



*SPECIALIST REPORT*

**ECOLOGICAL INVESTIGATION FOR CLEARING OF INDIGENOUS  
VEGETATION FOR THE PROPOSED TOWNSHIP ESTABLISHMENT  
ON PORTION 24 OF THE FARM MOHLABA 567LT  
GREATER TZANEEN LOCAL MUNICIPALITY - MOPANI DISTRICT**

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Version 1

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*Specialist Environmental & Biodiversity Assessments*

## Specialist declaration

I, Danie van der Walt, declare that -

- I act as an independent specialist in this application;
- I have performed the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity;
- I have expertise in conducting the specialist report relevant to this application, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the relevant environmental legislation, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in this project;
- I undertake to disclose to the applicant and the authorities all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this report are true and correct.

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Date: 2022-09-15

## EXECUTIVE SUMMARY

The applicant plans to establish a township on the property to provide housing for the low income population in the area. The project area is approximately 147Ha in extent and is presently vacant. As the clearing of indigenous vegetation is a regulated activity and as the site falls within a Critical Biodiversity Area (Figure 1), environmental authorization is required before commencement of the activity. As part of the EIA process a biodiversity assessment was recommended by the environmental consultant and Afrika Enviro & biology was appointed to do this assessment.

The property is 147Ha in extent and located immediately to the south of the railway line and to the north of the R36 to Tzaneen. The site is largely vacant and located in between industrial activities to the north and residential areas to the south and east. There is an unauthorized sawmill adjacent to the R36 and a few informal dwellings and patches of cultivated land encroach onto the southern section. Otherwise there are no structures or infrastructure on site. Several large trees are present on site. A drainage line is situated on the northern perimeter and a seasonal stream is situated near to the southern perimeter. There are no rocky outcrops or wetlands present. The vegetation assemblage and habitats are described and illustrated in the sections below and the biophysical features and habitat delineation of the site are projected on an aerial image.

The original (natural) habitat on site has been significantly modified and degraded over time. Harvesting of wood has resulted in most trees being lost and sand mining has destroyed the soil surface and vegetation over a large extent of the site. Unsustainable harvesting of wood is continuing on site. The disturbed areas are presently being used as dump sites for domestic and construction waste.

With view of the consequences of past and present impacts (overgrazing, frequent fires and poaching with dogs) and the frequent daily human activities on and around the development site, it is expected that fauna sensitive to these disturbances and impacts will be unlikely to be present on the site. Furthermore, it can be concluded that the fauna assemblage on the site is severely impoverished as result of the historic and present impacts and the site sensitivity for animals is low.

The biodiversity importance and ecological functions for the larger site area is considered to be Low – Medium. However, of special ecological importance are the remaining large trees on site. These are very important ecological keystone species that can be seen as individual micro-ecosystems as they present habitat and food to invertebrates and small vertebrates and birds alike. The individual trees have a High ecological importance and will still be able to maintain ecological functions if they can be conserved within the proposed development land. These trees will also provide shade to the future residents. It is recommended that indigenous trees with a diameter at breast height >30cm (DABH>30cm) be conserved within the development plan. This measure will also indirectly serve as protection of the RDL epiphytic orchid, *Ansellia africana*, if it is present in the larger trees. The sensitivity zoning (based upon natural integrity, fauna potential and ecological functions) for the different ecological units is delineated in the following table:

Habitat	Sensitivity Rating
Degraded granite bushveld	Low – Medium
Ephemeral drainage line	Low
Riparian habitat	Medium

It will be important to conserve the riparian habitat although it only has a medium sensitivity value as it still has an important function as an ecological corridor in addition to its hydrological functions. The riparian zones will need to be conserved within a riparian buffer of 20m wide (as calculated by the DWS buffer guidelines).

The biodiversity assessment concludes that although the development area falls within a Critical Biodiversity Area-1, the larger study area is of low - medium biological and ecological sensitivity and it will not be viable to manage it as a CBA-1 or to meet the objectives of this classification. However, the riparian habitat is important and must be conserved and protected. Furthermore, the following mitigation measures and recommendations should be adhered:

**General recommendations:**

The layout must be planned to accommodate the following:

- The areas classified as *modified and degraded bushveld* may be considered for development.
- Conserve trees with DABH>30cm;
- Use only indigenous flora for landscaping / wind breaks.
- Implement an alien invader vegetation control program.
- Spoil material may not be pushed into the riparian habitat or buffer zones.

**Sensitive habitats and buffer zones**

- Conserve the riparian habitat with a 20m buffer zone.
- No development activities that will lead to a loss of natural vegetation are recommended within the riparian habitat.
- The buffer zone may include a fence and a service road/firebreak.
- Spoil material may not be pushed into the surrounding natural environment, buffer zone or riparian habitat.
- It is recommended that an Environmental Control Officer (ECO) is appointed who will be responsible to actually delineate the buffer zone on site (considering actual on site conditions and to ensure that large trees are not destroyed for this purpose).

