



SPECIALIST REPORT

**ECOLOGICAL INVESTIGATION FOR CLEARING OF INDIGENOUS
VEGETATION FOR CULTIVATION ON
PORTION 5 OF THE FARM DUMA 201JU,
CITY OF MBOMBELA**

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October 2021

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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.

L.D. VAN DER WALT
Pri.Sci.Nat. (SACNASP Reg No 129707)

Date: 2021-10-21

EXECUTIVE SUMMARY

The applicant plans to clear indigenous vegetation on the property, specifically for the cultivation of fruit trees and nuts. The property is approximately 220Ha in extent of which the applicant wish to clear <20Ha. Environmental authorization of regulated activities 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 located to the south of the N4 National Road on the foothills of Crocodile Gorge Mountains. The property is largely in a natural state but for a small 2Ha area in the extreme north that has been transformed for cultivation. This area is not cultivated at present. The property is approximately 220Ha in extent of which the applicant wish to clear <20Ha (10%). The land use to the north of the property is citrus production. The topography of the property is rather mountainous and rugged with small to large granite outcrops present across the site and the vegetation on these outcrops is largely natural as it has been protected on the property for many years from negative external drivers. Several prominent drainage lines transect the property, attributing to the Crocodile River. These are ephemeral watercourses without permanent water. Presently, no agricultural activities are practiced on the property. Small corrugated steel structures are located near to the entrance on the northern section.

The natural habitat on the property is relatively untouched and provide habitat for a diverse range of fauna & flora (biota). Negative impact on biota can be mitigated keeping the activity sites as small as possible and selecting the least sensitive habitats for development as well as limiting fragmentation of habitat. This was one of the objectives of this investigation.

The results of the biodiversity investigation indicate that the larger site area is largely modified and the ecological functions and natural biota have been largely lost and has been compromised. The sensitivity zoning (based upon natural integrity, fauna potential and ecological functions) for the different ecological units is summarized in the following table:

Habitat Description	Ecological Sensitivity
Modified land	Low
Outcrop habitat	High
Riparian habitat	High
Foot-slope woodland	Medium
Mid-slope woodland	Medium
Southern-slope woodland	High

The mountainous terrain, rocky geology and steep slopes over most of the site will be a challenge for any development of the land. Access road construction and site preparation will lead to significant changes to the natural environment and negative direct and indirect impacts such as the loss of natural vegetation and loss and fragmentation of natural habitats and fauna. However, by projecting the development footprint onto previously modified land and on the most level areas as well avoiding sensitive bio-ecological features and habitats, the potential impact on the natural environment is effectively mitigated to medium magnitude.

By designing the development plan to accommodate / conserve sensitive habitats and important biota the cumulative impact will be reduced significantly. The riparian habitat and outcrop habitat is of significant ecological importance as it provides refuge and a corridor that enables animals to move about the larger study area and to migrate in between adjacent terrestrial habitats that are connected by way of this corridor. The southern slope woodland also falls in this category as it maintains unique floral biota. These habitats will not be directly affected by the activities and will be protected by a buffer zone. The property is approximately 220Ha in extent of which the applicant wish to clear <20Ha. This is equal to 10% of the property that will be modified, which is a relatively small development footprint, the remainder of the land will remain in its present state.

The following long term development strategy is proposed, in order to mitigate the loss of indigenous vegetation and habitat as well as fragmentation of habitat and encroachment of invasive alien vegetation. The site topography suggests that it will be impossible to develop large parcels of land without involving major earthmoving activities to level the land and destroying watercourses. By respecting watercourses and outcrop habitat (with a 10m buffer) and keeping below a 20% gradient. Areas that can be considered are indicated on Figure 1. In order to mitigate for the loss of large and protected trees it is proposed to conserve large and protected trees and limit vegetation clearing to underbrush, smaller trees and invasive vegetation. The closed woodland structure will have to be modified to an open woodland scenario in order to make room for the cultivation of Macadamia trees. The first objective will be to set a minimum standard of $\pm 10\%$ indigenous tree cover. This will be tested by employing the following method.

- 1) Clear all alien invasive vegetation and underbrush from the development sites.
- 2) Specialist investigation to verify the large trees which will be measured at Diameter at Breast Height (DBH) of 1.3m.
- 3) The following standard will be used to select trees for conservation:
 - 25cm DBH for any large trees.
 - 15cm DBH for protected trees (national and provincial legislation).
- 4) Macadamia trees may not be planted underneath the canopy of the conserved trees as it may damage the root systems.
- 5) The project will be monitored and conserved trees will be thinned to 10% tree cover after 5 years if the project needs more space.

The biodiversity assessment concludes that most of the site is largely in a natural state and of significant biological and ecological importance. However, specific areas may be considered for development where potential impacts on the natural environment can be managed to an acceptable level.

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APPENDIX 1: SPECIALIST DETAILS

1. Introduction

1.1 Background and objectives

The applicant plans to clear indigenous vegetation on the property, specifically for the cultivation of fruit trees and nuts. The property is approximately 220Ha in extent of which the applicant wish to clear <20Ha. Environmental authorization of regulated activities 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 2021-08-11 and 2021-11-08.

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 are included with Appendix 1.

2. Methods and Reporting

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). In order 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, and the POSA list of expected flora for this grid is included with Appendix 4 of this report.

2.4 Terrestrial Fauna

The fauna investigation is based on a desktop study verified by cross reference with available habitats of the study area, so as 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 close 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 scale of *Very Low*, *Low*, *Medium*, *High* and *Very High* is used, based upon biodiversity value and ecological functions (Table 1.1). 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.

