</i>		
Bush-shrike, Grey-headed	<i>Malaconotus blanchoti</i>		
Bush-shrike, Orange-breasted	<i>Telophorus sulfureopectus</i>		
Buzzard, Jackal	<i>Buteo rufofuscus</i>		
Buzzard, Steppe	<i>Buteo vulpinus</i>		
Camaroptera, Grey-backed	<i>Camaroptera brevicaudata</i>		
Canary, Black-throated	<i>Crithagra atrogularis</i>		
Canary, Yellow-fronted	<i>Crithagra mozambicus</i>		
Chat, Familiar	<i>Cercomela familiaris</i>		
Cisticola, Cloud	<i>Cisticola textrix</i>		
Cisticola, Desert	<i>Cisticola aridulus</i>		
Cisticola, Lazy	<i>Cisticola aberrans</i>		
Cisticola, Levillant's	<i>Cisticola tinniens</i>		
Cisticola, Rattling	<i>Cisticola chiniana</i>		
Cisticola, Wing-snapping	<i>Cisticola ayresii</i>		
Cisticola, Zitting	<i>Cisticola juncidis</i>		
Cliff-chat, Mocking	<i>Thamnolaea cinnamomeiventris</i>		
Cliff-swallow, South African	<i>Hirundo spilodera</i>		
Coot, Red-knobbed	<i>Fulica cristata</i>		
Cormorant, Reed	<i>Phalacrocorax africanus</i>		
Cormorant, White-breasted	<i>Phalacrocorax carbo</i>		
Coucal, Burchell's	<i>Centropus burchellii</i>		
Cursorer, Bronze-winged	<i>Rhinoptilus chalcopterus</i>		
Cursorer, Temminck's	<i>Cursorius temminckii</i>		
Crake, African	<i>Crecopsis egregia</i>		
Crake, Black	<i>Amaurornis flavirostris</i>		
Crombec, Long-billed	<i>Sylvietta rufescens</i>		
Crow, Pied	<i>Corvus albus</i>		
Cuckoo, African	<i>Cuculus gularis</i>		
Cuckoo, Black	<i>Cuculus clamosus</i>		
Cuckoo, Diderick	<i>Chrysococcyx caprius</i>		
Cuckoo, Great Spotted	<i>Clamator glandarius</i>		
Cuckoo, Jacobin	<i>Clamator jacobinus</i>		
Cuckoo, Klaas's	<i>Chrysococcyx klaas</i>		
Cuckoo, Levillant's	<i>Clamator levillantii</i>		
Cuckoo, Red-chested	<i>Cuculus solitarius</i>		
Cuckoo-shrike, Black	<i>Campephaga flava</i>		
Darter, African	<i>Anhinga rufa</i>		
Dove, Laughing	<i>Streptopelia senegalensis</i>		
Dove, Namaqua	<i>Oena capensis</i>		
Dove, Red-eyed	<i>Streptopelia semitorquata</i>		
Dove, Rock	<i>Columba livia</i>		
Drongo, Fork-tailed	<i>Dicrurus adsimilis</i>		
Duck, African Black	<i>Anas sparsa</i>		



Common name	Scientific Name	Regional	Global
Duck, Domestic	<i>Anas platyrhynchos</i>		
Duck, Fulvous	<i>Dendrocygna bicolor</i>		
Duck, Hybrid Mallard	<i>Anas hybrid</i>		
Duck, Knob-billed	<i>Sarkidiornis melanotos</i>		
Duck, Maccoa	<i>Oxyura maccoa</i>	NT	VU
Duck, Mallard	<i>Anas platyrhynchos</i>		
Duck, Unidentified	N/A N/A		
Duck, White-backed	<i>Thalassornis leuconotus</i>		
Duck, White-faced	<i>Dendrocygna viduata</i>		
Duck, Yellow-billed	<i>Anas undulata</i>		
Eagle, Martial	<i>Polemaetus bellicosus</i>	EN	VU
Eagle, Verreaux's	<i>Aquila verreauxii</i>	VU	LC
Eagle-owl, Spotted	<i>Bubo africanus</i>		
Egret, Cattle	<i>Bubulcus ibis</i>		
Egret, Great	<i>Egretta alba</i>		
Egret, Little	<i>Egretta garzetta</i>		
Egret, Yellow-billed	<i>Egretta intermedia</i>		
Eremomela, Burnt-necked	<i>Eremomela usticollis</i>		
Falcon, Amur	<i>Falco amurensis</i>		
Falcon, Lanner	<i>Falco biarmicus</i>	VU	LC
Falcon, Peregrine	<i>Falco peregrinus</i>		
Finch, Cuckoo	<i>Anomalospiza imberbis</i>		
Finch, Cut-throat	<i>Amadina fasciata</i>		
Finch, Red-headed	<i>Amadina erythrocephala</i>		
Firefinch, African	<i>Lagonosticta rubricata</i>		
Firefinch, Jameson's	<i>Lagonosticta rhodopareia</i>		
Fiscal, Common (Southern)	<i>Lanius collaris</i>		
Fish-eagle, African	<i>Haliaeetus vocifer</i>		
Flamingo, Greater	<i>Phoenicopterus ruber</i>	NT	LC
Flamingo, Lesser	<i>Phoenicopterus minor</i>	NT	NT
Flufftail, Red-chested	<i>Sarothrura rufa</i>		
Flycatcher, Fairy	<i>Stenostira scita</i>		
Flycatcher, Fiscal	<i>Sigelus silens</i>		
Flycatcher, Southern Black	<i>Melaenornis pammelaina</i>		
Flycatcher, Spotted	<i>Muscicapa striata</i>		
Francolin, Coqui	<i>Peliperdix coqui</i>		
Francolin, Crested	<i>Dendroperdix sephaena</i>		
Go-away-bird, Grey	<i>Corythaixoides concolor</i>		
Goose, Domestic	<i>Anser anser</i>		
Goose, Egyptian	<i>Alopochen aegyptiacus</i>		
Goose, Spur-winged	<i>Plectropterus gambensis</i>		
Goshawk, Gabar	<i>Melierax gabar</i>		
Grassbird, Cape	<i>Sphenoeacus afer</i>		
Grebe, Great Crested	<i>Podiceps cristatus</i>		
Grebe, Little	<i>Tachybaptus ruficollis</i>		
Green-pigeon, African	<i>Treron calvus</i>		
Greenshank, Common	<i>Tringa nebularia</i>		
Ground-hornbill, Southern	<i>Bucorvus leadbeateri</i>	EN	VU
Guineafowl, Helmeted	<i>Numida meleagris</i>		
Gull, Grey-headed	<i>Larus cirrocephalus</i>		
Hamerkop, Hamerkop	<i>Scopus umbretta</i>		
Harrier-Hawk, African	<i>Polyboroides typus</i>		
Hawk, African Cuckoo	<i>Aviceda cuculoides</i>		