## TABLE OF CONTENTS

1. Introduction.....	7
1.1 Background and objectives.....	7
1.2 Specialist report requirements.....	7
2. Methods and Reporting.....	8
2.1 Assumptions, uncertainties and limitations.....	8
2.2 General.....	8
2.3 Vegetation & habitats.....	8
2.4 Terrestrial Fauna.....	8
2.5 Watercourse classification & delineation.....	8
2.6 Ecological importance and sensitivity rating of habitats.....	9
3. Background Information.....	10
3.1 Biophysical description of the study area.....	10
3.2 Ecology & biodiversity.....	10
3.3 Conservation & Importance.....	10
4. Vegetation & habitat report and general biophysical descriptions.....	11
4.1 General site description and land uses.....	11
4.2 Habitats & vegetation.....	11
4.3 Occurrence of important flora species.....	13
5. Terrestrial Fauna Report.....	15
6. Sensitivity and Impact Assessment.....	16
6.1 Sensitivity rating.....	16
6.2 Impact assessment.....	16
7. Conclusion and Recommendations.....	19
8. References.....	20

## TABLES

Table 1: Criteria used for sensitivity rating of habitats.....	9
Table 2: Potential Red Data Listed species of the study area.....	14
Table 3: Weeds and invasive vegetation present on site.....	14
Table 4: Ecological sensitivity of ecological features and habitats.....	16
Table 5: Impact Assessment Table.....	18

## FIGURES

Figure 1: Limpopo Conservation Plan classification .....	7
Figure 2: Unsustainable wood harvesting has serious negative consequences on the natural environment	11
Figure 3: Invasive vegetation such as <i>Lantana camara</i> (left) and <i>Dichrostachys cinerea</i> (right) sterilize a large surface area for biodiversity and ecological functions.....	12
Figure 4: Many large trees have been pruned (left) by wood harvesters but several remain relatively natural (right) .....	12
Figure 5: The ephemeral drainage line is severely modified and of low ecological importance .....	13
Figure 6: Although many large riparian trees have been lost this habitat still retain large trees and some ecological functions.....	13
Figure 7: Site sensitivity map (Refer also to the attached Figure 6 in size A3) .....	15

## ABBREVIATIONS

CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
CR	Critical
DABH	Diameter at breast height
DWAF	Department of water and Forestry
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EN	Endangered
EIA	Environmental Impact Assessment
ESA	Ecological Support Area
FEPA	Freshwater Ecosystem Priority Area
Ha	Hectares
LUDS	Land Use Decision Support tool
MAP	Mean Annual Precipitation
NEMBA	National Environmental Management: Biodiversity Act
NFA	National Forestry Act, Act
NFEPA	National Freshwater Ecosystem Priority Area
NT	Near Threatened
ONA	Other Natural Areas
POSA	Plants of South Africa
RDL	Red Data Listed
RSA	Republic of South Africa
SANBI	South African National Biodiversity Institute
TOPS	Threatened or Protected Species
VU	Vulnerable
WRC	Water Resource Council

## 1. Introduction

### 1.1 Background and objectives

The applicant plans to establish a mixed township on the property to provide housing for the low income population in the area. The project area is approximately 147Ha in extent and is presently vacant. As the clearing of indigenous vegetation is a regulated activity and as the site falls within a Critical Biodiversity Area (Figure 1), environmental authorization is required before commencement of the activity. As part of the EIA process a biodiversity assessment was recommended by the environmental consultant and Afrika Enviro & biology was appointed to do this assessment. The terms are as follows:

- Biodiversity and habitat assessment;
- Sensitivity and habitat delineation;
- Recommendations.

The site was investigated on 15/09/2022.

### 1.2 Specialist report requirements

With reference to Appendix 6 of the EIA regulations (2014) the specialist declaration is included on page 2 of this report and details and the specialist's curriculum vitae and proof of professional registration are included with Appendix 1. The specialist procedures were completed according to the Species Environmental Assessment Guideline, Version 1.2020.

