

DRAFT BASIC ASSESSMENT REPORT

DEVELOPMENT OF 25 RESIDENTIAL STANDS ON REMAINDER PORTIONS 8,13,14
AND 20 OF MALELANE ESTATE 140 JU:
MALELANE AREA, MPUMALANGA.

PREPARED BY:



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1. EXECUTIVE SUMMARY

- This initial phase of the **Environmental Investigation Process** was conducted over a period of 5 months in the Malelane area. The proposed establishment of an agricultural residential estate on a macadamia farm will allow the applicant the opportunity to optimise the dual business approach and ensure a long-term sustainable outcome to his business activities.
- The public participation process was advertised locally and regionally in the printed media, on site and at the Spar complex in Malelane town. The immediate neighbours of the property were contacted specifically via e mail and requested to attend the Site Meeting. Several Government and Municipal Departments were included in all the notifications and invitations.
- All the reports **are** made available for comment at the Malelane **Library, the farm office of the applicant, the Municipal offices (Mr. Jan Mashele) and to all individuals and departments that registered and or attended the Public Site Meeting**. Comments received from various departments will be included in the Issues and Responses Report (**See Appendix 2**). Where applicable the comments will be addressed for consideration during the final impact assessment phases 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 BAR 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), a View Shed Analysis and several Technical Reports**. The **evaluation process** did not reveal any fatal flaws during the assessment process.
- **Establishment of Orchards**: The developer has obtained the services of agricultural specialists for advice on how to implement the macadamia programme. An experienced farm manager will be appointed to oversee the framing operations.
- **78% of the farm is set aside for agriculture** whilst all sensitive areas i.e., riparian zones and drainage lines will not be developed.
- 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**.
 - Will ensure the conservation of biodiversity in- and around the project area by maintaining an **ecological corridor along the eastern boundary** which promotes the connectivity between the farming areas and the Kruger National Park.
 - Additional **key issues** include:
 - The applicant has access to **adequate water** as per entitlements and lawful water use to establish the macadamia crops;
 - The soils are **suited to crop farming** especially macadamia;

- The existing bridge crossing to Stand 24 must be upgraded to link up with the project area.
- **Logistics:** The applicant has access to the equipment, trained staff and knowledge to undertake this expansion project.
- The applicant must implement **Agriculture Best Practice Techniques** on his farming operation as follows:
 - **Orchards:** Establish the plants on good, well drained soils in line with the recommendations provided by the soil/agriculture 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.
- **Riparian Zones:** 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.
- Ensure that all Protected Trees (where applicable) and plants of special concern are harvested and relocated to the buffer zones on the property. All translocations **must be permitted** by DAFF and MTPA and the ECO must oversee this process where applicable.

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).
- Maintain the integrity of the old farmhouse.
- 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.
- **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 Critical Biodiversity Areas (CBAs) and Ecological Support Areas (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 riparian corridor on the eastern boundary of the project area will be inundated by the small dam water and the riparian link will thus be affected. The increased moisture from the higher water levels in the dam will enhance plant growth and probably create a secondary riparian zone which will link up with the original upstream and downstream riparian corridors.
- The project team **must protect this riparian corridor** by incorporating a rehabilitated buffer around the periphery of the dam high level mark.
- By establishing a **10m buffer** around the dam high level mark, the new perimeter could be rehabilitated with vegetation removed and replanted from the dam basin.
- This measure of mitigation is consistent with the desired management objectives for riparian corridors and could prevent fragmentation.
- **Apply the mitigation hierarchy**: The mitigation hierarchy for dealing with negative impacts on biodiversity, consists of four activities:
 - **Avoid and prevent**: Consider options in land-use location, siting, scale, layout, technology and phasing to avoid impacts on biodiversity, ecosystem services and people. This is the best option but not always possible.
 - Identify the best practicable environmental options by avoiding loss of biodiversity and disturbance to ecosystems, especially in CBAs.
 - Four options for small dam locations were proposed, but all four were in the same river reach and none of them having a lower predicted impact on the system. The preferred dam will act as an existing access bridge over the stream.
 - **Minimise**: Consider alternatives in land-use location, siting, scale, layout, technology and phasing to minimise impacts on biodiversity, ecosystem services and people.
 - **Minimise unavoidable impacts**: Manage and mitigate impacts where possible, such as clearing of vegetation, erosion of soil, siltation of the river and control alien vegetation.
 - **Rehabilitate**: If impacts have been unavoidable, take measures to return impacted areas to a condition like the pre-impact or natural state — although this is important and necessary, rehabilitation can never replicate the diversity and complexity of an un-impacted natural site.
 - Replanting the new riparian zone will form part of this process.
 - Residential owners will replant the fallow soil with indigenous vegetation which will successfully mimic a riparian zone that has been absent for decades.
 - **Offset**: As a last resort, compensate for remaining unavoidable negative impacts on biodiversity. When every other effort has been made to minimise or rehabilitate impacts to a degree of 'no net losses of biodiversity against biodiversity targets, offsets can compensate for unavoidable negative impacts.
 - Unfortunately, due to the level of development on the farming property, there is no untransformed land left to set aside as an offset area.
 - The "rehabilitation" or re-establishment of a riparian zone in the gardens of the residential units will improve a rather sterile environment, as adjacent properties downstream of the KMAE have proven.
- **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:
 - Unfortunately, due to the level of development on the farming property, there is no untransformed land left to set aside land of high biodiversity importance for conservation. The remaining riverine and riparian corridors should be left intact and protected from further development. Should the riparian zone around the dam re-establish and the corridor regained, this zone should be managed and protected in order to link up with the downstream Crocodile River environment.

- The “rehabilitation” or re-establishment of a riparian zone in the gardens of the residential units will then link up with existing riparian corridors.
- **Remedy degradation and fragmentation through rehabilitation:** Design project layouts and select locations that minimise loss and fragmentation of remaining natural habitat and maintain spatial components of ecological processes, especially in ecological corridors, buffers around rivers and wetlands, CBAs and ESAs. Activities that are proposed for CBAs must be consistent with the desired management objectives for these features and should not result in fragmentation.
- The proposed project should re-establish the riparian corridors along the Crocodile River embankment and establish a rehabilitated buffer of 10 m around the periphery of the dam/bridge high level mark. This measure of mitigation is consistent with the desired management objectives for riparian corridors and should not result in fragmentation.
- **Promote long-term persistence of taxa of special concern:** Some bird species of special concern will utilise the riparian corridor once it is rehabilitated. Hooded Vulture, Martial Eagle and African Crowned Eagle have been observed in gardens of the adjacent properties.
- **Fertilisers Used:** Water soluble fertilisers will be mixed on the farm and dosed into the irrigation lines. The fertiliser is only injected into targeted areas therefore there will be no negative impact on indigenous trees or shrubs.
- **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.
- To achieve the above implement the monitoring programme described in paragraph **9.6.5** of this document.

- **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 dual approach in land use is approved.

2. ABBREVIATIONS

ASAP	As Soon As Possible
Asl	Above sea level
CBAs	Critical Biodiversity Areas
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
ESAs	Ecological Support Areas
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
KMAE	Kruger Malelane Agri Estate
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) must 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:	Extent of the Activity
EIA Regulations R 983: Listing Notice 1 of 2014 and amended in Government Gazette No. 40772 (2017). Notice No. 327.	12	The development of low-level drainage line crossing where such development occurs within a water course or within 32m of a water course.	An existing access bridge will be upgraded to allow for a safe crossing to Erf 24. This development will result in the damming of an unnamed drainage line to the east of the project site. Approximately 5000sqm of the drainage line will be flooded.
EIA Regulations R 983: Listing Notice 1 of 2014 and amended in Government Gazette No. 40772 (2017). Notice No. 327.	19	Infilling will be required to stabilise the all-weather drainage line bridge crossing. This will take place within 32m of a water course.	Approximately 20 tons of infilling material will be required during the upgrading of the access bridge crossing.
EIA Regulations R 983: Listing Notice 1 of 2014 and amended in Government Gazette No. 40772 (2017). Notice No. 327.	27	Although the greater area of the project site has been transformed by agriculture more than 1ha of indigenous will be cleared to install service lines and allow for the development footprint of each erf.	The project site is largely devoid of natural vegetation however collectively less than 1ha of natural vegetation will be removed to allow for development.
EIA Regulations R 983: Listing Notice 1 of 2014 and amended in Government Gazette No. 40772 (2017). Notice No. 327.	28	The property was primarily used for agriculture. The application under assessment will result in the northern portions being set aside for residential use (24 stands).	Although each Erf varies in size (approximately 1 ha each), however only 2500sqm of each hectare will be developed. This amounts to approximately 6h in total that will be allowed for buildings collectively.

EIA Regulations R 985: Listing Notice 3 of 2014 and amended in Government Gazette No. 40772 (2017). Notice No. 324.	2	The development of reservoirs in areas within 10km of a National Park.	At this early stage of the process all indications are that existing reservoirs will be repaired, relined and improved to fit in with the natural ambience of the project site. The current capacity of the reservoirs is 1 million litres.
EIA Regulations R 985: Listing Notice 3 of 2014 and amended in Government Gazette No. 40772 (2017). Notice No. 324.	4	The development of a road wider than 4m in areas within 10km of a National Park.	The access road within the project site will be marginally wider than 4m. All existing roads will be reused for the agricultural sector (orchards).
EIA Regulations R 985: Listing Notice 3 of 2014 and amended in Government Gazette No. 40772 (2017). Notice No. 324	12	The clearance of an area of 300sqm or more of indigenous vegetation.	The project site is largely devoid of natural vegetation however collectively less than 1ha of natural vegetation will be removed to allow for development.
EIA Regulations R 985: Listing Notice 3 of 2014 and amended in Government Gazette No. 40772 (2017). Notice No. 324	14	The development of a dam and infrastructure exceeding 10sqm within a watercourse in areas within 10km of a National Park.	An existing access bridge will be upgraded to allow for a safe crossing to Erf 24. This development will result in the damming of an unnamed drainage line to the east of the project site. Approximately 5000sqm of the drainage line will be flooded.
EIA Regulations R 985: Listing Notice 3 of 2014 and amended in Government Gazette No. 40772 (2017). Notice No. 324.	18	The widening of a road in areas within 10km of a National Park.	The access road within the project site will be marginally wider than 4m. All existing roads will be reused for the agricultural sector (orchards).

4. NEEDS AND DESIRABILITY OF THE PROPOSED ACTIVITY: DEVELOP 25 RESIDENTIAL STANDS ON A CROP FARM.

- **Introduction:** Development proposals should always follow an **integrated approach** to project planning.
- With this in mind, the proposed 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 uses envisaged by this project proposal (a combination of residential and agriculture) under investigation compliments the regional vision that the authorities have for this area.
- **The Proposed Development of Macadamia Orchards and the Need for more Nuts:** The project site has recently been purchased by the Blue Grass company. The need for additional macadamia nuts world-wide has allowed businessmen and farmers an opportunity to plan ahead and consider this crop as a business option.
- 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. Currently the farm produced a limited supply of household lawns and some sunflower and maize seeds. Once the previous owner passed away these marginal crops were farmed by persons that rented the property. These operations have now ceased to exist and the agricultural business requires a concerted effort and capital outlay to become competitive once again.

