SCIENTIFIC TERRESTRIAL SERVICES

Terrestrial Biodiversity Assessment

AS PART OF THE ENVIRONMENTAL AUTHORISATION APPLICATION PROCESSES FOR THE PROPOSED DEVELOPMENT OF A TOURIST FACILITY ON ERF 60 WITHIN THE WELGEVONDEN PRIVATE GAME RESERVE, NEAR THABAZIMBI, LIMPOPO PROVINCE.

PART C: Faunal Assessment

Prepared for:	Seedcracker
Report author:	C. Hooton
Report reviewers:	S. van Staden (Pr.Sci.Nat)
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Part of the SAS Environmental Group of Companies

DOCUMENT GUIDE

The table below provides a guide to the reporting of biodiversity impacts as they relate to 1) Government Notice No. 1150 Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on **Animal Species Theme** as published in Government Gazette 43855 dated 30 October 2020 (as amended in Government Notice 3717 of 2023).

Theme-Specific Requirements as per Government Notice No. 1150 Animal Biodiversity Theme – High Sensitivity Rating as per Screening Tool Output		
No.	**SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS**	**Section in report/Notes**
1.	**General Information**	
1.1	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "very high" or "high" sensitivity for terrestrial animal species must submit a Terrestrial Animal Species Specialist Assessment Report.	**Part C:** Faunal Assessment
1.2	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of "medium sensitivity" for terrestrial animal species must submit either a Terrestrial Animal Species Specialist Assessment Report or a Terrestrial Animal Species Compliance Statement, depending on the outcome of a site inspection undertaken in accordance with paragraph 4.	**Part C:** Section 3
1.3	The Terrestrial Animal Species Specialist Assessment and the Terrestrial Animal Species Compliance Statement must be undertaken within the study area.	**Part C:** Faunal Assessment
1.4	Where the nature of the activity is expected to have an impact on species of conservation concern beyond boundary of the preferred site, the project areas of influence must be determined by the specialist in accordance with Species Environmental Assessment Guideline, and the study area must include the project areas of influence, as determined.	**Part C:** Faunal Assessment
2	**Animal Species Specialist Assessment**	
2.1	The assessment must be prepared by a specialist registered with the South African Council for Natural Scientific Professions (SACNASP) within a field of practice relevant to the taxonomic groups ("taxa") for which the assessment is being undertaken.	**Part A – C:** Cover Page **Part A:** Appendix E
2.2	**The assessment must be undertaken in accordance with the Species Environmental Assessment Guideline[1] and must:**	
2.2.1	Identify the Species of Conservation Concern which were found, observed or are likely to occur within the study area;	**Part C**: Section 3 **Part C**: Appendix B & C
2.2.2	Provide evidence (photographs or sound recordings) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility, immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3);	**Part C: Section 3**
2.2.3	Identify the distribution, location, viability[2] and detailed description of population size of the Species of Conservation Concern identified within the study area;	**Part C**: Section 3 **Part C**: Appendix B & C
2.2.4	Identify the nature and the extent of the potential impact of the proposed development on the population of the Species of Conservation Concern located within the study area;	**Impact assessment and mitigation recommendations to be included in the final EIA report**.
2.2.5	Determine the importance of the conservation of the population of the Species of Conservation Concern identified within the study area, based on information available in national and international databases including the IUCN Red List of Threatened Species, South African Red List of Species, and/or other relevant databases;	**Part C**: Section 3 **Part C**: Appendix B
2.2.6	Determine the potential impact of the proposed development on the habitat of the Species of Conservation Concern located within the study area;	**Impact assessment and mitigation recommendations to be included in the final EIA report**.
2.2.7	Include a review of relevant literature on the population size of the Species of Conservation Concern, the conservation interventions as well as any national or provincial species management plans for the Species of Conservation Concern. This review must provide information on the need to conserve the Species of Conservation Concern and indicate whether the development is compliant with the applicable species management plans and if not, a motivation for the deviation;	**Part C**: Section 3 **Part C**: Appendix B

[1] Available at https://bgis.sanbi.org/
[2] the ability to survive and reproduce in the long term

Theme-Specific Requirements as per Government Notice No. 1150 Animal Biodiversity Theme – High Sensitivity Rating as per Screening Tool Output		
No.	**SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS**	**Section in report/Notes**
2.2.8	Identify any dynamic ecological processes occurring within the broader landscape, that might be disrupted by the development and result in negative impact on the identified Species of Conservation Concern, for example, fires in fire-prone systems;	**Impact assessment and mitigation recommendations to be included in the final EIA report**.
2.2.9	Identify any potential impact on ecological connectivity within the broader landscape, and resulting impacts on the identified Species of Conservation Concern and its long-term viability;	**Impact assessment and mitigation recommendations to be included in the final EIA report**.
2.2.10	Determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each Species of Conservation Concern	**Not Applicable to this report**
2.2.11	Discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, Data Deficient or Near Threatened Species, as well as any undescribed species; or roosting and breeding or foraging areas used by migratory species where these species show significant congregations, occurring in the vicinity.	**Part C**: Section 3 **Part C**: Appendix B
2.2.12	Identify any alternative development footprints within the preferred development site which would be of "low" sensitivity" or "medium" sensitivity as identified by the screening tool and verified through the site sensitivity verification	**Part C**: Section 4
2.3	The findings of the assessment must be written up in a Terrestrial Animal Species Specialist Assessment Report.	**Part C:** Faunal Assessment
3.	**Animal Species Specialist Assessment Report. This report must include as a minimum the following information:**	
3.1.1	Contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	**Part C:** Cover page **Part A**: Appendix E
3.1.2	A signed statement of independence by the specialist;	**Part A**: Appendix E
3.1.3	A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	**Part A**: Section 1 **Part C**: Section 1
3.1.4	A description of the methodology used to undertake the site sensitivity verification and impact assessment and site inspection, including equipment and modelling used where relevant;	**Part C**: Appendix A
3.1.5	A description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	**Not applicable to this report.**
3.1.6	A description of the assumptions made and any uncertainties or gaps in knowledge or data	**Part A**: Section 1 **Part C**: Section 1
3.1.7	Details of all Species of Conservation Concern found or suspected to occur on site, ensuring sensitive species are appropriately reported;	**Part C**: Section 3 **Part C**: Appendix C
3.1.8	The online database name, hyperlink and record accession numbers for disseminated evidence of Species of Conservation Concern found within the study area	**Not Applicable to this report**
3.1.9	The location of areas not suitable for development and to be avoided during construction where relevant;	**Part C**: Section 4
3.1.10	A discussion on the cumulative impacts;	**Impact assessment and mitigation recommendations to be included in the final EIA report**.
3.1.11	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr)	**Impact assessment and mitigation recommendations to be included in the final EIA report**.
3.1.12	A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not, of the development related to the specific theme considered, and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant.	**Impact assessment and mitigation recommendations to be included in the final EIA report**.
3.1.13	A motivation must be provided if there were any development footprints identified as per paragraph 2.3.12 above that were identified as having "low" or "medium" terrestrial animal species sensitivity and were not considered appropriate.	**Part C**: Section 4
3.2	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	**Part C**
4	**Medium Sensitivity Species of Conservation Concern Confirmation**	
4.1	Medium sensitivity data represents suspected habitat for SCC based on occurrence records for these species collected prior to 2002 or is based on	**Part C:** Faunal Assessment

Theme-Specific Requirements as per Government Notice No. 1150 Animal Biodiversity Theme – High Sensitivity Rating as per Screening Tool Output		
No.	**SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS**	**Section in report/Notes**
	habitat suitability modelling.	
4.2	The presence or likely presence of the Species of Conservation Concern identified by the screening tool, must be confirmed through a site inspection by a specialist registered with the South African Council for Natural Scientific Professions in a field of practice relevant to the taxonomic group ("taxa") for which the assessment is being undertaken.	**Part A – C:** Cover Page **Part A:** Appendix E
4.3	The assessment must be undertaken within the study area.	**Part A**: Section 1
4.4	The site inspection to determine the presence or likely presence of Species of Conservation Concern must be undertaken in accordance with the Species Environmental Assessment Guideline.	**Part C**: Section 3 **Part C**: Appendix C
4.5	The site inspection is to confirm the presence, likely presence or confirmed absence of a Species of Conservation Concern within the site identified as "medium" sensitivity by the screening tool.	**Part C**: Section 3 **Part C**: Appendix C
4.6	Where Species of Conservation Concern are found on site or have been confirmed to be likely present, a Terrestrial Animal Species Specialist Assessment must be submitted in accordance with the requirements specified for "very high" and "high" sensitivity in this protocol.	**Part C**: Section 3 **Part C**: Appendix C **Terrestrial Animal Species Specialist Assessment Recommended**
4.7	Similarly, where no Species of Conservation Concern are found on site during the investigation or if the presence is confirmed to be unlikely, a Terrestrial Animal Species Compliance Statement must be submitted.	**Part C**: Appendix C

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ACRONYMS

AIP	Alien and Invasive Plants
ARC	Agricultural Research Council
BGIS	Biodiversity Geographic Information Systems
CR	Critically Endangered
DEFF	Department: Environment, Forestry and Fisheries
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EN	Endangered
EW	Extinct in the Wild
GIS	Geographic Information System
GPS	Global Positioning System
IBA	Important Bird Area
IEM	Integrated Environmental Management
IIE	Independent Institute of Education (Pty) Ltd
IUCN	International Union for Conservation of Nature and Natural Resources
LEMA	Limpopo Environmental Management Act, 2003 (Act No.7 of 2003)
LC	Least Concern
NT	Near Threatened
NYBA	Not yet been assessed
P	Protected
PES	Present Ecological State
POC	Probability of Occurrence
QDS	Quarter Degree Square
RDL	Red Data Listed
RE	Regionally Extinct
SABAP 2	Southern African Bird Atlas Project 2
SANBI	South Africa National Biodiversity Institute
SP	Specially Protected
STS	Scientific Terrestrial Services
SCC	Species of Conservation Concern
TOPS	Threatened or Protected Species
VU	Vulnerable

GLOSSARY OF TERMS

Alien species (syn. exotic species; non-native species)	A species that is present in a region outside its natural range due to human actions (intentional or accidental) that have enabled it to overcome biogeographic barriers.
Biological diversity or Biodiversity (as per the definition in NEMBA)	The variability among living organisms from all sources including, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part and includes diversity within species, between species, and of ecosystems.
Biome - as per Mucina and Rutherford (2006)	A broad ecological spatial unit representing major life zones of large natural areas – defined mainly by vegetation structure, climate, and major large-scale disturbance factors (such as fires).
Bioregion (as per the definition in NEMBA)	A geographic region which has in terms of section 40(1) been determined as a bioregion for the purposes of this Act.
Carrying Capacity	The maximum population size of a biological species that can be sustained by that specific environment, given the food, habitat, water, and other resources available.
Community Characterisation	Comparisons can be made among communities using attributes such as species richness, species diversity, and evenness. - **Species richness** is simply the number of species in a community. - **Species diversity** is more complex and includes a measure of the number of species in a community, and a measure of the abundance of each species. - **Species evenness** is a description of the distribution of abundance across the species in a community. Species evenness is highest when all species in a sample have the same abundance. Evenness approaches zero as relative abundances vary. Source: https://tinyurl.com/2p9yr3j8
Corridor	A dispersal route or a physical connection of suitable habitats linking previously unconnected regions.
Critical Biodiversity Area (CBA)	A CBA is an area considered important for the survival of threatened species and includes valuable ecosystems such as wetlands, untransformed vegetation, and ridges.
Critically Endangered (CR) (IUCN[3] Red List category)	**Applied to both species/taxa and ecosystems**: A species is CR when the best available evidence indicates that it meets at least one of the five IUCN criteria for CR, indicating that the species is facing an extremely high risk of extinction. CR ecosystem types are at an extremely high risk of collapse. Most of the ecosystem type has been severely or moderately modified from its natural state. The ecosystem type is likely to have lost much of its natural structure and functioning, and species associated with the ecosystem may have been lost. CR species are those considered to be at extremely high risk of extinction.
Development footprint (as per the NEMA definition)	"in respect of land, means any evidence of its physical transformation as a result of the undertaking of any activity"
Degradation	The many human-caused processes that drive the decline or loss in biodiversity, ecosystem functions or ecosystem services in any terrestrial and associated aquatic ecosystems.
Disturbance	A temporal change, either regular or irregular (uncertain), in the environmental conditions that can trigger population fluctuations and secondary succession. Disturbance is an important driver of biological invasions.

