Appendix F.7

TERRESTRIAL ANIMAL SPECIES ASSESSMENT

TERRESTRIAL ANIMAL SPECIES ASSESSMENT FOR THE PROPOSED KOMATI POWER STATION SOLAR ENERGY PROJECT

Eskom Holdings SOC Ltd

Report - November 2023

Submitted to:
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Acronyms and Abbreviations

Abbreviation	Explanation
AIS	Alien Invasive Species
AOO	Area of Occupancy
BI	Biodiversity Importance
BESS	Battery Energy Storage System
CA	Conservation Areas
CBA	Critical Biodiversity Areas
CI	Conservation Importance
EIA	Environmental Impact Assessment
ESS	Environmental and Social Standard
EMP	Environmental Management Programme
EOO	Extent of Occurrence
FI	Functional Integrity
Ha	Hectare
IFC	International Finance Corporation
IBA	Important Bird Areas
IUCN	International Union for the Conservation of Nature
LSA	Local Study Area
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act
PA	Protected Areas
PS	Performance Standard
PV	Photovoltaic
QDS	Quarter Degree Square
RR	Receptor Resilience
RSA	Regional Study Area
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SEI	Site Ecological Importance

ToPS	Threatened or Protected Species
WB	World Bank

Details of the Expertise of the Specialist

Specialist Information	
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Qualifications	M.Sc. Resource Conservation Biology B.Sc. Hons. Ecology and Conservation Biology B.Sc. Zoology and Grassland Science
Summary of Past Experience	Andrew Zinn is a terrestrial ecologist with Hawkhead Consulting. In this role, he conducts varied specialist ecology studies, including flora and fauna surveys, for baseline ecological assessments and ecological impact assessments. He has over a decade of experience working in the fields of ecology and conservation research, and is registered as a Professional Natural Scientist (*Pr.Sci.Nat.*) – Ecological Science, with the South African Council of Natural Scientific Professions (SACNASP). Andrew has worked on projects in several African countries including Botswana, Democratic Republic of Congo, Ethiopia, Ghana, Mozambique, South Africa, Tanzania and Zambia.

Declaration of Independence by Specialist

I, Andrew Zinn, declare that I –

- Act as the independent specialist for the undertaking of a specialist section for the proposed Komati Power Station Solar Photovoltaic and Battery Energy Storage Project;
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed;
- Do not have, nor will have, a vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity; and
- Undertake to disclose, to the competent authority, any information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document.

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Appendix 6 of the EIA Regulations

Where applicable, this baseline report has been written in compliance with Appendix 6 of the EIA Regulations.

Section	Requirements	Section addressed in report
1.(1)	A specialist report prepared in terms of these Regulations must contain	
(a)	Details of	
(i)	the specialist who prepared the report; and	Preceding Page
(ii)	the expertise of that specialist to compile a specialist report including a curriculum vitae	Preceding Page
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority	Preceding Page
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.1
(cA)	an indication of the quality and age of base data used for the specialist report;	Section 3.0
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Sections 5.0 & 6.0
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3.2
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 3.0
(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Section 9.0
(g)	an identification of any areas to be avoided, including buffers;	Section 9.0
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Sections 6.0
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 4.0
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity (including identified alternatives on the environment) or activities;	Section 10.0
(k)	any mitigation measures for inclusion in the EMPr;	Section 12.0
(l)	any conditions for inclusion in the environmental authorisation;	Section 14.0
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 13.0

(n)	a reasoned opinion—	
(i)	(as to) whether the proposed activity, activities or portions thereof should be authorised;	Section 14.0
(iA)	regarding the acceptability of the proposed activity or activities; and	
(ii)	if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
(q)	any other information requested by the competent authority.	N/A
2.	Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

1. Introduction

Hawkhead Consulting was appointed by WSP Africa Pty (Ltd), on behalf of Eskom Holdings SOC (Ltd) (Eskom), to conduct the terrestrial animal species assessment for the proposed Komati Power Station Solar Photovoltaic and Battery Energy Storage Project (hereafter referred to as the "Project"), near Kriel in Mpumalanga Province, South Africa.

The proposed Project is aimed at obtaining environmental authorisation at a national level, in line with South African legislation and applicable regulations, and financing at the international level, as per the requirements of the World Bank Environmental & Social Framework; and the World Bank Group (WBG) Environmental, Health and Safety Guidelines (EHSG).

1.1. Purposes of this Report

This specialist study focused on terrestrial animal species (fauna), specifically, mammals, herpetofauna and invertebrate species of conservation concern). Separate bird and bat specialist studies have been conducted for the proposed Project.

The primary scope of work included:

- Reviewing and summarising pertinent information on terrestrial fauna presented in relevant ecological, conservation and biodiversity datasets and literature;
- Conducting a targeted field survey of the Project site to collect field data specific to the proposed development footprints;
- Compiling a baseline terrestrial fauna description, based on reviewed information and the findings of the field survey;
- Identifying and assessing potential negative impacts associated with the proposed Project; and
- Recommending appropriate biodiversity mitigation, management and monitoring measures for inclusion in the proposed Project's Environmental Management Plan (EMP) and/or Biodiversity Management Plan (BMP).

Predicated on the above scope items, the purpose of this report is therefore to 1) present a baseline description of terrestrial fauna (specifically mammals, herpetofauna and invertebrate species of conservation concern) occurring/potentially occurring on-site, 2) assess the potential impacts of the proposed Project on on-site fauna; 3) detail appropriate management and monitoring measures to avoid/mitigation identified impacts and guide on-site fauna management; and 4) provide an impact statement on the appropriateness of the project with respects to biodiversity conservation.

