Final Basic Assessment Report

Proposed Extensions To Pestana Kruger Lodge, Outside The Kruger National Park, Mpumalanga Province

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NuLeaf PLANNING & ENVIRONMENTAL

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Foreword

This report constitutes the Final Basic Assessment Report, and has been circulated digitally for Stakeholder information on 4 March 2020.

NuLeaf Planning and Environmental would like to thank all Stakeholders for their participation and input into this process.

All written comments received, including NuLeaf's response to each, has been captured in a Comments and Responses Register in Appendix E.

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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 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.
Public Participation:	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

The proposed development entails the expansion of the existing Pestana Kruger Lodge located outside the Kruger National Park. The expansion will entail the construction of an additional 35 luxury chalet blocks, comprising of 1016 beds in total. Two new recreational areas will also be constructed, as well as, a refuse handling area, maintenance/ workshop, a pedestrian bridge and staff quarters. All associated civil infrastructure (water, electricity and waste treatment) will be included.

Most of the untransformed vegetation within study area is classified as Critical Biodiversity Area (CBA): Irreplaceable by the MBSP. These are areas that are the most important in Mpumalanga for meeting biodiversity targets outside of formally protected areas and for conserving critical biodiversity ecosystems. The remaining portions within the study area are classified as Modified.

Lowveld Riverine Forest is assessed as Vulnerable in the National List of Threatened Ecosystems as listed in Government Gazette No. 34809 of 9 December 2011.

According to the MBSP freshwater assessment the study area falls within an Ecological Support Area (ESA) Important Sub-catchment, with some patches of Heavily Modified areas included. The sub-catchment is important as it is a Fish Support Area (FSA), as per NFEPA.

Ten SCC were recorded from within the study area. The tree *Elaeodendron transvaalense* has been assessed as NT. The trees *Sclerocarya birrea, Balanites maughamii, Boscia albitrunca, Elaeodendron transvaalense, Philenoptera violacea* and *Combretum imberbe* are protected under the NFA and the tree *Berchemia zeyheri* and the succulents *Aloe marlothii, A. parvibracteata* and *Stapelia gigantea* are protected under the MNCA.

No cultural heritage sites were recorded for the site.

The proposed development site is acceptable for development and is not fatally flawed in any way. The construction impacts, if effectively 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. Similarly, operational impacts can also be mitigated and will result in low post mitigation significance ratings.

It is recommended that the proposed Expansion of Pestana Kruger Lodge be supported on the condition that all mitigation measures mentioned in this report, the specialist reports and the draft EMPr are implemented and adhered to throughout the project lifecycle.

SECTION A: ACTIVITY INFORMATION

1. PROJECT DESCRIPTION

1.1. Development Components

The proposed development entails the expansion of the existing Pestana Kruger Lodge located outside the Kruger National Park. The expansion will entail the construction of an additional 35 luxury chalet blocks, comprising of 1016 beds in total. Two new recreational areas will also be constructed, as well as, a refuse handling area, maintenance/ workshop, a pedestrian bridge and staff quarters. All associated civil infrastructure (water, electricity and waste treatment) will be included.

The proposed extension will consist of the following:

- 35 chalet blocks totalling 136 units:
    - 27 blocks x 4 chalets = 108 chalets x 8 beds = 864 beds
    - 1 block x 2 chalets = 2 chalets x 8 beds = 16 beds
    - 6 blocks x 4 chalets = 24 chalets: 12 chalets x 4 beds, 12 chalets x 6 beds = 120 beds
    - 1 block x 2 chalets = 2 chalets x 8 = 16 beds
- 3 x Viewpoints/ bird hides
- 2 x Recreational areas e.g. swimming pools, jungle gyms, ablution facilities, braai areas.
- New reception area located in the existing building over the dam
- A kiosk with a coin operated laundromat
- A refuse sorting and storage area
- Maintenance store and workshop
- Staff quarters
- Pedestrian bridge
- The existing single lane vehicle river crossing to be expanded to a double lane
- Additional viewing deck to the main restaurant

Please note that the following infrastructure will be located within 32 m of a watercourse:

- 5 Chalet blocks
- 2 x Bird hides

The minimum allowable distance from the streams and dams are 25 m and from the Crocodile River is 67m. All of the above mentioned infrastructure is located outside of the stipulated buffer zones with the exception of the 5 Chalet blocks and 2 bird hides which as located within 25 m of the stream.

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

Government Notice R327 Activity No.	**Describe the relevant Basic Assessment Activity in writing as per Listing Notice 1 (GN No. R327)**	**Describe the portion of the development as per the project description that relates to the applicable listed activity**
12 (ii) (c)	The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more, where such developments occurs (c) within 32 meters of a watercourse.	The proposed expansion entails the construction of new chalets. Each unit will be approximately 22 square meters in size. 2-3 chalet blocks will be developed within 32 m of the dam(s)/watercourses located within the site.
19	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.	The single lane road over the stream in the property will be widened to allow for 2 cars to pass. A pedestrian bridge will also be constructed over the stream.
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 will be approximately 19 000 m^2 (1.9 Ha).
48 (i) (c)	The expansion of (i) infrastructure or structures where	The proposed expansion entails the construction of new

	the physical footprint is expanded 100 square meters or more, where such developments occurs (c) within 32 meters of a watercourse.	chalets. Each unit will be approximately 22 square meters in size. 2-3 chalet blocks will be developed within 32 m of the dam(s)/watercourses located within the site.
Government Notice R325 Activity No:	**Describe the relevant Basic Assessment Activity in writing as per Listing Notice 3 (GN No. R325)**	**Describe the portion of the development as per the project description that relates to the applicable listed activity**
Government Notice R324 Activity No:	**Describe the relevant Scoping and EIA Activity in writing as per Listing Notice 2 (GN No. R324)**	**Describe the portion of the development as per the project description that relates to the applicable listed activity**
2 (f) (ii) (dd) (ff)	The development of reservoirs, excluding dams, with a capacity of 250 cubic meters or more in (f) Mpumalanga (ii) outside urban areas in (dd) critical biodiversity areas and (ff) areas within 10 kilometres of a national park as identified in terms of NEMPAA	A reservoir with a capacity of 545 cubic meters will be constructed.
12 (f) (ii) (iii)	The clearance of an area of 300 square meters or more of indigenous vegetation in (f) Mpumalanga (ii) within critical biodiversity areas identified in bioregional plans (iii)or on land, where, at a time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning or proclamation in terms of NEMPAA.	Approximately 19 000 square meters of indigenous vegetation will be cleared for the proposed expansion. The expansion site is located within Pestana Kruger Lodge, which is classified as a CBA 1 irreplaceable.
14 (ii) (c); (f) (i) (ff) (hh)	The development of (ii) infrastructure or structures with a physical footprint of 10 square meters or more where such development occurs within (c) within 32 m of a watercourse in (f) Mpumalanga (i) outside urban areas in (ff) critical biodiversity areas and (hh) areas within 10 kilometres of a national park as identified in terms of NEMPAA.	The proposed expansion entails the construction of new chalets. Each unit will be approximately 22 square meters in size. 2-3 chalet blocks will be developed within 32 m of the dam(s)/watercourses located within the site. The expansion site is located within Pestana Kruger Lodge, which is classified as a CBA 1 irreplaceable. This site is within 1 km of the Kruger National Park.
17 (f) (i) (ee) (gg)	The expansion of a resort, lodge, hotel, tourism or hospitality facilities where the development footprint will be expanded and the expanded facility can accommodate an additional 15 people or more in (f) Mpumalanga (i) outside urban areas in (ee) critical biodiversity areas within (gg) areas within 10 kilometres of a national park as identified in terms of NEMPAA.	Pestana Kruger Lodge is proposing to expand their facilities to include 136 new 6-8 sleeper chalets. These new chalets will accommodate an additional 1016 people. The expansion site is located within Pestana Kruger Lodge, which is classified as a CBA 1 irreplaceable. This site is within 1 km of the Kruger National Park.
18 (f) (i) (ee) (gg)	The widening of a road by more than 4 meters, or the lengthening of a road by more than 1 km in (f) Mpumalanga (i) outside urban areas areas in (ee) critical biodiversity areas and (gg) areas within 10 kilometres of a national park as identified in terms of NEMPAA.	The existing access roads will need to be lengthened by more than 1 km in order to provide access to the new chalet units.
23 (ii) (c); (f) (i) (ee) (gg)	The expansion of (ii) infrastructure or structures where the physical footprint is expanded by 10 square meters or more where such expansion occurs within (c) within 32 meters or a watercourse in (f) Mpumalanga (i) outside urban areas in (ee) critical biodiversity areas and (gg) areas within 10 kilometres of a national park as identified in terms of NEMPAA.	The proposed expansion entails the construction of new chalets. Each chalet block will be approximately 480 square meters in size. 2-3 chalet blocks will be developed within 32 m of the dam(s)/watercourses located within the site. The expansion site is located within Pestana Kruger Lodge, which is classified as a CBA 1 irreplaceable. This site is within 1 km of the Kruger National Park.
Please note: Only those activities listed above shall be considered for authorisation. The onus is on the applicant to ensure that all applicable listed activities are included in the application. Environmental Authorisation must be obtained prior to commencement with each applicable listed activity. If a specific listed activity is not included in an Environmental Authorisation, an application for amendment or a new application for Environmental Authorisation will have to be submitted.		

