

FINAL ENVIRONMENTAL IMPACT REPORT

ALTERATION OF NATURAL LAND AND TRANSFORMED LAND (PLANTATIONS)
FOR AGRICULTURAL USE AND CLEARANCE OF AN AREA OF 1300 HA ON THE
FARM: KROKODILSPRUIT 248 JT: WHITE RIVER AREA, MPUMALANGA.
PROJECT NR. 1/3/1/16/1E-203

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1. EXECUTIVE SUMMARY

This initial phase of the **Environmental Investigation Process** was conducted over a period of 9 months in the White River area. The proposed debushing of natural and transformed land will allow the applicant the opportunity to expand his farming enterprise and ensure a long-term sustainable approach to his business activities.

The public participation process was advertised locally and regionally in the printed media, on site and at various sites of interest and public access in the town of White River. The immediate neighbours of the property were contacted specifically via e mail and requested to attend the Site Meeting.

All the reports were made available for comment at the **White River Library, the farm office of the applicant, the White River Municipal offices and to all individuals and departments that registered and or attended the Public Site Meeting**. Comments received from various departments were included in the Issues and Responses Report (**See Appendix 2**). Where applicable the comments were listed for consideration during the impact assessment phase of the project and included in the final recommendations.

This **study and evaluation** looked at the various aspects that could be affected by the implementation of such a proposal. Experience gleaned from similar projects in the Lowveld was sourced for additional input.

The **Environmental Impact Assessment** investigated the **significance** of impacts, **alternative** options and **mitigation** measures where applicable. The EIR also includes an **Environmental Management Programme (EMPr) and Specialist Studies** on the biodiversity and ecology of the designated project site, a **Heritage Impact Assessment (HIA), Soils Study** and a confirmation of the **availability of water** for the establishment phase of the proposed project. The **evaluation process** did not reveal any fatal flaws during the assessment process.

The following **key issues** are applicable:

1. Establishment of Orchards: The developer who has more than **30 years of experience of crop farming** in the Lowveld area has expressed the wish to expand his farming operations with an additional 1 300 ha.

2. Biodiversity Conservation: **55% of the farm is set aside for biodiversity** conservation and all riparian zones, drainage lines, rocky outcrops and sensitive areas will not be developed.

3. Specialist Study: The **Specialist Study on Biodiversity** and ecology followed the guidelines described in the Mpumalanga Biodiversity Sector Handbook (MBSP) as compiled by Dr. Mervyn Lötter *et al.* Following these guidelines, the project area:

- Will not affect any critical biodiversity areas;
- Impacts on natural habitat types and ecosystems have been reduced as most of the project area is found on historically **modified lands and degraded areas** whilst **55%** of the farm will remain in natural state;
- Will ensure the conservation of biodiversity in- and around the project area by maintaining **ecological corridors** which promote the sustainability of ecological support areas primarily to the west and south west of the project sites.

4. The Project: Additional **key issues** include:

- The applicant has access to **adequate water** as per entitlements and lawful water use to establish the crops;
- The soils are **suited to crop farming** especially macadamia and avocado;
- Two **low level water crossings** are required as the applicant will link up various sections of the farm with existing roads and causeways;

5. Expertise: The applicant has access to the equipment, trained staff and knowledge to undertake this expansion project.

6. Best Practice: The applicant has implemented Agriculture Best Practice Techniques on all his farming operations to date and these will continue with this expansion project. These are:

- **Orchards:** Establish the plants on good, well drained soils in line with the recommendations provided by the soil scientist.
- Design the orchards using a self-steering Real Time Kinematic (RTK) system that is accurate to 2cm, thus increasing the yield potential per hectare.
- Design the orchards along the contours of the farm and follow the lie of the land.
- Promote controlled, gradual run-off and drainage channels.
- Space crop plants as per crop type specifications.
- Use disease free plants from recognised, accredited nurseries.
- Prepare the land using fertilisers recommended by an accredited agronomist and ensure that lands are weed free.
- Install water saving irrigation systems which conserve water use over the long term.

7. Area Integrity: Maintain the integrity of the riparian zones, the ecological corridors and all buffer areas as indicated on the project maps and as delineated by Dr. Deacon and described in the Specialist Study.

8. Special Plants: Ensure that all Protected Trees (where applicable) and plants of special concern are harvested and relocated by the nurseries or approved service providers. All translocations **must be permitted** by DAFF and MTPA and the ECO must oversee this process where applicable.

9. Heritage Aspects:

- It is recommended that an Environmental Control Officer (ECO) oversee the implementation of the development phase and the handling procedure of any finds is described in the Environmental Management Programme (EMPr).
- Should any artefact, or historical site be incidentally discovered during excavations for foundations as well as in future, all works must cease with immediate effect. The find must be reported to the Project Manager for the development and the ECO for the project.
- These representatives will initiate an Action Plan in conjunction with SAHRA and the developer to address the management and handling of the find.
- **Existing Grave Sites: (See HIA in Appendices Document):**
- G1: Area to be demarcated clearly and all the trees within the perimeters of this site and which impact negatively on the graves must be removed and treated to prevent re-growth. A perimeter of 15m must be kept clear around the site. Access must be allowed for visitation.
- G2 – G7: The grave sites must be fenced off and a perimeter of 15m be kept clear of the site. Access must be allowed for visitation.
- **Stone Walls: Late Iron Age (LIA):**
- The LIA stone wall is situated next to the main access road (at the entrance). It is outside of the study area. It is recommended that care should be taken not to impact negatively on this feature, as it was the only LIA stone wall which was identified during the survey on the farm.

10. Conditions to be considered in Decision Making:

These conditions are based on the identification of mitigation measures and solutions that minimise impacts on biodiversity and conflicts in land-use by making use of use of CBA maps in the Environmental Impact Assessment.

- **Retain natural habitat and connectivity in CBAs and ESAs:** The avoidance of environmentally sensitive areas identified during the Sensitivity Mapping exercise is regarded as the single most effective possible mitigation measure for mitigating impacts on the ecology of the project area.
- The proposed clearing of areas should not impact on any CBA or ESA features: Four CBAs have been identified and all of these areas are conserved or buffered by either the Nature Reserve, areas of no development or inside buffered areas. All the areas covered by a continuous network of buffers and no-go areas comprise of 2593 ha of untransformed habitat.
- **Avoid** environmentally sensitive areas identified on the Sensitivity Mapping exercise: Of all the areas that were identified with high values of sensitivity, only 35% of Untransformed Grassland and 28% of Untransformed Woodland will be impacted upon during the clearing of vegetation. The perennial rivers, most of the drainage lines, all of the natural forests, the entire floodplain wetland and all the rocky outcrops will be conserved by the Nature Reserve, areas of no development or inside buffered areas.
- As a matter of priority, sites must be chosen that have already been cleared or altered (old lands and clearing forestry). Approximately 1735 ha of areas of mostly Medium to Low sensitivity (old lands and cleared forestry) can be considered for the farming activities.
- **Apply the mitigation hierarchy:**
- By making use of **“best practice guidelines”** during the construction- and operational phases, identify the best practical environmental options by avoiding loss of biodiversity and disturbance to ecosystems, especially in CBAs, by applying the mitigation hierarchy and the land-use guidelines recommended. In particular management actions should be implemented such as:
 - the re-establishment of indigenous vegetation wherever possible;
 - control of storm water run-off;
 - ongoing repair- and stabilisation of any erosion;
 - implement an alien plant control programme;
 - make use of current roads or tracks as far as possible;
 - implement a veld management plan for the conservation area, which emphasises the use of sustainable grazing and controlled fires;
 - prevent erosion and sediment-laden water from entering the adjacent watercourses;
 - generic buffers should be established and maintained around wetlands;
 - strict management of potential sources of agrochemical pollution;
 - avoid over irrigation;
 - maintaining an intact riparian corridor.
- **Remedy degradation and fragmentation through rehabilitation:**
- A network of corridors will be established by the buffers to CBAs and other sensitive habitat and connect most of the farm with the proposed Nature Reserve and other no-go areas: These are:
 - Buffers around rivers;
 - Buffers around drainage lines;
 - Buffers around wetlands;
 - Buffers around inselbergs;
 - Forests utilised as buffers around valley drainage lines.
- In the process of demarcating the agricultural land, larger areas were clumped together to prevent creating unconnected spaces.

- Planting or rehabilitation of cleared or excavated areas should commence as soon as the development activity is completed.
- Clear invasive alien vegetation and rehabilitate existing degraded habitats.
- **Secure priority biodiversity in CBAs and ESAs through biodiversity stewardship:**
- Set aside land of high biodiversity importance for conservation through biodiversity stewardship options. Where biodiversity losses are unavoidable, set aside another piece of land of equivalent or greater biodiversity importance for conservation:
- The management of Krokodilspruit have agreed to set aside a 735 ha Nature Reserve that will conserve large areas of North-eastern Mountain Grassland, areas of Eastern Dry Afro Temperate Forests and a number of rocky outcrops and inselbergs. A floodplain wetland and surrounding buffered areas will add an additional 80 ha to the reserve, establishing a **sanctuary of 815 ha near-pristine habitat.**
- **Promote long-term persistence of taxa of special concern:**
- Currently only plantation areas are being cleared and once a decision is made regarding this application, a fauna and flora survey (of the designated areas to identify and list the species of conservation importance and plans to relocate) will be submitted to the MTPA.
- Of the approximate 4113 ha on the farm, 2378 ha consists of untransformed habitat. The planned Nature Reserve will conserve 815 ha, which includes 41% of all the untransformed vegetation types. The conserved areas of 2593 ha (including buffered habitat) which forms a favourable network of connecting corridors, will form a refuge for most of the species of conservation importance and faunal species can then move to these areas.
- **Integrating *in situ* biodiversity-sensitive management into the overall design and operation of the proposed land-use development:**
- The state-of-the-art technology utilised on the farm involves the use of permeable/breathable agricultural fabric to all but eliminate weed growth and limit the competition for growth.
- The fabric also retains water, limits evaporation and maintains a healthy soil temperature.
- This water saving low flow irrigation system has a broader water distribution, allows for better nutrient utilisation, larger and enhanced yields as well as lower nutrient usage.
- The system of controlled traffic farming is described as a concept that was developed to increase crop yield by reducing soil compaction.
- Irrigation is placed underneath the agricultural fabric; the low flow drip thus ensures no over irrigation.
- **Fertilisers Used:** Water soluble fertilisers are mixed on the farm and dosed into the irrigation lines. The same principles above apply, fertiliser is only injected into targeted areas therefore there will be no negative impact on indigenous trees or shrubs.

Conclusion: The evaluation process did not reveal any fatal flaws during the assessment of potential impacts. The project satisfies the requirements of sustainable integrated environmental management. Provided the developer implements the implications/conditions of this report, and the mitigation measures proposed, it is recommended that the change in land use is approved.

2. ABBREVIATIONS

ASAP	As Soon As Possible
Asl	Above sea level
cm	centimetre
DAFF	Department of Agriculture, Forestry and Fisheries
DARDLA	Department of Agriculture: Resource Management: Provincial
DARDLEA	Department of Agriculture, Rural Development, Land and Environmental Affairs
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESKOM	Electricity Supply Commission
GPS	Geographical Positioning System
HIA	Heritage Impact Assessment
HIV	Human Immunodeficiency Virus
I&AP's	Interested and Affected Parties
IEM	Integrated Environmental Management
LFIS	Low Flow Irrigation System
m	metre
mm	millimetre
m/s	metre per second
NA	Not Applicable
NDA	National Department of Agriculture
NEMA	National Environmental Management Act
MTPA	Mpumalanga Tourism and Parks Agency
PDI	Previously Disadvantaged Individual
RES	Rhengu Environmental Services
SABS	South African Bureau of Standards
SAHRA	South African Heritage Resources Agency
sqm	square metre

3. APPLICABLE LEGISLATION

Legislation and guidelines that are being considered for the environmental impact assessment process are as follows:

3.1. Constitution of the Republic of South Africa (No.108, 1996):

The Constitution is the supreme law of South Africa, against which all other laws are measured. It sets out several fundamental environmental rights, which include:

The Environmental Clause:

Section 24 of the Constitution outlines the basic framework for all environmental policy and legislation:

It states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation; promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic- and social development.

Access to Information:

Section 32 of the Constitution provides that everyone has the right of access to any information held by the State or another juristic person and that is required for the exercise or protection of any rights.

Fair Administrative Action:

Section 33 of the Constitution provides for the right to lawful, reasonable and procedurally fair administrative action.

Enforcement of Rights and Administrative Review:

Section 38 of the Constitution guarantees the right to approach a court of law and to seek legal relief in the case where any of the rights that are entrenched in the Bill of Rights are infringed or threatened.

