

Application for Environmental Authorisation for the Proposed Development Of  
Nature Estate For Residential Purposes, Located North Of Komatipoort Town In  
Mpumalanga Province

APPENDIX G 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:

- **(0-12) 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.
- *Positive impacts*

## 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
<b>ALTERNATIVE A1 (PREFERRED ALTERNATIVE)- PLANNING AND DESIGN</b>											
<b>Direct Impacts</b>											
<b>Ground water</b>											
None.						•					
<b>Hydrology (surface water)</b>											
Risk to ecological function of the Crocodile River and drainage lines due to possible placement of structures and infrastructure within the habitat.  This pertains to the placement of 3 birdhides and certain river front erven.	1	4	8	5	65 H	• Hydrology, including ground water, surface water and storm water management as per the EMPr (section 7.1).	1	4	4	3	27 L
Risk to hydrological function (quality and fluctuation properties) along the Crocodile River and drainage lines due to activity and disturbance near the	2	4	6	5	60 H		2	3	4	4	36 M

watercourse.														
<b>Soil</b>														
Erosion risk to soils due to increased hard surface, associated increase in storm water runoff.	1	4	8	4	52 M	• Hydrology, including ground water, surface water and storm water management as per the EMPr (section 7.1).	1	4	4	3	27 L			
<b>Air</b>														
None.						•								
<b>Biodiversity (Flora)</b>														
Risk to critical biodiversity areas and ecological support areas due to vegetation clearing and the placement of structures and infrastructure.  Only a small pocket in the far southern portion of the site is classified as a CBA, the remainder of the site is ESA: protected area buffer. No development is taking place within the CBA.	3	4	4	5	55 M	• Biodiversity Management, including storm water management and waste management as per the EMPr (section 7.2).	3	4	2	3	27 L			
Risk to sensitive habitats, specifically the riparian habitat due to the placement of structures and infrastructure.  This pertains to the placement of 3 birdhides, certain bush erven and the new access road.	2	4	8	5	70 H		2	4	4	3	30 L			
Risk to Conservation Important Species and protected trees. i.e. <i>Aloe komatiensis</i> (VU), and, <i>Dalbergia melanoxylon</i> (NT), <i>Sclerocarya birrea</i> , <i>Boscia albitrunca</i> , <i>Combretum imberbe</i> , <i>Azelia quanzensis</i> , <i>Philenoptera violacea</i> and <i>Elaeodendron transvaalense</i> , <i>Aloe chabaudii</i> , <i>A. marlothii</i> , <i>A. spicata</i> , <i>A. komatiensis</i> , <i>Eulophia petersii</i> , <i>Stapelia gigantea</i> and <i>Pachypodium saundersii</i> and the trees <i>Spirostachys africana</i> and <i>Berchemia zeyheri</i> due to the placement of structures and infrastructure within the habitat.	2	4	8	3	42 M		2	4	4	2	20 L			
<b>Biodiversity (Fauna)</b>														
Risk of habitat fragmentation due to removal and	1	4	6	4	44	• Biodiversity Management, including storm water	1	4	4	3	27			

alteration of the habitat and the development of structures and infrastructure.					M	management and waste management as per the EMPr (section 7.2).						L
<b>Land Use &amp; Agricultural Potential</b>												
None.						•						
<b>Visual</b>												
Risk to visual quality of the surrounding area and sense of place due to the development of structures and infrastructure at the property within an otherwise natural environment.	3	4	6	4	52 M	• Visual planning as per the EMPr (section 7.2.5).	3	4	4	2		22 L
<b>Socio-economics</b>												
None.						•						
<b>Municipal services &amp; traffic</b>												
None.						•						
<b>Indirect Impacts</b>												
None												
<b>Cumulative Impacts</b>												
<b>Biodiversity (Flora)</b>												
Cumulative reduction of Conservation Important Species and protected trees. i.e. <i>Aloe komatiensis</i> (VU), and <i>Dalbergia melanoxylon</i> (NT), <i>Sclerocarya birrea</i> , <i>Boscia albitrunca</i> , <i>Combretum imberbe</i> , <i>Azelia quanzensis</i> , <i>Philenoptera violacea</i> and <i>Elaeodendron transvaalense</i> , <i>Aloe chabaudii</i> , <i>A. marlothii</i> , <i>A. spicata</i> , <i>A. komatiensis</i> , <i>Eulophia petersii</i> , <i>Stapelia gigantea</i> and <i>Pachypodium saundersii</i> and the trees <i>Spirostachys africana</i> and <i>Berchemia zeyheri</i> . This will result in the overall loss of these species.	3	5	8	4	64 H	• Biodiversity Management, including water management and waste management as per the EMPr (section 7.2).	3	5	6	2		28 L
<b>Biodiversity (Fauna)</b>												
Cumulative loss of faunal habitat.	2	4	8	3	42 M	• Biodiversity Management, including water management and waste management as per the EMPr (section 7.2).	2	4	4	2		20 L