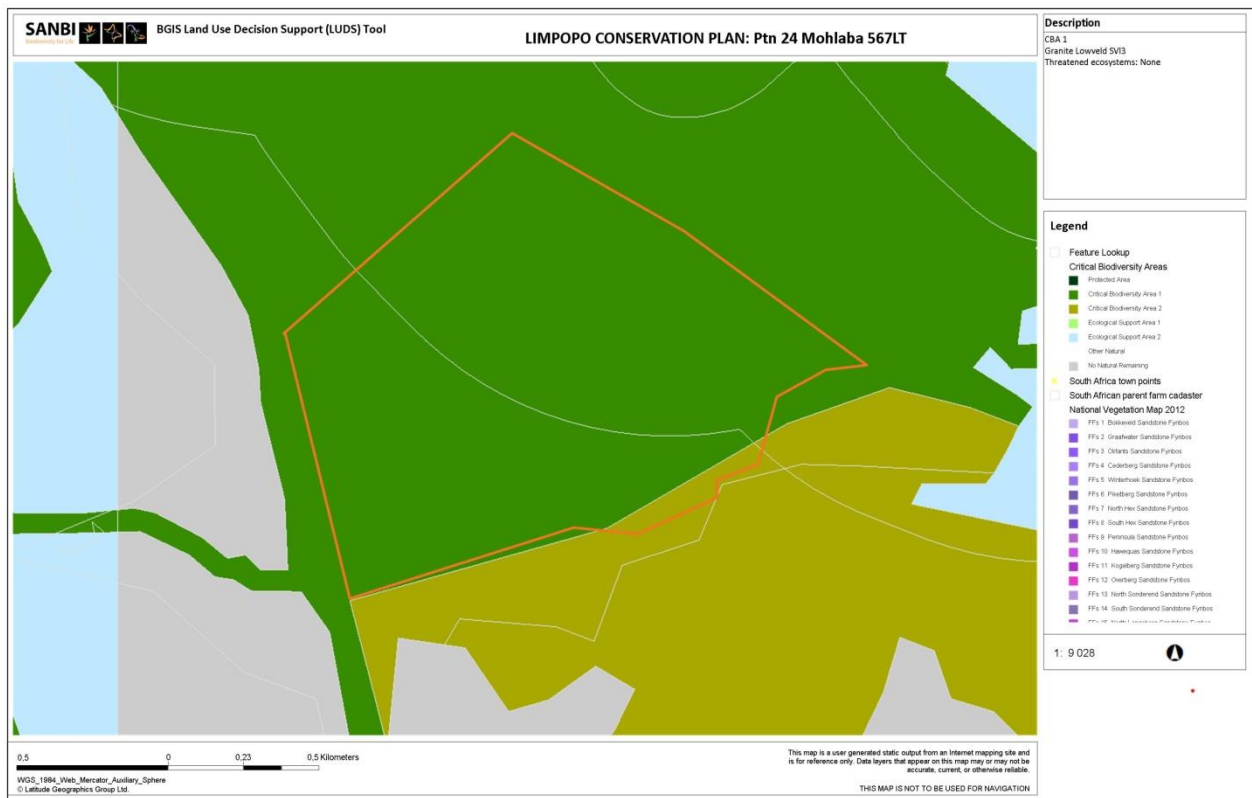


Figure 1: Limpopo Conservation Plan classification

## 2. Methods and Reporting

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### 2.1 Assumptions, uncertainties and limitations

The results and recommendations of the report are based on the actual site status. Assumptions that are made and uncertainties that are encountered are indicated in the report (where applicable). As indicated under the relevant sections in the report consultation of authorities' data bases forms part of this report. However, the scope of work for this specialist report does not include public participation. The author is confident that the results obtained by the present study are of significance to make conclusions and recommendations regarding the subjects that were investigated. The faunal survey was not a comprehensive specialist survey but rather an overview of the available habitats and their potential to be utilized by fauna. No nocturnal surveys were conducted.

### 2.2 General

The author relied on aerial images and ortho photos to remotely assess the site before the actual on site investigation in order to get familiarized with the different features and vegetation communities (habitats) present within the affected areas. The information thus gathered was used for selecting survey sites and to identify possible sensitive areas. Problematic, as well as potential sensitive areas were identified during the site assessment and these were thoroughly investigated as explained in the following two sections. All literature and other references used to support findings and to assist in making conclusions are listed.

### 2.3 Vegetation & habitats

Floral diversity was determined by completing survey transects and sample sites along all the different habitats within the physiographic zones represented in the study area (Deal *et al.* 1989a). To attain scientifically reliable results, obviously distinct vegetation communities were surveyed by selecting representative sites in each homogenous unit (Mathews *et al.* 1992). The vegetation units of Mucina & Rutherford (2006) are used as reference but where necessary communities are described according to a unit's diagnostic floral features and/or topographical setting or other biophysical features (or a combination of several descriptive features). By combining the available literature with the survey results, stratification of vegetation communities was possible. The survey transects and sites in the affected areas were also intensively searched for important species and the potential for Red Data Listed (RDL) and other important species were established and cross referenced with PRECIS Data for the relevant quarter degree grid/s as obtained from the SANBI data base (POSA). The aim was to identify distinct vegetation types and to establish their integrity and representation in the study area. The vegetation communities/habitats are described in section 4 of this report.

The author is confident that the results obtained by the present study are of sufficient significance to make conclusions and recommendations regarding the subjects that were investigated.

### 2.4 Terrestrial Fauna

The fauna investigation is based on a desktop study verified by cross reference with available habitats of the study area, to establish the faunal potential of a particular site. Selected survey sites were well searched for fauna and habitats were identified during the vegetation surveys so as to establish the faunal potential of a particular area. By method of elimination (based on available habitats and the taxon's biology and known distribution), lists of faunal representation for the study area was assembled.

