SCIENTIFIC TERRESTRIAL SERVICES

Terrestrial Biodiversity Assessment

AS PART OF THE ENVIRONMENTAL AUTHORISATION PROCESS FOR THE PROPOSED MAKGANYANE IRON ORE MINE NEAR POSTMASBURG, NORTHERN CAPE PROVINCE.

Part C: Faunal Assessment

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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 – Very High and 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 Focus Areas.	**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 Focus Areas 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 Focus Areas;	**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 Focus Areas, 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 Focus Areas;	**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 Focus Areas;	**Part C:** Section 5 **Part C:** Section 6
2.2.5	Determine the importance of the conservation of the population of the Species of Conservation Concern identified within the Focus Areas, 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

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

2.2.6	Determine the potential impact of the proposed development on the habitat of the Species of Conservation Concern located within the Focus Areas;	**Part C**: Section 5
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 and Section 5 **Part C**: Appendix B
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;	**Part C:** Section 3 **Part C:** Section 5
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;	**Part C:** Section 3 **Part C:** Section 5
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:** Section 5 **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 Focus Areas	**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 **Part C**: Section 5
3.1.10	A discussion on the cumulative impacts;	**Part C:** Section 5
3.1.11	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr)	**Part C:** Section 5
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.	**Part A**: Executive summary **Part C:** Section 6

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 habitat suitability modelling.	**Part C:** Faunal Assessment
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 Focus Areas.	**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
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**: Section 3 **Part C**: Appendix C

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ACRONYMS

AIP/AIPs	Alien Invasive Plant/Alien Invasive Plants
CI	Conservation Importance
CR	Critically Endangered
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EDL	Episodic Drainage Line
EIS	Ecological Importance and Sensitivity
EN	Endangered
FI	Functional Integrity
GIS	Geographic Information System
GN	Government Notice
GPS	Global Positioning System
Ha	Hectares
IBA	Important Bird Area
IEM	Integrated Environmental Management
IUCN	International Union for Conservation of Nature and Natural Resources
LC	Least Concern
NA	Not Applicable
NBA	National Biodiversity Assessment
NT	Near Threatened
NEMBA	National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)
NYBA	Not yet been assessed
m	Meter
m^2	Square metres
P	Protected, according to the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004): Amendment of Critically Endangered, Endangered, Vulnerable and Protected Species List. December 2007
PES	Present Ecological State
PFP	Preferential Flow Path
POC	Probability of Occurrence
QDS	Quarter Degree Square
RDL	Red Data Listed
R	Rare
RSA	Republic of South Africa
RR	Receptor Resilience
SABAP	Southern African Bird Atlas Project
SACNASP	South African Council for Natural Scientific Professions
SANBI	South Africa National Biodiversity Institute
SAS	Scientific Aquatic Services [Pty] Ltd
SEI	Site Ecological Importance
SP	Specially Protected
STS	Scientific Terrestrial Services
SCC	Species of Conservation Concern
sp and spp	The "**sp**." is an abbreviation for species. It is used when the actual species name cannot or need not or is not specified. The plural form of this abbreviation is "spp." and indicates "several species. Example: *Chrysoperla* **sp**. (when referring to a single species) and *Chrysoperla* spp.
TOPS	Threatened Or Protected Species (list of 2007) according to the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004):
VU	Vulnerable

GLOSSARY OF TERMS

Most definitions are based on terms and concepts elaborated by Richardson et al. (2011), Hui and Richardson (2017), Wilson et al. (2017), Skowno et al. (2019), and SANBI (2016), with consideration to their applicability in the South African context, especially South African legislation [notably the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), and the associated Alien and Invasive Species Regulations, 2020].

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.
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.
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 eviNorthern Cape DAEARDLRe 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 eviNorthern Cape DAEARDLRe 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.
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 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.
Endangered (EN) (IUCN Red List category)	**Applied to both species/taxa and ecosystems**: A species is EN when the best available eviNorthern Cape DAEARDLRe 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.

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

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.
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 eviNorthern Cape DAEARDLRe) 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. - Residual negative impacts: Negative impacts that remain after the proponent has made all reasonable and practicable changes to the location, siting, scale, layout, technology and design of the proposed development, in consultation with the environmental assessment practitioner and specialists (including a biodiversity specialist), in order to avoid and minimise negative impacts, and/or rehabilitate and/or restore impacted areas within 30 years (*It is acknowledged that the time it takes for full restoration differs from ecosystem type to ecosystem type, as well as the local conditions. Given that there is no readily accessible information on the recovery times of the different ecosystem types in South Africa, a general timeframe had to be used. The 30-year general timeframe in the definition of "residual impact" reflects that the difficulty in restoring South African ecosystems once they have been disturbed. It is based on the risk-averse and cautious approach.*). - 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.
Indigenous vegetation **(As per the definition in NEMA)**	Vegetation occurring naturally within a defined area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
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.
Listed invasive species	All alien species that are regulated in South Africa under the NEMBA, Alien and Invasive Species Regulations, 2020.
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.
Termitaria	Colonies of termites, typically within a tall mound of cemented earth.
Threatened ecosystem	An ecosystem that has been classified as CR, EN or VU, based on an analysis of ecosystem threat status. A threatened ecosystem has lost or is losing vital aspects of its structure, function, or composition. The NEMBA allows the Minister of Environmental Affairs or a provincial MEC for Environmental Affairs to publish a list of threatened ecosystems. To date, threatened ecosystems have been listed only in the terrestrial environment. In cases where no list has yet been published by the Minister, such as for all aquatic ecosystems, the ecosystem threat status assessment in the National Biodiversity Assessment (NBA) can be used as an interim list in planning and decision making.
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.
Trophic (ecological)	Refers to feeding and nutrition.
Vulnerable (VU) (Red List category)	**Applied to both species/taxa and ecosystems**: A species is VU when the best available eviNorthern Cape DAEARDLRe 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 eviNorthern Cape DAEARDLRe 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 (Pty) Ltd (STS) was appointed by Greenmined Environmental (Pty) Ltd to conduct a Terrestrial Biodiversity Impact Assessment as part of the Environmental Authorisation (EA) application process for the proposed Mining Rights Application (MRA) for the Makganyane Iron Ore Mine, located near Beeshoek, in the Northern Cape.

The proposed Minig Right Application (MRA) area will include the following farm portions: Portion 2 (A Portion of Portion 1), Remainder Portion, Remainder Portion of Portion 1 and Portion 3 of the Farm Makganyane No. 667. The MRA is located approximately 24 kilometre (km) north-west of Postmasburg on opposite sides of the R385 provincial road. Situated in the Magisterial / Administrative district of Kuruman, in the Northern Cape Province of South Africa. The total MRA comprises 1549,61 hectares (ha).

This assessment is however focused on only certain pre-selected areas, within the above-mentioned farm boundaries, associated with (i) an historical mining operational area, (ii) the proposed mining operation and (iii) a freshwater feature identified by the background databases, along with a 200 metre (m) buffer area will furthermore be referred to as "**Focus areas**" (Figure 1; Part A).

The proposed Makganyane mining operation is proposing the extraction of iron ore material from two open cast pits whereafter the crushed raw material will be transported by means of trucks along the R385 to the operational Beeshoek plant for processing. Once processed at the Beeshoek plant the concentrate is transported from the Postmasburg area to Arcelormittal's Vanderbijlpark and Newcastle Works through a combination of rail and road transport.

The following information was extracted from the mining work programme submitted for a mining right application for Makganyane Iron Ore Mine (Assmang (Pty) Ltd):

- The proposed mining operations will include two open cast pits, a stockpile area and a waste rock dump.
- Contractors will make use of diesel generated power supply and hence minimal electricity infrastructure will be required.
- A general water authorisation is available for 30 cubic metres (m^3) per day. Should additional water be required, it would need to be purchased from a third party.
- Offices, parking and other supporting infrastructure will be constructed as required.

No information relating to clean and dirty water separation systems (trenches, channels or a Pollution Control Dam [PCD]) or stormwater management systems was provided at the time of undertaking this assessment. Furthermore, it was assumed that the existing road network developed as part of the prospecting operation would be used for the mining operation as well. The Life of Mine (LoM) schedule is over 38 months. The proposed layout is shown in Figure 1.

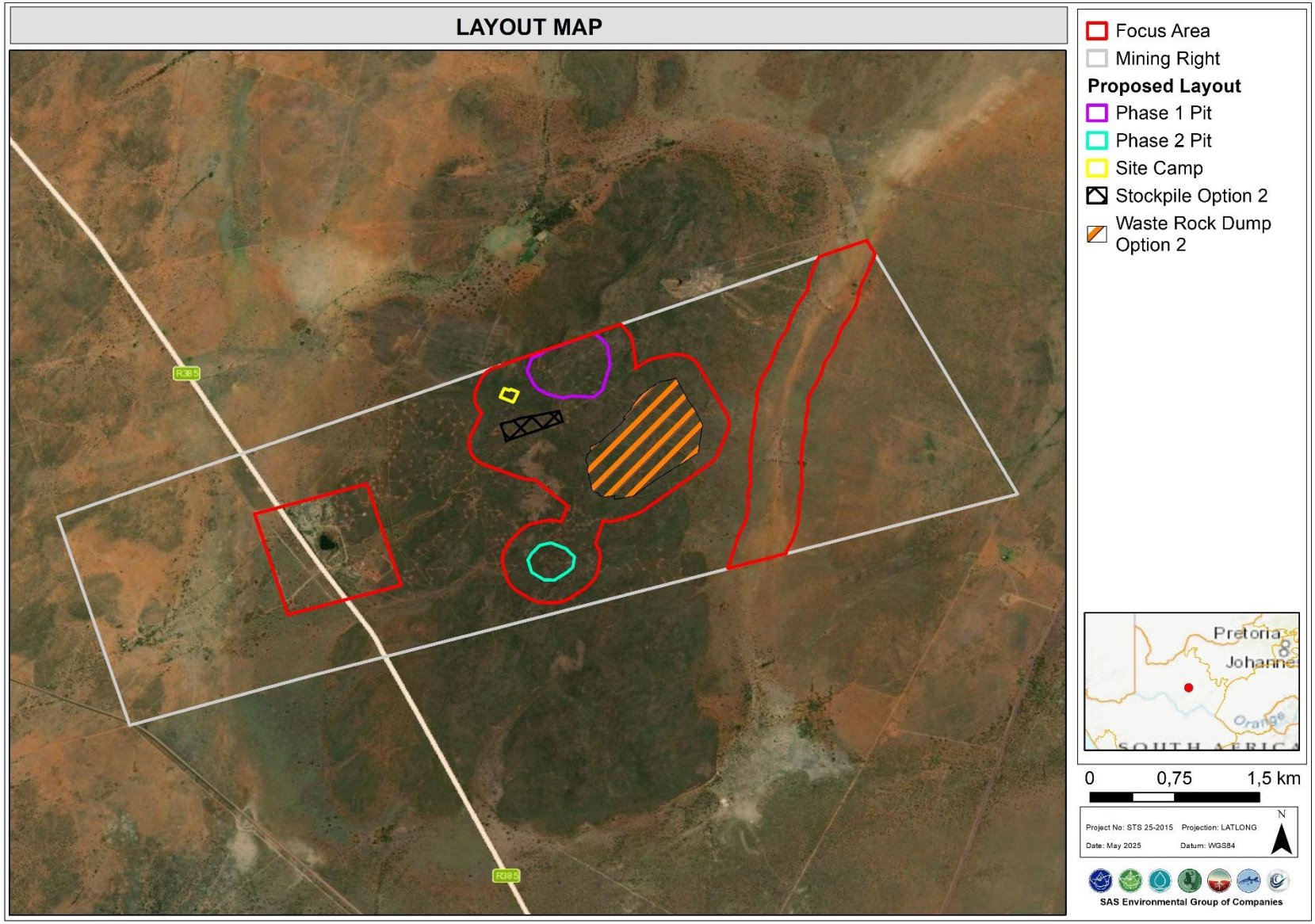

Figure 1: Proposed layout map for the Makganyane Iron Ore Mine.

1.1 Reporting Protocol

After the site verification and field assessment the low 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")) within the Focus Areas and MRA were disputed and a medium and high sensitivity was verified due to the presence of additional faunal SCCs, not triggered by the screening tool, with increased and confirmed POC. The medium sensitivity within the MRA was confirmed. Confirmation of the medium sensitivity was obtained on the basis that habitat for the flagged SCC is potentially available within the MRA. Following the application of the Site Ecological Importance (SEI), some areas within the Focus Areas were determined to be of high sensitivity. Given the confirmed medium and high sensitivities, the full reporting protocol has been followed.

1.2 Scope of Work

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

- To provide inventories of faunal species as encountered within the areas associated with the Focus Areas;
- To determine and describe habitat types, faunal communities and the ecological state of the sites associated with the proposed Focus Areas and to rank each habitat type based on conservation importance and ecological sensitivity;
- To identify and consider all sensitive landscapes such as rocky ridges, wetlands and/ or any other special features such as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) as they relate to faunal species;
- To conduct a Red Data Listed (RDL) and Species of Conservation Concern (SCC) assessment, including species as listed in the National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEMBA) Threatened or Protected Species (TOPS) list (Government Notice R152 in Government Gazette 29657, dated 23 February 2007, as amended), and the overall potential for such species to occur within the areas associated with the proposed Focus Areas;
- To guide the activities associated with the Focus Areas by providing detailed information in terms of the ecological importance of the habitats within the Focus Areas as well as the anticipated impact on such habitats stemming from the proposed

activities. Mitigation and management measures to reduce and manage such impacts are also provided in this report (Section 5); and

- To ensure the ongoing functioning of the ecosystem in such a way as to support local and regional conservation requirements, to allow regional and national biodiversity targets to be met, and the provision of ecological services in the local area is sustained.