2. FEASIBLE AND REASONABLE ALTERNATIVES

No alternatives are under consideration for the proposed extensions due to the fact that Pestana Kruger Lodge is an established venue and, therefore, the extensions need to take place within the existing property boundary. Additionally, all of the services are already in place and just need to be extended.

Only one site is under consideration for the proposed expansion. The preferred site is predominately a brown fields site. Chalet blocks will be placed in areas where burning has occurred and in open spaces where manicured grasses are present. The maintenance store/workshop and staff housing will be placed in an area that was used for refuse dumping.

The layout of the chalet blocks is designed to capitalize on the views offered by the Crocodile River and Kruger National Park to the west. The chalets will be grouped into duplex blocks, consisting of either 4 or 2 chalets per block, will be double storey in height with flat roofs and constructed out of brick and mortar. The chalet blocks located directly opposite the Crocodile River will have green roofs.

Two rows of chalet blocks will be located in the western portion of the property, overlooking the Crocodile River and Kruger National Park. Other chalets will be placed in the east, centred around a new recreational facility (swimming pools, braai area, jungle gym, ablutions). One of these chalet blocks encroaches into the 200 m conservation buffer for the *Caesalpinia rostrate,* classified as Vulnerable.

A row of chalets will also be positioned along the southern boundary, facing the golf course. The existing access road will be extended to provide access to the new chalet blocks. Parking areas will also be included. Refer to Map 1 for the proposed layout.

An existing building located over the existing dam in the east, will be upgraded into the new reception area. Just north of this, a kiosk with a coin operated laundromat will be constructed.

Additionally, the viewing deck at the existing restaurant will be extended, the existing vehicle bridge will be expanded to a dual lane and a pedestrian footbridge will be constructed over the stream in the east.

A refuse sorting/storage area, maintenance store/workshop and new staff accommodation will be located in an already disturbed area where refuse dumping is currently taking place in the north of the property.

Three (3) bird hides/viewpoints will be located throughout the property- one in the far north west overlooking the Crocodile River, one north of the existing restaurant overlooking the Crocodile River and one in the east overlooking the existing dam. These hides will be based on bird hides that are found within the Kruger National Park and will be no greater than 4x3 meters, be on elevated decks, lower than the tree line, made from natural materials and earth tones used so that the hides blend into the natural environment. Additionally, no spot lights will be used. Please refer to Appendix C for the 'look and feel' of the proposed hides.

The preferred layout respects the 1:100 flood line along the Crocodile River and other watercourses. 5 chalet blocks are located within the 32m buffer of the stream on site.

Advantages of this site and layout for the proposed expansion include the following:

- Majority of the site is already disturbed and transformed
- The 1:100 year flood line is respected

Disadvantages of this site and layout for the proposed expansion include the following:

- 5 chalet blocks are located within the 32 m buffer
- 3 chalets are located in high sensitivity areas
- 1 chalet block encroaches into the 200 m conservation buffer of the *Caesalpinia rostrate.*
- 1 bird hide is located within the 1:100 flood line

A sewage treatment plant will be constructed at a suitable position within the development site and all the sewage from the 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.

The treated effluent will comply with the General Standards required by the DWS and will be discharged into the stream 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 which will be buried underground to reduce the visual impact on the surrounds and Kruger National Park.

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

- Irrigating with purified effluent lowers the potable water abstraction requirements and consumption.
- 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

Coordinates of infrastructure:

	Latitude (S):			Longitude (E):		
• Chalets Blocks 1-10 with green roofs (4 units per block)	25º	27'	40.34"	31º	32'	12.14"
• Chalet Blocks 1-7 (4 units per block)	25º	27'	30.50"	31º	32'	14.31"
• Chalets Block 8 (4 units per block)	25º	27'	39.53"	31º	32'	18.30"
• Chalet Blocks 9-11 (4 units per block)	25º	27'	37.33"	31º	32'	21.13"
• Chalet Blocks 12-16 (4 units per block)	25º	27'	46.87"	31º	32'	22.16"
• Chalet Blocks 17 (4 units per block)	25º	27'	48.65"	31º	32'	13.64"
• Chalet Blocks 1-3 (2 units per block)	25º	27'	42.30"	31º	32'	18.02"
• Chalet Blocks 4-6 (2 units per block)	25º	27'	44.29"	31º	32'	19.55"
• Chalet Block 7 (2 units per block)	25º	27'	49.61"	31º	32'	13.78"
• Simplex	25º	27'	45.72"	31º	32'	13.15"
• Bird hide 1	25º	27'	36.41"	31º	32'	9.48"
• Bird hide 2	25º	27'	43.74"	31º	32'	12.50"
• Bird hide 3	25º	27'	39.94"	31º	32'	23.81"
• Refuse/maintenance workshop/ staff accommodation	25º	27'	36.00"	31º	32'	17.47"
• Recreational area 1	25º	27'	37.34"	31º	32'	20.95"
• Recreational area 2	25º	27'	39.97"	31º	32'	16.06"
• Pedestrian bridge	25º	27'	40.14"	31º	32'	22.30"
• Vehicle river crossing expansion	25º	27'	43.39"	31º	32'	17.98"

Coordinates of infrastructure located within 32m of a watercourse:

	Latitude (S):			Longitude (E):		
• Chalet 1	25º	27'	42.27"	31º	32'	13.53"
• Chalet 2	25º	27'	49.61"	31º	32'	13.78"

- Chalet 3
- Chalet 4
- Chalet 5

25º	27’	43.35“	31º	32‘	17.32“
25º	27’	42.78“	31º	32‘	18.96“
25º	27’	41.65“	31º	32‘	20.50“

2.1. No- project Alternative

The No-Project Alternative implies that the proposed development of the extension of Pestana Kruger Lodge 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 a regional road (R570). Existing internal roads are also located throughout the property. Two new internal roads will be constructed to allow access to the new units.

4. LOCALITY MAP

Please refer to Appendix A1 for the locality map.

5. LAYOUT/ ROUTE PLAN

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

6. SENSITIVITY MAP

Please refer to Appendix A3 for the Preferred Alternative 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

Pestana Kruger Lodge is located within the Nkomazi local municipality which is ideally situated to the North of Swaziland, South of the Kruger Park and East of Mozambique. The lodge itself shares a border with the Kruger

National Park (which dictates the type of land uses that will be found along its borders) as well as being located close to other areas of pristine natural environment including the Kaalrug Mountain range, the Lebombo Mountain range and the Crocodile River. These areas have excellent potential for eco-tourism uses.

Unemployment rates are high in Nkomazi and with a growing population this is a big concern for the future. Limited job opportunities combined with other factors such as low levels of skill development and literacy has resulted in a large portion of Nkomazi being poverty stricken. Eco-tourism is a mechanism that has been successfully used to boost job creation and in doing so reduce the impact of other negative socio-economic aspects.

The current conservation developments including those 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 an 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. These activities all provide the possibility for job creation, skills development, outside investment into Nkomazi and improved service delivery.

In this regard, the proposed extension of Pestana Kruger Lodge falls within the Nkomazi IDP and SDF.

b) Need and Desirability

Pestana Kruger Lodge is located on the banks of the Crocodile River, adjacent to the Kruger National Park. The Kruger National Park forms the western 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. The expansion of these accommodation facilities will also increase job opportunities to the Nkomazi community.

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: • 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, 2011:	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
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 throughput 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
Spatial Planning and Land Use Management Act (Act No.16 of 2013)	The Spatial Planning and Land Use Management Act aims: • to provide a framework for spatial planning and land use management; • to specify the relationship between the spatial planning and the land use management system and other kinds of planning; • to provide a framework for the monitoring, coordination and review of the spatial planning and land use management system; • to provide a framework for policies, principles, norms and standards for spatial development planning and land use management; • to provide for the facilitation and enforcement of land use and development measures;	Department of Rural Development and Land Reform	2013
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	Department of Water Affairs	1997

	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.		
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 (Act No. 15 of 1973)	To provide for the control of substances which may cause injury or ill-health to or death of human 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.	Department of Health	1973
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:	To provide for the establishment of municipalities in accordance with the requirements relating to	National Government	1998

Municipal Structures Act, No. 117 of 1998	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		
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 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.	National Government	2000
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
Integrated Pollution and Waste Management White Paper	To develop, implement and maintain an integrated pollution and waste management system which contributes to sustainable development and a measurable improvement in the quality of life, by harnessing the energy and commitment of all South Africans for the effective prevention, minimisation and control of pollution and waste.	Department of Environmental Affairs	2000
Environmental Management Policy White Paper	This is the government's national policy on environmental management. It sets out the vision principles, strategic goals and objectives and regulatory approaches that government will use for environmental management in South Africa.	Department of Environmental Affairs	1998

11. WATER, WASTE AND EFFLUENT

11.1. Solid Waste Management

Solid waste generated from the lodge and staff areas will separated at source into wet waste, recyclables and non-recyclables. Recyclables will be separated into the various categories, namely paper, plastic, cans and glass and are stored in marked 240 litre wheeled bins located at strategic points throughout the site. Non-recyclables will be stored in a similar manner. All recyclables and non-recyclables will then be collected from the various points via a caged tractor-trailer and taken to the refuse sorting/ storage facility near the entrance gate. This area will be fenced off and screened. Private contractors will collect the waste once per week or as and when needed and taken to the nearest recycling centre and/or landfill site.