[3] International Union for Conservation of Nature (IUCN)

Driver (ecological)	A driver is any natural or human-induced factor that directly or indirectly causes a change in ecosystem. A direct driver clearly influences ecosystem processes, where indirect driver influences ecosystem processes through altering one or more direct drivers.
Ecological Condition	"ecological condition" means the extent to which the composition, structure and function of an area or biodiversity feature has been modified from a reference condition of "natural". Various terminology can be used for precision of language: ➢ Fair ecological condition: Areas that are moderately modified, semi-natural. An ecological condition class in which ecological function is maintained even though composition and structure have been compromised. Can apply to a site or an ecosystem. ➢ Good ecological condition: Areas that are natural or near-natural. An ecological condition class in which composition, structure and function are still intact or largely intact. Can apply to a site or an ecosystem. ➢ Poor ecological condition: Areas that are severely or irreversibly modified. An ecological condition class in which ecological function has been compromised in addition to structure and composition. Can apply to a site or an ecosystem.
Ecological processes	The functions and processes that operate to maintain and generate biodiversity. In order to include ecological processes in a biodiversity plan, their spatial components need to be identified and mapped.
Ecoregion	An ecoregion is a "recurring pattern of ecosystems associated with characteristic combinations of soil and landform that characterise that region."
Endangered (EN) (IUCN Red List category)	**Applied to both species/taxa and ecosystems**: A species is EN when the best available evidence indicates that it meets at least one of the five IUCN criteria for EN, indicating that the species is facing a very high risk of extinction. EN ecosystem types are at a very high risk of collapse. EN species are those considered to be at very high risk of extinction.
Endemic species	Species that are only found within a pre-defined area. There can therefore be sub-continental (e.g., southern Africa), national (South Africa), provincial, regional, or even within a particular mountain range.
Fatal flaw **(IEM Series)**	Any problem, issue or conflict (real or perceived) that could result in proposals being rejected or stopped.
Faunal Class	In biological classification, class (Latin: classis) is a taxonomic rank, as well as a taxonomic unit. Class specifically refers to major groups, namely: mammals, avifauna (birds), reptiles and invertebrates.
Ground-truth	Ground truth is a term used in various fields to refer to information provided by direct observation (i.e., empirical evidence) as opposed to information provided by inference.
Habitat **(As per the definition in NEMBA)**	A place where a species or ecological community naturally occurs.
Habitat loss	Conversion of natural habitat in an ecosystem to a land use or land cover class that results in irreversible change in the composition, structure and functional characteristics of the ecosystem concerned.
Impact **(IEM Series, draft Offset policy, and NEMA)**	The positive or negative effects on human well-being and/or on the environment. Impact-related terminology: ➢ Cumulative impact: Past, current, and reasonably foreseeable future impacts of an activity, considered together with the impact of the proposed activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities. ➢ Impact Significant/significance: Significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e., intensity, duration, and likelihood). Impact significance is the value placed

	on the change by different affected parties (i.e., level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e., biophysical, social and economic). Such judgement reflects the political reality of impact assessment in which significance is translated into public acceptability of impacts. ➢ Significant impact: An impact that may have a notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds, or targets.
Important Bird and Biodiversity Area (IBA)	The IBA Programme identifies and works to conserve a network of sites critical for the long-term survival of bird species that: are globally threatened, have a restricted range, are restricted to specific biomes/vegetation types or sites that have significant populations.
Integrity (ecological)	The integrity of an ecosystem refers to its functional completeness, including its components (species) its patterns (distribution) and its processes.
Invasive species	Alien species that sustain self-replacing populations over several life cycles, produce reproductive offspring, often in very large numbers at considerable distances from the parent and/or site of introduction, and have the potential to spread over long distances.
Least Threatened	Least threatened ecosystems are still largely intact.
Native species (syn. indigenous species)	Species that are found within their natural range where they have evolved without human intervention (intentional or accidental). Also includes species that have expanded their range as a result of human modification of the environment that does not directly impact dispersal (e.g., species are still native if they increase their range as a result of watered gardens but are alien if they increase their range as a result of spread along human-created corridors linking previously separate biogeographic regions).
Near Threatened (according to IUCN)	Close to being at high risk of extinction in the near future.
Niche (ecological)	The role and position a species have in its environment; how it meets its needs for food and shelter, how it survives, and how it reproduces. A species' niche includes all of its interactions with the biotic and abiotic factors of its environment.
Protected	Species of high conservation value or national importance that require protection, according to TOPS 2007 and NEMBA.
Red Data Listed (RDL) species	According to the Red List of South African plants (http://redlist.sanbi.org/) and the International Union for Conservation of Nature (IUCN), organisms that fall into the Extinct in the Wild (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU) categories of ecological status.
Refugia (ecological)	Refugium (plural: refugia) is a location which supports an isolated or relict population of a once more widespread species. This isolation can be caused by climatic changes, geography, or human activities such as deforestation and overhunting.
Resource (ecological)	A resource is a substance or object in the environment required by an organism for normal growth, maintenance, and reproduction. Resources can be consumed by one organism and, as a result, become unavailable to another organism.
Species of Conservation Concern (SCC)	The term SCC in the context of this report refers to all RDL and IUCN listed threatened species as well as provincially and nationally protected species of relevance to the project.
Threatened species	A species that has been classified as CR, EN or VU, based on a conservation assessment (Red List), using a standard set of criteria developed by the IUCN for determining the likelihood of a species becoming extinct. A threatened species faces a high risk of extinction in the near future.
Vulnerable (VU) (Red List category)	**Applied to both species/taxa and ecosystems**: A species is VU when the best available evidence indicates that it meets at least one of the five IUCN criteria for VU, indicating that the species is facing a high risk of

	extinction. An ecosystem type is VU when the best available evidence indicates that it meets any of the criteria A to E for VU and is then considered to be at a high risk of collapse.

1 INTRODUCTION

Scientific Terrestrial Services (STS) Pty Ltd. was appointed to conduct a terrestrial biodiversity assessment as part of the Environmental Assessment (EA) application processes for the proposed development of a tourist facility on Erf 60 within the Welgevonden Private Game Reserve, approximately 24 kilometres (km) north-west of the small town of Vaalwater, Limpopo Province. The game reserve is located within the Waterberg District Municipality, spanning approximately 37,000 hectares (ha) and bordering Marakele National Park (the latter being situated to the south-west of the game reserve).

The proposed tourist facility is envisioned to include a lodge with villas and a parking area, staff quarters, a wastewater treatment plant, and access roads, amongst other infrastructure; hereafter referred to as the “study area”.

1.1 Reporting Protocol

The site verification and field assessments confirmed the medium and high animal species theme sensitivity (as identified by the Department of Forestry, Fisheries, and the Environment’s (DFFE) National Web-based Screening Tool (hereafter “screening tool”)) for the study area. The study area is located within a game reserve which is inhabited by several SCC, all of which have equal opportunity to occur within the study area.

1.2 Scope of Work

The purpose of this report is to define the faunal ecology of the study area as well as mapping and defining areas of increased Ecological Importance and Sensitivity (EIS) and to define the Present Ecological State (PES) of the study area. The objective of this study is:

- To provide inventories of faunal species as encountered within the study area;
- To determine and describe habitat types, communities and the ecological state of the study area and to rank each habitat type based on conservation importance and ecological sensitivity;
- To identify and consider all sensitive landscapes including rocky ridges, wetlands and/ or any other special features;
- To conduct a Red Data Listed (RDL) species assessment as well as an assessment of other Species of Conservation Concern (SCC), including potential for such species to occur within the study area;

- To provide detailed information to guide the activities associated with the proposed development activities associated within the study area; and
- To ensure the ongoing functioning of the ecosystem in such a way as to support local and regional conservation requirements and the provision of ecological services in the local area.

1.3 Assumptions and Limitations

The following assumptions and limitations are applicable to this report:

- The site assessment was undertaken on the 14 March 2024 (Autumn) to confirm the assumptions made during the consultation of the background maps and to determine whether the sensitivity of the faunal biodiversity associated with the assessment areas confirms the results of the screening tool;
- With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. It is, however, expected that most faunal communities have been accurately assessed and considered and the information provided is considered sufficient to allow informed decision making to take place and facilitate integrated environmental management;
- Due to the nature and habits of most faunal taxa, the high level of surrounding anthropogenic activities, it is unlikely that all species would have been observed during a field assessment of limited duration. Therefore, site observations were compared with literature studies where necessary;
- Sampling by its nature, means that not all individuals are assessed and identified. Some species and taxa within the footprint area may therefore have been missed during the assessment; and
- As per the best practice guideline that accompanies the protocol and screening tool, the name of certain sensitive species may not appear in the final Environmental Impact Assessment (EIA) report nor any of the specialist reports released into the public domain. It will be referred to as sensitive animals, and its threat status included, e.g., Critically Endangered (CR) sensitive animal.

2 ASSESSMENT APPROACH

2.1 General approach

To accurately determine the PES of the study area and capture comprehensive data with respect to faunal taxa, the following methodology were applied:

- Maps and digital satellite images were consulted prior to the field assessment to determine broad habitats, vegetation types and potentially sensitive sites. An initial visual on-site assessment of the study area was made in order to confirm the assumptions made during consultation of the digital satellite imagery;
- A literature review with respect to habitats, vegetation types and species distribution was conducted;
- Relevant databases considered during the assessment of the study area included the Important Bird and Biodiversity Areas (IBA, 2015), South African Bird Atlas Project 2 (SABAP2), International Union for Conservation of Nature (IUCN), the Limpopo Conservation Plan (C-Plan; 2018) and the National Biodiversity Assessment (NBA, 2018);
- The field assessment was undertaken from the 9th to the 14th of March 2024 to determine the faunal ecological status of the study area. The study area was assessed on foot, with focus being placed on areas considered to be of increased importance for SCC;
- Specific methodologies for the assessment, in terms of field work and data analysis of faunal ecological assemblages are presented in Appendix A of this report; and
- For the methodologies relating to the impact assessment and development of the mitigation measures, please refer to Appendix C of Part A.

2.2 Sensitivity Mapping

All the ecological characteristics associated with the study area were considered, and sensitive areas were assessed. In addition, identified locations of protected species were marked by means of Global Positioning System (GPS). A Geographic Information System (GIS) was used to project these features onto satellite imagery and/or topographic maps. The sensitivity map should guide the final design and layout of the proposed development activities. Please refer to Section 4 of this report for further details.