Table 1.1 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 natural flora remain and remaining habitat is degraded and fragmented. Ecological importance as well as biodiversity value is low. External impacts will not have a significant impact on its status.	<i>Low</i>
Total loss of natural habitat has occurred. Ecological functions have been lost.	<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 in this report. 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 and this report is not intended to replace or contradict the findings and recommendations of specialist wetland assessments.

3. Background Information

3.1 Biophysical description of the study area

The general study area consists of mountainous bushveld typical of the eastern Lowveld Escarpment foothills, specifically to the west of the Crocodile Poort Mountains. 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, mostly of the Nelspruit suite, forming hills with large boulders. Soils are shallow, coarse lithosols, comprised of Glenrosa or Mispah soil types.

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 Lowveld Sour Bushveld (A9) veld type according to Acocks (1988), or Sour 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. The more detailed vegetation classification system of Mucina & Rutherford (2006) is used to classify the veld unit on a regional scale (Appendix A2):

Unit 1) **Pretoriuskop Sour Bushveld** is found mainly to the east of Hazyview and around Pretoriuskop (KNP) in Mpumalanga Province. The topography consists of plains and gentle slopes with intermittent drainage lines. The vegetation structure is open savannah with few low shrubs and a well-developed grass component. Pretoriuskop Sour Bushveld is rated as *Least Threatened* as almost 40% is conserved within the Kruger National Park according to the National Spatial Biodiversity Assessment (Driver *et al*, 2004) on a regional level.

Unit 2) **Malelane Mountain Bushveld** is found on the mountains and hills to the east of Nelspruit in an area known as the Krokodilpoort Mountains. It consists of open to closed savannah depending on the altitude and measure of protection. This veld type is characterized by the trees *Pterocarpus angolensis* and *Dombeya rotundifolia* and under natural conditions it occurs with few shrubs present. It is related to Legogote Sour Bushveld. It is well protected (45% formally protected) and 4% is transformed and as such is rated as *Least threatened*.

3.3 Conservation & Importance

The Mpumalanga Biodiversity Sector Plan (MBSP); (MTPA, 2014) ratings for the terrestrial and freshwater ecology of the project area are projected in Appendix 2.

Terrestrial ecology: Other Natural Areas:

The MTPA requirements for *Other Natural Areas* are quoted as follows: *An overall management objective should be to minimize habitat and species loss and ensure*

ecosystem functionality through strategic landscape planning. These areas offer the greatest flexibility in terms of management objectives and permissible land uses but some authorization may still be required for high impact land uses. This classification is relevant to the largest extent of the property.

Terrestrial ecology: *Heavily - Moderately modified*

Moderately Modified - Old Lands (sometimes called 'old fields' in other documents) are those areas that were used for cultivation or mining in the past (within the last 80 years), but are no longer used for these purposes and have been left to re-vegetate. These old lands are areas where biodiversity pattern and ecological function have been seriously compromised in the past, but they may still play an important role in the provision of ecosystem services, or may provide important habitats for certain animal species. For example, old lands can provide important feeding grounds for birds such as blue cranes, and disused mine shafts can provide suitable habitats for certain bats.

Heavily modified areas are those preferred for intensive land-uses such as the construction of settlements, industrial development and other land-uses that have a high impact. These land-uses should still be located and managed in ways that maintain any residual ecological functionality, and that does not impact negatively on species for which these modified sites may be important. In some cases restoration may be advisable.

A small section of approximately 3Ha in the extreme northern corner conforms to the abovementioned classification.

Freshwater ecology: *Ecological Support Area (Important sub catchment):*

The MTPA requirements for an Ecological Support Area (important sub catchment) are quoted as follows: *This sub-category includes National Freshwater Ecosystems Priority Areas (FEPA) sub-catchments and Fish Support Areas. A river FEPA is the river reach that is required for meeting biodiversity targets for river ecosystems and threatened fish species. In managing the condition of a river FEPA, it is important to manage not only the river itself, but also the network of streams and wetlands as well as land based activities in the sub-catchment that supports the river FEPA. A proportion of tributaries and wetlands need to remain healthy and functional in order for the river FEPA to be kept in a good ecological condition. This requires that management activities are focused on maintaining water quantity and quality and the integrity of natural habitat in the sub-catchment.* The entire property falls within this classification.

One of the objectives of this report is to verify and investigate the abovementioned aspects and to provide recommendations and buffer zones where applicable.

4. Vegetation & habitat report and general biophysical descriptions

4.1 General site description and land uses

The property is located to the south of the N4 National Road on the foothills of Crocodile Gorge Mountains. The property is largely in a natural state but for a small 2Ha area in the extreme north that has been transformed for cultivation. This area is not cultivated at present. The property is approximately 220Ha in extent of which the applicant wish to clear <20Ha (10%). The land use to the north of the property is citrus production. The topography of the property is rather mountainous and rugged with small to large granite outcrops present across the site and the vegetation on these outcrops is largely natural as it has been protected on the property for many years from negative external drivers. Several prominent drainage lines transect the property, attributing to the Crocodile River. These are ephemeral watercourses without permanent water. Presently, no agricultural activities are practiced on the property. Small corrugated steel structures are located near to the entrance on the northern section. The biophysical features and habitat delineation of the property are projected on an aerial image (Figure. 1). Illustrations of the environment and vegetation are included with the following sections.

