

Draft Basic Assessment Report

Proposed Development Of A Timeshare Resort Located On Portion 101 Tenbosch Near The Crocodile River, Mpumalanga Province



Prepared by:



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Foreword

This report constitutes the **Draft Basic Assessment Report**, and has been circulated digitally for Stakeholder Comment on 8 November 2016.

NuLeaf Planning and Environmental would like to thank all Stakeholders for their participation and input into this process to date, and hereby invite Stakeholders to review this draft report and to provide feedback, input, concerns and comments.

All written comments received, including NuLeaf's response to each, will be captured in a Comments and Responses Register, which will be made available to all I&AP's and included in the Final Basic Assessment Report for submission to the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs.

All comments on the Draft BAR must be **in writing** and must reach NuLeaf by no later than close of business on 8 December 2016.

Please mark all comments for the attention of:

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Acronyms and abbreviations

BA:	Basic Assessment
BAR:	Basic Assessment Report
CBA:	Critical Biodiversity Area
CMP:	Construction Management Plan
DARDLEA:	Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs
DWS:	South African National Department of Water and Sanitation
EA:	Environmental Authorisation
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment
EMPr:	Environmental Management Programme
EMS:	Environmental Management System
EO:	Environmental Officer
I&AP:	Interested and Affected Party
IDP:	Integrated Development Plan
IEM:	Integrated Environmental Management
KNP	Kruger National Park
LED:	Local Economic Development
MTPA:	Mpumalanga Tourism and Parks Agency
NEMA:	National Environmental Management Act, Act No. 107 of 1998
NEMPAA:	National Environmental Management: Protected Areas Act, Act No. 57 of 2003
NPAES:	National Protected Area Expansion strategy
OMP:	Operational Management Plan
SAHRA:	South African Heritage Resources Agency

GLOSSARY OF TERMS

Alien Vegetation:	Alien vegetation defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations.
Alien Species:	A plant or animal species introduced from elsewhere: neither endemic nor indigenous.
Alternatives:	In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to: (a) The property on which or location where it is proposed to undertake the activity; (b) The type of activity to be undertaken; (c) The design or layout of activity; (d) The technology to be used in the activity; and (e) The operational aspects of the activity.
Applicant:	Any person who applies for an authorization to undertake an activity or to cause such activity to be undertaken as contemplated in the National Environmental Management Act (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010.

Buffer zone:	Is a collar of land that filters out inappropriate influences from surrounding activities, also known as edge effects, including the effects of invasive plant and animal species, physical damage and soil compaction caused by trampling and harvesting, abiotic habitat alterations and pollution. Buffer zones can also provide more landscape needed for ecological processes, such as fire.
Construction Activity:	Any action taken by the Contractor, his subcontractors, suppliers or personnel during the construction process.
Ecology:	The study of the inter relationships between organisms and their environments.
Environment:	All physical, chemical and biological factors and conditions that influence an object and/or organism.
Environmental Impact:	An Impact or Environmental Impact is the degree of change to the environment, whether desirable or undesirable, that will result from the effect of a defined activity. An Impact may be the direct or indirect consequence of the activity and may be simple or cumulative in nature.
Environmental Impact Assessment:	Assessment of the effects of a development on the environment.
Environmental Management Programme:	A legally binding working document, which stipulates environmental and socio-economic mitigation measures that, must be implemented by several responsible parties throughout the duration of the proposed project.
Indigenous:	Means a species that occurs, or has historically occurred, naturally in a free state within the borders of South Africa. Species that have been introduced to South Africa as a result of human activity are excluded (South Africa (Republic) National Environmental Management: Biodiversity Act, 2004: Chapter 1).
Interested and Affected Party:	Any person, group of persons or organization interested in or affected by an activity contemplated in an application, or any organ of state that may have jurisdiction over any aspect of the activity.
Invasive vegetation:	Plant species that show the potential to occupy in unnatural numbers, any disturbed area, including pioneer species.
Mitigate:	The implementation of practical measures to reduce adverse impacts
Public Participation:	Public Participation Process: is a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters. The legislated process contemplated in terms GN R543, in which all potential interested and affected parties are informed of the proposed project and afforded the opportunity to input, comment and object. Specific requirements are listed in terms of advertising and making draft reports available for comment.
Road Reserve:	The road reserve is a corridor of land, defined by co-ordinates and proclamation, within which the road, including access intersections or

interchanges, is situated. A road reserve may, or may not, be bounded by a fence.

Road Width:	The area within the Road Reserve including all areas beyond the Road Reserve that are affected by the continuous presence of the road i.e. the verge.
Red data plant species:	Are fauna and flora species that require environmental protection based on the World Conservation Union (IUCN) categories and criteria.
RoD:	Record of Decision pertaining to the Application for Environmental Authorisation issued by the Competent Authority. The RoD is legally binding on the Applicant and may contain a positive or negative decision on the Application as well as conditions and provisions for each.
Soil Compaction:	Mechanically increasing the density of the soil, vehicle passage or any other type of loading. Wet soils compact easier than moist or dry soils.
Species:	Means a kind of animal, plant or other organism that does not normally interbreed with individuals of another kind. The term "species" include any sub-species, cultivar, variety, geographic race, strain, hybrid or geographically separate population (South Africa [Republic] National Environmental Management: Biodiversity Act, 2004: Chapter 1).
The Contractor:	The contractor, as the developers agent on site, is bound by the ROD and EMP conditions through his/her contract with the developer, and is responsible for ensuring that conditions of the EMP and ROD are strictly adhered to at all times. The contractor must comply with all orders (whether verbal or written) given by the ECO, project manager or site agent in terms of the EMPr.
The Developer:	Remains ultimately responsible for ensuring that the development is implemented according to the requirements of the EMP and the conditions of the Environmental Decision throughout all phases of the project.
The Environmental Control Officer (ECO):	The ECO is appointed by the developer as an independent monitor of the implementation of the EMP i.e. independent of the developer and contractor.
The Environmental Officer (EO):	The Contractor shall submit to the Site Agent a nominated representative of the Contractor as an EO to assist with day to day monitoring of the construction activities for the contract.
Vegetation:	Is a collective word for plants occurring in an area.
Vulnerable:	A taxon is 'Vulnerable' when it is not 'Critically Endangered' or 'Endangered' but is facing a high risk of extinction in the wild in the medium term future.
Watercourse:	A river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows; and any collection of water which the Minister may by notice in the Government Gazette, declare to be a watercourse, and a reference to a

watercourse includes, where relevant, its bed and banks” (South Africa [Republic] National Water Act, 1998).

Executive Summary

SECTION A: ACTIVITY INFORMATION

Section A details all of the activities that will be undertaken during the development of the Proposed Timeshare Resort on Tenbosch Farm, as well as, the identification of reasonable and feasible alternatives, activity motivation and waste management.

Project Description

The proposed development entails the construction of tourist accommodation in the form of a timeshare resort within the Portion 101 Tenbosch Farm, 162 JU adjacent to the Crocodile River. The timeshare will comprise between 60-100 chalets and a central complex inclusive of recreational facilities. A third of the existing water rights from the river will be converted to be used for the development. All associated civil infrastructure (water, electricity, waste treatment) will be included, as well as, internal access tracks. Key staff will be housed on site while the remainder of the staff will be housed off site.

Feasible Alternatives

- *Site Alternative*

Only one site alternative is under consideration for the timeshare resort.

The preferred site is a 'brownfields' site which used to function as a citrus orchard. Majority of these citrus trees have been cleared, though there are other large trees on site and along the riverbank. The areas where the citrus orchards have been cleared will be replanted as agriculture. The site is situated adjacent to the Kruger National Park boundary on the southern bank of the Crocodile River. Agricultural, commercial and residential developments lie to the west, south and east of the site.

Services (water, electricity and sewage) will be obtained by extending the existing infrastructure at the farmhouses located on site.

- *Layout Alternatives*

Two layout alternatives are under consideration for the proposed timeshare resort.

Preferred Alternative: Alternative 1

The layout of the timeshare resort is designed to capitalize on the views provided by the Crocodile River and KNP to the north. The chalets will be grouped in pairs, 1 storey in height and constructed out of brick and mortar. Majority of the chalets will be located near the northern boundary of the site overlooking the Crocodile River and the Kruger National Park beyond. The remainder of the chalets will be clustered around two central complexes located in the east and west. The western central complex (an existing farmhouse) will consist of a communal recreational area with a swimming pool and a tennis court, while the eastern complex will consist of a swimming pool.

This Preferred Layout respects all recommended buffer areas, the flood line along the Crocodile River and all riparian buffers along the watercourses located on site. Existing drainage line crossings have been utilized where possible.

Layout Alternative: Alternative 2

The Layout Alternative is very similar to the layout of the Preferred Alternative, with the exception of the placement of the chalets in the eastern portion of the site. In this layout, approximately 12 of the chalets in the north eastern corner are located within the riparian buffer which is a high sensitivity area and no-go zone for development.

- *Technology Alternatives*

Two technology alternatives are under consideration for the proposed timeshare resort.

Preferred Alternative: Alternative 1

Raw water will be sourced from the conversion of existing water rights from the Crocodile River Irrigation System listed for 35ha and stored in a 350 kl storage tank. The water will then be distributed to each unit within the development via a water distribution network.

A sewage treatment plant will be constructed at a suitable position within the development site and all the sewage from the reticulated units within the development will be treated at this treatment plant. Outflow will be used for irrigation purposes. The key staff accommodation will be provided with onsite septic tank sewage disposal systems which will be located outside the 1:100 year flood plains.

The treatment processes for the plant will include screening, anaerobic digestion, trickling filter, settler and chlorine contact tank.

Electricity supply will be via the Eskom lines on site whereby an underground reticulation system will be installed.

Technology Alternative: Alternative 3

All service aspects will be as per the Preferred Alternative, with the exception that power will not be supplied by Eskom, but via solar power.

Solar panels will be roof mounted on the roofs of the units and recreation areas.

Waste and Effluent

Solid waste will be separated into non-recyclables and recyclables and stored separately for collection. Non-recyclables will be collected and stored in fenced 'scavenger proof' areas at a holding facility at the entrance gate to the development site. The waste will then be collected by the Resort Management/Service provider and transported to the Nkomazi Municipality's approved landfill site at Steenbok.

A water treatment plant will be constructed which will be constructed at a suitable position on the development area. Collector sewer lines will be constructed to convey the sewage to two sewage pump stations. Sewer rising mains will be provided to convey the wastewater to the wastewater treatment plant. Septic tanks and soakaways may be required for key staff and administration facilities. Effluent emanating from the septic tank at the units will be dissipated via a soak away by means of properly designed and installed soak away systems.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

This section provides a detailed description of the proposed development in terms of the groundwater, soil, biodiversity, visual and cultural/historical features found on site.

Groundwater and soil

The study area is underlain by transported sandy and gravelly soils overlying basalt bedrock belonging to the Letaba Formation, Lebombo Group, Karoo Supergroup.

Isolated outcrops of very hard rock basalt are present in the central, northern portion of the property which has been apportioned into three prominent geotechnical soil zones, Soil Zones "A" to "C."

Soil Zone A materials cover the majority of the site, Soil Zone B materials cover the central portion of the site and Soil Zone C occupies the two low-lying areas and drainage features including the dam located in the east. The timeshare units will be located along the northern boundary of the proposed site where Soil Zones A and B are found.

Groundcover

The study area is situated in Tshokwane - Hlane Basalt Lowveld within the Lowveld Bioregion in the Savanna Biome. This vegetation type is considered well protected and has a conservation status of **Least Concern** (Lötter et al., 2014). This is largely due to much of this community occurring within the Kruger National Park. It is not listed as a Threatened Ecosystem (Notice 1002 of Government Gazette 34809, 9 December 2011).

Most of the terrestrial ecosystems within the study area on Tenbosch is classified as **Heavily or Moderately Modified Areas** by the Mpumalanga Biodiversity Sector Plan (MBSP). The scattered untransformed sections are classified as **Other Natural Areas**.

The entire study area is also situated within the **Ecological Support Areas (ESA): Protected Area Buffers**. The wetland vegetation around the dam is classified as **ESA: Wetlands** in the MBSP. Both drainage lines in the study area are classified as **ESA: Important Sub catchments, Fish Support Areas**.

The study area is not situated in any of southern Africa's floristic centres of endemism, which are areas that have an unusually high number of plants unique to that area (Van Wyk & Smith, 2001).

Biodiversity

A specialist terrestrial ecology assessment was undertaken by ECOREX Consulting Ecologists CC in May 2016.

- Flora

A total of 140 plant species was recorded within the study area during fieldwork. Three of these are **protected** under the National Forests Act (No. 30 of 1998): *Philenoptera violacea*, *Combretum imberbe* and *Sclerocarya birrea subsp. caffra*, and two by the Mpumalanga Nature Conservation Act (No.10 of 1998): *Aloe marlothii* and *Crinum stuhlmannii*. *Dalbergia melanoxylon* is assessed as **Near Threatened** and *Crinum stuhlmannii* as **Declining**.

Three untransformed vegetation communities were identified within the study area on the basis of distinctive vegetation structure (grassland, woodland, thicket, etc.), floristic composition (dominant and diagnostic species) and position in the landscape (mid-slopes, terrace, crest, etc.). Transformed and degraded areas make up approximately 30 ha, or 75 % of the study area. Most of the transformed and degraded land is covered by citrus orchards, various buildings, a short golf course and old lands. The untransformed vegetation communities are *Ficus sycomorus* - *Hypoestes forskalii* Disturbed Riparian Forest, *Acacia nigrescens* – *Panicum maximum* Disturbed Closed Woodland, and *Phragmites australis* – *Typha capensis* Wetland.

- Fauna

Situated in the savanna biome immediately south of the Kruger National Park (KNP), the Komatipoort area has **very high** mammal diversity, relatively low numbers of endemics and a moderate number of Red Data species. The study area is mostly transformed (75 %) and little habitat remains, especially for larger mammals. However, it is located on the boundary fence of the KNP and animals can and do wander in through gates or the fence or via the stream channel in the east. Evidence of this was found in a small tract of woodland in the west where old Hippopotamus (*Hippopotamus amphibius*) faeces were located. An estimated 32 conservation-important mammals potentially occur within the project area, although most of these are more likely in adjacent conservation land than in the project area. Several bat species are highly likely to occur overhead, such as Geoffroy's Horseshoe Bat (*Rhinolophus clivosus*), but these species are only likely to feed over the site because of the shortage of suitable roosting sites.

- Birds

Eighty-eight bird species were confirmed to occur in the study area during fieldwork. Thirty-six species were recorded from Riparian Forest, 26 from the Wetland and 13 from Transformed. Three broad assemblages or species-habitat associations were identified, namely Forest Assemblage, Woodland Assemblage and Wetland Assemblage.

A pair of Martial Eagles (*Polemaetus bellicosus*) were observed flying over Closed Woodland in the study area and not actually utilising the habitat within, although it may occasionally hunt over the study area. No suitable breeding habitat is present on Tenbosch.

- *Reptiles and Frogs*

The Lowveld and foothills of far eastern Mpumalanga support a high diversity of reptile species with 102 species already recorded from the degree grid 2531 . Forty-seven species of reptiles have been recorded from the QDS 2531 BD, in which Tenbosch is situated. Of the potentially occurring species, only two **conservation-important** reptiles potentially occur. One of these has been assessed as **Vulnerable**: Nile Crocodile (*Crocodylus niloticus*), which is also **protected** under NEMBA ToPS. Southern African Python (*Python natalensis*) is **protected** under the National Environmental Management: Biodiversity Act (No.10 of 2004) and was confirmed during fieldwork from Riparian Forest immediately north of the dam.