### 2.5 Watercourse classification & delineation

It is important to differentiate between wetlands and riparian habitats. Riparian zones are not wetlands, however, depending on the ecosystem structure; wetlands can also be classified as riparian zones if they are located in this zone (e.g. valley bottom wetlands). Although these distinct ecosystems will be interactive



where they occur in proximity it is important not to confuse their hydrology and ecofunctions. For these reasons the results are reported in separate sections under specific headings.

These delineations are performed according to “A practical field procedure for identification and delineation of wetlands and riparian areas” as amended and published by the Department of Water Affairs and Forestry (2005); (Henceforth referred to as DWAF Guidelines (2005). Aerial photographs and land surveys were used to determine the different features and potential wetland and riparian areas of the study area. Vegetation diversity and assemblages were determined by completing survey transects along all the different vegetation communities identified in the riparian areas.

## 2.6 Ecological importance and sensitivity rating of habitats

By considering the results of all the above investigations, the authors allocate a qualitative sensitivity rating to the habitats that were identified, based upon its ecological importance and biodiversity value. A qualitative method was chosen at the first stage of assessment instead of a quantitative method in order to simplify the procedure of assessment.

In order to simplify the decision-making process, a qualitative scale used for rating the status of habitats. The scale ranging from *Low*, *Medium*, *High* and *Very High* is used, based upon biodiversity value and ecological functions (Table 1). This method is used as a first level of expressing the sensitivity of a specific component and is not used in comparative assessments of alternatives where a quantitative approach will be more appropriate. Wetland sensitivity is measured only on its maintenance of biodiversity function at this basic level of assessment.

Table 1: Criteria used for sensitivity rating of habitats

Ecological Importance/Biodiversity Value	Sensitivity Rating
Terrestrial and Riparian Communities	
Natural communities (habitats and ecosystems) that are regarded as pristine or largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged and the community is regarded as very important for the maintenance of biodiversity and rare and important taxa are present (e.g. occurrence of RDL, Endemic and/or Protected species). The local area is an important ecological support area and any external impacts will have a significant negative effect on its status.	<i>Very High</i>
Natural communities (habitats and ecosystems) which are regarded as ecologically important and sensitive and important for the maintenance of biodiversity. It may be linked to other important communities and provide an important refuge/corridor for biodiversity (fauna and flora). This rating can also be allocated due to the presence of one or more unique qualities (e.g. occurrence of RDL, Endemic and/or Protected species). The presence of unnatural impacts is low and can be managed.	<i>High</i>
Natural communities which have a limited ecological function and a limited function for maintaining biodiversity. This may be due to homogenous habitat conditions and/or the negative effects of external impacts. External impacts can be managed and mitigated to reduce the significance of their magnitude.	<i>Medium</i>
Communities which have been significantly modified or transformed with the result that little or no natural flora and habitats remain intact. Ecological importance as well as biodiversity value is low. External impacts will not have a significant impact on its status.	<i>Low</i>
Modifications to the natural environment have been severe and the ecosystem/s has been completely modified with an almost complete loss of natural habitat and biota.	<i>Very Low</i>

This method is used as a first level of expressing the sensitivity of a specific component and is not used in comparative assessments of alternatives where a quantitative approach will be more appropriate. Furthermore, it should be noted that the above method is used only at this (first) level for the sensitivity rating of wetlands and riparian habitat. A wetland ecological status and integrity assessment is based on quantitative variables and is not covered under the terms and scope of work for this report.

### 3. Background Information

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#### 3.1 Biophysical description of the study area

Historically, the general study area consisted of bushveld typical of the plains below the Lowveld Escarpment foothills. The most serious transformation of the natural environment consists of cultivation of crops and formal and informal settlements which have transformed significant areas of natural land in the past few years. The general geology of the area consists of granite and gneiss. Soils are mostly sandy and derived from granite. A typical Lowveld climate prevails with seasonal summer-rainfall, warm temperatures and dry winters. MAP ranging between 550mm and 800mm (increasing with altitude). Frost is infrequent.

#### 3.2 Ecology & biodiversity

Nationally, the site is situated within the Arid Lowveld (A11) veld type according to Acocks (1988), or Mixed Lowveld Bushveld according to Low & Rebelo (1998) and Schmidt et al (2002). However, these classifications are very broad and may include several sub veld types of importance. According to the more detailed vegetation classification system of Mucina & Rutherford (2006) the veld unit / ecosystem is classified as Granite Lowveld (SVI 3).

This vegetation unit/ecosystem occurs on a North-South belt on the Lowveld plains east of the escarpment. This vegetation type occurs at altitudes of 250 - 700 m above mean sea level and is characterised by tall shrubland with few trees to moderately dense low woodland on deep sandy uplands (Mucina and Rutherford, 2006). This ecosystem is conserved in the Kruger National Park (17%) to the east and adjoining game reserves (another 17%). More than 20% is already transformed, mainly as result of cultivation and expanding formal and informal settlements.