Common name	Scientific Name	Regional	Global
Hawk-eagle, African	<i>Aquila spilogaster</i>		
Heron, Black	<i>Egretta ardesiaca</i>		
Heron, Black-headed	<i>Ardea melanocephala</i>		
Heron, Goliath	<i>Ardea goliath</i>		
Heron, Green-backed	<i>Butorides striata</i>		
Heron, Grey	<i>Ardea cinerea</i>		
Heron, Purple	<i>Ardea purpurea</i>		
Heron, Squacco	<i>Ardeola ralloides</i>		
Honey-buzzard, European	<i>Pernis apivorus</i>		
Honeybird, Brown-backed	<i>Prodotiscus regulus</i>		
Honeyguide, Greater	<i>Indicator indicator</i>		
Honeyguide, Lesser	<i>Indicator minor</i>		
Hoopoe, African	<i>Upupa africana</i>		
Hornbill, African Grey	<i>Tockus nasutus</i>		
Hornbill, Southern Yellow-billed	<i>Tockus leucomelas</i>		
House-martin, Common	<i>Delichon urbicum</i>		
Ibis, African Sacred	<i>Threskiornis aethiopicus</i>		
Ibis, Glossy	<i>Plegadis falcinellus</i>		
Ibis, Hageda	<i>Bostrychia hagedash</i>		
Indigobird, Dusky	<i>Vidua funerea</i>		
Indigobird, Purple	<i>Vidua purpurascens</i>		
Indigobird, Village	<i>Vidua chalybeata</i>		
Jacana, African	<i>Actophilornis africanus</i>		
Kestrel, Greater	<i>Falco rupicoloides</i>		
Kingfisher, Brown-hooded	<i>Halcyon albiventris</i>		
Kingfisher, Giant	<i>Megaceryle maximus</i>		
Kingfisher, Half-collared	<i>Alcedo semitorquata</i>	NT	LC
Kingfisher, Malachite	<i>Alcedo cristata</i>		
Kingfisher, Pied	<i>Ceryle rudis</i>		
Kingfisher, Woodland	<i>Halcyon senegalensis</i>		
Kite, Black	<i>Milvus migrans</i>		
Kite, Black-shouldered	<i>Elanus caeruleus</i>		
Kite, Yellow-billed	<i>Milvus aegyptius</i>		
Korhaan, Northern Black	<i>Afrotis afraoides</i>		
Lapwing, African Wattled	<i>Vanellus senegallus</i>		
Lapwing, Blacksmith	<i>Vanellus armatus</i>		
Lapwing, Crowned	<i>Vanellus coronatus</i>		
Lark, Eastern Long-billed	<i>Certhilauda semitorquata</i>		
Lark, Flappet	<i>Mirafra rufocinnamomea</i>		
Lark, Red-capped	<i>Calandrella cinerea</i>		
Lark, Rufous-naped	<i>Mirafra africana</i>		
Lark, Sabota	<i>Calendulauda sabota</i>		
Longclaw, Cape	<i>Macronyx capensis</i>		
Mannikin, Bronze	<i>Spermestes cucullatus</i>		
Martin, Banded	<i>Riparia cincta</i>		
Martin, Brown-throated	<i>Riparia paludicola</i>		
Martin, Rock	<i>Hirundo fuligula</i>		
Martin, Sand	<i>Riparia riparia</i>		
Masked-weaver, Lesser	<i>Ploceus intermedius</i>		
Masked-weaver, Southern	<i>Ploceus velatus</i>		
Moorhen, Common	<i>Gallinula chloropus</i>		
Moorhen, Lesser	<i>Gallinula angulata</i>		
Mousebird, Red-faced	<i>Urocolius indicus</i>		