3 FAUNAL ASSESSMENT RESULTS

3.1 Sampling Effort

The assessments took place in early autumn during which several meanders were walked. Faunal species or signs thereof which were observed during these meanders were noted, whilst habitat condition/suitability was also recorded. These meanders were focused within the proposed project footprint that was provided at the time of assessment (modifications to the layout has since taken place), but also extended into a pre-defined 50 m buffer area surrounding the footprint areas.

3.2 Existing Impacts

The study area is located in a private game reserve and very limited existing impacts were noted. At the time of assessment, only a few narrow, gravel roads were present within the study area. Patches of localised disturbances were observed stemming from geotechnical work being undertaken, but these were isolated and small in extent.

3.3 Faunal Habitat

Two habitat units are associated with the study area. These habitat units are discussed briefly in terms of faunal utilisation and importance below. For a more detailed description and discussion of these habitat units please refer to the Part B: Floral Report. Figures 1 and 2 provides a visual representation of the habitats and proposed lodge layout within the study area.

1. **Waterberg Mountain Bushveld Habitat –** This habitat was dominated by woody species in varying densities and comprised of rocky outcrops as well as open bushveld sections. This habitat unit is largely undisturbed by anthropogenic activities, with the exception of some small dirt roads. This habitat extends beyond that of the study area and comprises a notable extent of the game reserve itself.
2. **Freshwater Habitat** – Tis habitat unit comprises areas considered to be watercourses (as delineated by a freshwater specialist: SAS 24-1037 (2024)) and comprises a Hillslope Seep Wetland, Riparian Habitat and Unchannelled Valley-Bottom (UCVB) wetlands that lack riparian vegetation. For the purposes of the faunal report all these features are however discussed collectively as the freshwater habitat.

3.4 Ecological functioning within the landscape

The study area is located within a private game reserve which is managed as a protected environment. The reserve is currently 37000 ha in extent and species movement/habitat connectivity within has not been restricted. The habitats within the study area form part of this larger functioning ecosystem, with faunal species readily traversing the study area.

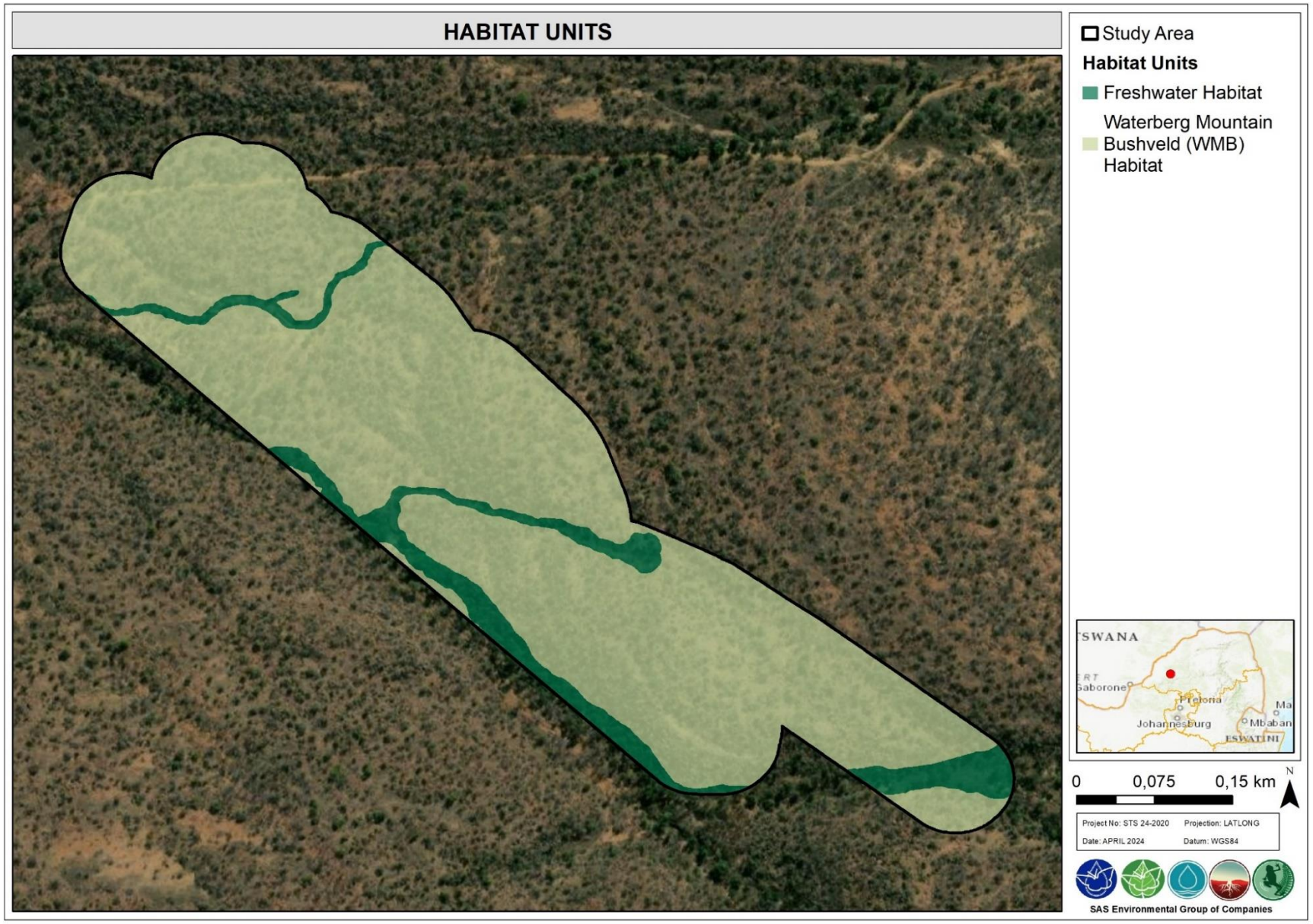

Figure 1: Habitat units associated with the study area.

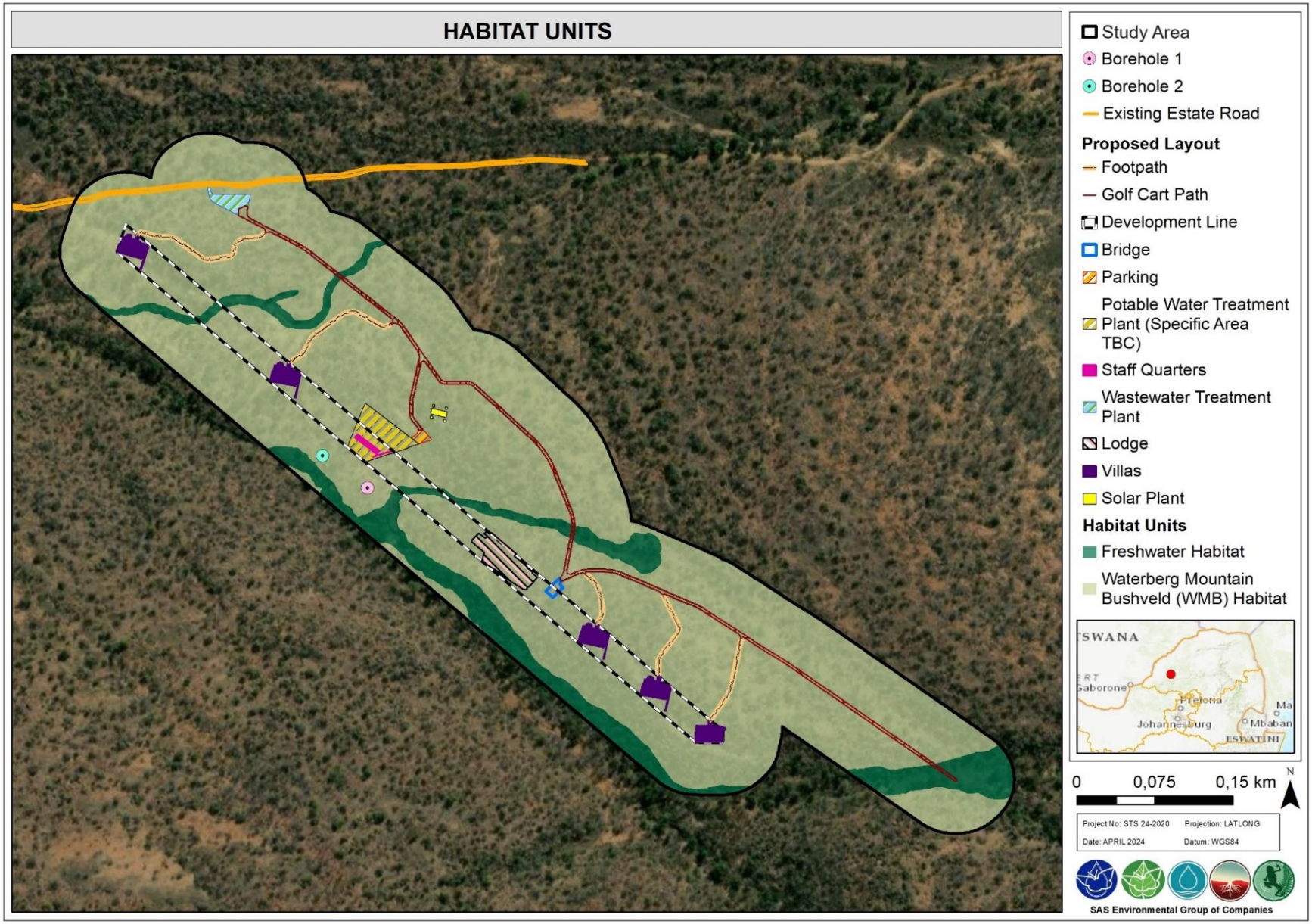

Figure 2: Habitat units associated with the study area, including the proposed activities superimposed onto the delineated habitats.

3.5 Mammals

Table 1: Field assessment results pertaining to mammal species within the study area.

Photographs:

a) *Equus quagga* (Plains Zebra) spoor; b) and c) *Phacochoerus africanus* (Common Warthog) burrow and tusk; d) *Loxodonta africana* (Elephant) spoor.

Mammal habitat and diversity

The game reserve in which the study area is located ha a high diversity of mammal species commensurate with the region and vegetation types. Many of these mammal species are large bodies animals that require large home ranges in which to forage. The study area, as is evident from the spoor and other signs of movement, forms part of several species home ranges/foraging grounds. Though the study area itself is small and would not be able tot sustain many of the species, it cannot be seen in isolation and as such, it considered in the greater context of the reserve and ecosystem. The freshwater habitats, notably the adjacent riparian areas, appear to serve as important movement corridors through the study area with several large game paths observed. The rocky outcrop areas likely provide suitable areas of refuge for small mammal species as they can readily find shelter herein. During the site assessment signs of the SCC *Loxodonta africana* (Elephant) were observed. Given the location of the study area, it is likely that several other SCC known to occur within the reserve will likely move through and utilise the study area.

Mammal SCC

Species Name	RDL Status	POC	Species Name	RDL Status	POC
Parahyaena brunnea (Brown Hyaena)	NT	High	Sensitive species 5	VU	High
Panthera pardus (Leopard)	VU	High	*Dasymys robertsii* (Robert's Shaggy Rat)	VU	Low
Loxodonta africana (Elephant)	EN	**Confirmed**	*Lycaon pictus* (Wild Dog)	EN	Low
Panthera leo (Lion)	VU	High	*Redunca fulvorufula* (Mountain Reedbuck)	EN	High
Smutsia temminckii (Pangolin)	VU	High	*Crocuta Crocuta* (Spotted Hyaena)	NT	High

3.6 Avifauna

Table 2: Field assessment results pertaining to avifaunal species within the study area.