#### 3.3 Conservation & Importance

By applying national and provincial conservation and land use decision making support tools (LUDS), the following data is relevant:

- i) According to the ***Limpopo Conservation Plan (LCP)*** the activity sites falls in a geographically sensitive area: Critical Biodiversity Area-1 (CBA-1). The LCP definition and management objectives for CBA-1:
  - Irreplaceable sites.
  - Maintain in a natural state with limited or no biodiversity loss.
  - Rehabilitate degraded areas to a natural or near natural state and manage for no further degradation.
  - Incompatible land use: Urban land-uses including residential (including infrastructure).
- ii) ***National Freshwater Ecosystem Priority Areas (NFEPAs)***; (WRC, 2011)  
This application indicates whether priority wetland areas are affected by the proposed activity. The classification for these wetlands are determined using the NFEPAs Technical Report and GIS metadata application (WRC, 2011) in combination with the *Classification system for wetlands and other aquatic ecosystems in South Africa* (SANBI, 2013). This application indicates that there are no FEPA listed wetlands or rivers on the site.
- iii) ***Threatened Ecosystems***  
Currently Granite Lowveld Bushveld is not listed as a threatened ecosystem. This ecosystem is conserved in the Kruger National Park (17%) to the east and adjoining game reserves (another 17%). More than 20% is transformed, mainly as result of cultivation and expanding formal and informal settlements.

## 4. Vegetation & habitat report and general biophysical descriptions

### 4.1 General site description and land uses

The property is 147Ha in extent and located immediately to the south of the railway line and to the north of the R36 to Tzaneen (Figure 1). The site is largely vacant and located in between industrial activities to the north and residential areas to the south and east. There is an unauthorized sawmill adjacent to the R36 and a few informal dwellings and patches of cultivated land encroach onto the southern section. Otherwise there are no structures or infrastructure on site. Several large trees are present on site. A drainage line is situated on the northern perimeter and a seasonal stream is situated near to the southern perimeter. There are no rocky outcrops or wetlands present. The vegetation assemblage and habitats are described and illustrated in the sections below and the biophysical features and habitat delineation of the site are projected on an aerial image (Figure. 1).

### 4.2 Habitats & vegetation

The vegetation communities present on the property are classified according to simplified biophysical descriptions and discussed in the following sections:

#### i) Degraded granite bushveld

The original (natural) habitat on site has been significantly modified and degraded over time. Harvesting of wood has resulted in most trees being lost and sand mining has destroyed the soil surface and vegetation over a large extent of the site. Unsustainable harvesting of wood is continuing on site. The disturbed areas are presently being used as dump sites for domestic and construction waste.



Figure 2: Unsustainable wood harvesting has serious negative consequences on the natural environment

Many trees have been partially pruned of large branches and mostly, only very large trees have survived. These include solitary specimens of *Combretum mespiliformis*, *Parinari curatellifolia*, *Ficus sur* and *Sclerocarya birrea*. Other trees or remains of trees present are *Albizia versicolor*, *Senegalia galpinii*, *Strychnos madagascariensis* and *Peltophorum africanum*. Shrubs are mostly consistent of a new generation of *Terminalia sericea*, *Piliostigma thonningii* and *Parinari curatellifolia* that dominates in some areas together with the grasses *Hyperthelia dissoluta* and *Brachiaria nigropedata*.

The disturbances and modifications onsite have resulted in alien vegetation invading the disturbed areas and especially *Lantana camara* forms dense stands. The species, *Leucine leucocephala* is another alien invasive species that forms a stand on the south eastern corner of the site. Pioneer indigenous invasive vegetation, especially *Dichrostachys cinerea*, also forms thickets in places. The indigenous invasive perennial, *Vernonia odorata* also covers large areas that have been disturbed in the past. Due to the

degraded nature of the habitat and the disturbances the present sensitivity of the ecology is low and biodiversity is also low.



Figure 3: Invasive vegetation such as *Lantana camara* (left) and *Dichrostachys cinerea* (right) sterilize a large surface area for biodiversity and ecological functions



Figure 4: Many large trees have been pruned (left) by wood harvesters but several remain relatively natural (right)

#### ii) **Watercourses and riparian habitat**

An ephemeral, first order drainage line is situated on the northern boundary. It has been modified to a serious extent due to sand mining and loss of vegetation. This has resulted in the channel becoming deeply eroded with very steep almost vertical banks. The banks have become infested with the invasive *Lantana camara* and only small examples of *Ficus sur*, *Vachellia natalitia* and *Parinari curatellifolia* lines the upper banks. The ecological sensitivity of this drainage line is low.