Common name	Scientific Name	Regional	Global
Mousebird, Speckled	<i>Colius striatus</i>		
Myna, Common	<i>Acridotheres tristis</i>		
Neddicky, Neddicky	<i>Cisticola fulvicapilla</i>		
Night-Heron, Black-crowned	<i>Nycticorax nycticorax</i>		
Nightjar, Fiery-necked	<i>Caprimulgus pectoralis</i>		
Nightjar, Freckled	<i>Caprimulgus tristigma</i>		
Olive-pigeon, African	<i>Columba arquatrix</i>		
Oriole, Black-headed	<i>Oriolus larvatus</i>		
Osprey, Osprey	<i>Pandion haliaetus</i>		
Ostrich, Common	<i>Struthio camelus</i>		
Owl, Barn	<i>Tyto alba</i>		
Owl, Marsh	<i>Asio capensis</i>		
Owlet, Pearl-spotted	<i>Glaucidium perlatum</i>		
Painted-snipe, Greater	<i>Rostratula benghalensis</i>	NT	LC
Palm-swift, African	<i>Cypsiurus parvus</i>		
Paradise-flycatcher, African	<i>Terpsiphone viridis</i>		
Paradise-whydah, Long-tailed	<i>Vidua paradisaea</i>		
Peacock, Common	<i>Pavo cristatus</i>		
Pelican, Great White	<i>Pelecanus onocrotalus</i>	VU	LC
Petronia, Yellow-throated	<i>Petronia supercilialis</i>		
Pigeon, Speckled	<i>Columba guinea</i>		
Pipit, African	<i>Anthus cinnamomeus</i>		
Pipit, Buffy	<i>Anthus vaalensis</i>		
Pipit, Long-billed	<i>Anthus similis</i>		
Pipit, Plain-backed	<i>Anthus leucophrys</i>		
Pipit, Striped	<i>Anthus lineiventris</i>		
Plover, Kittlitz's	<i>Charadrius pecuarius</i>		
Plover, Three-banded	<i>Charadrius tricollaris</i>		
Pochard, Southern	<i>Netta erythrophthalma</i>		
Prinia, Black-chested	<i>Prinia flavicans</i>		
Prinia, Tawny-flanked	<i>Prinia subflava</i>		
Puffback, Black-backed	<i>Dryoscopus cubla</i>		
Pygmy-Kingfisher, African	<i>Ispidina picta</i>		
Pytilia, Green-winged	<i>Pytilia melba</i>		
Quail, Common	<i>Coturnix coturnix</i>		
Quailfinch, African	<i>Ortygospiza atricollis</i>		
Quelea, Red-billed	<i>Quelea quelea</i>		
Rail, African	<i>Rallus caerulescens</i>		
Reed-warbler, African	<i>Acrocephalus baeticatus</i>		
Reed-warbler, Great	<i>Acrocephalus arundinaceus</i>		
Robin-chat, Cape	<i>Cossypha caffra</i>		
Robin-chat, White-throated	<i>Cossypha humeralis</i>		
Roller, European	<i>Coracias garrulus</i>	NT	LC
Roller, Lilac-breasted	<i>Coracias caudatus</i>		
Ruff, Ruff	<i>Philomachus pugnax</i>		
Rush-warbler, Little	<i>Bradypterus baboecala</i>		
Sandpiper, Common	<i>Actitis hypoleucos</i>		
Sandpiper, Curlew	<i>Calidris ferruginea</i>	LC	NT
Sandpiper, Marsh	<i>Tringa stagnatilis</i>		
Sandpiper, Wood	<i>Tringa glareola</i>		
Scops-owl, Southern White-faced	<i>Ptilopsis granti</i>		
Scrub-robin, White-browed	<i>Cercotrichas leucophrys</i>		
Secretarybird, Secretarybird	<i>Sagittarius serpentarius</i>	VU	VU



Common name	Scientific Name	Regional	Global
Seedeater, Streaky-headed	<i>Crithagra gularis</i>		
Shelduck, South African	<i>Tadorna cana</i>		
Shoveler, Cape	<i>Anas smithii</i>		
Shrike, Crimson-breasted	<i>Laniarius atrococcineus</i>		
Shrike, Lesser Grey	<i>Lanius minor</i>		
Shrike, Magpie	<i>Urolestes melanoleucus</i>		
Shrike, Red-backed	<i>Lanius collurio</i>		
Snake-eagle, Black-chested	<i>Circaetus pectoralis</i>		
Snake-eagle, Brown	<i>Circaetus cinereus</i>		
Snipe, African	<i>Gallinago nigripennis</i>		
Sparrow, Cape	<i>Passer melanurus</i>		
Sparrow, House	<i>Passer domesticus</i>		
Sparrow, Southern Grey-headed	<i>Passer diffusus</i>		
Sparrow-weaver, White-browed	<i>Plocepasser mahali</i>		
Sparrowhawk, Black	<i>Accipiter melanoleucus</i>		
Sparrowhawk, Little	<i>Accipiter minullus</i>		
Sparrowhawk, Ovambo	<i>Accipiter ovampensis</i>		
Spoonbill, African	<i>Platalea alba</i>		
Spurfowl, Natal	<i>Pternistis natalensis</i>		
Spurfowl, Swainson's	<i>Pternistis swainsonii</i>		
Starling, Cape Glossy	<i>Lamprotornis nitens</i>		
Starling, Pied	<i>Spreo bicolor</i>		
Starling, Red-winged	<i>Onychognathus morio</i>		
Starling, Violet-backed	<i>Cinnyricinclus leucogaster</i>		
Starling, Wattled	<i>Creatophora cinerea</i>		
Stilt, Black-winged	<i>Himantopus himantopus</i>		
Stint, Little	<i>Calidris minuta</i>		
Stonechat, African	<i>Saxicola torquatus</i>		
Stork, Yellow-billed	<i>Mycteria ibis</i>	EN	LC
Sunbird, Amethyst	<i>Chalcomitra amethystina</i>		
Sunbird, Greater Double-collared	<i>Cinnyris afer</i>		
Sunbird, Marico	<i>Cinnyris mariquensis</i>		
Sunbird, White-bellied	<i>Cinnyris talatala</i>		
Swallow, Barn	<i>Hirundo rustica</i>		
Swallow, Greater Striped	<i>Hirundo cucullata</i>		
Swallow, Lesser Striped	<i>Hirundo abyssinica</i>		
Swallow, Pearl-breasted	<i>Hirundo dimidiata</i>		
Swallow, Red-breasted	<i>Hirundo semirufa</i>		
Swallow, White-throated	<i>Hirundo albigularis</i>		
Swamp-warbler, Lesser	<i>Acrocephalus gracilirostris</i>		
Swamphen, African Purple	<i>Porphyrio madagascariensis</i>		
Swan, Mute	<i>Cygnus olor</i>		
Swift, African Black	<i>Apus barbatus</i>		
Swift, Common	<i>Apus apus</i>		
Swift, Horus	<i>Apus horus</i>		
Swift, Little	<i>Apus affinis</i>		
Swift, White-rumped	<i>Apus caffer</i>		
Tchagra, Black-crowned	<i>Tchagra senegalus</i>		
Tchagra, Brown-crowned	<i>Tchagra australis</i>		
Teal, Cape	<i>Anas capensis</i>		
Teal, Hottentot	<i>Anas hottentota</i>		
Teal, Red-billed	<i>Anas erythrorhyncha</i>		
Tern, Caspian	<i>Sterna caspia</i>	VU	LC