4.2 Habitats & vegetation

The land uses and habitat present on the property are classified according to simplified biophysical descriptions and discussed in the following sections:

i) **Modified land** (old and present agriculture lands and infrastructure)

An old land is present on the extreme northern corner and is approximately 2Ha in size (Figure 1). This area has not been cultivated in recent years and the natural vegetation is recovering and being colonized by woody vegetation and will provide limited habitat and refuge for fauna. Grasses present on the old land are *Hyperthelia dissoluta*, *Cynodon dactylon*, *Cynodon nlemfuensis* and *Sporobolus panicoides*. The most notable woody vegetation is *Dichrostachys cinerea*, *Vachellia sieberiana*, *Vachellia tortillis* and others such as *Ziziphus mucronata*, *Searsia transvaalensis*, *Diospyros lycioides* and *Dombeya pulchra*. Several large indigenous trees are present alongside the land that must be considered for conservation.



Indigenous pioneer vegetation is colonizing the old agriculture lands

A small section of land has been modified to accommodate small corrugated steel structures near to the entrance on the northern section. Due to these changes the sensitivity for biodiversity maintenance and ecological importance of these areas are low (fallow lands). Development Site A is situated within this community and is recommended for the activity (Figure 1).

ii) Outcrop habitat

Small to large granite rock outcrops are present on the property and increases progressively in size further to the south and east. These outcrops consist of large granite boulders and granite bedrock. Vegetation on the bedrock areas is limited to xerophytes such as *Xerophyta retinerfis*, *Jasminum multipartitum*, *Eulophia speciosa*, *Sarcostemma viminale*, *Aeollanthus parvifolius*, *Aloe petricola* (Protected), *Tulbaghia acutiloba* and the resurrection plant (*Selaginella dregei*). Species of ferns found in this habitat are *Cheilanthes viridus* and *Pellaea calomelanos*. On areas where substrate is available the vegetation structure varies from closed woodland to thickets that are located at the foot of the outcrops. Commonly found shrubs and climbers are *Searsia transvaalensis*, *Rhoicissus dentata*, *Bauhinia galpinii*, *Hippobromus pauciflorus*, *Ochna natalitia*, *Diospyros lycioides*, *Gymnosporia glaucophylla* and *Grewia flava*. Prominent trees are *Combretum molle*, *Englerophytum magalismsontanum*, *Heteropyxis natalensis*, *Pterocarpus angolensis* (Protected), *Pterocarpus rotundifolius*, *Peltophorum africanum*, *Sterculia murex*, *Cussonia spicata*, *Pappea capensis*, *Searsia chirindensis*, *Euphorbia ingens* and *Maytenus undata*. Red data listed *Dioscorea sylvatica* is present in the thickets on the outcrops.

This habitat maintains a diverse range of specialist biota and ecological functions. As this section represents the typical natural vegetation and ecological functions as it is considered to be of *High* ecological sensitivity. This habitat is not considered for development.



The rock outcrops provide habitat for specialized fauna and flora

iii) Riparian habitat & watercourses

As the topography is mountainous, several drainage lines are situated on the slopes and follow the contours in the valleys. These are mostly first order ephemeral watercourses that drain surface water from the higher lying land in the south to the main drainage channel in the north. In general the geology of the bed and banks is rocky and the banks are relatively steep. These drainage lines forms relatively deep channels in places with very steep banks and well-defined channels. Indigenous riparian vegetation is present and varies from solitary trees to thickets.

As these watercourses are strictly ephemeral in nature and for the most part first order, riparian vegetation is not well discernible from the terrestrial assemblage but in general woody vegetation is lush and trees are larger on the banks of the watercourses when compared to the surrounding terrestrial habitat. However, characteristic Lowveld riparian trees (Obligate riparian indicator species) are present in the northern section and include *Ficus sycomorus*, *Breonadia micrantha*, *Syzygium cordatum*, *Combretum erythrophyllum*, *Dalbergia armata*, *Bridelia micrantha* and *Vachellia robusta* spp *clavigera*. No RDL species were recorded. The delineation is projected in Figure 1 and is aligned on the present line of marginal riparian vegetation.

A relatively large irrigation dam is present in the northern section as well as in the central area of the property, resulting in a total loss of riparian vegetation and permanent inundation. These watercourses and associated riparian zones provide an important refuge and corridor for fauna and flora and have a **High** ecological sensitivity rating. These areas are not recommended for development and must be protected from potential development impacts.



The drainage lines are mainly intermittent, first order watercourses that are only active after the advent of rain



The southern drainage line is slightly more pronounced and flows into an earthen dam

iv) Foot-slope woodland

This community is present on the open spaces and small valleys adjacent to the outcrop habitat and watercourses in the lower lying, northern section. It can be described as a closed woodland community consisting of medium to tall shrubs and medium sized trees, with random large trees being present. Trees and shrubs recorded in this woodland are *Vachellia natalitia*, *Vachellia nilotica*, *Ziziphus mucronata*, *Sclerocarya birrea*, *Dombeya rotundifolia*, *Pterocarpus rotundifolius*, *Searsia leptodictya*, *Combretum collinum*, *Gymnosporia spp*, *Pappea capensis*, *Cussonia spicata*, *Euclea crispa*, *Euphorbia ingens* and *Peltophorum africanum*. It is evident that bush encroachment is taking place in some sections where the invasive *Dichrostachys cinerea* forms impenetrable thickets. No Red Data Listed (RDL) flora was recorded in this section. The wild Olive, *Olea europaea*, forms dominant stands in places.