- Marketing and sales of fruit and other agricultural products will thus continue as per the economic vision of the Maputo Corridor 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 millions of Rand into the local economy with a positive return in 5 years' time. Turnover will be in the range of R1 689 856,49 in year 6 and up to R 4 157 348.52 in year 15.
- **Neighbouring Land Uses and Compatibility:** The project area is surrounded by agriculture and a diversity of similar, compatible farming operations which include sugar cane, nurseries and vegetable 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 has been farmed for many years (since the early 1950's) producing vegetable crops for the internal agricultural market. At the time and late into the 90's this approach was adequate as a family business and small-scale farming remained profitable.
- Unfortunately, this type of farming (only 22% of the property is classified as high potential agriculture soils) is no longer competitive and hence the dual approach suggested by the new owners, i.e., agriculture combined with residential estate living. This will ensure a sustainable agriculture- and real estate product. The real estate product will generate an estimated R140 million investment in the area.
- See **Appendix 4.4.1 Volume 1** of the Appendices document.
- A financial analysis by the agricultural specialist has confirmed that the farm has the potential to meet the demands for macadamia nuts given the world-wide growth predicted for these products.
- To protect the long-term viability of the crop the homeowners will sign a long-term lease on the agricultural section of the project site.
- **Land Use and Building Footprint:** The agricultural land use will cover 78% of the project site. The zonation for the property will thus remain agriculture and the financial feasibility will simply be augmented by selling off 24 residential stands.
- **Portion 20:** This portion still belongs to- and is managed by the Irrigation Board. It provides accommodation to a number of staff members and houses the pump station which abstracts water from the Crocodile River as per allocated entitlements.
- The Irrigation Board has indicated that this property is up for sale and the applicant of this application has submitted an interest in obtaining the land.
- Should the applicant be successful in obtaining the land then no additional development will take place on Portion 20 as it would affect the ambience and property value of Stands 20-23.
- No additional environmental impacts would thus be applicable.
- **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 no land claim has been lodged against the property. Refer to **Appendix 4.2.** in this regard.
- **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 sustainable use of the arable land (medium and high potential).

- 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.
- **Service Provision Demands on the Local Authority:** The local municipality will not be responsible for the provision of services as this will be paid for by the applicant. The authority will however benefit from the income on rates and taxes as the property is part of the urban edge.
- **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 R40 million**) to develop the orchards and install the services for the residential properties.
- 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.
- The advent of the Covid 19 pandemic has compounded the misery for the jobless even further and projects that could alleviate the challenges faced by this community should be supported where applicable.
- Construction companies and agricultural teams will be tasked with building and installing the agricultural infrastructure. The entire farm boundary is being fenced in, to provide for additional security. These projects generate additional income in the community as the projects are labour intensive and ongoing for the foreseeable future.
- This will provide work opportunities (estimate 40 permanent and 120 temporary positions) for both skilled and unskilled labour (machine operators; bricklayers/builders and agricultural staff).
- Unskilled labour will earn as per the applicable minimum daily wage as determined by legislation at the time and as per qualifications and expertise provided.
- 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 Malelane and the Onderberg in general.
- **Location:** Is this the correct location for the project?
- Yes. 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.
- Mitigation measures proposed by the biodiversity specialist include the implementation of buffer zones, the restriction on development behind the 1:100-year floodline and the management of the stormwater run-off and erosion control.
- **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 Malelane 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 by allowing upmarket residential properties to be developed will ensure a sustainable long-term outcome.
- **Access Road:** The access to the Project Area from the Provincial gravel road (Opdraend Pad) is functional and allows for access to the project site.
- Construction/harvesting/marketing vehicles and equipment will thus have unhindered access to the project site.
- **Timing and Maximising Opportunities:** Is this the right time to implement such a development?
- The drought of 2015-2018 has highlighted the fact countrywide that crop production must plan ahead to remain sustainably competitive.
- **Water:** 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 macadamia crops. The applicant is planning ahead in an ever-changing market and positioning their business to meet the demands of the future.
- Agricultural estates have recently proven to be successful as residents are keen to share their living conditions with a rural farm lifestyle. A significant interest has been shown by investors to date in the event that the proposed project is approved.
- **Impact upon the Kruger National Park:** A View Shed Analysis has confirmed that the proposed development cannot be seen from any tourism- and guest facilities inside the Kruger National Park. See **Appendix 4.4.5** for detail in this regard.
- Furthermore, the proposed buildings rules and regulations including the architectural guidelines prohibits the use of bright colours, the use of floodlights, the positioning of lights in general and promotes the optimisation of planting and landscaping with indigenous plants and trees commensurate with the Malelane Mountain Bushveld.
- Additional to this the proposed in-house rules will place restrictions on noise, fires and the movement of vehicles which will be limited to designated roads only.
- Finally, RES has studied the SANParks: KNP Guideline for Neighbouring Properties. These guidelines have been internalised in the EMPr (**See Appendix 5**).

- **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 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	Basic Environmental Impact Assessment: Development of 25 Residential Stands on Remainder Portions 8, 13, 14 and 20 of Malelane Estates 140 JU.
Name of Applicant	Bluegrass Trading 1028 CC.
Address	P. O. Box 12074 Selcourt Springs 1567
Contact Person	Mr. Kleanthis Adamou
Cell Phone Number	082 810 7192
E Mail	kushi@bluegrass1028.co.za
Name of the Environmental Assessment Practitioner (EAP)	Rhengu Environmental Services (RES) EAP: Ralf Kalwa
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 2021
Date of Site Inspection/s and Meetings Persons Present	<p><u>Meeting 24 May 2021: Government Officials and General Public:</u></p> <ul style="list-style-type: none"> • Ms Nancy O'Farrell: Irrigation Boards (Malelane and Crocodile). • Mr. Johan Boshoff: Irrigation Boards (Malelane and Crocodile). • Mr. Renald Radley: Malelane Irrigation Board. • Mr. Lex Hollmann: Lex Hollman Trust and Jakkalsbessie HOA. • Mr. Andre de Zwardt: Applicant Representative. • Dr. Andrew Deacon: Biodiversity Specialist. • Mr. Johan Enslin: WULA Consultant. Project Team Member. • Mr. Ralf Kalwa: Rhengu Environmental Services. <p><u>Focus Group Meeting 25 May 2021: Officials from SANParks: KNP:</u></p> <ul style="list-style-type: none"> • Mr. Wehncke van der Merwe: SANParks (KNP) Bufferzone Coordinator. • Mr. Andre de Zwardt: Applicant Representative. • Mr. Derick Peacock: Town Planner. • Dr. Andrew Deacon: Biodiversity Specialist. • Mr. Ralf Kalwa: Rhengu Environmental Services. <p>See Minutes Attached in Appendix 2.</p>

6. LOCALITY INFORMATION

Name of Place and Locality.	The development site is found on the Farm: Malelane Estates 140JU. This farm is located approximately 5km west of Malelane town on the Opdraend Road. The farm is bordered in three wind directions by farms practicing agricultural land uses. The northern boundary borders the Kruger National Park at the Crocodile River.
Region/District	The property is found in the Nkomazi Region of the Lowveld, near Malelane.
Title Deed	See Appendix 4.1.
Size of Proposed Development	Approximately 28 ha.
Magisterial District	Nkomazi Municipality.
Nearest Town	Malelane.

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 project site is **well serviced** with several orchard/access roads and service lines which include potable/irrigation water and power supply (Eskom).
- The farm is equipped with **two concrete storage dams (1million litres capacity)** and **three bore holes**.
- The property is **fenced in** providing for a measure of **security and safety**.
- **Road Access** (Opdraend Road) for purposes of marketing and product sales is in place and functional. This road will also accommodate the traffic to- and from the proposed residential units.
- A Managers House, storerooms and garages 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 Malelane.
- Together with selling off 24 residential units the **agriculture-leisure dual approach** will ensure that the applicant establishes a long term, feasible, financial future for the project site.
- No other site is available to be considered for an alternative.
- The applicant has access to all applicable expertise, equipment and logistics to re-establish the farming operation.
- Once functional, the benefit of these high-value crops can be derived over many years.

Planned/Proposed Activity and Project Specifics:

- The proponent wishes to re-establish a functional farming enterprise by planting macadamia trees (on medium and high potential soils) on **78% of the property/farm**.
- The development will thus include the re-establishment of orchard roads with associated stormwater control measures in place.
- 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.
- The **upgrading of an existing access bridge to Stand 24** on the eastern section of the property.
- The establishment of residential stands on 24 portions of the river frontage for use by private homeowners. This will cover **22% of the project site**.
- The provision of services which will include water- and waste treatment plants, electricity to each residential stand and interlinking roads.

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

Topography	Mountain	Midslope	Flats	Valley Bottom	Wetland	River	Other
			X	X		X	
Geology	<ul style="list-style-type: none"> • Veld Type: SVI 3 Granite Lowveld: Mucina and Rutherford (2006). • From north to south, the Swazian Goudplaats Gneiss, Makhutswi Gneiss and Nelspruit Suite (granite gneiss and migmatite) and further south, the younger Mpuluzi Granite (Randian) form the major basement geology of the area. • Archaean granite and gneiss weather into sandy soils in the uplands and clayey soils with high sodium content in the lowlands. 						
Climate	<ul style="list-style-type: none"> • Summer rainfall with dry winters. • The annual average for rainfall in the area is around 630 mm. • Generally, a frost-free region. • Mean annual maximum and minimum temperatures for Skukuza are 39.5°C and -0.1°C for January and June respectively. 						
Soil Description	Depth	Texture			Dominant Soil Forms		
	800mm-1000mm deep.	Valley Bottom: Sandy/Loam. Midslopes: Coarse Sandy/Coarse Gravel. 18%-30% clay content.			Hutton and Shortlands.		
Stability	Buildings, e.g., pump houses, homesteads, workshops etc.; have been developed on these soils using normal construction methods and processes. Soils are considered as stable.						
Flora Description	<ul style="list-style-type: none"> • As per the classification by Mucina and Rutherford (2006) the farm falls within the Granite Lowveld Veld Type. • Tree species that <u>normally dominate</u> this veld type under natural conditions include: <i>Sclerocarya birrea</i>; <i>Ficus sansibarica</i>; <i>Trichilia emetica</i>; <i>Peltophorum africanum</i>; <i>Terminalia sericea</i>; <i>Acacia nigrescens</i>; <i>Acacia nilotica</i>; <i>Albizia harveyi</i>; <i>Combretum apiculatum</i>; <i>Combretum imberbe</i>; <i>Combretum zeyheri</i>; <i>Ficus stuhlmannii</i>; <i>Pterocarpus rotundifolius</i>; <i>Acacia exuvialis</i>; <i>Acacia gerrardii</i>; <i>Bolusanthus speciosus</i>; <i>Cassia abbreviata</i>; <i>Combretum collinum</i>; <i>Dalbergia melanoxylo</i>; <i>Gymnosporia glaucophylla</i>; <i>Lanea schweinfurthii</i>; <i>Pavetta schumanniana</i>; <i>Plectroniella armata</i> and <i>Terminalia prunioides</i>. • Note: The genus <i>Acacia</i> is replaced by the genus <i>Senegalia</i> and or <i>Vachellia</i> in certain literature. • Shrub species in this vegetation type include: <i>Combretum hereroense</i>; <i>Dichrostachys cinerea</i>; <i>Euclea divinorum</i>; <i>Strychnos madagascariensis</i>; <i>Gardenia volkensii</i>; <i>Hibiscus micranthus</i>; <i>Tephrosia polystachya</i>; <i>Abutilon austro-africanum</i>; <i>Agathisanthemum bojeri</i>; <i>Aptosimum lineare</i>; <i>Baleria elegans</i>; <i>Clerodendrum ternatum</i>; <i>Commiphora africana</i>; <i>Gossypium herbaceum</i> and <i>Pavonia burchellii</i>. • Woody Climbers include: <i>Sphedamnocarpus pruniensis</i>. • Herbaceous climbers include: <i>Rhynchosia totta</i>. • Grasses and other Graminoids include: <i>Brachiaria nigropedata</i>; <i>Digitaria eriantha</i>; <i>Eragrostis rigidior</i>; <i>Melinis repens</i>; <i>Panicum maximum</i>; <i>Pogonarthria squarrosa</i>; <i>Aristida congesta</i>; <i>Bulbostylis hispidula</i>; <i>Chloris mosambicensis</i>; <i>Enneapogon cenchroides</i>; 						

Heteropogon contortus; *Leptochloa eleusine*; *Perotis patens*; *Schmidtia pappophoroides*; *Sehima galpinii*; *Tricholaena monachne* and *Urochloa mosambicensis*.