NO-PROJECT ALTERNATIVE												
<b>Direct Impacts</b>												
None.												
<b>Indirect Impacts</b>												
None.												
<b>Cumulative Impacts</b>												
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:	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
<b>ALTERNATIVE A1 (PREFERRED ALTERNATIVE) - CONSTRUCTION PHASE</b>											
<b>Direct Impacts</b>											
<b>Ground water</b>											
Depletion of ground water due to overuse and waste during construction activities	2	1	6	3	27 L	<ul style="list-style-type: none"> <li>Pre-construction planning as per the EMPr (section 8.1)</li> <li>Hydrology, including groundwater as per the EMPr (section 8.2).</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> </ul>	2	1	4	2	14 L
Pollution and contamination of ground water due to: <ul style="list-style-type: none"> <li>Surface runoff</li> <li>Unmanaged sewage discharge, leaks and spills</li> <li>Solvent, paints and chemical spills</li> <li>Hydrocarbon and fuel leaks and spills</li> </ul>	2	1	8	3	33 M		2	1	6	2	18 L
<b>Hydrology (surface water)</b>											
Disturbance and loss of ecological function of the habitat (physical structure) of the Crocodile river and along the drainage lines due to:	1	1	10	4	48 M	<ul style="list-style-type: none"> <li>Pre-construction planning as per the EMPr (section 8.1)</li> </ul>	1	1	6	2	16 L

<ul style="list-style-type: none"> <li>• Clearing and destruction of riparian and wetland vegetation</li> <li>• Loss of fringing vegetation and erosion of denuded areas</li> <li>• Invasion by alien invasive trees and plants</li> <li>• Alteration in natural fire regimes</li> <li>• Shading of natural vegetation</li> <li>• Destabilization of banks</li> </ul>						<ul style="list-style-type: none"> <li>• Hydrology, including surfacewater as per the EMPr (section 8.2).</li> <li>• Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> </ul>					
<p>Disturbance and loss of hydrological function (quality and fluctuation properties) along the Crocodile River and drainage lines due to:</p> <ul style="list-style-type: none"> <li>• Destruction of riparian habitat</li> <li>• Alteration of surface characteristics (roughness) due to activity within the water course (uncontrolled access by workers)</li> <li>• Removal of stabilising vegetation (uncontrolled clearing and access by workers)</li> <li>• Sedimentation and siltation from erosion</li> </ul>	1	1	10	4	48 M		1	1	6	3	24 L
<p>Flow modification due to concentrating flows and storm water runoff from hard surfaces especially roads.</p>	1	1	8	4	40 M		1	1	4	3	18 L



Pollution and contamination of the Crocodile river and drainage lines due to:	3	1	10	4	56 M		3	1	6	3	30 L
<ul style="list-style-type: none"> <li>Unmanaged runoff of grey water, cement slurry and wash water.</li> <li>Unmanaged sewage discharge, leaks and spills</li> <li>Solvent, paints and chemical spills</li> <li>Litter and other inert construction waste.</li> <li>Hydrocarbon and fuel leaks and spills</li> </ul>											
<b>Soil</b>											
Soil contamination and pollution due to:	1	1	8	4	40 M	<ul style="list-style-type: none"> <li>Pre-construction planning as per the EMPr (section 8.1)</li> <li>Biodiversity Management, specifically soil contamination and erosion as per the EMPr (section 8.3.1 and 8.3.2)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> </ul>	1	1	4	3	18 L
<ul style="list-style-type: none"> <li>Unmanaged surface runoff (grey water, cement slurry and wash water)</li> <li>Unmanaged sewage discharge, leaks and spills</li> <li>Solvent, paints and chemical spills</li> <li>Litter and other inert construction waste.</li> <li>Hydrocarbon and fuel leaks and spills</li> </ul>											
Soil erosion by wind and rain due to:	1	4	6	3	33 M		1	4	4	2	18 L
<ul style="list-style-type: none"> <li>The removal of stabilising vegetation</li> <li>Soil compaction by movement of construction vehicles, equipment and activities</li> <li>Decrease in water infiltration and an increase of water runoff in construction areas</li> <li>Disturbance of sensitive soils</li> </ul>											
Soil compaction and increased risk of sediment transport and erosion.	1	1	8	4	40 M		1	1	4	3	18 L
<b>Air</b>											
Air pollution due emissions from construction vehicles and equipment.	3	1	4	4	32 M	<ul style="list-style-type: none"> <li>Pre-construction planning as per the EMPr (section 8.1)</li> <li>Biodiversity Management, specifically air quality as per the EMPr (section 8.3.4)</li> <li>Waste management plan and storm water</li> </ul>	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	2	1	6	4	36		2	1	4	3	21