This report should be read in conjunction with the Terrestrial Biodiversity and Plant Species Specialist Assessment report, and the specialist bird and bat specialist studies.

1.2. Project Location and Delimits of the Study Areas

Komati Power Station is located approximately 24 km north-east of Kriel in Mpumalanga Province (Figure 1). The site is bordered to the east and south by the R35 and R542 provincial roads respectively. Land to the immediate north and west of the site is dominated by infrastructure and facilities associated with Goedehoop Colliery.

Komati Power Station has a total of nine generating units, five 100 MW units on the east (Units 1 to 5) and four 125 MW units on the west (Units 6 to 9), with a total installed capacity of 1000 MW. The power station reached its end-of-life expectancy in September 2022 and all nine unit have ceased to be operational.

Two spatial scales were considered for this assessment:

- A Local Study Area (LSA), which encompasses the proposed Project's development footprints and all areas encompassed by the Project site boundary, within which direct impacts on biodiversity receptors (i.e., direct habitat loss, fauna mortality) are likely to occur; and
- A Regional Study Area (RSA), which comprised the catchment within which the proposed Project is situated and is considered to be an ecologically appropriate area of analysis for the identification of sensitive biodiversity receptors with potential to occur in the LSA, and which may be indirectly impacted by the proposed Project.

These are shown in Figure 2.

1.3. Summary Project Description

Komati Power Station has reached its end-of-life, and as a result, Eskom has developed a Just Energy Plan (EJETP) aimed at repurposing the power station property and thereby reducing the negative social impacts associated with the cessation of on-site operations.

The EJETP Komati incorporates the development of a Solar Energy Facility (SEF), comprising Photovoltaic (PV) and Battery Energy Storage System (BESS) facilities. These will all be located on land owned by Eskom.

The SEF will include the development of a PV facility with a capacity of 100 MW and a BESS of up to 150 MW. These have a combined construction footprint of approximately 200-250 hectares. Key proposed Project infrastructure are listed in Table 1 and shown in Figure 3.

Table 1: Proposed Project Infrastructure

Infrastructure	Description

Solar Energy Facility	• Solar Farm A:
	  ○ Extent: 156 Ha
	  ○ Buildable Area: 127 Ha
	  ○ Capacity: Up to 71.5 MW
	• Solar Farm B:
	  ○ Extent: 54 Ha
	  ○ Buildable Area: 50 Ha
	  ○ Capacity: Up to 28.5 MW
	• Solar modules will be elevated above the ground, and will be mounted on either fixed tilt systems or tracking system

Grid Connection	• Point of connection of Solar Panels will be to the Komati High Voltage (HV) yard.
	• Power routed via a medium voltage overhead line (OHL) or underground cabling.
	• Servitude of powerlines:
	  ○ Between 36 and 40m
	  ○ Area will be approximately 26ha

Infrastructure	Description

	• Substations:
	  ○ Each of the Solar Sites will be equipped with collector substations.
	  ○ Infrastructure associated with the substations includes:
	  ○ O&M buildings housing the control and communication equipment
	  ○ Access road infrastructure within the substation sites
	  ○ Site substations and collector substations
	• Site Access:
	  ○ New access roads or tracks may be required to provide access to sections of the powerline route.
	  ○ Access roads will be mostly a two-track gravel road under the OHPL in order to access pylons for construction and maintenance purposes

Site Substation and BESS	• Three BESS facilities • Footprints: Range from 2 ha up to 6 ha. • BESS capacity: 150 MW with four hours standby time. • Lithium Battery Technologies, such as Lithium Iron Phosphate, Lithium Nickel Manganese Cobalt oxides or Vanadium Redox flow technologies are being considered
Associated Infrastructure	• Access roads; • Perimeter roads; • Below ground electrical cables; • Above ground overhead lines; • Meteorological Station; • Operations and Maintenance (O&M) Building including control room, server room, security equipment room, offices, boardroom, kitchen, and ablution facilities); • Spares Warehouse and Workshop; • Hazardous Chemical Store; • Security Building; • Parking areas and roads; • Temporary laydown areas; • Temporary concrete batching plant • Construction camps and temporary laydown areas; and • Onsite substations.

1.4. Environmental Screening Tool - Project Sensitivities

The proposed Project's infrastructure footprint was assessed at a desktop level using the National Web-based Environmental Screening Tool. According to the Tool, the Animal Species Theme is rated 'High Sensitivity' due to the potential presence of fauna species of conservation concern, namely Black-footed cat (*Felis nigripes*), Maquassie Musk Shrew (*Crocidura maquassiensis*), African Marsh Rat (*Dasymys robertsii*), Spotted-necked Otter (*Hydrictis maculicollis*) and Oribi (*Ourebia ourebi ourebi*).