11.2. Liquid effluent

A wastewater treatment plant will be constructed at a suitable position on the development area.

The total Annual Average Daily Wet Weather Flow is approximately 98kl/day for a 60% occupancy rate and all sewer related infrastructure will be designed for 164kl/day.

A hybrid sewage treatment package plant is proposed that utilizes trickling filter technology. Trickling filter plants have the following advantages when compared to alternative technologies:

- Simple, reliable technology with minimal automation and control
- No skilled operators required
- Flexibility of effluent load
- Low sludge production
- Compact
- Odourless

The WWTW will consists of 3 shipping containers (2 x 12 mHC container double stacked for the trickling filter) and 1 x 6 m for the equipment container.

The treated effluent will comply with the with the RSA General Standard for Discharge as published in Table 3.2 of Gazette No. 20526 of 8 October 1999 and will be discharged into the stream or irrigated. The treatment processes for the plant will include screening, anaerobic digestion, trickling filter, settler and chlorine contact tank.

Screening: Raw sewage will enter the system up to the battery limits. A screening facility consisting of an inlet box (civil) with bar screen and drip tray will be required. Once a week, an operator will rake trapped matter (screenings) with the rake onto the drip tray and leave this to dewater. The (semi-dry) screenings from the previous week will be carted away by the operator to a proper disposal site.

Primary treatment tank (anaerobic Reactor): The raw sewage, after screening, will enter a two compartment anaerobic reactor. The anaerobic reactor will be a concrete structure. The anaerobic reactor has been designed with enough retention time to allow the solids and sludge to settle out and be digested in the first compartment, while the second will mainly contain grey water. Anaerobic conditions in this tank will ensure BOD removals of at least 40 % to 50 %. Additionally, aerobic sludge from the secondary settler will be recycled to the inlet of this tank, to be further digested. This reduces the overall sludge volume produced in the biological system.

Trickling Filter Feed Pumps (installed in the primary treatment tank): After primary treatment, the effluent will be discharged into a pump sump (Anoxic Reactor) from where it will be re-circulated by open impeller submersible pumps (duty/standby) through the trickling filter. This sump has been sized with a hydraulic retention time in excess of 60 min, which allows for anoxic conditions to prevail.

Trickling Filter (Aerobic Reactor): The trickling filter system consists of a bed of highly permeable medium, which serves as host for micro-organisms to attach to and grow on and form a biological film. The wastewater is sprayed over and percolates through the media. Organic material in the wastewater is absorbed by the micro-organisms growing as a biological film on the media. In the outer portion of the film, aerobic organisms degrade organic material, whereas anaerobic organisms exist deeper into the biological film, i.e. near the surface of the media.

Clarifier: The water from the trickling filter basin will be directed to the clarifier by transfer pumps (duty/standby) only if there is inflow into the plant. Water from the trickling filter contains solids made up of a mixture of aerobic and anaerobic sludge. This sludge will be heavier (and lower in volume) than aerobic sludge produced in an activated sludge plant and does not produce scum. It will settle and accumulate at the bottom of the clarifier.
Sludge will periodically be withdrawn from the bottom of the clarifier and will be gravitationally fed to the anaerobic reactor. To achieve this, an electrically actuated valve has been provided. The valve's opening time and frequency is controlled by a timer for the duration and interval of sludge extraction.

Disinfection: Clarified water from the clarifier is discharged into the chlorine contact tank. This tank has been sized for an effective contact time of 20 min at ADWF. Disinfection will be provided by a hypochlorite dosing system. The treated water will be suitable for irrigation and dust control.

Sludge Removal and Drying Beds (supplied by others): Sludge stabilisation and digestion takes place in the anaerobic reactor. This tank is annually inspected. If the sludge at the bottom of the first compartment of the anaerobic reactor has accumulated to a height of ca 400 mm the sludge has to be emptied (pumped) into sludge drying beds or taken away for dumping at a suitable location. An easy procedure for checking the sludge level inside the anaerobic reactor is given/described in our operation manuals. Sludge to be emptied every one to two years or alternatively collect and transport the accumulated sludge to a suitable disposal site. Since it is expected that the removal of the sludge will need to be done once every 1 – 2 years, this method may be more suitable for the proposed plant.

It is assumed that the sewage flow per unit will be 0.29 Kl/room, totalling 139 Kl/day.

11.3. Water Use

Water will be sourced from current water rights from the Crocodile River whereby this development has water rights for 34 720 kl/year which equates to 95,4 kl/day.

A number of boreholes have been drilled and tested. One borehole has a 38.9kl per day yield. The total raw water available for this development is 134,3kl/day.

The expected Annual Average Daily Water Demand is estimated at 203kl/day. For a 60% average occupancy, the water demand is 122kl/day against the available 134,4kl. Raw water pumps are installed at the TSB pump station next to the development. The developer has a formal agreement with TSB to use this extraction point. A servitude is also registered over the properties for the routing of the rising mains over the neighboring property.

The total Gross Annual Average Daily Water Demand is 122 kl/day for a 60% occupancy rate. Statically this resort has an average occupancy of 60%. What must also be taken into consideration, is that the occupancy is based on chalets occupied and does not reflect the number of rooms in a chalet that is occupied. A 3-bedroom units is been calculated at 6 persons in that chalet, where the actual number of people could only be 4. Therefore the occupancy of 60% is therefor still a conservative figure.

The fire storage demand of 2 hours is 108 kl.

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 required for firefighting is therefore 900 l/min for a duration of 2 hours, which equates to 108kl.

The total storage capacity required equates to 476kl (368kl for 48 hours domestic and commercial demand and 108kl for firefighting purposes). Although the newly drilled boreholes can be seen as a multiple sources of supply, it is recommended that a minimum of 48 hours of storage be provided.

The storage requirements are 368 kl for domestic consumption (48 hours of GAADD) plus 108kl for firefighting which equates to 476kl. A new reservoir of at least 500kl will be installed.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

12. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

The area of investigation is underlain by basaltic and peridotitic komatiite, tholeiite, chemical sediments, various mafic and ultramafic schists interlayered with banded iron formation and ferruginous, black, white and grey chert or acid to intermediate volcanic rocks (Zt) which is a combination of the Komati and Theespruit
Formations of the Onverwacht Subgroup that form part of the Barberton Sequence.
According to the geology map the north-western corner of the investigation area falls on the contact zone between the Komati and Theespruit Formations and Nelspruit Suite. The Nelspruit Suite intrusive rocks are described as grey to white, coarsegrained granite (Zn).

13. GROUNDCOVER

According to Mucina & Rutherford (2006), two vegetation types occur within the study area, namely Granite Lowveld and the azonal Lowveld Riverine Forest, both situated in the Lowveld Savannah Bioregion in the Savanna Biome.

Granite Lowveld occurs in a narrow strip from Phongola in northern KwaZulu-Natal in the south, through central Swaziland, and to Giyani in Limpopo Province in the north. Granite Lowveld originally covered about 19 838 km^2, of which 21% has been transformed, mostly through agriculture and urbanisation. Due to large tracts of this vegetation type occurring in public and private nature reserves in South Africa, including the Kruger National Park, it is considered Well Protected and has a provincial ecosystem status of Least Concern.

Lowveld Riverine Forest occurs along recent alluvial deposits at low altitudes from Maputaland in the south and northwards through the Lowveld region of Mpumalanga and Limpopo Provinces. It was assessed as Critically Endangered by Mucina & Rutherford (2006) and Moderately Protected under the MBSP, where it is classified as Escarpment Riverine Forest.

The project area is not situated within any centres of plant endemism as defined by Van Wyk & Smith (2001).

Lowveld Riverine Forest is assessed as Vulnerable in the National List of Threatened Ecosystems as listed in Government Gazette No. 34809 of 9 December 2011 (DEAT, 2011). Granite Lowveld is not a listed Threatened Ecosystem.

Most of the untransformed vegetation within study area is classified as Critical Biodiversity Area (CBA): Irreplaceable by the MBSP (Lötter et al., 2014). These are areas that are the most important in Mpumalanga for

meeting biodiversity targets outside of formally protected areas and for conserving critical biodiversity ecosystems. CBA areas should be maintained in a natural state with no further loss of natural habitat. The remaining portions within the study area are classified as Modified. These areas show the greatest flexibility in terms of management objectives and permissible land-uses although these area already transformed by the hotel grounds.

The entire study area is also situated within the Ecological Support Areas (ESA): Protected Area Buffers unit. 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.

According to the MBSP, the study area borders on an ESA Wetland, while the latest wetland delineations show that the study area includes a floodplain wetland and borders on a riverine wetland.