- **Herbs** include: *Achyranthes aspersa*; *Aspilia mosambicensis*; *Becium filamentosum*; *Chamaecrista absus*; *Commelina benghalensis*; *Commelina erecta*; *Cucumis africanus*; *Evolvulus alsinoides*; *Heliotropium strigosum*; *Hermbsstaedtia odorata*; *Hibiscus praeteritus*; *Indigofera filipes*; *Indigofera sanguinea*; *Kohautia virgata*; *Kyphocarpa angustifolia*; *Leucas glabrata*; *Ocimum gratissimum*; *Phyllanthus maderaspatensis*; *Pupalia lappacea*; *Vahlia capensis*; *Waltheria indica*; *Orbea rogersii* and *Stapelia leendertziae*.

Conservation Status

- This veld type is classified as vulnerable. 17% is statutorily conserved in the Kruger National Park. About 20% of this vegetation type has been transformed mainly by cultivation and settlement development.

Current Ecological Status of the Proposed Sites:

- The chapter above describes the **expected pristine state** of the natural flora and its associated biodiversity e.g., as in the Kruger National Park.
- However, the **prevailing condition** of the proposed site has been **largely transformed**.
- The project site has been **used for the production of lawns and** no natural vegetation is found at these sites. The topsoil has been removed in places as the harvesting of lawns results in unavoidable soil loss.
- **Fauna:** As per the impacts listed above, the proposed site is therefore devoid of antelope and other animals commonly associated with the Kruger National Park across the Crocodile River.
- **No rare and or endangered plant- and or animal species were observed during the survey of the transformed piece of property.**

Did the applicant undertake a soil feasibility?

Yes	No
X	

Comments:

A Soil Specialist was commissioned to undertake soil and agriculture suitability studies on all the soils. 78% of the project site will be allocated to agriculture. 22% of the soils are classified as high potential soils. The results are included in **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 and operational phases** of the project. 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

- A small unnamed drainage line flows out of the sugar cane fields into the Crocodile River (Eastern boundary of the property).
- A demarcation of the riparian zones is included in the Biodiversity Study in the EIR. **Appendix 4.4.2.**

Are there any known Red Data biota on or near the proposed development?

Yes	No
	X

Comments:

- No rare biota was 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.

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 4.4.4** 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 members from the Irrigation Board did participate during the Site/Public Meetings and their contribution to date has been commendable.
- The Chairman of a neighbouring Estate attended on behalf of the Homeowners Association (HOA).
- SANParks representatives were unable to attend the site meeting, however RES held a virtual meeting with SANParks officials the following day.
- The EAP also had to make a **special effort** to engage the local council in the form of Mr. Jan Mashele to ensure that this very important role-player was kept abreast of the progress of all aspects of the project in the Malelane area.
- The following key **issues/impacts** are listed for consideration:

Environmental Impacts	<ul style="list-style-type: none"> • Specialist Study on Terrestrial Ecology and Biodiversity. • Irrigation Systems and Water Rights. • Water Use and Quality. • Floodlines and Buffer Areas. • Soil Type and Suitability. • Agricultural Potential. • View Shed/Visual Impact. • Fishway. • Stormwater Control. • Foundations.
Economic-Operational Impacts	<ul style="list-style-type: none"> • Job Opportunities. • Economic Sustainability. • SANParks: Building Regulations and Architectural Guidelines. • Water Use Administration. • Traffic Management.
Social Impacts	<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	+1,P,D,L	+1
Water Use and Quality.	-1,P,D,L	0,P,D,L	-1
Floodlines and Buffer Areas.	-1,P,D,L	+2,P,D,L	+1
View Shed/Visual Impact.	-1,P,D,L	+1,P,D,L	0
Fishway.	-1,P,D,L	+1,P,D,L	0
Stormwater Control.	-1,P,D,L	+1,P,D,L	0
Foundations.	-1,P,D,L	+1,P,D,L	0
ECONOMIC-OPERATIONAL ASPECTS:			
Job Opportunities.	+1,M,D,L	+2,P,D,L	+3
Economic Sustainability.	0,M,D,L	+1,P,D,L	+1
SANParks: Building Regulations and Architectural Guidelines.	0,M,D,L	+1,P,D,L	+1
Water Use Administration.	0,M,D,L	+1,P,D,L	+1

Traffic Management.	0,P,D,L	0,P,D,L	0
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

- Water Use and Quality.

9.4.3. Operational/Management Issues

- Cultural Artefacts.
- Land Claim.
- Traffic Management.
- Specialist Study on Terrestrial Ecology and Biodiversity.
- Soil Type and Suitability.
- View Shed/Visual Impact.
- Fishway.
- Stormwater Control.
- Foundations.


9.4.4. Positive Impacts

- Job Opportunities.
- Needs and Desirability of the Project.
- Economic Sustainability.
- SANParks: Building Regulations and Architectural Guidelines.
- Water Use Administration.
- Irrigation Systems and Water Rights.
- Agricultural Potential.
- Floodlines and Buffer Areas.

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

Important Issues	Discussion/Mitigation/Recommended Management Approach
<p>1. Water Use and Quality.</p>	<ul style="list-style-type: none"> • <u>See Appendix 6.4 for detail.</u> The development will source water for the residential- and agriculture use from 3 boreholes and as per a water entitlement registered against the property from the irrigation canal. • The water uses will be registered as part of the water use application process which is currently under way and will define what water will be used where. Suffice to say, for purposes of this application adequate quantities of water are available for both land uses. • <u>Mitigation:</u> • <u>Managing the Borehole Abstraction:</u> All bore holes should be subjected to an aquifer testing programme every 5 years to ensure sustainability of supply. • Do not “over-use” the borehole. All holes must be equipped with a protection circuit and timer to ensure that abstraction schedules can be monitored and regulated. Do not withdraw water over and above the recommended critical level. • The Kruger National Park recommends that water abstraction should not exceed the yield by 50% in a 24-hour period. The 3 boreholes collectively deliver 280368 litres per day (140184 litres/day = 50%). • <u>Water Treatment Plant: Water Quality:</u> An Aquamat Water Treatment Plan will be installed to ensure that all minimum DWS quality and standard requirements are met at KMAE. • All water for human use must be tested for contamination and treated to ensure that the standards set by the Department of Water and Sanitation (DWS) are met. • Treatment schedules for each borehole have been recommended in <u>Appendix 6.4, Tables 7-9.</u> • It is also recommended that regular sample re-testing is undertaken to ensure clean, potable water.

Operational- Management Impacts	Discussion/Mitigation/Recommended Management Approach
1.Cultural Artefacts.	<p>See Appendix 4.4.4. for detail on the Heritage aspects of the project area.</p> <ul style="list-style-type: none"> • 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 on the project site. • It is not believed that any archaeological or historical features will be impacted upon by the development in general. • Archaeological material or graves are not always visible during a field survey and therefore some significant material may only be revealed during construction activities of the proposed dam development. • Mitigation Nr. 1: It is recommended that the owner be made aware that distinct archaeological material or human remains may only be revealed during the debushing or construction activities. Based on the survey and the findings in this report, Adansonia Heritage Consultants 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 we await their comments. • Mitigation Nr. 2: Stand 25: Existing Farmhouse: The original farmhouse of the Gouveia family, is the only feature with historical significance on the property. It is recommended that the house be documented and preserved with a possibility of restoring it for future use in the proposed development. • The house will continue to be used for the farm manager. • Mitigation Nr. 3: No artefacts have been observed during the farming activities which have occurred on the property for decades. • The property has been farmed for several years and no graves, historical sites or artefacts which are of historical importance have been unearthed/located to date. • However, should any artefacts or a find be incidentally discovered during trenching/construction activities, the proponent must engage the services of an accredited archaeologist to deal with the find. • 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

	<p>representatives will initiate an Action Plan in conjunction with SAHRA and the developer to address the management and handling of the find.</p>
<p>2.Land Claim.</p>	<ul style="list-style-type: none"> • See Appendix 4.2. for detail on the Land Claim process in the project area. • As per the contents of the letter from the Lands Claim Commissioner, the proposed project area has been exempted from any land claims. • The applicant is free to implement the farming activity. No objections to the proposed improvement of the infrastructure have been lodged with the EAP. • No mitigation measures are applicable.
<p>3.Traffic Management.</p>	<ul style="list-style-type: none"> • See Appendix 6.5 for detail of the implications of the development on the traffic in the project area. • As per the contents of the traffic study no significant impact is envisaged by the proposed project and the development is supported from a traffic engineering point of view. • Mitigation: From an operational perspective it is proposed that the access to the site is implemented as described in Figure 2 (Red Line below). <p style="text-align: center;">FIGURE 2 : DEVELOPMENT ACCESS LOCALITY</p> 

4. Specialist Study on Terrestrial and Aquatic Biodiversity.

- See **Appendix 4.5.2** for detail on all aspects of the biodiversity associated with the Project Area. The potential impacts of the project on the biodiversity of the study area are assessed under the following broad categories, namely:
 - **Activity 1: Construction of the lifestyle units:**
 - **Impact 1.1: Stormwater and erosion/siltation.**
 - **Applicable Activity:** Surface flows from residential areas will be released as stormwater into the receiving environment, which may cause erosion and siltation.
 - **Nature of Impact:** A development, such as the KMAE development implies that areas of natural/agricultural vegetation are replaced with housing units, roads, and other forms of impervious surfaces in the residential areas. The effect of this is that water runs from the new hard ground surfaces and enters streams or watercourses in greater volumes and over a shorter period of time. However, the KMAE development can be considered as a very low-density development which directly implies that runoff will not increase impermeable areas significantly.
 - **Mitigation Description of Impact 1.1.:** Modern stormwater management practices are aimed at considering stormwater as part of the water cycle, a strategy which is increasingly being known as Water Sensitive Urban Design (WSUD) with the stormwater management component being known as Sustainable Drainage Systems (SuDS). A number SuDS options are available and for this development Source and Local controls will be implemented for both the agriculture and the residential areas (ConSolv, 2020).
 - **Source Controls** include the following and are normally specified by the estate architect as part of the Architectural Guidelines for the development:
 - Rainwater Harvesting refers to the temporary storage and reuse of rooftop and/or surface runoff.
 - Soakaways are usually excavated pits that are packed with coarse aggregate and other porous media and are used to detain and infiltrate stormwater runoff from a single source.
 - Permeable pavements consist of load bearing, durable and pervious surfaces such as concrete block pavers (CBPs) on top of a granular or stone base that can temporarily store stormwater runoff.
 - **Local Controls** include the following:
 - Filter strips are vegetated areas of land that are used to manage shallow overland stormwater runoff through filtration;
 - Swales are shallow grass-lined channels with flat and sloped sides that are used to convey stormwater from one place to another. They typically remain dry between rainfall events;
 - Infiltration trenches are excavated trenches which are lined with a geotextile and backfilled with rock or other relatively large granular material. They are typically designed to receive stormwater runoff from adjoining residential properties;