Photographs:

a) *Dendropicos fuscescens* (Cardinal Woodpecker); b) *Merops bullockoides* (White-fronted bee-eater); c) Overview of the habitat associated with the study area.

Avifaunal discussion

For avifauna vegetation structure, as opposed to actual plant species richness, is widely acknowledged as the primary determinant of bird communities (Skowno & Bond 2003; Wichmann et al. 2009; Burgess et al. 2011; Smith et al. 2017). Though the vegetation structure within the study area was not significantly diverse, the changes, between the freshwater habitats, bushveld and outcrops do provide sufficient habitat and structural variation which will support a diversity of avifaunal species. Majority of avifaunal species observed within the study area were small bodied, with preferences for insectivorous, granivorous, and mixed feeding habits. These species tend to favour dense vegetation stands, enabling them to navigate lower levels in search of food resources.

Though no avifaunal SCC were observed during the site assessment, the private game reserve in which the study area is located does provide ideal habitat and foraging grounds for several such species. The closed and woody nature of the study area itself however may limit the occurrence of some of these species.

Avifaunal SCC

Species Name	RDL Status	POC	Species Name	RDL Status	POC
Sagittarius serpentarius (Secretarybird)	VU	Medium	*Aquila verreauxii* (Verreaux's Eagle)	VU	High
Aquila rapax (Tawny Eagle)	EN	High	*Gyps africanus* (White Backed Vulture)	CR	Medium
Stephanoaetus coronatus (Crowned Eagle)	NT	High	*Polemaetus bellicosus* (Martial Eagle)	EN	High

3.7 Herpetofauna (Amphibians and Reptiles)

Table 3: Field assessment results pertaining to reptile and amphibian species within the study area.

Photographs:

a.) *Meroles squamulosus* (Common Rough-scaled Lizard); b.) *Platysaurus minor* (Waterberg Flat Lizard); c.) *Gerrhosaurus flavigularis* (Yellow-throated Plated Lizard).

Herpetofauna habitat and diversity

The study area with its dense vegetation, dead wood material and rock outcrops provided suitable habitat and areas of refuge for several reptile species. Although no snakes were observed during the field assessment, it is highly likely that several species will occur on site, including *Bitis arietans* (Puff Adder), *Naja mossambica* (Mozambique Spitting Cobra) and *Lycophidion capense* (Cape Wolf Snake). Small mammals, reptiles and invertebrates will be the preferred prey for these predatory snakes that will roam throughout the study area and adjacent habitat. Smaller reptiles such as skinks and geckos were readily observed on the rocky outcrops as well as around the bases of larger woody trees.

The ephemeral nature of the Freshwater Habitat unit offers does not offer long term suitable habitat conditions for water dependant amphibians. The Freshwater Habitat and adjacent bushveld areas is likely more suitable to water independent amphibians, although breeding opportunities are still limited herein. During periods of high rainfall, it is likely that water independent species, notably toads, will make use of the temporary pools created for breeding. Overall, the study area is unlikely to support a high diversity or abundance of amphibian species.

No herpetofauna SCC were observed during the assessment; however, two have a high POC within the study area as there is sufficient habitat and food resources for these species and they have previously been recorded within the game reserve.

Herpetofauna SCC

Species Name	RDL Status	POC	Species Name	Status	POC
Kinixys lobatsiana (Lobatse Hinged Tortoise)	VU	High	*Python natalensis* (Southern African Rock Python)	P - TOPS	High

3.8 Invertebrates (Insects and Arachnids)

Table 4: Field assessment results pertaining to insect species within the study area.

Photographs:

a.) *Argiope australis* (Common Garden Orbweb Spider); b.) *Genus Acrida* (Slantface Grasshoppers) c.) *Aloeides taikosama* (Dusky Copper).
Invertebrate habitat and diversity
Invertebrates are considered a vital and important link in the ecosystem, fulfilling many ecological roles, including pollination, removal of carcasses and plant material, pest predation and parasitism and clearing of dung and scat from mammals. Insect species also provide a vital food resource for many of the other faunal species in the study area. No invertebrate SCC were observed during the field assessment. The habitat within the study area and adjacent habitats is considered to be intact and will likely support a diversity and abundance of insect and arachnid species. The abundance and diversity of insects directly impacts on arachnid species populations, as insects form the base food resource for arachnid species. Dominant orders observed throughout the study area were Coleoptera (Beetles), Lepidoptera (moths and butterflies) and Orthoptera (Grasshoppers and Crickets). A limited diversity of arachnid species was observed during the site assessment, however it must be noted that arachnid species are in general secretive and hard to detect. As such, food availability and habitat were used to infer potential arachnid diversity. As the habitat within the study area is intact, arachnid species common to the region are likely to flourish herein, provided sufficient food resources are available. The rocky outcrop areas further provide important areas of refuge for ground dwelling arachnids, whilst the rock crevices are suitable for ambush hunters such as some scorpions and larger ground living spiders.

Invertebrate SCC		
Species	**Status**	**POC**
Ceratogyrus darlingi (Rear Horned Baboon Spider)	P - TOPS	High

4 SITE ECOLOGICAL IMPORTANCE (SEI) AND AREAS OF CONCERN

This section aims to 1) present the sensitivity of the receptors identified within the study area (e.g., SCC, the vegetation/fauna community or habitat type present on the site), and 2) clearly define and map areas where avoidance mitigation is strongly recommended if significant, negative residual impacts are to be avoided (and to prevent potential fatal flaws).

Based on the criteria provided in Appendix A of this report, all habitats within the study area were allocated an importance category, i.e., SEI category. SEI is a function of the biodiversity importance (BI) of the receptor and its resilience to impacts (receptor resilience [RR]). BI in turn is a function of conservation importance (CI) and the functional integrity (FI) of the receptor. Table 5 indicates the individual SEI scoring for each habitat unit/receptor.

Figure 3 - 4 depicts the faunal SEIs for the identified receptors the proposed activities and how these will impact on the various receptors identified for the study area.

Table 5: Site Ecological Importance for the different habitat units within the study area.

Habitat Unit	CI	FI	BI	RR	SEI	Development Constraints
WATERBERG MOUNTAIN BUSHVELD	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km2	**High** Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts with no signs of major past disturbance and good rehabilitation potential.	**High**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and receptor functionality. Species have a moderate likelihood of returning to this habitat unit once the disturbance or impact has been removed.	**High**	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
FRESHWATER HABITAT	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km2	**High** Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts with no signs of major past disturbance and good rehabilitation potential.	**High**	**Medium** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and receptor functionality. Species have a moderate likelihood of returning to this habitat unit once the disturbance or impact has been removed.	**High**	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.

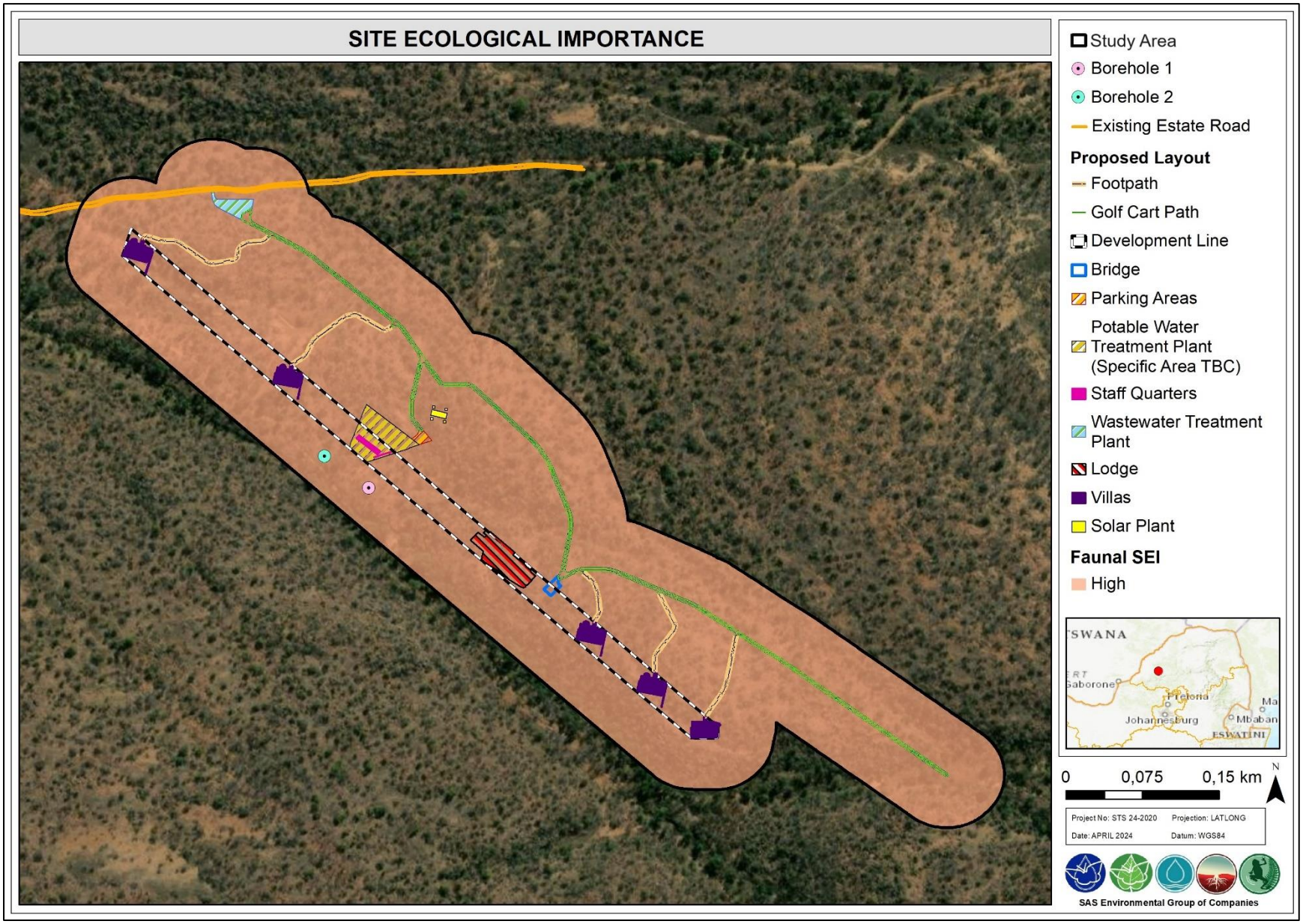

Figure 3: Faunal SEI scores associated with the study area, including a depiction of the proposed activities.

5 IMPACT ASSESSMENT

The below sections provide the significance of calculated impacts arising from the proposed activities within the study area. The impact assessment (methodology outlined in Appendix C of Part A) is based on the layout provided by the proponent, as illustrated in detail in Part A.

The following infrastructure is proposed:

- Linear developments: including footpaths to the villas and golf cart paths;
- Physical structures: bridge, a lodge and five villas, parking area, portable water treatment plant, solar plant, staff quarters, and a wastewater treatment plant; and
- Two new boreholes.

A summary table is provided below of the proposed activities, including to what extent (in hectares) they will impact on the various habitat units (Table 6) whilst an activities and aspects register is presented in Table 7 below.