1.3 Assumptions and Limitations

The following assumptions and limitations are applicable to this report:

- The faunal assessment was confined to the Focus Areas and did not include the neighbouring and adjacent properties, these were however considered as part of the desktop assessment;
- 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 as such the information provided herein 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 and 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;
- The field assessment was undertaken from the 1st to the 3rd of April 2025 (summer), to determine the faunal ecological status of the Focus Areas, and to “ground-truth” the results of the desktop assessment (presented in Section A);
- The field assessment focused only on the Focus Areas in which the footprint of the current layout will fall. The data for the rest of the MRA was extrapolated from the verified results; and
- 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.

2 ASSESSMENT APPROACH

The field assessment was undertaken during the summer (April 2025), to determine the faunal ecological status of the Focus Areas. A reconnaissance ‘walkabout’ was initially undertaken to determine the general habitat types found throughout the Focus Areas, following this, specific study sites were selected that were considered to be representative of the habitats

found within the Focus Areas, with special emphasis being placed on areas that may potentially support faunal SCC. Sites were investigated on foot in order to identify the occurrence of fauna within the Focus Areas. During the field assessment, camera traps were used to increase the likelihood of capturing and observing faunal species, notably nocturnal and reclusive mammals.

A detailed explanation of the method of assessment is provided in Appendix A of this report. The faunal categories covered in this assessment are mammals, avifauna, reptiles, amphibians, general invertebrates and arachnids. For the methodologies relating to the impact assessment and development of the mitigatory measures, please refer to Part A: Appendix C.

2.1 General approach

To accurately determine the PES of the Focus Areas and capture comprehensive data with respect to faunal taxa, the following methodology was applied:

- Maps and digital satellite images were consulted prior to the field assessment in order to determine broad habitats, vegetation types and potentially sensitive sites. An initial visual on-site assessment of the Focus Areas was made in order to confirm the assumptions made during consultation of the digital satellite imagery;
- For a detailed description of the vegetation types and habitats associated with the Focus Areas, please refer to Part B report;
- Relevant databases considered during the assessment of the Focus Areas included: iNaturalist, Important Bird and Biodiversity Areas (IBA, 2015), South African Bird Atlas Project 2 (SABAP2), International Union for Conservation of Nature (IUCN), Northern Cape Nature Conservation Act, 2009 (Act No 9 of 2009) (NCNCA), the Screening Tool (2024) and the National Biodiversity Assessment (NBA, 2018);
- Specific methodologies for the assessment, in terms of fieldwork 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 mitigatory measures, please refer to Part A: Appendix C.

2.2 Sensitivity Mapping

All the ecological features associated with the Focus Areas 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.

2.3 Faunal Species of Conservational Concern Assessment

During field assessments, it is not always feasible to identify or observe all species within an area, largely due to the secretive nature of many faunal species, possible low population numbers or varying habits of species. As such, and to specifically assess an area for faunal SCC, a Probability of Occurrence (POC) estimation is used, considering several factors to determine the probability of faunal SCC occurrence within the Focus Areas. Species listed in Appendix B whose known distribution ranges and habitat preferences include the proposed infrastructure development sites were taken into consideration. Faunal species likely to occur within the Focus Areas are indicated and briefly discussed within each of the relevant dashboards, along with their POC.

3 FAUNAL ASSESSMENT RESULTS

3.1 Sampling Effort

The 2025 site assessment took place over three days during summer by South African Council for Natural Scientific Professionals (SACNASP) registered faunal specialist. The site was surveyed on foot by means of extended transects (meanders) through the Focus Areas, where species were surveyed and habitat conditions noted; meanders were positioned within the various habitat types to ensure an adequate representation of faunal species from different classes (mammals, avifauna, reptiles, amphibians and invertebrates). Small and reclusive/nocturnal mammals are unlikely to be directly observed in the field due to their natural habits and threat avoidance tactics. As such camera traps were deployed overnight to observe these species so as to further provide further data on species assemblages, area occupancy and habitat suitability. Figure 2 below presents the GPS tracks of the specialist in relation to the Focus Areas as an indication of the area covered.

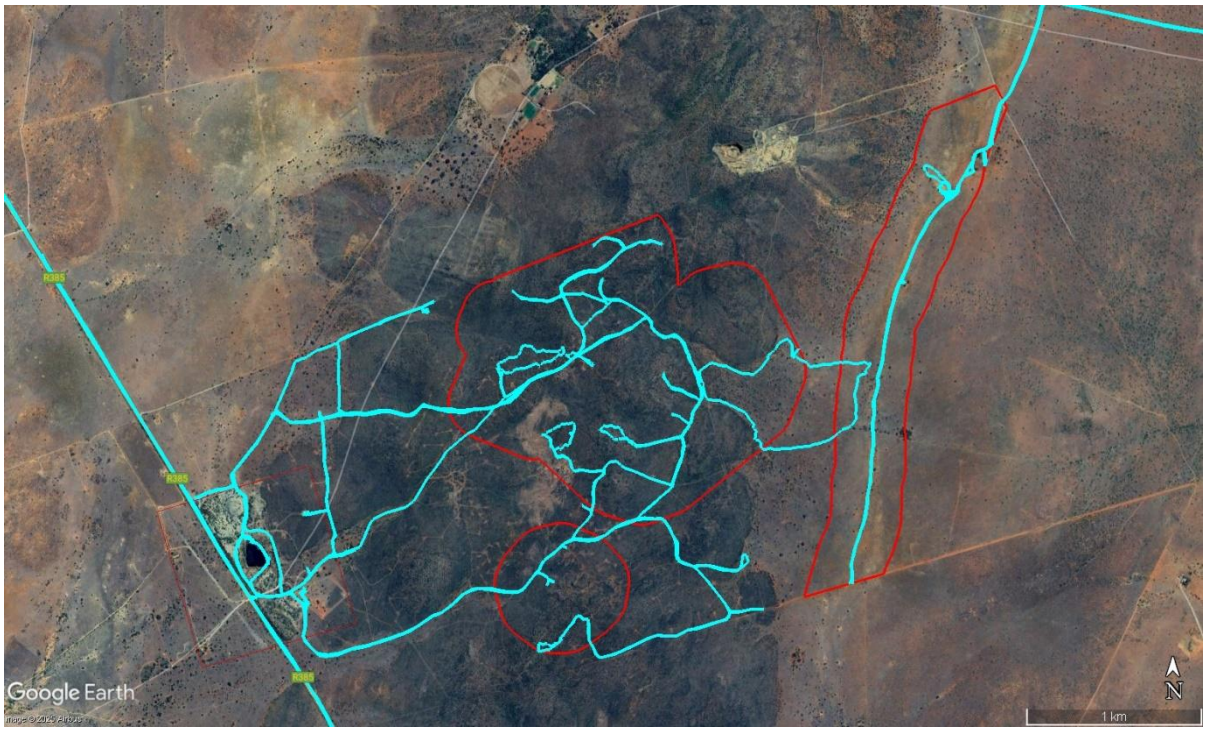

Figure 2: The Focus areas (red outline) and the specialists GPS tracks from the 2025 field assessment, the blue indicating the route taken by the faunal specialist.

3.2 Existing Impacts

The subsequent sections contextualise the Focus Areas and provide descriptions of the habitats on site, the existing impacts on site, as well as ecological processes that remain present within the Focus Areas.

The Focus areas have been significantly impacted by prospecting, from 2022 to 2024 (Figure 3). The historic prospecting has impacted the vegetation communities within the Focus areas, especially in terms of the vegetation structure – i.e., the impacted areas were associated with a lower woody tree cover and a higher abundance of both small shrubs and grass species than the reference vegetation (i.e., Kuruman Mountain Bushveld). Historic prospecting has resulted in the displacement of many larger mammal and avifaunal species, leading to a general decline in population abundance within the Focus areas. The ecosystem drivers (e.g., fire and herbivory) within the Focus areas are present albeit modified, based on the proximity to the historic mining activities and surrounding agricultural activities (i.e., cattle grazing).

Figure 3: Prospecting areas scattered throughout the Fous area.

A portion of the Focus Areas (to the west) is situated at a historic diamond mine and this anthropogenic activity has impacted the vegetation structure and composition of the surrounding vegetation, resulting in a compromised vegetation composition through the introduction of various Alien and Invasive Plants species (AIPs) and the removal of the indigenous vegetation. Therefore, the habitat integrity of the vegetation surrounding the old mining activities has decreased and considering that the post-mine closure activities and rehabilitations have been neglected the state of this area is in an overall 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). The old quarry from the historic diamond mine which is filled with freshwater does however supply drinking water for faunal species.

Within the far eastern portions of the Focus areas, the landowner has also indicated that they have been spraying herbicides to decrease the population of *Prosopis glandulosa,* however the impact of the spraying is evident in the woody component throughout this section of the Focus areas where other species such as *Senegalia mellifera* subsp*. detinens* are particularly observed to be affected (this is mostly evident in the far eastern section of the Focus areas).

3.3 Faunal Habitat

Based on the results of the field investigations undertaken in April 2025, the following habitat units were identified within the Focus Areas. These habitat units are discussed briefly below in terms of faunal utilisation and importance and are visually depicted in Figure 4 below. For a more detailed description and discussion of these habitat units in terms of the vegetative composition please refer to Part B: Floral Report.

1) **Kuruman Mountain Bushveld (approx. 274 ha):** The Kuruman Mountain Bushveld habitat is represented by a short closed thornveld. The majority of the Kuruman Mountain Bushveld habitat unit meets the definition of indigenous vegetation as per the NEMA definition. However, portions of this habitat unit have been recently impacted by prospecting activities, which only ceased end of 2024, therefore these sections of the Kuruman Mountain Bushveld are not considered indigenous vegetation. In some of the initial prospecting sites, indication of secondary succession is visible. The rocky nature of this habitat provided shelter and suitable habitat for reptiles, small to medium mammals and arachnids while the increase in vegetation attracted an increase in avifaunal and insect species. This habitat unit has the potential to support faunal SCC with an affinity for more rocky areas.
2) **Olifantshoek Plains Thornveld (approx. 119 ha):** This habitat is mostly associated with the eastern portions of the Focus areas. Overall, the vegetation structure included a tall open to semi-closed thornveld with a sparsely developed woody layer and a well-developed grass layer. The vegetation within this habitat is considered to be indigenous vegetation. The varied habitat structure, with trees and shrubs interspersed among the grass, provides suitable shelter for fauna and is especially favoured by avifauna, which were notably abundant in this area, albeit only common species being observed. This habitat unit has the potential to support faunal SCC with an affinity for more open areas with more prominent grass layers.
3) **Freshwater Habitat (approx. 114 ha):** This habitat was associated with two watercourse (SAS 25-0028, 2025), namely Episodic Drainage Lines (EDL) (without riparian habitat). The Freshwater Habitat is located within the central Focus area. The vegetation structure of the EDL is identical to the surrounding Kuruman

Mountain Bushveld vegetation. The Freshwater Habitat also includes various Preferential Flow Paths (PFP) and a Recharge Area that is not considered to be a true watercourse based on the definition provided by the NWA. The vegetation associated with the PFP is again composed of Kuruman Mountain Bushveld vegetation whereas the Recharge area was predominantly comprised of grasses and forbs with a scattered presence of shrubs. While the Recharge area has the potential to support several faunal SCC the PFPs and EDLs also serve as an important movement corridors for fauna and play an important role in connectivity within the landscape; and

4) **Transformed Habitat (33 ha):** The Transformed Habitat is mostly represented by the historic mining areas, mining infrastructure and farmhouses. The Transformed Habitat has been severely impacted and is in an overall poor ecological condition. The Transformed Habitat occurs mostly in the western extent of the Focus areas. Within this sub-unit, no clear vegetation structure can be linked to these areas as the natural vegetation structure has been altered or completely transformed (through mining activities). Furthermore, the Transformed Habitat has experienced a shift, in terms of species composition, structure and function, from the reference vegetation types (Kuruman Mountain Bushveld and Olifantshoek plains Thornveld). Due to these disturbances, which have reduced the availability of forage and shelter, these areas are not favourable for fauna habitation.

Figures 4 – 5 below provides a visual representation of the above-mentioned habitat units while Section 3.4 - 3.7 provide a dashboard report of the findings of each faunal class associated with the various habitat units.