3.2. National Environmental Management Act (No. 107, 1998):

The National Environmental Management Act (NEMA) is South Africa's overarching environmental legislation. The Act gives meaning to the right to an environment that is not harmful to health or well-being, entrenched in Section 24 of the Constitution of the Republic of South Africa, Act 108 of 1996. The National Environmental Management Act (NEMA, Act No. 107 of 1998) establishes a set of principles which all authorities (organs of State) have to consider when exercising their powers, for example, during the granting of permits. These include the following:

- Development must be sustainable.
- Pollution must be avoided or minimised and remedied.
- Waste must be avoided or minimised, reused or recycled.
- Negative impacts must be minimised.
- Responsibility for the environmental consequences of a policy, project, product or service applies throughout its life cycle.

NEMA further provides for an equitable access to natural resources, environmental protection and the formulation of environmental management frameworks. The Act is underpinned by the global concept of sustainable development.

The interpretation, administration and application of NEMA are guided by fundamental principles of sustainable development, provided in Chapter 1 of the Act. "Development must be socially, environmentally and economically sustainable" (s 2(3)) and requires the consideration of all relevant factors, which are elaborated by eight sub-principles".

These principles include:

- The polluter pays principle (s 2(4) (p)).
- The public trust doctrine (s2(4)(o)).
- The equitable access to natural resources (s 2(4)(d)).

Section 24 of the Act states that all activities that may significantly affect the environment and require authorisation by law must be assessed prior to their approval.

The Act goes on to list the requirements for an assessment. These include:

- The environment likely to be affected by the activity and viable alternatives.
- Cumulative effects and their potential significance.
- Mitigation measures including the "no go" option.

Section 28(1) states that "every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring".

If such degradation/pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution. These measures may include:

- Assessing the impact on the environment.
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks.
- Ceasing, modifying or controlling actions which cause pollution/degradation.
- Containing pollutants or preventing movement of pollutants.
- Eliminating the source of pollution.
- Remedying the effects of the pollution.

3.3. National Water Act (No. 36, 1998):

The Act details the management of South Africa's water resources in terms of utilisation and duty of care to prevent water pollution. The act further details the legislation pertaining to the pollution of water reserves (surface and ground water) and the remediation/rehabilitation thereof.

3.4. Mpumalanga Nature Conservation Act (No. 10, 1998):

An Act to consolidate and amend the laws relating to nature conservation within the Province and to provide for matters connected therewith. This Act makes provision with respect to nature conservation in the Mpumalanga Province. It provides for, among other things, protection of wildlife, hunting, fisheries, protection of endangered fauna and flora as listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the control of harmful animals, freshwater pollution and enforcement. The Mpumalanga Parks Board (now MTPA), established by section 2 of the Eastern Transvaal Parks Board Act, 1995, shall be responsible for the administration of the Act.

3.5. Conservation of Agricultural Resources Act (No. 43, 1983):

This Act provides for control over the utilisation of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants and for matters connected therewith.

3.6. National Environmental Management: Biodiversity Act (No.10, 2004):

To provide for, inter alia, the management and conservation of South Africa's biodiversity, to protect species and ecosystems. The Act also covers alien- and invasive species and genetically modified organisms that pose a threat to biodiversity.

The objectives of this Act are to within the framework of the National Environmental Management Act provide for:

- The management and conservation of biological diversity within the Republic and of the components of such biological diversity.
- The use of indigenous biological resources in a sustainable manner.
- The fair and equitable sharing among stakeholders of benefits arising.
- To give effect to ratified international agreements relating to biodiversity.
- To provide for co-operative governance in biodiversity management and conservation.
- To provide for a South African National Biodiversity Institute to assist in achieving these objectives of this act.

3.7. National Environmental Management: Protected Areas Act (No. 57, 2003) as amended by the National Environmental Management: Protected Areas Amendment Act (No 31 of 2004):

To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; for the establishment of a national register of all national, provincial and local protected areas; for the management of those areas in accordance with national norms and standards; for inter-governmental co-operation and public consultation in matters concerning protected areas and for matters in connection therewith.

3.8. National Environment Conservation Act (No 73, 1989):

The purpose of the Act is to provide for the effective protection and controlled utilisation of the environment and for matters incidental thereto. It embodies the concept of control of activities which may have detrimental effects on the environment which may be:

- Land use and transformation.
- Water use and disposal.
- Resource removal, including natural living resources.
- Resource renewal and,
- Agricultural processes.

The Act also provides for the control of Environmental Pollution through:

- Prohibition of littering.
- Removal of litter.
- Waste management.

In addition to the above the Act provides for the regulations regarding waste management such as:

- The classification of different types of waste and the handling, storage, transport and disposal of waste.
- Reduction of waste.
- Utilisation of waste by way of recovery, re-use or processing of waste.
- Location, planning and design of disposal sites and the site used for waste disposal.
- Administrative arrangements for the effective disposal of waste.
- Dissemination of information to the public on effective waste disposal.
- Control over the import and export of waste, etc.

3.9. National Heritage Resources Act (No. 25, 1999):

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). The enforcing authority for this act is the South African National Heritage Resources Agency (SAHRA). In terms of the Act, historically important features such as graves, trees, archaeology and fossil beds are protected. Similarly, culturally significant symbols, spaces and landscapes are also afforded protection.

In terms of Section 38 of the National Heritage Resources Act, SAHRA can call for a Heritage Impact Assessment (HIA) where certain categories of development are proposed. The Act also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is deemed adequate, a separate HIA is not required.

According to the National Heritage Resources Act (Section 38(8)), such an assessment has to meet the requirements of the relevant heritage authority. The following requires the approval of SAHRA:

- Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised.
- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length.
- Any development or other activity which will change the character of a site - exceeding 5 000 m² in extent; or involving three or more erven or divisions thereof which have been consolidated within the past five years.
- The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority.
- The re-zoning of a site exceeding 10 000 m² in extent.
- Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

3.10. Occupational Health and Safety Act (No. 85, 1993):

To provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety and to provide for matters connected therewith.

3.11. Promotion of Access to Information Act (No 2, 2000):

To give effect to the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights and to provide for matters connected therewith.

3.12. National Environment Management: Waste Act, 2008 (No 59 of 2008):

To reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.

- To provide for institutional arrangements and planning matters.
- To provide for national norms and standards for regulating the management of waste by all spheres of government.
- To provide for specific waste management measures.
- To provide for the licensing and control of waste management activities.
- To provide for the remediation of contaminated land.
- To provide for the national waste information system.
- To provide for compliance and enforcement.
- To provide for matters connected therewith.

Section 24 of the National Environmental Management Act (1998) requires that activities that require authorisation or permission by law which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorising, permitting, or otherwise allowing the implementation of an activity. The EIA process is the tool used to apply for authorisation from the regulating authority for the relevant activities identified that may impact on the environment.

3.13. National Forests Act, 1998 (Act No. 84 of 1998):

No person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated.

3.14. ACTIVITY NUMBER LISTED UNDER NEMA

This assessment considered the following listed activities:

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per the detailed project description:
EIA Regulations R 983: Listing Notice 1 of 2014.	12	The development of 2 low level river crossings exceeding 100sqm in size, where such development occurs within a water course or within 32m of a water course.
EIA Regulations R 983: Listing Notice 1 of 2014.	19	Infilling will be required to stabilise the all-weather river crossings. This will take place within 32m of a water course.
EIA Regulations R 984: Listing Notice 2 of 2014	15	The clearance of an area of 20 hectares or more of indigenous vegetation.
EIA Regulations R 985: Listing Notice 3 of 2014	12	Indigenous vegetation will be cleared to accommodate the new orchards.
EIA Regulations R 985: Listing Notice 3 of 2014	14	The development of 2 low level river crossings exceeding 100sqm in size, where such development occurs within a water course or within 32m of a water course.

4. NEEDS AND DESIRABILITY OF THE PROPOSED ACTIVITY: ALTERATION OF NATURAL- AND TRANSFORMED LAND FOR AGRICULTURAL USE.

- **Introduction:** Development proposals should always follow an **integrated approach** to project planning.
- With this in mind the project must make economic sense, whilst at the same time environmental damage and impact must be kept to a minimum and or mitigated fully.
- Finally, the needs and aspirations of society must be met with the view to producing the best long-term product for the community (internal- and external community) at large.
- Having said this it must be noted that developers are spending thousands of Rand of hard-earned money to ensure the financial viability of each proposed project.
- Developers, in most cases, think long and hard before they channel money towards a specific project.
- It is not in their interest to embark upon a project without having assessed all the risks involved. They, just as society, are keen to see that the project is a long-term **sustainable** success.
- **Strategic Regional Initiatives:** During the late 90's the Government in conjunction with local businesses and councils implemented the **Maputo Corridor** initiative in the Nkomazi Region of Mpumalanga.
- The Premier of the Province at the time (Mr. Mathews Phosa) went on record in the media and other forums where he encouraged local businesses and developers to embrace this initiative in all its facets.
- The corridor was to become the umbilical cord which linked South Africa to the Port of Maputo and to the economic opportunities of both countries.
- Specific emphasis was placed on the tourism potential; natural resources (e.g. gas); service provision; agricultural markets and the export possibilities via the harbour.
- The **Produce Market** currently under construction near Nelspruit (Mbombela) is further evidence of the prospective growth envisaged for the agricultural sector in the Province and combined with the advent of the **Nkomazi Special Economic Zone** near Komatipoort all indications are that agriculture has a bright future in the Province.
- Local Councils are thus very supportive of developments associated with the expansion of agriculture and the sustainable land use envisaged by this project proposal under investigation compliments the regional vision that the authorities have for this area.
- **The Proposed Development of Additional Orchards and the Need for more Nuts:**
The Farm Krokodilspruit has recently been purchased by the Danroc company. The need for additional macadamia- and avocado fruit world-wide has allowed businessmen and farmers an opportunity to plan ahead and consider expanding their fruit producing enterprises.
- At this stage South Africa produces just over 20% of the worlds macadamia nuts and all indications are that this percentage can be expanded by three times this figure in the years to come. In order for South Africa to capitalise on this need, farmers are encouraged to plan ahead and plant more trees.
- Developing the farm to realise its full potential thus makes economic sense.
- Marketing and sales of fruit and other agricultural products will thus continue as per the economic vision described above.

- **Will the new orchards be beneficial to the community at large?** Yes. It will create and maintain a plethora of new jobs and work opportunities presently not possible on the farm in its current state.
- **What are the economic benefits of the new orchards?** Development of the new orchards will plough more than R500 million into the local economy with a positive return in 12 years' time.
- **Neighbouring Land Uses and Compatibility:** The project area is surrounded by agriculture and a diversity of similar, compatible farming operations which include macadamia production.
- No objections to the project proposal have to date been submitted by any of the neighbours.
- **Financial Viability and Agricultural Potential of the Property:** The project site (Farm: Krokodilspuit) has been farmed for many years (since the early 1930's) producing crops for the internal agricultural market and more than 1500ha of blue gum plantations have produced timber for the forestry industry. The plantations and some additional natural land will now be replaced by macadamia (60%) and avocado (40%) trees.
- A financial analysis by the Project Team has confirmed that the farm has the potential to meet the demands for new nuts and fruit given the world-wide growth predicted for these products.
- **Land Claims:** The Lowveld Area was subjected to various land claim assessments by the Land Claims Commissioner in the past few years and combined with a recession in the agricultural sector, farmers were until recently reluctant to expand their enterprises under prevailing uncertain conditions.
- The project area is owned by the applicant and although a land claim has been lodged against the property the applicant has engaged with the commissioner in this regard.
- No objections to the proposed improvement of the infrastructure have been lodged with the EAP. **(See Appendix 4.2.)**
- **Industry Growth:** The predicted growth in the need for additional nuts has stimulated the industry to expand.
- The financial model for this property based on crop production is dependent on the expansion of the arable land.
- To this end the proposal then makes economic sense as crop production is a long-term solution and will ensure that production is optimised sustainably into the future.
- This also provides the proponent an opportunity to remain financially competitive in an ever challenging and diverse business market.
- **Social Commitment and Job Creation:** Several business sectors and community members will benefit if this project is successful.
- The proponent and his family will benefit financially in the long term. In the short to medium term however, the development node will require substantial capital (Approximately R500 million) to develop the orchards and replace the plantations.
- Additional infrastructure will be required including storerooms, pack sheds, maintenance centres for vehicles and the installation of irrigation service lines and pump stations.
- The Lowveld Region and outlying rural areas have been classified as one of the poorest in South Africa. Conservative estimates list jobless figures in the region of 30%. HIV infections are just under 40% and many job seeking immigrants from neighbouring countries migrate to this area and add to the challenges faced by rural communities.