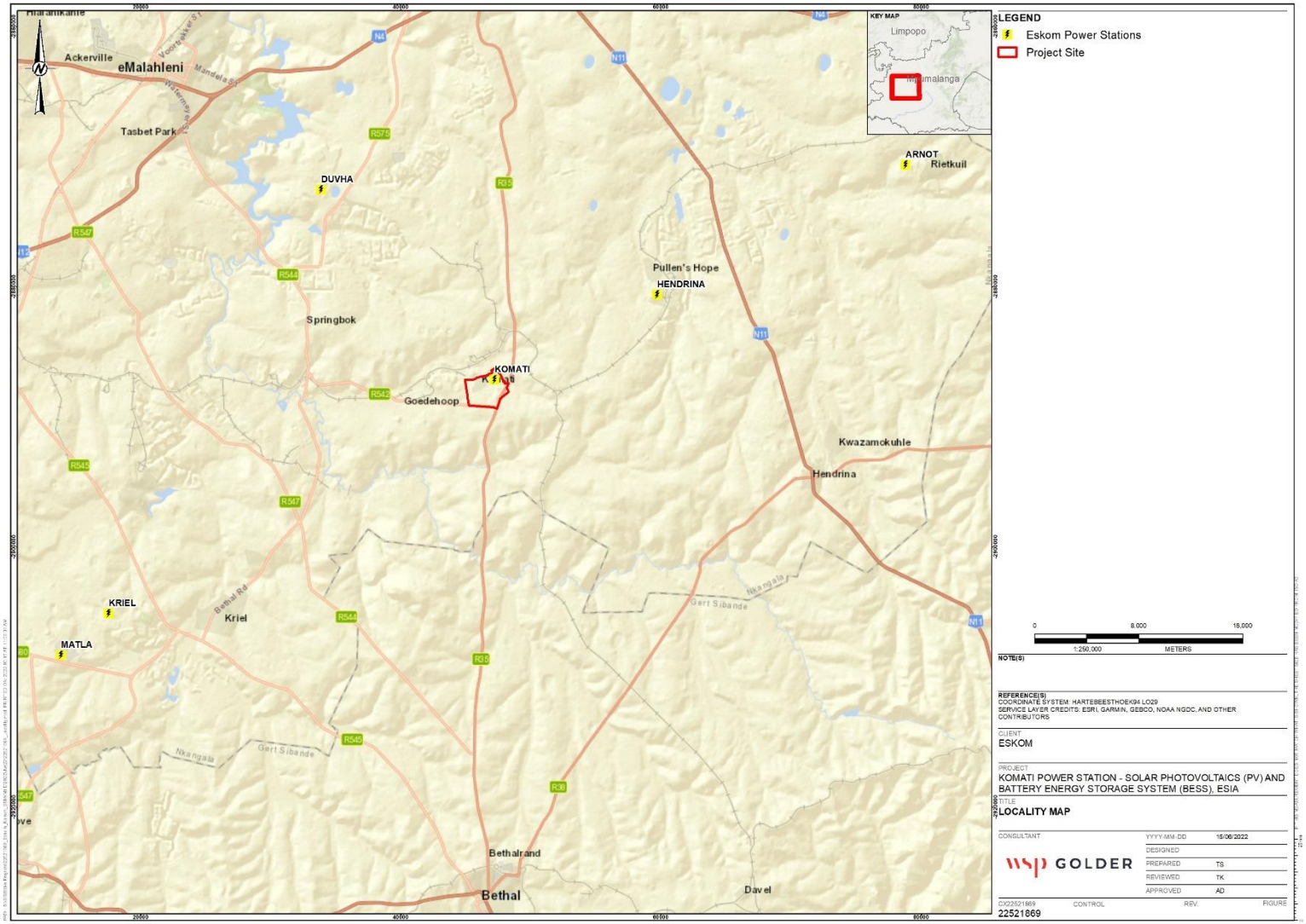

Figure 1: Regional location of Komati Power Station, in Mpumalanga Province, South Africa.