A seasonal second order stream is situated on the southern section. It has several small tributaries and the main stream flows from west to east and tribute directly to the Letaba River. It has also been subject to a loss of riparian vegetation and sand mining but it remains largely intact. Its banks are lined with obligate riparian trees *Combretum mespiliformis*, *Ficus sur*, *Trichilia emetica* and *Vachellia natalitia*. Invasive vegetation is *Lantana camara* and *Senegalia ataxacantha*. In-stream vegetation is the grass *Eragrostis lehmanniana* and the herbs, *Ludwigia octovalvis* and *Persicaria senegalensis*. This stream and its riparian habitat provides habitat for animals and maintains large trees. Its ecological sensitivity and biodiversity importance is medium.



Figure 5: The ephemeral drainage line is severely modified and of low ecological importance



Figure 6: Although many large riparian trees have been lost this habitat still retain large trees and some ecological functions

#### 4.3 Occurrence of important flora species

Conservation-important, naturally occurring species can be categorized according to specific features that are important, usually due to rarity, habitat specificity, medicinal value, ecological value, endemism, over-exploitation, economic value, or a combination of these. Species of conservation importance are either categorized as Red Data Listed species (RDL species), according to specific scientifically researched criteria and administered by the South African National Biodiversity Institute (SANBI), or as Protected Trees and Plants by the national forests and the provincial nature conservation legislation.

The National List for Red Data flora (2007) is the most updated and applicable reference for vegetation conservation in Mpumalanga. Applicable legislation that protects flora in South Africa and specifically in Mpumalanga Province are the National Environmental Management Biodiversity Act of 2004 (NEMBA), the Mpumalanga Nature Conservation Act of 1998 (MNCA) and the National Forests Act of 1998 (NFA). No RDL species was recorded. Due to the history and present of wood harvesting it is not likely that the hard wood and medicinal species has long since been become extinct on site. However, the epiphytic orchid, *Ansellia africana*, can possibly be present in the larger terrestrial and riparian trees but was not recorded. Potential RDL species of the study area are presented in Table 2.

Table 2: Potential Red Data Listed species of the study area

Family	Name	Status	Habitat	Potential on site
Apocynaceae	<i>Adenium swazicum</i>	CR	Lowveld savanna, plains bushveld	Unlikely. Severely degraded environment
Celastraceae	<i>Elaeodendron transvaalense</i>	NT	Lowveld savanna, plains bushveld	Unlikely. Severely degraded environment
Fabaceae	<i>Dalbergia melanoxylon</i>	NT	Lowveld savanna, plains bushveld	Unlikely. Severely degraded environment
Hyacinthaceae	<i>Bowiea volubilis</i> subsp. <i>volubilis</i>	VU	Rocky areas in riparian habitat	Unlikely. Severely degraded environment
Hyacinthaceae	<i>Drimia sanguinea</i>	NT	Lowveld savanna, plains bushveld	Unlikely. Severely degraded environment
Orchidaceae	<i>Ansellia africana</i>	VU	Epiphyte in deciduous woodland and plains bushveld, riparian trees.	Probable. Large trees and riparian trees.

Also of conservation importance is the occurrence of alien invasive species and weeds. Such species are listed in the Conservation of Agricultural Resources Act of 1983 (CARA) and the Mpumalanga Nature Conservation Act (1998). The control by landowners of such species is regulated by these Acts. Several important exotic species are present and most of the natural habitats contain alien invader species (Section 4.1 and Table 3).

Table 3: Weeds and invasive vegetation present on site

Scientific Name	Status	Scientific Name	Status
<i>Cirsium vulgare</i>	Category 1 weed	<i>Amaranthus viridis</i>	Naturalized/weed
<i>Pyracantha angustifolia</i>	Category 3 invader	<i>Tagetes minuta</i>	Naturalized/weed
<i>Ricinus communis</i>	Category 2 invader	<i>Lantana camara</i>	Category 1 invader
<i>Eucalyptus sp</i>	Category 2 invader		

## 5. Terrestrial Fauna Report

In view of the consequences of past and present impacts and the frequent daily human activities on and around the development sites, it is expected that most fauna has been lost in time as the natural habitat of the larger study area was transformed. For this reason a comprehensive fauna investigation was not deemed necessary and the specialist survey was limited to an overview of the available habitats and their potential to be utilized by fauna listed in the checklists prepared by a desktop study. The following observations and conclusions were made:

- No natural occurring fauna with exception of common birds were observed.
- No raptor's or large bird's nests were observed in any of the larger trees that will be lost and no signs of important fauna were observed.
- No sensitive or threatened fauna are expected to be present.

It can be concluded that the fauna assemblage on the site is severely impoverished as result of the historic and present impacts and the site sensitivity for animals is low.