This community varies from thickets of *Dichrostachys cinerea* to thickets of *Olea europaea*

Species diversity in this community is considered to be medium and the ecological functions in this habitat will be of local importance. The ecological importance and sensitivity are therefore rated as *Medium*.

v) Mid-slope woodland

This community is present on the central, eastern slopes leading to higher lying, western section. It is a closed woodland community and is dominated by *Terminalia sericea*, which forms vast stands in places. Grasses present varies from *Hyperthelia dissoluta*, *Eragrostis spp*, *Melinis repens*, *Heteropogon contortus* and *Loudetia simplex*. Shrubs to medium sized trees present are *Diospyros lycioides*, *Dichrostachys cinerea*, *Searsia leptodictya*, *Searsia rehmanniana*, *Terminalia sericea*, *Grewia bicolor*, *Euclea crispa*, *Combretum apiculatum* and *Combretum collinum*. Tree size is medium (3-8m in height), although solitary large trees (>8m) are present. Large trees include specimens of *Peltophorum africanum*, *Sclerocarya birrea* and *Kirkia wilmsii*. Development Site A is situated within this community and is recommended for the activity (Figure 1).



Vast stands of *Terminalia sericea* typifies this community



Closed woodland



Open woodland

vi) **Southern-slope woodland**

This community is found on the southern upper-slope at an altitude of approximately 745m a.s.l. Vegetation assemblage is more diverse compared to the previous community and it is differentiated by the frequent presence of *Faurea saligna* (Protected) and *Pterocarpus angolensis* (Protected), including large specimens. Exceptionally large specimens of the epiphytic orchid, *Ansellia africana* (Protected) , are also frequently present in the trees. Other shrubs and trees present are *Diospyros lycioides*, *Dichrostachys cinerea*, *Ochna natalitia*, *Grewia flava*, *Pterocarpus rotundifolius*, *Berchemia zeyherii* (Protected), *Combretum molle*, *Combretum collinum*, *Strychnos madagascariensis*, *Pappea capensis* and *Dombeya rotundifolia*.



Mixed woodland structure



Large specimen of *Sclerocarya birrea*



Large specimen of *Ansellia africana*



Differentiating species is *Faurea saligna*

It is obvious that this community maintains unique flora species and large specimens of trees. It is categorized as a high ecological and biodiversity importance and sensitivity. No development is recommended within this community.

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 protect 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). One RDL species was recorded *Dioscorea sylvatica* (Vulnerable) was recorded and thirteen protected species (Table 2.1 and Table 2.2). Permits will have to be obtained from the Department of Forestry, and/or the Mpumalanga Tourism and Parks Agency, if legally protected trees or plant species are to be removed or destroyed.

Table 2.1 National RDL species potential for the relevant quarter degree grid (2531DA)

Species	National Status	Habitat preference
<i>Brachystelma chlorozonum</i>	Near Threatened	Bushveld habitats.
<i>Dioscorea sylvatica</i>	Vulnerable	Rock outcrops (Recorded)
<i>Elaeodendron transvaalense</i>	Near Threatened	Expected in natural bushveld;
<i>Encephalartos laevifolius</i>	Critically Endangered	Prefers higher altitude grassland.
<i>Eriosema naviculare</i>	Endangered	Expected in natural bushveld;
<i>Siphonochilus aethiopicus</i>	Critically Endangered	Forests

Table 2.2 Protected and RDL species recorded on site

Scientific Name	RDL Status	Protected Status	Vegetation community/ Habitat
<i>Adenia gummifera</i>		MNCA	Rock outcrop habitat
<i>Aloe petricola</i>		MNCA	Rock outcrop habitat
<i>Aloe spicata</i>		MNCA	Rock outcrop habitat
<i>Ansellia africana</i>		MNCA	Natural woodland
<i>Berchemia zeyherii</i>		MNCA	Natural woodland
<i>Dioscorea sylvatica</i>	Vulnerable	MNCA	Rock outcrop habitat
<i>Eulophia streptopetela</i>		MNCA	Rock outcrop habitat
<i>Faurea saligna</i>		MNCA	Natural woodland
<i>Olea europaea</i>		MNCA	Natural woodland
<i>Gladiolus hollandii</i>		MNCA	Natural woodland
<i>Pterocarpus angolensis</i>		MNCA; NFA	Natural woodland
<i>Breonadia salicina</i>		MNCA; NFA	Watercourse riparian
<i>Sclerocarya birrea</i>		MNCA; NFA	Natural woodland

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. Alien invasive vegetation is fortunately well managed on this property and is not problematic. Alien invader species that was observed are listed in Table 2.3.

Table 2.3 Invasive vegetation and weeds identified on site

Scientific Name	CARA Category
<i>Tecoma stans</i>	Category 1 weed
<i>Solanum mauritianum</i>	Category 1 weed
<i>Melia azeredach</i>	Category 3 invader
<i>Jacaranda mimosifolia</i>	Category 3 invader
<i>Lantana camara</i>	Category 1 weed

5. Terrestrial Fauna Report

The fauna investigation was not a comprehensive specialist survey but rather an overview of the available habitats and their potential to be utilized by fauna listed in the checklists prepared by a desktop study. However, the affected area was investigated for fauna actually present.