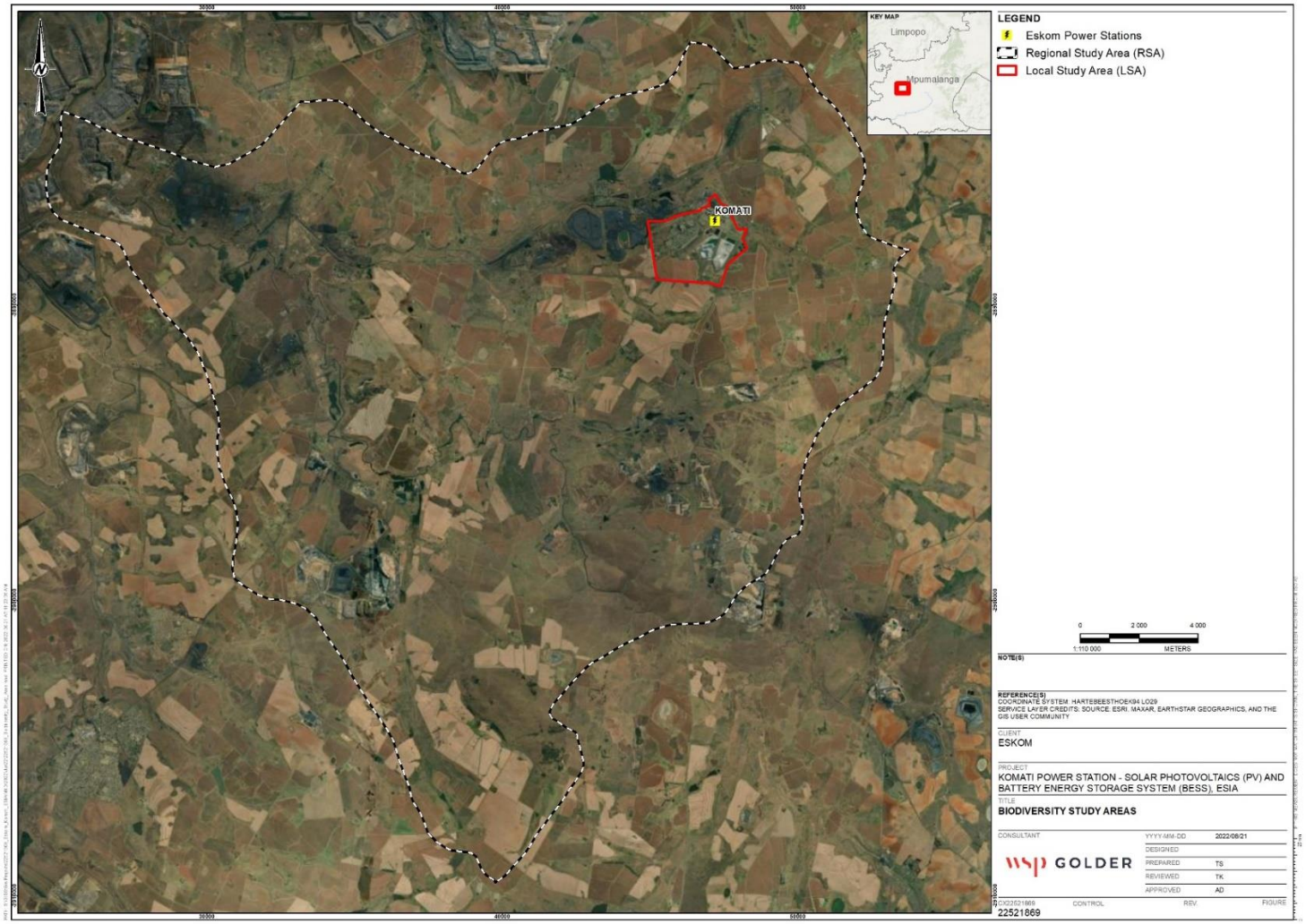

Figure 2: Aerial view showing the extent of the regional and local study areas.

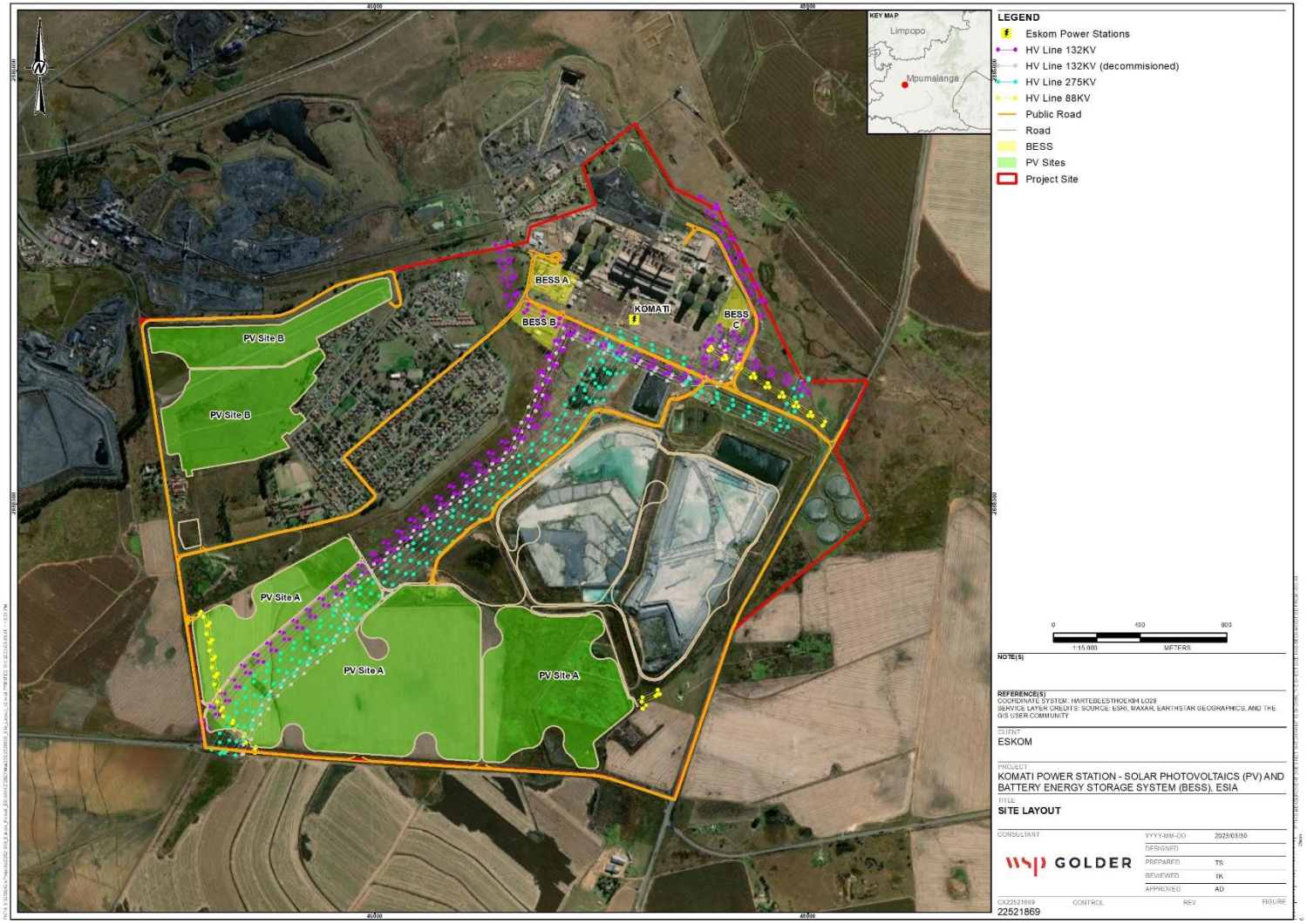

Figure 3: Location of proposed Project infrastructure in the Local Study Area

2. Relevant Legislation and Guidelines

Relevant international, national and provincial legislation, associated guidelines and policies that are relevant to the environmental and biodiversity, and which were used to guide the Terrestrial Animal Specialist Assessment are listed in Table 2.

Table 2: Relevant environmental and biodiversity legislation and guidelines.