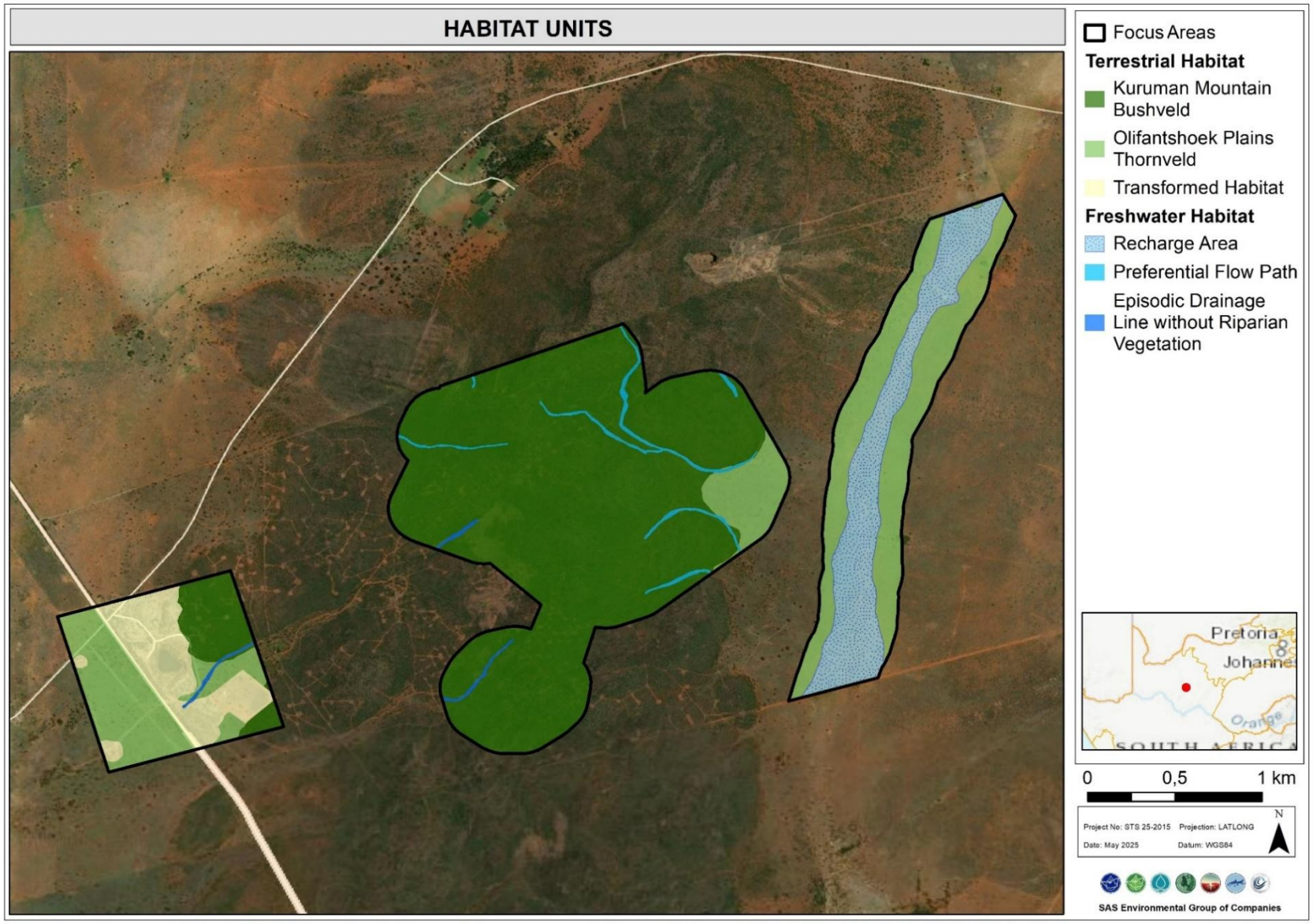

Figure 4: Conceptual illustration of the habitat units associated with the Focus Areas.

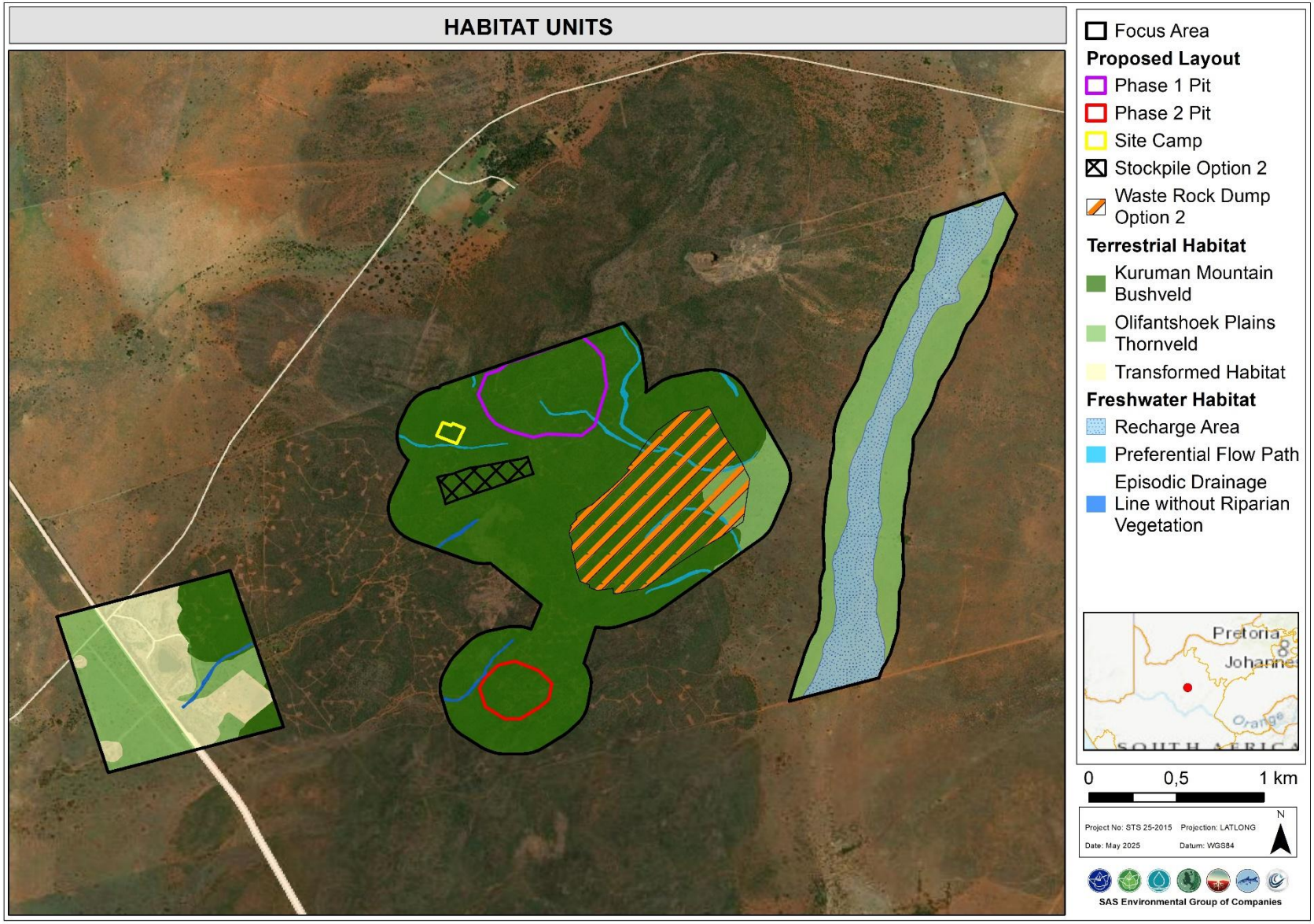

Figure 5: Conceptual illustration of the proposed mining activities in relation to the habitat units associated with the Focus Areas.

3.4 Mammals

Table 1: Field assessment results pertaining to mammal species within the Focus Areas.

a.) *Procavia capensis* (Rock Hyrax, LC); b.) *Tragelaphus strepsiceros* (Greater Kudu, LC); c) *Antidorcas marsupialis* (Springbok, LC; d.) Not observed during the site visit but a photograph was provided by one of the farmers of *Smutsia temminckii* (Temminck's Ground Pangolin, VU) seen within the MRA.

Mammal SCC			
Species	**Habitat and Resources in the Sites**	**Conservation Listing**	**POC**
Atelerix frontalis (Southern African Hedgehog)	This species occurs across a variety of habitats in Southern Africa. This species may potentially be found in the Mountain Bushveld and Thornveld habitats as well as along the edges of the Freshwater Habitat associated with the Focus Areas. The Focus Areas is within the known distribution of this species.	NT	Medium
Felis nigripes (Black footed Cat)	This species is found in the arid south and central parts of southern Africa in open dry habitats that have some vegetation cover. The Bushveld and Thornveld habitats may be utilised by this species in the Focus Areas. The Focus Areas is within the known distribution of this species.	VU	Medium
Smutsia temminckii (Temminck's Ground Pangolin)	This species has a wide distribution North of the Orange River in South Africa. It prefers woodland, grassland and rocky hills. The Mountain Bushveld and Thornveld Habitat in the Focus Areas are favourable habitats for this species. Two of the farmers from different properties within the MRA have confirmed the presence of this species on their properties. One of the farmers also provided photographs of this species taken on their property.	VU	**Confirmed**
Mellivora capensis (Honey Badger)	The Honey Badger has a widespread distribution across South Africa and is found in most habitats. The Bushveld and Thornveld habitats may be utilised by this species. The Focus Areas is within the known distribution of this species.	P - TOPS	Medium

Vulpes chama (Cape Fox)	The Cape Fox prefers open areas such as arid shrub and grasslands. The Bushveld and Thornveld habitats provide potentially suitable habitat for this species in the Focus Areas. They mostly feed on rodents, hares, insects and carrion. The Focus Areas is within the known distribution of this species.	P - TOPS	Medium

Mammal Discussion

A lower than expected abundance and diversity of mammals were observed in the Focus Areas likely due to the existing farming activities, historical prospecting and mining activities, potential hunting and trapping and the overall skittish nature of mammal species in the presence of humans. The Mountain Bushveld provides suitable habitat for some smaller to medium mammal species, whilst the remaining habitats have the potential to support a higher diversity of larger mammal species and provide grazing mammals with forage opportunities and some shelter. Transformed and more degraded areas are particularly devoid of mammals although some common species may occur particularly those that are adapted to exist in anthropogenically disturbed environments. Mesopredators will occur within the Focus Areas and surrounds, but large predators were completely absent from the Focus Areas and are not expected to occur within. The Freshwater Habitat (EDLs) although limited within the Focus Areas, serve as an important movement corridor for mammals travelling between habitats within the Focus Areas and landscape. This habitat may also provide a seasonal water source for mammals after rainfall.

The Focus Areas is connected to natural open areas surrounding it, ensuring ample habitat for mammals. The activities of farming, historical mining, and prospecting, as well as potential hunting and trapping in both the Focus Areas and its surroundings, most likely reduced the diversity and abundance of mammal species that were once present in the region. Despite fencing within and around the Focus Areas, most mammal species are still able to overcome these by crawling under, moving through or jumping over.

Common mammal species observed or signs thereof, apart from the photographs above, include *Geosciurus inauris* (Cape Ground Squirrel), *Raphicerus campestris* (Steenbok), *Lupulella mesomelas* (Black-backed Jackal), *Hystrix africaeaustralis* (Porcupine), *Cynictis penicillata* (Yellow Mongoose), *Sylvicapra grimmia* (Grey Duiker), *Lepus saxatilis* (Scrub Hare) and *Phacochoerus africanus* (Warthog). Although no mammal SCC was flagged by the screening tool or observed during the field assessment; one species, *Smutsia temminckii* (Temminck's Ground Pangolin, VU) was confirmed within the MRA by two different landowners. Several additional mammal SCCs and protected species have an increased POC within the Focus Areas. These species include: *Mellivora capensis* (Honey Badger, P- TOPS), *Atelerix frontalis* (Southern African Hedgehog, NT), *Felis nigripes* (Black footed Cat, VU), and *Vulpes chama* (Cape Fox, P-TOPS).

3.5 Avifauna

Table 2: Field assessment results pertaining to avifaunal species within the Focus Areas.

a) *Polihierax semitorquatus* (Pygmy Falcon, LC); b) *Laniarius atrococcineus* (Crimson-breasted Shrike, LC); c) *Tadorna cana* (South African Shelduck, LC); d) *Cinnyris fuscus* (Dusky Sunbird, LC).

Avifaunal SCC			
Species	**Habitat and Resources in the Sites**	**Conservation Listing**	**POC**
Gyps africanus (White-backed Vulture)	The white-backed vulture inhabits woodland regions of southern Africa. It relies on large mammalian carcasses as a food resource and very occasionally takes live prey. The Focus Areas may potentially be utilised for foraging but no breeding will occur in the herein as suitable large trees are mostly absent from the Focus Areas.	CR	Medium
Cursorius rufus (Burchell's Courser)	The Burchell's Courser is near endemic to South Africa and occurs widely in a fragmented pattern over arid interior regions. Open desert and semi-desert habitat with very sparse vegetation cover is its preferred habitat.	VU	Medium
Sagittarius serpentarius (Secretarybird)	This species favours open grassland and scrub with sufficient scattered trees for roosting/nest sites. The *Senegalia-Tarchonanthis* Thornveld may be utilised by this species in the Focus Areas where they may hunt reptiles, small mammals or invertebrates.	EN	High
Falco biarmicus (Lanner Falcon)	The Lanner Falcon occurs in open grassland, cleared woodland and agricultural fields where they will hunt birds, small mammals, reptiles and insects. Cliffs are favoured nesting sites but pylons, trees and building structures can also be utilised. The Kuruman Mountain Bushveld, Rocky Outcrops and the *Senegalia-Tarchonanthis* Thornveld may be utilised by this species in the Focus Areas.	VU	Medium
Polemaetus bellicosus (Martial Eagle)	The Martial Eagle occurs in a variety of habitats but prefers mesic and arid savanna and it is also commonly found in open shrubland and forest edges. The Kuruman Mountain Bushveld and *Senegalia-Tarchonanthis*	EN	Medium

	Thornveld may be utilised by this species for foraging purposes, but this species is unlikely to breed within the Focus Areas.		
Aquila rapax (Tawny Eagle)	Tawny Eagles are found in lightly wooded savannah and thornveld as well as semi-desert habitats. Scavenging and piracy are two of the most important foraging strategies for Tawny Eagles. The Focus Areas may provide suitable habitat for the Tawny Eagle.	EN	Medium
Coracias garrulus (European Roller)	Non-breeding migrant ranging from Morocco to southwestern and central Europe with its non-breeding range within Africa. European Rollers make use of abandoned excavated burrows and natural cavities as they are hole-nesters. Potential suitable habitat for this species may be found throughout the Focus Areas.	NT	Medium
Neotis ludwigii (Ludwig's Bustard)	Ludwig's Bustard is near-endemic to the region, primarily found in western Namibia and western South Africa. Within this area, they mostly inhabit the dry Karoo region of western South Africa. Ludwig's Bustards have a diverse diet, including small ground-dwelling animals such as insects and vertebrates. Their preferred food is the locust, which is abundant in their habitat. They are also known to eat flowers and seeds. There are recorded sightings of this species south of the Focus Areas, and given the presence of suitable habitat, they may potentially inhabit the Focus Areas.	EN	Medium
Ardeotis kori (Kori Bustard)	This species prefers dry, open savanna, Dwarf shrublands in the Nama Karoo and occasionally western grasslands that have clumps of trees near watercourses. This species has previously been recorded in close proximity to the current Focus Areas and has a high probability of occurring within the Focus Areas.	NT	High

Avifaunal Discussion

Avifaunal diversity associated with the Focus Areas appeared to be restricted to common species, with the more generalist and adaptable species being abundant. For avifauna, vegetation structure is commonly accepted as a primary determinant of avifaunal assemblages. The Thornveld Habitat and Mountain Bushveld Habitat offered the most structurally diverse habitats in the Focus Areas and appeared to contain the highest diversity of avifauna. Open patches with more grass species are also present in the eastern parts of the MRA providing locations of altered structure for avifauna preferring open landscapes. However, the vegetation here remains homogenous limiting resource opportunities. Anthropogenic structures such as fences do not restrict the movement of avifaunal species, making them capable of utilising the whole Focus Areas and surrounding landscape.