and cooking as well as from uncontrolled fires.					M	management plan (Section 10 and 11 of the EMPr) • Fire protection (Section 12 of EMPr)						L
<b>Biodiversity (Flora)</b>												
<i>Removal of invader alien species (positive impact).</i> <i>At least 18 declared invasive species were recorded during fieldwork.</i>	1	1	6	3	24 L	<ul style="list-style-type: none"> <li>Pre-construction planning as per the EMPr (section 8.1)</li> <li>Biodiversity Management, specifically flora as per the EMPr (section 8.3.5, 8.3.6, 8.3.7, 8.3.8)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	1	1	8	5	50 M	
Loss of critical biodiversity areas and ecological support areas: protected area buffer due to:  <ul style="list-style-type: none"> <li>Site clearing ahead of construction</li> <li>General construction activities and movement of construction vehicles</li> </ul> <i>Only a small pocket of CBA is located in the far southern portion of the site. No infrastructure will be located within the CBA.</i>	1	5	6	4	48 M		1	5	4	3	30 L	
Destruction of riparian areas due to placement of infrastructure within this habitat which will result in habitat and biodiversity loss.  <i>This is especially relevant for the 3 bird hides, a few bush erven and the new access road.</i>	1	5	8	5	70 H		1	5	6	3	36 M	
Disturbance and impacts on the riparian areas due to vegetation removal and the generation of dust and the placement of structures within this habitat. This could lead to: <ul style="list-style-type: none"> <li>Decreased visibility due to clouding of the water column;</li> <li>Decreased light penetration;</li> <li>Siltation of fine sediment substrates, gravel substrates and inter-substrate spaces; and</li> <li>The decrease in habitat availability.</li> </ul>	1	2	10	4	52 M		1	2	6	3	27 L	
Disturbance of sensitive habitats such as riparian	1	5	8	5	70		1	5	6	4	48	

<p>and high biodiversity areas due to:</p> <ul style="list-style-type: none"> <li>• Site clearing ahead of construction</li> <li>• General construction activities and movement of construction vehicles</li> <li>• Unmanaged sewage discharge, leaks and spills</li> <li>• Solvent, paints and chemical spills</li> <li>• Litter and other inert construction waste.</li> <li>• Hydrocarbon and fuel leaks and spills</li> </ul> <p><i>A small number of the bush erven and the access road are located within the buffer zone of the high biodiversity areas or within the high biodiversity areas.</i></p>					H						M
<p>Destruction and damage to Conservation Important Species and protected trees. i.e. <i>Aloe komatiensis</i> (VU), and <i>Dalbergia melanoxylon</i> (NT), <i>Sclerocarya birrea</i>, <i>Boscia albitrunca</i>, <i>Combretum imberbe</i>, <i>Azelia quanzensis</i>, <i>Philenoptera violacea</i> and <i>Elaeodendron transvaalense</i>, <i>Aloe chabaudii</i>, <i>A. marlothii</i>, <i>A. spicata</i>, <i>A. komatiensis</i>, <i>Eulophia petersii</i>, <i>Stapelia gigantea</i> and <i>Pachypodium saundersii</i> and the trees <i>Spirostachys africana</i> and <i>Berchemia zeyheri</i> due to:</p> <ul style="list-style-type: none"> <li>• Site clearing ahead of construction</li> <li>• General construction activities and movement of construction vehicles</li> </ul>	1	5	10	3	48 M		1	5	6	2	24 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"> <li>• Unmanaged cleared and disturbed areas, as well as, stockpiles</li> <li>• Unrehabilitated areas cleared and disturbed during construction</li> </ul>	1	4	8	4	52 M		1	4	8	2	26 L