Applicable Legislation and Guideline	Relevance to the Proposed Project
National Environmental Management Act, 1998 (Act No 107 of 1998) – NEMA	Section 24 of the NEMA, headed "Environmental Authorisations" sets out the provisions which are to give effect to the general objectives of Integrated Environmental Management, and laid down in Chapter 5 of the NEMA. In terms of section 24(1), the potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority charged by the NEMA with granting of the relevant environmental authorisation. In terms of section 24F(1) of the NEMA no person may commence an activity listed or specified in terms of section 24(2)(a) or (b) unless the competent authority has granted an environmental authorisation for the activity. Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the NEMA (1998), when applying for environmental authorisation, the following is relevant to this study: • Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	The NEMBA provides the framework under the NEMA for the: • Management and conservation of South Africa's biodiversity; • The protection of species and ecosystems that warrant protection; • The fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and • The establishment and functions of a South African National Biodiversity Institute (SANBI). Amongst other components, the NEMBA includes: • Lists of Critically Endangered, Endangered, Vulnerable and Protected Species (February 2007), with associated amendments (December 2007 and 3 June 2020) (ToPS); • Threatened or Protected Species Regulations (February 2007); and • National list of threatened terrestrial ecosystems for South Africa (2011, and 2021 revision).

Applicable Legislation and Guideline	Relevance to the Proposed Project
	The purpose of ToPS lists and regulations are to regulate the permit system concerning restricted activities involving specimens of listed threatened or protected species. The primary purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction by identifying 'witness' sites' of exceptionally high conservation value and enabling and facilitating proactive management of these ecosystems. The NEMBA also provides a list of regulations and guidance concerning alien invasive species, including: • A guideline for Monitoring, Control and Eradication Plans (September 2015); • 2020 Alien and Invasive Species Regulations (September 2020); and • 2020 Alien and Invasive Species Lists (March 2021).
Mpumalanga Nature Conservation Act (Act No. 10 of 1998)	Amongst other provisions, the Mpumalanga Nature Conservation Act (Act No. 10 of 1998) provides lists of specially protected and protected flora and fauna. Of particular relevance to this specialist study are species of game/wild animals that are listed under: • Schedule 1: Specially Protected Game; • Schedule 2: Protected Game; and • Schedule 4: Protected Wild Animals.
Other Relevant national and Provincial Policies, Plans and Guidelines	Other relevant policies, plans and guidelines that were considered during this study include: • Mpumalanga Biodiversity Sector Plan; • National Biodiversity Offset Guideline (2023), which provides guidance on the need to develop biodiversity offsets; • Species Environmental Assessment Guideline (SANBI, 2020); • National Protected Area Expansion Strategy (2016).
World Bank Environmental and Social Standard 6	The World Bank's (WB) Environmental and Social Standard 6 (ESS6) on Biodiversity Conservation and Sustainable Management of Living Natural Resources (World Bank, 2016) separates habitat into four categories for the purposes of implementing a differentiated risk management approach to habitats based on their sensitivity and values. The categories include 'Modified habitat', 'Natural habitat', 'Critical Habitat' and 'Legally protected and internationally and regionally recognized areas of biodiversity value'; each of which have varying levels of Borrower obligation in terms of biodiversity mitigation and management, and offset requirements. Whilst the assessment of Modified and Natural habitats is largely based on the establishment of the ecological condition of mapped habitat/vegetation units, and the boundaries of legally protected and/or internationally

Applicable Legislation and Guideline	Relevance to the Proposed Project
	recognised areas of high biodiversity value are generally defined; the identification and assessment of Critical Habitat requires additional, focussed effort – usually focussed on the presence of Critically Endangered, Endangered, range-restricted or migratory/congregatory species in significant numbers.

3. Study Methodology

3.1. Desktop Literature Review

3.1.1. Fauna Communities

- A list of mammal species previously recorded in the 2629AB QDS and the neighbouring 2629BA QDS was obtained from the Virtual Museum's MammalMAP database (FitzPatrick Institute of African Ornithology, 2022). This was augmented by reviewing the historic mammal distribution ranges presented in Stuart and Stuart (2007);
- Lists of herpetofauna potentially occurring on-site were sourced from FrogMAP and ReptilesMAP (FitzPatrick Institute of African Ornithology, 2022) for the relevant QDS. The historic amphibian and reptile distribution ranges in Du Preez and Carruthers (2009) and Bates *et al*, (2014) were also reviewed; and
- Lists of invertebrates potentially occurring on-site were sourced from SpiderMAP, ScorpionMAP, LepiMAP, LacewingMAP and OdonataMAP (FitzPatrick Institute of African Ornithology, 2022) for the relevant QDS. Dippenaar-Schoeman (2014) was also reviewed to identify taxa from Family Theraphosidae (baboon spiders) that may be present, as these are of conservation concern.

3.2. Field Survey

The field survey comprised a one-day field visit, conducted on the 14th December 2022. This period coincides with the wet/growing season, which is the optimal time to sample fauna.

3.2.1. Fauna

- During the field survey, any opportunistic observations of fauna were recorded, along with any observations of the presence of fauna, such as scats, tracks, burrows, etc. No formal fauna trapping or detailed surveys were conducted during the field visit; and
- Notes on general habitat condition, connectivity and disturbances were also made, and used to inform the habitat suitability assessments of fauna species of conservation concern that potentially occurring in the LSA (refer to Section 3.4 and Section 3.5).

3.3. Delineation and Mapping of Habitat Units

Mapping of habitat units in the LSA was conducted based on a combination of field observations and a study of available aerial/satellite imagery. It must be noted that owing to the spatial complexity and fragmentation of the LSA and the limited duration of the field survey, it was not possible to visit every non-transformed habitat patch.