- Construction companies and forestry teams will be tasked with building the infrastructure and removing the blue gums. The entire farm boundary is being fenced in to provide for additional security. These projects generate additional income in the community and the projects are labour intensive and ongoing for the foreseeable future.
- This will provide work opportunities (estimate 15-20 persons) for both skilled and unskilled labour (machine operators; bricklayers and labour to clear some of the vegetation).
- Unskilled labour will earn in the region of R 3200.00 per person per month.
- The opportunities above do not include adding to subsidiary services such as an increase in maintenance of vehicles; retail needs and medical facilities. This development will thus benefit the businesses in White River.
- **Location:** Is this the correct location for the project?
- Yes. Approximately 2000ha were assessed for conversion from natural land to arable farming land. Various options were analysed and the importance of maintaining ecological support areas and corridors played a vital role in decision making.
- See the Project Maps in **Appendices 1 and 4.4.2** for more detail in this regard.
- The project site (farm) is fixed and the proponent does not own similar land elsewhere. In terms of compatibility of land uses this development will fit in with similar developments in the area and neighbouring farms. The location is thus regarded as ideal.
- The project site is surrounded in all wind directions with similar land uses.
- **Environmental (Ecological) Implications/Limitations:** An assessment of the prevailing fauna and flora has not revealed any threats to species/habitat and or highlighted any critical limitations to the development which can be of ecological significance or which cannot be mitigated to ensure sustainability of the environment.
- Detail studies were commissioned to ensure that impacts on the environment are clearly understood and the results are included in the specialist reports on biodiversity with the Environmental Impact Assessment Report.
- All indications are that by **not developing the area set aside for the nature reserve** more of the natural vegetation which is endemic to the area will remain intact and this will ensure that ecological corridors (**as per MTPA policy and requirements**) are maintained on the farm. All rocky outcrops, drainage lines and wetlands will also be demarcated as no go zones, i.e. **no development allowed**. See the **Project- and Development Maps in Appendices 1 and 4.4.2**.
- **Positive Impacts:** Job creation, i.e. prevention of job losses, is regarded as a significant impact which will spill over into the well-being of several families in the local community.
- Furthermore, the financial viability of the project will translate into economic growth for the investors and the local Mbombela area as a whole, albeit in the medium to long term.
- The growth in agricultural production together with the improvement in the sustainability of the farm will result in higher incomes and ensure food/crop security.
- **Access Road:** The access to the Project Area from the Provincial tar road is functional and does not require any changes or upgrading.
- Construction/harvesting/marketing vehicles and equipment will have unhindered access to the project site.

- **Timing:** Is this the right time to implement such a development?
- The current drought (2015-2018) has highlighted the fact countrywide that crop production must plan ahead to remain sustainably competitive.
- Access to reliable water for irrigation within the framework of allocated entitlements is in place on the farm and soil types are suitable for the production of crops. The applicant is planning ahead in an ever-changing market and positioning their business to meet the demands of the future.
- **Integrated Environmental Management:** The objective of integrated environmental management is to balance all interests towards sustainability. For many the word “sustainability” remains a unicorn of environmental management; a myth that is often poorly defined and or understood.
- As participants in environmental management we can at best evaluate the project for its inherent advantages and disadvantages. With the help and input of the Public, Specialists and Project Consultants we endeavour to draw a clearer picture with which we all can associate and hopefully agree to and support.
- We raise questions which include but are not limited to: Is the proposed activity/development harmful to the environment?; Did we ensure that all perceived impacts were mitigated adequately in favour of maintaining the environmental integrity?; Will the local/regional/national community benefit from this development and or is the development an improvement on an old, outdated concept?; Did we ensure that the general public participated in this project from day of advertisement till submission of documentation? Did we ensure that the economics of the activity were in place prior to project implementation? Is the project feasible? What are the alternatives? Have we taken into account the various Government role players with regards to sharing information and or authorisation requirements of the project? The list goes on, however the team associated with this proposal is confident that we have ticked the right boxes to date and can answer in the positive to the questions listed above. In some cases, we have suggested measures of mitigation to soften the impact towards a degree of sustainability.
- **Need and Desirability of the Proposed Project:** In conclusion, it is the opinion of the EAP that the cumulative effect of the factors listed above will result in a positive contribution in the fields of economic benefit and social upliftment in the region, with little or at most manageable impacts in the environmental arena.

5. GENERAL INFORMATION

Project Title	Environmental Impact Assessment: Alteration of Natural- and Transformed Land (Plantations) for Agricultural Use (Approximately 1300ha) on the Farm: Krokodilspruit 248 JT: White River Area, Mpumalanga.
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Name of Applicant	Danroc (Pty) Ltd.
Address	P. O. Box 469 Barberton 1300
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E Mail	warren@danroc.co.za

Name of Consultant	Rhengu Environmental Services (RES)
Address	P. O. Box 1046 Malelane 1320
Contact Person	Ralf Kalwa
Telephone Number	082 414 7088
Fax Number	086 685 8003
Date of Report	July 2019

Date of Inspection/s Meetings Persons Present	Site and	Meeting 25 January 2019: Government Officials and General Public: Warren Hearne: Applicant Andrew Deacon: Project Ecologist. Ralf Kalwa: Rhengu Environmental Services: EAP See Minutes attached in Appendix 2.
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6. LOCALITY INFORMATION

Name of Place and Locality.	The development site is found on the Farm: Krokodilspruit 248 JT. This farm is located approximately 8km north of White River on the tar road between White River and Sabie. The farm is bordered in all wind directions by farms practicing agricultural land uses.
Region/District	The property is found in the Mbombela Region of the Lowveld, between the towns of White River and Sabie in Mpumalanga.
Title Deed	See Appendix 4.1 .
Size of Proposed Development	Approximately 1300 ha.
Magisterial District	Mbombela Municipality.
Nearest Town	White River.

Type of area where the proposed development will take place (mark all applicable blocks).

CBD		Rural	<input checked="" type="checkbox"/>	City		Recreational area	<input checked="" type="checkbox"/>
Commercial		Agricultural	<input checked="" type="checkbox"/>	Town		Informal Settlement	
Industrial		Staff Housing		Township		Other:	
Tourism		Road	<input checked="" type="checkbox"/>	In a Building			

7. PROJECT DESCRIPTION

Current Status and Infrastructure:

- The Krokodilspruit Farm is **well serviced** with several access roads and service lines which include potable/irrigation water and power supply (Eskom).
- The farm is equipped with **storage dams** and **pump houses**.
- The property is **game fenced**. Several smaller game species occur naturally on the farm.
- **Access** to the proposed orchards is largely in place. The farmer has spent a significant amount of time and effort in rehabilitating the road network and installing anti-erosion measures, storm water control and discharge points.
- **Road Access** for purposes of marketing and product sales is in place and functional.
- **Plantations:** Existing blue gum plantations have fallen into disrepair and are derelict. These plantations will be replaced with macadamia- and avocado orchards. This work is currently ongoing.
- Homesteads, storerooms, garages, warehouses, staff housing etc. require attention and must be upgraded where applicable and as the need arises.
- **No Site Alternatives:** The land earmarked for development is fixed and is part and parcel of an existing farming enterprise. By virtue of its position it links into existing agricultural land uses in the surrounding area.
- By optimising the potential of the farm, the applicant is confident that the land can continue to contribute sustainably to the agricultural business opportunities in- and around White River and the export market.
- No other site is available to be considered for an alternative.
- All existing farming operations will remain the same. The farmer has access to all applicable expertise, equipment and logistics to expand the farming operation.
- Once established, the benefit of these high-value crops can be derived over many years.

Planned/Proposed Activity and Project Specifics:

- The proponent wishes to remove indigenous vegetation on approximately 1300ha and establish orchards for agricultural use.
- The development will include the establishment of orchard roads.
- The construction of two low level river crossings will be required to accommodate equipment and vehicles during harvesting- and general farming operations to the various orchards.
- Orchard roads will be less than 3.5m wide and will be maintained to allow for a gradual controlled run off of water using mitre drains and speed humps.
- Modern low flow irrigation systems will be installed to each orchard.

8. DESCRIPTION OF NATURAL ENVIRONMENT (Mucina and Rutherford, 2006)

Topography	Mountain	Midslope	Flats	Valley Bottom	Wetland	River	Other
		X	X	X	X	X	
Geology	<ul style="list-style-type: none"> • Veld Type: SVI 9 Legogote Sour Bushveld: Mucina and Rutherford (2006). • Most of the area is underlain by gneiss and migmatite of the Nelspruit Suite, but the southern part occurs on the potassium-poor rocks of the Kaap Valley Tonalite (both Swazian Erathem). • The western parts of this land type occur on Pretoria Group shale and quartzite (Vaalian). Archaean granite plains with granite inselbergs and large granite boulders also occur in this land type. • Soils are Mispah, Glenrosa and Hutton forms. These soils vary from shallow to deep, sandy or gravelly and are well drained. Diabase intrusions are common, giving rise to Hutton soils. Erosion is low to moderate. • The farm also has elements of the GM 23 Veld Type (Northern Escarpment Quartzite Sourveld). This vulnerable landscape is rich in endemic plants and requires special attention. The applicant has proposed that this landscape is conserved in a nature reserve on the farm. See the Project Map in Appendix 1. 						
Climate	<ul style="list-style-type: none"> • Summer rainfall with dry winters. • The annual average for rainfall in the area is around 800 mm. • Generally, a frost-free region. • Mean annual maximum and minimum temperatures for Nelspruit are 35.7°C and 1.6°C for October and July respectively. 						
Stability	Buildings, e.g. pump houses, homesteads, workshops, roads etc., have been developed on these soils using normal construction methods and processes. Soils are considered as stable.						
Flora	<ul style="list-style-type: none"> • Note: Scientific names for plants and animals may change from time to time. The EAP has listed the plants below as per the reference material. • Tall Trees: <i>Pterocarpus angolensis</i> and <i>Sclerocarya birrea</i>. • Small Trees: <i>Acacia davyi</i>; <i>Acacia sieberiana</i>; <i>Combretum zeyheri</i>; <i>Erythrina latissima</i>; <i>Parinari curatellifolia</i>; <i>Terminalia sericea</i>; <i>Trichilia emetica</i>; <i>Vernonia amygdalina</i>; <i>Acacia caffra</i>; <i>Antidesma venosum</i>; <i>Erythroxylum emarginatum</i>; <i>Faurea rochetiana</i>; <i>Faurea saligna</i>; <i>Ficus burkei</i>; <i>Ficus glumosa</i>; <i>Ficus ingens</i>; <i>Ficus petersii</i>; <i>Heteropyxis natalensis</i>; <i>Peltophorum africanum</i>; <i>Piliostigma thonningii</i>; <i>Pterocarpus rotundifolius</i> and <i>Schotia brachypetala</i>. • Succulent Tree: <i>Euphorbia ingens</i>. • Tall Shrubs: <i>Diospyros lycioides</i>; <i>Erythroxylum delagoense</i>; <i>Olea europaea</i>; <i>Pachystigma macrocalyx</i>; <i>Pseudarthria hookeri</i> and <i>Rhus pentheri</i>. • Low Shrubs: <i>Diospyros galpinii</i>; <i>Flemingia grahamiana</i>; <i>Agathisanthemum bojeri</i>; <i>Eriosema psoraleoides</i>; <i>Gymnosporia heterophylla</i>; <i>Hemizygia punctata</i>; <i>Indigofera filipes</i>; <i>Myrothamnus flabellifolius</i> and <i>Rhus rogersii</i>. • Succulent Shrubs: <i>Aloe petricola</i>; <i>Euphorbia vandermerwei</i>; <i>Huernia kirkii</i>. • Woody Climbers: <i>Acacia ataxacantha</i>; <i>Bauhinia galpinii</i>; <i>Helinus</i> 						

	<i>integrifolius</i> and <i>Sphedamnocarpus pruriens</i> .
Conservation Status	<ul style="list-style-type: none"> • This land type is considered as endangered and only about 2% is statutorily conserved mainly in the Bosbokrand- and Barberton Nature Reserves. A further 2% is conserved in private reserves including the Mbesan -, Kaapsehoop- and Mondi Cycad Reserves. • It has been greatly transformed (50%) mainly by plantations, cultivated areas and urban development. Invasive plant infestations are found along drainage lines and riparian zones.

Did the applicant undertake a soil feasibility?

Yes	No
X	

Comments:

A Soil Specialist was commissioned to undertake soil suitability studies on all the soils in the plantations. This information could then be extrapolated to adjoining natural areas to provide a confirmation of soil suitability. These results are included in the Appendices to the Environmental Impact Assessment Reports (EIRs). **Appendix 4.4.1.**

Has the applicant proof of sufficient water for the proposed development?