<ul style="list-style-type: none"> <li>Construction vehicles operating on other sites and carrying material and seed onto site</li> </ul> <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>											
<b>Biodiversity (Fauna)</b>											
<p>Loss of faunal habitat which acts as a wildlife corridor and is an important faunal habitat for conservation-important fauna due to:</p> <ul style="list-style-type: none"> <li>Site clearing ahead of construction</li> <li>General construction activities and movement of construction vehicles</li> <li>Construction dust</li> <li>Construction material, litter and other inert construction waste</li> </ul>	1	4	8	4	52 M	<ul style="list-style-type: none"> <li>Pre-construction planning as per the EMPr (section 8.1)</li> <li>Biodiversity Management, specifically fauna as per the EMPr (section 8.3.9, 8.3.10, 8.3.11)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	1	4	6	2	22 L

Impoverishment of populations of important fauna confirmed on site i.e. one VU species of reptile was confirmed during fieldwork, namely Nile Crocodile and two CR birds (Hooded and White-backed Vultures) and one EN bird (Bateleur) were also confirmed overhead.	1	2	8	4	44 M		1	2	6	3	27 L
Disturbance of fauna along the Crocodile River within KNP due to noise from worker and construction vehicles.	1	1	8	5	50 M		1	1	6	4	32 M
Loss of general faunal habitat and ecological connectivity.	2	4	8	4	56 M		2	4	4	2	20 L
Mortality of fauna due to: <ul style="list-style-type: none"> <li>• Dangerous trenches and excavations</li> <li>• Persecution and extermination</li> <li>• Solvent, paints and chemical spills (poisoning)</li> </ul>	2	1	8	4	44 M		2	1	6	2	18 L

<ul style="list-style-type: none"> <li>Construction material, litter and other inert construction waste (suffocation)</li> <li>Collisions with construction vehicles</li> </ul>											
Increased illegal harvesting of plant and animal resources due to increased access to the site, influx of contract workers into the area	2	1	10	4	52 M		2	1	8	2	22 L
Poaching and snaring of fauna on site by construction staff.	2	1	10	4	52 M		2	1	6	3	27 L
Increased opportunity for smuggling of poached items out of the site and KNP due to regular presence of large construction vehicles.	2	1	10	3	39 M		2	1	6	3	27 L
<b>Land Use &amp; Agricultural Potential</b>											
None.						•					
<b>Heritage</b>											
<i>Possible discovery of new important artefacts (positive impact)</i>	1	1	6	2	16 L	<ul style="list-style-type: none"> <li>Pre-construction planning as per the EMPr (section 8.1)</li> </ul>	1	1	6	2	16 L
Damage to and / or destruction of archaeological, paleontological or historical artefacts unearthed during construction due to: <ul style="list-style-type: none"> <li>Site clearing ahead of construction</li> <li>General construction activities and movement of construction vehicles</li> </ul>	1	5	6	2	24 L	<ul style="list-style-type: none"> <li>Heritage Management, specifically fauna as per the EMPr (section 8.4)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	1	5	2	1	8 N
<b>Visual</b>											
Visual impact of construction, lighting and dust on sensitive visual receptors i.i. Shishangeni Lodge owing to the presence of construction equipment, camps and workers.	2	1	8	4	44 M	<ul style="list-style-type: none"> <li>Pre-construction planning as per the EMPr (section 8.1)</li> <li>Socio-economic Management, specifically visual impact as per the EMPr (section 8.5.1)</li> </ul>	2	1	2	2	10 N
Visual impact of construction, lighting and dust on conservation areas within the region (KNP).	3	1	6	4	40 M	<ul style="list-style-type: none"> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	3	1	4	3	24 L
<b>Socio-economics</b>											
<i>Stimulation of the local economy, especially the</i>	3	1	4	2	16	• Pre-construction planning as per the EMPr (section	3	1	4	3	24