Common name	Scientific Name	Regional	Global
Tern, Whiskered	<i>Chlidonias hybrida</i>		
Tern, White-winged	<i>Chlidonias leucopterus</i>		
Thick-knee, Spotted	<i>Burhinus capensis</i>		
Thick-knee, Water	<i>Burhinus vermiculatus</i>		
Thrush, Groundscraper	<i>Psophocichla litsipsirupa</i>		
Thrush, Karoo	<i>Turdus smithi</i>		
Thrush, Kurrichane	<i>Turdus libonyanus</i>		
Tinkerbird, Yellow-fronted	<i>Pogoniulus chrysoconus</i>		
Tit, Southern Black	<i>Parus niger</i>		
Tit-babbler, Chestnut-vented	<i>Parisoma subcaeruleum</i>		
Turtle-dove, Cape	<i>Streptopelia capicola</i>		
Vulture, Cape	<i>Gyps coprotheres</i>	EN	EN
Vulture, White-backed	<i>Gyps africanus</i>	CR	CR
Wagtail, African Pied	<i>Motacilla aguimp</i>		
Wagtail, Cape	<i>Motacilla capensis</i>		
Warbler, Garden	<i>Sylvia borin</i>		
Warbler, Sedge	<i>Acrocephalus schoenobaenus</i>		
Warbler, Willow	<i>Phylloscopus trochilus</i>		
Waxbill, Black-faced	<i>Estrilda erythronotos</i>		
Waxbill, Blue	<i>Uraeginthus angolensis</i>		
Waxbill, Common	<i>Estrilda astrild</i>		
Waxbill, Orange-breasted	<i>Amandava subflava</i>		
Weaver, Cape	<i>Ploceus capensis</i>		
Weaver, Thick-billed	<i>Amblyospiza albifrons</i>		
Weaver, Village	<i>Ploceus cucullatus</i>		
Wheatear, Capped	<i>Oenanthe pileata</i>		
Wheatear, Mountain	<i>Oenanthe monticola</i>		
White-eye, Cape	<i>Zosterops virens</i>		
Whydah, Pin-tailed	<i>Vidua macroura</i>		
Widowbird, Long-tailed	<i>Euplectes progne</i>		
Widowbird, Red-collared	<i>Euplectes ardens</i>		
Widowbird, White-winged	<i>Euplectes albonotatus</i>		
Wood-hoopoe, Green	<i>Phoeniculus purpureus</i>		
Woodpecker, Bearded	<i>Dendropicos namaquus</i>		
Woodpecker, Cardinal	<i>Dendropicos fuscescens</i>		
Woodpecker, Golden-tailed	<i>Campethera abingoni</i>		
Wryneck, Red-throated	<i>Jynx ruficollis</i>		

Table 18: Butterfly species occurring in QDS

Family	Scientific name	Common name	Red list category
Crambidae	<i>Syllepte nasonalis</i>		Not listed
Hesperiidae	<i>Abantis tettensis</i>	Spotted velvet skipper	Least Concern (SABCA 2013)
Hesperiidae	<i>Afrogegenes sp.</i>		
Hesperiidae	<i>Caprona pillaana</i>	Ragged skipper	Least Concern (SABCA 2013)
Hesperiidae	<i>Coeliades forestan forestan</i>	Striped policeman	Least Concern (SABCA 2013)
Hesperiidae	<i>Eretis umbra umbra</i>	Small marbled elf	Least Concern (SABCA 2013)
Hesperiidae	<i>Gegenes pumilio gambica</i>	Dark hottentot	Least Concern (SABCA 2013)
Hesperiidae	<i>Gomalia elma elma</i>	Green-marbled skipper	Least Concern (SABCA 2013)
Hesperiidae	<i>Kedestes callicles</i>	Pale ranger	Least Concern (SABCA 2013)
Hesperiidae	<i>Kedestes lepenula</i>	Chequered ranger	Least Concern (SABCA 2013)
Hesperiidae	<i>Kedestes nerva nerva</i>	Scarce ranger	Least Concern (SABCA 2013)
Hesperiidae	<i>Larsenia gemella</i>	Twin swift	Least Concern (SABCA 2013)
Hesperiidae	<i>Metisella willemi</i>	Netted sylph	Least Concern (SABCA 2013)
Hesperiidae	<i>Parosmodes morantii morantii</i>	Morant's orange	Least Concern (SABCA 2013)