14. SURFACE WATER.

According to the MBSP freshwater assessment the study area falls within an Ecological Support Area (ESA) Important Sub-catchment, with some patches of Heavily Modified areas included. The sub-catchment is important as it is a Fish Support Area (FSA), as per NFEPA. FSAs are fish sanctuaries that are in a lower than A or B ecological condition. Fish sanctuaries, which include both river FEPAs and FSAs, are rivers and their associated sub-catchments that are essential for protecting threatened and near-threatened fish; consequently, there should be no further deterioration in the condition of the associated rivers (Nel *et al.*, 2011). This particular FSA supports the Tiger Fish (*Hydrocynus vittatus*), a fish species of conservation concern. The study area also overlaps with an MBSP Critical Biodiversity Area (CBA): Aquatic Species. This CBA supports the Zambezi Siphonta dragonfly (*Neurogomphus zambeziensis*), listed by the Mpumalanga Tourism and Parks Agency provincial assessment as Vulnerable.

According to the MBSP, the study area borders on an ESA Wetland. According to this map, the study area includes a floodplain wetland and borders on a riverine wetland. The wetland probability map showed no modelled wetlands for this area.

Some non-perennial rivers flow through the study area, while the perennial Crocodile River forms the western border of the study area. According to the 2014 PES for South African rivers, the section of the Crocodile River flowing through this sub-catchment has a PES of 'D' (i.e. "Largely modified. A large loss of natural habitat, biota, and basic ecosystem functions has occurred.").

Refer to Appendix D.2 for the full Wetland Report

15. LAND USE CHARACTER OF SURROUNDING AREA

The proposed expansion of Pestana Kruger Lodge is located on the farm Riverside 173 JU and and lies about 3 km north-east of the town of Malelane and about 2 km north-west of the N4, in Mpumalanga Province, and is situated on the border of the Kruger National Park. It falls under the Ehlanzeni District Municipality, Nkomazi Local Municipality. The study area lies adjacent to the Kruger National Park boundary on the eastern bank of the Crocodile River. Surrounding land uses include agricultural, commercial and residential developments to the north, south and east and conservation land to the west.

16. CULTURAL/HISTORICAL FEATURES

Francois P. Coetzee, an independent Cultural Heritage Consultant, was commissioned by NuLeaf Planning and Environmental to undertake a Heritage Impact Assessment 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.

Additionally, the SAHRIS Palaeontological Sensitivity Map was consulted. The affected property is located within a blue zone indicating that there is a low sensitivity and that no palaeontological studies are required however a protocol for finds is required.

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

17. SOCIO-ECONOMIC CHARACTER

Nkomazi municipality is predominantly a rural municipality which struggles to attract external investments which leads to a high level of unemployment. Although the general unemployment rates have decreased from 41.5 % in 2001 to 34.3 % in 2011 this is still considered high. Employment is one of the main determinants of the level of development of a community. Unemployment leads to many negative social impacts including an increase in crime rates and health risks due to a decrease in personal and household income. It also has an economic impact on the municipality as it inhibits households from paying rates and taxes. Unemployment combined with an increased cost of living and greater household dependency directly affects the poverty seen within the municipality.

Education is also a major determinant of a community's development. Education levels impact a community's ability to fight poverty by preventing the development of skills. The education rate of women in this municipality is considerably low and this will have an effect on the general development status of the entire household. Although the level of education has seen a general improvement (47% had no formalized schooling in 1996 which dropped to 26% in 2011) this has still not improved employment opportunity - this is a due to the fact that the skills of the locals do not match the needs in the labour market.

Agriculture and tourism, specifically eco-tourism, have been identified as building blocks for socio-economic development within the municipality. They have provided job opportunities, increased the revenue brought into the municipality and provided a platform for skill development for local residents.

18. BIODIVERSITY

18.1. Terrestrial Ecology

A specialist terrestrial ecology assessment was undertaken by ECOREX Consulting Ecologists CC in August 2019.

18.1.1. Flora

A total of 127 plant species from 49 families were recorded within the study area during August 2019 fieldwork. The true plant species diversity of the study area is likely to be significantly higher, particularly with regard to grasses and herbaceous species, which are more conspicuous in the wet season.

Two 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.). The untransformed vegetation communities are described in detail below:

- *Ficus sycomorus – Syzygium guineense* Disturbed Riparian Forest

  Riparian Forest occurs along the small stream that runs through the central portion of the study area. Vegetation structure can best be described as Tall Forest (Edwards, 1983). Various anthropogenic factors, such as alien plant infestation and construction of hotel chalets and roads, have caused some disturbance to this community. Portions of nodes A, C and D are situated within this community. This community is strongly dominated by the trees *Ficus sycomorus* and *Syzygium guineense.* Other canopy species present include *Combretum imberbe, Schotia brachypetala, Trichilia emetica, Acacia robusta* subsp*. clavigera, A. xanthophloea* and *Diospyros mespiliformis.* The understory is fairly open in places but the shrubs *Gymnosporia senegalensis, Bridelia cathartica, Euclea natalensis* subsp*. angustifolia, Monanthotaxis caffra* and *Gymnanthemum coloratum* occur throughout. Dwarf shrubs and herbs found on the ground layer include *Barleria elegans, * Achyranthes aspera*, *Hypoestes forskaolii* and *Ageratum conyzoides.* The dominant grasses found are *Panicum maximum* and *P. deustum*.

  A total of 68 plant species, or 54% of the total species list, was recorded from Disturbed Riparian Forest. Species fidelity is predictably high, with 44 species (64%) being restricted to this community.

  Two species of conservation concern were recorded from Disturbed Riparian Forest. These are the trees *Sclerocarya birrea* and *Combretum imberbe*, which are protected under the National Forests Act (No. 30 of 1998).

- *Acacia nigrescens – Dichrostachys cinerea* Disturbed Closed Woodland

  This community occurs over most of the undeveloped and non-riparian areas at Pestana. Vegetation structure can best be described as Short Closed Woodland with Short Thicket developing in places (Edwards, 1983). As with the previous community, anthropogenic disturbances such as dumping of refuse and rubble, alien plant infestation and historical construction works have resulted in a disturbed ecological state in this community. Portions in the south of the study area are less disturbed and as a result have a higher canopy and fewer alien plant species. Each of the four proposed development nodes contains Disturbed Closed Woodland.

  The canopy is dominated by the tree *Acacia nigrescens,* with a high diversity of additional canopy species including *Combretum hereroense, C. imberbe, Acacia tortilis, A. senegal* var*. leiorhachis, Sclerocarya birrea, Pappea capensis, Peltophorum africanum, Ziziphus mucronata* and *Berchemia zeyheri*. The shrub layer is strongly dominated by encroaching *Dichrostachys cinerea* subsp. *africana*, with other common species including *Gymnosporia maranguensis, G. glaucophylla, Acacia exuvialis, Commiphora pyracanthoides, Euclea natalensis* subsp*. angustifolia, Grewia bicolor* and *G. flavescens.* Succulents are a feature of this community, and include *Euphorbia ingens, Aloe marlothii, A. parvibracteata, Cissus rotundifolia, Stapelia gigantea* and *Cynanchum viminale*. The ground layer is dominated by the grasses *Heteropogon contortus*, *Panicum maximum, Urochloa mosambicensis* and *Aristida congesta* subsp*. barbicollis.* Herbs include *Ruellia patula, Justicia debilis, Indigofera heterotricha, Sida dregei* and *Waltheria indica*.

  A total of 82 plant species, or 65% of the total species list, was recorded from Disturbed Closed Woodland. Species fidelity is very high, with 62 species (76%) being restricted to this community. Ten SCC were recorded from Disturbed Closed Woodland. The tree *Elaeodendron transvaalense* has been assessed as Near Threatened. The trees *Sclerocarya birrea*, *Balanites maughamii, Boscia albitrunca,*

Elaeodendron transvaalense, *Philenoptera violacea* and *Combretum imberbe* are protected under the NFA and the tree *Berchemia zeyheri* and the succulents *Aloe marlothii, A. parvibracteata* and *Stapelia gigantea* are protected under the MNCA.

Ten species of conservation concern were recorded from within the study area. The tree *Elaeodendron transvaalense* has been assessed as Near Threatened. The trees *Sclerocarya birrea*, *Balanites maughamii, Boscia albitrunca, Elaeodendron transvaalense*, *Philenoptera violacea* and *Combretum imberbe* are protected under the NFA and the tree *Berchemia zeyheri* and the succulents *Aloe marlothii, A. parvibracteata* and *Stapelia gigantea* are protected under the MNCA. Nine plant species with a threat status of Near Threatened or higher have either been recorded from within the QDGS 2531 BC or surrounding grids with similar habitat or are widespread in the Lowveld and are likely to occur within the general vicinity of the study area. One of these species was confirmed during fieldwork, as is discussed below:

- *Elaeodendron transvaalense* (Burtt Davy) R.H.Archer Bushveld Saffron:
  This is a small to medium-sized evergreen tree occurring in northern and eastern South Africa, and further afield through Namibia, Botswana, Zimbabwe, Mozambique and Zambia. The species is heavily harvested in South Africa for traditional medicine and some sub-populations have declined as a result; as such it has been assessed as Near Threated (Williams *et al*., 2008a). Low numbers were encountered in Disturbed Closed Woodland along the southern boundary of the study area.