5.1 Amphibians

A variety of frogs will utilize the aquatic and terrestrial habitats on the property for several reasons, including breeding purposes. Thirty frog species' range of distribution includes the study area, none of these have Red Data status. Only one species, the yellow-striped reed frog (*Hyperolius semidiscus*), is regarded as endemic. There is one species which are protected under the National Environmental Management: Biodiversity Act 2007, under the Threatened or Protected Species (TOPS) Rating, the African Bull Frog (*Pyxicephalus edulis*). No frogs were recorded.

5.2 Reptiles

According to the South African Reptile Conservation Assessment (SARCA); (Bates et al. 2014) approximately 120 species of reptiles can potentially occur in the larger study area. The terrestrial and arboreal habitats present in the larger study area will provide habitat for a diverse group of important reptiles that are considered endemic or are Red Data Listed. Seventeen Endemic (South Africa, Lesotho, Swaziland) and 23 Near Endemic (Southern Africa) species are included with the list as well as two Regionally Endemic (restricted range) species. No locally- or ultra-endemic species (very restricted range) are expected on site. One Red Data Listed species is included with the list (Table 3.1).

Table 3.1 Important reptiles of the study area.

Scientific Name Common Name	Habitat and Ecology	Distribution / Endemic / Range Description	RDL Status
<i>Crocodylus niloticus</i> Nile Crocodile	Inhabits large rivers, swamps, lakes and river mouths.	Widespread throughout Africa. Unlikely , may be visitor to dams	Vulnerable A2ac
<i>Smaug warreni warreni barbertonensis</i> Barberton Girdled Lizard	A rupicolous species occurring on rock outcrops on hillsides and mountain summits, in savanna central Bushveld, Lowveld Mopane.	Regionally Endemic Restricted range. Possibly present , habitat adequate.	Least Concern
<i>Platysaurus intermedius wilhelmi</i> Wilhelm's Flat Lizard	Commonly occurs on granite outcrops and inselbergs where it uses open exposed rock with associated boulders. Narrow rock crevices are important for refuge.	Regionally Endemic to atlas region. Likely to be present , recorded on outcrop habitat.	Least Concern

Several specimens of *Platysaurus intermedius wilhelmi* (Wilhelm's Flat Lizard) were recorded on the rock outcrops. Any negative impacts on these species' prime habitat will also reflect negatively on the maintenance potential of the site for these and

other reptile species. A large loss of indigenous vegetation and habitat (especially rocky habitat) will have a negative impact on the maintenance of reptiles, locally.

5.3 Birds

The literature review indicates that a diverse group of birds may utilize the area. Due to the topography and habitat types present in the study area, the expected birds will be diverse and largely limited to bushveld savannah species. A total of 21 Red Data Listed species are expected in the larger study area (Table 3.2).

Table 3.2 Red Data and Endemic birds that may be present in the study area. National Red Data listed birds according to Taylor M.R. et al, 2015.

Scientific name Common name (p Roberts)	Habitat requirements	National Red data Status	Occurrence Potential
<i>Aegypius occipitalis</i> Whiteheaded vulture (p492)	Dry woodland, arid savannah, often associated with Baobab trees.	VU	Low
<i>Aegypius tracheliotos</i> Lappetfaced vulture (p491)	Open woodland in arid and semi-arid regions. <i>Acacia</i> , <i>Boscia</i> , <i>Terminalia</i> .	VU	Low
<i>Alcedo semitorquata</i> Half collared kingfisher (p173)	Fast flowing streams; clear water and well-wooded banks; rapids. Broken escarpment terrain. Riverbanks to excavate nest tunnels.	NT (Endemic)	Medium
<i>Anastomus lamelligerus</i> Openbilled stork (p618)	Wetlands – floodplains, pans, marshes, ponds, streams, rivers, dams, lakes.	VU	Low
<i>Aquila ayresii</i> Ayre's eagle (p534)	Dense woodland and forest edges, often in hilly areas.	NT	Low
<i>Aquila rapax</i> Tawny eagle (p529)	Woodlands, lightly wooded areas: needs trees.	VU	Low
<i>Bucorcvus leadbeateri</i> Southern ground hornbill (p158)	Grassland, savanna, woodland. From higher than 2000m in grassland with patches of forests and gorges to lowland <i>Mopane</i> woodland.	VU	Low
<i>Buphagus erythrorhynchus</i> Redbilled oxpecker (p973)	Open savanna. Wide tolerance.	NT	Low
<i>Ciconia nigra</i> Black stork (p626)	Shallow water: streams, rivers, marshes, floodplains, coastal estuaries, large and small dams; dry land. Cliffs for breeding.	NT	Visitor
<i>Ephippiorhynchus senegalensis</i> Saddlebilled stork (p625)	Large rivers in open savanna, marshes, lake shores and flood plains.	EN	Low
<i>Falco biarmicus</i> Lanner Falcon (p556)	Open grassland and cleared woodland habitats. Cliff-nester, also in old nests in trees.	NT	Likely
<i>Gyps africanus</i> Whitebacked vulture (p488)	Drier woodlands, mopane, arid Kalahari; tall trees for roosting and nesting.	VU	Low
<i>Gyps coprotheres</i> Cape Vulture (p489)	Both open country (grasslands) and woodland. Reliant on tall cliffs for breeding and roosting. Wanders widely.	VU	Low
<i>Leptoptilos crumeniferus</i> Marabou stork (p626)	Terrestrial and aquatic habitats, excluding desert and forests.	NT	Low
<i>Mycteria ibis</i> Yellowbilled stork (p617)	Dams, large marshes, swamps, estuaries, margins of lakes and rivers, seasonal wetlands.	NT	Visitor
<i>Necrosyrtes monachus</i> Hooded vulture (p486)	Mesic savanna. Well-developed woodlands with tall trees, e.g. Mopane, Jackal berry and Nyala tree.	VU	Low
<i>Pododica senegalensis</i> African finfoot (p314)	Forest and woodland areas: Streams and rivers lined with reeds, overhanging trees and shrubs. Avoids stagnant and fast flowing water. Perennial watercourses, clear water.	VU	Low
<i>Polemaetus bellicosus</i> Martial Eagle (p538)	Open grassland and scrub. Large trees for nests. Wide range of vegetation types: deserts densely wooded and forested areas.	VU	High Recorded
<i>Sagittarius serpentarius</i> Secretary bird (p542)	Open country: Savanna, open woodland, grassland and dwarf shrubland.	NT	Low
<i>Stephanoaetus coronatus</i> Crowned eagle (p541)	Forests and plantations, dense woodland. Forested gorges in grassland.	NT	High
<i>Terathopius ecaudatus</i> Bateleur	Lowland and plains savannah	VU	Low