No frogs were recorded during the assessment although summer fieldwork with nocturnal surveys will result in a fair number of species.

Riparian Ecology

A specialist wetland/riparian survey was undertaken by Wet-Earth Eco-Specs to identify and delineate wetlands and riparian area, as well as, determine the present ecological state (PES) and the ecological importance and sensitivity (EIS).

Three (3) water courses were identified and can be described as riverine areas. There are wetland areas which form part of these riparian areas. These wetland areas occur around the dam and upstream of road crossings and weirs. These water courses have been named T01, T02 and T03 for ease of discussion.

- *T01*

Water course T01 is the dam located in the east of the proposed site. The riparian zone extends upstream from the edge of the property and downstream where it joins the Crocodile River. The Riparian Index of Habitat Integrity (RIHI) is a C/D (57.7). this is mainly owing to the road crossings, orchard footprint which has extended into the riparian areas, the dam which destroyed approximately 71 % of the original riparian area, a weir in an active channel and an extensive presence of exotic vegetation. The PES is D/E and the PES Ecostatus is D/E (largely modified/ seriously modified).

- *T02*

Watercourse T02 is the drainage line located in the western portion of the site. The riparian zone extends from the edge of the property upstream to where it joins with the Crocodile River downstream. The RIHI is a D (53.8 %). This is due to roads traversing the riparian zone, dumping, agriculture, vegetation clearing and water quality issues. PES is D while the PES Ecostatus is also a D (53.8%) (largely modified).

- *T03*

Watercourse T03 is the Crocodile River which forms the northern border of the proposed site. The RIHI is a C/D (57.9%) with the main impacts being flood events. Grazing and trampling, water abstraction and presence of exotic species. PES is C/D and the PES Ecostatus is a C/D (57.9%).

Visual

A visual impact assessment was undertaken by NuLeaf Planning and Environmental in order to determine the possible visual impact of the proposed timeshare resort located on Tenbosch Farm.

The visual quality of the broader study area is high, generally as a result of the lack of development and the large areas given over to conservation within the region. There is no evidence of widespread erosion or natural degradation, and development, where this occurs, is domestic in scale.

Viewer incidence is expected to be the highest along the roads surrounding the proposed development area and the properties directly adjacent to the site. Second to these are homesteads in close proximity to the proposed site. Tourists using the roads, residents of the area and tourist accommodation are considered the most sensitive to visual intrusion as they will be exposed to visual intrusion during their rest and relaxation times.

The overall visual absorption capacity (VAC) is low-medium.

SECTION C: PUBLIC PARTICIPATION

A list of interested and affected parties (I&AP's), as well as, compliance authorities was compiled inclusive of Local and District Municipalities, local landowners and environmental organizations.

Written notification of the proposed development, including a background information document, was sent to all identified I&AP's and Compliance Authorities on 13 May 2016.

A printed advertisement was placed in the Lowvelder, a local publication, on the 13 May 2016.

Site notices were placed at the entrances to the affected property, Crocodile Bridge Gate Reception, and the local Spar in Komatipoort on 10 May 2016.

SECTION D: IMPACT ASSESSMENT

Majority of the terrestrial ecosystems of Tenbosch Farm lie within areas classified as **Heavily/Moderately Modified Areas** as per the MBSP. The remaining untransformed sections of the farm are classified as **Other Natural Areas**. Tenbosch also does not lie within a Threatened Ecosystem.

- *Preferred Alternative: Alternative 1*

The Preferred Alternative is deemed to have the lowest environmental impact of all the alternatives considered in terms of the significance of the impacts during both the construction and operational phases.

The construction impacts, if effectively and sufficiently managed according to the mitigation measures proposed in this report, specialist reports and the draft environmental management programme (EMPr), will mostly be of **low** significance, post mitigation. It should be noted that a **moderate** post mitigation significance rating is anticipated in terms of the loss of faunal habitat. This is mainly due to the placement of infrastructure in areas of high sensitivity. No post mitigation impacts of high significance are expected.

Operational impacts can be similarly mitigated and residual impacts are expected to be of low significance overall. However, it should be noted that post mitigation significance is anticipated to be **moderate** in terms of air pollution due to emissions from increase number of vehicles to the area and the operational cost of services pertaining to the use of Eskom power. No post mitigation impacts of high significance are expected.

Positive impacts, which will be applicable to all alternatives, include job creation and employment opportunities for both the construction and operational phases, skills transfer and development. Diversifying the tourism offerings within the region will also have an overall positive impact.

With the above in mind, it is recommended that the Preferred Alternative be supported on the condition that all mitigation measures mentioned in this report, the specialist studies and the draft EMPr are implemented and adhered to throughout the project lifecycle. No fatal flaws are evident and the design approach and layout is deemed to be environmentally responsible. Additionally, the burying of the power cable will help to minimize the visual impact on the adjacent KNP and other tourism accommodation facilities within the area.

- *Layout Alternative: Alternative 2*

The Layout Alternative will result in slightly higher significance ratings for aspects such as hydrology and flora, particularly during the construction phase. This is owing to the placement of a number of chalets and section of the internal access roads being located within the riparian buffer which has a high sensitivity rating.

Post mitigation significance for the construction phase will be mostly **low**. However, **moderate** post mitigation significance ratings are expected for hydrology due to certain chalets being located just outside of the flood line of the Crocodile River, the disturbance of sensitive habitats due to the placement of a number of chalets within the riparian buffer and the cumulative impact of the disturbance of sensitive habitats.

The operational impacts will be similar to those of the Preferred Alternative, with post mitigation impacts being predominately of **low** significance. Slightly elevated post mitigation significance, as compared to the Preferred Alternative, is expected for the disturbance of sensitive habitats. Additionally, **moderate** post mitigation significance rating is anticipated for the cumulative disturbance/ destruction of sensitive habitats.

The placement of a number of chalets and a portion of the internal access road in the buffer of the riparian habitat is not environmentally responsible as this area has a high sensitivity and is declared a no development zone. In spite of the application of mitigation measures, certain impacts- particularly relating to ground and surface water and disturbance of sensitive habitats- will be of a slightly higher significance than in the Preferred Alternative. In light of this, it is recommended that the Layout Alternative is not supported.

- *Technology Alternative: Alternative 3*

The Technology Alternative will result in similar **low** post mitigation significance ratings as that of the Preferred Alternative for the construction phase. Slightly lower impacts are also anticipated for the loss of vegetation due to the fact that power will be supplied by solar panels which is less invasive in nature than the burying of cables.

The operational impacts will be similar to those of the Preferred Alternative, with residual impacts being mostly of **low** significance. Slightly elevated post mitigation impacts, as compared to the Preferred Alternative, is anticipated for soil erosion owing to the increase in hard surfaces and storm water runoff from the solar panels.

Solar panels are prohibitive from a capital cost perspective and are not considered ideal for this project of this size. Additionally, the potential visual impact on the KNP in terms of glare could be impact on KNP tourist visitor experience, particularly at certain times of the day.

With the above in mind, it is recommended that the Technology Alternative not be supported due to the potential visual impact on the KNP visitors.

- *No-go Alternative*

The No-go Alternative implies that the proposed development of the timeshare resort on Tenbosch Farm 101 will not take place. In this scenario receiving environment will not be negatively impacted upon in any manner, particularly with regard to biodiversity and surface water.

It should be noted that while no negative impacts will be incurred, the same can be said for positive impacts such as, the creation of employment and job opportunities, skills transfer and development.

SECTION E: RECOMMENDATION OF PRACTITIONER

As discussed in the preceding section, all significant negative impacts can be successfully mitigated and managed to acceptable levels (moderate to low) during the entire project lifecycle.

All mitigation measures as detailed in this BAR, the attached specialist reports and the draft EMPr must be implemented and adhered to for all phases of the project i.e. planning, construction and operation.

In addition, the following specific recommendations apply:

Planning and Design

- A minimum buffer zone of 16 m should be adhered to around the dam located in the east of the site.
- A minimum buffer zone of 15 m should be adhered to around the drainage line located in the west of the site.
- A minimum buffer zone of 67 m should be adhered to around the Crocodile River located to the north of the site.
- All activities should stay out of the 1:100 year flood line area.
- The sensitivity map must be used as a decision making tool to guide the layout design. Development on areas of high environmental sensitivity must be avoided.
- If infrastructure is planned within any natural vegetation, the areas should be checked by a suitably experienced botanist to locate all conservation-important species. These plants should be marked and the relevant permits applied for before removal and translocated to nearby suitable habitat prior to vegetation being cleared.
- A follow-up survey in late summer (February / March) should take place to search for the succulent *Aloe komatiensis*. This species is listed as Endangered and is confirmed from just outside the study area. This is a small aloe which may have been overlooked during fieldwork and a search during its flowering period will make it far more visible.
- The trees *Sclerocarya birrea* subsp. *caffra*, *Combretum imberbe* and *Philenoptera violacea* are nationally protected and a permit would be required to destroy them.
- *Aloe marlothii* and *Crinum stuhlmannii* are protected under provincial legislation and need to be rescued and relocated to adjacent suitable habitat if they are found to be within the development footprint. A permit to move these plants would also be required

Construction

- A suitably experienced botanist should be present on site at the time of pegging so as to identify sensitive plants or habitats.
- The nationally protected trees to be protected (*Sclerocarya birrea* subsp. *caffra*, *Combretum imberbe* and *Philenoptera violacea*), *Aloe marlothii* and *Crinum stuhlmannii* protected under provincial legislation and any other identified subsequent to the initial survey, should be clearly marked prior to construction.
- No natural watercourse is to be used for the cleaning of tools or any other apparatus. This includes for purposes of bathing, or the washing of clothes etc.
- No construction camps should be allowed in or within 20 m of a riparian areas.
- No stockpile areas should be located in or within 20 m of a riparian areas.
- Construction should preferably take place during the low flow/winter months in order to minimize the risk of sediment and debris being washed into riparian areas.
- Stockpiling of soil and of supplies for the construction camps must take place clearly away (at least 20 m where possible) from the edge of riparian areas to prevent soil being washed into the riparian areas habitat.

- Developers should implement an alien plant control program to combat the infestation present around the wetlands. This program should include regular inspections and follow-ups.

Operation

- Regulate and control movement over the site. Personnel, vehicles and equipment to move along designated routes.
- Ensure that all conserved species and specimens are suitably protected for the duration of the operational phase.
- No protected trees or plants may be removed without the relevant permits from the local authority.
- Maintenance workers and guests may not trample natural vegetation and work should be restricted to dedicated roads, paths and gardens within the development footprint.
- The operator must develop a management and monitoring programme for alien and invasive species detailing basic ID information, actions to prevent the establishment of invasive plants and methods of removal of site during construction.
- No unauthorised access is permitted to buffer areas or any natural areas outside of the facility footprint

SECTION A: ACTIVITY INFORMATION

1. PROJECT DESCRIPTION

1.1. Development Components

The proposed development entails the construction of tourist accommodation in the form of a timeshare resort within the Portion 101 Tenbosch Farm, 162 JU adjacent to the Crocodile River. The timeshare will comprise between 60-100 chalets and a central complex inclusive of recreational facilities. A third of the existing water rights from the river will be converted to be used for the development. All associated civil infrastructure (water, electricity, waste treatment) will be included, as well as, internal access tracks. Key staff will be housed on site while the remainder of the staff will be housed off site. Refer to Appendix A.

The areas where the citrus orchards were cleared will be replanted as agriculture.

The total footprint of the timeshare resort will not exceed 20 hectares.

The proposed timeshare resort will consist of the following:

- 60-100 chalets
- A central complex
- 2x swimming pools
- Tennis court
- Club house
- Recreation area
- Restaurant
- Viewpoints/ bird hides
- Parking area
- Staff accommodation
- Maintenance workshop
- Access control point/ reception

1.2. Detailed description of the listed activities associated with the project as applied for

Government Notice R983 Activity No.	Describe the relevant Basic Assessment Activity in writing as per Listing Notice 1 (GN No. R983)	Describe the portion of the development as per the project description that relates to the applicable listed activity
9 (i) (ii)	The development of infrastructure exceeding 1000 m in length for the bulk transportation of water or storm water with (i) internal diameter of 0,36 m or more or (ii) peak throughput of 120 litres per second or more.	Potable water and storm water infrastructure may exceed 1000m in length and may have an internal diameter of 0,36m, depending on the final storm water design.
10 (i) (ii)	The development and related operation of infrastructure exceeding 1000 m in length for the bulk transportation of sewage, effluent, process water, return water, industrial discharge or slimes with (i) internal diameter of 0,36 m or more or (ii) peak throughput of 120 liters per second or more.	Sewage reticulation infrastructure may exceed 1000m in length and may have an internal diameter of 0,36m, depending on the final storm water design.
12 (vi) (x) (xii) (c)	The development of (vi) bulk storm water outlet structures exceeding 100 square meters in size, (x) buildings exceeding 100 square meters in size, (xii) infrastructure or structures with a physical footprint of 100 square meters in size or more where such development occurs within 32 meters of a watercourse.	Depending on the storm water design, outlets may be developed within 32m of the Crocodile River or dam located within the site. Buildings or infrastructure may be constructed within 32 m of the drainage lines or dam.
27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.	The total cleared footprint of indigenous vegetation is not expected to exceed 20 Ha.

Government Notice R985 Activity No:	Describe the relevant Basic Assessment Activity in writing as per Listing Notice 3 (GN No. R985)	Describe the portion of the development as per the project description that relates to the applicable listed activity
2 (a) (iii) (ff)	The development of reservoirs for bulk water supply with a capacity of more than 250 cubic meters in (a) Mpumalanga (iii) outside urban areas within (ff) 10 Km from a national park identified in terms of NEMPAA.	Water storage for the timeshare resort may have a capacity of more than 250 cubic meters. The Kruger National Park is located less than 1 Km from the proposed site.
4 (a)(ii)(gg)	The development of a road wider than 4 meters with a reserve less than 13,5 m in (a) Mpumalanga (ii) outside urban areas within (gg) areas 10 Km from national parks identified in terms of NEMPAA.	The internal access tracks may exceed 4 meters in length. The Kruger National Park is located less than 1 Km from the proposed site.
6 (a) (ii) (gg) (ii)	The development of resorts, lodges, hotels, and tourism or hospitality facilities that sleeps 15 people or more in (a) Mpumalanga (ii) outside urban areas in (gg) areas within 10 Km from national park as identified in terms of NEMPAA and (ii) areas within 100 meters from the edge of a watercourse.	The proposed development will comprise of between 60-100 chalets and will be located within 100 meters of the Crocodile River. The Kruger National Park is located less than 1 Km from the proposed site.
12 (c) (iv)	The clearance of an area of 300 square meters or more of indigenous vegetation in (c) Mpumalanga (iv) on land zoned open space or had an equivalent zoning.	The total footprint will exceed 300 square meters.
14 (vi) (x) (xii) (c); (a) (ii) (hh)	The development of (vi) bulk storm water outlet structures exceeding 10 square meters in size, (x) buildings exceeding 10 square meters in size, (xii) infrastructure or structures with a physical footprint of 10 square meters or more, where such development occurs within (c) 32 meters or a watercourse; in (a) Mpumalanga (ii) outside urban areas in (hh) areas within 10 Km of a national park as identified in terms of NEMPAA.	Buildings and/or infrastructure may be within 32 m of the Crocodile River or other watercourse. The Kruger National Park is located less than 1 Km from the proposed site.
18 (a) (ii) (gg) (ii)	The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 Km in (a) Mpumalanga (ii) outside urban areas in (gg) areas within 10 Km of a national park identified in terms of NEMPAA and (ii) within 100 meters of a watercourse.	Access roads may be lengthened by more than 1 Km. The Kruger National Park is located less than 1 Km from the proposed site.