Common avifaunal species observed during the field assessment include: *Emberiza flaviventris* (Golden-breasted Bunting), *Curruca subcoerulea* (Chestnut-vented Warbler), *Lanius minor* (Lesser Grey Shrike), *Streptopelia capicola* (Cape Turtledove), *Pycnonotus nigricans* (Red-eyed Bulbul), *Vidua regia* (Shaft-tailed Whydah), *Lophotis ruficrista* (Red-crested Korhaan) and L*ophoceros nasutus* (African Gray Hornbill) to name a few (refer to Appendix C for the full list of species identified on-site). The avifaunal species observed mostly consisted of small insectivores, granivores and mixed feeders. Predatory birds that were observed consisted of common species such as, *Melierax canorus* (Pale Chanting-Goshawk), *Polihierax semitorquatus* (Pygmy Falcon) and *Falco rupicolus* (Rock Kestrel). Other raptor species are likely to be present, as their wide-ranging habits suggest they may still forage in the area. Most birds seemed to avoid the Transformed Habitat and preferred the more natural adjacent habitat units. The diversity of bird species was highest in the Kuruman Mountain Bushveld Habitat and Thornveld Habitat, where the vegetation structure was more diverse and provided better opportunities for foraging and shelter.

No avifaunal SCCs were observed during the field assessment, although several have the potential to occur in the Focus Areas. The online screening tool triggered a medium sensitivity for *Neotis ludwigii* (Ludwig's Bustard, EN) in the MRA. This sensitivity was confirmed as potential foraging habitat is available for this species. *Sagittarius serpentarius* (Secretarybird, VU) and *Ardeotis kori* (Kori Bustard, NT) both have a high POC within the Focus Areas as suitable habitat is available (notably in the more open areas) and as records of these species exist around the MRA. Other avifaunal SCCs which can potentially be found within the Focus Areas include *Gyps africanus* (White-backed Vulture, CR), *Aquila rapax* (Tawny Eagle, EN), *Cursorius rufus* (Burchell's courser, VU), *Falco biarmicus* (Lanner Falcon, VU), *Polemaetus bellicosus* (Martial Eagle, EN) and *Coracias garrulus* (European Roller, NT).

The proposed development in the Focus Areas will impact the availability of habitat for avifauna, leading to habitat loss and fragmentation. This will cause the dispersal of many bird species to adjacent habitats, reducing their abundance and diversity within the Focus Areas. The relocated species will possibly face increased competition for food and space in the surrounding areas. Furthermore, the development will lead to the localised loss of habitat, diversity, and bird abundance, while edge effects such as noise, dust, and potential expansion of the project footprint will impact bird species in the immediate vicinity. In addition, the increased movement of vehicles due to the new development may lead to higher avian mortality rates from collisions.

3.6 Herpetofauna (Reptiles and Amphibians)

Table 3: Field assessment results pertaining to herpetofauna species within the Focus Areas.

a) *Heliobolus lugubris* (Bushveld Lizard, LC); b) *Pelomedusa galeata* (Cape Terrapin, LC); c) *Stigmochelys pardalis* (Leopard Tortoise, LC); d) An example of rocky areas within the Mountain Bushveld Habitat that provides shelter and basking opportunity for reptiles.

Herpetofaunal SCC			
Species	**Habitat and Resources in the Sites**	**Conservation Listing**	**POC**
Pyxicephalus adspersus (Giant Bullfrog)	Inhabiting various vegetation types within Grassland, Savanna, Nama Karoo, and Thicket biomes, this species typically reproduces in seasonal, shallow, grassy pans situated in flat, open areas. It also utilises non-permanent vleis and shallow water along the edges of waterholes and dams. While occasionally found in clay soils, it exhibits a preference for sandy substrates. Artificial ponding, within the Focus Areas, after heavy rainfall events may support this species by providing suitable breeding and aestivation sites as well as food resources. Bullfrogs typically emerge from aestivation after the first rains of the season following winter. They will emerge from their burrows between October and March (most active between November and January) during or after heavy rainfall events.	TOPS - Protected	**Medium**
Herpetofauna Discussion			
No reptile SCCs were observed during the site visit or are expected to occur within the Focus Areas and associated habitats. The overall reptile abundances are expected to be higher than that which was observed as habitat, shelter and food were present throughout the Focus Areas notably within the Mountain Bushveld Habitat. Reptiles are inherently secretive and shy, making their detection and identification in the field challenging (specifically during site visits of limited duration). Although reptile observations were limited abundance and diversity are expected to be the highest in the Mountain Bushveld habitat as it provided good shelter, basking opportunities and food resources for reptiles. Common reptile species that might be found within the Focus Areas include *Varanus albigularis* (Rock Monitor, LC), *Naja nivea* (Cape Cobra, LC), *Pachydactylus capensis* (Cape Gecko, LC), *Zygaspis quadrifrons* (Kalahari Dwarf Lizard, LC), *Pedioplanis inornata* (Plain Sand Lizard, LC), *Psammophis leightoni* (Cape Sand Snake, LC), *Chamaeleo dilipis* (Flap-neck Chameleon, LC), *Acontias occidentalis* (Western Legless Skink, LC), *Bitis arietans arietans* (Puff Adder, LC) and *Agama aculeata* (Ground Agama, LC) to name a few.			

The clearance of vegetation is anticipated to prompt the localised migration of reptile species from the Focus Areas into the surrounding areas. This migration may elevate competition for food resources and habitat in the adjacent regions, potentially leading to a reduction in both abundance and diversity levels as a consequence of heightened resource competition. This effect on species diversity is expected to be limited, while reptile abundance is likely to diminish owing to edge effects impacting reptile species and their food resources in the immediate proximity of the development footprint. Moreover, the amplified vehicle movement to and from the footprint areas, along with increased human-wildlife conflict, is likely to heighten the risk of persecution for reptile species.

One TOPS-protected amphibian species has a medium POC within the study area, namely *Pyxicephalus adspersus* (Giant Bullfrog P-TOPS). Although there are no known records of this species in close proximity to the Focus Areas, the Focus Areas remains within the overall distribution range of the species. No amphibian species were observed during the site visit, however several common species may potentially be found within, such as *Tomopterna adiastola* (Confused Sand Frog), *Kassina senegalensis* (Bubbling Kassina), *Xenopus laevis* (African Clawed Frog) and *Breviceps adspersus* (Common Rain Frog). While the arid environment of the Focus Areas and the sparse presence of permanent watercourses or waterbodies lessen its suitability for amphibians, rainfall events create temporary ponds that can facilitate amphibian breeding and presence within the Focus Areas.

3.7 Invertebrates (Insects and Arachnids)

Table 4: Field assessment results pertaining to invertebrate species within the Focus Areas.

a) *Junonia oenone* (Dark Blue Pansy, LC); b) *Julodis humeralis* (Jewel Beetle, NYBA); c) *Uroplectes carinatus* (Common Lesser-Thicktail Scorpion, NYBA); d) Order – Solifugae (Sun Spiders).

Invertebrate SCC			
Species	**Habitat and Resources in the Sites**	**Conservation Listing**	**POC**
Opistophthalmus carinatus (Robust Burrowing Scorpion)	This species is found in a wide range of vegetation and soil types that have varying topography and geology. Rocky habitats on hillsides and at the bases of hills are the preferred habitat. The Mountain Bushveld Habitat may be a suitable habitat for this species.	P - TOPS	Medium
Opistophthalmus wahlbergii (Kalahari Burrower)	This species is found on sand dunes that typically have woodland vegetation. They also are found around human infrastructure. This species can be expected to be found in the more sandy areas of the Thornveld habitat.	P - TOPS	Medium
Harpactira sp (Common Baboon Spiders)	Baboon spiders live in silk-lined burrows under stones or large pieces of wood. Suitable habitat for these species can be found in the Mountain Bushveld and Thornveld Habitats within the Focus Areas.	P - TOPS	Medium
Invertebrate Discussion			
Insect abundance was high on site but consisted of a moderate diversity that was dominated by common species in the orders: Coleoptera (beetles), Orthoptera (crickets and grasshoppers) and Lepidoptera (moths and butterflies). Insects are the most common macro-organisms in landscapes and play a vital role in ecosystem functioning. High insect abundance and diversity typically indicate a healthy landscape. Insects serve as pollinators, help recycle nutrients back into the soil, and reduce the parasitic load in an environment by recycling dung back into the ground. They also provide a valuable food source for other faunal species. Low insect diversity and abundance may lead to reduced sustainability for other animal species and less effective ecosystem functioning.			

During the field assessment, observed arachnid (spiders and scorpions) abundances were low possibly due to their cryptic nature that makes them difficult to observe in the field. The Mountain Bushveld Habitat was considered of higher value for arachnids as it provided valuable shelter for such species as well as an increase in insect abundance that serves as their main food resource. Three TOPS-protected arachnid species may potentially be found within the Focus Areas, as suitable habitat is available, notably within the Mountain Bushveld and Thornveld Habitat.

The proposed development and associated infrastructure will lead to the loss of habitat and food resources, reducing the diversity of insects and other invertebrates. As large portions of natural habitat in the Focus Areas will be transformed, this loss of invertebrate abundance and diversity might have a negative cascading effect on the other faunal species in the Focus Areas, notably due to a reduction of food resources that invertebrates, notably insects, provide for other species. Impacts such as additional lighting and footprint creep will affect insect species near the proposed development, in addition to direct habitat loss.

4 SITE ECOLOGICAL IMPORTANCE (SEI) AND AREAS OF CONCERN

This section aims to (1) present the sensitivity of the receptors identified within the Focus Areas (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 Focus Areas 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 below indicates the individual SEI scoring for each habitat unit respectively. Figure 6 indicates the SEI for the Focus Areas, along with the proposed layout in Figure 7.

Table 5. A summary of the sensitivity of each habitat unit and the implications for the proposed activities.

Unit	CI	FI	BI	RR	SEI	Development Constraints
KURUMAN MOUNTAIN BUSHVELD	**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. **Confirmed POC:** *Smutsia temminckii* (Temminck's Ground Pangolin, VU).	**Medium** Mostly minor current negative ecological impacts with some major impacts (historical prospecting) and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium**	**Low** This habitat is unlikely to be able to recover fully after a relatively long period more than 15 years is required to restore <50% of the original species composition and functionality. The species associated with this habitat have a low likelihood of remaining at a site even when the impact is occurring, or species that have a low likelihood of returning to a site 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.
OLIFANTSHOEK PLAINS THORNVELD	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km2. 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. **Confirmed POC**: *Smutsia temminckii* (Temminck's Ground Pangolin, VU). **High POC**: *Sagittarius serpentarius* (Secretarybird, EN) & *Ardeotis kori* (Kori Bustard, NT).	**Medium** The Olifantshoek Plains Thornveld is mostly subject to minor current negative ecological impacts with some major impacts and a few signs of minor past disturbance (especially as a result of the impacts due to ongoing farming activities such as grazing).	**Medium**	**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 that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Medium**	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.

Unit	CI	FI	BI	RR	SEI	Development Constraints
FRESHWATER HABITAT: RECHARGE AREA	**High** Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km2. 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. **Confirmed POC:** *Smutsia temminckii* (Temminck's Ground Pangolin, VU). **High POC**: *Sagittarius serpentarius* (Secretarybird, EN) & *Ardeotis kori* (Kori Bustard, NT).	**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 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 that have a moderate likelihood of returning to a site 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: PFP & EDL	**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. **Confirmed POC:** *Smutsia temminckii* (Temminck's Ground Pangolin, VU).	**Medium** Mostly minor current negative ecological impacts with some major impacts (historical prospecting) and a few signs of minor past disturbance. Moderate rehabilitation potential.	**Medium**	**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 that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.	**Medium**	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.