	<ul style="list-style-type: none"> • Rio-retention areas are landscaped depressions used to manage stormwater runoff through several natural processes such as filtration, adsorption, biological uptake and sedimentation; • Certainly not all of these examples of controls will be installed at each unit, but a mixture of the most appropriate controls should be considered to prevent any further damage to the receiving environment (the KNP in this case). • <u>Mitigation Recommendation:</u> It is proposed that soakaways be used within the residential sites to lessen the impact of runoff from the roofs combined with permeable paving, both source control measures. Another source control which could be considered is rainwater harvesting. It is further proposed that swales be constructed adjacent to all the access roads as the primary local control. • Should water be channeled in any event from the property, it is suggested that the water should be slowed down before it reaches the KNP fence/boundary with a slowdown system such as infiltration trenches. • It is envisaged that the current open, erosion prone fallow lands will rapidly be transformed into lush gardens of local indigenous vegetation as soon as construction is completed. Some indigenous trees have already been planted as part of the initial rehabilitation. These gardens will each act as slowdown systems for stormwater generated by paved surfaces and roofs on the unit.
	<ul style="list-style-type: none"> • <u>Impact 1.2 Pollution: 1.2.1 Sewerage:</u> • <u>Applicable Activity:</u> Wastewater treatment. • <u>Nature of Impact:</u> Poorly maintained septic tanks can result in nutrient-rich runoff being discharged. These waste waters create unfavourable conditions for natural vegetation and encourage growth of weeds. When nutrients such as nitrogen and phosphorus are discharged from septic systems into the groundwater, they represent a potentially important nonpoint source of pollution into the Crocodile River. • This could also negatively affect the unnamed watercourse on the eastern boundary due to inter alia inadequately treated effluent, a risk associated with the passive biological treatment process of septic tanks. • <u>Mitigation Description of Impact 1.2.1:</u> In order to improve the level of wastewater treatment at the Wastewater Treatment Works (WWTW) and minimise the 'amount of disease organisms, nutrients, and chemicals that enter ground and surface waters, the system must be in proper working order, follow simple maintenance procedures and conserve water. • A waterborne sewerage system will thus be installed with a Maskam Fusion WWTW package which will be situated centrally. The outflow from this system will conform to General Standards and will be used for irrigation of the Macadamia orchards. One pump station (situated on proposed portion 19) will feed the WWTW. • All the sewerage from the reticulated sites within the development will be treated at the treatment plant. The Wastewater Treatment Plant will be constructed next to the water treatment plant and the treated water will be used for irrigation. The treated effluent must comply with the general standards required by the Department of

	<p>Water and Sanitation and must be of such quality that the treated water can be used for irrigation purposes.</p> <ul style="list-style-type: none"> • The project area drains towards the north-east, and the lowest point is next to the Crocodile River. It is proposed that the sewer lines be placed outside the riparian buffer. • No reticulation lines will be constructed within the 1:100-year flood line and one sewer pump station will be required to pump sewer to the proposed sewer treatment plant. • The total Annual Average Dry Weather Sewerage Flow is estimated at 21.66 kl/day. It is recommended that some spare capacity in the sewerage treatment plant be provided to cater for stormwater ingress.
	<ul style="list-style-type: none"> • Impact 1.2 Pollution: 1.2.2 Hazardous substances associated with construction activities. • Applicable Activity: Alterations to water quality due to pollution from hazardous chemicals released through effluents, storm water runoff or accidental spillages from the project area into the receiving aquatic environment. • Nature of Impact: Potential Substances: Oil, fuel, lime-containing (high pH) construction materials (concrete, cement and grouts), and chemicals such as hydrocarbons, carbonaceous sediments, flushed-out pesticides, house-hold detergents. • A range of hazardous chemicals, some of which are lethal to in-stream biota (fish and invertebrates) could contaminate the watercourses during various stages of this project if due precautions are not taken. Hazardous chemicals can leak or be accidentally spilled by construction vehicles during construction and might contaminate the soil, ground water and receiving wetlands. It is essential to prevent pollution of the waters of the Kruger National Park and the resulting poisoning of fish, birds and other animals. • Mitigation Description of Impact 1.2.2: The buffer boundaries for the water courses as assessed with the DWS buffer tool must be implemented between the development and surrounding environment. These buffers around the riparian zones and wetlands were calculated as follows: <ul style="list-style-type: none"> • Crocodile River: 23m wide. • Small stream on the eastern boundary (valley bottom wetland): 10m wide. • These buffers will protect the riverine area from the following potential sources of pollution: • Construction camps, storage areas, soil stockpile areas and laydown areas must be located outside the riparian or wetland buffer zones. • Prohibit the dumping of waste material within the riparian or wetland buffer zones. Spoil material must be appropriately disposed of at a registered waste disposal facility. • Portable toilets must be located outside the riparian- or wetland buffer zones.

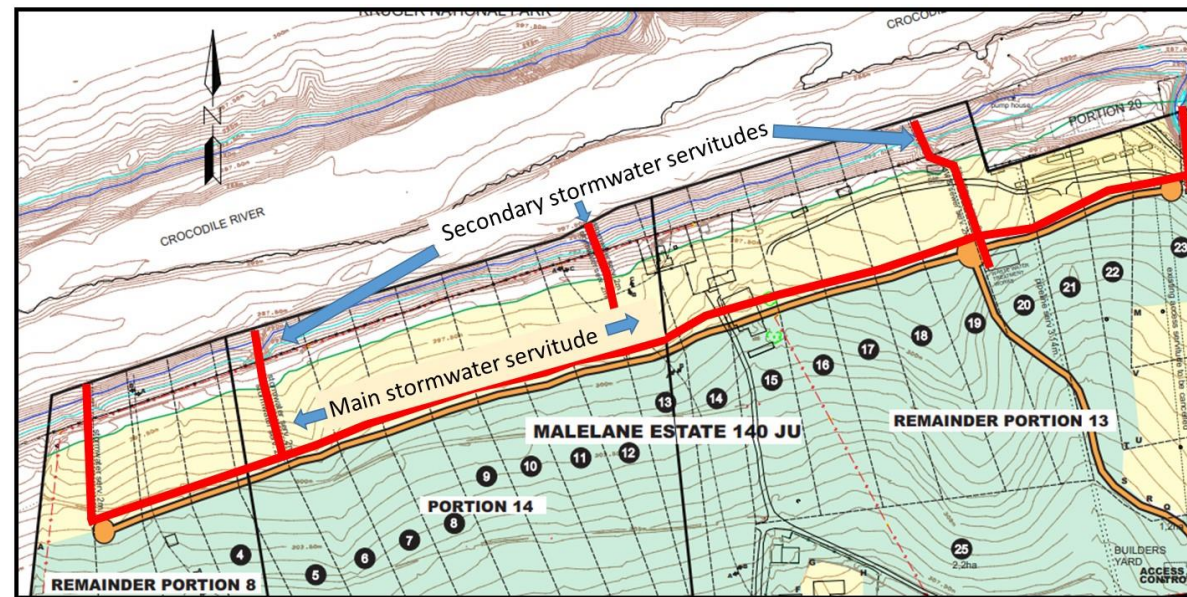
- **Impact 1.2 Pollution:** 1.2.3 Solid waste.
 - **Applicable Activity:** Solid waste disposal and management.
 - **Nature of Impact:** Improper solid waste disposal and management causes all types of pollution: air, soil, and water. Uncontrolled burning of solid waste and improper incineration contributes significantly to urban air pollution.
 - Health and safety issues also arise from improper solid waste management. Insect and rodent vectors are attracted to the waste and can spread diseases. The availability of household trash can alter the composition of wildlife communities by providing food for animal populations that thrive on trash (such as rats, baboons and monkeys) to the detriment of those that do not, e.g., small mammals and birds.
 - **Mitigation Description of Impact 1.2.3:** Refuse removal will be provided by the KMAE Management Team. Waste will be collected weekly by the Nkomazi Municipality. See **Appendix 6.6.** which confirms the removal of solid waste.
 - It is proposed that solid waste be taken daily in municipal refuse bags to a holding facility at the entrance gate of the development. A surfaced area with screening walls will be constructed at the entrance gate to accommodate a number of “skips”.
 - The holding facility must be constructed with brick and concrete. The facility will include a concrete floor, washing- and drainage facilities.
-
- **Activity 2.** Construction of a dam at an existing bridge crossing in an unnamed drainage line.
 - **Impact 2.1:** Inundation of the stream.
 - **Applicable Activity:** Drowning of a section of the riparian zone.
 - **Nature of Impact:** This impact refers to the permanent loss of untransformed habitat, especially the interruption of the riparian corridor.
 - **Mitigation Description of Impact 2.1:** Very little mitigation will be available during the flooding of the riparian zone.
 - Establish a 10m buffer zone (established with the DWS Buffer Tool) around the full-water mark and replant some of the key riparian tree species from the basin onto the dam margin boundary.
 - Currently there are some intact riparian zones upstream and downstream of the proposed dam basin along the stream banks of the drainage line. The riparian zone of the designated drainage line should be protected and excluded from any further development in order to maintain the integrity of the remaining riparian corridor.