3.4. Assessment of Species of Conservation Concern

Fauna species of conservation concern were defined as those listed as either threatened or near threatened on the Global Red List (IUCN, 2022-2), the Regional (i.e., South African / National) Red List, and/or the Mpumalanga Provincial Red List, as well as species listed as threatened or protected according to national and/or provincial legislation. These included:

- Global IUCN[1] Red List of Threatened Species (www.iucnredlist.org, 2022-2);
- Red List of Mammals of South Africa, Lesotho and Swaziland (Child *et al*., 2016);

[1] International Union for the Conservation of Nature.

- Red List of South Africa Species (for reptiles, amphibians and invertebrates) (www.speciesstatus.sanbi.org);
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004) - Threatened or Protected Species List (Notice 389 of 2013) (NEMBA ToPS List, 2007); and
- Mpumalanga nature Conservation Act (1999), specifically Schedules 1, 2 and 4 concerning Specially Protected and Protected fauna.

3.5. Habitat Suitability Assessment for Species of Conservation Concern

For species of conservation concern a 'probability of occurrence' in the RSA and LSA was established by conducting habitat suitability assessments. The following parameters were used in these assessments:

- Habitat requirements: Most threatened species have very specific habitat requirements. The presence of these habitats in and adjacent to the RSA and LSA was evaluated;
- Habitat status: The status or ecological condition of available habitat was assessed. Often a high level of habitat degradation will negate the potential presence of sensitive species; and
- Habitat linkage: Dispersal and movement between natural areas for breeding and feeding are important population-level processes. Habitat connectivity to surrounding natural habitat and corridors was evaluated to determine the likely persistence of species of conservation concern.

Probability of occurrence is presented in the following categories:

- Recorded: Any species of conservation concern observed/documented during the field visit;
- Probable: The species is likely to occur on the site due to suitable habitat and resources being present on the site;
- Possible: The species may occur on the site, or move through the site (in the case of mobile species), due to potential habitat and/or resources; and
- Unlikely: the species will not likely occur on the site due to lack of suitable habitat and resources, or significant differences in its Area of Occupancy (AOO) compared to its Extent of Occurrence (EOO).

3.6. Assessment of Site Ecological Importance

The ecological importance (sensitivity) of vegetation communities and habitats was determined using the protocol for evaluating site ecological importance (SEI) as published in SANBI's Species Assessment Guideline (SANBI, 2020). SEI is considered to be a function of the biodiversity importance (BI) of a receptor and its resilience to impacts (receptor resilience, RR), as per:

$$SEI = BI + RR.$$

Biodiversity importance is a function of conservation importance (CI) and the functional integrity (FI) of the receptor, as per:

$$BI = CI + FI$$

- **Conservation Importance** is defined as "the importance of a site for supporting biodiversity features of conservation concern present, e.g., populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), Rare species, range-restricted species, globally

significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes" (SANBI, 2020).

- **Functional Integrity** is defined as "A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts" (SANBI, 2020).
- **Receptor Resilience** is defined as "the intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention" (SANBI, 2020).

For tables detailing the rating criteria for Conservation Importance, Functional Integrity and Receptor Resilience and the scoring matrices, refer to Appendix B. Table 3 presents a guideline for interpreting the SEI (SANBI, 2020).

Table 3: 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 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.
Source: SANBI (2020).	

4. Assumptions, Uncertainties and Gaps in Knowledge

The following assumptions, uncertainties and gaps in knowledge are highlighted for this biodiversity assessment:

- Field work was conducted over a one-day period in December 2023 and focused specifically on the proposed Project's development footprints in the LSA. The timing of the field survey coincided with the mid-summer rainy period, which is the optimal period to sample fauna;
- The absence or non-recording of a specific fauna species, at a particular time, does not necessarily indicate that 1) the species does not occur there; 2) the species does not utilise resources in that area; or 3) the area does not play an ecological support role in the ecology of that species;

- Given the difficulty in fully sampling and characterising the abundance and distribution of fauna species in the LSA during the short period of time allocated to field work, the baseline descriptions were qualitative; and
- The delineation of habitat units was conducted using available Google Earth imagery. It is predicated on a subjective interpretation of aerial imagery and extrapolation of observations made during the field visit. It must be noted that owing to the spatially complexity and fragmentation of the LSA and limited duration of the field survey, it was not possible to visit and characterise every non-transformed habitat patch.

5. Landscape Context and Existing Impacts

The RSA is characterised by a mosaic of natural and modified habitats. Modified habitats are dominated by extensive areas of cultivation, with smaller areas comprising *inter alia*, various mining operations and alien tree plantations. Natural habitat is mostly confined to linear patches of grassland and wetland that are typically aligned with drainage features.

The LSA has also been heavily impacted by historic and contemporary anthropogenic activities. These are summarised below:

- Prominent infrastructure and disturbances include the power station complex and associated facilities (e.g., ash dumps, pollution control dams) (shown in Figure 4 and Figure 5) and Komati village. The village is a fully operational residential zone, with accompanying road network, police station, schools and commercial shops;
- Extensive areas are also dominated by cultivated fields, which are regularly disturbed by ploughing and crop harvesting. Cultivated fields that lie fallow are colonised by dense stands of alien weeds and pioneer flora;
- Prominent alien tree stands are present adjacent to the village. Colonisation by other alien species, including several listed invasive species, is also common and widespread throughout the LSA;
- Numerous informal drainage trenches have been excavated across the power station property in order to channel water away from access roads and improve general site accessibility. The earth works associated with these drainage trenches has resulted in vegetation clearing and disturbance, and this has facilitated the establishment of several alien invasive species;
- The LSA is also criss-crossed by large transmission line corridors which are maintained by Eskom;
- Other anthropogenic facilities and activities noted in the LSA during the field survey that have caused habitat disturbance and fragmentation include *inter alia*; gravel access roads (Figure 6), fencing, and refuse dumping (Figure 7) and burning; and
- Goedehoop Colliery is located along the northern and western boundary of the LSA. The colliery is characterised by large areas that have been completely transformed by mining activities.