Figure 7: Site sensitivity map (Refer also to the attached Figure 6 in size A3)

## 6. Sensitivity and Impact Assessment

### 6.1 Sensitivity rating

The biodiversity importance and ecological functions for the larger site area is considered to be Low – Medium. However, of special ecological importance are the remaining large trees on site. These are very important ecological keystone species that can be seen as individual micro-ecosystems as they present habitat and food to invertebrates and small vertebrates and birds alike. The individual trees have a High ecological importance and will still be able to maintain ecological functions if they can be conserved within the proposed development land. These trees will also provide shade to the future residents. It is recommended that indigenous trees with a diameter at breast height >30cm (DABH>30cm) be conserved within the development plan. This measure will also indirectly serve as protection of the RDL epiphytic orchid, *Ansellia africana*, if it is present in the larger trees. The sensitivity zoning (based upon natural integrity, fauna potential and ecological functions) for the different ecological units is delineated in Figure. 7 and summarized in Table 4.

Table 4: Ecological sensitivity of ecological features and habitats

Habitat	Sensitivity Rating
Degraded granite bushveld	Low – Medium
Ephemeral drainage line	Low
Riparian habitat	Medium

It will be important to conserve the riparian habitat although it only has a medium sensitivity value as it still has an important function as an ecological corridor in addition to its hydrological functions. The riparian zones will need to be conserved within a riparian buffer of 20m wide (as calculated by the DWS buffer guidelines).

### 6.2 Impact assessment

The potential and present impacts related to the above discussion were assessed by applying the following methodology:

- The *nature* of the impact entails a description of the cause of the impact, what will be affected and how it will be affected.
- The *extent* refers to the area where the impact will be significant e.g. on site, local area, regional, provincial, national or international.
- The *duration* refers to the lifetime of the impact:
  - Short term: 0-5 years
  - Medium term: 5-15 years
  - Long term: >15 years
  - Permanent
- The *probability* describes the likelihood of the impact occurring during the duration:
  - Improbable (Low likelihood)
  - Probable (Distinct possibility)
  - Highly Probable (Most likely)
  - Definite (Impact to occur regardless of any preventative measures).
- The *significance* is determined by analyzing the above subjects and is assessed as low, medium, or high.

The impact assessment is propagated in Table 5 and additional mitigation measures to ensure that potential impacts are minimized are listed in the following section.

The single most important impact on biodiversity as consequence of transforming natural habitat is the loss of vegetation and loss and fragmentation of natural habitats and consequently the loss of fauna. The typical ecosystem / vegetation type of this region is under pressure by various anthropological impacts and is not



listed as a threatened ecosystem. In view of the site location, historic and present land use as well as nearby human activities it is assumed that the fauna assemblage and diversity is impoverished on the larger site area but the riparian habitat is still important as an ecological corridor and refuge for biota.

If the riparian habitat and large trees (DABH>30cm) are conserved and the recommendations and mitigation measures are followed (Table 5), it is unlikely that threatened or important species will be lost.

Table 5: Impact Assessment Table

Aspect	Impact relevance	Significance before mitigation	Recommendations and Mitigation	Significance after mitigation
Planning phase	Potential impacts on bio-ecology	High	<p>Site selection must be conducted with specialist advice in order to identify the least sensitive areas with reference to biodiversity and ecology.</p> <ul style="list-style-type: none"> <li>Specialist advice was employed to identify suitable sites and to indicate sensitive areas that must be conserved.</li> <li>The areas classified as modified and degraded bushveld may be considered for development.</li> <li>The site sensitivities are indicated on Figure 7.</li> <li>Riparian habitat may not be considered for development.</li> </ul>	Medium
Vegetation & habitat	Loss of vegetation	High	<ul style="list-style-type: none"> <li>Conserve the riparian habitat.</li> <li>Conserve trees with DABH&gt;30cm</li> </ul>	Low
	Loss of important species	Medium	<ul style="list-style-type: none"> <li>Conserve the riparian habitat.</li> <li>Conserve trees with DABH&gt;30cm</li> </ul>	Low
	Fragmentation of habitat	High	<ul style="list-style-type: none"> <li>Conserve the riparian habitat.</li> <li>Implement alien vegetation and bush encroachment control programme.</li> </ul>	Low
	Impact on hydrology and watercourses	Medium	<ul style="list-style-type: none"> <li>Protect the riparian habitat and watercourses with a riparian buffer as delineated in Figure 7.</li> <li>Prevent siltation and erosion.</li> <li>Storm water discharge points / lead-offs must be designed to reduce the energy of discharged water.</li> <li>Implement an alien vegetation control programme.</li> </ul>	Low
Fauna	Loss of fauna	Low	<ul style="list-style-type: none"> <li>Conserve the riparian habitat.</li> <li>Reptiles and/or subterranean vertebrates that are unearthed during construction must be allowed to escape to the surrounds or must be relocated by a specialist.</li> <li>No-one is allowed to kill snakes or any other wild animals.</li> <li>Poaching of wild animals is illegal and individuals found guilty of this activity must be prosecuted.</li> <li>“Problem animals” must be removed by a specialist that deals therewith.</li> <li>Excavations must be inspected daily in order to rescue trapped animals.</li> </ul>	Low
Ecology	Impairment of ecological functions	Medium	<p>The loss and fragmentation of vegetation and habitat will consequently result in the impairment of ecological functions.</p> <ul style="list-style-type: none"> <li>By implementing all the above mitigation measures the loss of ecological functions will be limited to the sites only and provides the best option to minimize impacts on the ecology of the sensitive habitats in the surrounding area.</li> </ul>	Low
	Impacts on CBA	Medium	<p>The site assessment concludes that the area is modified and degraded with limited ecological potential and low biodiversity</p> <ul style="list-style-type: none"> <li>By conserving the riparian habitat and large trees, the potential impacts on the ESA are minimized and conservation of important terrestrial habitat and species will be implemented.</li> </ul>	Low

