

Application for Environmental Authorization for
Proposed Expansion to Pestana Kruger Lodge outside the Kruger National Park,
in Mpumalanga Province

APPENDIX F IMPACT ASSESSMENT TABLES

Compiled by:



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1. ASSESSMENT CRITERIA

The impacts anticipated to occur as a result of the proposed development are assessed/ evaluated to determine their significance. The following assessment criteria are used:

Extent (how far the impact extends):

- (1) **Very low:** within the site only
- (2) **Low:** within the local neighbourhoods
- (3) **Medium:** within the region
- (4) **High:** Nationally
- (5) **Very high:** Internationally

Duration (the timeframe over which the effects of the impact will be felt):

- (1) **Very short:** 0-2 years
- (2) **Short:** 3-5 years
- (3) **Medium:** 5-15 years
- (4) **Long:** >15 years
- (5) **Permanent**

Magnitude (the severity or size of the impact):

- (0) **None**
- (2) **Minor**
- (4) **Low**
- (6) **Moderate**
- (8) **High**
- (10) **Very High**

Probability (the likelihood of the impact actually occurring):

- (1) **Very improbable:** Less than 20% sure of the likelihood of an impact occurring
- (2) **Improbable:** 20-40% sure of the likelihood of an impact occurring
- (3) **Probable:** 40-60% sure of the likelihood of an impact occurring
- (4) **Highly probable:** 60-80% sure of the likelihood of that impact occurring
- (5) **Definite:** More than 80% sure of the likelihood of that impact occurring

The **significance** of the potential visual impact is determined by the sum of the individual scores for extent, duration and magnitude multiplied by the **probability** of the impact occurring i.e. **significance = (extent + duration + magnitude) x probability**.

The significance rating scale is interpreted as follows:

- (2-12) **Negligible:** Impact would be of a very low order. In the case of negative impacts, almost no mitigation and or remedial activity would be needed, and any minor steps, which might be needed, would be easy, cheap, and simple. In the case of positive impacts, alternative means would almost all likely be better, in one or a number of ways, than this means of achieving the benefit.
- (13-30) **Low:** Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and / or remedial activity would be either easily achieved or little would be required, or both. In case of positive impacts alternative means for achieving this benefit would likely be easier, cheaper, more effective, less time-consuming, or some combination of these.
- (31-56) **Moderate:** Impact would be real but not substantial. In the case of negative impacts, mitigation and / or remedial activity would be both feasible and fairly easily possible. In the case of positive impacts, other means of achieving these benefits would be about equal in time, cost, and effort.

- **(57-90) High:** Impacts of a substantial order. In the case of negative impacts, mitigation and / or remedial activity would be feasible but difficult, expensive, time-consuming or some combination of these. In the case of positive impacts, other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
- **(91-100) Very High:** Of the highest order possible. In the case of negative impacts, there would be no possible mitigation and / or remedial activity and in the case of positive impacts, there is no real alternative to achieving the benefit.

2. ENVIRONMENTAL IMPACT ASSESSMENT

The tables that follow detail the assessment of the significance of anticipated environmental impact during the entire project life cycle according to the impact assessment criteria. The findings of the various specialists appointed as part of the BAR process have informed the impact assessment below. These impacts have been supplemented with additional impacts as deemed appropriate by the EAP.

2.1 Impacts that may result from the Planning and Design Phase

Planning and design phase impacts refer to those impacts that may be mitigated through planning decisions. In this respect, the potential impacts are articulated as 'risks' rather than 'impacts', because in reality, no impact occurs on the ground at all during the planning phase. The rationale behind this approach is to demonstrate the mitigating effect of environmentally responsible and appropriate planning and design during this phase.

Potential impacts:	Extent (1-5)	Duration (1-5)	Magnitude (0-10)	Probability (1-5)	Significance	Proposed mitigation:	Extent (1-5)	Duration (1-5)	Magnitude (0-10)	Probability (1-5)	Significance
ALTERNATIVE A1 (PREFERRED ALTERNATIVE)											
Direct Impacts											
Ground water											
None.						•					
Hydrology (surface water)											
Risk to ecological function of the riparian habitat along the Crocodile River and other watercourses within the property due to the placement of structures and infrastructure within the habitat/ buffer zones.	2	4	8	4	56 M	<ul style="list-style-type: none"> • Planning and compliance, including ground water, surface water and storm water management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2). 	2	4	4	3	30 L
Risk to hydrological function (quality and fluctuation properties) along the Crocodile River and other watercourses due to activity and disturbance within the watercourse.	2	5	8	4	60 H		2	5	4	2	22 L