The above listed features and activities have caused environmental degradation, which has reduced the overall extent and integrity of natural habitat in the LSA and in the immediate surrounding landscape, and this has impacted on-site ecological functioning and species diversity.

Figure 4: The completely transformed coal deposit area at Komati Power Station.

Figure 5: View over the ash dam facilities in the local study area.

Figure 6: Amongst other features, gravel roads and drainage trenches have fragmented habitat in the local study area, and facilitated alien invasive species colonisation.

Figure 7: Rubble and refuse dumping site adjacent to the western boundary of the local study area.

6. On-Site Habitat Units

The Terrestrial Plant Species Assessment identified five habitat units in the LSA. As per IFC PS 6, three units meet the definition of 'modified habitat', i.e., anthropogenic activity has substantially modified primary ecological functioning and species composition. The remaining two units are classified as 'natural habitat' as they comprise viable assemblages of indigenous species and retain their primary ecological functions:

Modified Habitats

- Cultivated Fields;
- Alien Tree Stands; and
- Transformed Areas with Disturbed or Landscaped Vegetation.

Natural Habitats

- Mixed *Themeda triandra* Grassland; and
- Mixed Moist Grassland.

Table 4 presents the total extent of modified and natural habitats in the LSA. Figure 8 presents a habitat unit map for the study area.

For full descriptions of each habitat unit refer to the Terrestrial Plant Species Assessment report.

Table 4: Extent of modified and natural habitats in the local study area.

Habitat Type	Habitat Units	Current Extent (Ha)
Modified Habitats	Cultivated Fields	107.49
	Alien Tree Stands	4.25
	Transformed Areas with Disturbed or Landscaped Vegetation	382.14
	Sub Total	**493.87**
Natural Habitats	Mixed *Themeda triandra* Grassland	31.01
	Mixed Moist Grassland	145.83
	Sub Total	**176.84**

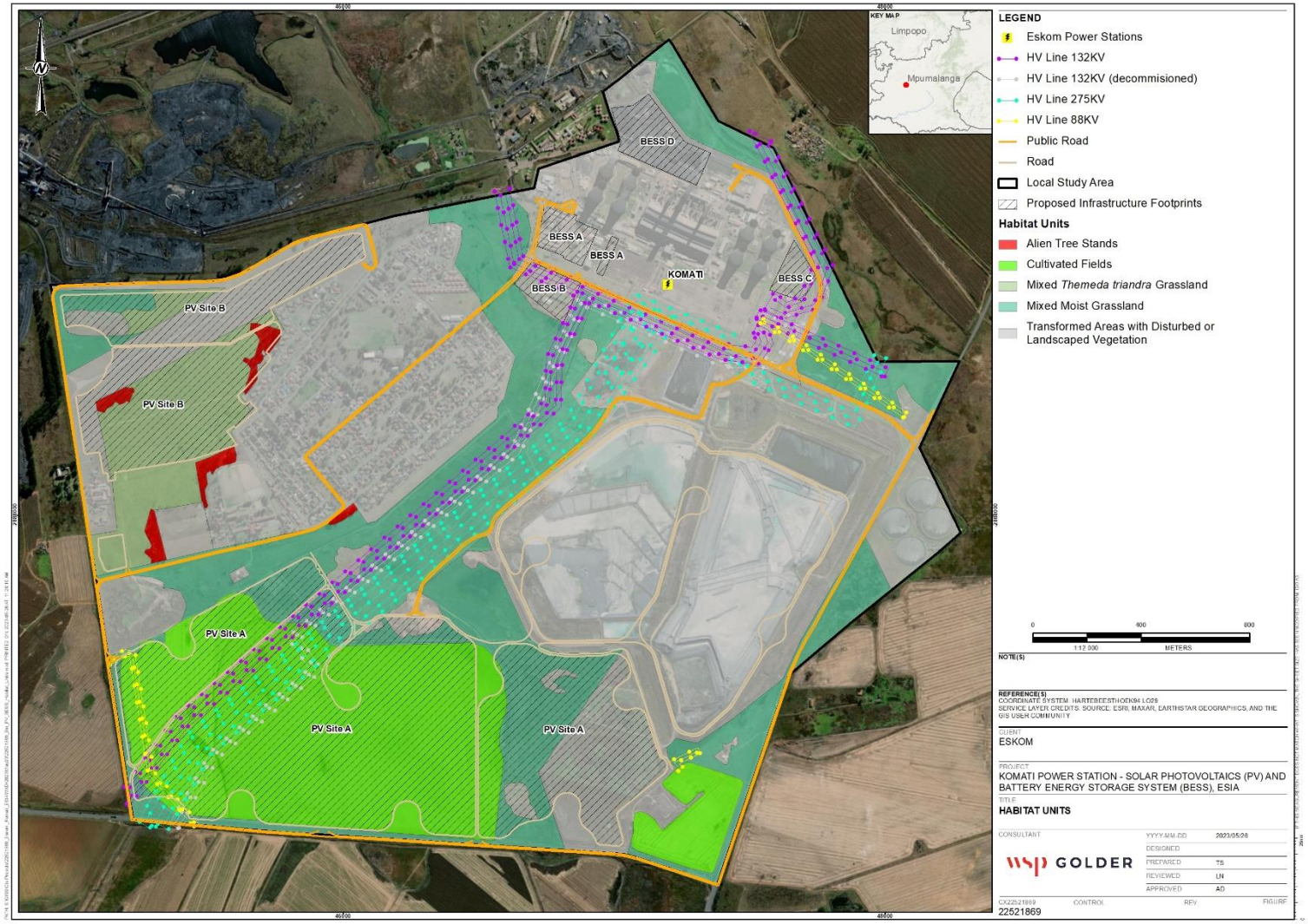

Figure 8:Habitat unit map of the local study area, showing proposed Project infrastructure, as well as existing Eskom facilities.