Two Vulnerable species have a likelihood of occurrence within the study area, and are discussed below:

- *Dioscorea sylvatica* Eckl. Forest Elephant's Foot: *Dioscorea sylvatica* is a large vine occurring from the Eastern Cape to central Africa. It has been classified as Vulnerable as a result of commercial harvesting in the 1950's and current harvesting for the traditional medicine industry preventing populations from recovering (Williams *et al.*, 2017). This species is also a listed Threatened or Protected Species (ToPS) under the National Environmental Management: Biodiversity Act (No. 10 of 2004). It is deciduous in dry conditions / environments and may have been overlooked in the Disturbed Riparian Fore*st community.*

- *Caesalpinia rostrata N.E.Br*. is a large, scrambling shrub that occurs in wooded drainage lines in far southern Mpumalanga and adjacent Mozambique. It is listed as Vulnerable due to the massive reduction of habitat as a result of expanding sugarcane agriculture and is now only known from less than ten localities. This poorly known plant is confirmed from an area immediately adjacent to the study area (MTPA Threatened species database), although none were located during fieldwork, habitat potentially occurs within Disturbed Riparian Forest and adjacent woodland within the study area, although with a low likelihood as this area was searched during fieldwork.

One potential Near Threatened species occurs within the study area, namely *Drimia sanguinea*, which is discussed below:

- *Drimia sanguinea* (Schinz) Jessop Red Drimia: This small bulb is invisible for most of the year either through dormancy or being inconspicuous due to its grass-like leaves. It is only in the flowering season that they are visible. This takes place in early spring and it is therefore likely that this bulb was not located during fieldwork due to the timing of the survey. This plant is listed as Near Threatened due to over-collection for the medicinal plant trade and potentially occurs in the Disturbed Closed Woodland community.

The remaining Species of Conservation Concern have a low likelihood of occurrence due to lack of suitable habitat, being highly conspicuous species that are unlikely to be overlooked during fieldwork or regional rarity.

Twenty-two alien plant species were recorded during fieldwork, ten of which are invasive species as listed in the Conservation of Agricultural Resources Act, Act No. 43 of 1983 (CARA). These include * *Parthenium hysterophorus, * Opuntia ficus-indica, * O. stricta, * Ricinus communis, * Tecoma stans, * Melia azedarach, * Passiflora subpeltata, * Sesbania punicea,* Solanum mauritianum* and * *Lantana camara*. Eight of these are found within the Disturbed Riparian Forest community, while the Disturbed Closed Woodland community supports four species.

18.1.2. Fauna

- Mammals

The Malalane area is situated in the savanna biome adjacent to the GKNP and therefore has very high mammal diversity, relatively low numbers of endemics and a relatively high number of Red Data species. The Pestana Hotel shares a boundary with the KNP but larger mammals are restricted in movement by the presence of a large, electrified fence. Therefore, mammal populations within the property are low and mostly confined to smaller, common species. Sixty-seven mammal species are confirmed for the QDGS 2531 BC in the Animal Demography Unit's Virtual Museum's database, the majority being recorded in the adjacent GKNP.

Five mammal species were confirmed to occur within the hotel property during fieldwork. All are common and widespread savanna species including African Savanna Hare *Lepus victoriae*, Vervet Monkey *Chlorocebus pygerythrus*, Chacma Baboon *Papio ursinus*, Southern Bushbuck *Tragelaphus sylvaticus* and Tree Squirrel *Paraxerus cepapi*.

An estimated 12 conservation-important mammals potentially occur within the study area. Several cave-roosting bat species of conservation concern are likely to occur overhead, but these species are only likely to feed over the site because of the shortage of suitable roosting sites and have been excluded from this assessment, as have larger mammals occurring within the adjacent GKNP. Of the 12 potentially occurring species, eight are considered to be species of conservation concern with only three considered threatened. None were confirmed during fieldwork and no threatened species potentially occur on a regular basis due to either a lack of suitable habitat present, general scarcity or high human disturbance levels.

Two species with a moderate or higher likelihood of occurrence are assessed as Near Threatened, which are species close to or likely to soon qualify for the status of Vulnerable. These two are described below:

- Natal Red Duiker (*Cephalophus natalensis)*: This small antelope is listed as Near Threatened due to ongoing habitat loss due to agriculture and bush-clearing as well as losses through bushmeat hunting. It is still fairly common in the general Malalane area (*pers. obs*.) and potentially occurs within the Riparian Forest community.

- Giant Yellow House Bat (*Scotophilus nigrita):* This large bat has only fairly recently been confirmed to occur within South Africa and is now only known from three localities along the Crocodile River, one of which is Malalane. All local records are from bat boxes within built up areas and therefore this species potentially occurs within the Pestana Hotel grounds. It is listed as Near Threatened due to habitat loss, potential poisoning from pesticides and local rarity.

Eight potentially occurring species are protected under either the Mpumalanga Nature Conservation Act (No.10 of 1998) (MNCA) or the National Environmental Management: Biodiversity Act Threatened or Protected Species (No. 10 of 2004) (NEMBA ToPS), and at least some are likely to occur.

- Birds

The study area falls within the Kruger National Park and Adjacent Areas Important Bird & Biodiversity Area (IBA) and qualifies as a Global IBA. Eleven globally threatened species are resident within the GKNP, in addition to fourteen resident regionally threatened birds. A number of migratory and vagrant threatened species also occur.

Eighty-four bird species were confirmed from within or immediately adjacent to the actual habitat represented in the study area during fieldwork. Two broad assemblages or species-habitat associations were identified, and are briefly described below:

- Riparian Forest Assemblage: Tall Riparian Forest occurs along the small stream running through the central portion of the study area. This habitat provides refuge for a number of bird species that favour taller and denser vegetation than the surrounding shorter, dry woodlands, such as Purple-crested Turaco *Tauraco porphyreolophus*, Trumpeter Hornbill *Bycanistes bucinator*, White-browed Robin-Chat *Cossypha heuglini*, Spectacled Weaver *Ploceus ocularis* and African Green Pigeon *Treron calvus*. Rarer species located include African Goshawk *Accipiter tachiro*, Purple-banded Sunbird *Cinnyris bifasciatus* and Bearded Scrub Robin *Cercotrichas quadrivirgata.* Thirty-nine species (46% of the total list) were recorded from this assemblage, the lower of the two assemblages.

- Closed Woodland Assemblage: The assemblage present outside of the Riparian Woodland is characterised by dry woodland vegetation which supports a wide diversity of species, although mostly of a generalist nature. Common bird species found include Blue Waxbill *Uraeginthus angolensis,* Red-billed Firefinch *Lagonosticta senegala*, Lesser Masked Weaver *Ploceus intermedius*, Cape Glossy Starling *Lamprotornis nitens* and Cardinal Woodpecker *Dendropicos fuscescens*. Less common species located include Cut-throat Finch *Amadina fasciata* and Yellow-throated Bush Sparrow *Gymnoris superciliaris.*

An estimated five conservation-important birds potentially occur within the study area. All five of these are considered threatened, although none were confirmed to occur during fieldwork. A number of larger threatened species such as vultures, eagles and storks are confirmed from the adjacent KNP but these have been excluded from the list of potentially occurring species due to the high human disturbance levels, lack of suitable habitat and lack of prey.

Four of the five potentially occurring species of conservation concern are considered threatened, one of which has a moderate likelihood of occurrence. This species is discussed below:

- White-backed Night-Heron (*Gorsachius leuconotus*): This secretive, nocturnal heron is assessed as Vulnerable due to a significant loss of riparian habitat in South Africa. It is regularly recorded at night from the Malalane Bridge over the Crocodile River (*pers. obs*.) and probably regularly forages along the forested stream in the study area.

One Near Threatened bird species potentially occurs within the study area and is discussed below:

- Half-collared Kingfisher (*Alcedo semitorquata):* This small, brightly coloured kingfisher requires fairly undisturbed, tree-lined streams and dams and is listed as Near Threatened due to habitat quality degradation. Suitable habitat is present along the forested stream in the central part of the study area, where it may be resident. It has been confirmed from the adjacent Crocodile River (pers.obs.).

- Reptiles and Frogs

The Lowveld of north-eastern Mpumalanga supports a high diversity of reptile species with 102 species already recorded from the degree grid square 2531. Thirty-four species of reptiles have been recorded from the QDGS 2531 BC, in which Pestana Kruger Lodge 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 is discussed below:

- Nile Crocodile (*Crocodylus niloticus*): Degradation of aquatic habitats, persecution, harvesting for the medicinal market and accidental poisoning has led to an assessment of Vulnerable for Africa's largest reptile. The adjacent KNP supports the largest population in South Africa, with almost 4500 individuals. A single animal was observed along the stream running though the study area and this species probably regularly forages along it but no breeding habitat (sandy river banks) are present.