Soil											
Erosion risk to soils due to increased hard surface and associated increase in storm water runoff.	1	4	8	4	52 M	<ul style="list-style-type: none"> • Planning and compliance, including ground water, surface water, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2). 	1	4	4	2	18 L
Air											
None.						•					
Biodiversity (Flora)											
Risk to Granite Lowveld vegetation classified as Least Concern and associated loss of species richness due to the placement of structures and infrastructure.	3	4	6	4	52 M	<ul style="list-style-type: none"> • Planning and compliance, including protected species, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2). 	3	4	2	3	27 L
Risk to Lowveld Riverine Forest classified as Critically Endangered and a Vulnerable Ecosystem and associated loss of species richness due to the placement of structures and infrastructure.	3	5	10	4	72 H		3	5	6	3	42 M
Risk to sensitive habitats, specifically riparian zones to the placement of structures and infrastructure.	3	4	8	4	60 H		3	4	6	3	39 M
Risk to critical biodiversity areas due to vegetation clearing and the placement of structures and infrastructure. This pertains to the placement of chalets and the reservoir.	3	4	8	5	75 H		3	4	4	3	33 M
Loss of plant species of conservation importance: The tree <i>Elaeodendron transvaalense</i> is assessed as NT. The trees <i>Sclerocarya birrea</i> , <i>Balanites maughamii</i> , <i>Boscia albitrunca</i> , <i>Elaeodendron transvaalense</i> , <i>Philenoptera violacea</i> and <i>Combretum imberbe</i> are protected under the NFA and the tree <i>Berchemia zeyheri</i> and the succulents <i>Aloe marlothii</i> , <i>A. parvibracteata</i> and <i>Stapelia gigantea</i> are protected under the MNCA	3	5	8	4	64 H		3	5	4	2	24 L
Biodiversity (Fauna)											

Risk to habitat for conservation important fauna and habitat fragmentation due to removal and alteration of the existing habitat and the development of structures and infrastructure.	1	4	8	4	52 M	<ul style="list-style-type: none"> • Planning and compliance, including protected species, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2). 	1	4	4	3	27 L
Land Use & Agricultural Potential											
None.						•					
Heritage											
None.						•					
Visual											
Risk to visual quality of the surrounding area and sense of place due to the development of structures and infrastructure at the proposed site within an otherwise natural environment.	3	4	8	4	60 H	<ul style="list-style-type: none"> • Development footprint planning as per the EMPr (section 7.2). • Visual environment planning as per the EMPr (section 7.3). 	3	4	4	2	22 L
This pertains to the placement of the chalets and particularly the placement of the reservoir on the koppie.											
Risk of lighting impact at night due to the operation of the Resort.	3	4	8	4	60 H		3	4	4	3	33 M
Socio-economics											
None.						•					
Municipal services & traffic											
None.						•					
Indirect Impacts											
None											
Cumulative Impacts											
Biodiversity (Flora)											
Cumulative loss of Granite Lowveld vegetation classified as Least Concern and associated loss of species richness due to the placement of structures and infrastructure. This will result in the overall reduction of Granite Lowveld vegetation.	3	4	6	4	52 M	<ul style="list-style-type: none"> • Planning and compliance, including protected species, storm water management and waste management as per the EMPr (section 7.1). • Development footprint planning as per the EMPr (section 7.2). 	3	4	2	3	27 L
Cumulative loss of Lowveld Riverine forest classified	3	4	10	4	68		3	4	6	3	39

as Critically Endangered and associated loss of species richness due to the placement of structures and infrastructure. This will result in the overall reduction of Lowveld Riverine Forest.					H						M
Cumulative loss of sensitive habitats, specifically riparian zones. This will result in the overall reduction of riverine vegetation.	3	4	8	4	60 H		3	4	4	2	22 L
Cumulative loss of CBA: Irreplaceable	3	4	8	4	60 H		3	4	6	3	39 M
Cumulative Reduction of plant species of conservation importance: The tree <i>Elaeodendron transvaalense</i> is assessed as NT. The trees <i>Sclerocarya birrea</i> , <i>Balanites maughamii</i> , <i>Boscia albitrunca</i> , <i>Elaeodendron transvaalense</i> , <i>Philenoptera violacea</i> and <i>Combretum imberbe</i> are protected under the NFA and the tree <i>Berchemia zeyheri</i> and the succulents <i>Aloe marlothii</i> , <i>A. parvibracteata</i> and <i>Stapelia gigantea</i> are protected under the MNCA;	3	5	8	4	64 H		3	5	4	3	36 M
Biodiversity (Fauna)											
Cumulative loss of faunal habitat.	2	4	8	3	42 M	<ul style="list-style-type: none"> • Planning and compliance, including protected species, storm water management and waste management as per the EMP (section 7.1). • Development footprint planning as per the EMP (section 7.2). 	2	4	4	2	20 L

NO-PROJECT ALTERNATIVE											
Direct Impacts											
None.						•					
Indirect Impacts											
None.						•					
Cumulative Impacts											
None.						•					

2.2 Impacts that may result from the Construction Phase

Construction phase impacts refer to those impacts that may be mitigated through sound construction management.