Yes	No
X	

Comments:

Water rights and quantity are available for macadamia production during the **establishment phase** of the project. Once established the dry land farming approach will be implemented. The applicant has calculated that his current supply will suffice using the latest irrigation methods and technology available in the market. **See Appendix 4.3.**

Wetlands/Rivers and Watercourses bordering proposed development	<ul style="list-style-type: none"> • Several small drainage lines are found on the property including two perennial rivers (Krokodilspruit and Sandspruit). These features will be excluded for development purposes and protected as per legislative requirements. A demarcation of the riparian zones is included in the Biodiversity Study in the EIR. Appendix 4.4.2. • Two low level crossings will be developed at S 25°16'33.81" E 30°56.11'89" and at S 25°16'53.8" E 30°55'18.33" See an example of the crossings in Appendix 1.
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Are there any known Red Data biota on or near the proposed development?

Yes	No
	X

Comments:

- No rare biota were observed by the EAP during the site visits to the site.
- The Specialist Ecologist has assessed this aspect in more detail as part of the Biodiversity- and Ecology Specialist Study.

Fauna Description	<ul style="list-style-type: none"> • The applicant has identified an area suitable for game farming and to serve the functions of a nature reserve. • The application will ensure that the game section is formalised which will allow for a natural corridor and habitat niches for game and other naturalised fauna. Many smaller and larger animals will be allowed to seek refuge in this natural corridor.
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Are there any known rare bird breeding sites on or near the proposed development?

Yes	No
	X

Comments

No breeding sites were discovered at or near the project sites. The Specialist Study has however assessed this aspect in more detail. **Appendix 4.4.2.**

Are there any known archaeological, cultural- or historical sites on or near the proposed development?

Yes	No
X	

- A Heritage- and Culture Specialist was commissioned to assess the potential presence of historical sites and artefacts. See **Appendix 4.4.3** for detail.
- Should any artefacts or a find be discovered during construction/development, the proponent must engage the services of an accredited archaeologist to deal with the find.
- Should the application be approved, it is recommended that an Environmental Control Officer (ECO) oversee the implementation of the development phase and the handling of finds will be addressed in the Environmental Management Programme (EMPr).

What general precautionary measures will be taken if an archaeological, cultural- or historical site is discovered?

- Should any artefact, or historical site be discovered during the removal of vegetation and or installation of irrigation systems as well as in future, all works must cease with immediate effect.
- The find must be reported to the Project Manager/Applicant for the development and the ECO for the project. These representatives will initiate an Action Plan in conjunction with SAHRA to address the management and handling of the find.

9. ENVIRONMENTAL ISSUES

This chapter describes the **issues, concerns and opinions** identified:

- during the **public participation process, i.e. focus group meetings;**
- by **authorities and the applicant/management authority** during consultation- and pre-application meetings and telephonic discussions;
- by the **EAP** based on previous experience in the Lowveld.

9.1. Key Issues: See Issues and Responses Report in Appendix 2.

- The response to the on-site- and newspaper advertisements was **poor**. The call for potential Interested and Affected Parties to attend the on-site meeting **did not result** in a significant interest.
- The EAP also had to make a **special effort** to engage the local council in the form of Mr. Danny Sono to ensure that this very important role-player was kept abreast of the progress of all aspects of the project in the White River area.
- The following key **issues/impacts** are listed for consideration:

Environmental Aspects	<ul style="list-style-type: none"> • Specialist Study on Terrestrial Ecology and Biodiversity. • Irrigation Systems and Water Rights. • Soil Type and Suitability. • Agricultural Potential.
Economic-Operational Aspects	<ul style="list-style-type: none"> • Job Opportunities. • Economic Sustainability.
Social Aspects	<ul style="list-style-type: none"> • Cultural Artefacts. • Job Opportunities. • Land Claim. • Needs- and Desirability of Project.

9.2. Ranking of Environmental Issues Identified

To identify the significant issues, these were ranked as per the four different criteria outlined in the Environmental Impact Assessment Guideline Document for assessing impacts in Environmental Impact Reports.

The environmental elements (issues/impacts) are evaluated according to the following criteria:

1. **Intensity** – 4 Categories were distinguished:

Positive (+), Negative (-), No Impact (0), and Uncertain (U).

The positive- and negative categories were further divided to distinguish between low-, medium-, and significant impacts.

Scores were awarded as follows:

Low = 1, Medium = 2, and Significant = 3.

Issues/Impacts were ranked in order of importance as:

- | | |
|--|-------------------|
| 1. Critical Issues/Impacts with scores | ≥ -5, |
| 2. Important Issues/Impacts with scores | < - 5 to - 1, and |
| 3. Operational/Management Issues/Impacts with scores | ≥ 0. |

2. **Duration** - Is the impact – **Short-**, **Medium** term, or **Permanent**.

3. **Probability** of impact – **Improbable (I)**; **Probable (?)**; **Definite (D)**,

4. **Extent** – Is the effect **Local**; **Regional**; **National**; or **International**.

5. **NA** - Not Applicable.

9.3. Environmental Screening

KEY OF SYMBOLS TO BE USED IN TABLE			
Intensity of impact/issue:	Significant Impact	Medium Impact	Low Impact
Positive (+)	+ 3	+ 2	+ 1
Negative (-)	- 3	- 2	- 1
Impact uncertain (U)	U		
No envisaged impact (0)	0		
Duration of impact/issue	Short Term = S	Medium Term = M	Permanent = P
Probability of impact/issue	Improbable = I	Probable = ?	Definite = D
Extent of impact/issue	Local = L	Regional = R	National / Int. = N
NA: Not Applicable	TABLE FOR IDENTIFICATION OF POTENTIAL ENVIRONMENTAL IMPACTS		
ENVIRONMENTAL ELEMENT	DEVELOPMENT PHASE	OPERATIONAL PHASE	TOTAL SCORE
ENVIRONMENTAL ASPECTS: GENERAL			
Specialist Study on Terrestrial Ecology and Biodiversity.	-1,P,D,L	+1,P,D,L	0
Irrigation Systems and Water Rights.	0,P,D,L	+1,P,D,L	+1
Soil Type and Suitability.	0,P,D,L	0,P,D,L	0
Agricultural Potential.	0,M,D,L	+2,P,D,L	+2
ECONOMIC ASPECTS:			
Job Opportunities.	+1,M,D,L	+2,P,D,L	+3
Economic Sustainability.	0,M,D,L	+1,P,D,L	+1
SOCIAL ASPECTS			
Cultural Artefacts.	0,S,D,L	0,P,D,L	0
Job Opportunities.	+1,M,D,L	+2,P,D,L	+3
Land Claim.	0,S,D,L	0,P,D,L	0
Needs and Desirability of Project.	+1,M,D,L	+2,P,D,L	+3

9.4. Issues Identified

9.4.1 Critical Issues

No **Critical Issues** were identified during the screening process.

9.4.2 Important Issues

No **Important Issues** were identified during the screening process.

9.4.3. Operational/Management Issues

- Specialist Study on Terrestrial Ecology and Biodiversity.
- Soil Type and Suitability.
- Cultural Artefacts.
- Land Claim.

9.4.4. Positive Impacts

- Irrigation Systems.
- Agricultural Potential.
- Job Opportunities.
- Needs and Desirability of Project.
- Economic Sustainability.

9.5. Impacts/Issues: (This Section must be read in conjunction with the contents of the Environmental Management Programme: Appendix 5).

Operational/Management Issues	Discussion/Mitigation/Recommended Management Approach
<p>1. Specialist Study on Terrestrial Ecology and Biodiversity including Riparian Ecology</p>	<ul style="list-style-type: none"> • <u>Vegetation Units and Land Cover Types within the Study Area:</u> • A total of seven units comprising untransformed vegetation/habitat and five units comprising transformed vegetation/habitat were identified. These units and their surface areas described in hectares cover a total surface area of approximately 4113 ha: • <u>Untransformed vegetation/habitat:</u> • Untransformed Grassland – North-eastern Mountain Grassland (737.4 ha) • Woodland (303.9 ha) • Perennial rivers (224.4 ha with buffers) • Seasonal and ephemeral drainage lines (251.3 ha with buffers) • Forests - Eastern Dry Afro temperate Forest Subtype (717.5 ha) • Valley-bottom wetland (4.3 ha) • Rocky outcrops or Granite Inselbergs (65.0 ha) • <u>Transformed vegetation/habitat</u> • Forestry (1085.7 ha). • Secondary Grassland: Old and fallow lands (488.8 ha) • Current cultivation (148.0 ha) • Infrastructure (Limited) • Transformed woodland (100.4 ha) • <u>Sensitivity Mapping:</u> • Important parameters relating to faunal diversity and landscape sensitivity listed in the different vegetation - and land cover types were used to establish the biodiversity sensitivity and value of the project area: • <u>Untransformed Habitat Types:</u> • <u>Very High:</u> Grassland, Afro temperate forests and Rocky outcrops. • <u>High:</u> Woodland, Perennial rivers, drainage lines, Valley-bottom wetland. • <u>Transformed Habitat Types:</u> • <u>Moderate:</u> Secondary Grassland and Transformed woodland. • <u>Negligible:</u> Forestry, Current cultivation and Infrastructure. • Any potential risks must be managed and mitigated to ensure that no deterioration of the sensitive habitat

types takes place. In the case of the Krokodilspruit study, it was decided to delineate the following biotopes and add buffers to these areas:

- **Mitigation 1:** Perennial rivers - buffer of 50m;
- Seasonal and ephemeral drainage lines - buffer of 30m, however in the Afro Temperate Forest, the outer edge of the forest will automatically form a buffer for the drainage line;
- Eastern Dry Afro Temperate Forest Subtype – buffer of 30m;
- Valley-bottom wetland - 100m buffer;
- Rocky outcrops or Granite Inselberg - buffer of 30m.
- **No Development:** Due to the Nature Reserve and buffers, as well as areas of no development, large areas which includes the CBAs and Other Natural Areas (ONAs) will not be developed for this project.
- With the Nature Reserve in place and the wetland areas buffered, four of the High and Very High sensitivity and value land types are totally protected. These are the Perennial rivers and associated riparian zones and buffers (224 ha), Eastern Dry Afro Temperate Forest and associated drainage lines (717 ha), Floodplain wetland and buffer (80 ha), and the 64 ha of the buffered Rocky outcrops.
- **Buffer Areas:** The Floodplain wetland and nearby drainage lines will be allocated a wider buffer, an area of approximately 80 ha can thus be incorporated into the Nature Reserve.
- 94% of the drainage lines will be protected with a buffer of 30 m. Approximately 27% of the Untransformed Woodland will be conserved in the Nature Reserve and buffers, however only about 27% of this biotope will be cleared for the orchards, the other 45% represent scattered bush clumps in the area and should thus remain intact.
- The corridors created by buffers connect the CBA areas and most of the farm with the proposed Nature Reserve. All the areas covered by this continuous network **comprise of 2593 ha of untransformed habitat.** This network will provide viable corridors and dwellings for animals undertaking a range of movements, including daily or regular movements, seasonal and migratory movements, dispersal movements, and range expansion. The protected network, which includes the Nature Reserve will be a sanctuary for both animals and plants, which includes several Red Data listed and protected species.
- The Nature Reserve and buffers, as well as areas of no development, large areas which includes the CBAs and Other Natural Areas (ONAs) will not be developed for this project. Of the 2378 ha untransformed habitats on the farm, 79% (1896 ha) will be protected in the Nature Reserve, no-go areas or in buffer zones.
- **Mitigation 2: Bee Stations:** Active beehives will be sited in the buffer areas to promote pollination and provide refuge for these special components of the biodiversity sector which are currently under threat world-wide.
- Pollinating hives are distributed approximately 2 hives per hectare. Hives will be placed in the natural bush

- protected in the buffer areas and special bush clumps.
- It is ideal to locate them near trees or tall grass to minimise drifting of the colonies. These landmarks allow them to find their hives and not enter different hives.
 - **Mitigation 3:** Development must be seen as sustainable and must be undertaken in a responsible manner. To achieve this, the following measures of mitigation are listed for implementation. The Department of Agriculture, Forestry and Fisheries (DAFF) was involved in the Public Participation- and Consultation Process from the onset of this project.
 - They have advised the project team that all protected/commercial tree species found in the project area should be used in a sustainable way, creating job opportunities and empowering the communities at large.
 - The project team have identified several local wood carvers, carpenters, builders and furniture craftsmen who will be allowed to remove the commercial species under a DAFF permit.
 - Where possible, the applicant will replant special species in the Nature Reserve.
 - All plant removals/transfers must be permitted by the DAFF and the MTPA.
-
- **See Appendix 4.4.2.** for detail on the biodiversity of the project area.
 - **Mitigation 4: Biodiversity Protection:**
 - **Critical Biodiversity Areas:** The four identified Optimal Critical Biodiversity Areas on the farm will be incorporated as follows in the project area:
 - **CBA1:** The entire CBA is incorporated in the buffered Eastern Dry Afro Temperate Forest; no development will take place in this area.
 - **CBA2:** The entire CBA is incorporated in the Nature Reserve and no development will take place in this area.
 - **CBA3:** The entire CBA is incorporated in an Area of no development and thus will not be impacted.
 - **CBA4:** The entire CBA is incorporated in the buffered drainage lines and no new development will take place in this area.
 - **All the CBAs will thus be protected in either the Nature Reserve or in the buffered areas where no development is allowed.**
-
- **Mitigation 5: Ecological Corridors:** The corridors created by buffers connect the CBA areas and most of the farm with the proposed Nature Reserve. All the areas covered by this continuous network collectively make up 2593 ha of untransformed habitat.
 - This network will provide viable corridors and dwellings for animals undertaking a range of movements, including daily or regular movements, seasonal and migratory movements, dispersal movements, and range expansion.
 - The protected network, which includes the Nature Reserve will be a sanctuary for both animals and plants, which includes several Red Data listed and protected species.