Abbreviations as follows: CR=critically endangered; EN=endangered; VU=vulnerable; T=threatened; NT=near threatened; LC=least concern; DD=data deficient. Endemic status (SA = South Africa; Sthrn A = Southern Africa)

The site is relatively unused and human traffic is very low due to the inaccessibility of the larger site area. For this reason the bird assemblage in the local area can be assumed to be diverse and representative of the atlas area (with exception of sensitive and specialized birds that may have been affected by negative changes to the larger local environment). The presence of large bird nests (e.g. raptors, vultures or storks) has to be investigated. Large raptors (residents from the nearby Kruger National Park) will certainly visit the site regularly in search of prey as their natural habitat has already been significantly reduced over the past decades. A large loss of indigenous vegetation and habitat will have a negative impact on the maintenance of birds, locally.

Threatened species that have a high likelihood of being present (Table 3.2) are the Lanner falcon, Martial Eagle and the Crowned eagle. These are raptors of which the Lanner falcon and Martial Eagle have a wide tolerance for habitat requirements. The Crowned eagle has a much more limited habitat tolerance and prefers the dense woodland and forest (including riparian forest) found in the valley and surrounds. These raptors prefer large (preferably indigenous) trees (>10m in height) to nest in. No large bird nests (e.g. raptors, vultures or storks) was identified during this assessment but has to be investigated again before clearing of vegetation commences.

5.4 Mammals

Several species of small to medium sized mammals will utilize the natural habitats on the property. Table 3.3 projects the assemblage of Red Data Listed and Endemic mammals that falls within the distribution range of the study area (Child et al, 2016).

Table 3.3 Red Data listed mammals of the study area (Child et al, 2016)

Scientific Name Common Name	Habitat and Ecology	Endemism / Local status	Regional Status 2016	IUCN Status
ORDER: Artiodactyla - Family: Bovidae				
<i>Cephalophus natalensis</i> Natal Red Duiker	Inhabits evergreen forest, tropical/subtropical forest patches, coastal scrub, and riverine thickets.	Likely to be present locally Recorded	Near Threatened B2ab(ii,V)	Least Concern 2016
<i>Damaliscus lunatus lunatus</i> Tsessebe	Generally an inhabitant of floodplains and other grasslands in sub-Saharan Africa.	Locally extinct	Vulnerable D1	Least Concern 2008
<i>Hippotragus niger niger</i> Sable Antelope	The Sable Antelope is an "edge" species that frequents the woodland/grassland ecotone.	Locally extinct	Vulnerable A1ab+C2a(i) +D1*†	Least Concern 2008
<i>Ourebia ourebi</i> Oribi	Oribi inhabit savannah woodlands, floodplains and other open grasslands, from around sea level to about 2,200 m.	Unlikely to be present, habitat inadequate	Endangered C2a(ii)	Least Concern 2016
ORDER: Artiodactyla - Family: Hippopotamida				
<i>Hippopotamus amphibius</i> Hippopotamus	The Hippo is an amphibious creature, spending the majority of its day in water, and emerging at night.	Occasional visitor	Least Concern*†	Vulnerable A4cd 2008
ORDER: Perissodactyla - Family: Rhinocerotidae				