Potential impacts:						Proposed mitigation:					
	Extent (1-5)	Duration (1-5)	Magnitude (0-10)	Probability (1-5)	Significance		Extent (1-5)	Duration (1-5)	Magnitude (0-10)	Probability (1-5)	Significance
ALTERNATIVE A1 (PREFERRED ALTERNATIVE)											
Direct Impacts											
Ground water											
Depletion of ground water due to overuse and waste during construction activities	3	2	6	3	33 M	<ul style="list-style-type: none"> Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) 	3	2	4	2	18 L
Pollution and contamination of ground water due to: <ul style="list-style-type: none"> Surface runoff Unmanaged sewage discharge, leaks and spills Solvent, paints and chemical spills Hydrocarbon and fuel leaks and spills 	3	2	8	3	39 M	<ul style="list-style-type: none"> 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). 	3	2	4	2	18 L
Hydrology (surface water)											
Disturbance and loss of ecological function of the habitat (physical structure) along the Crocodile River and other watercourses on site due to: <ul style="list-style-type: none"> Clearing and destruction of riparian and wetland vegetation Loss of fringing vegetation and erosion of denuded areas Invasion by alien invasive trees and plants 	2	2	8	4	48 M	<ul style="list-style-type: none"> Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) Site establishment, including site demarcation, accommodation, pollution control, access roads and protection of the riparian system as per the EMPr (section 8.2) Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). 	2	2	4	3	24 L

<ul style="list-style-type: none"> Alteration in natural fire regimes Shading of natural vegetation 						<ul style="list-style-type: none"> Stockpiles, storage and handling as per the EMPr (section 8.4). 					
Pollution and contamination of the Crocodile River and drainage lines on site due to: <ul style="list-style-type: none"> Unmanaged runoff of grey water, cement slurry and wash water. Unmanaged sewage discharge, leaks and spills Solvent, paints and chemical spills Litter and other inert construction waste. Hydrocarbon and fuel leaks and spills 	3	2	8	4	52 M	<ul style="list-style-type: none"> 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). 	3	2	4	2	18 L
Disturbance and loss of hydrological function (quality and fluctuation properties) of the Crocodile River and the drainage lines due to: <ul style="list-style-type: none"> Impeded and / or redirected flow due to activity within the water course Uncontrolled discharges into the water resource (storm water) Alteration of surface characteristics (roughness) due to activity within the water course Removal of stabilising vegetation Sedimentation and siltation from erosion 	2	5	6	4	52 M		2	5	4	2	22 L
Soil											
Soil contamination and pollution due to: <ul style="list-style-type: none"> Unmanaged surface runoff (grey water, cement slurry and wash water) Unmanaged sewage discharge, leaks and spills Solvent, paints and chemical spills Litter and other inert construction waste. Hydrocarbon and fuel leaks and spills 	1	2	6	4	36 M	<ul style="list-style-type: none"> Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) Site establishment, including site demarcation, accommodation, pollution control and access roads as per the EMPr (section 8.2) Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). 	1	2	4	2	14 L
Soil erosion by wind and rain due to:	1	4	6	3	33 M	<ul style="list-style-type: none"> Stockpiles, storage and handling as per the EMPr (section 8.4). 	1	4	4	2	18 L

<ul style="list-style-type: none"> • The removal of stabilising vegetation • Soil compaction by movement of construction vehicles, equipment and activities • Decrease in water infiltration and an increase of water runoff in construction areas • Disturbance of sensitive soils <p>This pertains to the construction of the chalets and reservoir.</p>						<ul style="list-style-type: none"> • 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). 					
Air											
Air pollution due emissions from construction vehicles and equipment.	3	1	4	4	32 M	<ul style="list-style-type: none"> • Site establishment, including site demarcation, accommodation, pollution control and access roads as per the EMPr (section 8.2) • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching as per the EMPr (section 8.5). • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including visual as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10). 	3	1	4	3	24 L
Dust liberated by general construction activities and movement of construction vehicles.	2	1	6	4	36 M		2	1	4	3	21 L
Smoke from open fires used by site staff for heating and cooking as well as from uncontrolled fires.	2	1	6	3	27 L		2	1	4	2	14 L
Biodiversity (Flora)											
<i>Removal of invader alien species found on site (positive impact).</i>	1	1	4	3	18 L	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora, and protection of the riparian system as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and 	1	1	4	4	24 L
Loss of Granite Lowveld vegetation classified as Least Concern due to the placement of structures and infrastructure and associated loss of species richness due to: <ul style="list-style-type: none"> • Site clearing ahead of construction • General construction activities and movement of 	1	4	4	5	45 M		1	4	2	4	28 L