2. FEASIBLE AND REASONABLE ALTERNATIVES

2.1. Site Alternatives

Only one site alternative is under consideration for the timeshare resort.

The preferred site is a 'brownfields' site which used to function as a citrus orchard. Majority of these citrus trees have been cleared, though there are other large trees on site and along the riverbank. The areas where the citrus orchards have been cleared will be replanted as agriculture. The site is situated adjacent to the Kruger National Park boundary on the southern bank of the Crocodile River. Agricultural, commercial and residential developments lie to the west, south and east of the site.

Services (water, electricity and sewage) will be obtained by extending and upgrading the existing infrastructure at the farmhouses located on site.

Advantages of this site for the proposed development include the following:

- The site is a 'brownfields' site
- The site has a high aesthetic value owing to the presence of the Crocodile River and KNP beyond
- Existing large trees will help to conceal the visual impact of the timeshare resort

- The site is classified as Heavily or Moderately Modified Areas by the Mpumalanga Biodiversity Sector Plan (MBSP)

Disadvantages of this site for the proposed activity include the following:

- This site is located close to Bucklers Africa Lodge
- Site could potentially have a visual impact on the adjacent KNP

2.2. Lay-out Alternatives

Two layout alternatives are under consideration for the proposed timeshare resort.

Preferred Alternative: Alternative 1

Refer to Appendix A.2.1 for the preferred layout of the timeshare resort.

The layout of the timeshare resort is designed to capitalize on the views provided by the Crocodile River and KNP to the north. The chalets will be grouped in pairs, 1 storey in height and constructed out of brick and mortar. Majority of the chalets will be located near the northern boundary of the site overlooking the Crocodile River and the Kruger National Park beyond. The remainder of the chalets will be clustered around two central complexes located in the east and west. The western central complex (an existing farmhouse) will consist of a communal recreational area with a swimming pool and a tennis court, while the eastern complex will consist of a swimming pool.

The existing farmhouse and buildings located in the east will be upgraded to a clubhouse, recreation area, restaurant and a parking area will also be included.

Five (5) bird hides/ viewpoints will be located throughout the property- one near the centre of the property near the northern boundary, one adjacent to the clubhouse and recreation area in the north east, one in the extreme north eastern corner of the property and two overlooking the dam in the south eastern portion of the property.

An existing workshop in the centre of the property will be upgraded to a maintenance facility and key staff accommodation.

An access control point, a parking area and a reception office will be located south east of the maintenance facility as you enter the property from the District road 1870.

This Preferred Layout respects all recommended buffer areas, the flood line along the Crocodile River and all riparian buffers along the watercourses located on site. Existing drainage line crossings have been utilized where possible.

Advantages of this layout for the proposed development include the following:

- Areas of high sensitivity have been avoided, with the majority of the development lying in areas of moderate sensitivity to low/transformed
- The 1:100 year flood line is respected
- The riparian buffer is respected
- Existing drainage line crossings have been utilized where possible

Disadvantages of this layout for the proposed development include the following:

- Certain chalets are located in close proximity to other tourism accommodation facilities
- Bird hides are located within high sensitivity areas
- Species of conservation concern occur on the site and could potentially be impacted upon

- Small portions of the internal access roads encroach into areas of high sensitivity

Layout Alternative: Alternative 2

Refer to Appendix A.2.2 for the Layout Alternative for the proposed timeshare resort.

The Layout Alternative is very similar to the layout of the Preferred Alternative, with the exception of the placement of the chalets in the eastern portion of the site. In this layout, approximately 12 of the chalets, as well as, a portion of the internal access road in the north eastern corner are located within the riparian buffer which is a high sensitivity area and no-go zone for development.

Advantages of this layout for the proposed development include the following:

- The 1:100 year flood line is respected
- Existing drainage line crossings have been utilized where possible

Disadvantages of this layout for the proposed development include the following:

- Certain chalets are located in close proximity to other tourism accommodation facilities
- The riparian buffer is not respected
- Species of conservation concern occur on the site and could potentially be impacted upon
- A portion of the chalets are located in high sensitivity areas
- Small portions of the internal access roads are located in areas of high sensitivity
- Bird hides are located within a high sensitivity areas

2.3. Technology Alternatives

Two technology alternatives are under consideration for the proposed timeshare resort.

Preferred Alternative: Alternative 1

Raw water will be sourced from the conversion of existing water rights from the Crocodile River Irrigation System listed for 35ha and stored in a 350 kl storage tank. The water will then be distributed to each unit within the development via a water distribution network. The elevation of the development area is not sufficient to provide sufficient pressure for ground reservoirs, and a booster system with standby electricity will be provided.

A sewage treatment plant will be constructed at a suitable position within the development site and all the sewage from the reticulated units within the development will be treated at this treatment plant. A sewage pump station or stations will be required to convey the sewage from the lowest positions to the plant. Outflow will be used for irrigation purposes. The key staff accommodation will be provided with onsite septic tank sewage disposal systems which will be located outside the 1:100 year flood plains.

The treated effluent will comply with the General Standards required by the DWS and will be discharged into a large earth embankment dam located within the development area. The treatment processes for the plant will include screening, anaerobic digestion, trickling filter, settler and chlorine contact tank.

Electricity supply will be via the Eskom lines on site whereby an underground reticulation system will be installed. Each unit will be supplied with a 60A single phase connection and the diversity maximum demand for the unit will be taken as 5kVA.

Advantages of this technology for the proposed activity include the following:

- Irrigating with purified effluent lowers the potable water abstraction requirements and consumption. This is of relevance and importance in a water scarce country, such as ours.

- Existing service infrastructure is already in place

Disadvantages of this technology for the proposed activity include the following:

- Existing energy supply, which will be extended, is not renewable and sustainable green technology
- The long term cost of energy from Eskom is set to increase significantly in the future, meaning a long term escalation in operational energy costs
- Burying the cable could pose risks to the drainage lines, as well as, areas of high sensitivity

Technology Alternative: Alternative 3

All service aspects will be as per the Preferred Alternative, with the exception that power will not be supplied by Eskom, but via solar power.

Solar panels will be roof mounted on the roofs of the units and recreation areas.

Advantages of this technology for the proposed activity include the following:

- The use of renewable energy (solar power) as a primary source of energy generation at the timeshare resort is an ecologically sustainable solution
- The use of off-grid power negates the requirement for ecologically invasive electrical infrastructure (cabling) to the units.
- The use of off-grid renewable energy at the timeshare resort will mostly likely bring a long term saving on operational energy costs.

Disadvantages of this technology for the proposed activity include the following:

- The decision to make use of renewable energy (solar power) will imply a higher capital cost for the timeshare resort, as this infrastructure is expensive when compared to conventional on-grid energy solutions
- Solar panels represent additional hard surfaces, which in turn imply higher storm water and runoff volumes from within the timeshare resort footprint
- Solar panels could potentially have a high visual impact on the adjacent KNP tourists and impact on their visitor experience

2.4. No- project Alternative

The No-Project Alternative implies that the proposed development of the timeshare resort on Tenbosch Farm and all associated infrastructure will not take place. In this scenario no negative environmental impacts relating to ground/surface water and biodiversity will be incurred.

The No Project Alternative also implies that no positive impacts or benefits will be experienced such as the generation of employment opportunities, job creation and diversification of tourism offerings in the region.

3. SITE ACCESS

Ready access is available to the proposed development site via the District Road 1870 that runs parallel to the property. Existing internal dirt roads are also located throughout the property. These may be upgraded (paved) and expanded for use for the proposed development.

4. LOCALITY MAP

Please refer to Appendix A1 for the locality map.

5. LAYOUT/ ROUTE PLAN

Please refer to Appendix A2.1 for the Preferred Alternative layout map and Appendix A2.2 for the Alternative 2 layout map.

6. SENSITIVITY MAP

Please refer to Appendix A3.1 for the Preferred Alternative sensitivity map and Appendix A3.2 for the Alternative 2 sensitivity map.

7. SITE PHOTOGRAPHS

Please refer to Appendix B for photographs taken at the 8 compass points.

8. FACILITY ILLUSTRATION

Please refer to Appendix C for the facility illustration(s).

9. ACTIVITY MOTIVATION

a) IDP, SDF other guidelines

Areas of pristine natural environment in the northern part of Nkomazi include the Kaalrug Mountain range to the west, the Lebombo Mountain range to the east and the whole length of the Crocodile River. These areas have excellent potential for eco-tourism uses.

The existing conservation developments of Marloth Park, Lionspruit Game Reserve, Ligwalagwala Conservancy, Dumaneni Reserve, Mahushe-Shonge Nature Reserve, Mawewe Cattle/Game Project as well as the proposed Vlakbult, Ntunda, Madadeni-Sikwahlane and Masibekela-Mananga Cattle Game projects create the opportunity for an uninterrupted conservation zone in the centre of Nkomazi. This forms one large ecological unit that stretches from Kruger National Park in the north to Lubombo Conservancy in the south-east. Associated land uses may include nature conservation, cattle ranching, game breeding, tourist facilities and hunting.

Kruger National Park – the Kruger National Park dictates the type of land uses to be found adjacent to its border, including agriculture, tourism related developments i.e. eco areas, conservancies and uses focusing on nature conservation.

In this regard, the proposed development of a timeshare resort on Tenbosch Farm falls within the Nkomazi IDP.

b) Need and Desirability

Tenbosch Farm is located on the banks of the Crocodile River, adjacent to the Kruger National Park. The motivation and reasoning behind the proposed development of the timeshare resort is to further develop the growing tourism industry and possible tourism linkages within the area. Tenbosch farm is situated in a prime position. The Kruger National Park forms the northern boundary of the proposed site. Other game reserves nearby are the Mjejane Private Game Reserve and Lionspruit Game Reserve. These Game Reserves are within easy driving distance from Gauteng and are also popular Big 5 game viewing destinations. It is, therefore, important that the natural recreational potential of this region be explored. In order to do this, accommodation facilities need be developed in the greater region that will help to unlock the natural potential of the region.

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

The following legislation may also be applicable:

TITLE OF LEGISLATION, POLICY OR GUIDELINE	APPLICABILITY TO THE PROJECT	ADMINISTERING AUTHORITY	DATE
LEGAL FRAMEWORK			
Constitution of Republic of South Africa (Act No.108 of 1996):	This is the fundamental law of South Africa, setting out the Bill of Rights as well as the relationship of various government structures to each other.	National Government	1996
Conservation of Agricultural Resources Act (Act No. 43 of 1983):	Provides for control over the utilization of the natural agricultural resources of the Republic. The proposed project will be required in terms of this legislation to ensure that: <ul style="list-style-type: none"> ▣ The soil mantle is protected and conserved, ▣ The natural water sources are protected, ▣ Vegetative cover is conserved and weeds and invader plants are removed from the site. 	Department of Agriculture	1983
National Environmental Management Act (Act No. 107 of 1998)	To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and enforcement of other environmental management laws; and to provide for matters connected therewith.	Department of Environmental Affairs	1998
National Environmental Management: Protected Areas Act (Act No. 57 of 2003):	The Act provides 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 intergovernmental co-operation and public consultation in matters concerning protected areas, and for matters in connection therewith. The proposed development is adjacent to the Kruger National Park, a Protected Area in terms of this Act.	Department of Environmental Affairs	2003
National Environmental Management: Biodiversity Act (Act No. 10 of 2004):	The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework set out by NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed (see below). Rare or protected species may be affected during construction. The Act lists species that are threatened or require protection to ensure their survival in the wild, while regulating the activities, which may involve such listed threatened or protected species and activities which may have a potential impact on their long-term survival. The Act has listed flora and fauna species.	Department of Environmental Affairs	2004
National Spatial Biodiversity Assessment,	The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels.	Department of Environmental Affairs	2011

2011:			
National Forests Act (Act No. 84 of 1998):	This Act provides for the management, utilisation and protection of forests through the enforcement of permitting requirements associated with the removal of protected tree species, as indicated in a list of protected trees (first promulgated in 1976 and updated since). Although not anticipated, should any protected tree species require removal or relocation within the project area, a permit will be required.	Department of Agriculture, Forestry and Fisheries	1998
National Veld and Forest Fire Act (Act No. 101 of 1998)	The purpose of this Act is to prevent and combat veld, forest and mountain fires throughout the Republic. The Act provides for a variety of institutions, methods and practices for achieving this purpose.	Department of Water Affairs	1998
National Heritage Resources Act (Act No. 25 of 1999)	The National Heritage Resources Act legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 hectares (ha) and where linear developments exceed 300 metres in length. In this regard, the proposed development site will be subject to engagement with the South African Heritage Resources Agency (SAHRA). Potential impact on cultural heritage, paleontological or archaeological resources through excavation activities or disturbance will need to be monitored. Permits may be required per the National Heritage Resources Act (Act No. 25 of 1999).	South African Heritage Resources Agency (SAHRA)	1999
The National Water Act (Act No. 36 of 1998)	This Act aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. The proposed development will have to ensure that local water resources are protected, used, developed, conserved, managed and controlled in a responsible way.	Department of Water Affairs	1998
The National Water Services Act (Act No. 108 of 1997)	The Act legislates the necessity to provide for the rights of access to basic water supply and basic sanitation; to provide for the setting of national standards and of norms and standards for tariffs; to provide for water services development plans; to provide a regulatory framework for water services institutions and water services intermediaries; to provide for the establishment and disestablishment of water boards and water services committees and their powers and duties; to provide for the monitoring of water services and intervention by the Minister or by the relevant Province; to provide for financial assistance to water services institutions; to provide for certain general powers of the Minister; to provide for the gathering of information in a national information system and the distribution of that information; to repeal certain laws; and to provide for matters connected therewith.	Department of Water Affairs	1997
National Environmental Management Waste Act (Act No. 59 of 2008)	The Waste Act reforms the law regulating waste management in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation. The proposed development will be subject to this Act in terms of the disposal of waste.	Department of Environmental Affairs	2008
Hazardous Substances Act	To provide for the control of substances which may cause injury or ill-health to or death of human	Department of Health	1973

(Act No. 15 of 1973)	beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances, and for the control of certain electronic products; to provide for the division of such substances or products into groups in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products; and to provide for matters connected therewith.		
National Environmental management Air Quality Act (Act No. 39 of 2004)	To reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.	Department of Environmental Affairs	2004
Occupational Health and Safety Act, 1993 (Act No. 85 of 1993):	The purpose of this Act is 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. The proposed development will therefore be subject to this Act during the construction and operational Application for Environmental Authorisation.	Department of Labour	1993
Integrated Environmental Management Information Series	IEM is a key instrument of NEMA and provides the overarching framework for the integration of environmental assessment and management principles into environmental decision-making. The aim of the information series is to provide general information on techniques, tools and processes for environmental assessment and Management. These various documents have been referred to for information on the most suitable approach to the environmental assessment process for the proposed development.	Department of Environmental Affairs	1992
Local Government: Municipal Structures Act, No. 117 of 1998	To provide for the establishment of municipalities in accordance with the requirements relating to categories and types of municipality; to establish criteria for determining the category of municipality to be established in an area; to define the types of municipality that may be established within each category; to provide for an appropriate division of functions and powers between categories of municipality; to regulate the internal systems, structures and office-bearers of municipalities; to provide for appropriate electoral systems; and to provide for matters in connection therewith	National Government	1998
Local Government: Municipal Systems Act, No. 32 of 2000	To provide for the core principles, mechanisms and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of local communities, and ensure universal access to essential services that are affordable to all; to define the legal nature of a municipality as including the local community within the municipal area, working in partnership with the municipality's political and administrative structures; to provide for the manner in which municipal powers and functions are exercised and performed; to provide for	National Government	2000

	community participation; to establish a simple and enabling framework for the core processes of planning, performance management, resource mobilisation and organisational change which underpin the notion of developmental local government.		
REGIONAL PLANNING POLICIES			
Nkomazi Local Municipality IDP	The Kruger National Park has influenced the spatial form of the local municipality and dictates the type of land uses to be found adjacent to its border, including agriculture and tourism related developments. Tourism has been identified as one of the five key pillars for economic development within the municipality.	Nkomazi Local Municipality	2015/2016

11. WASTE AND EFFLUENT

11.1. Solid Waste Management

Solid waste will be separated into non-recyclables and recyclables and stored separately for collection. Non-recyclables will be collected and stored in fenced 'scavenger proof' areas at a holding facility at the entrance gate to the development site. The waste will then be collected by the Resort Management/Service provider and transported to the Nkomazi Municipality's approved landfill site at Steenbok.