Southern African Python *Python natalensis* is protected under the NEMBA ToPS and is likely to occasionally forage within the study area.

No frogs were recorded during the assessment, although dedicated frog surveys, including trapping, would no doubt have produced a few species but are unlikely to have produced data that would change the recommendations in this report.

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

18.2. 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).

Four (4) water courses were identified and can be described as riverine areas. There are riparian areas and a wetland. The delineated riparian areas are demarcated and indicated as PR1, PR3 and PR4. The wetland identified is demarcated as PR2.

- PR1

Watercourse PR1 is the riparian zone located on the south east portion of the farm. The riparian zone extends upstream from the edge of the property and downstream where it reaches the guesthouses. The Riparian Index of Habitat Integrity (RIHI) is a C (62.1%). The main impacts include the upstream road crossing, golf course (impacted corridor upstream of the study area), sugarcane factory upstream, and the presence of exotic vegetation. The PES is C and the PES Ecostatus is C (62.1%).

- Marginal zone: The existence of a golf course and industrial activity upstream has resulted in a somewhat disturbed environment, with a large portion of this zone being deprived of some vegetation cover. This zone has patchy vegetation coverage and is dominated by woody species, grasses, and sedges. The substrate consists of soil with rocky features in places. The dominant tree species are *Diospyros mespiliformis, Ficus sycomorus, Syzygium guineense*, and *Trichilia emetica*. The fern *Pteris vittata* also occurs. Other species that occur in this zone include: *Phragmites australis*, *Cyperus sexangularis*, *Panicum maximum*, *Commelina bengalensis*, etc. Exotic vegetation, such as *Melia azedarach, Tecoma stans, Tagetes minuta,* etc. occur.

- Non-marginal zone: This zone is reasonably wide and is mostly covered by shrubs and trees. The substrate consists mainly of soil material and rocky habitat in places. The ground cover consists mainly of leaf litter and other moribund material. The following woody species occur: *Bridelia micrantha*, *Acacia xanthophloea*, Philenoptera violacea, *Phyllanthus reticulatus, Ficus sycomorus, Syzygium cordatum, Celtis africana, Sclerocarya birrea subsp. caffra, Grewia flavescens, Bridelia cathartica, Phyllanthus reticulatus, Gymnosporia senegalensis* and *Gymnanthemum coloratum*, etc. Understory plants such as *Setaria megaphylla, Hypoestes forskaolii,* and *Panicum maximum* occur. The exotics, *Melia azedarach* and *Chromolaena odorata* are dominant in places within this zone. Other exotics found include: *Solanum mauritianum, Lantana camara, Ageratum conyzoides*, etc.

- PR 2

  Watercourse PR2 is a wetland with artificial features located in the north-eastern portion of the property. The wetland extends upstream from the edge of the R570 road and downstream where it joins riparian PR3. The wetland's catchment has been altered by agricultural activities, and the wetland itself has been transformed due to the building of a dam; this has resulted in changes to the three components of wetland health assessed. The wetland can, therefore, be currently described as having an "F" PES Category (heavily modified). The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognisable. The wetlands ecosystem services do reflect some values in contributing towards better water quality in the form of sediment trapping, phosphate trapping, streamflow regulation, toxicant removal, and nitrate removal. The wetland does not contribute significantly towards human services, as indicated by the score which shows that these services are low.

- PR3

  Watercourse PR3 is the riparian zone located along the centre of the site. The riparian zone extends upstream from the edge of the guesthouses and downstream to where it joins the Crocodile River. The Riparian Index of Habitat Integrity (RIHI) is a D (55.9%). The main impacts are the road crossings, lodge footprint (extending into riparian areas, cover an area of 65% of the non-marginal zone), golf course (impacted corridor upstream of the study area), sugarcane factory upstream, felling of riparian vegetation, and the presence of exotic vegetation. The PES EcoStatus EC is a D (55.9%).

  - Marginal zone: The presence of a dam upstream, a golf course and industrial site within its catchment and the guesthouse development footprint within the non-marginal zone has resulted in the degradation of the marginal zone's integrity. The dominant tree species are *Ficus sycomorus, F. sur, Diospyros mespiliformis, Combretum microphyllum, Syzygium cordatum,* and *Trichilia emetica.* The following grass and sedge species occur, although in low numbers in this zone: *Cyperus sexangularis*, *Pteris vittata*, etc. Exotic vegetation, such as:

Caryota urens, *Melia azedarach, Tecoma stans, Tagetes minuta, Ricinus communis, Lantana camara*, etc. occur

- Non-marginal zone: This zone is dominated by trees, with a few shrubs. The undergrowth has been reduced to garden-like features: mowed grass cover and large areas with no cover, for the purpose of the premises. The substrate consists mainly of soil material and rocky habitat in places. The banks are reasonably steep in places. The following woody species occur: *Philenoptera violacea, Ficus sycomorus, Syzygium cordatum, Celtis africana, Sclerocarya birrea* subsp*. caffra*, *Bridelia cathartica, Grewia flavescens, Bridelia cathartica, Combretum erythrophyllum, Diospyros mespiliformis, Gymnosporia senegalensis, and Gymnanthemum coloratum,* etc. Understory plants such as: *Setaria megaphylla, Hypoestes forskaolii, Cucumis zeyheri*, *Cynodon dactylon*, and *Panicum maximum* occur. Some exotic vegetation such as *Melia azedarach, Bougainvillea spectabilis, Solanum mauritianum, Bidens pilosa, Lantana camara, Ageratum conyzoides,* etc. were also found.

- PR4

Watercourse PR4 is the Crocodile River which forms the western border of the proposed site. The RIHI is a C/D (59%) with the main impacts being flood events, grazing and trampling (stunted trees and shrubs), a tributary consisting of polluted water from industrial sugarcane factory and the presence of exotic species. The sugarcane factory pollute the water in the increase in sucrose and fructose that further benefit the microbe organisms which forms the basis of the food chain, thus the reason for an increase in diversity within this confluence. PES is C/D and the PES Ecostatus is a C/D (57.9%).

- Marginal zone: The dominant vegetation consists of grass and sedges. The substrate consists mainly of alluvial soils. The following grass and sedge species occur: *Cynodon dactylon, Panicum maximum, Sporobolus africanus, Commelina diffusa subsp. scandens, Phragmites australis, Cyperus sexangularis, Schoenoplectus brachyceras,* etc. Exotic vegetation such as the macrophyte, *Eichhornia crassipes* occurs in places along the edge of the active channel. Other exotic species such as *Ricinus communis, Centella asiatica, Sesbania bispinosa, Sesbania punicea*, etc. occur. This riparian area is situated at the outflow point of a small tributary consisting of water coming from a sugarcane factory and a golf course upstream. It is expected that the water will be high in nutrients and a higher temperature than the norm. This results in a higher occurrence and diversity of animals (crocodiles, hippopotamus, elephant, etc.) at its confluence with the Crocodile River. The increase in mammal activity results in trampling and overgrazing.

- Non-marginal zone: The dominant vegetation consists of grass and scattered shrub species. Grazing and trampling have resulted in bare soil surface areas and trees being stunted due to continuous grazing. It appears that the woody species are trying to recover after flood events in the past. The substrate consists mainly of alluvial material and rocky dykes crossing the riverine area. The following woody species are dominant: *Combretum imberbe, Dichrostachys cinerea, Gymnosporia senegalensis, Ziziphus mucronata, Acacia nigrescens, Philenoptera violacea, Phyllanthus reticulatus, Peltophorum africanum, Pluchea dioscoridis,* etc. Grass species such as *Sporobolus africanus, Cynodon dactylon, Setaria sphacelata, Panicum deustum and Panicum maximum occur. Cyperus sexangularis and Schoenoplectus* spp. are the dominant sedges. Some exotic vegetation such as *Melia azedarach, Solanum mauritianum, Lantana camara, Parthenium hysterophorus, Sesbania punicea*, etc. were also found. This riparian area is situated at the outflow point of a small tributary (as mentioned above) consisting of water from a sugarcane factory and a golf course upstream. As previously

mentioned, it is expected that the water will be high in nutrients and a higher temperature than the norm. This has resulted in a higher occurrence and diversity of animals (crocodiles, hippopotamus, elephant, etc.) at its confluence with the Crocodile River resulting in trampling and overgrazing of this zone.

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

19. VISUAL

A visual impact assessment was undertaken by NuLeaf Planning and Environmental in order to determine the possible visual impact of the proposed extensions to Pestana Kruger Lodge.

The proposed development is situated on Pestana Kruger Lodge which is located on the R570 Riverside Rd, Malelane and is within the Nkomazi Local Municipality, in the Ehlanzeni District Municipality, Mpumalanga. Pestana Kruger Lodge is approximately 800m north east from Malelane Gate, Kruger National Park and 3 km north east of Malelane.

The eastern boundary of the farm is defined by a regional road (R570), while the western boundary is formed by the Kruger National Park and the Crocodile River. Cultivated farmlands and tourism accommodation surrounds the property (Leopard Creek lies to the north).

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.