<i>local service delivery industry (i.e. accommodation, catering, cleaning, transport and security, etc.). (positive impact)</i>					L	8.1) <ul style="list-style-type: none"> <li>• Socio-economic Management as per the EMPr (section 8.5)</li> <li>• Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>• Fire protection (Section 12 of EMPr)</li> </ul>					L
<i>Creation of short-term employment and business opportunities and the opportunity for skills development and on-site training. (Positive impact).</i>	2	1	6	3	27 L		2	1	6	4	36 M
<i>Jobs and employment opportunities will be created, with a percentage being low and semi-skilled.</i>											
Noise, dust and safety impacts and disturbance to adjacent landowners due to general construction activities and movement of construction vehicles.	2	1	8	4	44 M		2	1	6	3	27 L
An increase in construction workers and associated increase in social problems for the community, including: <ul style="list-style-type: none"> <li>• An increase in alcohol and drug use;</li> <li>• An increase in crime levels;</li> <li>• An increase in teenage and unwanted pregnancies;</li> <li>• An increase in prostitution;</li> <li>• An increase in sexually transmitted diseases (STDs).</li> <li>• An increase in vandalism.</li> </ul>	3	1	4	3	24 L		3	1	4	2	16 L
Increase in casual workers and associated increase in poaching.	1	1	8	4	40 M		1	1	6	3	24 L
Increased risk of veld fires due to the presence of construction workers on site.	2	1	10	4	52 M		2	1	4	3	21 L
<b>Services &amp; traffic</b>											
Increase in traffic on the surrounding local roads due to construction vehicles.	2	1	6	4	36 M	<ul style="list-style-type: none"> <li>• Pre-construction planning as per the EMPr (section 8.1)</li> <li>• Socio-economic Management specifically services and traffic as per the EMPr (section 8.5.4)</li> <li>• Waste management plan and storm water</li> </ul>	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	2	1	6	4	36 M		2	1	4	3	21 L

adjacent landowners.						management plan (Section 10 and 11 of the EMPr)					
<b>Indirect Impacts</b>											
<b>Biodiversity (Flora)</b>											
Loss of floral biodiversity, Conservation Important Species and protected trees due to increased incidence of veld fires	3	4	8	3	45 M	• As above	3	4	4	2	22 L
<b>Biodiversity (Fauna)</b>											
Loss of faunal biodiversity due to increased incidence of veld fires	3	1	8	3	36 M	• As above	3	1	6	2	20 L
<b>Socio-economics</b>											
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
<b>Traffic and services</b>											
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
<b>Cumulative Impacts</b>											
<b>Biodiversity (Flora)</b>											
Cumulative loss of critical biodiversity areas and ecological support areas	3	4	8	3	45 M	<ul style="list-style-type: none"> <li>• Pre-construction planning as per the EMPr (section 8.1)</li> <li>• Biodiversity Management, specifically flora as per the EMPr (section 8.3.5, 8.3.6, 8.3.7, 8.3.8)</li> <li>• Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>• Fire protection (Section 12 of EMPr)</li> </ul>	3	4	4	3	33 M
Cumulative loss of ecological function of sensitive habitats.	3	4	8	4	60 H		3	4	6	2	26 L
Cumulative reduction and damage to Conservation Important Species and protected trees. i.e. <i>Aloe komatiensis</i> (VU), and <i>Dalbergia melanoxylon</i> (NT), <i>Sclerocarya birrea</i> , <i>Boscia albitrunca</i> , <i>Combretum imberbe</i> , <i>Azelia quanzensis</i> , <i>Philenoptera violacea</i> and <i>Elaeodendron transvaalense</i> , <i>Aloe chabaudii</i> , <i>A. marlothii</i> , <i>A. spicata</i> , <i>A. komatiensis</i> , <i>Eulophia petersii</i> , <i>Stapelia gigantea</i> and <i>Pachypodium saundersii</i> and the trees <i>Spirostachys africana</i> and <i>Berchemia zeyheri</i>	3	5	8	4	64 H		3	5	4	2	24 L
<b>Biodiversity (Fauna)</b>											
Cumulative loss of faunal habitat.	2	4	8	3	42 M	• Pre-construction planning as per the EMPr (section 8.1)	2	4	6	2	24 L