11.2. Liquid effluent

A water treatment plant will be constructed at a suitable position on the development area. Collector sewer lines will be constructed to convey the sewage to two sewage pump stations. Sewer rising mains will be provided to convey the wastewater to the wastewater treatment plant.

The treated effluent will comply with the General Standards required by the DWS and will be discharged into a large earth embankment dam located within the development area. The treatment processes for the plant will include screening, anaerobic digestion, trickling filter, settler and chlorine contact tank.

Septic tanks and soakaways may be required for key staff and administration facilities. Effluent emanating from the septic tank at the units will be dissipated via a soak away by means of properly designed and installed soak away systems.

It is assumed that the sewage flow per unit will be 1200 litres/day and 200 litres/capita for staff. The total annual average daily wet weather flow is approximately 96.8 m³/day for a 100% occupancy rate.

12. WATER USE

Water will be sourced from converted water rights from the Crocodile River.

The anticipated total gross annual average daily water demand is 119.5 m³/day for a 100% occupancy rate (74 units at 111 Kl/day, 10 on site staff at 2.5 Kl/day, 45 non-resident staff on site at 2.25 Kl/day and 75 visitors to the clubhouse/restaurant at 3.75 Kl/day).

The storage capacity of reservoirs serving fire areas should, over and above the allowance for domestic demand, include for the design fire flow. The minimum additional storage capacity require for firefighting is therefore 900 l/min for a duration of 2 hours, which equates to 108 m³. The total storage capacity required equates to 335 m³ (227 m³ for 48 hours domestic and commercial demand and 108 m³ for firefighting purposes).

The storage requirements are 239 m³ for domestic consumption (48 hours of GAADD) plus 108 m³ for firefighting which equates to 347 m³. The elevation of the development area is not sufficient to provide sufficient pressure for ground reservoirs, and a booster system with standby electricity will have to be provided.

Trenching for electricity and potable water will be consolidated into single trench alignments which will follow road and pathway alignments where possible. Wastewater will have its own alignment.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

13. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

The study area is underlain by transported sandy and gravelly soils overlying basalt bedrock belonging to the Letaba Formation, Lebombo Group, Karoo Supergroup.

Isolated outcrops of very hard rock basalt are present in the central, northern portion of the property which has been apportioned into three prominent geotechnical soil zones, Soil Zones "A" to "C."

Soil Zone A materials cover the majority of the site, Soil Zone B materials cover the central portion of the site and Soil Zone C occupies the two low-lying areas and drainage features including the dam located in the east. The timeshare units will be located along the northern boundary of the proposed site where Soil Zones A and B are found.

Soil Zone A (thin to moderate horizon of loose to medium dense, colluvial clayey sand, loose pebble marker and medium dense to dense residual basalt over soft rock to hard rock basalt). This soil zone has a potentially low degree of expansiveness.

Soil Zone B (This soil zone consists of moderate horizon of loose silty sand and very stiff, sandy clay over medium dense, alluvial clayey sand and loose pebble marker over dense residual basalt over soft rock to hard rock basalt). The soils blanketing portions of this zone are, in general, clayey and have the potential to be medium in the degree of expansiveness.

Minor to moderate seepage of ground water was encountered in two test in the eastern portion of the site from below a depth of 1,5m in the lower-lying areas adjacent to the earth dam. No water seepage were encountered elsewhere, however, the necessary damp-proofing precautions should therefore be taken underneath structures. The site soils are expected to be potentially chemically aggressive with regards to underground ferrous metal pipes (pH values ranging from 6,83 to 7,43 and electrical conductivity values ranging from 4,83 to 152,9 mS/m) and the use of non-ferrous metal pipes or plastic pipes are recommended for wet services. The chemical tests conducted on the ground water sample have shown the water to be of good quality for human consumption although the water is corrosive towards metals and concrete.

Refer to Appendix D.1 for the full Geotechnical Report.

14. GROUNDCOVER

According to Mucina & Rutherford (2006), the study area is situated in Tshokwane - Hlane Basalt Lowveld within the Lowveld Bioregion in the Savanna Biome. This vegetation type is restricted to a strip running parallel to the Lebombo Mountains from central Swaziland in the south to the Olifants River in the north. Tshokwane - Hlane Basalt Lowveld originally covered 281 929 ha in Mpumalanga, of which 12.1 % has been transformed, mostly through sugarcane and settlements. This vegetation type is considered well protected and has a conservation status of **Least Concern** (Lötter et al., 2014). This is largely due to much of this community occurring within the Kruger National Park. It is not listed as a Threatened Ecosystem (Notice 1002 of Government Gazette 34809, 9 December 2011).

Most of the terrestrial ecosystems within the study area on Tenbosch is classified as **Heavily or Moderately Modified** Areas by the Mpumalanga Biodiversity Sector Plan (MBSP). The scattered untransformed sections are classified as **Other Natural Areas**. Other Natural Areas refer to areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character, while performing a range of biodiversity and ecological functions. Other Natural Areas offer much more flexibility in terms of permissible land

uses, but the desired management objective should be to minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning.

The entire study area is also situated within the **Ecological Support Areas (ESA): Protected Area Buffers**. ESA's are "areas that are not essential for meeting (conservation) targets, but play an important role in supporting the functioning of CBA's and that deliver important ecosystem services" (Lötter et al., 2014). Protected Area Buffers are areas that surround proclaimed protected areas that moderate the negative impacts of land-uses that may affect the ecological functioning of those protected areas .

The wetland vegetation around the dam is classified as **ESA: Wetlands** in the MBSP. These areas are not essential for meeting biodiversity conservation targets but play an important role in supporting the functioning of Critical Biodiversity Areas and deliver important ecosystem services. Both drainage lines in the study area are classified as **ESA: Important Sub catchments, Fish Support Areas**. These are areas that are important for supporting threatened and near threatened indigenous freshwater fish populations.

The study area is not situated in any of southern Africa's floristic centres of endemism, which are areas that have an unusually high number of plants unique to that area (Van Wyk & Smith, 2001).

Refer to Appendix D.4 for the full Ecology Report

15. SURFACE WATER

According to the MBSP freshwater assessment there are some ESA wetlands within the study area. These are associated with the dam occurring within the study area as well as with the Crocodile River, which lies on the northern border of the site. The NFEPA project classifies the wetlands within the study area as channelled valley-bottom wetlands.

According to the NBA 2011, all of the wetlands in the vicinity of the study area belong to wetland ecosystem types that are **Critically Endangered**. A Critically Endangered ecosystem type is one in which most of the ecosystem type has been severely or moderately modified from its natural state and few natural or near-natural examples of this ecosystem remain; these remaining healthy examples should be the focus of urgent conservation action (Driver et al., 2012).

The sub-catchment within which the study area falls has been classified by the MBSP as an '**ESA Important Sub-catchment**', but does include large sections of '**Heavily Modified**' areas as well as a dam. The sub-catchment is important as it is a **Fish Support Area**. This is owing to the presence of a fish species of conservation concern (Tiger Fish *Hydrocynus vittatus*).

The study area is associated with one perennial river (Crocodile) and several non-perennial rivers. The extent to which a river has been modified by human activity is referred to as the river condition (Nel et al., 2011). According to NFEPA, the Crocodile River has a condition of 'D', which means that it is largely modified such that a large loss of natural habitat, biota and basic ecosystem functions have occurred (Nel et al., 2011).

Refer to Appendix D.2 for the full Wetland Report

16. LAND USE CHARACTER OF SURROUNDING AREA

The proposed development is situated on Portion 101 of the farm Tenbosch 162 JU, approximately 8 km north-west of the town of Komatipoort, Ehlanzeni District, Mpumalanga. The study area lies adjacent to the Kruger National Park boundary on the southern bank of the Crocodile River between the town of Marloth Park to the west and the Crocodile Bridge Gate to the east. Surrounding land uses include agricultural, commercial and residential developments to the west, south and east and conservation land to the north.

17. CULTURAL/HISTORICAL FEATURES

Francois P. Coetzee, an independent Cultural Heritage Consultant, was commissioned by NuLeaf Planning and Environmental to undertake a Heritage Impact Assessment of Portion 101 of the farm Tenbosch 162 JU in order to determine the heritage potential and the impact on possible heritage resources.

No Stone Age or Iron Age settlements, structures, features, assemblages or artefacts were recorded during the survey. Also, no graveyards or individual graves were recorded.

No buildings over 60 years old were found on site. The two (2) houses located on site were built in the 1960/70s.

Refer to Appendix D.3 for the full Heritage Impact Report.

18. SOCIO-ECONOMIC CHARACTER

Agriculture and tourism have been identified as one of the building blocks for economic development within the municipality and has been experiencing growth thereof.

Due to the fact that Nkomazi municipality is mostly a rural municipality, the municipality suffers from a high rate of unemployment as it is struggling to attract investments. Other factors contributing to the high unemployment rate is the shortage of skills and illiteracy rates. As it is generally applicable throughout the country, unemployment is at the heart of poverty within the municipality.

The latest official statistical information suggests that unemployment rate has been on a downward trend. In 2007 the total unemployment rate of Nkomazi was approximately 34.2% which can be attributed to the 26% and 43% of males and females respectively. According to the 2011 STATS SA Census the total unemployment rate in the municipality is 34% with 26.8% being males and 42.5 % being females.

There were major improvements in educational attainment within the municipality between 2001 and 2011. In 1996 47% had had no schooling and this decreased to 26% in 2011 which indicates favourable improvements in educational attainment over a period of 15 years.

19. BIODIVERSITY

19.1. Terrestrial Ecology

A specialist terrestrial ecology assessment was undertaken by ECOREX Consulting Ecologists CC in May 2016.

19.1.1. Flora

A total of 140 plant species was recorded within the study area during fieldwork. Three of these are **protected** under the National Forests Act (No. 30 of 1998): *Philenoptera violacea*, *Combretum imberbe* and *Sclerocarya birrea subsp. caffra*, and two by the Mpumalanga Nature Conservation Act (No.10 of 1998): *Aloe marlothii* and *Crinum stuhlmannii*. *Dalbergia melanoxyton* is assessed as **Near Threatened** and *Crinum stuhlmannii* as **Declining**. The latter two species are discussed below:

- *Dalbergia melanoxyton* Guill. & Perr. Zebra Wood: This species usually grows as a small to medium-sized tree and is found throughout the Lowveld and as far north and west as Senegal. Although not locally listed, it is assessed by the IUCN as **Near Threatened** due to over-collection for the wood

carving industry and in the manufacturing of musical instruments. A single small plant was found in the western portion of the study area.

- *Crinum stuhlmannii* Baker Candy-striped Crinum: A single large Crinum species, most likely *C. stuhlmannii*, was located within Transformed vegetation in a line of trees between the large lawn of the eastern building complex and the Kruger National Park fence. This large bulbous plant is listed as **Declining** due to the ongoing and uncontrolled harvesting of bulbs for the medicinal plant trade.

Three untransformed vegetation communities were identified within the study area on the basis of distinctive vegetation structure (grassland, woodland, thicket, etc.), floristic composition (dominant and diagnostic species) and position in the landscape (mid-slopes, terrace, crest, etc.). Transformed and degraded areas make up approximately 30 ha, or 75 % of the study area. Most of the transformed and degraded land is covered by citrus orchards, various buildings, a short golf course and old lands. The untransformed vegetation communities are described in detail below:

- *Ficus sycomorus* - *Hypoestes forskoolii* Disturbed Riparian Forest

This vegetation community occurs in two portions within the study area. The larger tract is located in the eastern section below the dam, running down along the small stream to the Crocodile River. Vegetation structure is mostly Low to Tall Forest (sensu Edwards, 1983; Figure 2). Riparian Forest covers approximately 3 ha which equates to 7.5 % of the study area. Evergreen trees and woody shrubs dominate this vegetation community, with the dominant canopy species being *Ficus sycomorus*, *Diospyros mespilliformis* and *Trichilia emetica*. Other common canopy species include *Bridelia micrantha*, *Rauvolfia caffra* and *Acacia xanthophloea*. Woody shrubs dominating the understory include *Grewia monticola*, *Bridelia cathartica*, *Phyllanthus reticulatus*, *Gymnosporia senegalensis*, *Pluchea dioscoridis* and *Gymnanthemum coloratum*. Much of the understory of Riparian Forest had been slashed, particularly west of the channel, but in less disturbed parts the common understory plants included the herbs *Hypoestes forskoolii*, *Cucumis zeyheri* and *Jasminum fluminense* and the grasses *Setaria megaphylla* and *Panicum maximum*. A feature of this community is the high level of alien plant infestation with many species forming monospecific stands (such as *Hedychium gardnerianum*). Some are declared alien invasive plants but many are growing as garden escapes, and at least 21 species were recorded from this community.

A total of 62 species (44 % of the entire list) was recorded from Riparian Forest, the second highest of all the vegetation communities. Species fidelity, which is closely linked to community uniqueness, is also high, with 34 species (55 % of the community list) occurring nowhere else in the study area.

Only two conservation-important species were recorded. *Philenoptera violacea* and *Sclerocarya birrea subsp. caffra* are **protected** under the National Forests Act (No. 30 of 1998).

- *Acacia nigrescens* – *Panicum maximum* Disturbed Closed Woodland

Acacia – *Panicum* Disturbed Closed Woodland covers 2.2 ha or 5.5 % of the study area. Vegetation structure can best be described as Short to Tall Closed Woodland, although some bush clearing has taken place in parts which has resulted in an Open Shrubland vegetation structure (Edwards, 1983).

A moderate variety of trees dominate the canopy with the most dominant including various legumes such as *Acacia nigrescens*, *Acacia nilotica* and *Peltophorum africanum*. Other common trees located include *Combretum hereroense* and *C. imberbe*, *Sclerocarya birrea subsp. caffra* and *Ziziphus mucronata*. Common shrubs found include *Grewia bicolor*, *G. flavescens*, *Dichrostachys cinerea subsp.*

africana and *Gymnosporia senegalensis*. Dwarf shrubs were prominent, and include *Barleria elegans*, *Abutilon austro-africanum*, *Solanum campylacanthum* subsp. *panduriforme* and *Maerua parvifolia*. Forbs, bulbs and herbs recorded included *Kalanchoe rotundifolia*, *Acalypha villicaulis*, *Cucumis zeyheri* and *Justicia flava*. Scattered *Aloe marlothii* were also observed. The dominant grasses found include *Panicum maximum*, *Cenchrus ciliaris*, *Digitaria eriantha*, *Eragrostis superba*, *Heteropogon contortus* and *Urochloa mosambicensis*.

A total of 78 species was recorded in *Acacia – Panicum* Disturbed Closed Woodland, representing 56 % of the entire species list and the highest of the three vegetation communities. Species fidelity is high, with 39 species (50 % of the community list) occurring nowhere else in the study area. One **Near Threatened** tree species was recorded: *Dalbergia melanoxylon*, as well as three species **protected** under the National Forests Act (No. 30 of 1998): *Philenoptera violacea*, *Combretum imberbe* and *Sclerocarya birrea* subsp. *caffra*, and one by the Mpumalanga Nature Conservation Act (No.10 of 1998): *Aloe marlothii*.