## 7. Conclusion and Recommendations

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The biodiversity assessment concludes that although the development area falls within a Critical Biodiversity Area-1, the larger study area is of low - medium biological and ecological sensitivity and it will not be viable to manage it as a CBA-1 or to meet the objectives of this classification. However, the riparian habitat is important and must be conserved and protected. Furthermore, the following mitigation measures and recommendations should be adhered to (Refer also to Figure. 7).

### General recommendations:

The layout must be planned to accommodate the following:

- The areas classified as *modified and degraded bushveld* may be considered for development.
- Conserve trees with DABH>30cm;
- Use only indigenous flora for landscaping / wind breaks.
- Implement an alien invader vegetation control program.
- Spoil material may not be pushed into the riparian habitat or buffer zones.

### Sensitive habitats and buffer zones

- Conserve the riparian habitat with a 20m buffer zone.
- No development activities that will lead to a loss of natural vegetation are recommended within the riparian habitat.
- The buffer zone may include a fence and a service road/firebreak.
- Spoil material may not be pushed into the surrounding natural environment, buffer zone or riparian habitat.
- It is recommended that an Environmental Control Officer (ECO) is appointed who will be responsible to actually delineate the buffer zone on site (considering actual on site conditions and to ensure that large trees are not destroyed for this purpose).

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## Appendix 1

### CONCISE CURRICULUM VITAE OF SPECIALIST

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<b>Practice/Firm information</b>	Name of Practice/Firm: AFRIKA ENVIRO & BIOLOGY
<b>Relevant Tertiary Education &amp; Courses</b>	<p><b>Tertiary education:</b></p> <ul style="list-style-type: none"> <li>M.Sc. (Zoology) cum laude, 1993. Title of script: An evaluation of the allozyme variation as well as the effect of cryopreservation of semen on the genetic selection of the African catfish (<i>Clarias gariepinus</i>).</li> </ul> <p><b>Accredited Courses</b></p> <ul style="list-style-type: none"> <li>Implementing integrated management systems (SHEQ): ISO9001, ISO14001 and OHSAS18001. Centre for Environmental Management, North-west University, Potchefstroom, October 30 – November 4, 2005.</li> <li>Wetland Training: Delineation, Functions and Rehabilitation of Wetlands. University of Pretoria, Rietvlei Nature Reserve, May, 2006.</li> <li>Environmental Impact Assessment (NEMA Regulations). Centre for Environmental Management, Northwest University, Potchefstroom, May, 2007.</li> <li>OHS Act and Regulations (Act 85 of 1993). Department of Labour, Gauteng, September, 2010.</li> </ul> <p><b>Short Courses and Practical Workshops</b></p> <ul style="list-style-type: none"> <li>Fish Index Validation: Field Testing. DWAF Guidelines. Waterval-Boven. 2006.</li> <li>Short Course: Soil Classification and Wetland Delineation. Terrasoil Science. Nelspruit. February 2009.</li> <li>DWAF: Directorate: Water Abstraction and Instream Use: Training course for section 21 (c) and (i) water use authorization. Pretoria, November 2010.</li> </ul>
<b>Professional Affiliation/s</b>	<ul style="list-style-type: none"> <li>Professional Natural Scientist, SA Council for Natural Scientific Professions Reg No: 129707</li> <li>EAPASA Reg No: 2021/3917.</li> </ul>
<b>Employment Record</b>	Employed since 2003 as a free-lance Environmental Scientist as individual or as subcontractor to larger firms.
<b>Relevant Experience</b>	<p>Graduated with Botany and Zoology as main subjects. Post graduate subjects include freshwater ecology, terrestrial ecology and field assessments. 20 Years of experience in the field of vegetation, animal and biodiversity assessments and report writing for EIA purposes.</p>
<b>Specialist subjects</b>	<p>Aquatic Ecologist: Aquatic ecological assessments and bio-monitoring, wetland delineations and assessments; Biodiversity Specialist; Biodiversity assessments; Botany &amp; Terrestrial Ecologist: Vegetation and terrestrial ecological assessments.</p>