	<ul style="list-style-type: none"> • Impact 2.2: Migration barrier. • Applicable Activity: Dams prevent the free passage of aquatic animals and fish and thus disrupt riverine migration routes. • Nature of Impact: The disruption of migratory routes affects the lifecycle of migratory aquatic species and prevents brood stock from reaching their spawning grounds during the breeding season, resulting in a failure of recruitment and eventual extinction of the stock above the dam. • Mitigation Description of Impact 2.2: The catchment area is small and 90% transformed (sugar cane fields). Only approximately 650m of transformed and artificially created river is available for utilisation (negligible). • Potentially, as fish may be attracted to migrate upstream and after spending energy to cross the barrier (potential fishway), there is no to limited suitable habitat available upstream. • The proposed dam may furthermore create suitable habitat (pool) for colonisation of high abundance of predatory sharptooth catfish (and potential other unwanted species such as alien largemouth bass). These species will prey on and potentially eradicate all small and juvenile fish species that may enter the dam. • An assessment as to the necessity for providing a fishway at the said barrier (bridge-dam) was completed by Dr Pieter Kotze (Kotze, 2021) See Appendix 4.4.3 for detail. • Based on the results of this assessment, it was concluded that a fishway will add little, if any ecological benefit at the proposed dam site and therefore no fishway is required for installation at the proposed dam. This recommendation is based on ecological considerations.
	<ul style="list-style-type: none"> • Activity 3: Establishment of the orchards. • Impact 3.1: Stormwater and erosion/siltation • Applicable Activity: Erosion and siltation due to channelled and thus concentrated stormwater flowing from the orchards. • Nature of Impact: Whether the stormwater arrives via non-point sources or via stormwater systems, it inevitably discharges directly into the receiving waters without any prior treatment. Even moderate runoff volumes and velocities give rise to a wide variety of water quality problems that are linked to flooding and wash-off. The typical categories of problems that arise are sedimentation, erosion (channel widening and streambed alteration) and habitat changes, as well as loss of aquatic- or riparian habitats. • It is clear, that historical land uses resulted in concentrated stormwater channelling between croplands and where this channelled water was released on the other side of the KNP fence, visible erosion took place, leaving the scars of erosion dongas on the floodplain. • It is also clear by the colour of the soil below the property on the KNP side of the fence that sheet erosion through the years transported a great deal of soil from the agricultural lands into the Park.

- Both the loss of good agricultural soil and the deposition of washed-out alluvial sediment into the KNP must be considered a significant adverse impact.
- **Mitigation Description of Impact 3.1:** Proper stormwater management is essential to ensure protection of life and property from flood hazards and that the natural environment is protected.
- The **objectives of stormwater management** can be summarised as follow:
 - to provide a stormwater drainage system for the protection of the property from damage by runoff from frequent storms;
 - to prevent loss of life and reduce damage of the property from severe storms;
 - to prevent land and watercourse erosion;
 - to protect water resources from pollution;
 - to preserve natural watercourses and their eco-systems;
 - to achieve the foregoing objectives at optimal total cost.
- The stormwater channels and structures will be designed for a 1:2-year storm recurrence, except at the piped crossings where a 1:5-year storm recurrence is catered for. The infrastructure will be located within the road servitudes.
- The introduction of efficient stormwater drainage systems to deal with the erosion and siltation problem implies that the runoff must be conveyed as efficiently as possible to the natural watercourses. This has the effect of decreasing the time runoff takes to reach the natural watercourses. The result is a **reduction of overland flow**, meandering watercourses and the like, through a system which drains runoff to the watercourses as quickly as possible. The flood problem is therefore transferred downstream.
- It is suggested that Best Practice Guidelines and Specifications relating to stormwater management should be used to implement measures to slow down flows channelled through the orchards, right from where the orchards start at the southern boundary.
- The layout below illustrates the proposed stormwater servitudes in the project area. It is clear that this system will mainly serve the agricultural stormwater emanating from the orchards. It therefore comes down to the fact that **each residential unit** must be able to manage the stormwater on its own property.
- The main stormwater servitude runs parallel along the east to west road servitude, and five secondary stormwater servitudes run from the main stormwater servitude directly to the northern boundary of the project area. The most eastern line will release its volume of stormwater into the unnamed drainage line, a natural drainage system for rainwater.
- This layout predicts that the main stormwater line will collect most of the stormwater draining from the orchards, and then release the flow via the secondary stormwater lines into the Crocodile River floodplain.
- It is clear that if all the stormwater is released equally through the secondary stormwater lines, the impact of

erosion will not be alleviated. The dongas will remain or even deteriorate due to the concentrated stormwater flows during high rainfall events. To **mitigate for this impact**, the following are suggested:

- The main stormwater channel should be a few centimetres deeper than the secondary stormwater channels, in order for most of the initial inflows to be diverted to the natural stream outlet and no erosion is expected to occur here;
- It may be appropriate to release the stormwater below the dam wall in order to protect the structure from higher than usual flood peaks;
- When the main stormwater channel fills up, more water will be released into the secondary stormwater channels and the water diverted towards the northern boundary of the project area and the KNP fence;
- In order to prevent high volumes of stormwater being released straight into the downstream environment, it is suggested that the stormwater channels first let the water flow into a system of drains and rock-filled sumps to slow down the flows and then dissipate the released water over gabion mattresses to prevent further erosion and siltation on the KNP section of the fence.



- **Impact 4:** Human Wildlife Conflict.
- **Applicable Activity:** Human-animal conflict.
- **Nature of Impact:** Human-animal conflict is often caused by learned behaviour. The eradication of the problem animal is often the result.
- Situations might arise where certain animals and their behaviour become problematic to the management of a place bordering a wilderness area or so close to a Big Five location (Kruger Park).
- It is therefore important to design the facilities in a way that prevents this undesirable learnt behaviour. The most common problem animals in this regard are: elephants, hyaena, baboons, vervet monkeys and badgers.
- Although there is a strong barrier between KMAE and the park, animals are opportunists and will sometimes find a way to get past the barrier. Smaller species such as baboons, vervet monkeys and badgers can easily climb through or over the fence.
- **Mitigation Description of Impact 4:** It will be expected from the KMAE management to implement the necessary preventative measures to avoid the development of problem animals. A **Problem Animal Policy** for the owners may include the following strategy:
 - **Potential food sources:** It is important to prevent the animals associating humans with easy food, therefore food should never be left visible, unattended and/or accessible.
 - Educate and sensitise contractors, owners, guests and visitors on the issues related to problem animals.
 - Fences around waste storage facilities must be functional.
 - It must be made clear to owners and their guests that the feeding of any animals, even birds, is unacceptable.
 - Fruit trees, such as oranges, should not be planted. Plant indigenous trees.
 - **Interfering with biota:** No person shall disturb or destroy any fauna or flora.
 - Do not disturb any animal inside the project area.
 - Do not remove, cut or damage a plant inside the project area.
 - No snake (poisonous or non-poisonous) may under any circumstances be killed unless a human life is at stake.
 - No trapping, snaring, hunting, fishing or killing of any animal may occur inside the project area.
 - Baiting of wildlife to enhance viewing is not permitted.
 - **General Conditions on the KNP Boundary:** Strict lighting controls will be enforced to limit light pollution. No floodlights and open lighting will be allowed for night lighting. The number and wattage of outdoor lights will be limited/low key and shields must be used to direct lighting downwards.
 - No fires may be lit except in designated areas.
 - No loud noise or disturbance will be permitted.

- **Impact 5**: The introduction and spread of alien vegetation.
- **Applicable Activity**: Invasive, non-native plants often establish in vacant niches, such as cleared or eroded areas and subsequently compete with indigenous plant species for space and thus further transform the natural habitat.
- **Nature of Impact**: One of the main threats to the biodiversity are considered to be the introduction and spread of alien vegetation.
- **Mitigation Description of Impact 5**: The control methods of alien invasive plants can broadly be classified into three categories: mechanical, chemical or biological:
- Mechanical control methods involve the physical destruction or total removal of plants (e.g., felling, strip-barking; ringbarking, hand-pulling and mowing).
- Chemical control of invasive alien plants includes the foliar spraying of herbicides to kill targeted plants.
- Biological control or bio-control methods involves the release of natural enemies that will reduce plant health and reduce population vigour to a level comparable to that of the natural vegetation.
- It is often necessary to use a combination of at least two of these methods to control or remove invasive alien plants.
- Using mechanical and chemical control methods remove all alien/invader plants from KMAE.
- After the implementation of the methods, it is important to evaluate the effectiveness of the methods and to monitor the cleared areas on a regular basis to identify emergent seedlings and to remove those immediately.
- A list of indigenous plants must be available to owners so that no alien invading plants are planted in gardens and become escapees to the KNP. There should be strict controls regarding this aspect.

Biodiversity Impacts Assessment Summary Post Mitigation:

Impact No	Issue and Aspect	Significance without mitigation	Significance with mitigation
1.1	Stormwater flows resulting in erosion and siltation.	Medium	Low
1.2.1	Sewerage - Wastewater treatment.	Medium	Low
1.2.2	Hazardous substances.	Medium	Low
1.2.3	Solid waste disposal and management.	Medium	Low
2.1	Flooding of the riparian zone.	Medium	Medium
2.2	Migration barrier.	Low	Low
3.1	Storm water and erosion/siltation – orchards.	High	Medium
4	Human wildlife conflict.	Low	Low
5	The introduction and spread of alien vegetation.	Medium	Low

5. Soil Type and Suitability.

- **See Appendix 4.4.1** for detail on the soils of the project area.
- **Financial Viability: A Dual Approach:** The project site has been farmed for many years (since the early 1950's) producing vegetable crops for the internal agricultural market. At the time and late into the 90's this approach was adequate as a family business and small-scale farming remained profitable.
- Unfortunately, this type of farming (**only 22% of the property is classified as high potential agriculture soils**) is no longer competitive and hence the dual approach suggested by the new owners, i.e., agriculture combined with rural residential estate living. This will ensure a sustainable agriculture- and real estate product. The real estate product will generate an estimated R140 million investment in the area.
- See **Appendix 4.4.1 Volume 1** of the Appendices document.
- A financial analysis by the agricultural specialist has confirmed that the farm has the potential to meet the demands for macadamia nuts given the world-wide growth predicted for these products.
- To protect the long-term viability of the crop the homeowners will sign a long-term lease on the agricultural section of the project site.
- **Land Use and Building Footprint:** The agricultural land use will cover 78% of the project site. The zonation for the property will thus remain agriculture and the financial feasibility will simply be augmented by selling off 24 residential stands.
- **Soil Survey:** 47 survey pints were assessed by the agriculture specialist.
- **Effective Depth and Texture:** 800-1000mm deep in places with 18%-30% clay content. Hutton and Shortlands

dominate the soil type. Elements of rockiness occurs at various points on the property.

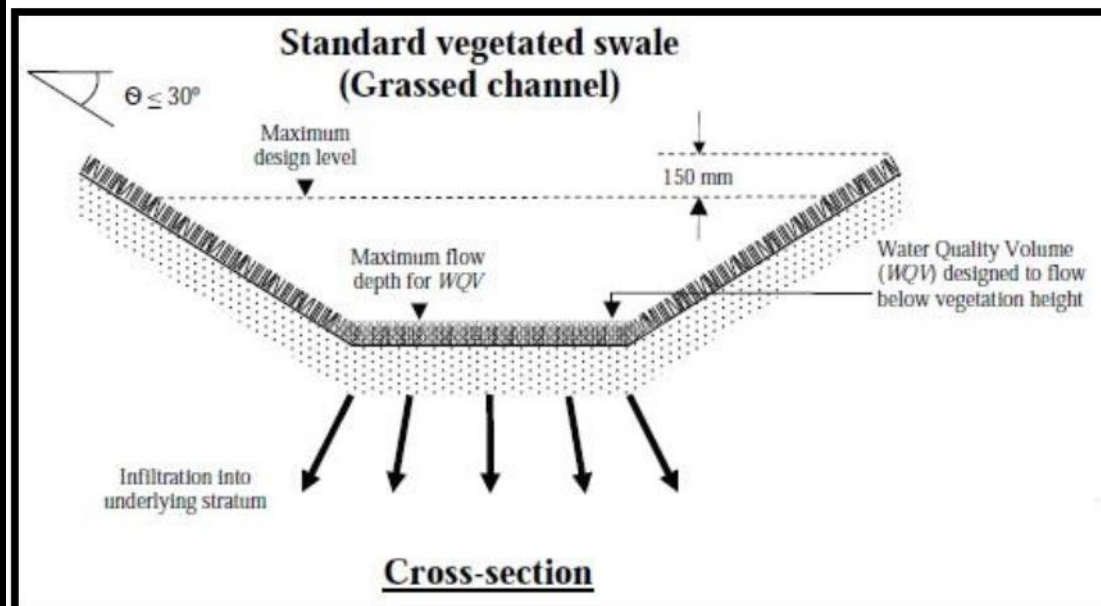
- **Mitigation**: Approximately 15ha of the property is thus classified as high potential land.
- Although the soil is rocky in places and the remainder of the project site is classified as medium potential agricultural land it is suitable for macadamia orchards.
- Together with adequate water from irrigation and a scientific approach to macadamia farming the project site is suited for the proposed land use and will be productive.
- **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.
- **Cover Up the Ridges**: 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 whilst maintaining a healthy soil temperature.
- **Plant Using Technology**: 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.
- **Reduce Compaction of the Soil**: 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.