- *Phragmites australis – Typha capensis* Wetland

Tall and dense wetland vegetation surrounds the artificial dam in the eastern part of the study area. Vegetation structure is mostly Tall Closed Grassland (sensu Edwards, 1983, Table 6). Wetland areas cover approximately 4.6 ha or 11.5 % of the entire study area. This figure, though, includes the unvegetated open water of the dam itself. The reed *Phragmites australis* and the rush *Typha capensis* strongly dominate this community. Other species located include the sedges *Cyperus dives* and *C. sexangularis*, the grass *Leersia hexandra*, the herbs *Persicaria decipiens* and *Commelina diffusa* subsp. *scandens*, the shrubs *Ludwigia octovalvis* and *Phyllanthus reticulatus*, and the fern *Thelypteris confluens*.

A total of 15 species (11 % of the entire list) was recorded from the Wetland community, the lowest species richness of the three untransformed vegetation communities in the study area. Species fidelity, which is closely linked to community uniqueness, is high, with 8 species (53 % of the community list) occurring nowhere else in the study area.

No conservation-important species were recorded within this vegetation community.

- Transformed/degraded

Approximately 30 ha, or 75 % of the study area, are transformed either through agriculture (mostly citrus), sheds, houses and a golf course. However, four **conservation-important** plant species were recorded from Transformed areas including *Crinum stuhlmannii* (**Declining** and **protected** under the MNCA), *Philenoptera violacea* and *Sclerocarya birrea* subsp. *caffra* (**protected** under the NFA) and *Aloe marlothii* (**protected** under the MNCA). Most of these plants grow around the homesteads or golf course.

19.1.2. Fauna

- Mammals

Situated in the savanna biome immediately south of the Kruger National Park (KNP), the Komatiport area has **very high** mammal diversity, relatively low numbers of endemics and a moderate number of Red Data species. The study area is mostly transformed (75 %) and little habitat remains, especially for

larger mammals. However, it is located on the boundary fence of the KNP and animals can and do wander in through gates or the fence or via the stream channel in the east. Evidence of this was found in a small tract of woodland in the west where old Hippopotamus (*Hippopotamus amphibius*) faeces were located. An estimated 32 conservation-important mammals potentially occur within the project area, although most of these are more likely in adjacent conservation land than in the project area. Several bat species are highly likely to occur overhead, such as Geoffroy's Horseshoe Bat (*Rhinolophus clivosus*), but these species are only likely to feed over the site because of the shortage of suitable roosting sites.

Of the 32 potentially occurring species, 26 are considered to be of conservation concern with only four considered threatened. Hippopotamus (*Hippopotamus amphibius*), was confirmed in Closed Woodland during fieldwork and is discussed below:

- Hippopotamus (*Hippopotamus amphibius*): Desiccated faeces were located in the small tract of Closed Woodland in the western part of the study area. This large even-toed ungulate may also occasionally utilise the dam and stream in the east. However, due to human disturbance and access problems due to the fence, it would probably only frequent the study area occasionally. It is listed as **Vulnerable** due to habitat loss, range contraction, conflict from farmers and a decline in water quality. This species is resident in the adjacent Crocodile River (pers.obs.).

The remaining three potentially occurring threatened species, namely African Wild Dog (*Lycoan pictus*, **Endangered**), Lion (*Panthera leo*, **Vulnerable**) and Ground Pangolin (*Smutsia temminckii*, **Vulnerable**), all have a low likelihood of occurrence due to disturbance, lack of prey or general scarcity.

Eight potentially occurring species are **Near Threatened**, which are species close to or likely to soon qualify for the status of Vulnerable. Four of these have a moderate likelihood of occurring due to the presence of suitable habitat, namely Honey Badger (*Mellivora capensis*), Side-striped Jackal (*Canis adustus*), Welwitsch's Hairy Bat (*Myotis welwitschii*) and Rusty Bat (*Pipistrellus rusticus*).

- Birds

Eighty-eight bird species were confirmed to occur in the study area during fieldwork. Thirty-six species were recorded from Riparian Forest, 26 from the Wetland and 13 from Transformed. Three broad assemblages or species-habitat associations were identified, each of which is briefly described below:

- **Forest Assemblage:** This assemblage occurs in the tall evergreen forest patches, best represented in the eastern portion of the study area. Although some overlap occurs with the Woodland assemblage, the composition of species differs sufficiently to justify the inclusion of this assemblage. Bird species found include those species not commonly found in the adjacent KNP due to habitat transformation through large herbivores. These include Scaly-throated Honeyguide, Red-backed Mannikin, African Goshawk, Tambourine Dove, Yellow-rumped Tinkerbird and Black-throated Wattle-eye. Thirty-six species (41 %) were recorded from the Forest assemblage, the highest of the three assemblages.
- **Woodland Assemblage:** The drier woodlands across the study area provide refuge for a number of generalist species that will occasionally forage in any type of wooded habitat including the Riparian Forest. These include Black-backed Puffback, White-bellied Sunbird and Yellow-breasted Apalis. Some species, though, are restricted to this assemblage and include Jameson's Firefinch, White-browed Scrub Robin, Brown-crowned Tchagra and Southern

Yellow-billed Hornbill. Due to the small size of the woodland patches, many woodland species will probably only visit the study area to forage or include the patches as part of larger territories extending into the KNP. Thirty-one species (35 % of the entire species list) were recorded from the Woodland assemblage, the second highest of the three.

- **Wetland Assemblage:** The artificial dam and associated reed and rush beds in the eastern portion of the study area provide habitat for a number of wetland-dependant species not found in the other assemblages. These include shy reedbed skulkers such as Little Rush and Lesser Swamp Warblers, Black Crake and African Swamphen, open water species such as African Darter, Pied and Giant Kingfishers and African Fish Eagle and the floating macrophyte specialist African Jacana. Twenty-six species were recorded in this assemblage, representing 30 % of the total species list.

The savanna biome supports the highest diversity of bird species within the Southern African sub-region and the KNP supports the largest bird list of all conservation areas in South Africa with an estimated 57 % of the birds found within the entire southern African sub-region recorded. Eighty-eight bird species were confirmed to occur within the actual habitats represented in the study area during fieldwork.

Twenty-nine of the bird species potentially occurring within the study area (confirmed to occur in 2531 BD during SABAP2 or potentially occur due to presence of suitable habitat) have **Red Data status**. One of these was confirmed to occur during fieldwork:

- **Martial Eagle (*Polemaetus bellicosus*):** Africa's largest eagle is listed as Endangered due to many factors including habitat loss, direct persecution from small-stock farmers and indirect persecution from electrocution and reservoir drownings. A pair of eagles was observed flying over Closed Woodland in the study area and not actually utilising the habitat within, although it may occasionally hunt over the study area. No suitable breeding habitat is present on Tenbosch.

Twenty-one additional species of conservation-concern have a low likelihood of foraging over the study area. This is primarily due to a lack of suitable prey such as small antelope and gamebirds, human disturbance from farming and recreational activities and insufficient habitat area available due to habitat transformation.

Seven potentially occurring species are listed as **Near Threatened** with three having a moderate likelihood of occurring within the study area, namely Half-collared Kingfisher (*Alcedo semitorquata*), European Roller (*Coracias garrulous*) and Marabou Stork (*Leptoptilos crumeniferus*).

- Reptiles and Frogs

The Lowveld and foothills of far eastern Mpumalanga support a high diversity of reptile species with 102 species already recorded from the degree grid 2531. Forty-seven species of reptiles have been recorded from the QDS 2531 BD, in which Tenbosch is situated. Of the potentially occurring species, only two **conservation-important** reptiles potentially occur. One of these has been assessed as **Vulnerable**: Nile Crocodile (*Crocodylus niloticus*), which is also **protected** under NEMBA ToPS. This species was confirmed during fieldwork and is discussed below:

- **Nile Crocodile (*Crocodylus niloticus*):** Africa's largest reptile is listed as Vulnerable due to a number of factors including habitat transformation, water pollution, direct persecution from landowners and harvesting for the medicinal market (Bates et. al., 2014). The Kruger National Park supports an estimated 3000 individuals which constitutes the largest population in South

Africa (Thorbjarnarson, 1992). The adjacent Crocodile River supports a resident population of crocodiles (pers.obs.) and smaller individuals are able to enter the study area at the junction of the Crocodile River and the small stream in the eastern portion (pers.obs.). In communication with a number of farm labourers, the presence of a few juvenile Nile Crocodiles was confirmed to occur in the dam on the stream but larger specimens potentially occur. No breeding habitat (sandy river banks) is available around the dam though.

Southern African Python (*Python natalensis*) is **protected** under the National Environmental Management: Biodiversity Act (No.10 of 2004) and was confirmed during fieldwork from Riparian Forest immediately north of the dam. Two additional reptile species were recorded during fieldwork: Rainbow Skink (*Trachylepis margaritifera*) and Common Giant Plated Lizard (*Matobosaurus validus*).

No frogs were recorded during the assessment although summer fieldwork with nocturnal surveys will result in a fair number of species.

Refer to Appendix D.4 for the full Ecology report.

19.2. Riparian Ecology

A specialist wetland/riparian survey was undertaken by Wet-Earth Eco-Specs to identify and delineate wetlands and riparian area, as well as, determine the present ecological state (PES) and the ecological importance and sensitivity (EIS).

Three (3) water courses were identified and can be described as riverine areas. There are wetland areas which form part of these riparian areas. These wetland areas occur around the dam and upstream of road crossings and weirs. These water courses have been named T01, T02 and T03 for ease of discussion.

- T01

Water course T01 is the dam located in the east of the proposed site. The riparian zone extends upstream from the edge of the property and downstream where it joins the Crocodile River. The Riparian Index of Habitat Integrity (RIHI) is a C/D (57.7). This is mainly owing to the road crossings, orchard footprint which has extended into the riparian areas, the dam which destroyed approximately 71 % of the original riparian area, a weir in an active channel and an extensive presence of exotic vegetation. The PES is D/E and the PES Ecstatus is D/E (largely modified/ seriously modified).

- **Marginal zone:** The presence of a dam indicates a disturbed environment with the result that a large portion of this zone is dominated by reeds, grasses and sedges. The section downstream of the dam is dominated by trees and scattered clumps of grass and sedge. The substrate consists of soil with rocky features occurring in places. The dominant tree species are *Ficus sycomorus* and *Trichilia emetica*. The following grass and sedge species occur in this zone: *Phragmites australis*, *Typha capensis*, *Cyperus dives*, *Cyperus sexangularis*, etc. Exotic vegetation, such as: *Melia azedarach*, *Tecoma stans*, *Verbena bonariensis*, *Tagetes minuta*, *Ricinus communis*, *Lantana camara*, etc. occurs.
- **Non-marginal zone:** A reed and tree dominated state exists along the edges of the dam. Downstream of the dam the dominant vegetation is mostly trees and herbs. The substrate consists mainly of soil material and rocky habitat in places. The banks are steep in places. The following woody species occur: *Bridelia micrantha*, *Acacia xanthophloea*, *Philenoptera violacea*, *Phyllanthus reticulatus*, *Ficus sycomorus*, *Syzygium cordatum*, *Celtis africana*, *Sclerocarya birrea subsp. caffra*, *Bridelia micrantha*, *Rauvolfia caffra*, *Grewia monticola*, *Bridelia cathartica*, *Phyllanthus reticulatus*, *Gymnosporia senegalensis*, *Pluchea dioscoridis*

and *Gymnanthemum coloratum*, etc. Understory plants such as: *Setaria megaphylla*, *Hypoestes forskoolii*, *Cucumis zeyheri*, *Jasminum fluminense*, and *Panicum maximum* occur. Some exotic vegetation such as: *Melia azedarach*, *Solanum mauritianum*, *Lantana camara*, *Ageratum conyzoides*, etc. were also found.

- T02

Watercourse T02 is the drainage line located in the western portion of the site. The riparian zone extends from the edge of the property upstream to where it joins with the Crocodile River downstream. The RIHI is a D (53.8 %). This is due to roads traversing the riparian zone, dumping, agriculture, vegetation clearing and water quality issues. PES is D while the PES Ecostatus is also a D (53.8%) (largely modified).

- **Marginal zone:** The dominate vegetation consists of shrub species with scattered grass and herbs. Within the riparian section adjacent to the storage facilities, upstream of the road crossing, the understory has been cleared and is dominated by trees and scattered clumps of grass and sedges. The substrate consists mainly of soil with rocky banks in places. Dominant woody species present include *Ficus sycomorus*, *Rauvolfia caffra*, *Phyllanthus reticulatus* and *Trichilia emetica*. The following grass and sedge species occur: *Persicaria decipiens*, *Commelina diffusa* subsp. *scandens*, *Phragmites australis*, *Typha capensis*, *Cyperus dives*, *Cyperus sexangularis*, etc. In the area between the two road crossings the grass *Leersia hexandra* dominates. Exotic vegetation such as *Melia azedarach*, *Tecoma stans*, *Verbena bonariensis*, *Tagetes minuta*, *Ricinus communis*, *Lantana camara*, etc. occurs.
- **Non-marginal zone:** A tree and grass-dominated state occurs upstream of the road-crossing. In this area the groundcover and some shrubs have been felled to clear the space. The substrate consists mainly of soil and rocky material. The downstream section is dominated by a woodier component. Upstream of the lower road crossing the dominant vegetation consists of grass and sedges. The following woody species occur: *Rhoicissus tridentata* subsp. *cuneifolia*, *Bridelia micrantha*, *Acacia nigrescens*, *Acacia xanthophloea*, *Philenoptera violacea*, *Phyllanthus reticulatus*, *Ficus sycomorus*, *Ziziphus mucronata*, *Syzygium cordatum*, *Celtis africana*, *Sclerocarya birrea* subsp. *caffra*, *Rauvolfia caffra*, *Grewia monticola*, *Grewia flavescens*, *Phyllanthus reticulatus*, *Gymnosporia senegalensis*, *Pluchea dioscoridis* and *Gymnanthemum coloratum*, etc. Understory plants such as *Setaria megaphylla* and *Panicum maximum* are present. Some exotic vegetation such as, *Melia azedarach*, *Solanum mauritianum*, *Lantana camara*, *Ageratum conyzoides*, etc. were also found. The climber *Ipomoea purpurea* occurs abundantly and has a smothering effect on the vegetation.

- T03

Watercourse T03 is the Crocodile River which forms the northern border of the proposed site. The RIHI is a C/D (57.9%) with the main impacts being flood events. Grazing and trampling, water abstraction and presence of exotic species. PES is C/D and the PES Ecostatus is a C/D (57.9%).

- **Marginal zone:** Reeds and sedges are the dominate vegetation type. The substrate consist mainly of alluvial sand. The following grass and sedge species occur: *Cynodon dactylon*, *Persicaria decipiens*, *Commelina diffusa* subsp. *scandens*, *Phragmites australis*, *Typha capensis*, *Cyperus dives*, *Cyperus sexangularis*, *Leersia hexandra* etc. Exotic vegetation such as: macrophyte *Eichhornia crassipes* occurs along the edge of the active channel. Other exotic species, such as *Ricinus communis*, *Centella asiatica*, *Sesbania bispinosa*, etc. occur.
- **Non-marginal zone:** Reeds with scattered trees and shrub species are the dominate vegetation type. Continuous grazing and trampling has resulted in the reeds and trees being

stunted. The woody species are obviously recovering after major flood destruction in the not-too-distant past. The substrate consists mainly of alluvial material and rocky dykes crossing the riverine area. The following woody species are dominant: *Dichrostachys cinerea*, *Gymnosporia senegalensis*, *Ziziphus mucronata*, *Lippia javanica*, *Bridelia micrantha*, *Acacia nigrescens*, *Philenoptera violacea*, *Phyllanthus reticulatus*, *Pluchea dioscoridis*, *Gomphocarpus physocarpus*, *Asparagus cooperi*, etc. Grass species such as *Cynodon dactylon*, *Setaria sphacelata* and *Panicum maximum*, are also present. *Cyperus sexangularis* and *Schoenoplectus* spp. are the dominant sedges. Some exotic vegetation such as, *Centella asiatica*, *Spathodea campanulata*, *Melia azedarach*, *Solanum mauritianum*, *Lantana camara*, *Parthenium hysterophorus*, *Ageratum conyzoides*, etc. were also identified.