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 Corridor Gazette on 8 August 2019. Site notices were placed at the following locations in and around the proposed property on 6 August 2019:

Site Notice Position	Latitude	Longitude
Entrance gate to the proposed property	S25°27'35.20"	E31°32'20.19"
Reception area of the proposed property	S25°27'46.21"	E31°32'13.26"
Malelane Gate Reception	S25°27'44.02"	E31°31'56.19"

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 12 August 2019.
- A printed advertisement was placed in the Corridor Gazette, a local publication, on 8 August 2019.
- Site notices were placed at the entrances to the affected property, in the reception of the affected property and the Malelane Gate Reception on 6 August 2019.

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
Johan Piek	Leopard Creek Estate	jjp@leopardcreek.co.za
Greg Beyer	RCL Foods	Greg.beyers@rclfoods.com
Tracy-lee Peterson	SANParks	Tracy.peterson@sanparks.org
Ronelle Putter	Malalane Irrigation Board	Ronelle.putter@lantic.net

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

3. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

No issues have been raised thus far.

Interested and Affected Party	Issue

4. COMMENTS AND RESPONSE REPORT

Please refer to Appendix E for the comments and response report.

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
Nkomazi Local Municipality	Shirely Shabungu	Shirely.shabangu@nkomazi.gov.za
DAFF	Themba Khoza	khozab@daff.gov.za
MTPA	Johan Eksteen	johan@mtpa.gov.za
DWS	Silo Kheva	khevas@dws.gov.za

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

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. 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	• 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	22 L	
	Soil		
	Erosion risk to soils	18 L	• 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 Granite Lowveld vegetation classified as Least Concern	27 L	• 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 Lowveld Riverine Forest classified as Critically Endangered and a Vulnerable Ecosystem	42 M	
	Risk to sensitive habitats, specifically riparian zones	39 M	
	Loss of plant species of conservation importance: The tree	24 L	

Activity	Impact summary	Significance	Proposed mitigation
	Elaeodendron transvaalense is assessed as NT. The trees *Sclerocarya birrea, Balanites maughamii, Boscia albitrunca, Elaeodendron transvaalense, Philenoptera violacea* and *Combretum imberbe* are protected under the NFA and the tree *Berchemia zeyheri* and the succulents *Aloe marlothii*, *A. parvibracteata* and *Stapelia gigantea* are protected under the MNCA		
	Biodiversity (Fauna)		
	Risk to habitat for conservation important fauna and habitat fragmentation	27 L	• 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		
	None.		
	Heritage		
	None.		
	Visual		
	Risk to visual quality of the surrounding area and sense of place	22 L	• 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.		
	Indirect impacts:		
	None.		
	Cumulative impacts:		
	Biodiversity (Flora)		
	Cumulative loss of Granite Lowveld vegetation classified as Least Concern.	27 L	• 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 Lowveld Riverine forest classified as Critically Endangered and associated loss of species richness.	39 M	
	Cumulative loss of sensitive habitats, specifically riparian zones.	22 L	
	Cumulative loss of CBA: Irreplaceable.	39 M	
	Cumulative reduction of plant species of conservation importance: The tree *Elaeodendron transvaalense* is assessed as NT. The trees *Sclerocarya birrea, Balanites*	36 M	

Activity	Impact summary	Significance	Proposed mitigation
	maughamii, Boscia albitrunca, Elaeodendron transvaalense, Philenoptera violacea and *Combretum imberbe* are protected under the NFA and the tree *Berchemia zeyheri* and the succulents *Aloe marlothii, A. parvibracteata* and *Stapelia gigantea* are protected under the MNCA.		
	Biodiversity (Fauna)		
	Cumulative loss of faunal habitat.	20 L	• 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	• 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	24 L	• 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). • 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).
	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	
	Soil		

Activity	Impact summary	Significance	Proposed mitigation
	Soil contamination and pollution	14 L	• 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	• 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)		
	Removal of invader alien species found on site (positive impact).	*24* *L*	• 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
	Loss of Granite Lowveld vegetation classified as Least Concern	28 L	
	Loss of Lowveld Riverine Forest classified as Critically Endangered and a Vulnerable Ecosystem	39 M	
	Loss of critical biodiversity areas	39 M	
	Increased harvesting of plant resources by construction workers	14 L	
	Disturbance of sensitive habitats, specifically riparian zones	27 L	
	Development within the 200m conservation buffer for *Caesalpinia rostrate.*	27 L	
	Destruction and damage to plant species of conservation	20 L	

Activity	Impact summary	Significance	Proposed mitigation
	importance: *Elaeodendron transvaalense, Sclerocarya birrea, Balanites maughamii, Boscia albitrunca, Elaeodendron transvaalense, Philenoptera violacea, Combretum imberbe, Berchemia zeyheri, Aloe marlothii, A. parvibracteata* and *Stapelia gigantea*		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	18 L	• 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.	30 L	
	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	• 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	• 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).
	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 the District Road	14 L	

Activity	Impact summary	Significance	Proposed mitigation
			• 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		
	*Stimulation of the local economy, especially the local service delivery industry (i.e. accommodation, catering, cleaning, transport and security, etc.)**(positive impact)***	*24 L*	• 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).
	*Creation of short-term employment and business opportunities and the opportunity for skills development and on-site training (**Positive impact**).*	*36 M*	
	Noise, dust and safety impacts and disturbance to adjacent tourism developments and KNP	24 L	
	An increase in construction workers and associated increase in social problems for the community	27 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 R570 and other roads due to construction vehicles.	21 L	• 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, plant species of conservation importance and protected trees	18 L	• As above
	Socio-economics		
	Loss of property and threat to human life due to increased incidence of veld fires	16 L	• As above
	Traffic and services		
	Degradation of local roads due to	21	• As above

Activity	Impact summary	Significance	Proposed mitigation
	the increase in the numbers of heavy vehicles.	L	
	Cumulative impacts:		
	Biodiversity (Flora)		
	Cumulative loss of Granite Lowveld vegetation classified as Least Threatened and associated loss of species richness.	18 L	• 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 Lowveld Riverine Forest classified as Least Threatened and associated loss of species richness.	22 L	
	Cumulative loss of ecological function of sensitive habitats, specifically riparian zones.	26 L	
	Cumulative reduction and damage to plant species of conservation importance: *Aloe spp.* and *Stapelia gigantea*	24 L	
	Biodiversity (Fauna)		
	Cumulative loss of faunal habitat.	20 L	• 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 improve skills levels in the area (positive impact)	*24* *L*	• Socio-economic planning as per the EMPR (section 7.4). • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1)

Activity	Impact summary	Significance	Proposed mitigation
			• 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	• 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	• 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	• 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	• 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
	Soil erosion	18 L	

Activity	Impact summary	Significance	Proposed mitigation
			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	• Socio economic management, including staff management as per the EMPr (section 9.5)
	Biodiversity (Flora)		
	Loss of Granite Lowveld vegetation classified as Least Threatened and associated loss of species richness	18 L	• 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)
	Loss of Lowveld Riverine Forest classified as Critically Endangered and associated loss of species richness	22 L	
	Loss of critical biodiversity areas	27 L	
	Disturbance of sensitive habitats, specifically riparian zones	18 L	
	Destruction and damage to plant species of conservation importance: *Elaeodendron transvaalense*, *Sclerocarya birrea, Balanites maughamii, Boscia albitrunca, Elaeodendron transvaalense, Philenoptera violacea, Combretum imberbe, Berchemia zeyheri, Aloe marlothii, A. parvibracteata* and *Stapelia gigantea*	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.	20 L	
	Biodiversity (Fauna)		
	Loss of faunal habitat	18 L	• 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	20 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 proposed	16	• Socio economic management, including staff

Activity	Impact summary	Significance	Proposed mitigation
	extension and infrastructure on KNP tourists using game drive routes	L	management and visual impact management as per the EMPr (section 9.5)
	Visual Impact of the proposed extension on protected and conservation areas (ie KNP)	20 L	
	Visual impact of the proposed extension on observers travelling along local roads	20 L	
	Visual Impact of the proposed extension and infrastructure on adjacent tourism developments.	16 L	
	Visual Impact of lighting of the proposed extension 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	20 L	
	Socio-economic		
	Stimulation of the local economy, especially the local service delivery industry (accommodation, catering, cleaning, transport, security etc.) (positive impact)	*33* *M*	• Socio economic management, including staff management, and visual impact management as per the EMPr (section 9.5)
	Creation of long term employment and business opportunities as well as opportunities for skills development and transfer (positive impact)	*56* *M*	
	Creation of opportunities for local SMME's (positive impact)	*52* *M*	
	Noise impact on conservation areas within the region, specifically KNP	15 L	
	Municipal services and Traffic		
	Operational cost of running services and infrastructure, specifically electricity	44 M	• Socio economic management, including staff management and visual impact management as per the EMPR (section 9.5)
	Increase in traffic on the R570 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*	• Socio economic management, including staff management, and visual impact management as per the EMPr (section 9.5)
	Cumulative impacts:		
	Biodiversity (Flora)		