Family	Scientific name	Common name	Red list category
Hesperiidae	<i>Pelopidas thrax</i>	White-banded swift	Least Concern (SABCA 2013)
Hesperiidae	<i>Platylesches ayresii</i>	Peppered hopper	Least Concern (SABCA 2013)
Hesperiidae	<i>Platylesches neba</i>	Flower-girl hopper	Least Concern (SABCA 2013)
Hesperiidae	<i>Spialia asterodia</i>	Star sandman	Least Concern (SABCA 2013)
Hesperiidae	<i>Spialia delagoae</i>	Delagoa sandman	Least Concern (SABCA 2013)
Hesperiidae	<i>Spialia depauperata australis</i>	Wandering sandman	Least Concern (SABCA 2013)
Hesperiidae	<i>Spialia dromus</i>	Forest sandman	Least Concern (SABCA 2013)
Hesperiidae	<i>Spialia ferax</i>	Common sandman	Least Concern (SABCA 2013)
Hesperiidae	<i>Spialia mafa mafa</i>	Mafa sandman	Least Concern (SABCA 2013)
Hesperiidae	<i>Spialia spio</i>	Mountain sandman	Least Concern (SABCA 2013)
Hesperiidae	<i>Tsitana tsita</i>	Dismal sylph	Least Concern (SABCA 2013)
Lycaenidae	<i>Actizera lucida</i>	Rayed blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Alaena amazoula ochroma</i>	Yellow zulu	Least Concern (SABCA 2013)
Lycaenidae	<i>Aloeides aranda</i>	Aranda copper	Least Concern (SABCA 2013)
Lycaenidae	<i>Aloeides taikosama</i>	Dusky copper	Least Concern (SABCA 2013)
Lycaenidae	<i>Aloeides trimeni trimeni</i>	Trimen's copper	Least Concern (SABCA 2013)
Lycaenidae	<i>Anthene amarah amarah</i>	Black striped hairtail	Least Concern (SABCA 2013)
Lycaenidae	<i>Anthene definita definita</i>	Common hairtail	Least Concern (SABCA 2013)
Lycaenidae	<i>Anthene livida livida</i>	Pale hairtail	Least Concern (SABCA 2013)
Lycaenidae	<i>Axiocerses amanga amanga</i>	Bush scarlet	Least Concern (SABCA 2013)
Lycaenidae	<i>Axiocerses coalescens</i>	Black-tipped scarlet	Least Concern (SABCA 2013)
Lycaenidae	<i>Axiocerses tjoane tjoane</i>	Eastern scarlet	Least Concern (SABCA 2013)
Lycaenidae	<i>Azonus jesous</i>	Topaz babul blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Azonus moriqua</i>	Black-bordered babul blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Azonus ubaldus</i>	Velvet-spotted babul blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Capys disjunctus</i>	Russet protea	Least Concern (SABCA 2013)
Lycaenidae	<i>Chilades trochylus</i>	Grass jewel	Least Concern (SABCA 2013)
Lycaenidae	<i>Cigaritis ella</i>	Ella's bar	Least Concern (SABCA 2013)
Lycaenidae	<i>Cigaritis mozambica</i>	Mozambique bar	Least Concern (SABCA 2013)
Lycaenidae	<i>Cigaritis natalensis</i>	Natal bar	Least Concern (SABCA 2013)
Lycaenidae	<i>Cigaritis phanes</i>	Silvery bar	Least Concern (SABCA 2013)
Lycaenidae	<i>Cnodontes penningtoni</i>	Pennington's buff	Least Concern (SABCA 2013)
Lycaenidae	<i>Crudaria leroma</i>	Silver spotted grey	Least Concern (SABCA 2013)
Lycaenidae	<i>Cupidopsis cissus cissus</i>	Common meadow blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Cupidopsis jobates jobates</i>	Tailed meadow blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Deudorix antalus</i>	Brown playboy	Least Concern (SABCA 2013)
Lycaenidae	<i>Eicochrysops messapus mahallakoena</i>	Cupreous blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Euchrysops malathana</i>	Common smoky blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Euchrysops subpallida</i>	Ashen smoky blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Iolais alienus alienus</i>	Brown-line sapphire	Least Concern (SABCA 2013)
Lycaenidae	<i>Iolais mimosae rhodosense</i>	Mimosa sapphire	Least Concern (SABCA 2013)
Lycaenidae	<i>Iolais pallene</i>	Saffron sapphire	Least Concern (SABCA 2013)
Lycaenidae	<i>Iolais trimeni</i>	Trimen's sapphire	Least Concern (SABCA 2013)
Lycaenidae	<i>Lachnocnema bibulus</i>	Common woolly legs	Least Concern (SABCA 2013)
Lycaenidae	<i>Lachnocnema durbani</i>	D'Urban's woolly legs	Least Concern (SABCA 2013)
Lycaenidae	<i>Lampides boeticus</i>	Pea blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Lepidochrysops glauca</i>	Silvery blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Lepidochrysops ortygia</i>	Koppie blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Lepidochrysops patricia</i>	Patricia blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Lepidochrysops plebeia plebeia</i>	Twin-spot blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Leptomyrina henningi henningi</i>	Henning's black-eye	Least Concern (SABCA 2013)
Lycaenidae	<i>Leptotes sp.</i>		
Lycaenidae	<i>Leptotes babaulti</i>	Babault's zebra blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Leptotes pirithous pirithous</i>	Common zebra blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Myrina silenus ficedula</i>	Common fig tree blue	Least Concern (SABCA 2013)