Refer to Appendix D.2 for the full Wetland Report.

20. VISUAL

A visual impact assessment was undertaken by NuLeaf Planning and Environmental in order to determine the possible visual impact of the proposed timeshare resort located on Tenbosch Farm.

The study area lies adjacent to the Kruger National Park boundary on the southern bank of the Crocodile River between the town of Marloth Park to the west and the Crocodile Bridge Gate to the east. Land cover within the study area is characterised by a moderately developed shrub layer and a dense herbaceous layer. Land use is deemed predominately cultivation.

The visual quality of the broader study area is high, generally as a result of the lack of development and the large areas given over to conservation within the region. There is no evidence of widespread erosion or natural degradation, and development, where this occurs, is domestic in scale.

Viewer incidence is expected to be the highest along the roads surrounding the proposed development area and the properties directly adjacent to the site. Second to these are homesteads in close proximity to the proposed site. Tourists using the roads, residents of the area and tourist accommodation are considered the most sensitive to visual intrusion as they will be exposed to visual intrusion during their rest and relaxation times.

Tourists within the neighbouring Kruger National Park, including visitors to the nearby lodges and tourists making use of internal game drive routes, represent additional visual receptors.

The overall visual absorption capacity (VAC) is low-medium.

Refer to Appendix D5 for the full Visual Impact Assessment.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

An advertisement was placed in the Lowvelder, a local publication, on 13 May 2016. Site notices were placed at the following locations in and around the proposed property on 10 May 2016:

Site Notice Position	Latitude	Longitude
Entrance gate to the proposed property	S25°23'18.34"	E31°53'22.84"
Entrance gate to the proposed property	S25°23'15.18"	E31°53'4.51"

Spar in Komatipoort	S25°26'11.89"	E31°57'35.75"
Crocodile Bridge Gate Reception	-	-

2. DETERMINATION OF APPROPRIATE MEASURES

The following details the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 733:

- A list of interested and affected parties (I&AP's), as well as, compliance authorities was compiled inclusive of Local and District Municipalities, local landowners and environmental organizations.
- Written notification of the proposed development, including a background information document, was sent to all identified I&AP's and Compliance Authorities on 13 May 2016.
- A printed advertisement was placed in the Lowvelder, a local publication, on the 13 May 2016.
- Site notices were placed at the entrances to the affected property, Crocodile Bridge Gate Reception, and the local Spar in Komatipoort on 10 May 2016.

The following key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 733 were notified:

Name	Affiliation	Contact Details
Cheryl Venter	Buckler's Africa Lodge	info@bucklersafrica.co.za
Sascha	Hippo Hills Lodge	res@hippohills.co.za
Mike Klopper	Elephant Walk Retreat	enquiries@elephantwalk.co.za
Tracy-lee Peterson	SANParks	Tracy.peterson@sanparks.org
Greg Beyers	RCL Foods Sugar and Milling/ Libuyile Farming Services	Greg.beyers@rclfoods.com
Ronelle Putter	Crocodile River Major Irrigation Board	Ronelle.putter@lantic.net
Gerhard Kuhn	Tenbosch Irrigation Board	gskuhn@tiscali.co.za

Proof of stakeholder engagement is included in Appendix E.2.

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Interested and Affected Party	Issue
Tracy-Lee Petersen (SANParks)	Potential negative impact the development could have on the KNP
RCL Foods Sugar and Milling	Water quantity and availability Water quality and waste Impact of existing farming activities in the area on the proposed development

4. COMMENTS AND RESPONSE REPORT

No comments have been received.

5. AUTHORITY PARTICIPATION

Authorities and organs of state identified as key stakeholders:

Authority/ Organ of State	Contact Person	Contact Details
DARDLEA	Robyn Luyt	rluyt@mpg.gov.za
Ehlanzeni District Municipality	Pretty Masego	pmashego@ehlanzeni.gov.za
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Refer to Appendix E.4 for proof that the Authorities and Organs of State received written notification of the proposed activities.

6. CONSULTATION WITH OTHER STAKEHOLDERS

Refer to Appendix E.5 for a list of registered I&APs.

SECTION D: IMPACT ASSESSMENT

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

1.1. Potential impacts

All potential environmental impacts, both positive and negative, have been identified for the entire lifecycle of the project i.e. Planning / design, construction and operations. The decommissioning of the proposed development is not anticipated and has therefore not been assessed.

1.1.1. Planning and Design Phase

Planning and design phase impacts refer to those impacts that may be mitigated through planning decisions.

Direct Impacts:

GROUND WATER

- None.

SURFACE WATER

- Risk to ecological and hydrological function of the riparian habitat along the Crocodile River due to the placement of structures and infrastructure within the habitat/ buffer zones.
- Risk to hydrological function (quality and fluctuation properties) along the Crocodile River and drainage lines due to activity and disturbance within the watercourse.

SOIL

- Erosion risk to soils due to increased hard surface and associated increase in storm water runoff.

AIR

- None.

BIODIVERSITY (FLORA)

- Risk to Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened and associated loss of species richness due to the placement of structures and infrastructure.
- Risk to sensitive habitats due to the placement of structures and infrastructure.
- Risk to plant species of conservation importance and protected trees due to the placement of structures and infrastructure within the habitat.

BIODIVERSITY (FAUNA)

- Risk to faunal habitat and habitat fragmentation due to removal and alteration of the existing habitat and the development of structures and infrastructure.

LAND USE AND AGRICULTURAL POTENTIAL

- Loss of potentially arable land due to the development of permanent structures and infrastructure.

HERITAGE

- None.

VISUAL

- Risk to visual quality of the surrounding area and sense of place due to the development of structures and infrastructure within an otherwise natural environment.
- Risk of lighting impact at night due to the operation of the Resort.

SOCIO-ECONOMICS

- None.

MUNICIPAL SERVICES AND TRAFFIC

- None.

Indirect Impacts:

- None.

Cumulative Impacts:

BIODIVERSITY (FLORA)

- Cumulative loss of Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened and associated loss of species richness.
- Cumulative loss of sensitive habitats.
- Cumulative reduction of plant species of conservation importance and protected trees.

BIODIVERSITY (FAUNA)

- Cumulative loss of faunal habitat.

1.1.2. Construction Phase

Direct Impacts:

GROUND WATER

- Depletion of ground water due to overuse and waste during construction activities.
- Pollution and contamination of ground water due to surface runoff, unmanaged sewage discharge, leaks and spills, solvent, paints and chemical spills, hydrocarbon and fuel leaks and spills.

SURFACE WATER

- Disturbance and loss of ecological function of the habitat (physical structure) along the Crocodile River and drainage lines due to clearing and destruction of riparian and wetland vegetation, loss of fringing vegetation and erosion of denuded areas, invasion by alien invasive trees and plants, alteration in natural fire regimes, shading of natural vegetation.
- Pollution and contamination of surface water resources.
- Disturbance and loss of hydrological function (quality and fluctuation properties) of the Crocodile River and the drainage lines

SOIL

- Soil contamination and pollution.
- Soil erosion by wind and rain due to the removal of stabilising vegetation, soil compaction, decrease in water infiltration and an increase of water runoff in construction areas.

AIR

- Air pollution due emissions from construction vehicles and equipment.
- Dust liberated by general construction activities and movement of construction vehicles.

BIODIVERSITY (FLORA)

- *Removal of invader alien species found on site (positive impact).*
- Loss of Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened and associated loss of species richness due to site clearing ahead of construction, general construction activities and movement of construction vehicles, unmanaged sewage discharge, leaks and spills, solvent, paints and chemical spills, hydrocarbon and fuel leaks and spills, litter and other inert construction waste.
- Destruction and damage to Conservation important and protected trees.

BIODIVERSITY (FAUNA)

- Loss of faunal habitat due to site clearing ahead of construction, general construction activities and movement of construction vehicles, construction dust, construction material, litter and other inert construction waste.
- Loss of general faunal habitat and ecological connectivity.
- Mortality of fauna due to dangerous trenches and excavations, persecution and extermination, solvent, paints and chemical spills (poisoning), construction material, litter and other inert construction waste (suffocation), collisions with construction vehicles.
- Poaching and snaring of fauna on site and in the greater Kruger National park by construction staff.

LAND USE AND AGRICULTURAL POTENTIAL

- None.

HERITAGE

- *Possible discovery of new important artefacts (Positive Impact).*
- Damage to and / or destruction of archaeological, paleontological or historical artefacts unearthed during construction due to site clearing ahead of construction, general construction activities and movement of construction vehicles.

VISUAL

- The visual impact of construction, lighting and dust on adjacent tourism developments and KNP tourists
- Visual impact of construction, lighting and dust on observers travelling along game drive routes within the KNP
- The visual impact of construction, lighting and dust on locals using the District Road owing to the presence of construction equipment, camps and workers

SOCIO-ECONOMICS

- *Stimulation of the local economy, especially the local service delivery industry (i.e. accommodation, catering, cleaning, transport and security, etc.) (positive impact).*
- *Creation of short-term employment and business opportunities and the opportunity for skills development and on-site training (Positive impact).*
- Noise, dust and safety impacts and disturbance to KNP tourists and adjacent tourism developments.
- Increase in casual workers and associated increase in poaching.

MUNICIPAL SERVICES AND TRAFFIC

- Increase in traffic on the D1870 and other local roads due to construction vehicles.
- Increase in the number and frequency of construction vehicles accessing the site and the resultant noise, dust, and safety impacts on other road users, residents of the local community and adjacent tourism developments.

Indirect Impacts:

BIODIVERSITY (FLORA)

- Loss of floral biodiversity, plant species of conservation importance and protected trees due to increased incidence of veld fires.

SOCIO-ECONOMICS

- Loss of property and threat to human life due to increased incidence of veld fires.

TRAFFIC AND SERVICES

- Degradation of local roads due to the increase in the numbers of heavy vehicles.

Cumulative Impacts:

BIODIVERSITY (FLORA)

- Cumulative loss of Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened and associated loss of species richness.
- Cumulative loss of ecological function of sensitive habitats, specifically riparian zones.
- Cumulative reduction and damage to Conservation important species and protected trees.

BIODIVERSITY (FAUNA)

- Cumulative loss of faunal habitat.

SOCIO-ECONOMICS

- *Community upliftment and the opportunity to up-grade and improve skills levels in the area (positive impact).*

SERVICES AND TRAFFIC

- Cumulative increase in traffic and the resultant noise, dust, and safety impacts on other road users, residents of the local community and adjacent tourism developments.

1.1.3. Operational Phase

Direct Impacts:

GROUND WATER

- Depletion of ground water resources due to over use and waste during operation.
- Pollution and contamination of ground water due to unmanaged storm water runoff, unmanaged sewage discharge, sewage leaks and spills, herbicides, pesticides and fertilisers, discharge and spill of solvents, paints, chemicals and cleaning products, discharge and spill of hydrocarbons and fuel.

SURFACE WATER

- Disturbance and loss of ecological function of the habitat (physical structure) along the Crocodile River and drainage lines
- Pollution and contamination of surface water due to unmanaged storm water runoff, litter and uncontrolled waste, sewage leaks and spills, herbicides, pesticides and fertilisers.
- Disturbance and loss of hydrological function (quality and fluctuation properties) along the Crocodile and drainage lines

SOIL

- Soil contamination and pollution.

- Soil erosion due to soil compaction by uncontrolled movement of staff and guests (especially vehicles), runoff over exposed or cleared areas that have failed to rehabilitate.

AIR

- Air pollution by emissions from increased number of vehicles

BIODIVERSITY (FLORA)

- Loss of Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened and associated loss of species richness due to uncontrolled vegetation clearing and access by staff and guests, encroachment of alien invasive species, litter and waste.
- Disturbance of sensitive habitats, specifically riparian zones
- Destruction and damage to Conservation important species and protected trees due to uncontrolled vegetation clearing and access by staff and guests.
- Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas in the event that the rehabilitation process is not successful.

BIODIVERSITY (FAUNA)

- Loss of faunal habitat due to uncontrolled vegetation clearing and access by staff and guests, encroachment of alien invasive species, litter and waste.
- Faunal disturbances, displacement of taxa and changes in distribution and abundance due to uncontrolled vegetation clearing and access by staff and guests, general operations (activities) of the facility, noise from guests, staff and vehicles,
- Mortality of fauna due to persecution and extermination, solvents, paints, chemicals and cleaning products (poisoning), litter and waste (suffocation).
- Poaching and snaring of faunal species by staff.

LAND USE AND AGRICULTURAL POTENTIAL

- None.

HERITAGE

- None.

VISUAL

- Visual Impact of the timeshare resort and infrastructure on KNP tourists using game drive routes
- Visual Impact of the timeshare resort on protected and conservation areas (i.e. KNP)
- Visual impact of the resort on observers travelling along local roads
- Visual Impact of the resort and infrastructure on adjacent tourism developments.
- Visual Impact of lighting of the resort on adjacent tourism developments and observers residing in close proximity.
- Impact on the character of the landscape and sense of place of the region

SOCIO-ECONOMICS

- *Stimulation of the local economy, especially the local service delivery industry (accommodation, catering, cleaning, transport, security etc.) (positive impact).*
- *Creation of long term employment and business opportunities as well as opportunities for skills development and transfer (positive impact).*

- *Creation of opportunities for local SMME's (positive impact).*

MUNICIPAL SERVICES AND TRAFFIC

- Operational cost of running services and infrastructure, specifically electricity
- Increase in traffic on the D1870 and on other roads due to increased visitor numbers.
- Increase in the number and frequency of vehicles accessing the site, and the resultant noise, dust, and safety impacts on other road users, residents of the local community and adjacent tourism developments.

Indirect Impacts:

VISUAL

- Visual impact of the proposed development of the timeshare resort on the sense of place and visual character of the region.

Cumulative Impacts:

BIODIVERSITY (FLORA)

- Cumulative loss of Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened and associated loss of species richness.
- Cumulative disturbance of sensitive habitats, specifically riparian zones
- Cumulative reduction and damage to Conservation important and protected trees.

HERITAGE

- None.

VISUAL

- The accumulation of built forms and within an otherwise natural environment.

SOCIO-ECONOMIC

- *Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area (positive impact).*
- *Promotion of social and economic development in the local communities and improvement in the overall wellbeing of the community (positive impact).*

SERVICES AND TRAFFIC

- Cumulative increase in traffic on the D1870 and on other roads due to increased visitor numbers.
- Cumulative increase in the number and frequency of vehicles accessing the site, and the resultant noise, dust, and safety impacts for other road users, adjacent tourism development and residents of the local communities.