Activity	Impact summary	Significance	Proposed mitigation
	Cumulative loss of Granite Bushveld vegetation classified as Least Threatened and associated loss of species richness.	18 L	• 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)
	Cumulative loss of Lowveld Riverine Forest vegetation classified as Critically Endangered and associated loss of species richness.	22 L	
	Cumulative disturbance/loss of sensitive habitats, specifically riparian zones and CBA	22 L	
	Cumulative reduction and damage to plant species of conservation importance: *Elaeodendron transvaalense*, *Sclerocarya birrea, Balanites maughamii, Boscia albitrunca, Elaeodendron transvaalense, Philenoptera violacea, Combretum imberbe, Berchemia zeyheri, Aloe marlothii, A. parvibracteata* and *Stapelia gigantea*	24 L	
	Visual		
	The accumulation of built forms and within an otherwise natural environment.	22 L	• Socio economic management, including staff management and visual impact management as per the EMPr (section 9.5)
	Socio-economics		
	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)	*52* *M*	• Socio economic management, including staff management and visual impact management as per the EMPr (section 9.5)
	Promotion of social and economic development in the local communities and improvement in the overall wellbeing of the community (positive impact)	*27* *L*	
	Services and traffic		
	Cumulative increase in traffic on the R570 and on other roads due to increased visitor numbers.	22 L	• 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

Most of the untransformed vegetation within the study area is classified as Critical Biodiversity Area (CBA): Irreplaceable by the MBSP. The remaining portions within the study area are classified as Modified. Small portions of Disturbed Riparian Forest located within the property is mostly representative of an Ecosystem assessed as Vulnerable in the National List of Threatened Ecosystems.

The development site is located within the Ecological Support Areas (ESA): Protected Area Buffers unit 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 self-catering chalets falls within the guidelines where majority of the development will fall within Critical Biodiversity Area (CBA): Irreplaceable.

According to the MBSP, the study area borders on an ESA: Wetland, while the latest wetland delineations show that the study area includes a floodplain wetland and borders on a riverine wetland. The wetland's catchment has been altered by agricultural activities, and the wetland itself has been transformed due to the building of a dam; this has resulted in changes to the three components of wetland health assessed. The wetland is currently described as having an "E" PES Category. The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognisable.

According to the MBSP freshwater assessment the study area falls within an Ecological Support Area (ESA) Important Sub-catchment, with some patches of Heavily Modified areas included. The sub-catchment is important as it is a Fish Support Area (FSA), as per NFEPA.

The proposed chalets in the north-western portion of the property fall predominately within the *Acacia nigrescens-Dichrostachys cinerea* Disturbed Woodland vegetation community (Least Threatened) which has a moderate sensitivity rating. One chalet block encroaches slightly into the Riparian Forest vegetation which has a high sensitivity rating. The units located in the north eastern portion, as well as, the two new recreational areas are located within areas of low sensitivity.

Four chalet blocks are located within the 32 m buffer of the watercourse and in the Riparian forest. However, this area is not pristine at all. Existing units are located within this buffer and the vegetation is transformed ie. manicured lawns.

Additionally, one chalet block in the east is located within the 200 m conservation buffer of the *Caesalpinia rostrate.* As per SANBI's guidelines, no development should take place within 200 m of confirmed populations. However, it should be noted that the plant species does not occur within the property boundary, but it located across the road on an adjacent property. As a result, no impact will be had on this plant.

The chalet blocks located along the southern boundary, near the golf course and the chalet blocks on the northern foot of the koppie are located in an area with moderate sensitivity. Similarly, the chalet blocks located in the south western portion of the site lie within areas of moderate to high sensitivity. However, it should be noted that this area of high sensitivity is already partially transformed and most of the Riparian forest community is situated on a steep bank.

It should be noted that a large number of protected tree and plant species were found throughout the site. Majority of these plants and trees are found in areas where the proposed chalet blocks are to be placed in the western and southern portion of the property. The final placement of these chalet blocks will be done on site and every effort to avoid these trees will be made. However, if this is not possible, then permits will have to obtained to remove them.

The refuse sorting/storage area, maintenance store/workshop and new staff accommodation lie within an area of moderate sensitivity, however, this area is already disturbed/ impacted upon as it is where refuse dumping has taken place.

Two bird hides are to be located along the western boundary of the property in a high sensitivity area where one is located within the 1:100 flood line, while a third is to be constructed overlooking the dam located on the eastern side of the property, in a moderate sensitivity area. An environmentally-friendly and tread light approach will be utilized for the construction of these bird hides/viewpoints. These hides will be on elevated platforms so that minimal vegetation clearing will have to take place.

All areas with a high sensitivity rating have been avoided with the exception of the five chalet blocks. Additionally, the 62 m buffer around the Crocodile River has been respected. The 1:100 year flood line is also respected.

Species of conservation importance are found within the site.

In terms of Near Threatened or Vulnerable fauna, only the Nile crocodile (*Crocodylus niloticus*) listed as Vulnerable and protected under the NEMBA ToPS was recorded on site, during the site visit. It is, however, important to note that given the properties location as well as its close proximity to the Kruger National Park there is a high potential for the occurrence of other conservation-important species.

Statement:

The proposed development site is acceptable for development and is not fatally flawed in any way. The construction impacts, if effectively 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 for the loss of Critically endangered vegetation and CBAs. 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 an increase in the 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 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.

In light of the above discussion, it is recommended that the proposed Expansion of Pestana Kruger Lodge be supported on the condition that all mitigation measures mentioned in this report, the specialist reports and the draft EMPr are implemented and adhered to throughout the project lifecycle.

<u>No-go Alternative</u>

The No-go Alternative implies that the proposed expansion of the lodge 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 extension of the Pestana Kruger lodge will take place in predominately disturbed/transformed areas. Limited encroachment into sensitive areas will occur and 1:100 flood line of the Crocodile River will be respected with the exception of minimal, low impact structure being placed in these zones.

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 25 m should be adhered to around the two riparian zones located along the centre of the site.
- A minimum buffer zone of 25 m should be adhered to around the wetland located in the north east section of the site.
- A minimum buffer zone of 62 m should be adhered to around the Crocodile River located to the west of the site.
- All activities should stay out of the 1:100 year flood line area.
- All activities should stay out of the riparian areas area and its recommended buffer zones.
- No development to take place in the Disturbed Riparian Forest community.
- No development to take place within the 200m conservation buffer for *Caesalpinia rostrata*, irrespective of vegetation community, as recommended by SANBI.
- All protected succulents (such as *Aloe spp.* and *Stapelia gigantea*) should be removed from the construction sites prior to clearing by an experienced botanist / horticulturalist and planted either in adjacent untransformed vegetation or in garden beds around the hotel.
- Prior to construction, the borders of the development zone should be demarcated with danger tape in order to prohibit access by the construction team into surrounding areas.

Construction

- All protected succulents (such as *Aloe spp.* and *Stapelia gigantea*) should be removed from the construction sites prior to clearing by an experienced botanist / horticulturalist and planted either in adjacent untransformed vegetation or in garden beds around the hotel.
- 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. cafra*, *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.
- All existing and proposed roads to contain adequate stormwater drainage and erosion control measures.
- 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 development to take place within the 200m conservation buffer for Caesalpinia rostrata, irrespective of vegetation community, as recommended by SANBI.

- Destruction of trees during construction to be kept to an absolute minimum. Permits will be required for the removal of protected trees.
- New infrastructure should not impact any large indigenous trees, wherever possible.
- Where possible, all future development to take place over existing transformed areas to preserve the remaining natural vegetation on the site.
- Plan and develop outside riparian areas.
- Create the recommended buffer around riparian areas (likely, a buffer of <20 m may adequately fulfill several functions and values such as biotic movement, protecting the edge of the riparian areas, and some water quality functions, etc.) (MacFarlane, Dickens, & Von Hase, 2009).

Operation

- Remove all dumped and refuse material in the riparian area.
- Rehabilitation of disturbed riparian areas habitat should commence immediately after construction is completed.
- Management measures to eradicate and control alien plants need to be informed by a invasive species management program.
- Grounds staff should be trained to recognize and eradicate potential invasive plants.
- Undertake yearly removal of aliens within the area (done in summer) until equilibration is reached. This may take several years.
- Management should periodically search the natural bush in the general vicinity of the Lodge site in order to detect whether snaring is taking place.
- Yellow light bulbs should be utilized as they attract fewer insects and arachnids.
- Outside lighting should preferably be directed away (or “inland”) from the riparian zone.
- Internal lights should be shielded by blinds/curtains.
- Control measures should be implemented (e.g. limit the number of individuals) access to the riparian zone
- No feeding of any animals is permitted anywhere.
- Noise should be kept to a minimum at night.

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
- J.1: Fossil Finds Procedure
- J.2: Services Report

APPENDIX A: MAPS
APPENDIX A.1: LOCALITY

APPENDIX A.2: LAYOUT MAP

APPENDIX B: PHOTOGRAPHS

APPENDIX C: FACILITY ILLUSTRATIONS

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

APPENDIX E: PUBLIC PARTICIPATION

APPENDIX I: SPECIALIST DECLARATION

APPENDIX J: ADDITIONAL INFORMATION
APPENDIX J.1: FOSSIL FIND PROCEDURE