<p>construction vehicles</p> <ul style="list-style-type: none"> • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Hydrocarbon and fuel leaks and spills • Litter and other inert construction waste 						<p>hazardous material as per the EMPr (section 8.3).</p> <ul style="list-style-type: none"> • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching as per the EMPr (section 8.5). • Alien plant control as per the EMPr (section 8.6). • Vehicles and equipment management as per the EMPr (section 8.7). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10). 					
<p>Loss of Lowveld Riverine Forest classified as Critically Endangered and a Vulnerable Ecosystem due to the placement of structures and infrastructure and associated loss of species richness due to:</p> <ul style="list-style-type: none"> • Site clearing ahead of construction • General construction activities and movement of construction vehicles • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Hydrocarbon and fuel leaks and spills • Litter and other inert construction waste <p>This pertains to the construction of certain chalet units and the pedestrian bridge and vehicle bridge.</p>	1	4	10	4	60 H		1	4	8	3	39 M
<p>Loss of critical biodiversity areas due to:</p> <ul style="list-style-type: none"> • Site clearing ahead of construction • General construction activities and movement of construction vehicles <p>This pertains to the construction of the chalets and the reservoir.</p>	3	4	8	5	75 H		3	4	6	3	39 M
<p>Increased harvesting of plant resources by construction workers for medicinal purposes.</p>	1	2	4	3	21 L		1	2	4	2	14 L
<p>Disturbance of sensitive habitats, specifically riparian zones due to:</p>	1	2	8	4	44 M		1	2	6	3	27 L

<ul style="list-style-type: none"> • Site clearing ahead of construction • General construction activities and movement of construction vehicles • Unmanaged sewage discharge, leaks and spills • Solvent, paints and chemical spills • Litter and other inert construction waste. • Hydrocarbon and fuel leaks and spills <p>This pertains to the construction of certain chalet units and the pedestrian bridge and vehicle bridge.</p>											
Development within the 200m conservation buffer for <i>Caesalpinia rostrate</i> .	1	2	8	4	44 M		1	2	4	3	21 L
<p>Destruction and damage to plant species of conservation importance: <i>Elaeodendron transvaalense</i>, <i>Sclerocarya birrea</i>, <i>Balanites maughamii</i>, <i>Boscia albitrunca</i>, <i>Elaeodendron transvaalense</i>, <i>Philenoptera violacea</i>, <i>Combretum imberbe</i>, <i>Berchemia zeyheri</i>, <i>Aloe marlothii</i>, <i>A. parvibracteata</i> and <i>Stapelia gigantea</i></p> <ul style="list-style-type: none"> • Site clearing ahead of construction • General construction activities and movement of construction vehicles <p>This pertains to the construction of the chalets adjacent to the Crocodile River and along the southern boundary.</p>	1	5	8	4	56 M		1	5	4	2	20 L
<p>Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas due to:</p> <ul style="list-style-type: none"> • Unmanaged cleared and disturbed areas, as well as, stockpiles • Unrehabilitated areas cleared and disturbed during construction 	1	4	8	4	52 M		1	4	6	2	22 L

<ul style="list-style-type: none"> Construction vehicles operating on other sites and carrying material and seed onto site <p>Bush encroachment is the process, which transforms grassy vegetation into a woody species-dominated one. This is recognised as a very serious problem throughout Sub-Saharan Africa, as it means that large areas of grazing lands are lost (or reduced in capacity), and it transforms habitats and reduces species diversity.</p>											
Biodiversity (Fauna)											
<p>Loss of faunal habitat for conservation-important fauna species particularly Riparian Forest found along the drainage lines and the Closed Woodland vegetation due to:</p> <ul style="list-style-type: none"> Site clearing ahead of construction General construction activities and movement of construction vehicles Construction dust Construction material, litter and other inert construction waste 	1	4	6	4	44 M	<ul style="list-style-type: none"> Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora, protection of the riparian system 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). 	1	4	4	2	18 L
Loss of general faunal habitat and ecological connectivity.	2	4	6	4	48 M		2	4	4	3	30 L
<p>Mortality of fauna due to:</p> <ul style="list-style-type: none"> Dangerous trenches and excavations Persecution and extermination Solvent, paints and chemical spills (poisoning) Construction material, litter and other inert construction waste (suffocation) Collisions with construction vehicles 	2	1	8	3	33 M		2	1	4	2	14 L
Poaching and snaring of fauna on site and in the greater Kruger National Park by construction staff.	2	1	8	3	33 M		2	1	6	2	18 L