Ceratotherium simum Southern White Rhinoceros	The species is found in grassland in bushveld savanna habitats.	Near Endemic. Locally extinct	Near Threatened A4ad*†	Near Threatened C1+A3ad 2011
<i>Diceros bicornis minor</i> Black Rhinoceros	Black Rhino occur in a wide variety of habitats from desert areas in Namibia to wetter forested areas.	Near Endemic. Locally extinct	Endangered C2a(i)*†	Critically Endangered A2abcd 2012
ORDER: Perissodactyla - Family: Equidae				
ORDER: Artiodactyla Family: Giraffidae				
<i>Giraffa camelopardalis</i> Giraffe	Acacia savannah/woodland and open woodland landscapes are the preferred habitats for this subspecies.	Locally extinct	Least Concern	Vulnerable A2acd 2016
ORDER: Proboscidea Family: Elephantidae				
<i>Loxodonta africana</i> African Elephant	Within South Africa, elephants occur in most habitat types.	Locally extinct	Least Concern*†	Vulnerable A2a 2008
ORDER: CARNIVORA Family: Mustelidae				
<i>Aonyx capensis</i> Cape Clawless Otter	African Clawless Otters are predominantly aquatic and seldom found far from water.	Unlikely to be present, habitat inadequate	Near Threatened C2a(i)*	Near Threatened A2cde+3cde 2015
<i>Lutra maculicollis</i> Spotted-necked Otter	The Spotted-necked Otter inhabits freshwater habitats where water is un-silted, unpolluted, and rich in small to medium sized fishes.	Unlikely to be present, habitat inadequate	Vulnerable C2a(i)	Near Threatened A3cde 2015
<i>Poecilogale albinucha</i> African Weasel	It is mainly found in savanna associations, although this species probably has a wide habitat tolerance.	Unknown	Near Threatened C1	Least Concern 2015
ORDER: CARNIVORA Family: Herpestidae				
<i>Lycaon pictus</i> African Wild Dog	African Wild Dogs were primarily an open plains species, more recent data indicate that they reach their highest densities in thicker bush.	Locally extinct	Endangered D	Endangered C2a(i)
ORDER: CARNIVORA Family: Felidae				
<i>Leptailurus serval</i> Serval	The Serval has quite specific habitat requirements, so it may be locally restricted to smaller areas within its broad distribution range.	Possibly present, habitat adequate	Near Threatened A2c + C2a(i)*†	Least Concern 2015
<i>Panthera pardus</i> Leopard	Leopards occur in the widest range of habitats among any of the Old World Cats.	Possibly present, habitat adequate	Vulnerable C1*†‡	Vulnerable A2cd
<i>Panthera leo</i> Lion	Wide tolerance of habitat. Social prides of several individuals.	Locally extinct	Least Concern	Vulnerable A2abcd
ORDER: CARNIVORA Family: Hyaenidae				
<i>Hyaena brunnea</i> Brown Hyaena	The Brown Hyaena is found in dry areas, rocky, mountainous areas with bush cover in the bushveld areas.	Endemic to southern Africa. Occasional visitor	Near Threatened C2a(i)+D1*	Near Threatened C1 2015

<i>Crocuta crocuta</i> Spotted Hyaena	Widespread in African savannah.	Locally extinct	Near Threatened C2a(ii)*†‡	Least Concern
ORDER: Chiroptera Family: Vespertilionidae				
<i>Miniopterus schreibersii</i> Schreibers' Long-fingered Bat	Fragmented, Primary cause of change: Human interference.	Occasional visitor	Near Threatened	
ORDER: Insectivora Family: Chrysochloridae				
<i>Amblysomus hottentotus</i> Hottentot's Golden Mole	This species occurs predominantly within the mesic eastern regions of South Africa.	Endemic. Unlikely to be present, habitat inadequate	Least Concern	Least Concern 2015
ORDER: Insectivora Family: Soricidae				
<i>Crocidura mariquensis</i> Swamp Musk Shrew	This species has highly specific habitat requirements.	Unlikely to be present, habitat inadequate	Near Threatened B2ab(ii,iii,iv)	Least Concern 2016
<i>Myosorex cafer</i> Dark-footed Forest Shrew	Dark-footed Forest Shrews are restricted to moist, densely vegetated forests and grasslands.	Endemic. Unlikely to be present, habitat inadequate	Vulnerable B2ab(i,ii,iii,iv)*†	Least Concern 2016
ORDER: Primates Family: Cercopithecoidea				
<i>Cercopithecus albogularis</i> Samango Monkey	Samango Monkeys are primarily arboreal, utilising the canopy of evergreen forests.	Unlikely to be present, habitat inadequate	Near Threatened B2ab(ii,iii,v)	Least Concern 2008
ORDER: Rodentia Family: Muridae				
<i>Dasymys robertsii</i> African Marsh Rat	These species have been recorded from a wide variety of habitats, but they rely on intact wetlands in these areas.	Unlikely to be present, habitat inadequate	Near Threatened B2ab(ii,iii,iv)	Least Concern 2016
ORDER: Pholidota Family: Manidae				
<i>Smutsia temminckii</i> Temminck's Ground Pangolin	It is a predominantly solitary, terrestrial species that is present in various woodland and savannah habitats.	Locally extinct	Vulnerable A4d	Vulnerable A4cd*†‡

For interest sake, historically expected species are included (Table 3.3) and it can be concluded that nine species are locally extinct since historic times. The site is relatively unused and human traffic is very low due to the inaccessibility of the larger site area. For this reason the mammal assemblage in the local area can be assumed to be diverse and representative of the atlas area (with exception of locally extinct taxa). The following larger mammals were recorded on site: Impala, Burchells Zebra, Bushbuck, Kudu, Nyala, Common duiker and Red Duiker (RDL). The remaining species are not expected to be present due to the fact that species specific habitat parameters are inadequate or they are locally extinct. It can be assumed that the natural habitats on site provide ideal conditions for a wide range of small mammals.

5.5 Invertebrate Report

Potentially, the natural habitats on site will offer refuge to all invertebrate groups with the available habitats on site. This consists of a large number of species for which field searches are too extensive to be accommodated for the present study. Picker *et al.* (2002) can be referred to so as to get an idea of the large amount of invertebrate diversity that can be expected in the study area. The habitats present have the potential to support approximately 275 species of butterflies. Cross-referenced larval host plants and prey items, a total of approximately 175 species may be present at one time or another. Due to the dynamic mobility of butterflies, any of these species has the potential to be present at a given time, although variable conditions will be a limiting factor. No Red Data Listed species are expected in the study area.