1.1.4. Decommissioning Phase

The decommissioning of the facility is not anticipated at this stage and, therefore, no impacts are anticipated

1.2. Impact assessment

Activity	Impact summary	Significance	Proposed mitigation
Preferred Alternative (Alternative 1)			
Planning and Design Phase	Direct impacts:		
	Ground Water		
	None.		
	Hydrology (Surface Water)		
	Risk to ecological function of the riparian habitat along the Crocodile River	30 L	<ul style="list-style-type: none"> • Planning and compliance, including ground water, surface water and storm water management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).
	Risk to hydrological function (quality and fluctuation properties) along the Crocodile River and drainage lines	33 M	
	Soil		
	Erosion risk to soils	18 L	<ul style="list-style-type: none"> • Planning and compliance, including ground water, surface water, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).
	Air		
	None.		
	Biodiversity (Flora)		
	Risk to Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened	27 L	<ul style="list-style-type: none"> • Planning and compliance, including protected species, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).
	Risk to sensitive habitats, specifically riparian zones	22 L	
	Risk to plant species of conservation importance: protected trees <i>Sclerocarya birrea subsp. cafra</i> , <i>Combretum imberbe</i> and provincially protected species <i>Aloe marlothii</i> and <i>Crinum stuhlmannii</i>	36 M	
	Biodiversity (Fauna)		
	Risk to Riparian forest, Closed Woodland and wetland faunal habitat and habitat fragmentation	27 L	<ul style="list-style-type: none"> • Planning and compliance, including protected species, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).
	Land use and Agricultural potential		
	Loss of potentially arable land	14 L	<ul style="list-style-type: none"> • Development footprint planning as per the EMPr (section 7.2).
	Heritage		
	None.		
Visual			
Risk to visual quality of the surrounding area and sense of place	22 L	<ul style="list-style-type: none"> • Development footprint planning as per the EMPr (section 7.2). • Visual environment planning as per the EMPr (section 7.3). 	
Risk of lighting impact at night due to the operation of the Resort.	33 M		
Socio-economic			
None.			
Municipal services and Traffic			
None.			

Activity	Impact summary	Significance	Proposed mitigation
	Indirect impacts:		
	None.		
	Cumulative impacts:		
	Biodiversity (Flora)		
	Cumulative loss of Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened	27 L	<ul style="list-style-type: none"> • Planning and compliance, including protected species, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).
	Cumulative loss of sensitive habitats, specifically riparian zones	22 L	
	Cumulative reduction of plant species of conservation importance: protected trees <i>Sclerocarya birrea subsp. cafra</i> , <i>Combretum imberbe</i> and <i>Philenoptera violacea</i> and provincially protected species <i>Aloe marlothii</i> and <i>Crinum stuhlmannii</i>	36 M	
	Biodiversity (Fauna)		
	Cumulative loss of Riparian forest, Closed Woodland and wetland faunal habitat.	24 L	<ul style="list-style-type: none"> • Planning and compliance, including protected species, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2).
Construction Phase	Direct impacts:		
	Ground Water		
	Depletion of ground water due to overuse and waste during construction activities	18 L	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control and access roads as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Vehicles and equipment management as per the EMPr (section 8.7).
	Pollution and contamination of ground water	18 L	
	Hydrology (Surface Water)		
	Disturbance and loss of ecological function of the habitat (physical structure) along the Crocodile River and drainage lines	14 L	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control, access roads and protection of the riparian system as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching as per the EMPr (section 8.5). • Alien plant control as per the EMPr (section 8.6).
	Pollution and contamination of surface water of the Crocodile River and drainage lines	18 L	
Disturbance and loss of hydrological function (quality and fluctuation properties) of the Crocodile River and the drainage lines	22 L		

Activity	Impact summary	Significance	Proposed mitigation
			<ul style="list-style-type: none"> • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including staff, visual as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).
Soil			
	Soil contamination and pollution	14 L	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control and access roads as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching as per the EMPr (section 8.5). • Vehicles and equipment management as per the EMPr (section 8.7). • Rehabilitation as per the EMPr (section 8.10).
	Soil erosion by wind and rain	18 L	
Air			
	Air pollution due emissions from construction vehicles and equipment.	24 L	<ul style="list-style-type: none"> • Site establishment, including site demarcation, accommodation, pollution control and access roads as per the EMPr (section 8.2) • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching as per the EMPr (section 8.5). • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including visual as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).
	Dust liberated by general construction activities and movement of construction vehicles.	21 L	
	Smoke from open fires used by site staff for heating and cooking as well as from uncontrolled fires	14 L	
Biodiversity (Flora)			
	<i>Removal of invader alien species found on site (positive impact).</i>	30 L	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora, and protection of the riparian system as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3)
	Loss of Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened	28 L	
	Disturbance of sensitive habitats, specifically riparian zones	26 L	
	Destruction and damage to plant species of conservation importance: protected trees <i>Sclerocarya birrea subsp. cafra</i> ,	20 L	

Activity	Impact summary	Significance	Proposed mitigation
	<i>Combretum imberbe</i> and <i>Philenoptera violacea</i> and provincially protected species <i>Aloe marlothii</i> and <i>Crinum stuhlmanni</i>		EMPr (section 8.3). <ul style="list-style-type: none"> • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching as per the EMPr (section 8.5). • Alien plant control as per the EMPr (section 8.6). • Vehicles and equipment management as per the EMPr (section 8.7). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).
	Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas	22 L	
Biodiversity (Fauna)			
	Loss of faunal habitat	20 L	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora and protection of fauna as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Erosion control, including excavation, backfilling and trenching as per the EMPr (section 8.5). • Alien plant control as per the EMPr (section 8.6). • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including staff as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).
	Loss of general faunal habitat and ecological connectivity.	33 M	
	Mortality of fauna	14 L	
	Poaching and snaring of fauna on site and in the greater Kruger National Park	18 L	
Land use and Agricultural potential			
	None.		
Heritage			
	Damage to and / or destruction of archaeological, paleontological or historical artefacts unearthed during construction	8 N	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, access roads and protection of cultural heritage as per the EMPr (section 8.2)
Visual			
	Visual impact of construction, lighting and dust on adjacent tourism developments and KNP tourists	21 L	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control and access roads as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3).
	Visual impact of construction, lighting and dust on observers travelling along game drive routes within the KNP	14 L	
	The visual impact of construction, lighting and dust on locals using	21 L	

Activity	Impact summary	Significance	Proposed mitigation
	the District Road		<ul style="list-style-type: none"> • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching as per the EMPr (section 8.5). • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including staff, visual as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10).
Socio-economic			
	<i>Stimulation of the local economy, especially the local service delivery industry (i.e. accommodation, catering, cleaning, transport and security, etc.) (positive impact)</i>	24 L	<ul style="list-style-type: none"> • Socio-economic planning as per the EMPr (section 7.4). • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including accommodation and access roads as per the EMPr (section 8.2) • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including staff as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9).
	<i>Creation of short-term employment and business opportunities and the opportunity for skills development and on-site training (Positive impact).</i>	40 M	
	Noise, dust and safety impacts and disturbance to adjacent tourism developments and KNP	21 L	
	An increase in construction workers and associated increase in social problems for the community	21 L	
	Increase in casual workers and associated increase in poaching.	28 L	
	Increased risk of veld fires due to the presence of construction workers on site.	24 L	
Municipal services and Traffic			
	Increase in traffic on the D1870 and on other local roads due to construction vehicles.	21 L	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including access roads as per the EMPr (section 8.2) • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including visual as per the EMPr (section 8.8).
	Increase in the number and frequency of construction vehicles accessing the site and the resultant noise, dust, and safety impacts on other road users, residents of the local community and adjacent tourism developments.	15 L	
Indirect impacts:			
Biodiversity (Flora)			
	Loss of floral biodiversity, Red data species and protected trees due to increased incidence of veld fires	16 L	<ul style="list-style-type: none"> • As above
Socio-economics			
	Loss of property and threat to human life due to increased incidence of veld fires	16 L	<ul style="list-style-type: none"> • As above

Activity	Impact summary	Significance	Proposed mitigation
	Traffic and services		
	Degradation of local roads due to the increase in the numbers of heavy vehicles.	21 L	<ul style="list-style-type: none"> As above
	Cumulative impacts:		
	Biodiversity (Flora)		
	Cumulative loss of Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened and associated loss of species richness.	18 L	<ul style="list-style-type: none"> Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora, and protection of the riparian system as per the EMPr (section 8.2) Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). Stockpiles, storage and handling as per the EMPr (section 8.4). Erosion control, including water management, storm water management, excavation, backfilling and trenching as per the EMPr (section 8.5). Alien plant control as per the EMPr (section 8.6). Vehicles and equipment management as per the EMPr (section 8.7). Fire management as per the EMPr (section 8.9). Rehabilitation as per the EMPr (section 8.10).
	Cumulative loss of ecological function of sensitive habitats, specifically riparian zones.	26 L	
	Cumulative reduction and damage to plant species of conservation importance: protected trees (<i>Sclerocarya birrea subsp. cafra</i> , <i>Combretum imberbe</i> and <i>Philenoptera violacea</i> and provincially protected species <i>Aloe marlothii</i> and <i>Crinum stuhlmanni</i>)	24 L	
	Biodiversity (Fauna)		
	Cumulative loss of faunal habitat.	20 L	<ul style="list-style-type: none"> Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora, and protection of fauna as per the EMPr (section 8.2) Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). Erosion control, including excavation, backfilling and trenching as per the EMPr (section 8.5). Alien plant control as per the EMPr (section 8.6). Vehicles and equipment management as per the EMPr (section 8.7). Socio-economic management, including staff as per the EMPr (section 8.8). Fire management as per the EMPr (section 8.9). Rehabilitation as per the EMPr (section 8.10).
	Socio-economics		
	Community upliftment and the opportunity to up-grade and	24 L	<ul style="list-style-type: none"> Socio-economic planning as per the EMPr (section 7.4).

Activity	Impact summary	Significance	Proposed mitigation
	<i>improve skills levels in the area (positive impact)</i>		<ul style="list-style-type: none"> Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) Site establishment, including accommodation and access roads as per the EMPr (section 8.2) Vehicles and equipment management as per the EMPr (section 8.7). Socio-economic management, including staff as per the EMPr (section 8.8). Fire management as per the EMPr (section 8.9).
Traffic and services			
	Cumulative increase in traffic and the resultant noise, dust, and safety impacts on other road users, residents of the local community and adjacent tourism developments.	16 L	<ul style="list-style-type: none"> Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) Site establishment, including access roads as per the EMPr (section 8.2) Vehicles and equipment management as per the EMPr (section 8.7). Socio-economic management, including visual as per the EMPr (section 8.8).
Operational Phase	Direct impacts:		
	Ground Water		
	Depletion of ground water resources due to over use and waste during operation.	18 L	<ul style="list-style-type: none"> Biodiversity management, including access roads and resource management as per the EMPr (section 9.1) Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPr (section 9.2) Erosion control as per the EMPr (section 9.3) Socio economic management, including staff management as per the EMPR (section 9.5) Vehicles and equipment management as per the EMPr (section 9.4)
	Pollution and contamination of ground water	22 L	
	Hydrology (Surface Water)		
	Disturbance and loss of ecological function of the habitat (physical structure) along the Crocodile River and drainage lines	18 L	<ul style="list-style-type: none"> Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) Materials management, including solid, liquid and hazardous waste, fuel and hazardous material as per the EMPR (section 9.2) Erosion control as per the EMPr (section 9.3) Vehicles and equipment management as per the EMPr (section 9.4) Socio economic management, including staff management as per the EMPR (section 9.5) Fire management as per the EMPR (section 9.6)
	Pollution and contamination of surface water	20 L	
	Disturbance and loss of hydrological function (quality and fluctuation properties) along the Crocodile and drainage lines	18 L	
Soil			
Soil contamination and pollution	18 L	<ul style="list-style-type: none"> Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPR (section 9.2) 	
Soil erosion	18 L		

Activity	Impact summary	Significance	Proposed mitigation
			<ul style="list-style-type: none"> Erosion control as per the EMPr (section 9.3) Vehicles and equipment management as per the EMPr (section 9.4) Socio economic management, including staff management as per the EMPr (section 9.5)
Air			
	Air pollution by emissions from increased numbers of vehicles	33 M	<ul style="list-style-type: none"> Socio economic management, including staff management as per the EMPr (section 9.5)
Biodiversity (Flora)			
	Loss of Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened and associated loss of species richness	18 L	<ul style="list-style-type: none"> Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPr (section 9.2) Erosion control as per the EMPr (section 9.3) Vehicles and equipment management as per the EMPr (section 9.4) Socio economic management, including staff management as per the EMPr (section 9.5) Fire management as per the EMPr (section 9.6)
	Disturbance of sensitive habitats, specifically riparian zones	18 L	
	Destruction and damage to plant species of conservation importance: protected trees (<i>Sclerocarya birrea subsp. cafra</i> , <i>Combretum imberbe</i> and <i>Philenoptera violacea</i> and provincially protected species <i>Aloe marlothii</i> and <i>Crinum stuhlmannii</i>)	20 L	
	Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas in the event that the rehabilitation process is not successful.	24 L	
Biodiversity (Fauna)			
	Loss of faunal habitat	18 L	<ul style="list-style-type: none"> Biodiversity management, including access roads, resource management, protection of flora, alien plant control and protection of fauna as per the EMPr (section 9.1) Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPr (section 9.2) Erosion control as per the EMPr (section 9.3) Vehicles and equipment management as per the EMPr (section 9.4) Socio economic management, including staff management, and visual impact management as per the EMPr (section 9.5) Fire management as per the EMPr (section 9.6)
	Faunal disturbances, displacement of taxa and changes in distribution and abundance	18 L	
	Mortality of fauna	20 L	
	Poaching and snaring of faunal species by staff.	24 L	
Land use and Agricultural potential			
	None.		•
Heritage			
	None.		•
Visual			
	Visual Impact of the timeshare resort and infrastructure on KNP tourists using game drive routes	16 L	<ul style="list-style-type: none"> Socio economic management, including staff management and visual impact management as per the EMPr (section 9.5)
	Visual Impact of the timeshare resort on protected and conservation areas (i.e. KNP)	16 L	
	Visual impact of the resort on observers travelling along local	8 N	

Activity	Impact summary	Significance	Proposed mitigation
	roads		
	Visual Impact of the resort and infrastructure on adjacent tourism developments.	16 L	
	Visual Impact of lighting of the resort on adjacent tourism developments and observers residing in close proximity.	20 L	
	Impact on the character of the landscape and sense of place of the region	22 L	
Socio-economic			
	<i>Stimulation of the local economy, especially the local service delivery industry (accommodation, catering, cleaning, transport, security etc.) (positive impact)</i>	33 M	<ul style="list-style-type: none"> Socio economic management, including staff management, and visual impact management as per the EMPr (section 9.5)
	<i>Creation of long term employment and business opportunities as well as opportunities for skills development and transfer (positive impact)</i>	60 H	
	<i>Creation of opportunities for local SMME's (positive impact)</i>	52 M	
	Noise impact on conservation areas within the region, specifically KNP	21 L	
Municipal services and Traffic			
	Operational cost of running services and infrastructure, specifically electricity	44 M	<ul style="list-style-type: none"> Socio economic management, including staff management and visual impact management as per the EMPr (section 9.5)
	Increase in traffic on the D1870 and on other roads due to increased visitor numbers.	30 L	
	Increase in the number and frequency of vehicles accessing the site, and the resultant noise, dust, and safety impacts on other road users, residents of the local community and adjacent tourism developments.	22 L	
Indirect impacts:			
Visual			
	Visual impact of the proposed development of the timeshare resort on the sense of place and visual character of the region.	24 L	<ul style="list-style-type: none"> Socio economic management, including staff management, and visual impact management as per the EMPr (section 9.5)
Cumulative impacts:			
Biodiversity (Flora)			
	Cumulative loss of Tshokwane-Hlane Basalt Lowveld vegetation classified as Least Threatened and associated loss of species richness..	22 L	<ul style="list-style-type: none"> Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPr (section 9.2) Erosion control as per the EMPr (section 9.3)
	Cumulative disturbance of sensitive habitats, specifically riparian zones	22 L	
	Cumulative reduction and damage	24	

Activity	Impact summary	Significance	Proposed mitigation
	to plant species of conservation importance: protected trees (<i>Sclerocarya birrea</i> subsp. <i>cafra</i> , <i>Combretum imberbe</i> and <i>Philenoptera violacea</i> and provincially protected species <i>Aloe marlothii</i> and <i>Crinum stuhlmannii</i>)	L	<ul style="list-style-type: none"> • Vehicles and equipment management as per the EMPr (section 9.4) • Socio economic management, including staff management as per the EMPr (section 9.5) • Fire management as per the EMPr (section 9.6)
Visual			
	The accumulation of built forms and within an otherwise natural environment.	22 L	<ul style="list-style-type: none"> • Socio economic management, including staff management and visual impact management as per the EMPr (section 9.5)
Socio-economics			
	<i>Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area (positive impact)</i>	33 M	<ul style="list-style-type: none"> • Socio economic management, including staff management and visual impact management as per the EMPr (section 9.5)
	<i>Promotion of social and economic development in the local communities and improvement in the overall wellbeing of the community (positive impact)</i>	27 L	
Services and traffic			
	Cumulative increase in traffic on the D1870 and on other roads due to increased visitor numbers.	22 L	<ul style="list-style-type: none"> • Planning and compliance, including waste management as per the EMPr (section 7.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPr (section 9.2) • Socio economic management, including staff management, and visual impact management as per the EMPr (section 9.5)
	Cumulative increase in the number and frequency of vehicles accessing the site, and the resultant noise, dust, and safety impacts for other road users, adjacent tourism development and residents of the local communities.	22 L	

Please refer to Appendix F for the full impact assessment

2. ENVIRONMENTAL IMPACT STATEMENT

The majority of the terrestrial ecosystems of Tenbosch Farm lie within areas classified as **Heavily/Moderately Modified Areas** as per the MBSP. The remaining untransformed sections of the farm are classified as **Other Natural Areas**. Tenbosch also does not lie within a Threatened Ecosystem.