Land Use & Agricultural Potential											
None.						•					
Heritage											
Damage to and / or destruction of archaeological, paleontological or historical artefacts unearthed during construction.	1	5	4	2	20 L	<ul style="list-style-type: none"> Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) Site establishment, including site demarcation, access roads and protection of cultural heritage as per the EMPr (section 8.2) 	1	5	2	1	8 N
Visual											
The visual impact of construction, lighting and dust on adjacent tourism developments and KNP tourists as well as, the presence of construction equipment, camps and workers	2	1	6	4	36 M	<ul style="list-style-type: none"> Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) Site establishment, including site demarcation, accommodation, pollution control and access roads as per the EMPr (section 8.2) Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). Stockpiles, storage and handling as per the EMPr (section 8.4). Erosion control, including water management, storm water management, excavation, backfilling and trenching as per the EMPr (section 8.5). Vehicles and equipment management as per the EMPr (section 8.7). 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). 	2	1	4	3	21 L
Visual impact of construction, lighting and dust on observers travelling along game drive routes within the KNP	2	1	6	3	27 L		2	1	4	2	14 L
The visual impact of construction, lighting and dust on locals using the District Road owing to the presence of construction equipment, camps and workers	2	1	6	3	27 M		2	1	4	2	14 L
Socio-economics											
<i>Stimulation of the local economy, especially the local service delivery industry (i.e. accommodation, catering, cleaning, transport and security, etc.). (positive impact)</i>	3	1	4	2	16 L	<ul style="list-style-type: none"> Socio-economic planning as per the EMPr (section 7.4). Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) 	3	1	4	3	24 L
<i>Creation of short-term employment and business</i>	2	1	6	3	27		2	1	6	4	36

<i>opportunities and the opportunity for skills development and on-site training. (Positive impact).</i> <i>Jobs and employment opportunities will be created, with a percentage being low and semi-skilled.</i>					<i>L</i>	<ul style="list-style-type: none"> • Site establishment, including accommodation and access roads as per the EMPr (section 8.2) • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including staff as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). 					<i>M</i>
Noise, dust and safety impacts and disturbance to KNP tourists and adjacent tourism development due to general construction activities and movement of construction vehicles	2	2	6	4	40 M		2	2	4	3	24 L
An increase in construction workers and associated increase in social problems for the community, including: <ul style="list-style-type: none"> • An increase in alcohol and drug use; • An increase in crime levels; • An increase in teenage and unwanted pregnancies; • An increase in prostitution; • An increase in sexually transmitted diseases (STDs). • An increase in vandalism. 	3	2	4	3	27 L		3	2	4	3	27 L
Increase in casual workers and associated increase in poaching.	2	1	6	4	36 M		2	1	4	4	28 L
Increased risk of veld fires due to the presence of construction workers on site.	3	1	8	4	48 M		2	1	4	3	24 L
Services & traffic											
Increase in traffic on the R570 and on other roads due to construction vehicles.	2	1	6	4	36 M	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including access roads as per the EMPr (section 8.2) • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including visual as per the EMPr (section 8.8). 	2	1	4	3	21 L
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.	2	1	6	4	36 M		2	1	2	3	15 L

Indirect Impacts												
Biodiversity (Flora)												
Loss of floral biodiversity, plant species of conservation importance and protected trees due to increased incidence of veld fires	3	2	6	3	33 L	• As above	3	2	4	2	18 L	
Socio-economics												
Loss of property and threat to human life due to increased incidence of veld fires	3	1	6	3	30 L	• As above	3	1	4	2	16 L	
Traffic and services												
Degradation of local roads due to the increase in the numbers of heavy vehicles.	2	1	6	4	36 M	• As above	2	1	4	3	21 L	
Cumulative Impacts												
Biodiversity (Flora)												
Cumulative loss of Granite Lowveld vegetation classified as Least Threatened and associated loss of species richness.	3	4	4	3	33 M	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora, and protection of the riparian system as per the EMPr (section 8.2) • Materials management, including solid, liquid and hazardous waste, concrete and cement work, fuel and hazardous material as per the EMPr (section 8.3). • Stockpiles, storage and handling as per the EMPr (section 8.4). • Erosion control, including water management, storm water management, excavation, backfilling and trenching as per the EMPr (section 8.5). • Alien plant control as per the EMPr (section 8.6). • Vehicles and equipment management as per the EMPr (section 8.7). • Fire management as per the EMPr (section 8.9). • Rehabilitation as per the EMPr (section 8.10). 	3	4	2	2	18 L	
Cumulative loss of Lowveld Riverine Forest classified as Least Threatened and associated loss of species richness.	3	4	6	3	39 M		3	4	4	2	22 L	
Cumulative loss of ecological function of sensitive habitats, specifically riparian zones.	3	4	8	3	45 M		3	4	6	2	26 L	
Cumulative reduction and damage to plant species of conservation importance: <i>Aloe spp.</i> and <i>Stapelia gigantea</i>	3	5	6	3	42 M		3	5	4	2	24 L	
Biodiversity (Fauna)												
Cumulative loss of faunal habitat, particularly	2	4	8	3	42	• Pre-construction planning, including planning and	2	4	6	2	20	