						<ul style="list-style-type: none"> <li>Biodiversity Management, specifically fauna as per the EMPr (section 8.3.9, 8.3.10, 8.3.11)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>					
<b>Socio-economics</b>											
<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"> <li>Pre-construction planning as per the EMPr (section 8.1)</li> <li>Socio-economic Management as per the EMPr (section 8.5)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	3	1	4	3	24 L
<b>Services &amp; traffic</b>											
Cumulative increase in traffic and the resultant noise, dust, and safety impacts on other road users, residents of the local community and adjacent landowners.	3	1	6	4	40 M	<ul style="list-style-type: none"> <li>Pre-construction planning as per the EMPr (section 8.1)</li> <li>Socio-economic Management specifically services and traffic as per the EMPr (section 8.5.4)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> </ul>	3	1	4	2	16 L

<b>NO-PROJECT ALTERNATIVE</b>											
<b>Direct Impacts</b>											
None						•					
<b>Indirect Impacts</b>											
None.						•					
<b>Cumulative Impacts</b>											
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:	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
<b>ALTERNATIVE A1 (PREFERRED ALTERNATIVE) – OPERATIONAL PHASE</b>											
<b>Direct Impacts</b>											
<b>Ground water</b>											
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"> <li>Hydrology as per the EMPr (section 9.1)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> </ul>	3	4	2	2	18 L
Pollution and contamination of ground water due to: <ul style="list-style-type: none"> <li>Unmanaged storm water runoff</li> <li>Unmanaged sewage discharge</li> <li>Sewage leaks and spills</li> <li>Herbicides, pesticides and fertilisers</li> <li>Discharge and spill of solvents, paints, chemicals and cleaning products</li> <li>Discharge and spill of hydrocarbons and fuel</li> </ul>	3	4	8	3	45 M		3	4	4	2	22 L
<b>Hydrology (surface water)</b>											
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"> <li>Encroachment of alien invasive species</li> <li>Uncontrolled vegetation clearing and access by</li> </ul>	1	4	8	3	39 M	<ul style="list-style-type: none"> <li>Hydrology as per the EMPr (section 9.1)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	1	4	4	2	18 L

staff and residents										
Pollution and contamination of surface water due to:	2	4	10	3	48 M					
<ul style="list-style-type: none"> <li>• Unmanaged storm water runoff</li> <li>• Litter and uncontrolled waste</li> <li>• Sewage leaks and spills</li> <li>• Herbicides, pesticides and fertilisers</li> <li>• Discharge and spill of solvents, paints, chemicals and cleaning products</li> <li>• Discharge and spill of hydrocarbons and fuel</li> </ul>										
Disturbance and loss of hydrological function (quality and fluctuation properties) along the Crocodile River and drainage lines due to:	1	4	8	3	39 M					
<ul style="list-style-type: none"> <li>• Uncontrolled discharges into the water resource (storm water)</li> <li>• Alteration of surface characteristics (roughness) due to activity within the water course (uncontrolled access by staff and visitors)</li> <li>• Removal of stabilising vegetation (uncontrolled clearing and access by staff and residents)</li> <li>• Sedimentation and siltation from erosion</li> </ul>										
<b>Soil</b>										
Soil contamination and pollution due to:	1	4	6	3	33 M	<ul style="list-style-type: none"> <li>• Biodiversity management, specifically soil as per the EMPr (section 9.2.1 and 9.2.2)</li> <li>• Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>• Fire protection (Section 12 of EMPr)</li> </ul>				
<ul style="list-style-type: none"> <li>• Unmanaged storm water runoff</li> <li>• Litter and uncontrolled waste</li> <li>• Sewage leaks and spills</li> <li>• Herbicides, pesticides and fertilisers</li> <li>• Discharge and spill of solvents, paints, chemicals and cleaning products</li> <li>• Discharge and spill of hydrocarbons and fuel</li> </ul>										
Soil erosion due to:	1	4	8	3	39 M					