Unit	CI	FI	BI	RR	SEI	Development Constraints
TRANSFORMED HABITAT	**Low** No confirmed and highly unlikely populations of SCC and < 50% of receptor contains natural habitat with limited potential to support SCC.	**Low** The Transformed almost has no habitat connectivity but migrations are still possible across some modified or degraded natural habitat. Low rehabilitation potential. The habitat is associated with several major current negative ecological impacts.	**Low**	**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.	**Very Low**	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

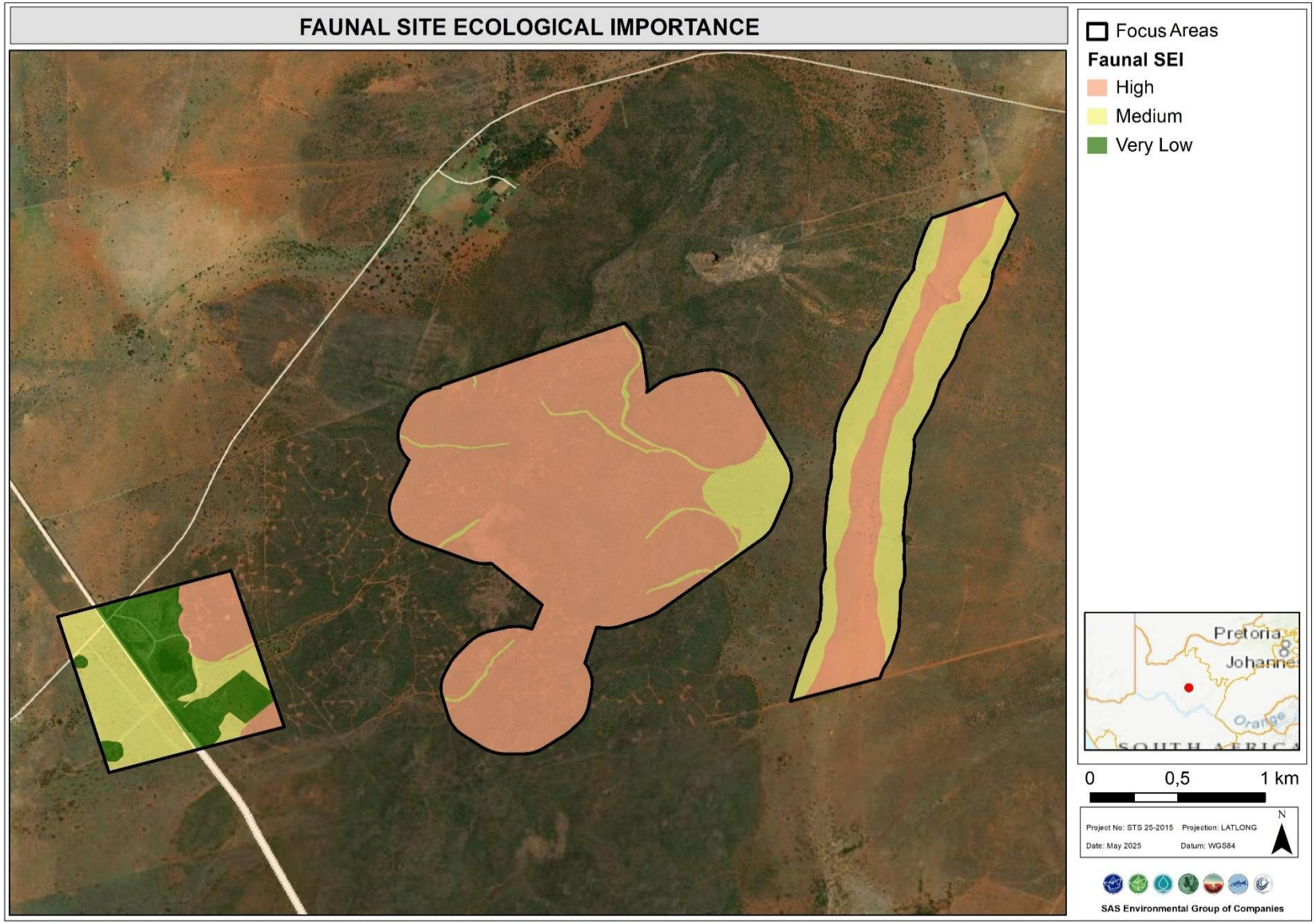

Figure 6: Habitat sensitivities associated with the Focus Areas.

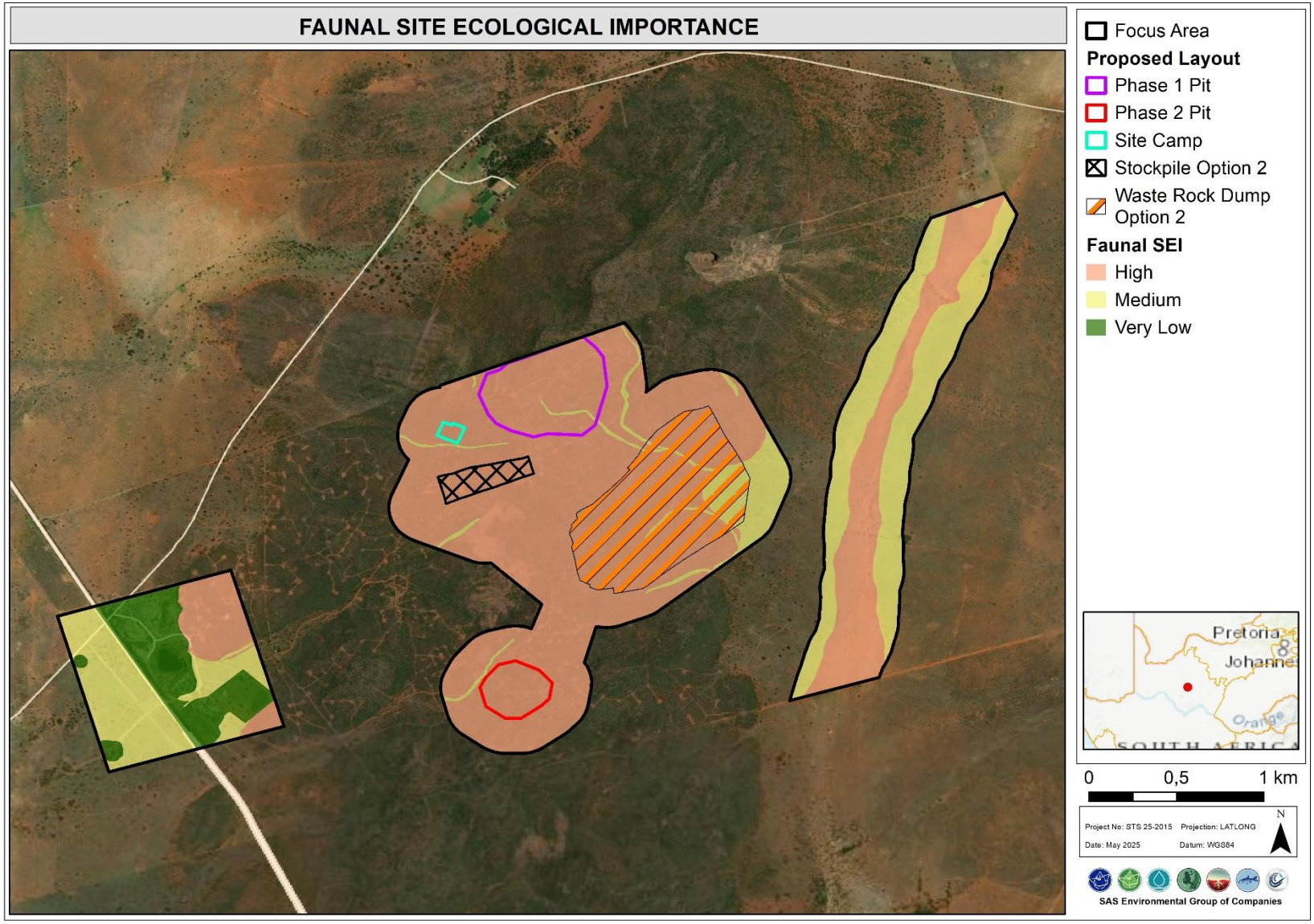

Figure 7: Habitat sensitivities associated with the Focus Areas in relation to the proposed layout.

5 IMPACT ASSESSMENT

The sections below provide the significance of perceived impacts arising from the proposed activities within the Focus areas. The impact assessment is based on the layout provided by the proponent as illustrated in Part A (Figure 3), for additional information regarding the project description please see **Part A**. The following infrastructure is proposed for Makganyane Iron Ore Mine:

- The proposed mining operations will include **two open cast pits**, **a stockpile area** and a **waste rock dump**; and
- **Offices, parking** and other **supporting infrastructure** will be constructed as required.

The table below indicate the extent of habitat loss, of the habitat units within the Focus areas, as a result on the proposed Makganyane mining activities.

Table 6: Impacts on habitat units within the Focus areas.

Habitat Unit	Total extent (ha)	Extent loss (ha)
Kuruman Mountain Bushveld	273,83	92,98
Olifantshoek Plains Thornveld	118,64	5,99
Transformed Habitat	32,46	NA
Freshwater Habitat		
Episodic Drainage Line	3,34	NA
Preferential Flow Path	102,52	2,98
Recharge Area	8,31	NA
Total Extent	**539,13**	**101,95**

5.1 Activities and Aspect Register

The sections below provide the significance of perceived impacts arising from the proposed activities within the Focus Areas.

An impact discussion and assessment of all potential i) pre-construction phase (“planning phase” hereafter), ii) construction and operational phase (“mining phase” hereafter), and iii) decommissioning and rehabilitation phase impacts are provided in Section 5.2. All mitigatory measures required to minimise the calculated impacts are presented in Section 5.2.

Distinct activities and perceived impacts can be identified in Table 7 below.

Table 7: Aspects and activities register considering faunal ecology during the pre-construction and planning phase, mining phase and decommissioning and rehabilitation phase.

ACTIVITIES AND ASPECTS REGISTER
Planning Phase
- Potential failure to initiate necessary management plans before and at the commencement of construction activities: • Potential failure to design an erosion control plan and stormwater management plan; • Potential failure to determine a desired post-closure land-use goal and associated rehabilitation strategy; • Potential failure to develop an AIP Management/Control Plan; and • Potential failure to develop a Biodiversity Action Plan (BAP). - **Impact**: Long-term or permanent degradation and modification of the receiving environment, potential loss of SCC and faunal habitat.
- Potential poorly planned placement of the proposed infrastructure encroaching into areas of increased sensitivity which carry out important ecological functions. - **Impact**: Extensive and unnecessary loss of important faunal habitat, leading to a decline in faunal diversity, including a decline in potential faunal SCC numbers and diversity.
- Potential failure to implement the required mitigation measures before and at the commencement of construction activities. - **Impact**: Long-term or permanent degradation and modification of the receiving environment and displacement or loss of faunal SCC.
Mining Phase
- Potential inadequate layout optimisation, resulting in extensive site clearing and the removal of indigenous vegetation. - **Impact:** Unnecessary loss of faunal habitat, species and the potential loss of faunal SCC.
- Uncontrolled and unplanned site clearing and the removal of vegetation and destruction of faunal habitat. - **Impact:** Loss of faunal habitat and faunal species reliant on this habitat beyond the demarcated footprints.
- Potential failure to demarcate the authorised footprints prior to mining commencing. - **Impact**: Increased size of planned footprints and loss of additional faunal habitat and SCC.
- Potentially impaired water quality and altered flow / recharge of watercourses. - **Impact:** Impact on ecologically important freshwater habitat not only in the Focus Areas but potentially downstream.
- Proliferation of AIP species that colonise areas of increased disturbances and may outcompete indigenous plant species, including further transformation of adjacent, undeveloped habitat. - **Impact:** Degradation of favourable faunal habitat outside of the direct mining footprint, leading to a decrease in faunal diversity at a local scale and loss of land to meet biodiversity targets.
- Potential failure to correctly stockpile topsoil removed during construction and mining activities leading to: • Potential contamination of topsoil stockpiles with AIP propagules; • Compaction of stockpiled topsoil leading to loss of viable soils for rehabilitation; and • Inefficient vegetating of stockpiled topsoil resulting in loss and degradation of soils. - **Impact:** Loss of viable soils for rehabilitation, thus hampering the potential for faunal species to successfully recolonise during rehabilitation activities, increasing the residual impacts.
- Potential dumping of excavated and construction material outside of designated areas, promoting the establishment of AIPs. - **Impact:** Loss of faunal habitat, diversity and potential SCC.
- Potential that the edge effects of the proposed mining activities are poorly managed. - Ineffective rehabilitation of compacted areas, bare soils, or eroded areas leading to a continual proliferation of AIP species in disturbed areas and subsequent spread to surrounding natural areas altering the faunal habitat. - **Impact:** Loss of faunal habitat, diversity and potential SCC in the adjacent areas to the proposed mine footprint. Loss of surrounding faunal diversity and potential faunal SCC through the displacement of indigenous flora by AIP species - especially in response to disturbance in natural areas.
- Potential failure to implement a concurrent rehabilitation and an AIP plan. - **Impact:** Potential for long-term degradation of faunal habitat in the areas adjacent to the mining footprint.
- Habitat fragmentation and loss of migratory corridors. - **Impact:** Long-term changes in faunal movement and potential loss of SCC due to a decrease in genetic exchange abilities.
- Potential failure to relocate faunal SCC should they be found within footprint areas and cannot relocate on their own.

ACTIVITIES AND ASPECTS REGISTER
- **Impact:** Loss of threatened species within the study area and placing further strain on such species at a population/regional level.
- Additional pressure on faunal habitat as a result of an increased human presence, contributing to: • Potential hunting/trapping/removal/collection of faunal species or potential SCC; and • Increased human activity will lead to the further displacement of species and potential faunal SCC. - **Impact:** Decreased faunal species abundance and diversity.
- Potential failure to correctly stockpile topsoil resulting in 1) potential contamination of topsoil stockpiles with AIP propagules, 2) compaction of stockpiled topsoil leading to loss of viable soils for rehabilitation, and 3) inefficient vegetating of stockpiled topsoil resulting in loss and degradation of soils (e.g., loss of viable soil through erosion and sediment runoff). - **Impact**: Long-term loss of faunal habitat and species diversity due to unsuitable topsoil for rehabilitation.
Decommission and Rehabilitation Phase
- Ineffective rehabilitation of exposed and impacted areas, increasing erosion risk, and AIP proliferation within the surrounding areas. - **Impact:** Permanent loss of faunal habitat, diversity and SCC, and a higher likelihood of edge effect impacts on adjacent and nearby natural vegetation.
- Potential poor management and failure to monitor rehabilitation efforts, leading to: • Landscapes being left fragmented, resulting in reduced migration capabilities of faunal species and a decrease in faunal diversity; • Compacted soils limiting the re-establishment of natural vegetation; and • Increased risk of erosion in areas left disturbed. - **Impact:** Long-term (or permanent) loss of faunal habitat, diversity and SCC.
- On-going risk of contamination from mining facilities beyond closure. - **Impact:** Permanent impact on floral habitat.