The development site is located within the **ESA: Protected Area Buffer** which is a buffer area of 10 Km around National Parks. The primary objective is to maintain or improve ecological and tourism functionality of the Protected Area (in this case the KNP). Permissible activities/land uses include low and high impact tourism and linear structures. In this regard, the development of a timeshare resort falls within the guidelines where majority of the development will fall within Heavily/Moderately modified areas and Other Natural Areas.

The dam located near the eastern boundary of the site is classified as an **ESA: Wetland** which is described as a non-FEPA wetland where the main objective is to maintain it in a natural state with limited loss of ecosystem, functionality or species without lowering the PES. Low impact tourism is the preferred land use. The dam has

been declared as a no-go area for development with just 2 low impact bird hides/lookout points to be constructed along the edge of the dam.

The drainage lines (one near the centre of the site and the other near the eastern boundary) are classified as **ESA: Important Sub catchment & Fish Support Area**. The main objective is to maintain it in a natural state with limited loss of ecosystem or functionality without lowering the PES. Low impact tourism is preferable, followed by high impact tourism. The drainage lines have a high sensitivity rating and have been declared as no development zones. As a result, no development shall take place within these areas with the exception of the internal access road which will cross over the drainage line in the centre of the site at an existing crossing, thereby minimizing the impact.

Preferred Alternative: Alternative 1

Majority of the chalets in the western portion of the site fall within the *Acacia nigrescens-Panicum maximum* Disturbed Closed Woodland (**Least Threatened**) which has a **moderate** sensitivity rating, with the central recreation area, pool, tennis court and remaining chalets falling within Transformed vegetation community which has a **low** sensitivity rating. The chalets in the eastern portion of the farm, the pool and the maintenance facility and staff accommodation all lie within Transformed vegetation which has a **low** sensitivity rating. The recreation area, restaurant and clubhouse fall within *Acacia nigrescens-Panicum maximum* Disturbed Closed Woodland (**Least Threatened**) which has a **moderate** sensitivity rating.

All areas with a high sensitivity rating have been avoided and declared no-go areas for development, with the exception of 2 small low impact bird hides/lookout points. The area around the dam, while having a moderate biodiversity value, has been avoided and declared as a no-go area as per the specialist recommendation.

The Preferred Layout respects all recommended buffers, namely the riparian buffers around the watercourses. A 16 m buffer has been implemented around the dam in the east, a 15 m buffer around the drainage line near the centre of the site and a 67 m buffer has been implemented from the Crocodile River in the north. The 1:100 year flood line along the Crocodile River is also respected.

Species of conservation importance are found within the site.

In terms of fauna, Hippopotamus (*Hippopotamus amphibious*) listed as vulnerable was confirmed to occur on site, as well as, the Martial Eagle (*Polemaetus bellicosus*), the Nile Crocodile (*Crocodylus niloticus*) also listed as Vulnerable and the Southern African Python (*Python natalensis*) which is protected.

Sewage treatment will be via a waste water treatment plant. All the sewage from the reticulated sites within the development will be treated at this treatment plant. A sewage pump station or stations will be required to convey the sewage from the lowest positions to the plant. Outflow will be used for irrigation purposes.

Power will be supplied by the existing Eskom line located onsite. This existing line will be extended whereby an underground reticulation system will be installed to minimize the visual impact. Each unit will be supplied with a 60A single phase connection.

Statement:

The Preferred Alternative is deemed to have the lowest environmental impact of all the alternatives considered in terms of the significance of the impacts during both the construction and operational phases.

The construction impacts, if effectively and sufficiently managed according to the mitigation measures proposed in this report, specialist reports and the draft environmental management programme (EMPr), will mostly be of **low** significance, post mitigation. It should be noted that a **moderate** post mitigation significance rating is anticipated in terms of the loss of faunal habitat. This is mainly due to the placement of infrastructure in areas of high sensitivity. No post mitigation impacts of high significance are expected.

Operational impacts can be similarly mitigated and residual impacts are expected to be of low significance overall. However, it should be noted that post mitigation significance is anticipated to be **moderate** in terms of air pollution due to emissions from increase number of vehicles to the area and the operational cost of services pertaining to the use of Eskom power. No post mitigation impacts of high significance are expected.

Positive impacts, which will be applicable to all alternatives, include job creation and employment opportunities for both the construction and operational phases, skills transfer and development. Diversifying the tourism offerings within the region will also have an overall positive impact.

With the above in mind, it is recommended that the Preferred Alternative be supported on the condition that all mitigation measures mentioned in this report, the specialist studies and the draft EMP are implemented and adhered to throughout the project lifecycle. No fatal flaws are evident and the design approach and layout is deemed to be environmentally responsible. Additionally, the burying of the power cable will help to minimize the visual impact on the adjacent KNP and other tourism accommodation facilities within the area.

Layout Alternative: Alternative 2

In the Layout Alternative most arguments for the Preferred Alternative hold true.

The layout of the timeshare resort is that of the Preferred Alternative with the exception that approximately 12 of the chalets in the eastern portion and a section of road are located within the riparian buffer which has a **high** sensitivity rating and is declared as a no development zone. The placement of these chalets and infrastructure within an area of high sensitivity is not recommended or ideal.

The services as that of the Preferred Alternative.

Statement

The Layout Alternative will result in slightly higher significance ratings for aspects such as hydrology and flora, particularly during the construction phase. This is owing to the placement of a number of chalets and section of the internal access roads being located within the riparian buffer which has a high sensitivity rating.

Post mitigation significance for the construction phase will be mostly **low**. However, **moderate** post mitigation significance ratings are expected for hydrology due to certain chalets being located just outside of the flood line of the Crocodile River, the disturbance of sensitive habitats due to the placement of a number of chalets within the riparian buffer and the cumulative impact of the disturbance of sensitive habitats.

The operational impacts will be similar to those of the Preferred Alternative, with post mitigation impacts being predominately of **low** significance. Slightly elevated post mitigation significance, as compared to the Preferred Alternative, is expected for the disturbance of sensitive habitats. Additionally, **moderate** post mitigation significance rating is anticipated for the cumulative disturbance/ destruction of sensitive habitats.

The placement of a number of chalets and a portion of the internal access road in the buffer of the riparian habitat is not environmentally responsible as this area has a high sensitivity rating and is declared a no development zone. In spite of the application of mitigation measures, certain impacts- particularly relating to ground and surface water and disturbance of sensitive habitats- will be of a slightly higher significance than in the Preferred Alternative. In light of this, it is recommended that the Layout Alternative is not supported.

Technology Alternative: Alternative 3

This alternative includes the layout of the Preferred Alternative, and as such, all arguments hold true for this alternative. All service aspects will also be as per the Preferred Alternative, with the exception that the power will not be supplied by Eskom, but rather by solar panels mounted on the roofs of the units.

Statement

The Technology Alternative will result in similar **low** post mitigation significance ratings as that of the Preferred Alternative for the construction phase. Slightly lower impacts are also anticipated for the loss of vegetation due to the fact that power will be supplied by solar panels which is less invasive in nature than the burying of cables.

The operational impacts will be similar to those of the Preferred Alternative, with residual impacts being mostly of **low** significance. Slightly elevated post mitigation impacts, as compared to the Preferred Alternative, is anticipated for soil erosion owing to the increase in hard surfaces and storm water runoff from the solar panels.

Solar panels are prohibitive from a capital cost perspective and are not considered ideal for this project of this size. Additionally, the potential visual impact on the KNP in terms of glare could be negatively impact on KNP tourist visitor experience, particularly at certain times of the day.

With the above in mind, it is recommended that the Technology Alternative not be supported due to the potential visual impact on the KNP visitors.

No-go Alternative

The No-go Alternative implies that the proposed development of the timeshare resort on Tenbosch Farm 101 will not take place. In this scenario receiving environment will not be negatively impacted upon in any manner, particularly with regard to biodiversity and surface water.

It should be noted that while no negative impacts will be incurred, the same can be said for positive impacts such as, the creation of employment and job opportunities, skills transfer and development.

SECTION E. RECOMMENDATION OF PRACTITIONER

The proposed development of the Timeshare Resort on Tenbosch Farm will take place in predominately disturbed/transformed areas and is considered a 'brownfields' site. Limited encroachment into sensitive areas will occur and both the riparian buffer and 1:100 flood line of the Crocodile River is respected.

As discussed in the preceding section, all significant negative impacts can be successfully mitigated and managed to acceptable levels (moderate to low) during the entire project lifecycle.

All mitigation measures as detailed in this BAR, the attached specialist reports and the draft EMPr must be implemented and adhered to for all phases of the project i.e. planning, construction and operation.

In addition, the following specific recommendations apply:

Planning and Design

- A minimum buffer zone of 16 m should be adhered to around the dam located in the east of the site.
- A minimum buffer zone of 15 m should be adhered to around the drainage line located in the west of the site.
- A minimum buffer zone of 67 m should be adhered to around the Crocodile River located to the north of the site.
- Buildings and other hardened surface infrastructure (including storm water attenuation measures) should be located outside of buffered watercourses, sensitive areas and riparian habitat.
- All activities should stay out of the 1:100 year flood line area.

- All storm water should be diverted to a point where the water must be released in a controlled manner that will not initiate or enhance any erosion.
- The sensitivity map must be used as a decision making tool to guide the layout design. Development on areas of high environmental sensitivity must be avoided.
- If infrastructure is planned within any areas of natural vegetation, the areas should be checked by a suitably experienced botanist to locate all conservation-important species. These plants should be marked and the relevant permits applied for before removal and translocated to nearby suitable habitat prior to vegetation being cleared.
- A follow-up survey in late summer (February / March) should take place to search for the succulent *Aloe komatiensis*. This species is listed as Endangered and is confirmed from just outside the study area. This is a small aloe which may have been overlooked during fieldwork and a search during its flowering period will make it far more visible.
- The trees *Sclerocarya birrea* subsp. *caffra*, *Combretum imberbe* and *Philenoptera violacea* are nationally protected and a permit would be required to destroy them.
- *Aloe marlothii* and *Crinum stuhlmannii* are protected under provincial legislation and need to be rescued and relocated to adjacent suitable habitat if they are found to be within the development footprint. A permit to move these plants would also be required

Construction

- A suitably experienced botanist should be present on site at the time of pegging so as to identify sensitive plants or habitats.
- The nationally protected trees to be protected (*Sclerocarya birrea* subsp. *caffra*, *Combretum imberbe* and *Philenoptera violacea*), *Aloe marlothii* and *Crinum stuhlmannii* protected under provincial legislation and any other identified subsequent to the initial survey, should be clearly marked prior to construction.
- Locate construction camps and stock yards in the least visible areas. Make use of the natural screening capacity of the site by placing these facilities adjacent a dense vegetation patch with sufficient height to conceal these project components. Alternatively, the screening capacity of the site can be temporarily enhanced through the erection of a 3 m high shade cloth fence around the construction camp during construction. The colour of the shade cloth should be similar to that of the adjacent vegetation, i.e. a light brown or green
- No natural watercourse is to be used for the cleaning of tools or any other apparatus. This includes for purposes of bathing, or the washing of clothes etc.
- The construction of pathways (disturbance zones) in or adjacent to the riparian areas is to be closely managed and strictly controlled to minimize damage to riparian areas.
- No construction camps should be allowed in or within 20 m of a riparian area.
- No stockpile areas should be located in or within 20 m of a riparian area.
- Construction should preferably take place during the low flow/winter months in order to minimize the risk of sediment and debris being washed into riparian areas.
- Stockpiling of soil and of supplies for the construction camps must take place clearly away (at least 20 m where possible) from the edge of riparian areas to prevent soil being washed into the riparian areas habitat.
- During the construction and operation phases erosion and siltation measures should be implemented (e.g. the use of temporary silt traps downstream of construction areas).
- Developers should implement an alien plant control program to combat the infestation present around the wetlands. This program should include regular inspections and follow-ups.

Operation

- Regulate and control movement over the site. Personnel, vehicles and equipment to move along designated routes.

- Ensure that all conserved species and specimens are suitably protected for the duration of the operational phase.
- No protected trees or plants may be removed without the relevant permits from the local authority.
- Maintenance workers and guests may not trample natural vegetation and work should be restricted to dedicated roads, paths and gardens within the development footprint.
- The operator must develop a management and monitoring programme for alien and invasive species detailing basic ID information, actions to prevent the establishment of invasive plants and methods of removal of site during construction.
- No unauthorised access is permitted to buffer areas or any natural areas outside of the facility footprint

SECTION F: APPENDIXES

Appendix A: Maps

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports

Appendix E: Public Participation

Appendix F: Impact Assessment

Appendix G: Environmental Management Programme (EMPr)

Appendix H: Details of EAP and expertise

Appendix I: Specialist's declaration of interest

Appendix J: Additional Information

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APPENDIX A.2.2: ALTERNATIVE 2 LAYOUT

APPENDIX A.3.1: PREFERRED ALTERNATIVE SENSITIVITY

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APPENDIX B: PHOTOGRAPHS

APPENDIX C: FACILITY ILLUSTRATIONS

APPENDIX D: SPECIALIST REPORTS
APPENDIX D.1: GEOTECHNICAL REPORT

APPENDIX D.2: RIPARIAN AND WETLAND REPORT

APPENDIX D.3: HERITAGE REPORT

APPENDIX D.4: ECOLOGY REPORT

APPENDIX D.5: VISUAL IMPACT REPORT

APPENDIX E: VISUAL PUBLIC PARTICIPATION

APPENDIX F: IMPACT TABLES

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APPENDIX H: DETAILS OF EAP

APPENDIX I: SPECIALIST DECLARATION

APPENDIX J: ADDITIONAL INFORMATION