Family	Scientific name	Common name	Red list category
Lycaenidae	<i>Pseudonacaduba sichela sichela</i>	Dusky line blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Stugeta bowkeri tearei</i>	Bowker's marbled sapphire	Least Concern (SABCA 2013)
Lycaenidae	<i>Tarucus sybaris sybaris</i>	Dotted blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Tuxentius calice</i>	White pie	Least Concern (SABCA 2013)
Lycaenidae	<i>Tuxentius melaena melaena</i>	Black pie	Least Concern (SABCA 2013)
Lycaenidae	<i>Uranotauma nubifer nubifer</i>	Black heart	Least Concern (SABCA 2013)
Lycaenidae	<i>Virachola dinochares</i>	Apricot playboy	Least Concern (SABCA 2013)
Lycaenidae	<i>Zintha hintza hintza</i>	Hintza pierrot	Least Concern (SABCA 2013)
Lycaenidae	<i>Zizeeria knysna knysna</i>	African grass blue	Least Concern (SABCA 2013)
Lycaenidae	<i>Zizula hylax</i>	Tiny grass blue	Least Concern (SABCA 2013)
Noctuidae	<i>Cylogramma latona</i>		Not listed
Noctuidae	<i>Grammodes sp.</i>		
Noctuidae	<i>Plecopterodes moderata</i>		Not listed
Nymphalidae	<i>Acraea aglaonice</i>	Clear-spotted acraea	Least Concern (SABCA 2013)
Nymphalidae	<i>Acraea anemosa</i>	Broad-bordered acraea	Least Concern (SABCA 2013)
Nymphalidae	<i>Acraea axina</i>	Little acraea	Least Concern (SABCA 2013)
Nymphalidae	<i>Acraea horta</i>	Garden acraea	Least Concern (SABCA 2013)
Nymphalidae	<i>Acraea natalica</i>	Natal acraea	Least Concern (SABCA 2013)
Nymphalidae	<i>Acraea neobule neobule</i>	Wandering donkey acraea	Least Concern (SABCA 2013)
Nymphalidae	<i>Brakefieldia perspicua perspicua</i>	Eyed bush brown	Least Concern (SABCA 2013)
Nymphalidae	<i>Byblia anvatara acheloia</i>	Joker	Least Concern (SABCA 2013)
Nymphalidae	<i>Byblia ilithyia</i>	Spotted joker	Least Concern (SABCA 2013)
Nymphalidae	<i>Catacroptera cloanthe cloanthe</i>	Pirate	Least Concern (SABCA 2013)
Nymphalidae	<i>Charaxes achaemenes achaemenes</i>	Bushveld charaxes	Least Concern (SABCA 2013)
Nymphalidae	<i>Charaxes brutus natalensis</i>	White-barred charaxes	Least Concern (SABCA 2013)
Nymphalidae	<i>Charaxes candiope</i>	Green-veined charaxes	Least Concern (SABCA 2013)
Nymphalidae	<i>Charaxes jahlnusa rex</i>	Pearl-spotted charaxes	Least Concern (SABCA 2013)
Nymphalidae	<i>Charaxes saturnus saturnus</i>	Foxy charaxes	Least Concern (SABCA 2013)
Nymphalidae	<i>Charaxes vansoni</i>	Van Son's charaxes	Least Concern (SABCA 2013)
Nymphalidae	<i>Danaus chrysippus orientis</i>	African monarch, Plain tiger	Least Concern (SABCA 2013)
Nymphalidae	<i>Hamanumida daedalus</i>	Guinea-fowl butterfly	Least Concern (SABCA 2013)
Nymphalidae	<i>Hypolimnas misippus</i>	Common diadem	Least Concern (SABCA 2013)
Nymphalidae	<i>Junonia hierta cebrene</i>	Yellow pansy	Least Concern (SABCA 2013)
Nymphalidae	<i>Junonia oenone oenone</i>	Blue pansy	Least Concern (SABCA 2013)
Nymphalidae	<i>Junonia orithya madagascariensis</i>	Eyed pansy	Least Concern (SABCA 2013)
Nymphalidae	<i>Neptis saclava marpessa</i>	Spotted sailer	Least Concern (SABCA 2013)
Nymphalidae	<i>Paternympha narycia</i>	Spotted-eye brown	Least Concern (SABCA 2013)
Nymphalidae	<i>Phalanta phalantha aethiopica</i>	African leopard	Least Concern (SABCA 2013)
Nymphalidae	<i>Physcaeneura panda</i>	Dark-webbed ringlet	Least Concern (SABCA 2013)
Nymphalidae	<i>Precis archesia archesia</i>	Garden commodore	Least Concern (SABCA 2013)
Nymphalidae	<i>Stygionympha wichgrafi wichgrafi</i>	Wichgraf's hillside brown	Least Concern (SABCA 2013)
Nymphalidae	<i>Telchinia burni</i>	Pale-yellow acraea	Least Concern (SABCA 2013)
Nymphalidae	<i>Telchinia encedon encedon</i>	White-barred acraea	Least Concern (SABCA 2013)
Nymphalidae	<i>Telchinia rahira rahira</i>	Marsh acraea	Least Concern (SABCA 2013)
Nymphalidae	<i>Telchinia serena</i>	Dancing acraea	Least Concern (SABCA 2013)
Nymphalidae	<i>Vanessa cardui</i>	Painted lady	Least Concern (SABCA 2013)
Nymphalidae	<i>Ypthima sp.</i>		
Nymphalidae	<i>Ypthima asterope asterope</i>	African ringlet	Least Concern (SABCA 2013)
Papilionidae	<i>Papilio demodocus demodocus</i>	Citrus swallowtail	Least Concern (SABCA 2013)
Papilionidae	<i>Papilio nireus lyaeus</i>	Green-banded swallowtail	Least Concern (SABCA 2013)
Pieridae	<i>Belenois aurota</i>	Brown-veined white	Least Concern (SABCA 2013)
Pieridae	<i>Belenois creona severina</i>	African common white	Least Concern (SABCA 2013)
Pieridae	<i>Catopsilia florella</i>	African migrant	Least Concern (SABCA 2013)
Pieridae	<i>Colias electo electo</i>	African clouded yellow	Least Concern (SABCA 2013)
Pieridae	<i>Colotis annae annae</i>	Scarlet tip	Least Concern (SABCA 2013)



Family	Scientific name	Common name	Red list category
Pieridae	<i>Colotis euipe omphale</i>	Smoky orange tip	Least Concern (LC)
Pieridae	<i>Colotis evenina sipylus</i>	Orange tip	
Pieridae	<i>Eurema brigitta brigitta</i>	Broad-bordered grass yellow	Least Concern (SABCA 2013)
Pieridae	<i>Mylothris agathina agathina</i>	Common dotted border	Least Concern (SABCA 2013)
Pieridae	<i>Mylothris rueppellii haemus</i>	Twin dotted border	Least Concern (SABCA 2013)
Pieridae	<i>Pinacopteryx eriphia eriphia</i>	Zebra white	Least Concern (SABCA 2013)
Pieridae	<i>Pontia helice helice</i>	Common meadow white	Least Concern (SABCA 2013)
Pieridae	<i>Teracolus agoye agoye</i>	Speckled sulphur tip	Least Concern (SABCA 2013)
Pieridae	<i>Teracolus eris eris</i>	Banded gold tip	Least Concern (SABCA 2013)
Pieridae	<i>Teracolus subfasciatus</i>	Lemon traveller	Least Concern (SABCA 2013)
Pyralidae	<i>Mittonia hamptoni</i>		
Sphingidae	<i>Acherontia atropos</i>		Not listed