	<ul style="list-style-type: none"> • Fertiliser Used: Reducing Costs and Quantities: Water soluble fertilisers will be mixed on the farm and dosed into the irrigation lines. The 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.
<p>6.View Shed/Visual Impact.</p>	<ul style="list-style-type: none"> • Impact upon the Kruger National Park: A View Shed Analysis has confirmed that the proposed development cannot be seen from any tourism- and guest facilities inside the Kruger National Park. See Appendix 4.4.5 for detail in this regard. • Furthermore, the proposed buildings rules and regulations including the architectural guidelines prohibits the use of bright colours, the use of floodlights, the positioning of lights in general and promotes the optimisation of planting and landscaping with indigenous plants and trees commensurate with the Malelane Mountain Bushveld. • Additional to this the proposed in-house rules will place restrictions on noise, fires and the movement of vehicles which will be limited to designated roads only. • Finally, RES has studied the SANParks: KNP Guideline for Neighbouring Properties. These guidelines have been internalised in the EMPr (See Appendix 5). • Mitigation: Impact upon the Kruger National Park is considered minimal provide all building heights are restricted to below 7.5m in height. This restriction is included as a condition in the recommendations and the EMPr. • Secondly, the planting of indigenous trees in- and between the residential units will reduce the potential impact upon the KNP to less than 3%.
<p>7.Fishway.</p>	<ul style="list-style-type: none"> • Need for a Fishway: See Appendix 4.4.3 for detail in this regard. The need for a fishway at the bridge crossing/dam site was investigated and assessed by Dr. Piet Kotze. • Based on available information, three of the five criteria (60%) in the “fishway necessity protocol” indicated that a fishway is not needed/feasible. The assessment therefore indicates that implementation of a fishway may not be required or feasible at this site. • A “priority protocol” score of 42% was calculated, indicating that the provision of a fishway at this proposed barrier is considered of very low priority. • Based on the above considerations it is unlikely that the cost of a fishway would be justified since little ecological benefit will be gained. • Mitigation: The proposed development can contribute by taking ownership of the stream of concern. It is strongly recommended that this river reach should be rehabilitated to improve its ecological integrity and its contribution towards the receiving Crocodile River. The following aspects could be considered: • Clearing of all alien vegetation from the riparian zone.

- Indigenous riparian zone vegetation should be maintained (no clearing of indigenous riparian vegetation).
- Cleaning of all solid waste and preventing further rubbish dumping in this stream. Preventing solid waste/rubbish to be transported via this stream towards the Crocodile River (Kruger National Park).
- Stabilisation of riverbanks and addressing current erosion problems.
- Inclusion of all possible erosion control measures within the proposed development to decrease the inflow of sediment that result in bed modification within this stream and the receiving Crocodile River (includes erosion in upstream catchment).
- Prohibiting the introduction of any fish species (indigenous or alien) within this proposed development.

8. Stormwater Control.

- **Swales:** See **Appendix 6.1.** for detail in this regard.
- This aspect has been addressed under Impact 3.1. above. **The figure below illustrates the proposed design of the swale (grassed channel).**



9. Foundations.

- **Foundations:** See **Appendix 6.2.** for detail in this regard.
- The residential units can be constructed and developed along the northern boundary of the project site.
- **Mitigation:** Foundation recommendations are included in detail in the Geotechnical Report and the engineering and architectural teams for each residential unit must take note of these restrictions/recommendations during the design phase for each home.
- **Soil Zones A-C** will require one or more of the following mitigation measures of construction. Civil engineers and soil test results will inform each homeowner of what is applicable where on the property:
- Mesh-reinforced slabs; reinforced strip footings; reinforced masonry and reinforced concrete beams may be required at certain residential units.

Positive Impacts	Discussion/Mitigation/Recommended Management Approach
<p>1.Job Opportunities.</p>	<ul style="list-style-type: none"> • <u>Creating Job Opportunities:</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 R40 million) to develop the orchards and install the services for the residential properties. • 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. • The advent of the Covid 19 pandemic has compounded the misery for jobless even further and projects that could alleviate the challenges faced by the community should be supported where applicable. • Construction companies and agricultural teams will be tasked with building and installing the agricultural infrastructure. The entire farm boundary is being fenced in to provide for additional security. These projects generate additional income in the community as the projects are labour intensive and ongoing for the foreseeable future. • <u>Mitigation:</u> This will provide work opportunities (estimate 40 permanent and 120 temporary positions) for both skilled and unskilled labour (machine operators; bricklayers/builders and agricultural staff). • Unskilled labour will earn as per the applicable minimum daily wage as determined by legislation at the time and as per qualifications and expertise provided. • 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 Malelane and the Onderberg in general.

2. Needs and Desirability of the Project.

- **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 (a combination of residential and agriculture) under investigation compliments the regional vision that the authorities have for this area.
- **The Proposed Development of Macadamia Orchards and the Need for more Nuts:** The project site has recently been purchased by the Blue Grass company. The need for additional macadamia nuts world-wide has allowed businessmen and farmers an opportunity to plan ahead and consider this crop as a business option.
- 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. Currently the farm produced a limited supply of household lawns and some sunflower and maize seeds. Once the previous owner passed away these marginal crops were farmed by persons that rented the property. These operations have now ceased to exist and the agricultural business requires a concerted effort and capital outlay to become competitive once again.
- 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 millions of Rand into the local economy with a positive return in 5 years' time. Turnover will be in the range of R1 689 856,49 in year 6 and up to R 4 157 348.52 in year 15.

- **Neighbouring Land Uses and Compatibility**: The project area is surrounded by agriculture and a diversity of similar, compatible farming operations which include sugar cane, nurseries and vegetable 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 has been farmed for many years (since the early 1950's) producing vegetable crops for the internal agricultural market. At the time and late into the 90's this approach was adequate as a family business and small-scale farming remained profitable.
- Unfortunately, this type of farming (only 22% of the property is classified as high potential agriculture soils) is no longer competitive and hence the dual approach suggested by the new owners, i.e., agriculture combined with rural residential estate living. This will ensure a sustainable agriculture- and real estate product. The real estate product will generate an estimated R140 million investment in the area.
- See **Appendix 4.4.1 Volume 1** of the Appendices document.
- A financial analysis by the agricultural specialist has confirmed that the farm has the potential to meet the demands for macadamia nuts given the world-wide growth predicted for these products.
- To protect the long-term viability of the crop the homeowners will sign a long-term lease on the agricultural section of the project site.
- **Land Use and Building Footprint**: The agricultural land use will cover 78% of the project site. The zonation for the property will thus remain agriculture and the financial feasibility will simply be augmented by selling off 24 residential stands.
- **Portion 20**: This portion still belongs to- and is managed by the Irrigation Board. It provides accommodation to a number of staff members and houses the pump station which abstracts water from the Crocodile River as per allocated entitlements.
- The Irrigation Board has indicated that this property is up for sale and the applicant of this application has submitted an interest in obtaining the land.
- Should the applicant be successful in obtaining the land then no additional development will take place on Portion 20 as it would affect the ambience and property value of Stands 20-23.
- No additional environmental impacts would thus be applicable.
- **Land Claims**: The Lowveld Area was subjected to various lands 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 no land claim has been lodged against the property. Refer to **Appendix 4.2**, in this regard.
- **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 sustainable use 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.
- **Service Provision Demands on the Local Authority:** The local municipality will not be responsible for the provision of services as this will be paid for by the applicant. The authority will however benefit from the income on rates and taxes as the property is part of the urban edge (**See Appendix 1** for a Municipal Zonation Map).
- **Social Commitment and Job Creation:** Construction companies and agricultural teams will be tasked with building and installing the agricultural infrastructure. The entire farm boundary is being fenced in to provide for additional security. These projects generate additional income in the community as the projects are labour intensive and ongoing for the foreseeable future.
- This will provide work opportunities (estimate 40 permanent and 120 temporary positions) for both skilled and unskilled labour (machine operators; bricklayers/builders and agricultural staff).
- Unskilled labour will earn as per the applicable minimum daily wage as determined by legislation at the time and as per qualifications and expertise provided.
- 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 Malelane and the Onderberg in general.
- **Location:** Is this the correct location for the project?
- Yes. 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.
- Mitigation measures proposed by the biodiversity specialist include the implementation of buffer zones, the restriction on development behind the 1:100-year floodline and the management of the stormwater run-off and erosion control.
- **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 Malelane 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 by allowing upmarket residential properties to be developed will ensure a sustainable long-term outcome.
- **Access Road:** The access to the Project Area from the Provincial gravel road (Opdraend Pad) is functional and allows for access to the project site.
- Construction/harvesting/marketing vehicles and equipment will thus have unhindered access to the project site.
- **Timing:** Is this the right time to implement such a development?
- The drought of 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 macadamia crops. The applicant is planning ahead in an ever-changing market and positioning their business to meet the demands of the future.
- Agricultural estates have recently proven to be successful as residents are keen to share their living conditions with a rural farm lifestyle. A significant interest has been shown by investors to date in the event that the proposed project is approved.
- **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.