	<ul style="list-style-type: none"> • Summary of Impact Mitigation on Biodiversity Components: ECO to monitor and control: • Impact 1: Clearing of approximately 1300 ha of transformed and untransformed land types. • Mitigation Description: • Establish the Nature Reserve, no-go areas and buffer zones. • Avoid environmentally sensitive areas (CBA or ESA features). • Choose sites that have already been cleared or altered (Old lands). • Adhere- and respect buffer zones. • Before clearing, demarcate the extent of the deforestation footprint; limit the removal of vegetation to the construction footprint only.
	<ul style="list-style-type: none"> • Impact 2: Replacing forestry with Macadamia orchards. • Mitigation Description: • Replace plantations with Macadamias in order to limit the clearing of untransformed vegetation as well as having a lower impact on water usage of the farming area. • The substantial vegetated riparian buffer zones should remain intact along all watercourses, to facilitate the containment of sediment-laden run-off from cleared areas. • Strict measures must be taken to prevent erosion and sediment-laden water from entering the adjacent watercourses. • Where steeper slopes are cleared of alien trees, prevent wash-off down the slope. <hr/> <ul style="list-style-type: none"> • Impact 3: Erosion and siltation. • Mitigation Description: • Re-establish indigenous vegetation wherever possible; • Ongoing repair and stabilisation of any erosion; • Clearing and construction should be restricted to the driest time of the year. • Control of storm water run-off; • Strict measures must be taken to prevent sediment-laden water from entering the adjacent watercourses; • The vegetated riparian buffer zone should remain intact along all watercourses to facilitate the containment of sediment-laden run-off from orchards. <hr/> <ul style="list-style-type: none"> • Impact 4: Habitat fragmentation. • Mitigation Description: • A network of corridors is provided by buffers around sensitive habitats. • The proposed corridors will buffer all the CBA areas and, • Connect most of the farm with the proposed Nature Reserve and other no-go areas.

	<ul style="list-style-type: none"> • Impact 5: Disturbance to Fauna. • <u>Mitigation Description:</u> • During all phases it is important to establish no-go zones for both workers and their vehicles. <hr/> <ul style="list-style-type: none"> • <u>Impact 6:</u> Human interference impacting on biota. • <u>Mitigation Description:</u> • The collection, hunting or harvesting of animals at the project site is strictly forbidden. • There must be a stringent and dedicated control of collection, poaching, hunting or harvesting of animals. • All personnel should be informed not to harm or collect species such as snakes and tortoises. • Site access to be controlled and no unauthorised persons should be allowed onto the site. • During all phases it is important to establish no-go zones for both workers and their vehicles. <hr/> <ul style="list-style-type: none"> • <u>Impact 7:</u> Loss of Red Data listed and protected fauna/flora species. • <u>Mitigation Description:</u> • A network of corridors is provided as refuge by buffers around sensitive habitats and connected to the Nature Reserve and no-go areas.
	<ul style="list-style-type: none"> • <u>Impact 8:</u> Linear structures: Impacts of roads and pipelines. • <u>Mitigation Description:</u> • Refrain from creating unnecessary new roads or tracks, make use of current routes as far as possible. • Re-establishment of indigenous vegetation wherever possible, • Control storm water run-off; • Ongoing repair and stabilisation of any erosion; • Check open trenches daily for trapped animals. <hr/> <ul style="list-style-type: none"> • <u>Impact 9:</u> Alien invasive vegetation. • <u>Mitigation Description:</u> • An alien invasive plant management and control plan should be compiled for both the construction- and operational phases on the farm. See Appendix 5 for more detail. <hr/> <ul style="list-style-type: none"> • <u>Impact 10:</u> Loss of untransformed woodland habitat for biodiversity. • <u>Mitigation Description:</u> • Avoid environmentally sensitive areas identified on the Sensitivity Mapping exercise (See Appendix 4.4.2). • Sites must be chosen that have already been cleared or altered (Old lands). • Before clearing, demarcate the extent of the development footprint and limit the removal of vegetation to the approved footprint only.

	<ul style="list-style-type: none"> • Red listed/protected biota: Relocate any affected species. Botanist/ECO to advise on site. • Implement all required actions regarding vegetation species of special concern (manual removal and nurseries). <hr/> <ul style="list-style-type: none"> • Impact 11: Loss of untransformed grassland habitat for biodiversity. • Mitigation Description: • Before clearing, demarcate the extent of the development footprint and limit the removal of vegetation to the clearing footprint only. • Red listed/protected biota: Relocate any affected species. Botanist/ECO to advise on site. • Implement all required actions regarding vegetation species of special concern (manual removal and nurseries). • Avoid environmentally sensitive areas identified during the Sensitivity Mapping exercise. (See Appendix 4.4.2). • Sites must be chosen that have already been cleared or altered (Old lands). • Develop and implement a veld management plan for the conservation area, which emphasises the use of sustainable grazing and controlled fires to ensure optimal vegetation condition and biodiversity levels. <hr/> <ul style="list-style-type: none"> • Impact 12: Impact of the project on all the drainage lines and riverine environment. • Mitigation Description: • Generic buffers should be established around streams within the farm catchments. • Maintaining an intact riparian habitat is especially important as it represents an ecological corridor for use by other biota and therefore the riparian zone should be designated as a No-Go area. • Erosion control should be implemented soon after clearing of vegetation in the surrounding terrestrial habitats. • Strict management of potential sources of agrochemical pollution must be implemented. • Avoid over irrigation and utilise drip irrigation. • Should alien plants be observed, these must be removed immediately by the management of the farm.
	<ul style="list-style-type: none"> • Impact 13: Impact of the project on the ecology of the Eastern Dry Afro Temperate Forest. • Mitigation Description: • Generic buffers must be established around the indigenous forests and associated drainage lines. <hr/> <ul style="list-style-type: none"> • Impact 14: Impact of the project on the ecology of the Floodplain wetland. • Mitigation Description: • The floodplain wetland is included in the Nature Reserve and must be conserved as such.

	<ul style="list-style-type: none"> • Impact 15: Impact of the project on the ecology of the Rocky outcrops. • Mitigation Description: • The Rocky outcrops must be protected with a buffer around the inselberg habitat, which will include any woodland associated with the biotope.
2. Soil Type and Suitability.	<ul style="list-style-type: none"> • See Appendix 4.4.1 for detail on the soils of the project area. • A soil survey was conducted by Alwyn du Preez on more than 500ha of a representative sample of the soils found on Krokodilspruit Farm. • A number of maps and chemical analysis were compiled and undertaken by the consultant. • Alwyn concluded that the soils at Krokodilspruit are suitable for the farming of macadamia and avocados. • Suitability and Potential: Key Factors to support this conclusion are: • Soil Forms: 61% of the sampled area consists of high potential Hutton soil forms. Other soils forms are also suitable. • Effective Depth: Soil depth is not limited and varies on average between 111cm-130cm (72% of the sites sampled) and 31cm-50cm on 13 % of the sites sampled (Total 85% of the sites sampled). • Soil Suitability: 82% of the soils are very suitable; 15% suitable and 2.7% not suitable for crop production. • Irrigation Suitability after Ridge Preparation: 76% of the soils sampled are suited to irrigation, classified as excellent; 8% as good, 14% as suitable and less than 1% as not suitable. • Plant Available Water Capacity: More than 67% of the sites sampled were suited to providing water at 140mm-160mm depth and more than 10% at a depth of 40mm-60mm. Access to water for the roots is thus considered good. • Mitigation Measures for Macadamia Establishment: • No extra-ordinary agronomic measures are under discussion at the moment e.g. orchard layout, but the following environmental requirements are included for clarity: • It is necessary to supplement moisture by using irrigation during the establishment phase to ensure that moisture stress does not suppress growth and production. Water for irrigation is available within the allocated quota. • Suitable Soils: These crops can be grown in a wide variety of suitable soil types. • The layout of the orchard largely depends on the irrigation system used and the desired number of trees per hectare. • Water Conservation: To conserve water the installation of a low flow-irrigation system will be implemented and tree spacing will be in line with best practice for this soil type. • The applicant will implement state of the art technology for its new orchard development in White River.

	<ul style="list-style-type: none"> • <u>Cover Up the Ridges: (See Site Photographs in Appendix 1):</u> The technology involves the laying down of permeable/breathable agricultural fabric to all but eliminate weed growth and limit the competition for growth. The fabric also retains water by limiting evaporation and whilst maintaining a healthy soil temperature. • <u>Plant using Technology:</u> All rows are marked by using a self-steering Real Time Kinematic (RTK) system that is accurate to 2cm, thus increasing the yield potential per hectare. • <u>Reduce Compaction of the Soil:</u> The applicant follows a Controlled Traffic Farming principle that reduces compaction in the root zone and promotes a biological ecosystem for the orchard trees. Real-time kinematic (RTK) positioning is a satellite navigation technique used to enhance the precision of positioned data derived from satellite-based positioning systems. • The system of controlled traffic farming is described as a concept that was developed to increase crop yield by reducing soil compaction. • Equipment is adapted so all field operations are supported from permanent traffic lanes to allow optimum production from wide, non-trafficked crop beds. • In practice it means repeated use of the same wheel tracks for all operations using a precise machinery guidance system. • <u>Fertiliser Used: Reducing Costs and Quantities:</u> • Water soluble fertilisers are mixed on the farm and dosed into the irrigation lines. The same principles above apply, fertiliser is only injected in targeted areas therefore there will be no negative impact on indigenous trees or shrubs. Also, this reduces the amount of fertiliser required and saves on costs. • Typical fertilisers used are as follows: Ammonium sulphate, Potassium chloride, Calcium nitrate.
3.Cultural Artefacts.	<ul style="list-style-type: none"> • See <u>Appendix 4.4.3.</u> for detail on the Heritage aspects of the project area. • A specialist study on the cultural importance of the project area was undertaken by Christine Rowe. • The survey revealed no archaeological or historical structures/artefacts of significance in the study area which cannot be mitigated successfully. • Based on the survey and the findings in this report, <u>Adansonia Heritage Consultants</u> state that there are no compelling reasons which may prevent the proposed development to continue, but it is recommended that earthmoving activities be monitored by a qualified archaeologist and that an assessment be undertaken should any archaeological material be found. • The specialist study was submitted to SAHRA and the organisation concurs with the findings of the study (See Letter from SAHRA in <u>Appendix 2.</u>) • <u>Mitigation Description:</u> • <u>Handling of Unexpected Cultural Finds:</u> The proposed project does not traverse, impact and or influence aspects of historical value, however the following conditions are listed in the event that an unexpected find or

	<p>artefact is unearthed:</p> <ul style="list-style-type: none"> • An accredited archaeologist must oversee the debushing process. • Sensitise the Contractor/labourers to be aware of the importance of cultural artefacts and implement the recommended procedure below in the event that such a discovery is made accidentally during construction. • Should any artefact or historical site be discovered during excavations for irrigation trenches as well as in future, all works must cease with immediate effect. • The find must be reported to the ECO and the Project Manager for the project. These representatives will initiate an Action Plan in conjunction with an accredited archaeologist (Contact SAHRA) to address the management and handling of the find. • <u>Existing Grave Sites:</u> • <u>Grave Site 1:</u> Area to be demarcated clearly and all the trees within the perimeters of this site and which impact negatively on the graves must be removed and treated to prevent re-growth. A perimeter of 15m must be kept clear around the site. Access must be allowed for visitation. • <u>Grave Sites 2 – Grave Sites 7:</u> The grave sites must be fenced off and a perimeter of 15m be kept clear of the site. Access must be allowed for visitation. • <u>Stone Walls: Late Iron Age (LIA):</u> • The LIA stone wall is situated next to the main access road (at the entrance). It is outside of the study area. It is recommended that care should be taken not to impact negatively on this feature, as it was the only LIA stone wall which was identified during the survey on the farm.
4. Land Claim.	<ul style="list-style-type: none"> • <u>Land Claims:</u> The Lowveld Area was subjected to various land claim assessments by the Land Claims Commissioner in the past few years and combined with a recession in the agricultural sector, farmers were until recently reluctant to expand their enterprises under prevailing uncertain conditions. • The project area is owned by the applicant and although a land claim has been lodged against the property the applicant has engaged with the commissioner in this regard. • No objections to the proposed improvement of the infrastructure have been lodged with the EAP. <u>(See Appendix 4.2.)</u>