Riparian Forest found along the drainage lines and the Closed Woodland vegetation.					M	<ul style="list-style-type: none"> preparation as per the EMPr (section 8.1) • Site establishment, including site demarcation, accommodation, pollution control, access roads, protection of flora, protection of the riparian system 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). 					L
Socio-economics											
<i>Community upliftment and the opportunity to up-grade and improve skills levels in the area. (positive impact)</i>	3	1	2	2	12 N	<ul style="list-style-type: none"> • Socio-economic planning as per the EMPr (section 7.4). • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including accommodation and access roads as per the EMPr (section 8.2) • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including staff as per the EMPr (section 8.8). • Fire management as per the EMPr (section 8.9). 	3	1	4	3	24 L
Services & traffic											
Cumulative increase in traffic and the resultant noise, dust, and safety impacts on other road users, residents of the local community and adjacent tourism developments.	3	1	6	4	40 M	<ul style="list-style-type: none"> • Pre-construction planning, including planning and preparation as per the EMPr (section 8.1) • Site establishment, including access roads as per the EMPr (section 8.2) 	3	1	4	2	16 L

						<ul style="list-style-type: none"> • Vehicles and equipment management as per the EMPr (section 8.7). • Socio-economic management, including visual as per the EMPr (section 8.8). 					
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NO-PROJECT ALTERNATIVE											
Direct Impacts											
None						•					
Indirect Impacts											
None.						•					
Cumulative Impacts											
None.						•					

2.3 Impacts that may result from the Operational Phase

Operational phase impacts refer to those impacts that may be mitigated through effective and efficient operating procedures.

Potential impacts:	Proposed mitigation:										
	Extent (1-5)	Duration (1-5)	Magnitude (0-10)	Probability (1-5)	Significance						
ALTERNATIVE A1 (PREFERRED ALTERNATIVE)											
Direct Impacts											
Ground water											
Depletion of ground water resources due to over use and waste during operation.	3	4	4	3	33 M	<ul style="list-style-type: none"> Biodiversity management, including access roads and resource management as per the EMPr (section 9.1) 	3	4	2	2	18 L
Pollution and contamination of ground water due to: <ul style="list-style-type: none"> Unmanaged storm water runoff Unmanaged sewage discharge Sewage leaks and spills Herbicides, pesticides and fertilisers Discharge and spill of solvents, paints, chemicals and cleaning products Discharge and spill of hydrocarbons and fuel 	3	4	6	3	39 M	<ul style="list-style-type: none"> 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) 	3	4	4	2	22 L
Hydrology (surface water)											
Disturbance and loss of ecological function of the habitat (physical structure) along the Crocodile River and drainage lines due to: <ul style="list-style-type: none"> Encroachment of alien invasive species Uncontrolled vegetation clearing and access by staff and guests 	1	4	8	3	39 M	<ul style="list-style-type: none"> Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) Materials management, including solid, liquid and hazardous waste, fuel and hazardous material as per the EMPr (section 9.2) Erosion control as per the EMPr (section 9.3) 	1	4	4	2	18 L
Pollution and contamination of surface water due to:	2	4	8	3	42		2	4	4	2	20

<ul style="list-style-type: none"> • Unmanaged storm water runoff • Litter and uncontrolled waste • Sewage leaks and spills • Herbicides, pesticides and fertilisers • Discharge and spill of solvents, paints, chemicals and cleaning products • Discharge and spill of hydrocarbons and fuel 					M	<ul style="list-style-type: none"> • Vehicles and equipment management as per the EMPr (section 9.4) • Socio economic management, including staff management as per the EMPr (section 9.5) • Fire management as per the EMPr (section 9.6) 					L
Disturbance and loss of hydrological function (quality and fluctuation properties) along the Crocodile and drainage lines due to: <ul style="list-style-type: none"> • Uncontrolled discharges into the water resource (storm water) • Alteration of surface characteristics (roughness) due to activity within the water course (uncontrolled access by staff and guests) • Removal of stabilising vegetation (uncontrolled clearing and access by staff and guests) • Sedimentation and siltation from erosion 	1	4	8	3	39 M		1	4	4	2	18 L
Soil											
Soil contamination and pollution due to: <ul style="list-style-type: none"> • Unmanaged storm water runoff • Litter and uncontrolled waste • Sewage leaks and spills • Herbicides, pesticides and fertilisers • Discharge and spill of solvents, paints, chemicals and cleaning products • Discharge and spill of hydrocarbons and fuel 	1	4	8	3	39 M	<ul style="list-style-type: none"> • Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPr (section 9.2) • Erosion control as per the EMPr (section 9.3) • Vehicles and equipment management as per the EMPr (section 9.4) 	1	4	4	2	18 L
Soil erosion due to: <ul style="list-style-type: none"> • Soil compaction by uncontrolled movement of staff and guests (especially vehicles) • Runoff over exposed or cleared areas that 	1	4	6	4	44 M	<ul style="list-style-type: none"> • Socio economic management, including staff management as per the EMPr (section 9.5) 	1	4	4	2	18 L