An impact discussion and assessment of all potential i) establishment and construction phase, ii) mining phase, and iii) decommissioning and rehabilitation phase impacts are provided in Sections 5.1.1 - 5.1.3. All mitigatory measures required to minimise the perceived impacts are presented tables in the associated impact assessment tables.

Table 6: Extent of the various habitat units that will be impacted by the proposed activities.

Affected Habitat Unit	Proposed Activity	Total Enclosed Area (ha)
Waterberg Mountain Bushveld Habitat	Bridge	0,01
	Footpaths	0,06
	Golf Cart Paths	0,25
	Lodge	0,13
	Parking Areas	0,01
	Portable Water Treatment Plant and Staff Quarters	0,18
	Solar Plant	0,01
	Villas 1-5	0,21
	Wastewater Treatment Plant	0,05
Freshwater Habitat	Golf Cart Paths	0,01
TOTAL EXTENT IMPACTED		0,93

Table 7: Activities and aspects likely to impact the floral resources of the study area.

ACTIVITIES AND ASPECTS REGISTER
Pre-Construction Phase
➢ Potential inconsiderate planning and design of infrastructure, leading to the unnecessary sensitive habitat loss as well as unnecessary edge effect impacts on areas outside of the proposed development footprint. ➢ **Impact:** Degradation and modification of the receiving environment, loss of fauna habitat.
➢ Potential failure to implement an alien and invasive plant (AIP) control measures as part of the planning activities, resulting in the introduction of AIPs during construction activities and the subsequent spread of AIPs from the development footprint to surrounding natural habitat.

ACTIVITIES AND ASPECTS REGISTER
➢ **Impact:** Degradation of faunal habitat and potential decrease in carrying capacity due to the proliferation of AIPs as they outcompete indigenous plant species.
Construction Phase
➢ Site clearing and the removal of vegetation. ➢ **Impact:** Loss of faunal habitat and displacement of faunal species from the footprint areas.
➢ Potential loss of habitat outside of authorised footprints (i.e., footprint creep) due to either inadequate design of infrastructure or poorly demarcated construction areas. ➢ **Impact**: Increased impact extents to faunal habitat and species.
➢ Potential introduction of AIP species (and subsequent proliferation of these species) with construction material. ➢ **Impact:** Proliferation of AIPs beyond the construction footprint and further degradation of faunal habitat.
➢ Potential dumping of construction material within areas where no construction is planned. ➢ **Impact:** Degradation / loss of faunal habitat beyond the planned construction footprint areas. .
➢ Risk of contamination from vehicular or construction machinery spills which may pollute the receiving environment. ➢ **Impact:** Ingress of hydrocarbons and toxins into the soil, impact plant growth and faunal species which come into contact with these pollutants, notably soil fauna.
➢ Alteration of faunal species movement patterns that currently traverse the study area. Planned structures will create partial habitat fragmentation within the study area. ➢ **Impact**: Impact to faunal species movement patterns and habitat connectivity.
➢ Potential failure to rehabilitate disturbed sites as soon as they become available, potentially resulting in increased erosion risks and/or the proliferation of AIPs. ➢ **Impact**: Loss of faunal habitat, decreased carrying capacity and impacts to species diversity.
Operational and Maintenance Phases
➢ Increased noise and light pollution in the study area. ➢ **Impact:** Potential short to medium term alteration of faunal species movement patterns and area usage (Faunal species will likely adjust to the lodge presence in the long-term).
➢ Increased human presence in the area once operational, potentially leading to an increased risk of fire frequency. ➢ **Impact:** Increased unplanned fires will impact upon faunal habitat and species diversity

5.1 Faunal Impact Assessment Results

Sections 5.1.1 – 5.1.3 indicate the perceived risks to the faunal ecology associated with all phases of the proposed project activities. The table also provides the findings of the impact assessment undertaken with reference to the perceived impacts prior to the implementation of mitigation measures and following the implementation of mitigation measures. The mitigated results of the impact assessment have been calculated on the premise that all mitigation measures as stipulated in this report are adhered to and implemented. Should such actions not be adhered to, it is highly likely that post-mitigation impact scores will increase.

5.1.1 Pre-construction Phase impacts on faunal habitat, diversity, and SCC from the proposed project activities.

Impacted Feature	Probability	Sensitivity	Severity	Spatial Scale	Duration	Likelihood	Consequence	Significance	Probability	Sensitivity	Severity	Spatial Scale	Duration	Likelihood	Consequence	Significance
Habitat and Diversity																
Waterberg Mountain Bushveld Habitat	5	4	2	2	4	**9**	**8**	**72 Medium-low**	5	4	2	1	4	**9**	**7**	**63 Medium-low**
Freshwater Habitat	4	4	2	2	2	**8**	**6**	**48 Low**	4	4	1	1	2	**8**	**4**	**32 Low**
Species of Conservation Concern																
All affected habitat units	3	4	2	2	3	**7**	**7**	**49 Low**	2	4	2	1	3	**6**	**6**	**36 Low**
Habitat Connectivity																
All affected habitat units	4	4	2	2	4	**8**	**8**	**64 Medium-low**	4	4	2	1	4	**8**	**7**	**56 Medium-low**
Mitigation Measures																

- At all times, ensure that sound environmental management is in place during the pre-construction phase;
- It is recommended that prior to the commencement of construction activities, the construction servitude and footprint areas must be clearly demarcated to prevent footprint creep into areas beyond the authorised footprints;
- Prior to the commencement of any construction related activities, all AIPs must be removed in accordance with the reserves alien plant control plan. This must continue into the construction and operational phase of the project; and
- Ideally major vegetation clearance and earth works should be planned for the drier winter months.

5.1.2 Construction Phase impacts on faunal habitat, diversity, and SCC from the proposed project activities.

Impacted Feature	Probability	Sensitivity	Severity	Spatial Scale	Duration	Likelihood	Consequence	Significance	Probability	Sensitivity	Severity	Spatial Scale	Duration	Likelihood	Consequence	Significance
Habitat and Diversity																
Waterberg Mountain Bushveld Habitat	5	4	2	2	3	**9**	**7**	**63 Medium-low**	5	4	2	1	2	**9**	**5**	**45 Low**
Freshwater Habitat	4	4	2	2	2	**8**	**6**	**48 Low**	4	4	1	1	2	**8**	**4**	**32 Low**
Species of Conservation Concern																
All affected habitat units	3	4	2	2	3	**7**	**7**	**49 Low**	2	4	2	1	2	**6**	**5**	**30 Low**
Habitat Connectivity																
All affected habitat units	4	4	2	2	3	**8**	**7**	**56 Medium-low**	4	4	2	1	2	**8**	**5**	**40 Low**
Mitigation Measures																

- The construction footprint and removal of vegetation must be kept as small as possible within the authorised footprints to minimise impact to the surrounding habitats;
- Vegetation clearance must be undertaken in a phased manner in order to allow for faunal species to move off ahead of clearance activities naturally;
- As far as possible, existing roads/tracks are to be used to gain access and move around the study area;
- All freshwater crossings must be suitably designed in order to ensure the continued functioning of the affected system as well as allowing for the continued movement of small faunal species along these systems;
- No faunal species are to be killed when encountered. Particular reference is made to reptile species, notably snakes, which may be encountered during construction activities;
- A suitably trained snake handler should be on call should a venomous snake require removal;
- Small arachnids and reptiles that become trapped int the construction site should be carefully moved to adjacent habitat outside of the designated construction footprint;
- No food or rubbish is to be disposed of / kept on site that may attract faunal species, notably scavengers, monkeys and baboons;
- Noise disturbances are to be kept to a minimum as far as possible. Particularly noisy activities should ideally be undertaken between 10am and 3pm when most faunal species are least active;
- Upon completion of construction activities, it must be ensured that no bare areas remain, and that indigenous species be used to revegetate the disturbed areas (outside of the footprint areas); and
- Edge effects of all construction activities, which may affect the habitat within surrounding areas, must be strictly managed, e.g., AIP control and soil erosion control etc;

5.1.3 Operational Phase impacts on faunal habitat, diversity, and SCC from the proposed project activities.

Impacted Feature	Probability	Sensitivity	Severity	Spatial Scale	Duration	Likelihood	Consequence	Significance	Probability	Sensitivity	Severity	Spatial Scale	Duration	Likelihood	Consequence	Significance
Habitat and Diversity																
All affected habitat units	3	4	2	1	4	**7**	**7**	**56 Medium-low**	2	4	2	1	4	**6**	**7**	**42 Low**
Species of Conservation Concern																
All affected habitat units	2	4	2	1	4	**6**	**7**	**42 Low**	1	4	2	1	2	**5**	**5**	**25 Very-low**
Habitat Connectivity																
All affected habitat units	2	4	1	1	4	**6**	**6**	**36 Low**	2	4	1	1	4	**6**	**6**	**36 Low**
Mitigation Measures																
- No dumping of litter or any waste must be allowed on-site as this will lead to the attraction of scavengers, baboons and monkeys. Such may lead to the creation of problem animals which may need to be destroyed should they become a threat to people; - Continued monitoring and control of all edge effects must be undertaken, notably AIP management and erosion control; - External lighting, where required, should be kept to a minimum in order to minimise lighting impacts on the surrounding areas. Downward facing, soft yellow / red lighting should be used for external lights to minimise insect attraction and excessive light pollution. The use of harsh, white light colours/hues and LEDs must be avoided as these lighting colours attract higher number of insects at night; - Educate guests to the lodge that no animals are to be harmed/killed, particularly in reference to small invertebrate and reptile species; and - Removal of species from the operational areas such as snakes should be undertaken by a suitably qualified member of staff, ensuring that the species in questions is not harmed.																

5.2 Impact Discussion

5.2.1 Impacts on Faunal Habitat and Diversity

The proposed lodge construction will result in the clearance of vegetation within the planned footprint areas. The extent of the vegetation clearance activities is however expected to be small, and not lead to notable habitat loss such that it would impact on faunal species survivability within the study area or game reserve. Whilst the construction activities will likely result in the displacement of fauna from not just the footprint areas but also the immediate surrounds due to the increased noise impacts, these impacts are not permanent and will cease once construction is completed. The lodge operation may continue to contribute to minor increases in ambient noise, though it is likely that the majority of faunal species will become habituated to the lodge and movement of guests/staff.

5.2.2 Impacts on Faunal SCC

Though no faunal SCC were directly observed, the track of *Loxodonta africana* (Elephant) were seen traversing the study area in several areas. The private game reserve in which the study area is located is known to be inhabited by several faunal SCC, many of which may periodically occur within the study area. Given the overall small extent of the study area, and the ephemeral nature of the Freshwater Habitats, the study area is unlikely to attract any SCC for extended periods of time. Many of the faunal SCC will likely make use of the study area as part of their larger home/foraging ranges. The proposed lodge development may in the short term impact on faunal SCC occurrence/utilisation of the study area, however over the long term these impacts are likely to decrease.

5.2.3 Probable Residual Impacts

Even with mitigation, residual impacts on the receiving faunal ecological environment are likely. The following points highlight the key residual impacts that have been identified:

- Edge effects such as erosion and AIPs may lead to continued habitat degradation in the adjacent areas;
- Loss of habitat and faunal species within the footprint areas and;
- Disturbed areas are highly unlikely to be rehabilitated to baseline levels of ecological functioning and loss of faunal habitat and species diversity within the footprint areas may be long term.