Positive Impacts	Discussion/Mitigation/Recommended Management Approach
1. Irrigation Systems.	<ul style="list-style-type: none"> • <u>Low Flow Irrigation</u>: The efficient use of water and the implementation of a site-specific irrigation system will go a long way towards the sustainable use of irrigation water on the new orchards. • It is therefore essential that a cost-effective system is used which optimises the use of water and prevents run-off and erosion. For this reason, the <u>Low Flow Irrigation System (LFIS)</u> is proposed for consideration. • It is widely known that water is a scarce commodity and for this reason the following measures of mitigation will be implemented: • <u>Mitigation Description:</u> • <u>Irrigation Scheduling</u>: Irrigation scheduling involves deciding when and how much water to apply to an orchard. Good scheduling will apply water at the right time and in the right quantity in order to optimise production and minimise adverse environmental impacts. Bad scheduling will mean that either not enough water is applied, or it is not applied at the right time, resulting in under-watering, or too much is applied, or it is applied too soon resulting in over-watering. Under- or overwatering can lead to reduced yields, lower quality and inefficient use of nutrients. • <u>Water Efficiency</u>: The efficiency of water use in agricultural production is generally low. Only 40% to 60% of the water is effectively used by the crop, the rest of the water is lost in the system or in the farm either through evaporation, run-off or by percolation into the groundwater. Irrigation scheduling, if properly managed can offer a good solution to improve water efficiency in the farm. • Various methods and tools have been developed to determine when crops require water and how much irrigation water needs to be applied. These include the various soil- and plant monitoring methods as well as the more common soil water balance and scheduling simulation models. • <u>Advantages of Irrigation Scheduling</u>: It can: <ul style="list-style-type: none"> • Enable farmers to schedule watering to minimise crop water stress and maximise yields. • Reduce farmer's costs of water and labour through less irrigation, thereby making maximum use of soil moisture storage. • Lower fertiliser costs by reducing surface run-off and deep percolation (leaching) to a minimum. • Increase net returns by increasing crop yields and crop quality. • Minimise water-logging problems by reducing the drainage requirements. • <u>What is Low Flow Irrigation?</u> Sub-surface or low volume irrigation is the process of delivering precise amounts of water and nutrients directly to the plant's root zone, drop by drop, offering users exact irrigation control and efficient use of limited water resources. • <u>Why Should One Use Low Volume Irrigation?</u> This method saves water use. It is far more water-efficient

than sprinklers. In general, these applications use 30% - 70% less water than an overhead irrigation system and plants grow to maturity about 50% faster.

- Water loss due to evaporation, mist, surface run-off or wind interference is virtually eliminated. Because of the conserving nature of low volume products, users report that they are typically granted an exemption from their water management district when other forms of irrigation are being restricted or banned.
- **Advantages of Low Flow Irrigation:** Notable advantages are:
 - A slow, even flow of water application to the plants and soil. Plants will thrive under these conditions.
 - A slow, steady application of water and nutrients directly to the plant's roots is the best way to ensure plant health and vitality (Improved plant growth).
 - The system is easy to install, it is flexible and adaptable.
 - It solves spray- and rotor irrigation problems.
 - No damaging spray finds its way onto unwanted areas, e.g. roads and buildings. This prevents erosion and unnecessary run-off.
 - The adjacent soil and foliage are kept dry, reducing fungal diseases.
 - Soil aeration is improved because soil particles are not washed down, thus decreasing soil compaction and improving root growth.
 - The system saves on maintenance and labour.
 - The system does not make use of moving sprinkler parts which require intensive maintenance to repair.
 - Unobtrusive and aesthetic. Hidden under mulch or beneath the soil.
 - The system does not interfere with landscaping or scenery.
 - Decreased labour to install and maintain plus lower overall material cost.
 - Security/Less theft. No exposed sprinkler heads, pipes or surface driplines to tamper with.
- **Summary of Benefits of Low Flow Irrigation System:**
 - **Broader water distribution:** Since water enters the ground at a slow pace, it spreads around the sides of the plant rather than seeping downward.
 - **Better nutrient utilisation:** Since water stays closer to the area where the roots are most active, more nutrients are available to the plant, and there are fewer ground pollutants.
 - **Larger and enhanced yields:** Since the in-ground air-water ratio at any given moment is higher, crop yields are larger and of a better quality.
 - **Lower nutrient usage:** Since all fertiliser is distributed at the active root-zone level, the plant receives a high percentage of the amount distributed, leading to lower quantities of applied fertiliser.
 - **Water saving:** Irrigation is placed underneath the agricultural fabric; the low flow drip ensures no over irrigation. Drip emitters have an ultra-low flow of 0.7 lt/hr each, spaced 1m apart.

	<ul style="list-style-type: none"> • <u>Fertiliser Used:</u> • Water soluble fertilisers are mixed on the farm and dosed into the irrigation lines. The same principles above apply, fertiliser is only injected in targeted areas therefore there will be no negative impact on indigenous trees or shrubs. Also, this reduces the amount of fertiliser required and saves on costs. • Typical fertilisers used are as follows: Ammonium sulphate, Potassium chloride, Calcium nitrate, Zink nitrate, Boron, Monoammonium phosphate. These fertilisers are not detrimental to indigenous plants.
2. Agricultural Potential.	<ul style="list-style-type: none"> • <u>See Appendix 4.4.1</u> for detail on the agricultural potential of the project area. • Also refer to the Soil Type and Suitability paragraph above. • The soils in the project area are suitable for the production of crops and together with climate, adequate water supply for the <u>establishment phase</u> and <u>professional farming techniques</u> the potential of the project site is regarded as high from an agricultural perspective. • This has been confirmed by Mr. Alwyn du Preez, macadamia expert in his documents submitted in Appendix 4.4.1.
3. Job Opportunities.	<ul style="list-style-type: none"> • <u>Social Commitment and Job Creation:</u> Several business sectors and community members will benefit if this project is successful. • The proponent and his family will benefit financially in the long term. In the short to medium term however, the development node will require substantial capital (Approximately R500 million) to develop the orchards and replace the plantations. • Additional infrastructure will be required including storerooms, pack sheds, maintenance facilities for vehicles and the installation of irrigation service lines and pump stations. • The Lowveld Region and outlying rural areas have been classified as one of the poorest in South Africa. Conservative estimates list jobless figures in the region of 30%. HIV infections are just under 40% and many job seeking immigrants from neighbouring countries migrate to this area and add to the challenges faced by rural communities. • Construction companies and forestry teams will be tasked with building the infrastructure and removing the blue gums. The entire farm boundary is being fenced in to provide for additional security. These projects generate additional income in the community and the projects are labour intensive and ongoing for the foreseeable future. • This will provide work opportunities (estimate 15-20 persons) for both skilled and unskilled labour (machine operators; bricklayers and labour to clear some of the vegetation). • Unskilled labour will earn in the region of R 3200.00 per person per month. • At full capacity this project will be employing in the region of 1800 people and thus benefiting a further 5400

	<p>family members of the employees. At current operation as the farm is now it can only financially sustain 30 employees.</p> <ul style="list-style-type: none"> • The opportunities above do not include adding to subsidiary services such as an increase in maintenance of vehicles; retail needs and medical facilities. This development will thus benefit the businesses in White River.
4. Needs and Desirability of Project.	<ul style="list-style-type: none"> • Introduction: Development proposals should always follow an integrated approach to project planning. • With this in mind the project must make economic sense, whilst at the same time environmental damage and impact must be kept to a minimum and or mitigated fully. • Finally, the needs and aspirations of society must be met with the view to producing the best long-term product for the community (internal- and external community) at large. • Having said this it must be noted that developers are spending thousands of Rand of hard-earned money to ensure the financial viability of each proposed project. • Developers, in most cases, think long and hard before they channel money towards a specific project. • It is not in their interest to embark upon a project without having assessed all the risks involved. They, just as society, are keen to see that the project is a long-term sustainable success. • Strategic Regional Initiatives: • The Produce Market currently under construction near Nelspruit (Mbombela) provides evidence of the prospective growth envisaged for the agricultural sector in the Province and combined with the advent of the Nkomazi Special Economic Zone near Komatipoort all indications are that agriculture has a bright future in the Province. • Local Councils are thus very supportive of developments associated with the expansion of agriculture and the sustainable land use envisaged by this project proposal under investigation compliments the regional vision that the authorities have for this area. • The Proposed Development of Additional Orchards and the Need for more Nuts: The Farm Krokodilspruit has recently been purchased by the Danroc company. The need for additional macadamia- and avocado fruit world-wide has allowed businessmen and farmers an opportunity to plan ahead and consider expanding their fruit producing enterprises. • At this stage South Africa produces just over 20% of the worlds macadamia nuts and all indications are that this percentage can be expanded by three times this figure in the years to come. In order for South Africa to capitalise on this need, farmers are encouraged to plan ahead and plant more trees. • Developing the farm to realise its full potential thus makes economic sense. • Marketing and sales of fruit and other agricultural products will thus continue as per the economic vision described above. • Will the new orchards be beneficial to the community at large? Yes. It will create and maintain a plethora

of new jobs and work opportunities presently not possible on the farm in its current state.

- **What are the economic benefits of the new orchards?** Development of the new orchards will plough more than R500 million into the local economy with a positive return in 12 years' time.
- **Neighbouring Land Uses and Compatibility:** The project area is surrounded by agriculture and a diversity of similar, compatible farming operations which include macadamia production.
- No objections to the project proposal have to date been submitted by any of the neighbours.
- **Financial Viability and Agricultural Potential of the Property:** The project site (Farm: Krokodilspruit) has been farmed for many years (since the early 1930's) producing crops for the internal agricultural market and more than 1500ha of blue gum plantations have produced timber for the forestry industry. The derelict plantations and some additional natural land will now be replaced by macadamia (60%) and avocado (40%) trees.
- A financial analysis by the Project Team has confirmed that the farm has the potential to meet the demands for new nuts and fruit given the world-wide growth predicted for these products.
- **Industry Growth:** The predicted growth in the need for additional nuts has stimulated the industry to expand.
- The financial model for this property based on crop production is dependent on the expansion of the arable land.
- To this end the proposal then makes economic sense as crop production is a long-term solution and will ensure that production is optimised sustainably into the future.
- This also provides the proponent an opportunity to remain financially competitive in an ever challenging and diverse business market.
- **Location:** Is this the correct location for the project?
- Yes. Approximately 2000ha were assessed for conversion from natural land to arable farming land. Various options were analysed and the importance of maintaining ecological support areas and corridors played a vital role in decision making.
- See the **Project Maps** in the appendices for more detail in this regard.
- The project site (farm) is fixed and the proponent does not own similar land elsewhere. In terms of compatibility of land uses this development will fit in with similar developments in the area and neighbouring farms. The location is thus regarded as ideal.
- The project site is surrounded in all wind directions with similar land uses.
- **Environmental (Ecological) Implications/Limitations:** An assessment of the prevailing fauna and flora has not revealed any threats to species/habitat and or highlighted any critical limitations to the development which can be of ecological significance or which cannot be mitigated to ensure sustainability of the environment.
- By **not developing the area set aside for the nature reserve** more of the natural vegetation which is

endemic to the area will remain intact and this will ensure that ecological corridors (**as per MTPA policy and requirements**) are maintained on the farm. All rocky outcrops, drainage lines and wetlands will also be demarcated as no go zones, i.e. **no development allowed**. See the **Project- and Development Maps in Appendix 1**.