5.2 Faunal Impact Assessment Results

Section 5.2 indicates the perceived risks to the faunal ecology associated with all phases of the proposed mining activities. The section 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.

The post-closure rehabilitation goal was not provided at the time of assessment. As such, it will be recommended that the post-closure landscape should attempt to reinstate, as far as is feasible, a wilderness landscape resembling the surrounding areas and comprising indigenous vegetation from the reference states.

Important to note is the below impact tables only include the habitat units that will be impacted by the current proposed layout. However, where edge effects are anticipated to affect these habitats, these are also assessed collectively in the impact tables. Furthermore, should the layout be amended and various infrastructure added (e.g., PCD, pipelines and access roads) the impact assessment will need to be updated as well to reflect the necessary changes.

Table 8: Planning Phase impacts on the faunal habitat, diversity, and SCC from the proposed activities. Required mitigation measures are presented at the bottom of the table.

Impacting activities and associated habitat unit	Pre-Mitigation								Post-Mitigation							
	Severity	Duration	Extent	Frequency	Probability	Consequence	Overall likelihood	Significance	Severity	Duration	Extent	Frequency	Probability	Consequence	Overall likelihood	Significance
PLANNING PHASE																
Faunal Habitat and Diversity																
Kuruman Mountain Bushveld	3	4	3	2	5	3.3	3.5	11.7 Medium	2	4	2	2	5	2.7	3.5	9.3 Low-Medium
Olifantshoek Plains Thornveld	2	4	2	2	5	2.7	3.5	9.3 Low-Medium	1	4	1	2	5	2	3.5	7 Low-Medium
Freshwater Habitat: PFP & EDL	2	4	2	2	5	2.7	3.5	9.3 Low-Medium	1	4	1	2	5	2	3.5	7 Low-Medium
Faunal SCC																
Kuruman Mountain Bushveld	3	4	3	2	5	3.3	3.5	11.7 Medium	2	4	2	2	5	2.7	3.5	9.3 Low-Medium
Olifantshoek Plains Thornveld	2	4	2	2	5	2.7	3.5	9.3 Low-Medium	1	4	1	2	5	2	3.5	7 Low-Medium
Freshwater Habitat: PFP & EDL	2	4	2	2	5	2.7	3.5	9.3 Low-Medium	1	4	1	2	5	2	3.5	7 Low-Medium
Mitigation measures																
Habitat and Diversity: - At all times, ensure that sound environmental management is in place during the planning phase; - Site boundaries should be clearly demarcated so as to ensure that vegetation beyond the authorised footprint is not cleared; - Where possible, and feasible, all access roads should be kept to existing roads and areas that have already been disturbed so as to reduce fragmentation of existing natural habitat; - Ensure that a suitable relocation plan is in place to guide the effective and efficient relocation of species where necessary; - Ensure that a suitable snake handler is on call, or a suitable staff member has been trained to carry out removal activities of snakes encountered; - Prior to the commencement of construction activities, an authorised AIP Management/Control Plan should be compiled/implement; and - Prior to the commencement of construction activities on site, a rehabilitation plan should be developed and regularly updated as needed.															

Table 9: Mining Phase impacts on the faunal habitat, diversity, and SCC from the proposed activities. Required mitigation measures are presented at the bottom of the table.

Impacting activities and associated habitat unit	Pre-Mitigation								Post-Mitigation							
	Severity	Duration	Extent	Frequency	Probability	Consequence	Overall likelihood	Significance	Severity	Duration	Extent	Frequency	Probability	Consequence	Overall likelihood	Significance
MINNING PHASE																
Faunal Habitat and Diversity																
Kuruman Mountain Bushveld	4	4	4	5	5	4	5	20 High	4	4	3	5	5	3.7	5	18.3 Medium -High
Olifantshoek Plains Thornveld	3	4	3	5	5	3.3	5	16.7 Medium -High	3	4	2	5	5	3	5	15 Medium -High
Freshwater Habitat: PFP & EDL	3	4	3	5	5	3.3	5	16.7 Medium -High	3	4	2	5	5	3	5	15 Medium -High
Faunal SCC																
Kuruman Mountain Bushveld	5	4	4	5	5	4.3	5	21.7 High	5	4	3	5	4	4	4.5	18 Medium -High
Olifantshoek Plains Thornveld	4	4	3	5	5	3.7	5	18.3 Medium -High	4	4	2	5	4	3.3	4.5	15 Medium -High
Freshwater Habitat: PFP & EDL	4	4	3	5	5	3.7	5	18.3 Medium -High	4	4	2	5	4	3.3	4.5	15 Medium -High
Mitigation measures																
Faunal Habitat and Diversity																
- Removal of vegetation must be restricted to what is absolutely necessary and should remain within the approved project footprint. Footprints to be clearly demarcated to avoid footprint creep into adjacent habitat; - If snakes / scorpions / baboon spiders (or any other faunal species) are located within any buildings on site and pose a risk to operations staff and /or infrastructure, the species is to be carefully captured and moved to a safe space outside of the footprint. Where necessary, a trained snake catcher / competent staff member / ECO must effect the relocation; - No collection or hunting of any fauna species is to be allowed by personnel; - Night lighting must be kept to a minimum, as it attracts insects and disturbs their natural nocturnal activities and navigation senses. In this regard, lighting should be inward and downward facing to the footprint area. Lights should avoid the use of LEDs and other bright white globes. Soft yellow light emitting globes (sodium vapour) and red lights should be installed at all points as and where needed; - No unauthorised fires are to be allowed on the site; - No dumping of litter or human refuse/waste on site should be allowed; - Edge effects must be monitored and managed, notably AIP proliferation; - Existing roads are to be used for access purposes. No off-roading or driving through the surrounding veld is to be permitted; - Any disturbed areas should be concurrently rehabilitated; - Clearing activities within the various footprints should be undertaken in a phased approach. This will allow for faunal species to move out ahead of clearance activities. Where necessary, small/slow-moving species must be assisted / relocated out of harm's way; - Suppress dust to mitigate the impact of dust on surrounding vegetation which will reduce its palatability for herbivores; - Manage the spread of AIP species, which may affect natural habitat outside of planned footprints; and - Disturbed / bare areas no longer in use are to be rehabilitated using indigenous plant species.																
Faunal SCC																
- Edge effect control needs to be implemented to prevent further degradation and potential loss of faunal SCC habitat outside of the proposed development footprint; - No collection or hunting of SCC allowed by mining staff or associated contract workers, unless for the purpose of relocation; - Before any vegetation clearing activities start the footprint and immediate surrounding areas should be inspected for the presence of *Smutsia temminckii* (Temminck's Ground Pangolin, VU). Should individuals be found they should be safely captured and relocated to similar habitat outside of the footprint areas; - It is recommended that prior to and during vegetation clearing activities in the natural vegetation units, the site should be inspected for the presence of protected burrowing scorpions and baboon spiders. If located, these species should be carefully excavated ensuring no																

Impacting activities and associated habitat unit	Pre-Mitigation								Post-Mitigation							
	Severity	Duration	Extent	Frequency	Probability	Consequence	Overall likelihood	Significance	Severity	Duration	Extent	Frequency	Probability	Consequence	Overall likelihood	Significance
harm to the specimens and relocated to similar surrounding habitat outside of the footprint area. A night-time survey utilising UV lights is recommended to aid in the collection of potentially protected scorpions. The survey should be undertaken in summer when these arachnids are more active; - Should any SCC need to be removed from any footprint areas, it is to be done carefully by a trained professional/competent staff member. Where applicable permits must be obtained for such relocation. A biodiversity specialist should be contacted to advise in this regard, or alternatively the project ECO; and - If avian SCC nests are located, a qualified avifaunal specialist should be consulted to determine the best management options. If nests are known to have nestlings or eggs within, these should be allowed to fledge prior to the nest removal. It is important that no mining related activities take place adjacent to any active nest, ideally not within 200m, in order to limit the risk of nest abandonment.															

Table 10: Decommissioning and Rehabilitation Phase impacts on the faunal habitat, diversity, and SCC from the proposed activities. Required mitigation measures are presented at the bottom of the table.

Impacting activities and associated habitat unit	Pre-Mitigation								Post-Mitigation							
	Severity	Duration	Extent	Frequency	Probability	Consequence	Overall likelihood	Significance	Severity	Duration	Extent	Frequency	Probability	Consequence	Overall likelihood	Significance
DECOMMISSIONING AND REHABILITATION PHASE																
Faunal Habitat and Diversity																
Kuruman Mountain Bushveld	3	4	2	4	4	3	4	12 Medium	2	4	1	4	3	2.3	3.5	8.2 Low-Medium
Olifantshoek Plains Thornveld	2	4	2	4	4	2.7	4	10.7 Medium	2	4	1	4	3	2.3	3.5	8.2 Low-Medium
Freshwater Habitat: PFP & EDL	2	4	2	4	4	2.7	4	10.7 Medium	2	4	1	4	3	2.3	3.5	8.2 Low-Medium
Faunal SCC																
Kuruman Mountain Bushveld	2	4	2	4	4	2.7	4	10.7 Medium	1	4	1	4	3	2	3.5	7 Low-Medium
Olifantshoek Plains Thornveld	1	4	2	4	3	2.3	3.5	8.2 Low-Medium	1	4	1	4	2	2	3	6 Low-Medium
Freshwater Habitat: PFP & EDL	1	4	2	4	3	2.3	3.5	8.2 Low-Medium	1	4	1	4	2	2	3	6 Low-Medium
Mitigation measures																
Habitat, Diversity and SCC: - All infrastructure and footprint areas should be rehabilitated in accordance with the rehabilitation plan. Rehabilitation efforts must be implemented and continuously monitored for a period of at least 5 years after decommissioning and closure, or until an acceptable level of habitat and biodiversity re-instatement has occurred, in such a way as to ensure that natural processes and veld succession will lead to the re-establishment of the natural wilderness conditions which are analogous with the desired post-closure land use; - The post-closure rehabilitation land use must be determined and agreed upon for the rehabilitation plan to be drafted. It is recommended that the post-closure land use be to natural vegetation that represents, as far as possible, the pre-mined vegetation communities, with ecological function prioritised; - All temporary structures, waste, rubble, AIPs etc. must be removed from the site before re-vegetating can commence. Site levelling and preparation for rehabilitation activities must ensure no harm or disturbance comes to the surrounding natural areas; - Appropriate shaping of disturbed areas is essential. Ideally, the pit is to be backfilled with the excavated waste rock material and the remaining areas sloped in accordance with the surrounding landscape. Topsoil is to be used to cover the disturbed areas to ensure suitable growth media is present in order to best facilitate rehabilitation measures; - Edge effects such as erosion and AIP proliferation, which may affect adjacent or sensitive habitat, need to be strictly managed adjacent to the footprint areas and as part of the rehabilitation phase; - Ongoing AIP monitoring and control should take place throughout the rehabilitation phase of the project; - Any natural areas beyond the direct authorised footprint, which have been affected by the decommissioning activities, must be rehabilitated using indigenous species; and - All soils compacted because of construction activities falling outside of the Focus Areas should be ripped and profiled. Special attention should be paid to AIP control within these areas.															

5.3 Impact Discussion

The impact assessment was undertaken on all aspects of faunal ecology deemed likely to be affected by the proposed Makganyane Iron Ore Mine. The proposed activities will result in the loss of faunal habitat associated with the removal of vegetation in habitats of high and medium faunal SEI as well as the displacement of species within the footprint areas leading to reduced diversity and abundance within the Focus Areas.

The impact assessment is divided between impacts on 1) faunal habitat and diversity and 2) threatened faunal SCCs and/or their associated habitat. The post-closure rehabilitation goal was not provided at the time of assessment. As such, it will be recommended that the post-closure landscape should attempt to reinstate, as far as is feasible, a wilderness landscape resembling the surrounding areas and comprising indigenous vegetation from the reference states.

Several faunal SCCs have been confirmed or are highly likely to occur within the Focus Areas. It is assumed that if such species are potentially within the proposed layout, they will be displaced from the Focus Areas, and some slow-moving species may even be killed. The rescue/relocation of threatened faunal species is not recognised as a mitigation measure to reduce impacts by the proposed activities (SANBI, 2020) and, as such, cannot be used to reduce the scoring of impacts to such species for the impact assessment. Search and rescue initiatives for threatened species must still be attempted if proposed activities are approved but cannot be regarded as a mitigation measure as faunal habitat will still be lost.

5.3.1 Impact on Faunal Habitat and Diversity

The proposed mining activities will impact on faunal species predominantly as a result of loss of habitat due to vegetation clearance and earthworks. The subsequent loss of habitat will lead to a decrease in species abundance and diversity, as species will be displaced from the Focus Areas. Whilst some species which are highly tolerant to degraded / transformed habitats may continue to exist within the mining footprint, the majority of species will no longer be able to inhabit the Focus Areas. Such activities will result in a localised loss of species in the Focus Areas, whilst the mining activities may also significantly impact upon habitat connectivity and the current movement patterns of faunal species in the area.

Overall, the perceived impact significance of the proposed project (of the currently provided layout) on faunal habitat and diversity (prior to mitigation) ranges from **Medium** to **Low-Medium** for the Planning Phase, **High** to **Medium-High** during the Mining Phase and **Medium**

during the Decommissioning and Rehabilitation Phase. These impact scores can be reduced in most cases through the effective implementation of the proposed mitigation measures given in section 5.2. The highest impacts can be expected during the Mining Phase when vegetation will be cleared, and faunal habitat will be lost leading to a reduced diversity and abundance of fauna within the Focus Areas. Although the anticipated post-mitigation impacts within the Focus Areas are expected to result in a **Medium-High** significance at a local scale, it is unlikely that faunal species will be affected at a population level if strict mitigation measures and a thorough rehabilitation plan are implemented.