5.2.4 Cumulative Impacts

The study area is not expected to contribute significantly to any cumulative impacts in the region. Within the private game reserve, there are already several low impact gravel roads and lodges, though these are spread out over the 37,000 ha reserve property. The construction of the lodge and associated facilities will nonetheless have a small contribution to further habitat loss in the game reserve, however this loss is not considered to be significant.

6 CONCLUSION

The proposed lodge is located within an existing private game reserve. The game reserve hosts a diversity of faunal species as well as several faunal SCC. The tracks of one SCC, *Loxodonta africana* (Elephant) were observed on several occasions within the study area, whilst it is likely that other SCC will also move through the study area from time to time.

The construction and operation of the proposed lodge is expected to have medium-low to low significance impacts on the faunal ecology. With the implementation of mitigation measures these impacts can be reduced.

This study serves to provide the relevant information required to implement Integrated Environmental Management (IEM) and to ensure that the best long-term use of the ecological resources in the study area will be made in support of the principle of sustainable development. It is the opinion of the ecologists that the proposed development of the lodge can proceed provided that all mitigation measures as stipulated are implemented.

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APPENDIX A: Faunal Method of Assessment

It is important to note that due to the nature and habits of fauna, varied stages of life cycles, seasonal and temporal fluctuations along with other external factors, it is unlikely that all faunal species will have been recorded during the site assessment. Transects were walked throughout the study area to cover maximum ground within the given timeframe.

Mammals

Mammal species were recorded during the field assessment with the use of visual identification by actively searching/listening for individuals or the presence of spoor, calls and dung. Specific attention was given to mammal SCC listed on a regional and national level, as well as those identified by the Screening Tool. Desktop analysis of the study area was used to determine areas of higher value to mammal species and study were placed within these areas during the field survey. Specific attention was given to mammal SCC listed on a regional and national level, as well as those identified by the Screening Tool.

Avifauna

The Southern African Bird Atlas Project 2 database (http://sabap2.adu.org.za/) was compared with the recent field survey of avifaunal species identified in the study area. Field surveys were undertaken utilising direct observation and bird call identification techniques in order to accurately identify avifaunal species. Specific attention was given to avifaunal SCC listed on a regional and national level, as well as those identified by the Screening Tool. Areas of higher value to avifaunal species were determined through desktop analysis and increased time were spent in these areas. Specific attention was given to avifaunal SCC listed on a regional and national level, as well as those identified by the Screening Tool.

Reptiles

Reptiles were identified during the field survey. Suitable applicable habitat areas (rocky outcrops and fallen dead trees) were inspected and all reptiles encountered were identified. It is worth noting that reptiles are inherently secretive and shy and that it is difficult to observe all species during site assessments of limited duration, notably when cool and wet weather persists. The data gathered during the assessment along with the habitat analysis provided an indication of which reptile species are likely to occur on the study area. Specific attention was given to reptile SCC listed on a regional and national level, as well as those identified by the Screening Tool.

Amphibians

Identifying amphibian species is done by the use of direct visual identification along with call identification technique. Amphibian species flourish in and around wetland, riparian and moist grassland areas. It is unlikely that all amphibian species will have been recorded during the site assessment, due to their cryptic nature and habits, varied stages of life cycles and seasonal and temporal fluctuations within the environment. Specific attention was given to potential amphibian SCC listed on a regional and national level, as well as any species identified by the Screening Tool.

Insects

Whilst conducting transects through the study area, all insect species visually observed were identified, and where possible photographs taken. It must be noted, however that due to the cryptic nature and habits of insects, varied stages of life cycles and seasonal and temporal fluctuations within the environment, it is unlikely that all insect species will have been recorded during the site assessment period. Nevertheless, the data gathered during the assessment along with the habitat analysis provided an accurate indication of which species are likely to occur in the study area at the time of the survey. Specific attention was given to insect SCC listed on a regional and national level, as well as any species identified by the Screening Tool.

Arachnids

Suitable applicable habitat areas (rocky outcrops, sandy areas and fallen dead trees) where spiders and scorpions are likely to reside were searched. Rocks were overturned and inspected for signs of

these species. Specific attention was paid to searching for Mygalomorphae arachnids (Trapdoor and Baboon spiders) as well as potential SCC scorpions. Specific attention was given to arachnid SCC listed on a regional and national level, as well as any species identified by the Screening Tool.

Faunal Species of Conservational Concern Assessment

Prior to the site visit, a record of faunal SCC and their habitat requirements was developed for the study area, which includes consulting the National Web-based Environmental Screening Tool. Because not all SCC have been included in the Screening Tool layers (e.g. NT and DD taxa), it remains important for the specialist to be on the lookout for additional SCC. For this study, known distribution ranges and literature regarding SCC was used in conjunction with primary sources described below.

The National Web-Based Environmental Screening Tool

The Screening Tool was accessed to obtain a list of potentially occurring species of conservation concern for the study area. Each of the themes in the Screening Tool consists of theme-specific spatial datasets which have been assigned a sensitivity level namely, "*low*", "*medium*", "*high*" and "*very high*" sensitivity. The four levels of sensitivity are derived and identified in different ways, e.g. for **confirmed** areas of occupied habitat for SCC a Very High and High Sensitivity is assigned and for areas of suitable habitat where SCC may occur based on spatial models only, a Medium Sensitivity is assigned. The different sensitivity ratings pertaining to the Animal [and Plant] Protocols are described below[4]:

- **Very High**: Habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 km^2 are considered Critical Habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under Critically Endangered (CR), Endangered (EN), or Vulnerable (VU) D criteria of the IUCN or species listed as Critically/ Extremely Rare under South Africa's National Red List Criteria. For each species reliant on a Critical Habitat, all remaining suitable habitat has been manually mapped at a fine scale.
- **High**: Recent occurrence records for all threatened (CR, EN, VU) and/or rare endemic species are included in the high sensitivity level. Spatial polygons of suitable habitat have been produced for each species by intersecting recently collected occurrence records (those collected since the year 2000) that have a spatial confidence level of less than 250 m with segments of remaining natural habitat.
- **Medium**: Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. Two types of spatial models have been included. The first is a simple rule-based habitat suitability model where habitat attributes such as vegetation type and altitude are selected for all areas where a species has been recorded to occur. The second is a species distribution model which uses species occurrence records combined with multiple environmental variables to quantify and predict areas of suitable habitat. The models provide a probability-based distribution indicating a continuous range of habitat suitability across areas that have not been previously surveyed. A probability threshold of 75% for suitable habitat has been used to convert the modelled probability surface and reduce it into a single spatial area which defines areas that fall within the medium sensitivity level.
- **Low**: Areas where no SCC are known or expected to occur.

NEMBA TOPS SPECIES AND NATIONALLY AND PROVINCIALLY LISTED SCC

The Threatened or Protected Species (TOPS) Regulations (GN 255 of 2015) under Section 56(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA), were taken into consideration as well as all species listed by the IUCN, the National Biodiversity Assessment 2019 and the relevant provincial conservation databases.

[4] More details on the use of the Screening Tool for Species of Conservation Concern can be found in the below resources:
- South African National Biodiversity Institute (SANBI). 2020. Draft Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa. South African National Biodiversity Institute, Pretoria. Version 1.0.
- The National Web based Environmental Screening Tool website: https://screening.environment.gov.za/screeningtool/#/pages/welcome

Throughout the fauna assessment, special attention was paid to the identification of any of these SCC as well as the identification of suitable habitat that could potentially support these species. The **Probability of Occurrence (POC)** for each faunal SCC is described as:

- "**Confirmed'**: if observed during the survey;
- "**High**": if within the species' known distribution range and suitable habitat is available;
- "**Medium**": if either within the known distribution range of the species or if suitable habitat is present; or
- "**Low**": if the habitat is not suitable and falls outside the distribution range of the species.

The accuracy of the POC is based on the available knowledge about the species in question, with many of the species lacking in-depth habitat research.

Site Ecological Importance (SEI)

SEI is considered to be a function of the biodiversity importance (BI) of the receptor (e.g., species of conservation concern, the vegetation/fauna community or habitat type present on the site[5]) and its resilience to impacts (receptor resilience [RR]) as follows:

SEI = BI + RR

SEI can be derived from a simple matrix of BI and RR as follows:

Table A1: Matrix of CI and FI to determine BI.

Site Ecological Importance (SEI)		Biodiversity Importance				
		Very high	High	Medium	Low	Very low
Receptor Resilience	Very low	Very high	Very high	High	Medium	Low
	Low	Very high	Very high	High	Medium	Very low
	Medium	Very high	High	Medium	Low	Very low
	High	High	Medium	Low	Very low	Very low
	Very high	Medium	Low	Very low	Very low	Very low

Interpretation of the SEI in the context of the proposed development is provided below.

Table A2: Guidelines for interpreting SEI in the context of the proposed development activities.

Site ecological importance	Interpretation in relation to proposed development activities
Very high	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/ unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

BI in turn is a function of conservation importance (CI) and the functional integrity (FI) of the receptor as follows:

[5] Note that the habitat type may be independent of the vegetation community and that it may even be artificial, e.g., excavated rock quarries that provide crucial breeding habitat for cliff-nesting species such as Bald Ibis.

BI = CI + FI

BI can be derived from a simple matrix of CI and FI as follows:

Table A3: Matrix of CI and FI to determine BI.

Biodiversity importance		Conservation importance				
		Very high	High	Medium	Low	Very low
Functional Integrity	Very high	Very high	Very high	High	Medium	Low
	High	Very high	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very low
	Low	Medium	Medium	Low	Low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

Conservation importance (CI) is evaluated in accordance with recognised established internationally acceptable principles and criteria for the determination of biodiversity-related value, including the IUCN Red List of Species, Red List of Ecosystems and Key Biodiversity Areas (KBA; IUCN [2016]).

Conservation importance is defined here as:

> *'The importance of a site for supporting biodiversity features of conservation concern present, e.g., populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), Rare species, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.'*

These criteria are defined as follows:

- IUCN threatened and Near Threatened species (CR, EN, VU and NT) are defined as either the global or national assessments of the risk of extinction as evaluated by a dedicated panel of species specialists according to the criteria of the International Union for The Conservation of Nature (www.iucnredlist.org). Where the global and national assessments differ for the same taxon, the national evaluation of status[6] should be used in calculating SEI unless the global assessment is both more recent and of a more threatened category. It is important to note that the specialist is required to have a firm understanding of the IUCN Red List Categories and Criteria (IUCN 2012) in order to appropriately apply these for the evaluation of SEI. This criterion can be assessed using confirmed occurrences of species or the suitability of the habitat to support these species. Rare species are those included on South Africa's National Red List as Rare or Critically Rare or Extremely Rare. These are highly restricted species that are currently not declining. However, should any development impact on a population of these species they will immediately qualify under one of the IUCN categories of threat. y Range-restricted species – the presence of terrestrial flora, vertebrate and invertebrate fauna with a global population extent of occurrence (EOO) of 10 000 km^2 or less.
- Globally significant populations of congregatory species – a roughly estimated proportion (%) of the global population of a fauna species that congregate for breeding/feeding/hibernation/other reasons. y Significant areas of threatened vegetation types – this is a function of both the area (size) being considered in relation to the total extent of that vegetation type (i.e., proportion) and how threatened (CR, EN, VU) the vegetation types are.
- Natural processes – natural unmanaged areas with low levels of ecological disturbance have largely intact natural processes such as pollination, seed dispersal and migration, and thus have greater intrinsic conservation importance than those that are modified through ecological disturbance.