- **Positive Impacts:** Job creation, i.e. prevention of job losses, is regarded as a significant impact which will spill over into the well-being of several families in the local community.
- Furthermore, the financial viability of the project will translate into economic growth for the investors and the local Mbombela area as a whole, albeit in the medium to long term.
- The growth in agricultural production together with the improvement in the sustainability of the farm will result in higher incomes and ensure food/crop security.
- **Access Road:** The access to the Project Area from the Provincial tar road is functional and does not require any changes or upgrading.
- Construction/harvesting/marketing vehicles and equipment will have unhindered access to the project site.
- **Timing:** Is this the right time to implement such a development?
- The current drought (2015-2018) has highlighted the fact countrywide that crop production must plan ahead to remain sustainably competitive.
- Access to reliable water for irrigation within the framework of allocated entitlements is in place on the farm and soil types are suitable for the production of crops. The applicant is planning ahead in an ever-changing market and positioning their business to meet the demands of the future.
- **Integrated Environmental Management:** The objective of integrated environmental management is to balance all interests towards sustainability. For many the word “sustainability” remains a unicorn of environmental management; a myth that is often poorly defined and or understood.
- As participants in environmental management we can at best evaluate the project for its inherent advantages and disadvantages. With the help and input of the Public, Specialists and Project Consultants we endeavour to draw a clearer picture with which we all can associate and hopefully agree to and support.
- We raise questions which include but are not limited to: Is the proposed activity/development harmful to the environment?; Did we ensure that all perceived impacts were mitigated adequately in favour of maintaining the environmental integrity?; Will the local/regional/national community benefit from this development and or is the development an improvement on an old, outdated concept?; Did we ensure that the general public participated in this project from day of advertisement till submission of documentation? Did we ensure that the economics of the activity were in place prior to project implementation? Is the project feasible? What are the alternatives? Have we considered the various Government role players with regards to sharing information and or authorisation requirements of the project? The list goes on, however the team associated with this proposal is

	<p>confident that we have ticked the right boxes to date and can answer in the positive to the questions listed above. In some cases, we will have to suggest measures of mitigation to soften the impact towards a degree of sustainability.</p> <ul style="list-style-type: none"> • <u>Need and Desirability of the Proposed Project:</u> In conclusion, it is the opinion of the EAP that the cumulative effect of the factors listed above will result in a positive contribution in the fields of economic benefit and social upliftment in the region, with little or at most manageable impacts in the environmental arena.
5. Economic Sustainability	<ul style="list-style-type: none"> • <u>Economics of the Proposed Project:</u> Development of the new orchards will plough more than R500 million into the local economy with a positive return in 12 years' time. • <u>More Jobs:</u> Job creation, i.e. prevention of job losses, is regarded as a significant impact which will spill over into the well-being of several families in the local community. • At full capacity this project will be employing in the region of 1800 people and thus benefiting a further 5400 family members of the employees. At current operation as the farm is now it can only financially sustain 30 employees. • Furthermore, the financial viability of the project will translate into economic growth for the investors and the local Mbombela area as a whole, albeit in the medium to long term. • The growth in agricultural production together with the improvement in the sustainability of the farm will result in higher incomes and ensure food/crop security. • <u>Industry Growth:</u> The predicted growth in the need for additional nuts has stimulated the industry to expand. • The financial model for this property based on crop production is dependent on the expansion of the arable land. • To this end the proposal then makes economic sense as crop production is a long-term solution and will ensure that production is optimised sustainably into the future. • This also provides the proponent an opportunity to remain financially competitive in an ever challenging and diverse business market.

9.6. Description of Options, Phases and Alternatives

9.6.1. Site Alternatives:

No Site Alternatives: The land earmarked for development is fixed and is part and parcel of an existing farming enterprise. The project portion of the land has been acquired recently to ensure the sustainability in the long term of farming as a business for the applicant.

By virtue of its position it links into existing agricultural land uses in the surrounding area. By optimising the potential of the proposed portion of the farm the applicant is confident that the land can continue to contribute sustainably to the agricultural business opportunities in- and around White River and the Province in general. It is also important to note that **2 alternative land uses** are envisaged for the site: Conservation of biodiversity (approximately 55%) and crop production (45% for agriculture).

The No Go Option will affect economic growth and negate economic opportunity in the area. The developer has ownership of a property within the borders of the agricultural business sector in the White River area and has expressed the wish to formalise the opportunity into a sustainable business (job creation, service delivery, diversity of business opportunities) opportunity. The farming activity is already in place on the remainder of the applicants' farm.

This application is for **an expansion of the same activity**. A no go approach would remove these options out of the economic- and social equation in the area. No known environmental reasons were identified which could make this a "No Go" option.

Indirect Impact: The land will stand derelict and fall into disrepair and become a financial burden to the owner.

9.6.2. Demand Alternatives:

1. Power Supply:

Eskom Supply: Eskom remains the only viable and practical option for an agricultural activity of this nature. The electricity will be required to pump water and run pumps to the various orchards. Eskom supply is in place and a pump house is functional and in working order.

Solar Power: Solar power (panels and energizers) have been installed to electrify the boundary fence and these units provide security and controlled access to the site.

2. Water Supply and Irrigation Options:

Water supply will be made available from the existing farm dams and bore holes as per the water allocation and entitlements existing in the name of the applicant/farm.

3. Low Flow Irrigation: Advantages	3. Overhead/Sprinkler Systems: Advantages
<ul style="list-style-type: none"> • Efficient use of available irrigation water. 	<ul style="list-style-type: none"> • Easy to install.
<ul style="list-style-type: none"> • Water is deposited on the plant roots, optimising plant growth. 	<ul style="list-style-type: none"> • Labour intensive creating more job opportunities during operational and maintenance phases.
<ul style="list-style-type: none"> • Cost effective as it limits wastage. 	<ul style="list-style-type: none"> • Applies vast quantities of water in a short period.
<ul style="list-style-type: none"> • Reduces evaporation and overspray. 	
<ul style="list-style-type: none"> • The system is easy to install, it is flexible and adaptable. 	
<ul style="list-style-type: none"> • No damaging spray finds its way onto unwanted areas, e.g. roads and buildings. This prevents erosion and unnecessary run-off. 	
<ul style="list-style-type: none"> • The adjacent soil and foliage are kept dry, reducing fungal diseases. 	
<ul style="list-style-type: none"> • Water and nutrients are delivered directly to the root zone which promotes healthy plant growth and reduces plant stress. 	
<ul style="list-style-type: none"> • Soil aeration is improved because soil particles are not washed down, thus decreasing soil compaction and improving root growth. 	
<ul style="list-style-type: none"> • The system saves on maintenance and labour. 	
<ul style="list-style-type: none"> • The system does not make use of moving sprinkler parts which require intensive maintenance to repair. 	
<ul style="list-style-type: none"> • Unobtrusive and aesthetic. Hidden under mulch or beneath the soil. 	
<ul style="list-style-type: none"> • The system does not interfere with landscaping or scenery. 	
<ul style="list-style-type: none"> • Decreased labour to install and maintain plus lower overall material cost. 	
<ul style="list-style-type: none"> • Security. No exposed sprinkler heads, pipes or surface driplines to tamper with. 	
Dripline Irrigation: Disadvantages	Overhead/Sprinkler Systems: Disadvantages
<ul style="list-style-type: none"> • Blockages can be troublesome. 	<ul style="list-style-type: none"> • Water loss and wastage is high.
<ul style="list-style-type: none"> • Less labour required during various phases. 	<ul style="list-style-type: none"> • Water application per plant not always effective.
	<ul style="list-style-type: none"> • More water is irrigated increasing costs and more electricity is used.
	<ul style="list-style-type: none"> • Unwanted areas, e.g. roads are often covered in water and spray.
	<ul style="list-style-type: none"> • More incidents of erosion and run-off are associated with this irrigation method.
	<ul style="list-style-type: none"> • Less effective during windy periods.
	<ul style="list-style-type: none"> • Susceptible to theft of the various components.
	<ul style="list-style-type: none"> • High maintenance costs.

9.6.3. Scheduling Phases/Alternatives:**1. Time of Year (Season):**

To ensure a safe working environment and to reduce the potential impact to the surrounding natural environment, it remains imperative that the orchards are preferably prepared in the period April to September. With the exception of heavy rainfall, the debushing period should take place when windy events are low (dust emissions). Moist, stable soils will be less susceptible to damage and topsoil loss during these moderate conditions will be manageable.

2. Time of Week:

It is recommended to keep the preparation/debushing period as short as possible. Preparation work will be limited to normal working hours daily (07h00-17h00) from Monday through to Saturday.

9.6.4. Input/Systems Alternatives:**1. Plant Variety:**

Macadamia and avocado crops are not limited to one or two varieties. Varieties are numerous and each type has its own set of advantages and disadvantages. These characteristics vary from being disease resistant; water friendly (require less irrigation); producing more product per plant (less is more) and being adaptable to soil type diversity. The applicant has access to an Advisory Service in the industry and these officials will play a vital role in matching the project site with a plant variety that will best fit the local project site conditions.

Summary of Preferred Alternatives: Key Points:

- The project site is fixed. Less than 50% of the site will be used for agriculture and the remainder will be conserved for the maintenance of biodiversity, ecological corridors and riparian zones.
- The project site consists largely of transformed lands and areas already modified due to historical impacts. Some untransformed grass lands will also be utilised.
- Service provision for power will be supplied by Eskom and water will be sourced from the existing storage dams, canals and boreholes on site.
- Preparation will commence during the mid-season avoiding windy conditions and very wet periods where possible.
- A low flow irrigation system will be used for purposes of irrigation during the establishment phase. This will be combined with a computerised water/moisture maintenance facility to maximise water application at the correct times and only when necessary.
- Extension officers and consultants will assist with the choice of crop varieties. This will be determined as per the soil potential of each orchard section.

10. PUBLIC PARTICIPATION

1. Advertisements: The Environmental Impact Assessment (EIA) process was advertised as follows:

1.1. At the Municipal Offices in White River.

1.2. On site at the entrance to the farm on the White River-Sabie provincial road and at all entrance gates and fence lines visible to neighbours and/or the general public and or workers passing through the area.

1.3. The proposed project and the Environmental Impact Assessment process was advertised in a Regional Newspaper (The **Lowvelder: 23 November 2018**).

1.4. Advertisements were also sent to the direct neighbours of the property and to all officials from Government Departments listed in the distribution list.

See Appendix 2 for copies of Notices, Advertisements and Newspaper clippings.

2. Participation: Although the intention to implement this activity was advertised as prescribed by DARDLEA and potential Interested and Affected Parties were given more than 30 days to register, no involvement from the broader Public nor any Interest Groups was forthcoming. Participation by Interested Groups was therefore limited and channelled towards neighbours and officials from the DWS (IUCMA), DARDLA, DARDLEA, DAFF and NDA: Agriculture. Copies of all reports were also submitted to MTPA, the White River Municipality and the Sand River Irrigation Board.

3. Site Meeting: Consultation was formalised through an on-site Public Meeting held on the **25 January 2019**.

4. Issues and Impacts: Issues and impacts were determined by RES and complimented by those raised during discussions with neighbours and officials from the various departments. Many of these were also gleaned from similar projects in the Lowveld area and from previous experience obtained on projects recently completed in the area.

5. Minutes: See **Appendix 2** for a comprehensive set of minutes and the Issues and Responses Report.

6. Focus Group Meetings: Where applicable, on-going consultation was formalised through focus group meetings with each neighbour and or official department as per request and or as the need arises.

7. Reports/Copies of Information: Copies of the all **Reports** generated have been submitted for comments as per the registered list of Interested and Affected Parties.

Hard Copies were made available at a **Public Venue (White River Library) and the offices of the applicant.**

8. Specialist Studies Completed: Ms Christine Rowe (Heritage Specialist) has completed an archaeological evaluation of the Project Site and Dr. Andrew Deacon (Biodiversity Specialist) undertook various aquatic- and terrestrial surveys. Contents and outcomes of these studies are shared with I&APs in the **Appendices** of the **Environmental Impact Assessment Reports.**

9. All **Reports** were made available for comment at the **White River Library, the farm office of the applicant, the White River Municipal offices and to all individuals and departments that registered and or attended the Public Site Meeting.** Comments are included in the Issues and Responses Report

(See Appendix 2).

Are any organisations or individuals known that objected/raised concerns towards the proposed development?

Yes	No
	X

No objections were raised to date. Concerns and suggestions were noted and addressed in the Issues and Responses Report.

How many organisations or individuals objected/raised concerns/issues towards the proposed development?

None.

Comments:

See Appendix 2 for a detailed copy of the Issues and Responses Report.
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Any **social benefits** that will result from this proposed development?

Yes	No
X	

Comments:

- The development process will result in significant job- and business opportunities during various stages of the process. As is the current farming activities have had a direct influence and impact on job creation in the area as blue gum trees are removed and replaced by macadamia plants.
- Development labour and expertise will be required to remove the natural vegetation and install the irrigation systems and associated infra-structure. This phase will require input from both informal- and formal sectors of the agricultural industry.
- The status and operations of the property were neglected in all its facets and the farm lay derelict as a going enterprise with the previous owners not interested in improving the business. The applicant purchased the farm and has expressed the wish to optimise the operation in all its facets and fluxes.
- The advent of the proposed project could however see this climb to **40** during the development phase (**temporary jobs**) and more than **1800 job opportunities** in the long term after the project is completed and fully operational. Job opportunities will include but not be limited to maintenance positions on the irrigation systems and fences; weeding and fertiliser operations; planting and harvesting.
- Unskilled labour will earn in the region of R 3200.00 per person per month.
- The opportunities above do not include subsidiary services such as an increase in maintenance of vehicles; retail needs and medical facilities. This development will thus benefit the businesses in White River.
- Finally, the removal of certain tree species will be made available to the wood carving-, furniture manufacturing and associated industries as recommended by officials from DAFF during previous projects in the Lowveld. All removals will take place once DAFF have issued the applicable licences authorising such removals.