<ul style="list-style-type: none"> <li>• Soil compaction by uncontrolled movement of staff and visitors (especially vehicles)</li> <li>• Runoff over exposed or cleared areas that have failed to rehabilitate.</li> <li>• Disturbance of sensitive soils by uncontrolled movement of staff and residents (especially vehicles)</li> </ul>											
<b>Air</b>											
Air pollution by emissions from increased numbers of private vehicles.	3	4	4	3	33 M	<ul style="list-style-type: none"> <li>• Biodiversity management, specifically air quality as per the EMPr (section 9.2.3)</li> <li>• Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>• Fire protection (Section 12 of EMPr)</li> </ul>	3	4	4	3	33 M
<b>Biodiversity (Flora)</b>											
Loss of critical biodiversity areas and ecological support areas due to: <ul style="list-style-type: none"> <li>• Uncontrolled vegetation clearing and access by staff and residents</li> <li>• Encroachment of alien invasive species</li> <li>• Litter and waste</li> </ul>	1	4	8	3	39 M	<ul style="list-style-type: none"> <li>• Biodiversity management, specifically flora as per the EMPr (section 9.2.4, 9.2.5 and 9.2.6)</li> <li>• Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>• Fire protection (Section 12 of EMPr)</li> </ul>	1	4	4	2	18 L
Disturbance of sensitive habitats such as riparian and high biodiversity areas due to: <ul style="list-style-type: none"> <li>• Uncontrolled vegetation clearing and access by staff and residents</li> <li>• Encroachment of alien invasive species</li> <li>• Litter and waste</li> </ul>	1	4	8	3	39 M		1	4	4	3	27 L
Destruction and damage to Conservation Important Species and protected trees. i.e. <i>Aloe komatiensis</i> (VU), and <i>Dalbergia melanoxylon</i> (NT), <i>Sclerocarya birrea</i> , <i>Boscia albitrunca</i> , <i>Combretum imberbe</i> , <i>Azalia quanzensis</i> , <i>Philenoptera violacea</i> and <i>Elaeodendron transvaalense</i> , <i>Aloe chabaudii</i> , A.	1	5	8	3	42 M		1	5	4	2	20 L

<i>marlothii</i> , <i>A. spicata</i> , <i>A. komatiensis</i> , <i>Eulophia petersii</i> , <i>Stapelia gigantea</i> and <i>Pachypodium saundersii</i> and the trees <i>Spirostachys africana</i> and <i>Berchemia zeyheri</i> due to uncontrolled vegetation clearing and access by staff and visitors.												
Increase in exotic vegetation/alien species and bush encroachment into disturbed soils and areas in the event that the rehabilitation process is not successful.  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.	1	4	8	3	39 M			1	4	6	2	22 L
<b>Biodiversity (Fauna)</b>												
Loss of faunal habitat due to:  <ul style="list-style-type: none"> <li>Uncontrolled vegetation and bush clearing and access by staff and residents</li> <li>Encroachment of alien invasive species</li> <li>Litter and waste</li> </ul>	1	4	6	3	33 M	<ul style="list-style-type: none"> <li>Biodiversity management, specifically flora as per the EMPr (section 9.2.7, 9.2.8 and 9.2.9, 9.2.10)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>		1	4	4	2	18 L
Faunal disturbances especially along the Crocodile river in KNP, displacement of taxa and changes in distribution and abundance due to:  <ul style="list-style-type: none"> <li>Uncontrolled vegetation and bush clearing and access by staff and residents</li> <li>General operations (activities) of the facility</li> <li>Noise from staff and vehicles</li> <li>Night drives</li> <li>Perimeter safety fences</li> </ul>	1	4	6	4	44 M			1	4	4	3	27 L
Mortality of fauna due to:	2	4	4	4	40 M			2	4	4	2	20 L

<ul style="list-style-type: none"> <li>Persecution and extermination</li> <li>Solvents, paints, chemicals and cleaning products (poisoning)</li> <li>Litter and waste (suffocation)</li> </ul>															
Poaching and snaring of faunal species by staff.	2	4	6	3	36 M						2	4	6	2	24 L
<b>Land Use &amp; Agricultural Potential</b>															
None.															
<b>Visual</b>															
Potential visual impact on sensitive visual receptors in close proximity to the proposed developments i.e Shishangeni Lodge.	1	4	8	3	39 M	<ul style="list-style-type: none"> <li>Socio-economic management, specifically visual impact as per the EMPr (section 9.3.1)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	1	4	2	2	14 L				
Potential visual impact on sensitive visual receptors within the region	2	4	4	3	30 L		2	4	4	2	20 L				
Potential visual impact on protected and conservation areas (i.e. Kruger National Park) within the study area.	2	4	8	3	42 M		2	4	4	2	20 L				
The potential visual impact of safety and security lighting of the developments at night on sensitive visual receptors in close proximity i.e. Shishangeni Lodge and KNP	2	4	8	3	42 M		2	4	2	2	16 L				
<b>Socio-economics</b>															
<i>Stimulation of the local economy, especially the local service delivery industry (accommodation, catering, cleaning, transport, security etc.). (positive impact)</i>	3	4	4	2	22 L	<ul style="list-style-type: none"> <li>Socio-economic management as per the EMPr (section 9.3)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	3	4	4	3	33 M				
<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 M		2	4	8	4	56 H				
<i>Creation of opportunities for local SMME's (positive impact)</i>	2	4	6	3	36 M		2	4	6	4	48 M				
Impact on adjacent land uses, activities and Shishangeni Lodge.	2	4	2	3	24 L		2	4	2	1	8 N				
<b>Service and traffic</b>															