have failed to rehabilitate.														
This is of particular relevance to the reservoir which will be located on a koppie which may be sensitive to erosion if rehabilitation is not successful.														
Air														
Air pollution by emissions from increased numbers of vehicles	3	4	4	3	33 M	• Socio economic management, including staff management as per the EMPr (section 9.5)	3	4	4	3	33 M			
Biodiversity (Flora)														
Loss of Granite Lowveld vegetation classified as Least Threatened and associated loss of species richness due to:	1	4	6	3	33 M	<ul style="list-style-type: none"> • Biodiversity management, including access roads, resource management, protection of flora and alien plant control as per the EMPr (section 9.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPr (section 9.2) • Erosion control as per the EMPr (section 9.3) • Vehicles and equipment management as per the EMPr (section 9.4) • Socio economic management, including staff management as per the EMPr (section 9.5) • Fire management as per the EMPr (section 9.6) 	1	4	4	2	18 L			
<ul style="list-style-type: none"> • Uncontrolled vegetation clearing and access by staff and guests • Encroachment of alien invasive species • Litter and waste 														
Loss of Lowveld Riverine Forest classified as Critically Endangered and associated loss of species richness due to:	1	4	8	3	39 M		1	4	6	2	22 L			
<ul style="list-style-type: none"> • Uncontrolled vegetation clearing and access by staff and guests • Encroachment of alien invasive species • Litter and waste 														
Loss of critical biodiversity areas due to:	1	4	8	4	52 M		1	4	4	3	27 L			
<ul style="list-style-type: none"> • Uncontrolled vegetation clearing and access by staff and visitors • Encroachment of alien invasive species • Litter and waste 														
Disturbance of sensitive habitats, specifically riparian zones due to:	1	4	6	4	44 M		1	4	4	2	18 L			

<ul style="list-style-type: none"> • Uncontrolled vegetation clearing and access by staff and guests • Encroachment of alien invasive species • Litter and waste 											
<p>Destruction and damage to plant species of conservation importance: <i>Elaeodendron transvaalense</i>, <i>Sclerocarya birrea</i>, <i>Balanites maughamii</i>, <i>Boscia albitrunca</i>, <i>Elaeodendron transvaalense</i>, <i>Philenoptera violacea</i>, <i>Combretum imberbe</i>, <i>Berchemia zeyheri</i>, <i>Aloe marlothii</i>, <i>A. parvibracteata</i> and <i>Stapelia gigantea</i></p>	1	5	8	3	42 M		1	5	4	2	20 L
<p>Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas in the event that the rehabilitation process is not successful.</p> <p>Colonisation and re-emergence of exotic vegetation / alien species and bush encroachment into disturbed soils and poorly rehabilitated areas. Alien invasive species tend to out-compete indigenous, slower growing species and could also result in unsuccessful rehabilitation.</p>	2	4	6	4	48 M		2	4	4	2	20 L
Biodiversity (Fauna)											
<p>Loss of faunal habitat due to:</p> <ul style="list-style-type: none"> • Uncontrolled vegetation clearing and access by staff and guests • Encroachment of alien invasive species • Litter and waste 	1	4	6	3	33 M	<ul style="list-style-type: none"> • Biodiversity management, including access roads, resource management, protection of flora, alien plant control and protection of fauna as per the EMPr (section 9.1) • Materials management, including solid liquid and hazardous waste, fuel and hazardous material as per the EMPr (section 9.2) 	1	4	4	2	18 L
<p>Faunal disturbances, displacement of taxa and changes in distribution and abundance due to:</p> <ul style="list-style-type: none"> • Uncontrolled vegetation clearing and access by staff and guests 	2	4	6	4	48 M	<ul style="list-style-type: none"> • Erosion control as per the EMPr (section 9.3) • Vehicles and equipment management as per the EMPr (section 9.4) 	2	4	4	2	20 L

<ul style="list-style-type: none"> General operations (activities) of the facility Noise from guests, staff and vehicles 						<ul style="list-style-type: none"> 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) 					
Mortality of fauna due to:	2	4	4	4	40 M		2	4	4	2	20 L
<ul style="list-style-type: none"> Persecution and extermination Solvents, paints, chemicals and cleaning products (poisoning) Litter and waste (suffocation) 											
Poaching and snaring of faunal species by staff.	2	4	6	3	36 M		2	4	6	2	24 L
Land Use & Agricultural Potential											
None.						•					
Heritage											
None.						•					
Visual											
Visual Impact of the proposed extension and infrastructure on KNP tourists using game drive routes	2	4	6	3	36 M	<ul style="list-style-type: none"> Socio economic management, including staff management and visual impact management as per the EMPr (section 9.5) 	2	4	2	2	16 L
Visual Impact of the proposed extension on protected and conservation areas (ie KNP)	2	4	6	3	36 L		2	4	4	2	20 L
Visual impact of the proposed extension on observers travelling along local roads .	2	4	6	3	36 M		2	4	4	2	20 L
This is of particular relevance to the reservoir as it will be placed on a small koppie.											
Visual Impact of the proposed extension and infrastructure on adjacent tourism developments.	2	4	6	3	36 M		2	4	2	2	16 L
Visual Impact of lighting of the proposed extension on adjacent tourism developments and observers residing in close proximity.	2	4	4	3	30 L		2	4	4	2	20 L
Impact on the character of the landscape and sense of place of the region	2	4	6	4	48 M		2	4	4	2	20 L
Socio-economics											
<i>Stimulation of the local economy, especially the</i>	3	4	4	2	22	• Socio economic management, including staff	3	4	4	3	33