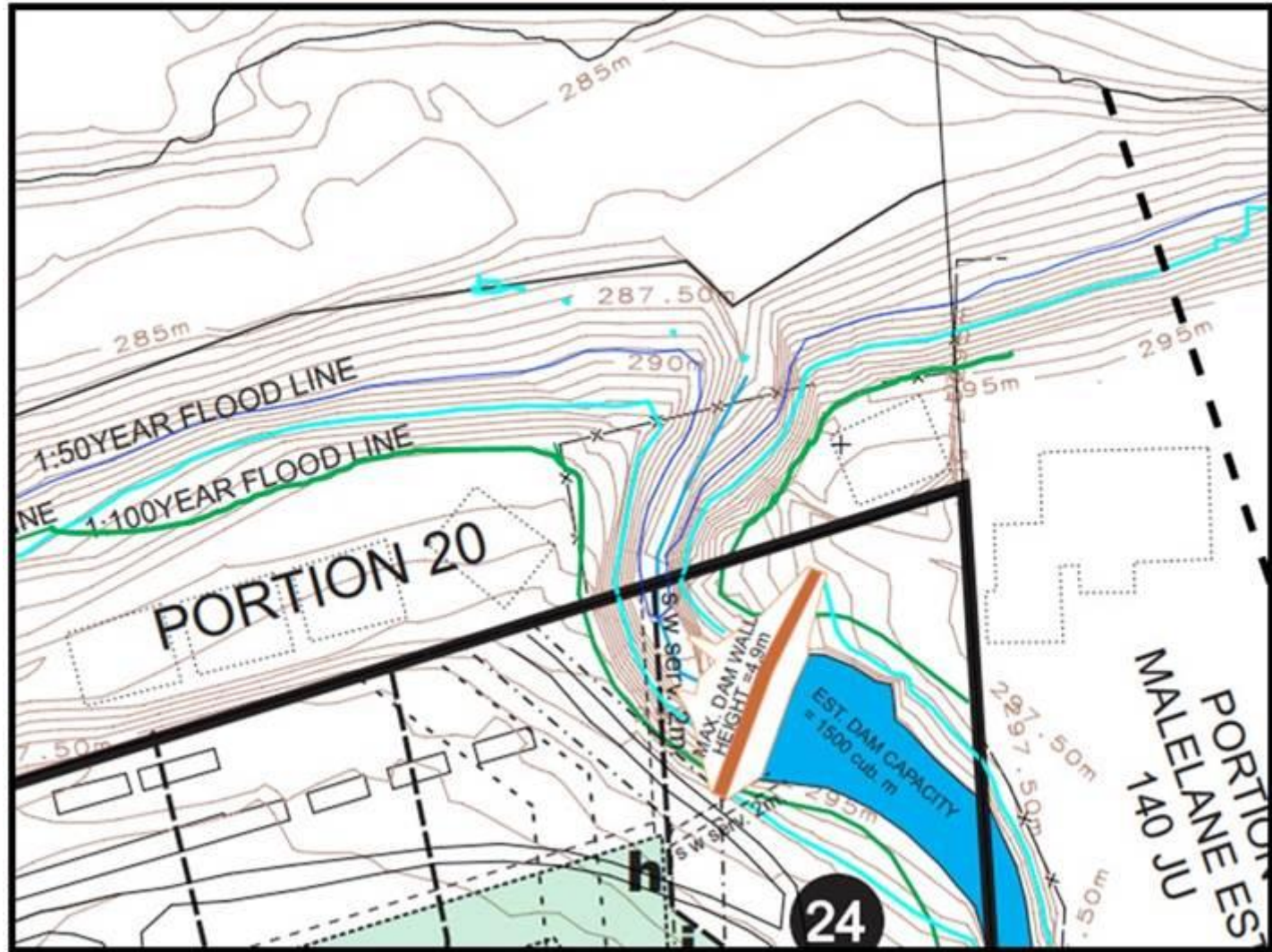
	<ul style="list-style-type: none"> • <u>Need and Desirability of the Proposed Project:</u> In conclusion, it is the opinion of the EAP that the cumulative effect of the factors listed above will result in a positive contribution in the fields of economic benefit and social upliftment in the region, with little or at most manageable impacts in the environmental arena.
<p>3.Economic Sustainability.</p>	<ul style="list-style-type: none"> • <u>Economics of the Project:</u> Development of the new orchards will plough millions of Rand into the local economy with a positive return in 5 years' time. Turnover will be in the range of R1 689 856,49 in year 6 and up to R 4 157 348.52 in year 15. • The project site has been farmed for many years (since the early 1950's) producing vegetable crops for the internal agricultural market. At the time and late into the 90's this approach was adequate as a family business and small-scale farming remained profitable. • Unfortunately, this type of farming (only 22% of the property is classified as high potential agriculture soils) is no longer competitive and hence the dual approach suggested by the new owners, i.e., agriculture combined with rural residential estate living. This will ensure a sustainable agriculture- and real estate product. The real estate product will generate an estimated R140 million investment in the area. • See <u>Appendix 4.4.1 Volume 1</u> of the Appendices document. • A financial analysis by the agricultural specialist has confirmed that the farm has the potential to meet the demands for macadamia nuts given the world-wide growth predicted for these products. • To protect the long-term viability of the crop the homeowners will sign a long-term lease on the agricultural section of the project site.
<p>4.SANParks: Building Regulations and Architectural Guidelines.</p>	<ul style="list-style-type: none"> • <u>Impact upon the Kruger National Park:</u> A View Shed Analysis has confirmed that the proposed development cannot be seen from any tourism- and guest facilities inside the Kruger National Park. See <u>Appendix 4.4.5</u> for detail in this regard. • Furthermore, the proposed buildings rules and regulations including the architectural guidelines prohibits the use of bright colours, the use of floodlights, the positioning of lights in general and promotes the optimisation of planting and landscaping with indigenous plants and trees commensurate with the Malelane Mountain Bushveld. • Additional to this the proposed in-house rules will place restrictions on noise, fires and the movement of vehicles which will be limited to designated roads only. • <u>Mitigation:</u> RES has studied the SANParks: KNP Guideline for Neighbouring Properties. These guidelines have been internalised where applicable in the EMPr (<u>See Appendix 5</u>).

<p>5. Water Use Administration.</p>	<ul style="list-style-type: none"> • The local Irrigation Board has raised a concern that the division of property owners each with their own title deed will result in a very cumbersome administration process in terms of water entitlements, water use, billing per landowner and other logistical issues. • Mitigation 1: Logistical Arrangements: Currently the Irrigation Board manages a pump house and abstraction point near the Crocodile River on Portion 20. Other affected infra-structure includes pipelines, staff housing and canals. It must be noted that all these aspects must be allowed to continue functioning unhindered as a supplier of irrigation water. • The staff of the board require 24-hour access to the various facilities under its jurisdiction. • Mitigation 2: The developer and the Irrigation Board must compile an Operational- and Maintenance Management Plan to ensure an amicable relationship for all parties going forward. This plan must address all the issues listed above (including the administration concerns) by the Irrigation Board. • Mitigation 3: Rights to Access: The Irrigation Board and its staff members will be allowed to function as per normal working- and maintenance requirements. • Mitigation 4: The developer must register as a Water Services Provider (as per the Water Services Act) with the local municipality and reach an agreement to provide water to the various users. This process is <i>in prep</i>.
<p>6. Irrigation Systems and Water Rights.</p>	<ul style="list-style-type: none"> • See Appendices 4.3 and 4.4.1 for copies of the water rights. • Low Flow Irrigation: 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 Low Flow Irrigation System (LFIS) 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: • Mitigation Description: • Irrigation Scheduling: 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. • Water Efficiency: 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 on 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**.
- **Advantages of Irrigation Scheduling:** It can:
 - 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.
- **What is Low Flow Irrigation?** 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.
- **Why Should One Use Low Volume Irrigation?** 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.

	<ul style="list-style-type: none"> • 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. • <u>Summary of Benefits of Low Flow Irrigation System:</u> • 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. • Fertiliser Used: Water soluble fertilisers will be mixed on the farm and dosed into the irrigation lines. The 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.
7.Agricultural Potential.	<ul style="list-style-type: none"> • See Appendix 4.4.1. and the paragraph on Soil Suitability above. • <u>Financial Viability and Agricultural Potential of the Property:</u> The project site has been farmed for many years (since the early 1950's) producing vegetable crops for the internal agricultural market. At the time and late into the 90's this approach was adequate as a family business and small-scale farming remained profitable. • Unfortunately, this type of farming (only 22% of the property is classified as high potential agriculture soils) is no longer competitive and hence the <u>dual approach</u> suggested by the new owners, i.e., agriculture combined with rural residential estate living. This will ensure a sustainable agriculture- and real estate product. The real estate product will generate an estimated R140 million investment in the area. • A financial analysis by the agricultural specialist has confirmed that the farm has the potential to meet the demands for macadamia nuts given the world-wide growth predicted for these products. • To protect the long-term viability of the crop the homeowners will sign a long-term lease on the agricultural section of the project site. • <u>Land Use and Building Footprint:</u> The agricultural land use will cover 78% of the project site. The zonation for the property will thus remain agriculture and the financial feasibility will simply be augmented by selling off 24

	residential stands.
8. Floodlines and Buffer Areas.	<ul style="list-style-type: none"> • See Appendix 6.3 for detail and the Final Development Map/Floodline Map in Appendix 1. • <u>What are Buffer Zones:</u> Aquatic buffer zones are typically designed to act as a barrier between human activities and sensitive water resources thereby protecting them from adverse negative impacts. Buffer zones associated with water resources have been shown to perform a wide range of functions, and on this basis, have been proposed as a standard measure to protect water resources and associated biodiversity. These functions include: <ul style="list-style-type: none"> • Maintaining basic aquatic processes. • Reducing impacts on water resources from upstream activities and adjoining land uses. • Providing habitat for aquatic- and semi-aquatic species. • Providing habitat for terrestrial species. • A range of ancillary societal benefits. • <u>Mitigation: Two Buffer Zones at KMAE:</u> The buffer boundaries for the water courses as assessed with the DWS buffer tool must be implemented between the development and surrounding environment. These buffers around the riparian zones and wetlands were calculated as follows: <ul style="list-style-type: none"> • Crocodile River: 23m wide. • Small stream on the eastern boundary (valley bottom wetland): 10m wide. • <u>These buffers will protect the riverine area from the following potential sources of pollution:</u> <ul style="list-style-type: none"> • Construction camps, storage areas, soil stockpile areas and laydown areas must be located outside the riparian or wetland buffer zones. • Prohibit the dumping of waste material within the riparian or wetland buffer zones. Spoil material must be appropriately disposed of at a registered waste disposal facility. • Portable toilets must be located outside the riparian- or wetland buffer zones. • See the delineation of the Crocodile River Buffer Zone in the Maps in Appendix 1. • Together with the 1:100-year floodline demarcation these zones must be avoided at all times by the development footprint and where applicable riparian vegetation must be replanted in both these zones. • See below: Unnamed Drainage Line: Eastern Boundary: Light Blue Line: 10 m Buffer Zone around the drainage line.



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 Malelane and the Province in general. It is also important to note that **2 alternative land uses** are envisaged for the site: Agriculture (approximately 78%) and residential units (22%). This dual approach makes the project economically viable in the long term.

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 and tourism business sector in the Malelane area and has expressed the wish to formalise the opportunity into a sustainable business (job creation, service delivery, diversity of business opportunities) venture.

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. The loss of jobs would add to the poverty that is prevalent in sections of the community.

9.6.2. Demand Alternatives:

1. Power Supply:

Eskom Supply: Eskom remains the only viable and practical option for an agricultural-residential activity of this nature. The electricity will be required to pump water and run pumps to the various orchards and residential units. Eskom supply is in place and the service provider has confirmed that adequate capacity is available for both the residential and agricultural sectors.

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 irrigation canal and bore holes as per the water allocation and entitlements existing in the name of the applicant/farm.

3. Low Flow Irrigation: Advantages (Recommended Option)	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 March to September. Except for heavy rainfall, the preparation 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 period as short as possible. Preparation and construction work will be limited to normal working hours daily (07h00-17h00) from Monday through to Friday.

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

Macadamia nuts 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. 78% of the site will be used for agriculture and the remainder will be used for residential units and 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.
- 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.