Increase in traffic on the surrounding roads.	2	4	6	4	48 M	<ul style="list-style-type: none"> <li>Socio-economic management as per the EMPr (section 9.3)</li> </ul>	2	4	4	3	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 landowners.	2	4	6	4	48 M	<ul style="list-style-type: none"> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	2	4	4	2	20 L
<b>Indirect Impacts</b>											
<b>Visual</b>											
The potential visual impact of the development on the visual character of the landscape and sense of place of the region (particularly the KPGR)	3	4	6	3	39 M	<ul style="list-style-type: none"> <li>Socio-economic management, specifically visual impact as per the EMPr (section 9.3.1)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	3	4	2	2	18 L
<b>Cumulative Impacts</b>											
<b>Biodiversity (Flora)</b>											
Cumulative disturbance of sensitive habitats.	3	4	6	3	39 M	<ul style="list-style-type: none"> <li>Biodiversity management, specifically flora as per the EMPr (section 9.2.4, 9.2.5 and 9.2.6)</li> </ul>	3	4	4	2	22 L
Cumulative reduction and damage to Conservation Important Species and protected trees. i.e. <i>Aloe komatiensis</i> (VU), and <i>Dalbergia melanoxylon</i> (NT), <i>Sclerocarya birrea</i> , <i>Boscia albitrunca</i> , <i>Combretum imberbe</i> , <i>Azelia quanzensis</i> , <i>Philenoptera violacea</i> and <i>Elaeodendron transvaalense</i> , <i>Aloe chabaudii</i> , <i>A. marlothii</i> , <i>A. spicata</i> , <i>A. komatiensis</i> , <i>Eulophia petersii</i> , <i>Stapelia gigantea</i> and <i>Pachypodium saundersii</i> and the trees <i>Spirostachys africana</i> and <i>Berchemia zeyheri</i>	3	5	8	3	48 M	<ul style="list-style-type: none"> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	3	5	4	2	24 L
<b>Visual</b>											
The accumulation of built forms and within an otherwise natural environment.	3	4	6	4	52 M	<ul style="list-style-type: none"> <li>Socio-economic management, specifically visual impact as per the EMPr (section 9.3.1)</li> <li>Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>Fire protection (Section 12 of EMPr)</li> </ul>	3	4	4	2	22 L
<b>Socio-economics</b>											

<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	2	2	18 L	<ul style="list-style-type: none"> <li>• Socio-economic management as per the EMPr (section 9.3)</li> <li>• Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>• Fire protection (Section 12 of EMPr)</li> </ul>	3	4	4	3	33 M
<i>Promotion of social and economic development in the local communities and improvement in the overall wellbeing of the community (positive impact)</i>	3	4	2	2	18 L		3	4	2	3	27 L
<b>Services and traffic</b>											
Cumulative increase in traffic on the surrounding roads due to increased visitor numbers.	3	4	6	3	39 M	<ul style="list-style-type: none"> <li>• Socio-economic management as per the EMPr (section 9.3)</li> <li>• Waste management plan and storm water management plan (Section 10 and 11 of the EMPr)</li> <li>• Fire protection (Section 12 of EMPr)</li> </ul>	3	4	2	2	18 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 landowners and residents of the local communities.	3	4	4	3	33 M		3	4	4	2	22 L
Waste disposal practices will have an accumulative effect on the local landfill site's capacity to absorb waste.	3	4	6	4	52 M		3	4	4	2	22 L

<b>NO-PROJECT ALTERNATIVE</b>											
<b>Direct Impacts</b>											
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
<b>Indirect Impacts</b>											
None.						•					
<b>Cumulative Impacts</b>											
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.