11. DECOMMISSIONING PHASE

The applicant accepts responsibility for the Cradle to Grave principle. It is unlikely that the proposed development will be decommissioned in the foreseeable future however elements of the site may require a change in land use or have to undergo a process of decommissioning in some form or another. For such an event several **objectives** are submitted for the record and consideration.

11.1. Decommissioning Objectives

The applicant/developer remains responsible for the life cycle of the project and all the decommissioning activities in the project area. The infrastructure will undergo a full and comprehensive decommissioning programme. This programme must be described in a **decommissioning plan**.

It is recommended that an **Independent Environmental Assessment Practitioner (EAP)** is appointed at the time **to compile a detailed decommissioning plan** to address all the aspects of the decommissioning process prevalent at the time.

11.2. Decommissioning Approach (Under guidance of an EAP)

Essentially the following approach must be implemented:

11.2.1. Removable concrete structures

- All foreign material such as gravel and concrete (Pump Houses?) must be broken up and removed to a designated gravel pit, which will be identified by the local Municipality for purposes of rehabilitation.
- All roads, buildings and service infra-structure must be demolished and removed off site.
- All service lines, where applicable (electrical- and water supply) must be removed and trenches rehabilitated.
- The lie of the land must be returned to fit in with the adjoining land surface.

11.2.2. Reinstatement

- All foreign material must be removed and disposed of at a borrow pit earmarked for rehabilitation.
- The disturbed area must be levelled off and contoured to fit in with the rest of the landscape.
- The disturbed area must be ripped and fertilised to enhance re-vegetation.
- The exposed soil must be brush packed with brush and grass material from the area, to serve as a seed bank for re-vegetation.
- The reinstated area must be irrigated once a week to promote the re-vegetation process.
- These aspects will require on site monitoring, as the occurrence of natural rainfall will determine the frequency of irrigation required.

12. MONITORING AND AUDITING

It is recommended, that in the event that this proposal/application is approved, that the developer/applicant appoint an independent **Environmental Control Officer (ECO)** to oversee the implementation of the **Environmental Management Programme (EMPr)** and **monitor compliance** of the **Environmental Impact Assessment (EIA)**.

Furthermore, if the proposal is approved, the ECO must ensure that all the **conditions** as set out in the **Environmental Authorisation** issued by the DARDLEA, are met and implemented as stipulated.

The ECO must submit a quarterly Audit Report during the development phase to the applicant and DARDLEA for record- and implementation purposes.

The **role of the ECO** and independent audit teams are well defined within the framework of the **Integrated Environmental Management (IEM)**.

13. RECOMMENDATIONS AND CONCLUSIONS:

1. **Establishment of Orchards:** The developer who has more than **30 years of experience of crop farming** in the Lowveld area has expressed the wish to expand his farming operations with an additional 1 300 ha.
2. **55% of the farm is set aside for biodiversity** conservation and all riparian zones, drainage lines, rocky outcrops and sensitive areas will not be developed.
3. The **Specialist Study on Biodiversity** and ecology followed the guidelines described in the Mpumalanga Biodiversity Sector Handbook (MBSP) as compiled by Dr. Mervyn Lötter *et al.* Following these guidelines, the project area:
 - Will not affect any critical biodiversity areas;
 - Impacts on natural habitats and ecosystems have been reduced as most of the project area is found on historically **modified lands and degraded areas** whilst **55%** of the farm will remain in natural state;
 - Will ensure the conservation of biodiversity in- and around the project area by maintaining **ecological corridors** which promote the sustainability of ecological support areas to the west and south west of the project sites.
4. Additional **key issues** include:
 - The applicant has access to **adequate water** as per entitlements and lawful water use to establish the crops;
 - The soils are **suited to crop farming** especially macadamia and avocado;
 - Two **low level water crossings** are required as the applicant will link up various sections of the farm with existing roads and causeways;
5. The applicant has access to the equipment, trained staff and knowledge to undertake this expansion project.
6. The applicant has implemented **Agriculture Best Practice Techniques** on all his farming operations to date and these will continue with this expansion project. These are:
 - **Orchards:** Establish the plants on good, well drained soils in line with the recommendations provided by the soil scientist.
 - Design the orchards using a self-steering Real Time Kinematic (RTK) system that is accurate to 2cm, thus increasing the yield potential per hectare.
 - Design the orchards along the contours of the farm and follow the lie of the land.
 - Promote controlled, gradual runoff and drainage channels.
 - Space crop plants as per crop type specifications.
 - Use disease free plants from recognised, accredited nurseries.
 - Prepare the land using fertilisers recommended by an accredited agronomist and ensure that lands are weed free.
 - Install water saving irrigation systems which conserve water use over the long term.
7. Maintain the integrity of the riparian zones, the ecological corridors and all buffer areas as indicated on the project maps and as delineated by Dr. Deacon in the Specialist Study.
8. Ensure that all Protected Trees (where applicable) and plants of special concern are harvested and relocated by the nurseries. All translocations **must be permitted** by DAFF and MTPA and the ECO must oversee this process where applicable.

9. Heritage Aspects:

- It is recommended that an Environmental Control Officer (ECO) oversee the implementation of the development phase and the handling procedure of any finds is described in the Environmental Management Programme (EMPr).
- Should any artefact, or historical site be incidentally discovered during excavations for foundations as well as in future, all works must cease with immediate effect. The find must be reported to the Project Manager for the development and the ECO for the project.
- These representatives will initiate an Action Plan in conjunction with SAHRA and the developer to address the management and handling of the find.

10. Conditions to be considered in Decision Making:

These conditions are based on the identification of mitigation measures and solutions that minimise impacts on biodiversity and conflicts in land-use by making use of use of CBA maps in the Environmental Impact Assessment.

- **Retain natural habitat and connectivity in CBAs and ESAs:** The avoidance of environmentally sensitive areas identified during the Sensitivity Mapping exercise is regarded as the single most effective possible mitigation measure for mitigating impacts on the ecology of the project area.
- The proposed clearing of areas should not impact on any CBA or ESA features: Four CBAs have been identified and these areas are all conserved or buffered by either the Nature Reserve, areas of no development or inside buffered areas. All the areas covered by a continuous network of buffers and no-go areas comprise of 2593 ha of untransformed habitat.
- Avoid environmentally sensitive areas identified during the Sensitivity Mapping exercise: Of all the areas that were identified with high values of sensitivity, only 35% of Untransformed Grassland and 28% of Untransformed Woodland will be impacted upon during the clearing of vegetation. The perennial rivers, most of the drainage lines, all of the natural forests, the entire floodplain wetland and all the rocky outcrops will be conserved by the Nature Reserve, areas of no development or inside buffered areas.
- As a matter of priority, sites must be chosen that have already been cleared or altered (old lands and clearing forestry). Approximately **1735 ha** of areas of mostly Medium to Low sensitivity (old lands and cleared forestry) can be considered for the farming activities.
- **Apply the mitigation hierarchy:**
- By making use of **“best practice guidelines”** during the construction- and operational phases, identify the best practicable environmental options by avoiding loss of biodiversity and disturbance to ecosystems, especially in CBAs, by applying the mitigation hierarchy and the land-use guidelines recommended. In particular management actions should be implemented such as:
 - the re-establishment of indigenous vegetation wherever possible;
 - control of storm water run-off;
 - ongoing repair- and stabilisation of any erosion;
 - implement an alien plant control programme;
 - make use of current roads or tracks as far as possible;
 - implement a veld management plan for the conservation area, which emphasises the use of sustainable grazing and controlled fires;
 - prevent erosion and sediment-laden water from entering the adjacent watercourses;
 - generic buffers should be established and maintained around wetlands;
 - strict management of potential sources of agrochemical pollution;
 - avoid over irrigation;
 - maintaining an intact riparian corridor.

- **Remedy degradation and fragmentation through rehabilitation:**
- A network of corridors will be established by the buffers to CBAs and other sensitive habitat and connect most of the farm with the proposed Nature Reserve and other no-go areas:
- Buffers around rivers;
- Buffers around drainage lines;
- Buffers around wetlands;
- Buffers around inselbergs;
- Forests utilised as buffers around valley drainage lines.
- In the process of demarcating the agricultural land, larger areas were clumped together to prevent creating unconnected spaces.
- Planting or rehabilitation of cleared or excavated areas should commence as soon as the development activity is completed.
- Clear invasive alien vegetation and rehabilitate existing degraded habitats.
- **Secure priority biodiversity in CBAs and ESAs through biodiversity stewardship:**
- Set aside land of high biodiversity importance for conservation through biodiversity stewardship options. Where biodiversity losses are unavoidable, set aside another piece of land of equivalent or greater biodiversity importance for conservation:
- The management of Krokodilspruit have agreed to set aside a 735 ha Nature reserve that will conserve large areas of North-eastern Mountain Grassland, areas of Eastern Dry Afro Temperate Forests and a number of rocky outcrops and inselbergs. A floodplain wetland and surrounding buffered areas will add an additional 80 ha to the reserve, establishing a **sanctuary of 815 ha near-pristine habitat.**
- **Promote long-term persistence of taxa of special concern:**
- Currently only plantation areas are being cleared and once a decision is made regarding this application, a fauna and flora survey (of the designated areas to identify and list the species of conservation importance and plans to relocate) will be submitted to the MTPA.
- Of the approximate 4113 ha on the farm, 2378 ha consists of untransformed habitat. The planned Nature Reserve will conserve 815 ha, which includes 41% of all the untransformed vegetation types. The conserved areas of 2593 ha buffered habitat which forms a favourable network of connecting corridors, will form a refuge for most of the species of conservation importance and faunal species can then move to these areas.
- **Integrating *in situ* biodiversity-sensitive management into the overall design and operation of the proposed land-use development:**
- The state-of-the-art technology utilised on the farm involves the use of permeable/breathable agricultural fabric to all but eliminate weed growth and limit the competition for growth.
- The fabric also retains water, limits evaporation and maintains a healthy soil temperature.
- This water saving low flow irrigation system has a broader water distribution, allows for better nutrient utilisation, larger and enhanced yields as well as lower nutrient usage.
- The system of controlled traffic farming is described as a concept that was developed to increase crop yield by reducing soil compaction.
- Irrigation is placed underneath the agricultural fabric; the low flow drip ensures no over irrigation.

- **Fertilisers Used:** Water soluble fertilisers are mixed on the farm and dosed into the irrigation lines. The same principles above apply, fertiliser is only injected into targeted areas therefore there will be no negative impact on indigenous trees or shrubs.

11. Monitoring Requirements:

- Environmental performance monitoring should be designed to ensure that mitigation measures are implemented. The monitoring programme should clearly indicate the linkages between impacts, indicators to be measured, measurement methods and definition of thresholds that will signal the need for corrective actions.
- The applicant must appoint an independent ECO that will have the responsibility of monitoring and reporting on compliance with the conditions of the Environmental Authorisation (EA), as well as monitoring and reporting on the implementation of the approved EMPr.
- A monitoring programme for the biodiversity associated with the project, would ideally be to record the reaction of the biota to changes in the environment due to the impacts of the project.
- A **short-term** riverine monitoring programme (riparian and aquatic) should be established to monitor the effects of the river crossings.
- Before the clearing of untransformed habitats, a botanist/ECO must be part of the identification-, relocation or removal programme of plant species of conservation importance.
- Establish an effective record keeping system regarding veld condition, alien vegetation presence and burning should be included in a monitoring programme:
- Establish an effective record keeping system for each area where soil is disturbed for whatever purposes. The monitoring will evaluate whether the erosion and sedimentation control techniques that are employed throughout the site preparation activities are effective in minimising erosion of exposed areas and sedimentation of site surface water.
- The large number of Red Data listed and endemic species (26 species have a high probability of occurring on the Krokodilspruit farm) necessitates a monitoring program to assess their numbers and status in the project area.
- An inventory system should be established in a concerted effort with regular staff working in the project area to identify Red Data or Species of Special Concern and record these species. In the event that any threatened or near-threatened animal species are recorded within the study area in future, appropriate conservation measures should be developed in consultation with the relevant conservation authorities.
- It is clear that the implementation of buffers around sensitive habitat types is regarded as the most effective possible mitigation measure for mitigating impacts to the biodiversity of the project.

12. Conclusion: The evaluation process did not reveal any fatal flaws during the assessment of potential impacts. The project satisfies the requirements of sustainable integrated environmental management. Provided the developer implements the implications/conditions of this report, and the mitigation measures proposed, it is recommended that the change in land use is approved.

14. REFERENCES

Department of Environmental Affairs and Tourism, 1998. *Guideline Document, EIA Regulations, implementation of sections 21, 22 & 26 of the Environment Conservation Act*. Government Printer, Pretoria.

Gertenbach W P D, 1980. *Rainfall Patterns in the Kruger National Park*. Koedoe 23, National Parks Board, Pp 35 – 43.

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