5.3.2 Impacts on Faunal SCC

Within the Focus Areas, no faunal SCCs were triggered by the online screening tool, however several additional SCCs have increased and confirmed POC within the Focus Areas and MRA. Within the MRA the screening tool did flag a medium sensitivity for *Neotis ludwigii* (Ludwig's Bustard, EN) in the MRA. This sensitivity was confirmed due to potential suitable habitat being present.

Within the Focus Areas, one mammal SCC was confirmed by two separate land owners namely *Smutsia temminckii* (Temminck's Ground Pangolin, VU). This species will utilise the Kuruman Mountain Bushveld and Olifantshoek Plains Thornveld Habitats as well as some of the Freshwater Habitat within the Focus Areas. The proposed mining development has the potential to impact this species in two significant ways. Firstly, it may directly displace individual members of the species from the Focus Areas and potentially kill individuals if not safely relocated out of the way of large machinery. Secondly, the associated vegetation clearing could result in a reduction of suitable foraging and/or breeding habitat within the region. Two additional threatened mammal species and two TOPS-protected species have medium POC within the Focus Areas due to distribution overlap and potential suitable habitat.

Two avifaunal SCCs have high POC within the Focus Areas namely, *Ardeotis kori* (Kori Bustard, NT) and *Sagittarius serpentarius* (Secretarybird, EN). Both these species are known to occur within the region and have suitable habitat within the Focus Areas. These species will most likely be found within the Olifantshoek Plains Thornveld and Freshwater Habitat (Recharge Area) where they will likely forage and potentially nest. The disturbance due to the construction of the mine will displace any individuals should they occur within the Focus Areas, albeit suitable habitat loss is minimal. Additionally, there are seven avifaunal SCCs that have a medium POC to occur within the Focus Areas as potentially suitable habitat is available and distributions overlap. Most of these avian species require extensive habitats to meet their

dietary needs, thus their presence within the Focus Areas is expected to be only temporary should they occur.

One TOPS-protected amphibian *Pyxicephalus adspersus* (Giant Bullfrog, TOPS-P), has medium POC to occur within the Focus Areas. This species will rely on potential artificial ponding areas after heavy rains to breed, forage and aestivate within the Focus Areas.

Three TOPS-protected arachnid species, *Opistophthalmus carinatus* (Robust Burrowing Scorpion), *Opistophthalmus wahlbergii* (Kalahari Burrower, P-TOPS) and Baboon spiders in the genus *Harpactira* have medium POC within the Focus Areas. These species are most likely to be found in the Kuruman Mountain Bushveld and Olifantshoek Plains Thornveld Habitat. Vegetation clearance activities and earth works will place many of the smaller, slow moving SCC and protected species at risk, not only from a loss of habitat but also potential mortalities as they come into contact with faster moving heavy machinery.

The highest impacts on faunal SCC can be expected during the mining phase where impacts can be expected to range from **High** to **Medium-High** (pre-mitigation). Although some impact scores can be reduced through the implementation of mitigation measures, the significance will remain **Medium-High** (post-mitigation)**.** The Planning and Decommissioning and Rehabilitation Phases will result in reduced impacts on faunal SCC. Subject to the strict implementation of mitigation measures, the relatively small footprint of the proposed mine, in comparison to the available habitat in the region, is unlikely to result in significant impacts on SCC populations in the region. However, it is important to acknowledge that individuals within the Focus Areas may still be impacted at a local scale.

5.3.3 Probable Residual Impacts

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

- Continued degradation of natural habitat adjacent to the site as a result of edge effects;
- Continued decrease of faunal diversity and abundance in the Focus Areas;
- Continued loss of potential and confirmed SCCs in the Focus Areas;
- Edge effects such as further habitat fragmentation and AIP proliferation; and
- Disturbed areas are highly unlikely to be rehabilitated to baseline levels of ecological functioning and loss of faunal habitat and species diversity will most likely be long term.

5.3.4 Cumulative Impacts

Historical and current diamond mining activities, albeit small scale, to the north and west of the Focus Areas have already resulted in local habitat loss and disturbance to faunal species in the immediate area. Such impacts have led to habitat transformation and the displacement of species, many of which likely relocated to the Focus Areas in order to escape disturbances. To the north-east of the Focus Areas, additional mining operations have already caused significant habitat loss in the larger region, increasing pressure on species as habitat loss continues.

The proposed activities will result in the loss of faunal habitats within the development areas and a decrease in the abundance of fauna. This may also reduce the presence of specific faunal species in the area. As a result, fauna may be forced to move into surrounding vegetated areas, leading to more competition for territories and breeding sites. Additionally, this displacement could lead to increased competition for resources, potentially resulting in higher mortality rates and reduced species diversity. Increased human presence and activity in the area, during construction and once the development is operational, could potentially lead to noise disturbance, illegal harvesting and persecution of fauna in or adjacent to the Focus Areas. There is also an increased risk of fire frequency, which could negatively impact faunal communities outside the development footprint. Dumping of other waste material in sensitive areas / areas outside of demarcated dump sites will further add to the overall cumulative impact on the receiving environment.

Based on the general landscape and habitat within the Focus Areas the site has the potential to host intermediate assemblages of fauna and several potential and confirmed SCCs. These SCCs have potential foraging and breeding habitat within the Focus Areas, as such, uncontrolled development/activities within the respective habitats (particularly the Kuruman Mountain Bushveld and Olifantshoek Plains Thornveld Habitat) will potentially result in the loss of breeding or foraging habitat for these species.

5 CONCLUSION

During the field assessment, four broad habitat units were identified, namely the Kuruman Mountain Bushveld (High SEI), Olifantshoek Plains Thornveld (Medium SEI), Freshwater Habitat: (Recharge Area) (High SEI), Freshwater Habitat (EDL & PFP) (Medium SEI) and Transformed Habitat (Very Low SEI).

The site assessment indicated that the Focus Areas has the potential to host several faunal SCCs and protected species. Including nine avifaunal species, five mammal species, one amphibian and three invertebrate species. One mammal species has been confirmed, *Smutsia temminckii* (Temminck's Ground Pangolin, VU) while two avifaunal species, *Ardeotis kori* (Kori Bustard, NT) and *Sagittarius serpentarius* (Secretarybird, EN) have high POC within the Focus Areas. These species are all expected to be impacted upon through the current development either directly through displacement or through losing foraging and breeding habitat.

The highest impacts on faunal ecology are anticipated during the mining phase of the proposed mining activities, as this phase will result in large portions of the Focus Areas (i.e., indigenous vegetation), of high and medium faunal SEI, being cleared. **Medium-High and High** impacts prior to mitigation can be anticipated within the Focus Areas. Following mitigation measures, impact scoring can be reduced for the most part although impact significance will mostly stay the same (**Medium-High**).

The objective of this study was to provide sufficient information on the faunal ecology of the area, together with other studies on the physical and socio-cultural environment, in order for the Environmental Assessment Practitioner and the relevant authorities to apply the principles of Integrated Environmental Management and the concept of sustainable development. Although the anticipated post-mitigation impacts within the Focus Areas are expected to result in a **Medium-High** significance at a local scale, it is unlikely that faunal species will be affected at a population level. With the implementation of stringent mitigation measures and environmental management including thorough rehabilitation plan, it is believed that the project can be considered for authorisation.

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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. The presence of anthropogenic activities associated with the Focus Areas may have an impact on faunal behaviour and in turn the rate of observations.

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 Focus Areas was used to determine areas of higher value to mammal species and focus was placed within these areas during the field survey. Transects were walked throughout the Focus Areas to cover maximum ground within the given timeframe.

Small and reclusive/nocturnal mammals are unlikely to be directly observed in the field due to their natural habits and threat avoidance tactics. As such camera traps were employed to capture some of these species in order to further saturate the species diversity/abundance data.

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 Focus Areas. Field surveys were undertaken utilising direct observation and bird call identification techniques 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.

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. The data gathered during the assessment along with the habitat analysis provided an accurate indication of which reptile species are likely to occur in the Focus Areas. 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. The data gathered during the assessment along with the habitat analysis provided an accurate indication of which amphibian species are likely to occur within the Focus Areas as well as the surrounding area. Specific attention was given to amphibian SCC listed on a regional and national level, as well as those identified by the Screening Tool.

Invertebrates

Whilst conducting transects through the Focus Areas, all insect species visually observed were identified, and where possible photographs were 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 Focus Areas at the time of the survey. Specific attention was given to insect SCC listed on a regional and national level, as well as those identified by the Screening Tool.

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 within the Focus Areas.

Faunal Species of Conservational Concern Assessment

The Probability of Occurrence (POC) for each faunal SCC is described:

- "**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.

Faunal Site Ecological Importance (SEI)

SEI is 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[4]) 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.

[4] 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.

APPENDIX B: Faunal SCC

Table B1: TOPS list of faunal species (2007) that require a permit, should they need to be transported for relocation purposes

Scientific Name	Common Name	POC
CRITICALLY ENDANGERED SPECIES		
REPTILIA		
Caretta	Loggerhead Sea Turtle	N/A
Dermochelys coriacea	Leatherback Sea Turtle	N/A
Eretmochelys imbricate	Hawksbill Sea Turtle	N/A
AVES		
Grus carunculatus	Wattled Crane	Low
Hirundo atrocaerulea	Blue Swallow	Low
Neophron percnopterus	Egyptian Vulture	Low
Poicephalus robustus	Cape Parrot	Low
MAMMALIA		
Bunolagus monticularis	Riverine Rabbit	Low
Chrysospalax	Rough-haired Golden Mole	Low
ENDANGERED SPECIES		
REPTILIA		
Chelonia mydas	Green Turtle	Low
Cordylus giganteus	Giant Girdled Lizard	Low
Lepidochelys olivacea	Olive Ridley Turtle	Low
Psammobates geometricus	Geometric Tortoise	Low
AVIFAUNA		
Anthropoides paradiseus	Blue Crane	Low
Balearica regulorum	Grey Crowned Crane	Low
Ephippiorhynchus senegalensis	Saddle-billed Stork	Low
Gypaetus barbatus	Bearded Vulture	Low
Gyps africanus	White-backed Vulture	Medium
Gyps coprotheres	Cape Vulture	Low
Necrosyrtes	Hooded Vulture	Low
Pelecanus rufescens	Pink-backed Pelican	Low
Scotopelia peli	Pel's Fishing Owl	Low
Torgos tracheliotus	Lappet-faced Vulture	Low
MAMMALIA		
Amblysomus robustus	Robust Golden Mole	Low
Damaliscus tunatus	Tsessebe	Low
Diceros bicornis	Black Rhinoceros	Low
Equus zebra	Mountain Zebra	Low
Lycaon pictus	African Wild Dog	Low
Neamblysomus gunningi	Gunning's Golden Mole	Low
Ourebia ourebi	Oribi	Low
Paraxerus palliatus	Red Squirrel	Low
Petrodromus tetradactylus	Four-toed Elephant-shrew	Low
INVERTEBRATA		
Colophon spp - species	Stag Beetles	Low
VULNERABLE SPECIES		
AVES		
Trigonoceps occipitalis	White-headed Vulture	Low
Aquila rapax	Tawny Eagle	Medium
Ardeotis kori	Kori Bustard	High
Ciconia nigra	Black Stork	Low
Circaetus fasciolatus	Southern Banded Snake Eagle	Low

Scientific Name	Common Name	POC
Eupodotis caerulescens	Blue Korhaan	Low
Falco fasciinucha	Falcon	Low
Falco naumanni	Lesser Kestrel	Low
Falco peregrinus	Peregrine Falcon	Low
Geronticus calvus	Bald Ibis	Low
Neotis ludwidii	Ludwig's Bustard	Medium
Polemaetus bellicosus	Martial Eagle	Medium
Terathopius ecaudatus	Bateleur	Low
Tyto capensis	Grass Owl	Low
MAMMALIA		
Acinonyx jubatus	Cheetah	Low
Chrysospalax trevelyani	Giant Golden Mole	Low
Cricetomys gambianus	Giant Rat	Low
Damaliscus pyrgorgus pygargus	Bontebok	Low
Dendrohyrax arboreus	Tree Hyrax	Low
Hippotragus equinus	Roan Antelope	Low
Smutsia temminckii	Pangolin	Confirmed
Neamblysomus julianae	Juliana's Golden Mole	Low
Neotragus moschatus	Suni	Low
Panthera leo	Lion	Low
Panthera pardus	Leopard	Low
Philantomba monticola	Blue Duiker	Low
INVERTEBRATA		
Peripatopsis alba	White Cave Velvet Worm	Low
PROTECTED SPECIES		
AMPHIBIA		
Pyxicephalus adspersus	Giant Bullfrog	Medium
Pyxicephalus edulis	African Lesser Bullfrog	Low
REPTILIA		
Bitis gabonica	Gaboon Adder	Low
Bitis schneideri	Namaqua Dwarf Adder	Low
Bradypodion taeniabronchum	Smith's Dwarf Chameleon	Low
Cordylus cataphractus	Girdled Lizard	Low
Crocodylus niloticus	Nile crocodile	Low
Python natalensis	African Rock Python	Low
AVES		
Bucowus leadeateri	Southern Ground-Hornbill	Low
Circus ranivorus	African Marsh Harrier	Low
Neotis denhami	Denham's Bustard	Low
Spheniscus	Jackass Penguin	Low
MAMMALIA		
Atelerix frontalis	South African Hedgehog	Medium
Ceratotherium simum	White Rhinoceros	Low
Connochaetes	Black Wildebeest	Low
Crocuta crocuta	Spotted Hyaena	Low
Felis nigripes	Black-footed Cat	Medium
Parahyaena brunnea	Brown Hyaena	Low
Leptailurus serval	Serval	Low
Loxodonta africana	African elephant	Low
Lutra maculicollis	Spotted-necked Otter	Low
Millivora capensis	Honey Badger	Medium
Raphicerus sharpei	Sharpe's Grysbok	Low
Redunca	Reedbuck	Low
Vulpes chama	Cape Fox	Medium

Scientific Name	Common Name	POC
INVERTEBRATA		
Aloeides clarki	Coega Copper Butterfly	Low
Ceratogyrus spp - All species	Horned Baboon Spiders	Low
Echinodiscus bisperforatus	Pansy Shell	Low
Dromica spp - All species	Tiger Beetles	Low
Graphipterus assimilis	Velvet Ground Beetle	Low
Hadogenes spp -species	Flat Rock Scorpions	Low
Haliotis midae	South African Abalone	Low
Harpactira spp - All species	Common Baboon Spiders	Medium
Ichnestoma - Aspecies	Fruit Chafer Beetles	Low
Manticora spp - Aspecies	Monster Tiger Beetles	Low
Megacephala asperata	Tiger Beetle	DD
Megacephala regalis	Tiger Beetle	DD
Nigidius auriculatus	Stag beetle	DD
Oonotus adspersus	Stag Beetle	DD
Oonotus interioris	Stag Beetle	DD
Oonotus rex	Stag Beetle	DD
Oonotus sericeus	Stag Beetle	DD
Opisthacanthus spp - All species	Creeping Scorpions	Low
Opistophthalmus spp - All species	Burrowing Scorpions	Medium
Platychile pallida	Tiger Beetle	DD
Prosopocoilus petitclerci	Stag Beetle	DD
Prothyma guttipennis	Tiger Beetle	DD
Pterinochilus spp - All species	Golden Baboon Spiders	Low

DD = Data Deficient

Table B2: Screening Tool triggered species for the MRA.