While most of the features that will be included in the CI will be provided by the screening tool, it is important to note that CI is evaluated at a much finer spatial scale and based on fieldwork data collection and comprehensive desktop analyses performed by the specialist during the EA process. As a minimum

[6] http://speciesstatus.sanbi.org/. For mammals: https://www.ewt.org.za/wp-content/uploads/2020/04/2020-updated-2016-Red-List-of-Mammals-of-South- Africa-Lesotho-Swaziland-Summary-Listings.xlsx; for plants: http://redlist.sanbi.org.

requirement, CI needs to be determined for each identified habitat within the project footprint, but best practice recommendation is that it should be determined for all habitats within the entire PAOI[7].

Fulfilling criteria to evaluate CI do not rely on a single specific threshold for each of the above defining characteristics but can act in combination or in isolation, providing a more robust evaluation of CI (Table A4). Furthermore, while CI is most likely to be assessed based on data collected during the fieldwork survey, it can also be an assessment of the suitability of the receptor to support populations conforming to the fulfilling criteria. As can be seen from the worked example below, each of these evaluations of the fulfilling criteria demand necessary justification.

Table A4: Conservation importance (CI) criteria.

Conservation importance	Fulfilling criteria
Very high	- Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare[8] or Critically Rare[9] species that have a global EOO of < 10 km^2. - Any area of natural habitat[10] of a CR ecosystem type or large area (> 0.1% of the total ecosystem type extent[11]) of natural habitat of EN ecosystem type. - Globally significant populations of congregatory species (> 10% of global population).
High	- Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km^2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. - Small area (> 0.01% but < 0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1%) of natural habitat of VU ecosystem type. - Presence of Rare species. - Globally significant populations of congregatory species (> 1% but < 10% of global population).
Medium	- Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. - Any area of natural habitat of threatened ecosystem type with status of VU. - Presence of range-restricted species. - > 50% of receptor contains natural habitat with potential to support SCC.
Low	- No confirmed or highly likely populations of SCC. - No confirmed or highly likely populations of range-restricted species. - < 50% of receptor contains natural habitat with limited potential to support SCC.
Very low	- No confirmed and highly unlikely populations of SCC. - No confirmed and highly unlikely populations of range-restricted species. - No natural habitat remaining.

[7] Because CI needs to be assigned to a receptor (e.g., the vegetation/fauna community or habitat type), it is customary to use the flora community delineation developed for a PAOI by a botanical specialist. However, such delineation is often too fine scaled to define fauna-specific habitats, which are generally more structural than phytosociological in nature. Where this is the case, the fauna specialist should merge two or more relevant floral communities to correlate with the specific fauna habitat type that is characteristic of a particular taxon assemblage. In certain cases, the faunal specialist will have to demarcate habitats that have not been classified by the botanical specialist; a pertinent example is the presence of cliffs, which are frequently important breeding habitat for some bird SCC.

[8] For butterflies, as per Armstrong *et al*. (2013).

[9] For plants, as per Raimondo *et al*. (2009).

[10] This excludes areas of transformed habitat within a defined ecosystem even if these are partially restored, e.g., Highveld grasslands that have been converted to maize fields and then abandoned so that some form of functional grassland is restored; this is not natural habitat as it does not and will not in the future have species composition representative of the original natural habitat.

[11] This can be calculated from the threatened ecosystem of South Africa shapefile available from the SANBI (current available version 2011: http://bgis.sanbi. org/Projects/Detail/49).

Functional integrity (FI) of the receptor (e.g., the vegetation/fauna community or habitat type) is defined here as the receptors' current ability to maintain the structure and functions that define it, compared to its known or predicted state under ideal conditions. Simply stated, FI is:

'A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.'

These criteria can be defined as:

- Connectivity to other natural areas – connectivity, which can also be measured conversely as the degree of habitat fragmentation, refers to how connected habitat patches are to each other, which has a significant influence on numerous ecological processes, such as migration and dispersal opportunities of biota and therefore genetic exchange between populations. Connectivity to other similar habitats becomes more important as the remaining intact and functional area of a habitat decreases, mainly because population sizes decrease and are therefore at greater risk from ecological perturbations and inbreeding effects. The degree of connectivity between habitat patches varies greatly with the dispersal ability of the taxon or taxon group (e.g., fossorial reptiles) in question.
- Degree of current persistent negative ecological impacts – persistent negative impacts such as uncontrolled spread of alien and invasive flora effectively decreases both the remaining intact area and ecosystem functioning of a particular habitat. Persistent ecological disruptors must not include components that landowners are legally obliged to address or that should be addressed as norm for best practice. Wilful neglect of these legal obligations or the presence of invasive alien species that can practically be controlled through management actions should not negatively influence the FI score to a major extent.
- Remaining intact and functional area – the proportion of the receptor that supports natural habitat with intact ecological processes – small areas are less likely to withstand ecological degradation compared to large areas, and the latter are therefore better able to maintain structure and function allowing for intact ecological processes.

Ecological processes can be considered to be mostly intact and functional if the receptor area has low levels of current ecological disruptors, has good connectivity to other areas and is a relatively large area. As for CI, the fulfilling criteria to evaluate FI do not rely on a single specific threshold for each of the above defining characteristics but can act in combination or in isolation (Table A5) and will require justification by the specialist.

Table A5: Functional integrity (FI) criteria.

Functional integrity	Fulfilling criteria
Very high	- Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types. - High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. - No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing).
High	- Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. - Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. - Only minor current negative ecological impacts (e.g., few livestock utilising area) with no signs of major past disturbance (e.g., ploughing) and good rehabilitation potential.
Medium	- Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. - Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. - Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.
Low	- Small (> 1 ha but < 5 ha) area.

Functional integrity	Fulfilling criteria
	- Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. - Several minor and major current negative ecological impacts.
Very low	- Very small (< 1 ha) area. - No habitat connectivity except for flying species or flora with wind-dispersed seeds. - Several major current negative ecological impacts.

Ecological processes can be considered to be mostly intact and functional if the receptor area has low levels of current ecological disruptors, has good connectivity to other areas and is a relatively large area. As for CI, the fulfilling criteria to evaluate FI do not rely on a single specific threshold for each of the above defining characteristics but can act in combination or in isolation (Table 8.2) and will require justification by the specialist (see worked example below).

Receptor resilience (RR) is defined here as:

> *'The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.'*

The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor (Table A4) and will require justification by the specialist. The specialist needs to bear in mind that resilience will often be linked to a particular disturbance or impact, or even time of year, and needs to be described in relation to these factors. For example, large birds of prey have different levels of resilience to noise disturbance depending on whether they are breeding or not; these species would have low resilience to noise disturbance such as construction of a road adjacent to a nest site during the breeding season but a higher resilience to lodge construction in an area with limited breeding habitat outside of the breeding season.

Receptor resilience needs to be evaluated by the specialist and justification for each evaluation must be provided in the report (see worked example below). Finally, after the successful evaluation of both BI and RR as described above, it is possible to evaluate SEI from the final matrix as follows:

SEI should be described in the above manner for each impact receptor within the area of influence and clearly mapped in relation to the proposed development activities and infrastructure. Interpretation of SEI in the context of the proposed development activities (Table A1) must be provided by the specialist.

It is very important to note that SEI is specific to the proposed development activities and cannot be meaningfully compared between different proposed projects with different associated activities on the same spatial location. However, SEI for the same proposed development with multiple alternative layouts and/or locations may be compared within the same study.

Table A6: Resilience criteria.

Resilience	Fulfilling criteria
Very high	Habitat that can recover rapidly (~ less than 5 years) to restore > 75%[28] of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
Medium	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species

Resilience	Fulfilling criteria
	that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.
Very low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

APPENDIX B: Faunal SCC

Faunal Species of Conservation Concern

Table B1: Red Data Mammal species listed in the Limpopo SoER 2004 report including Red List status.

Scientific name	Common Name	Limpopo SoER 2004 Status	Red List Status
Diceros bicornis	Black Rhinoceros	CR	CR
Neamblysomus julianae	Juliana's golden mole	CR	VU
Loxodonta africana	African elephant	VU	VU
Lycaon pictus	African wild dog	EN	EN
Amblysomus gunningi	Gunning's golden mole	VU	EN
Lutra maculicollis	Spotted-necked otter	VU	LC
Acinonyx jubatus	Cheetah	VU	VU
Felis lybica	African Wild Cat	VU	NYBA
Panthera leo	Lion	VU	VU
Ceratotherium simum	White rhinoceros	NT	NT

LC = Least concerned, EN = Endangered, VU = Vulnerable, NT = Near Threatened. NYBA = Not yet been assessed

Table B2: Red Data Bird species listed in the Limpopo SoER 2004 report including Red List status.

Scientific name	Common Name	Limpopo SoER 2004 Status	Red List Status
Gyps coprotheres	Cape Vulture	T	VU
Ciconia nigra	Black Stork	T	LC
Falco naumanni	Lesser Kestrel	T	LC
Certhilauda chuana	Short-clawed Lark	T	LC
Pterocles gutturalis	Yellow throated Sandgrouse	T	LC
Anthropoides paradiseus	Blue Crane	T	VU
Gyps africanus	White backed Vultures	T	EN
Ardeotis kori	Kori Bustard	T	LC
Scotopelia peli	Pel's Fishing Owl	T	LC
Bucorvus leadbeateri	Southern Ground Hornbill	T	VU
Buphagus erythrorhynchus	Red-billed Oxpecker	T	LC
Terathopius ecaudatus	Bateleur	T	NT
Polemaetus bellicosus	Martial Eagle	T	NT
Aquila rapax	Tawny Eagle	T	LC
Torgos tracheliotos	Lappet faced Vulture	T	VU
Trigonoceps occipitalis	White headed Vulture	T	VU
Buphagus africanus	Yellow billed Oxpecker	T	LC
Stephanoaetus coronatus	Crowned hawk Eagle	T	NT

LC = Least concerned, EN = Endangered, VU = Vulnerable, NT = Near Threatened. T = listed as threatened but with no specific status for the Limpopo Province

Table B3: Red Data Amphibian species listed in the Limpopo SoER 2004 report including Red List status.

Scientific name	Common Name	Limpopo SoER 2004 Status	Red List Status
Breviceps sylvestris	Transvaal forest rain frog	VU	EN
Ptychadena uzungwensis		P	LC
Leptopelis bocagii		P	LC
Hemisus guineensis	Guinea Snout-burrower	P	LC

LC = Least concerned, EN = Endangered, VU = Vulnerable, P = Peripheral.

Table B4: Red Data Reptile species listed in the Limpopo SoER 2004 report including Red List status.

Scientific name	Common Name	Limpopo SoER 2004 Status	Red List Status
Homoroselaps dorsalis	Striped Harlequin snake	R	NT
Xenocalamus transvaalensis	Transvaal Quill-snout snake	R	DD
Lamprophis swazicus	Swazi Rock Snake	R	NT
Python natalensis	African Python	VU	NYBA
Lygodactylus methueni	Methuen's Dwarf Gecko	VU	VU
Crocodylus niloticus	Nile Crocodile	VU	LC
Lycophidion variegatum	Variegated Wolf snake	P	NYBA
Psammophis jallae	Jalla's Sand snake	P	NYBA

R = Rare, DD = Data Deficient, LC = Least concerned, VU = Vulnerable, NT = Near Threatened, P = Peripheral. NYBA = Not yet been assessed

Table B5: Red Data Invertebrates species mentioned in the Limpopo SoER 2004 report including Red List status.