Table 19: Reptile species possibly occurring in QDS

Family	Scientific name	Common name	Red list category
Agamidae	<i>Agama atra</i>	Southern Rock Agama	Least Concern (SARCA 2014)
Chamaeleonidae	<i>Chamaeleo dilepis</i>	Common Flap-neck Chameleon	Least Concern (SARCA 2014)
Colubridae	<i>Crotaphopeltis hotamboeia</i>	Red-lipped Snake	Least Concern (SARCA 2014)
Colubridae	<i>Dasyptelis scabra</i>	Rhombic Egg-eater	Least Concern (SARCA 2014)
Colubridae	<i>Philothamnus semivariegatus</i>	Spotted Bush Snake	Least Concern (SARCA 2014)
Cordylidae	<i>Cordylus vittifer</i>	Common Girdled Lizard	Least Concern (SARCA 2014)
Elapidae	<i>Hemachatus haemachatus</i>	Rinkhals	Least Concern (SARCA 2014)
Elapidae	<i>Naja annulifera</i>	Snouted Cobra	Least Concern (SARCA 2014)
Elapidae	<i>Naja mossambica</i>	Mozambique Spitting Cobra	Least Concern (SARCA 2014)
Gekkonidae	<i>Hemidactylus mabouia</i>	Common Tropical House Gecko	Least Concern (SARCA 2014)
Gekkonidae	<i>Lygodactylus capensis capensis</i>	Common Dwarf Gecko	Least Concern (SARCA 2014)
Gekkonidae	<i>Pachydactylus affinis</i>	Transvaal Gecko	Least Concern (SARCA 2014)
Gerrhosauridae	<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard	Least Concern (SARCA 2014)
Lamprophiidae	<i>Aparallactus capensis</i>	Black-headed Centipede-eater	Least Concern (SARCA 2014)
Lamprophiidae	<i>Atractaspis bibronii</i>	Bibron's Stiletto Snake	Least Concern (SARCA 2014)
Lamprophiidae	<i>Boaedon capensis</i>	Brown House Snake	Least Concern (SARCA 2014)
Lamprophiidae	<i>Lycophidion capense capense</i>	Cape Wolf Snake	Least Concern (SARCA 2014)
Lamprophiidae	<i>Psammophis brevirostris</i>	Short-snouted Grass Snake	Least Concern (SARCA 2014)
Lamprophiidae	<i>Psammophylax rhombeatus</i>	Spotted Grass Snake	Least Concern (SARCA 2014)
Lamprophiidae	<i>Psammophylax tritaeniatus</i>	Striped Grass Snake	Least Concern (SARCA 2014)
Lamprophiidae	<i>Pseudaspis cana</i>	Mole Snake	Least Concern (SARCA 2014)
Leptotyphlopidae	<i>Leptotyphlops sp.</i>		
Pelomedusidae	<i>Pelomedusa galeata</i>	South African Marsh Terrapin	Not evaluated
Pythonidae	<i>Python natalensis</i>	Southern African Python	Least Concern (SARCA 2014)
Scincidae	<i>Trachylepis capensis</i>	Cape Skink	Least Concern (SARCA 2014)
Scincidae	<i>Trachylepis punctatissima</i>	Speckled Rock Skink	Least Concern (SARCA 2014)
Scincidae	<i>Trachylepis varia sensu lato</i>	Common Variable Skink Complex	Least Concern (SARCA 2014)
Testudinidae	<i>Kinixys lobatsiana</i>	Lobatse Hinged Tortoise	Least Concern (SARCA 2014)
Testudinidae	<i>Kinixys spekii</i>	Speke's Hinged Tortoise	Least Concern (SARCA 2014)
Testudinidae	<i>Stigmochelys pardalis</i>	Leopard Tortoise	Least Concern (SARCA 2014)
Typhlopidae	<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake	Least Concern (SARCA 2014)
Varanidae	<i>Varanus albigularis albigularis</i>	Rock Monitor	Least Concern (SARCA 2014)
Varanidae	<i>Varanus niloticus</i>	Water Monitor	Least Concern (SARCA 2014)
Viperidae	<i>Bitis arietans arietans</i>	Puff Adder	Least Concern (SARCA 2014)
Viperidae	<i>Causus rhombeatus</i>	Rhombic Night Adder	Least Concern (SARCA 2014)



Table 20: Amphibian species found in 2527DD QDS (FrogMAP)

Family	Scientific name	Common name	Red list category
	<i>Unidentified Anura</i>	--Not possible to make a positive identification--	
Bufo	<i>Schismaderma carens</i>	Red Toad	Least Concern
Bufo	<i>Sclerophrys sp.</i>		
Bufo	<i>Sclerophrys capensis</i>	Raucous Toad	Least Concern
Bufo	<i>Sclerophrys garmani</i>	Olive Toad	Least Concern
Bufo	<i>Sclerophrys gutturalis</i>	Guttural Toad	Least Concern
Hyperoliidae	<i>Hyperolius marmoratus</i>	Painted Reed Frog	Least Concern (IUCN ver 3.1, 2013)
Hyperoliidae	<i>Kassina senegalensis</i>	Bubbling Kassina	Least Concern
Microhylidae	<i>Phrynomantis bifasciatus</i>	Banded Rubber Frog	Least Concern
Pipidae	<i>Xenopus laevis</i>	Common Platanna	Least Concern
Pyxicephalidae	<i>Amietia delalandii</i>	Delalande's River Frog	Least Concern (2017)
Pyxicephalidae	<i>Amietia fuscigula</i>	Cape River Frog	Least Concern (2017)
Pyxicephalidae	<i>Cacosternum boettgeri</i>	Common Caco	Least Concern (2013)
Pyxicephalidae	<i>Pyxicephalus adspersus</i>	Giant Bull Frog	Near Threatened
Pyxicephalidae	<i>Tomopterna sp.</i>		
Pyxicephalidae	<i>Tomopterna cryptotis</i>	Tremelo Sand Frog	Least Concern
Pyxicephalidae	<i>Tomopterna natalensis</i>	Natal Sand Frog	Least Concern

Table 21: Other invertebrate species occurring in QDS

Family	Scientific name	Common name	Red list category
Dung Beetles			
Scarabaeidae	<i>Catharsius calaharicus</i>	None known	
Scarabaeidae	<i>Catharsius heros</i>	None known	
Scarabaeidae	<i>Chalconotus convexus</i>	None known	
Scarabaeidae	<i>Copris amyntor</i>	None known	
Scarabaeidae	<i>Copris elphenor</i>	None known	
Scarabaeidae	<i>Copris mesancanthus mesacanthus</i>	None known	
Scarabaeidae	<i>Copris mesancanthus transvaalensis</i>	None known	
Scarabaeidae	<i>Euoniticellus intermedius</i>	None known	
Scarabaeidae	<i>Garreta nitens</i>	None known	
Scarabaeidae	<i>Heliocopris hamadryas</i>	None known	
Scarabaeidae	<i>Heliocopris pirmal</i>	None known	
Scarabaeidae	<i>Latodrepanus laticollis</i>	None known	
Scarabaeidae	<i>Neosisyphus barbarossa</i>	None known	
Scarabaeidae	<i>Neosisyphus rubrus</i>	None known	
Scarabaeidae	<i>Onitis parainflaticollis</i>	None known	
Scarabaeidae	<i>Onitis pseudosetosus</i>	None known	
Scarabaeidae	<i>Onthophagus aeruginosus</i>	None known	
Scarabaeidae	<i>Onthophagus deterrens</i>	None known	
Scarabaeidae	<i>Onthophagus discretus</i>	None known	
Scarabaeidae	<i>Onthophagus ebenus</i>	None known	
Scarabaeidae	<i>Phalops ardea</i>	None known	
Scarabaeidae	<i>Sarophorus costatus</i>	None known	
Scarabaeidae	<i>Scarabaeus (Sceliages) hippias</i>	None known	
Scarabaeidae	<i>Scarabaeus lamarcki</i>	None known	
Scarabaeidae	<i>Scarabaeus nigroaeneus</i>	None known	
Scarabaeidae	<i>Scarabaeus rusticus</i>	None known	
Scarabaeidae	<i>Sisyphus goryi</i>	None known	
Lacewing			
Ascalaphidae	<i>Encyopsis flavilinea</i>	Owlfly	
Ascalaphidae	<i>Tmesibasis laceratus</i>	Owlfly	