9.6.5. Monitoring Requirements: Alternative Methods:

- **Measuring Mitigation**: 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.
- **ECO**: 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.
- **Monitoring Programme**: 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.
- **Aspect 1: Dam buffer and riparian corridor**: It is vital to monitor the effectiveness of the maintenance plan which optimises the riparian plant species development and riparian habitat restoration (ensure integrity of wildlife corridor is retained and links between habitat types are enhanced). The restoration of the dam buffer area should be monitored throughout the duration of construction activities to ensure that the effectiveness of the final buffer zone areas is maintained and that management measures are implemented appropriately. Regular inspections during the operational phase should also be undertaken to ensure that functions are not undermined by inappropriate activities.
- **Aspect 2: Vegetation clearing or disturbing soil**: 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- and stormwater control techniques that are employed throughout the site preparation activities are effective in minimising erosion of exposed areas and sedimentation of site surface water.
- **Aspect 3: Water quality**: It is recommended that the SASS5 method be implemented as part of the Biomonitoring Programme, specifically for the reaction of the sensitive species to water quality above and below the dam. Monitoring surveys (per year) are suggested as follows:
 - One wet season survey at the established sites.
 - One dry season survey when the impacts of reduced surface water and water quality issues become evident.
- **Aspect 4: Exotic- and alien invasive plants**: To anticipate and evaluate imminent or potential risks to the project area regarding exotic- and alien invasive plants, as well as pathways of invasion, a monitoring programme should be developed in order to create effective mechanisms to manage or mitigate these.
- Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. It is important to evaluate the effectiveness of control methods and to monitor the cleared areas on a regular basis to identify emergent seedlings and to remove those immediately.

10. PUBLIC PARTICIPATION

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

1.1. At the SPAR Centre in Malelane town. This is focal point for most residents in the town.

1.2. On site at the entrance to the farm on the Opdraend 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 Environmental Impact Assessment process was advertised in a Local/Regional Newspaper (The **Lowvelder: 8 April 2021**).

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 was forthcoming. Participation by Interested Groups was therefore limited and channelled towards neighbours and officials from the DWS (IUCMA), DARDLA, DARDLEA, DAFF, the Irrigation Board, SANParks and NDA: Agriculture. Copies of all reports were also submitted to MTPA, the Nkomazi Municipality and the applicable Irrigation Boards.

3. Site Meeting: Consultation was formalised through an on-site Public Meeting held on the **24 May 2021**. This was augmented by a Focus Group Meeting on **25 May 2021** with representatives from the Kruger National Park.

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 **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 (Malelane Public 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. Dr. Piet Kotze investigated the need and feasibility of installing a fishway and Dr. Sandra MacFayden conducted a View Shed Analysis to assess the potential visual impact of the development on the Kruger National Park.

These studies were augmented by a comprehensive set of technical assessments which included the provision of services; geotechnical and hydrology studies; a traffic study etc. 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 Malelane **Library, the farm office of the applicant 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.

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 and these will increase 4-fold in the permanent job market and by an additional 120 annually for temporary positions.
- Development labour and expertise will be required to prepare the orchards 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.
- Job opportunities will include but not be limited to maintenance positions on the irrigation systems and fences; weeding and fertiliser operations; planting and harvesting.
- Additional permanent positions will be generated once the residential units have been completed. Until then, many labourers and skilled workers will be involved during the construction phase.
- 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 Malelane.

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 must 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 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 has obtained the services of agricultural specialists for advice on how to implement the macadamia programme. An experienced farm manager will be appointed to oversee the framing operations.

2. 78% of the farm is set aside for agriculture whilst all sensitive areas i.e., riparian zones and drainage lines 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 habitat types and ecosystems have been reduced as most of the project area is found on historically **modified lands and degraded areas**.
- Will ensure the conservation of biodiversity in- and around the project area by maintaining an **ecological corridor along the eastern boundary** which promotes the connectivity between the farming areas and the Kruger National Park.
- Additional **key issues** include:
- The applicant has access to **adequate water** as per entitlements and lawful water use to establish the macadamia crops;
- The soils are **suited to crop farming** especially macadamia;
- The existing bridge crossing to Stand 24 must be upgraded to link up with the project area.

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

6. Best Practice Guidelines: The applicant must implement **Agriculture Best Practice Techniques** on his farming operation as follows:

- **Orchards:** Establish the plants on good, well drained soils in line with the recommendations provided by the soil/agriculture 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 low flow irrigation systems which conserve water use over the long term.

7. Buffer Areas: 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. Protected Trees: Ensure that all Protected Trees (where applicable) and plants of special concern are harvested and relocated to the buffer zones on the property. 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).
- Maintain the integrity of the old farmhouse.
- 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. Biodiversity 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 riparian corridor on the eastern boundary of the project area will be inundated by the small dam water and the riparian link will thus be affected. The increased moisture from the higher water levels in the dam will enhance plant growth and probably create a secondary riparian zone which will link up with the original upstream and downstream riparian corridors.
- The project team **must protect this riparian corridor** by incorporating a rehabilitated buffer around the periphery of the dam high level mark.
- By establishing a **10m buffer** around the dam high level mark, the new perimeter could be rehabilitated with vegetation removed and replanted from the dam basin.
- This measure of mitigation is consistent with the desired management objectives for riparian corridors and could prevent fragmentation.
- The buffer boundary for the Crocodile River as assessed with the DWS buffer tool must be implemented between the development and surrounding environment.
- Crocodile River: **23m wide.**
- **Apply the mitigation hierarchy:** The mitigation hierarchy for dealing with negative impacts on biodiversity, consists of four activities:
 - **Avoid and prevent:** Consider options in land-use location, siting, scale, layout, technology and phasing to avoid impacts on biodiversity, ecosystem services and people. This is the best option but not always possible.
 - Identify the best practicable environmental options by avoiding loss of biodiversity and disturbance to ecosystems, especially in CBAs.
 - Four options for small dam locations were proposed, but all four were in the same river reach and none of them having a lower predicted impact on the system. The preferred dam will act as an access bridge over the stream.
 - **Minimise:** Consider alternatives in land-use location, siting, scale, layout, technology and phasing to minimise impacts on biodiversity, ecosystem services and people.
 - **Minimise unavoidable impacts:** Manage and mitigate impacts where possible, such as clearing of vegetation, erosion of soil, siltation of the river and control alien vegetation.
 - **Rehabilitate:** If impacts have been unavoidable, take measures to return impacted areas to a condition like the pre-impact or natural state — although this is important and necessary, rehabilitation can never replicate the diversity and complexity of an un-impacted natural site.
 - Replanting the new riparian zone will form part of this process.
 - Owners will replant the fallow soil with indigenous vegetation which will successfully mimic a riparian zone that has been absent for decades.
 - **Offset:** As a last resort, compensate for remaining unavoidable negative impacts on biodiversity. When every other effort has been made to minimise or rehabilitate impacts to a degree of 'no net losses of biodiversity against biodiversity targets, offsets can compensate for unavoidable negative impacts.
- Unfortunately, due to the level of development on the farming property, there is no untransformed land left to set aside as an offset area.

- The “rehabilitation” or re-establishment of a riparian zone in the gardens of the residential units will improve a rather sterile environment, as adjacent properties downstream of the KMAE have proven.
- **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:
- Unfortunately, due to the level of development on the farming property, there is no untransformed land left to set aside land of high biodiversity importance for conservation. The remaining riverine and riparian corridors should be left intact and protected from further development. Should the riparian zone around the dam re-establish and the corridor regained, this zone should be managed and protected in order to link up with the downstream Crocodile River environment.
- The “rehabilitation” or re-establishment of a riparian zone in the gardens of the residential units will link up with existing riparian corridors.
- **Remedy degradation and fragmentation through rehabilitation:** Design project layouts and select locations that minimise loss and fragmentation of remaining natural habitat and maintain spatial components of ecological processes, especially in ecological corridors, buffers around rivers and wetlands, CBAs and ESAs. Activities that are proposed for CBAs must be consistent with the desired management objectives for these features and should not result in fragmentation.
- The proposed project should re-establish the riparian corridors along the Crocodile River embankment and establish a rehabilitated buffer of 10 m around the periphery of the dam/bridge high level mark. This measure of mitigation is consistent with the desired management objectives for riparian corridors and should not result in fragmentation.
- **Promote long-term persistence of taxa of special concern:** Some bird species of special concern will utilise the riparian corridor once it is rehabilitated. Hooded Vulture, Martial Eagle and African Crowned Eagle have been observed in gardens of the adjacent properties.

11. Water: Managing the Borehole Abstraction:

- All bore holes should be subjected to an aquifer testing programme every 5 years to ensure sustainability of supply. Do not “over-use” the borehole.
- All holes must be equipped with a protection circuit and timer to ensure that abstraction schedules can be monitored and regulated.
- Do not withdraw water over and above the recommended critical level.

12. Stormwater Control: Residential Units:

- It is proposed that soakaways be used within the residential sites to lessen the impact of runoff from the roofs combined with permeable paving, both source control measures.
- Another source control which could be considered is rainwater harvesting.
- It is further proposed that swales be constructed adjacent to all the access roads as the primary local control.
- In order to prevent high volumes of stormwater being released straight into the Kruger National Park, it is suggested that the stormwater channels first let the water flow into a system of drains and rock-filled sumps to slow down the flows and then dissipate the released water over gabion mattresses to prevent further erosion and siltation on the KNP section of the fence

13.Fishway:

- An assessment as to the necessity for providing a fishway at the said barrier (bridge-dam) was completed by Dr Pieter Kotze. See **Appendix 4.4.3** for detail.
- Based on the results of this assessment, it was concluded that a fishway will add little, if any ecological benefit at the proposed dam site and therefore **no fishway is required for installation at the proposed dam**. This recommendation is based on ecological considerations.

14.View shed/Visual Impact:

- Impact upon the Kruger National Park is considered minimal provide all building heights are restricted to below **7.5m in height**. This restriction is included as a condition in the recommendations and the EMPr.
- Secondly, the **planting of indigenous trees** in- and between the residential units will reduce the potential impact upon the KNP to less than 3%.

15.Irrigation Board Functions:

- The developer and the Irrigation Board must compile an **Operational- and Maintenance Management Plan** to ensure an amicable relationship for all parties going forward.
- The Irrigation Board and its staff members will be allowed to function as per normal working- and maintenance requirements.
- The developer must register as a **Water Services Provider** (as per the Water Services Act) with the local municipality and reach an agreement to provide water to the various users. This process is *in prep*.

16.SANParks: Kruger National Park Guidelines:

- The SANParks Guidelines for properties bordering the Kruger National Park have been internalised and included where applicable in the EMPr (**Appendix 5**).

17. 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.
- To achieve the above implement the monitoring programme described in paragraph **9.6.5** of this report.

18.Portion 20:

- This portion still belongs to- and is managed by the Irrigation Board. It provides accommodation to a number of staff members and houses the pump station which abstracts water from the Crocodile River as per allocated entitlements.
- The Irrigation Board has indicated that this property is up for sale and the applicant of this application has submitted an interest in obtaining the land.
- Should the applicant be successful in obtaining the land then no additional development will take place on Portion 20 as it would affect the ambience and property value of Stands 20-23.
- No additional environmental impacts would thus be applicable.

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 that the dual approach 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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