Scientific name	Common Name	Limpopo SoER 2004 Status	Red List Status
Taurhina splendens	Splendid fruit chafer *	T	NYBA
Charaxes marieps	Marieps Charaxes butterfly *	T	NYBA
Trichostetha fasicularis	Protea beetle *	T	NYBA
Ischnestoma ficqui	Fruit eating beetles *	T	NYBA

NYBA = Not yet been assessed. T = listed as threatened but with no specific status for the Limpopo Province. * Very little detailed or general information exists on terrestrial invertebrates in the Limpopo Province, thus in general there is very little consolidated information regarding invertebrates (Limpopo SOER, 2004).

Table B6: NEMBA: TOPS list (2007).

Scientific Name	Common Name
CRITICALLY ENDANGERED SPECIES	
REPTILIA	
Caretta caretta	Loggerhead Sea Turtle
Dermochelys coriacea	Leatherback Sea Turtle
Eretmochelys imbricate	Hawksbill Sea Turtle
AVES	
Grus carunculatus	Wattled Crane
Hirundo atrocaerulea	Blue Swallow
Neophron percnopterus	Egyptian Vulture
Poicephalus robustus	Cape Parrot
MAMMALIA	
Bunolagus monticularis	Riverine Rabbit
Chrysospalax villosus	Rough-haired Golden Mole
ENDANGERED SPECIES	
REPTILIA	

Scientific Name	Common Name
Chelonia mydas	Green Turtle
Cordylus giganteus	Giant Girdled Lizard
Lepidochelys olivacea	Olive Ridley Turtle
Psammobates geometricus	Geometric Tortoise
AVIFAUNA	
Anthropoides paradiseus	Blue Crane
Balearica regulorum	Grey Crowned Crane
Ephippiorhynchus senegalensis	Saddle-billed Stork
Gypaetus barbatus	Bearded Vulture
Gyps africanus	White-backed Vulture
Gyps coprotheres	Cape Vulture
Necrosyrtes	Hooded Vulture
Pelecanus rufescens	Pink-backed Pelican
Scotopelia peli	Pel's Fishing Owl
Torgos tracheliotus	Lappet-faced Vulture
MAMMALIA	
Amblysomus robustus	Robust Golden Mole
Damaliscus tunatus	Tsessebe
Diceros bicornis	Black Rhinoceros
Equus zebra	Mountain Zebra
Lycaon pictus	African Wild Dog
Neamblysomus gunningi	Gunning's Golden Mole
Ourebia ourebi ourebi	Oribi
Paraxerus palliatus	Red Squirrel
Petrodromus tetradactylus	Four-toed Elephant-shrew
INVERTEBRATA	
Colophon spp - All species	Stag Beetles
VULNERABLE SPECIES	
AVES	
Trigonoceps occipitalis	White-headed Vulture
Aquila rapax	Tawny Eagle
Ardeotis kori	Kori Bustard
Ciconia nigra	Black Stork
Circaetus fasciolatus	Southern Banded Snake Eagle
Eupodotis caerulescens	Blue Korhaan
Falco fasciinucha	Falcon
Falco naumanni	Lesser Kestrel
Falco peregrinus	Peregrine Falcon
Geronticus calvus	Bald Ibis
Neotis ludwidii	Ludwig's Bustard
Polemaetus bellicosus	Martial Eagle
Terathopius ecaudatus	Bateleur
Tyto capensis	Grass Owl
MAMMALIA	
Acinonyx jubatus	Cheetah
Chrysospalax trevelyani	Giant Golden Mole
Cricetomys gambianus	Giant Rat
Damaliscus pyrgorgus pygargus	Bontebok
Dendrohyrax arboreus	Tree Hyrax
Hippotragus equinus	Roan Antelope
Pholidota temminckii	Pangolin
Neamblysomus julianae	Juliana's Golden Mole
Neotragus moschatus	Suni
Panthera leo	Lion

Scientific Name	Common Name
Panthera pardus	Leopard
Philantomba monticola	Blue Duiker
INVERTEBRATA	
Peripatopsis alba	White Cave Velvet Worm
PROTECTED SPECIES	
AMPHIBIA	
Pyxicephalus adspersus	Giant Bullfrog
Pyxicephalus edulis	Afiican Bullfrog
REPTILIA	
Bitis gabonica	Gaboon Adder
Bitis schneideri	Namaqua Dwarf Adder
Bradypodion taeniabronchum	Smith's Dwarf Chameleon
Cordylus cataphractus	Girdled Lizard
Crocodylus niloticus	Nile crocodile
Python natalensis	African Rock Python
AVES	
Bucowus leadeateri	Southern Ground-Hornbill
Circus ranivorus	African Marsh Harrier
Neotis denhami	Denham's Bustard
Spheniscus	Jackass Penguin
MAMMALIA	
Atelerix frontalis	South African Hedgehog
Ceratotherium simum	White Rhinoceros
Connochaetes	Black Wildebeest
Crocuta crocuta	Spotted Hyaena
Felis nigripes	Black-footed Cat
Parahyaena brunnea	Brown Hyaena
Leptailurus serval	Serval
Loxodonta africana	African elephant
Lutra maculicollis	Spotted-necked Otter
Millivora capensis	Honey Badger
Raphicerus sharpei	Sharpe's Grysbok
Redunca arundinum	Reedbuck
Vulpes chama	Cape Fox
INVERTEBRATA	
Aloeides clarki	Coega Copper Butterfly
Ceratogyrus spp - All species	Horned Baboon Spiders
Echinodiscus bisperforatus	Pansy Shell
Dromica spp - All species	Tiger Beetles
Graphipterus assimilis	Velvet Ground Beetle
Hadogenes spp *-species*	Flat Rock Scorpions
Haliotis midae	South African Abalone
Harpactira spp - All species	Common Baboon Spiders
Ichnestoma - Aspecies	Fruit Chafer Beetles
Manticora spp – All species	Monster Tiger Beetles
Megacephala asperata	Tiger Beetle
Megacephala regalis	Tiger Beetle
Nigidius auriculatus	Stag beetle
Oonotus adspersus	Stag Beetle
Oonotus interioris	Stag Beetle
Oonotus rex	Stag Beetle
Oonotus sericeus	Stag Beetle
Opisthacanthus spp - All species	Creeping Scorpions
Opistophthalmus spp - All species	Burrowing Scorpions

Scientific Name	Common Name
Platychile pallida	Tiger Beetle
Prosopocoilus petitclerci	Stag Beetle
Prothyma guttipennis	Tiger Beetle
Pterinochilus spp - All species	Golden Baboon Spiders

Table B7: Species as identified by the screening tool.

Scientific name	Common Name	Red List Status	POC
Avifaunal Species			
Sagittarius serpentarius	Secretarybird	VU	Medium
Mammalian Species			
Dasymys robertsii	Robert's Shaggy Rat	VU	Low
Lycaon pictus	African wild dog	EN	Medium
Sensitive Species			
Sensitive species 5[12]	NA	VU	High
Reptile Species			
Kinixys lobatsiana	Lobatse Hinged Tortoise	VU	High

LC = Least concerned, EN = Endangered, VU = Vulnerable, NT = Near Threatened

South African Bird Atlas Project 2 list

Table B8: Avifaunal Species for the relevant pentad 2410_2745.

Pentads	Link to pentad summary on the South African Bird Atlas Project 2 web page
2410_2745	https://sabap2.birdmap.africa/coverage/pentad/2410_2745

[12] The identity of sensitive species identified by the Screening Tool must remain confidential and may under no circumstances be made known to the public (as per the best practise guideline as stipulated by the South African National Biodiversity Institute (SANBI) that accompanies the protocol and screening tool).

APPENDIX C: Faunal Species List

Table C1: Mammal species recorded on site.

Scientific Name	Common Name	Threat Status
Lepus saxatilis	Scrub Hare	LC
Sylvicapra grimmia	Common Duiker	LC
Canis mesomelas	Black-backed Jackal	LC
Raphicerus campestris	Steenbok	LC
Paraxerus cepapi	Tree squirrel	LC
Equus quagga	Plains Zebra	LC
Phacochoerus africanus	Common Warthog	LC
Loxodonta africana	Elephant	EN

LC = Least Concern

Table C2: Avifaunal species recorded on site.

Scientific name	Common Name	Threat Status
Merops bullockoides	White-fronted bee-eater	LC
Dendropicos fuscescens	Cardinal Woodpecker	LC
Cercotrichas paena	Kalahari Scrub Robin	LC
Tchagra australis	Brown-crowned Tchagra	LC
Uraeginthus angolensis	Blue Waxbill	LC
Passer melanurus	Cape Sparrow	LC
Streptopelia capicola	Cape Turtle Dove	LC
Lanius collaris	Common Fiscal	LC
Pycnonotus tricolor	Dark-capped Bulbul	LC
Numida meleagris	Helmeted Guineafowl	LC
Streptopelia senegalensis	Laughing Dove	LC
Dicrurus adsimilis	Fork-tailed Drongo	LC
Urocolius indicus	Red-faced Mousebird	LC
Prinia flavicans	Black-chested Prinia	LC
Corythaixoides concolor	Grey Go-away-bird	LC
Pternistis swainsonii	Swainsons Spurfowl	LC
Emberiza flaviventris	Golden-breasted Bunting	LC
Ploceus velatus	Southern Masked Weaver	LC
Lagonosticta senegala	Red-billed Firefinch	LC
Corvus albus	Pied Crow	LC
Lamprotornis nitens	Cape Starling	LC
Colius striatus	Speckled Mousebird	LC
Merops bullockoides	White-fronted bee-eater	LC

LC = Least Concern

Table C3: Reptile species recorded on site.

Scientific name	Common Name	Threat Status
Meroles squamulosus	*Common Rough-scaled Lizard*	NYBA
Trachylepis margaritifer	Rainbow Skink	LC
Gerrhosaurus flavigularis	Yellow-throated Plated Lizard	NYBA
Platysaurus minor	Waterberg Flat Lizard	NYBA

LC = Least Concern, NYBA = Not Yet Been Assessed

Table C4: Insect species recorded or expected (*) to occur on site.

Scientific Name	Common Name	Threat Status
Acanthacris ruficornis	Garden Locust	LC
Anacridium moestum	Tree Locust	NYBA
Junonia hierta	Yellow Pansy	LC
Musca domestica	House Fly	NYBA
Spialia sp.	Sandman	NYBA
Pinacopteryx eriphia	Zebra White	LC
Platypleura haglundi	Orange-wing	NYBA
Mylabris sp	Blister Beetle	NA
Garreta sp	Dung Beetle	NYBA
Danaus chrysippus	African Monarch	LC
Anomalipus elephas	Large Armoured Darkling Beetle	NYBA
Alcimus sp.	Robber Fly	NA
Miomantis caffra	South African Mantis	NYBA
Cyrtacanthacris tatarica	Brown-spotted Locust	NYBA
Graphipterus wahlbergi	Velvet Ground Beetle	NYBA
Promachus sp	Giant Robber Flies	NYBA
Acrida acuminata	Common Stick Grasshopper	NYBA
Aloeides taikosama	Dusky Copper	NYBA
Genus *Acrida*	Slantface Grasshoppers	NYBA

LC = Least Concern, NYBA = Not Yet Been Assessed

Table C5: Arachnid species recorded.

Scientific Name	Common Name	Threat Status
Family Agelenidai	Funnel-web Spiders	NYBA
Selenops radiatud	House Wall Spider	NYBA
Argiope australis	Common Garden Orbweb Spider	NYBA

NYBA = Not Yet Been Assessed