5.6 Pollinators

Pollinators provide an essential ecosystem service that result in the out-crossing and sexual reproduction of many plants. They benefit society by increasing food security in agricultural and natural ecosystem and they play an important role in conserving biological biodiversity (Eardly *et al.* 2006). Pollinator diversity includes an immense range of fauna, ranging from the tiniest invertebrates to relatively large vertebrates. Often, pollinators form part of a highly specific niche in pollinator-plant relationships and the ecosystem integrity as a whole. The loss of a single important habitat requirement (e.g. hides and cover objects, larval hosts, availability of water, etc.) for pollinators in an ecosystem could have far reaching effects, ultimately resulting in extinction. Fragmentation of habitats will undoubtedly also have a negative impact on the occurrence and distribution of pollinators and consequently on the genetic and population integrity of ecosystems. The successful survival of pollinators is thus further motivation for the conservation of undisturbed and unimpaired, interconnected ecological corridors crossing property boundaries in local areas.

5.7 Synopsis of fauna assemblage

The natural habitat on the property is relatively untouched and provide habitat for a diverse range of fauna & flora (biota). Negative impact on fauna can be mitigated keeping the activity sites as small as possible and selecting the least sensitive habitats for development as well as limiting fragmentation of habitat.

6. Sensitivity and Impact Assessment

6.1 Sensitivity rating

The results of the biodiversity investigation indicate that the larger site area is largely modified and the ecological functions and natural biota have been largely lost and has been compromised. The sensitivity zoning (based upon natural integrity, fauna potential and ecological functions) for the different ecological units is delineated in Figure. 1 and summarized in Table 4.1.

Table 4.1 Ecological sensitivity and surface areas

Habitat Description	Ecological Sensitivity
Modified land	Low
Outcrop habitat	High
Riparian habitat	High
Foot-slope woodland	Medium
Mid-slope woodland	Medium
Southern-slope woodland	High
Total	

6.2 Impact assessment

The mountainous terrain, rocky geology and steep slopes over most of the site will be a challenge for any development of the land. Access road construction and site preparation will lead to significant changes to the natural environment and negative direct and indirect impacts such as the loss of natural vegetation and loss and fragmentation of natural habitats and fauna. However, by projecting the development footprint onto previously modified land and on the most level areas as well avoiding sensitive bio-ecological features and habitats, the potential impact on the natural environment is effectively mitigated to medium magnitude.

By designing the development plan to accommodate / conserve sensitive habitats and important biota the cumulative impact will be reduced significantly. The riparian habitat and outcrop habitat is of significant ecological importance as it provides refuge and a corridor that enables animals to move about the larger study area and to migrate in between adjacent terrestrial habitats that are connected by way of this corridor. The southern slope woodland also falls in this category as it maintains unique floral biota. These habitats will not be directly affected by the activities and will be protected by a buffer zone. The property is approximately 220Ha in extent of which the applicant wish to clear <20Ha. This is equal to 10% of the property that will be modified, which is a relatively small development footprint, the remainder of the land will remain in its present state.

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. This activity will be highly significant on site level, but as this habitat type is classified as *Least threatened* and is well represented locally and regionally it can be reasoned that this impact will be of medium significance locally and medium-low significance regionally. Protected trees will be destroyed when the site is cleared.

The following long term development strategy is proposed, in order to mitigate the loss of indigenous vegetation and habitat as well as fragmentation of habitat and encroachment of invasive alien vegetation. The site topography suggests that it will be impossible to develop large parcels of land without involving major earthmoving activities to level the land and destroying watercourses. By respecting watercourses and outcrop habitat (with a 10m buffer) and keeping below a 20% gradient. Areas that can be considered are indicated on Figure 1. In order to mitigate for the loss of large and protected trees it is proposed to conserve large and protected trees and limit vegetation clearing to underbrush, smaller trees and invasive vegetation. The closed woodland structure will have to be modified to an open woodland scenario in order to make room for the cultivation of Macadamia trees. The first objective will be to set a minimum standard of $\pm 10\%$ indigenous tree cover. This will be tested by employing the following method.

- 1) Clear all alien invasive vegetation and underbrush from the development sites.
- 2) Specialist investigation to verify the large trees which will be measured at Diameter at Breast Height (DBH) of 1.3m.
- 3) The following standard will be used to select trees for conservation:
 - 25cm DBH for any large trees.
 - 15cm DBH for protected trees (national and provincial legislation).
- 4) Macadamia trees may not be planted underneath the canopy of the conserved trees as it may damage the root systems.
- 5) The project will be monitored and conserved trees will be thinned to 10% tree cover after 5 years if the project needs more space.

The impact assessment is propagated in Table 4 and additional mitigation measures in order to ensure that potential impacts are minimized are listed in Table 4. The way of reasoning discussed in the preceding paragraphs and the impact assessment

indicates the areas that may be considered for development (Figure 1). This gives a total of approximately 19Ha available for cultivation.

7. Conclusion and Recommendations

The biodiversity assessment concludes that most of the site is largely in a natural state and of significant biological and ecological importance. However, specific areas may be considered for development where potential impacts on the natural environment can be managed to an acceptable level. Alien invasive vegetation control will be a crucial part of mitigation during the entire lifespan of the project. Mitigation measures are listed in Table 4 (Refer also to Figure. 1).

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These include members of the IUCN Species Survival Commission Specialist Groups, IUCN Red List Partners, and many others, including experts from universities, museums, research institutes and non-governmental organizations. Website: www.iucn.org/redlist

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Appendixes

APPENDIX 1: SPECIALIST DETAILS