Species	Common Name	Status	Sensitivity	POC
Neotis ludwidii	Ludwig's Bustard	EN	Medium	Medium

EN = Endangered,

South African Bird Atlas Project 2 list for quadrant QDS 2822BB

Table B2: Avifaunal Species for the pentads 2805_2255, and 2805_2250, within the QDS 2822BB

Pentads	Link to pentad summary on the South African Bird Atlas Project 2 web page
2805_2255	http://sabap2.adu.org.za/coverage/pentad/2805_2255
2805_2250	http://sabap2.adu.org.za/coverage/pentad/2805_2250

APPENDIX C: Faunal Species List

Table C1: Mammal species and signs thereof observed and likely (*) to be associated with the Focus Areas.

Scientific Name	Common Name	Threat Status
Smutsia temminckii	Temminck's Ground Pangolin	VU
Sylvicapra grimmia	Common Duiker	LC
Procavia capensis capensis	Cape Rock Hyrax	LC
Lepus saxatilis	Scrub Hare	LC
Tragelaphus strepsiceros	Greater Kudu	LC
Canis mesomelas	Black-backed Jackal	LC
Cynictis penicillata	Yellow Mongoose	LC
Papio ursinus	Chacma Baboon	LC
Phacochoerus africanus	Warthog	LC
Raphicerus campestris	Steenbok	LC
Hystrix africaeaustralis	Porcupine	LC
Geosciurus inauris	Ground Squirrel	LC
Antidorcas marsupialis	Springbok	LC
**Orycteropus afer*	Aardvark	LC
**Genetta felina*	Southern Small-spotted Genet	LC
**Caracal caracal*	Caracal	LC
**Lepus capensis*	Cape Hare	LC
**Pedetes capensis*	Springhare	LC
**Cryptomys hottentotus*	Common Mole-rat	LC
**Elephantulus intufi*	Bushveld Sengi	LC
**Rhabdomys pumilio*	Four-striped Grass Mouse	LC

LC = Least Concern; VU = Vulnerable

Table C2: Avifaunal species recorded during the field survey.

Scientific name	Common name	Threat Status
Anthoscopus minutus	Southern Penduline Tit	LC
Afrotis afraoides	Northern Black Korhaan	LC
Alopochen aegyptiaca	Egyptian Goose	LC
Batis pririt	Pririt Batis	LC
Bradornis mariquensis	Marico Flycatcher	LC
Calendulauda africanoides	Fawn-coloured Lark	LC
Calendulauda sabota	Sabota Lark	LC
Cercotrichas paena	Kalahari Scrub-Robin	LC
Cinnyris fuscus	Dusky Sunbird	LC
Cisticola chiniana	Rattling Cisticola	LC
Cisticola fulvicapillus	Neddicky	LC
Clamator jacobinus	Jacobin Cuckoo	LC
Colies colius	White-backed mousebird	LC
Columba guinea	Speckled Pigeon	LC
Corypha fasciolata	Eastern Clapper Lark	LC
Crithagra flaviventris	Yellow Canary	LC
Curruca subcoerulea	Chestnut-vented Warbler	LC
Dendropicos fuscescens	Cardinal Woodpecker	LC
Dicrurus adsimilis	Fork-tailed Drongo	LC

Scientific name	Common name	Threat Status
Elanus caeruleus	Black-shouldered Kite	LC
Emberiza flaviventris	Golden-breasted Bunting	LC
Erythropygia paena	Kalahari scrub Robin	LC
Falco rupicolus	Rock Kestrel	LC
Hirundo fuligula	Rock Martin	LC
Lamprotornis nitens	Cape Starling	LC
Laniarius atrococcineus	Crimson-breasted Shrike	LC
Lanius minor	Lesser Grey Shrike	LC
Lophoceros nasutus	African Gray Hornbill	LC
Lophotis ruficrista	Red-crested Bustard	LC
Melaniparus cinerascens	Ashy Tit	LC
Melierax canorus	Pale Chanting-Goshawk	LC
Merops apiaster	European Bee-Eater	LC
Merops hirundineus	Swallow-tailed Bee-Eater	LC
Merops pusillus	Little Bee Eater	LC
Motacilla capensis	Cape Wagtail	LC
Muscicapa striata	Spotted Flycatcher	LC
Myrmecocichla formicivora	Southern Anteater-Chat	LC
Numida meleagris	Helmeted Guineafowl	LC
Oenanthe familiaris	Familiar Chat	LC
Parus cinerascens	Ashy Tit	LC
Passer melanurus	Cape Sparrow	LC
Philetairus socius	Sociable Weaver	LC
Plectropterus gambensis	Spur-winged Goose	LC
Plocepasser mahali	White-browed Sparrow-Weaver	LC
Ploceus velatus	Southern Masked Weaver	LC
Polihierax semitorquatus	Pygmy Falcon	LC
Prinia flavicans	Black-chested Prinia	LC
Prinia masulosa	Karoo Prinia	LC
Pternistis adspersis	Red-billed Spurfowl	LC
Pterocles bicinctus	Double-banded Sandgrouse	LC
Pycnonotus nigricans	Red-eyed Bulbul	LC
Saxicola torquata	African Stonechat	LC
Serinus flaviventris	Yellow Canary	LC
Sigelus silens	Fiscal Flycatcher	LC
Sporopipes squamifrons	Scaly Weaver	LC
Spreo bicolor	Pied Starling	LC
Stenostira scita	Fairy Flycatcher	LC
Streptopelia capicola	Cape turtledove	LC
Sylvia subcaerulea	Chestnut-vented tit-babbler	LC
Tadorna cana	South African Shelduck	LC
Tchagra australis	Brown-crowned Tchagra	LC
Thinornis tricollaris	Three-banded Plover	LC
Tockus leucomelas	Southern Yellow-billed Hornbill	LC
Tricholaema leucomelas centralis	Common Pied Barbet	LC
Turdoides bicolor	Southern Pied Babler	LC
Upupa africana	African Hoopoe	LC
Uraeginthus granatinus	Violet eared waxbill	LC

Scientific name	Common name	Threat Status
Vanellus armatus	Blacksmith Lapwing	LC
Vidua regia	Shaft-tailed Whydah	LC

LC = Least Concern

Table C3: Insect species observed during the site assessment.

Scientific Name	Common Name	Threat Status
Phyllocnema latipes	Round-necked Longhorn Beetles	NYBA
Cyrtacanthacris tatarica	Brown-spotted Locust	NYBA
Acanthoplus discoidalis	Brown Armoured Corn Cricket	NYBA
Hoplocorypha sp	African Stick Mantises	NYBA
Hycleus burmeisteri	Felt Blister Beetle	NYBA
Junonia oenone oenone	Mainland Dark Blue Pansy	LC
Sternocera orissa orissa	Giant Jewel Beetle	NYBA
Colotis evenina	Common Orange Tip	LC
Hodotermes mossambicus	Northern harvester termite	NYBA
Junonia hierta	Yellow Pansy	LC
Passalidius fortipes	Burrowing ground beetle	NYBA
Munza laticlavia	Cicada	NYBA
Anthia andersoni ssp. *andersoni*	Ground Beetle	NYBA
Apterogyna sp.	Velvet ant	NA
Solenosthedium liligerum	Yellowheart Shield Bug	NYBA
Eremoides bicristatus	Crested Owlfly	NYBA
Azanus jesous	African Babul Blue	LC
Stips sp.	Ridged seed beetle	NYBA
Neodanuria bolauana	Mantid	NYBA
Cigarits phanes	Silvery Silverline	LC
Cigaritis natalensis	Natal Bar	LC
Subfamily *Tarachodinae*	Tarachodine Mantises	NYBA
Gonometa postica	African silk moth	NYBA
Family Hoplocoryphidae	Hoplocoryphid Mantises	NYBA
Proagoderus sapphirinus	Dung Beetle	NYBA
Calidea dregii	Rainbow Shield Bug	NYBA
Catopsilia florella	African Migrant	NYBA
Genus *Manticora*	Monster Tiger Beetles	NYBA
Belenois aurota	Brown-veined White	NYBA
Genus *Lamarckiana*	Rain Locust	NYBA
Lampides boeticus	Pea Blue	LC
Junonia orithya	Eyed Pansy	NYBA
Danaus chrysippus	African Monarch	NYBA
Colotis euippe	Smokey Orange Tip	NYBA
Eurema brigitta	Broad-bordered Grass Yellow	NYBA
Spalia sp	Sandman	NYBA
Order Mantodea	Mantids	NYBA
Cynthia cardui	Painted Lady	LC
Platypleura sp	Cicada	NYBA
Crocothemis erythraea	Broad Scarlet	LC
Sphingonotus scabriculus	Blue-wing	NYBA
Garreta sp	Dung Beetle	NYBA
Pachylomera femoralis	Flattened Giant Dung Beetle	NYBA

Scientific Name	Common Name	Threat Status
Cerocala sp	Moths	NYBA
Munza laticlavia	Cicada	NYBA
Zonocerus elegans	Elegant Grasshopper	NYBA
Gastrimargus sp.	N/A	NYBA
Rhachitopis sp	N/A	NYBA
Systophlochius palochius	Orange wing	NYBA
Anterhynchium fallax	N/A	NYBA
Camponotus fulvopilosus	Bal-byter	NYBA
Crematogaster peringueyi	Cocktail Ant	NYBA
Gonometa postica	African Silk Moth	NYBA
Genus *Heliocopris*	Giant Dung Beetles	NYBA
Pantala flavescens	Wandering Glider	LC
Genus *Mutilla*	Velvit Ant	NYBA
Julodis humeralis	Jewel Beetle	NYBA
Mylabris oculata	CMR Bean Beetle	NYBA

LC = Least concerned, NYBA = Not yet been assessed by the IUCN

Table C4: Arachnid species recorded during the site assessment.

Scientific Name	Common Name	Threat Status
Argiope australis	Common Garden Orbweb Spider	NYBA
Agelena sp.	Grass Funnel-web Spiders	NYBA
Parapalystes lycosinus	Rain Spider	NYBA
Family Lycosidae	Wolf Spriders	NYBA
Family Daesiidae	Membraneromans	NYBA
Uroplectes carinatus	Common Lesser-Thicktail Scorpion	NYBA
Solifugae sp	Sun Spider	NYBA

LC = Least Concern, TOPS – Threatened or Protected Species (NEMA)

Table C5: Reptile species observed during the site assessment and likely (*) to be associated with the Focus Areas.

Scientific name	Common Name	Threat Status
Trachylepis sulcata	Western Rock Skink	LC
Heliobolus lugubris	Bushveld Lizard	LC
Pelomedusa galeata	Cape Terrapin	LC
Stigmochelys pardalis	Leopard Tortoise	LC
**Pedioplanis lineoocellata lineoocellata*	Spotted Sand Lizard	LC
**Pedioplanis inornata*	Plain Sand Lizard	LC
**Agama aculeata aculeata*	Western Ground Agama	LC
**Boaedon capensis*	Brown House Snake	LC
**Atractaspis bibronii*	Bibron's Stiletto Snake	LC
**Telescopus semiannulatus semiannulatus*	Eastern Tiger Snake	LC
**Varanus albigularis*	Rock Monitor	LC
**Pachydactylus capensis*	Cape Gecko	LC
**Zygaspis quadrifrons*	Kalahari Dwarf Lizard	LC
**Psammophis leightoni*	Cape Sand Snake	LC
**Chamaeleo dilipis*	Flap-neck Chameleon	LC
**Acontias occidentalis*	Western Legless Skink	LC
**Bitis arietans arietans*	Puff Adder	LC
**Stigmochelys pardalis*	Leopard Tortoise	LC

LC = Least Concern

Table C6: Amphibian species likely (*) to be associated with the Focus Areas.

Scientific name	Common Name	Threat Status
**Tomopterna adiastola*	Confused Sand Frog	LC
**Pyxicephalus adspersus*	Giant Bullfrog	TOPS-P
**Kassina senegalensis*	Bubbling Kassina	LC
**Sclerophrys gutturalis*	Guttural Toad	LC