<i>local service delivery industry (accommodation, catering, cleaning, transport, security etc.). (positive impact)</i>					<i>L</i>	management and visual impact management as per the EMPr (section 9.5)					<i>M</i>
<i>Creation of long term employment and business opportunities as well as opportunities for skills development and transfer (positive impact)</i>	2	4	6	4	48 <i>M</i>		2	4	8	4	56 <i>M</i>
<i>Creation of opportunities for local SMME's (positive impact)</i>	2	4	6	3	36 <i>M</i>		3	4	6	4	52 <i>M</i>
Noise impact on conservation areas within the region, specifically KNP	2	1	4	4	28 <i>M</i>		2	1	2	3	15 <i>L</i>
Service and traffic											
Operational cost of running services and infrastructure, specifically electricity	1	4	6	4	44 <i>M</i>	• Socio economic management, including staff management and visual impact management as per the EMPr (section 9.5)	1	4	6	4	44 <i>M</i>
Increase in traffic on the R570 and on other roads due to increased visitor numbers.	2	4	6	4	48 <i>M</i>		2	4	4	3	30 <i>L</i>
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.	3	4	6	4	52 <i>M</i>		3	4	4	2	22 <i>L</i>
Indirect Impacts											
Visual											
Visual impact of the proposed development of the Lodge on the sense of place and visual character of the region.	3	4	6	4	39 <i>M</i>	• Socio economic management, including staff management and visual impact management as per the EMPr (section 9.5)	2	4	2	4	24 <i>L</i>
Cumulative Impacts											
Biodiversity (Flora)											
Cumulative loss of Granite Bushveld vegetation classified as Least Threatened and associated loss of species richness.	3	4	6	3	39 <i>M</i>	• 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)	3	4	2	2	18 <i>L</i>
Cumulative loss of Lowveld Riverine Forest vegetation classified as Critically Endangered and associated loss of species richness.	3	4	8	3	45 <i>M</i>		3	4	4	2	22 <i>L</i>
Cumulative disturbance/loss of sensitive habitats, specifically riparian zones and CBA	3	4	8	4	60 <i>H</i>		3	4	4	2	22 <i>L</i>

Cumulative reduction and damage to plant species of conservation importance: <i>Elaeodendron transvaalense</i> , <i>Sclerocarya birrea</i> , <i>Balanites maughamii</i> , <i>Boscia albitrunca</i> , <i>Elaeodendron transvaalense</i> , <i>Philenoptera violacea</i> , <i>Combretum imberbe</i> , <i>Berchemia zeyheri</i> , <i>Aloe marlothii</i> , <i>A. parvibracteata</i> and <i>Stapelia gigantea</i>	3	5	6	3	42 M	<ul style="list-style-type: none"> Vehicles and equipment management as per the EMPr (section 9.4) Socio economic management, including staff management as per the EMPr (section 9.5) Fire management as per the EMPr (section 9.6) 	3	5	4	2	24 L
Visual											
The accumulation of built forms and within an otherwise natural environment.	3	4	6	4	52 M	<ul style="list-style-type: none"> Socio economic management, including staff management and visual impact management as per the EMPr (section 9.5) 	3	4	4	2	22 L
Socio-economics											
<i>Creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area (positive impact)</i>	3	4	6	3	39 M	<ul style="list-style-type: none"> Socio economic management, including staff management and visual impact management as per the EMPr (section 9.5) 	3	4	6	4	52 M
<i>Promotion of social and economic development in the local communities and improvement in the overall well being of the community (positive impact)</i>	3	4	4	2	14 L		3	4	4	3	27 L
Services and traffic											
Cumulative increase in traffic on the R570 and on other roads due to increased visitor numbers.	3	4	6	3	39 L	<ul style="list-style-type: none"> Planning and compliance, including waste management as per the EMPr (section 7.1) 	3	4	4	2	22 L
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.	3	4	4	3	33 L	<ul style="list-style-type: none"> 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) 	3	4	4	2	22 L

NO-PROJECT ALTERNATIVE

Direct Impacts

No stimulation of the local economy, especially the local service delivery industry.	3	4	6	4	52 M	• None.	3	4	6	4	52 M
No short term and long-term employment through skills development and on-site training.	3	4	6	4	52 M	• None.	3	4	6	4	52 M
Indirect Impacts											
None.						•					
Cumulative Impacts											
No opportunity to up-grade and improve skill levels in the area.	3	4	6	4	52 M	• None.	3	4	6	4	52 M

2.4 Decommissioning Phase

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