Family	Scientific name	Common name	Red list category
Chrysopidae	<i>Chrysemosa jeanneli</i>		
Myrmeleontidae	<i>Centroclisis brachygaster</i>		
Myrmeleontidae	<i>Hagenomyia lethifer</i>		
Myrmeleontidae	<i>Myrmeleon sp.</i>		
Myrmeleontidae	<i>Neuroleon chloranthe</i>		
Myrmeleontidae	<i>Palpares caffer</i>		
Odonata			
Aeshnidae	<i>Anaciaeschna triangulifera</i>	Evening Hawker	LC
Aeshnidae	<i>Anax ephippiger</i>	Vagrant Emperor	LC
Aeshnidae	<i>Anax imperator</i>	Blue Emperor	LC
Chlorocyphidae	<i>Platycypha sp.</i>	dancing jewels	
Chlorocyphidae	<i>Platycypha caligata</i>	Dancing Jewel	LC
Coenagrionidae	<i>Africallagma sp.</i>	African bluets	
Coenagrionidae	<i>Africallagma glaucum</i>	Swamp Bluet	LC
Coenagrionidae	<i>Africallagma sapphirinum</i>	Sapphire Bluet	LC
Coenagrionidae	<i>Agriocnemis sp.</i>	wisps	
Coenagrionidae	<i>Agriocnemis falcifera</i>	White-masked Wisp	LC
Coenagrionidae	<i>Azuragrion nigridorsum</i>	Sailing Bluet	LC
Coenagrionidae	<i>Ceriagrion glabrum</i>	Common Citril	LC
Coenagrionidae	<i>Ischnura senegalensis</i>	Tropical Bluetail	LC
Coenagrionidae	<i>Pseudagrion sp.</i>		
Coenagrionidae	<i>Pseudagrion kersteni</i>	Powder-faced Sprite	LC
Coenagrionidae	<i>Pseudagrion massaicum</i>	Masai Sprite	LC
Coenagrionidae	<i>Pseudagrion salisburyense</i>	Slate Sprite	LC
Gomphidae	<i>Ceratogomphus pictus</i>	Common Thorntail	LC
Gomphidae	<i>Paragomphus cognatus</i>	Rock Hooktail	LC
Lestidae	<i>Lestes plagiatus</i>	Highland Spreadwing	LC
Libellulidae	<i>FAMILY Libellulidae</i>		
Libellulidae	<i>Brachythemis leucosticta</i>	Southern Banded Groundling	LC
Libellulidae	<i>Crocothemis erythraea</i>	Broad Scarlet	LC
Libellulidae	<i>Orthetrum sp.</i>		
Libellulidae	<i>Orthetrum abbotti</i>	Little Skimmer	LC
Libellulidae	<i>Orthetrum caffrum</i>	Two-striped Skimmer	LC
Libellulidae	<i>Orthetrum chrysostigma</i>	Epaulet Skimmer	LC
Libellulidae	<i>Orthetrum julia</i>	Julia Skimmer	LC
Libellulidae	<i>Orthetrum trinacria</i>	Long Skimmer	LC
Libellulidae	<i>Sympetrum fonscolombii</i>	Red-veined Darter or Nomad	LC
Libellulidae	<i>Trithemis sp.</i>		
Libellulidae	<i>Trithemis annulata</i>	Violet Dropwing	LC
Libellulidae	<i>Trithemis arteriosa</i>	Red-veined Dropwing	LC
Libellulidae	<i>Trithemis dorsalis</i>	Highland Dropwing	LC
Libellulidae	<i>Trithemis furva</i>	Navy Dropwing	LC
Libellulidae	<i>Trithemis kirbyi</i>	Orange-winged Dropwing	LC
Libellulidae	<i>Urothemis edwardsii</i>	Blue Basker	LC
Libellulidae	<i>Zygonyx natalensis</i>	Blue Cascader	LC
Macromiidae	<i>Phyllomacromia picta</i>	Darting Cruiser	LC
Platycnemididae	<i>Elattonaura glauca</i>	Common Threadtail	LC
Scorpions			
Buthidae	<i>Pseudolychas ochraceus</i>		
Buthidae	<i>Uroplectes carinatus</i>		
Buthidae	<i>Uroplectes triangulifer</i>		
Hormuridae	<i>Hadogenes gunningi</i>		
Scorpionidae	<i>Opisthophthalmus glabrifrons</i>		



Family	Scientific name	Common name	Red list category
Scorpionidae	<i>Opisthophthalmus pugnax</i>		
Spiders			
Araneidae	<i>Neoscona sp.</i>	Neoscona hairy field spiders	
Hersiliidae	<i>Hersilia sp.</i>	Long-spinnered bark spiders	
Lycosidae	<i>FAMILY Lycosidae</i>	Wolf spiders	
Pisauridae	<i>Euprosthops sp.</i>	Large funnel web pisaurids	
Pisauridae	<i>Rothus sp.</i>	Crowned pisaurids	
Salticidae	<i>Evarcha denticulata</i>	Paterson evarcha	
Selenopidae	<i>FAMILY Selenopidae</i>	Flatties or wall spiders	
Tetragnathidae	<i>Tetragnatha sp.</i>	Long-jawed water orb-web spiders	
Theraphosidae	<i>Brachionopus sp.</i>		
Theraphosidae	<i>Brachionopus pretoriae</i>		
Theraphosidae	<i>Harpactira hamiltoni</i>		
Theridiidae	<i>Latrodectus sp.</i>	comb-footed or cobweb spiders	
Theridiidae	<i>Latrodectus geometricus</i>	Common brown button spiders	
Uloboridae	<i>Uloborus sp.</i>	hackled orb-web spiders	