7. Fauna Assessment

7.1. Mammals

7.1.1. Mammal Richness and Habitat Availability

Based on historic distribution ranges, up to 69 mammal species potentially occurring in the region in which the RSA is located (listed in Appendix C). MammalMAP records indicate that, of these, 23 species have previously been recorded in the 2629AB and 2629BA QDS. Recorded mammals range from several small rodents to medium-sized antelope, such as the Blesbok (*Damaliscus pygargus phillipsi*) and Oribi (*Ourebia ourebi*).

During the 2022 field survey, tracks of three mammal species was recorded in the LSA, including Water Mongoose (*Atilax paludinosus*) (Figure 9), Porcupine (*Hystrix africaeaustralis*) (Figure 10), and a small cat. The latter is potentially an African Wildcat (*Felis silvestris*) or a domestic/feral cat. The Komati environmental manager also indicated that Serval (*Leptailurus serval*) are known to be present in the LSA.

The LSA is highly modified and fragmented by various built infrastructure, including restrictive linear features, such as boundary and internal security fences. This, coupled with the relatively large human population and high levels of anthropogenic activity, render habitat in the local study area mostly unsuitable for many mammal species.

Figure 9: Water Mongoose (Atilax paludinosus) tracks

Figure 10: Porcupine (Hystrix africaeaustralis) tracks

7.1.2. Mammals of Conservation Concern

Of mammal species potentially occurring in the RSA, 23 are of conservation concern. These are listed in Table 5, along with their habitat preferences and a probability of occurrence. Serval, which was noted to be present in the LSA based on anecdotal evidence, is a SCC. This species is listed as Near Threatened on both the Regional and Mpumalanga Red Lists, but it is listed as Least Concern on the global Red List (IUCN, 2022-2). It is also listed as Protected on the NEMBA ToPS List (2007).

The environmental sensitivity screening report for the proposed Project rated the Animal Species Theme as 'High Sensitivity', and highlighted the potential presence of five sensitive mammal features, namely Black-footed Cat (*Felis nigripes*), Maquassie Musk Shrew (*Crocidura maquassiensis*), Spotted-necked Otter (*Hydrictis maculicollis*), African Marsh Rat (*Dasymys robertsii*) and Oribi (*Ourebia ourebi ourebi*). These, as well as the Serval, are discussed in more detail below:

- Black-footed Cat (Vulnerable, Global & SA): A secretive and nocturnal species that generally occurs at low densities, with an estimated regional population size ranging from 7 526-11 905 km^2 (Wilson*, et al*., 2016). Black-footed Cats favour short, open grassland habitats where they shelter in abandoned Aardvark burrows or hollowed out termite mounds (Wilson*, et al*., 2016). Suitable habitat is present in both the regional and local study areas; however, it unlikely the Black-footed Cat is present in the LSA due to the high levels of anthropogenic activity;
- Maquassie Musk Shrew (Vulnerable, SA): A species endemic to southern Africa. The EOO of the Maquassie Musk Shrew is estimated at 284 735 km^2, however it is patchily distributed, with an AOO of between 40 496 – 47 246 km^2 (based on a 500 m buffer strip around wetlands) (Taylor, *et al*., 2016). Population size is estimated at 179 000 individuals. Little is known about the habitat preferences of the Maquassie Musk Shrew. It has been recorded in moist grassland-type habitats, but is also likely to tolerate urban and rural landscapes (Taylor, *et al*., 2016). It is therefore possible that this species is present in both the regional- and local study areas;
- Spotted-necked Otter (Near Threatened, Global & Vulnerable, SA): A widespread species that is restricted to areas of permanent water (Ponsonby, *et al*., 2016). The estimated range of Spotted-necked Otter totals 31 407 km of river, resulting in an estimated population size (taking into account both undisturbed and disturbed river habitats), of 17 117 individuals (Ponsonby, *et al*., 2016). Although there is suitable habitat across the RSA for this species, there is limited suitable habitat available in the LSA. It is therefore considered unlikely that Spotted-necked Otter is present in the LSA;
- African Marsh Rat (Vulnerable, SA): This species favours intact river and wetland systems, and has not been found in degraded wetlands (Pillay *et. al*., 2016). The EOO of the African Marsh Rat is estimated at greater than 10 000 km^2, while its AOO is calculated at between 1 030-11 382 km^2. The population size for this species is unknown (Pillay *et. al*., 2016). Considering the disturbed nature of wetland habitats in the LSA, it is considered unlikely that the African Marsh Rat is present. It is probable however, that this species is present in the RSA;
- Oribi (Endangered, Global, SA & MP): A grassland species, requiring a matrix of short- and tall grass habitats for feeding and sheltering. Regional population is estimated at 1 859 to 2 169 mature individuals (Shrader, *et al.,* 2016). Subpopulations of Oribi are highly fragmented and movement between subpopulation is probably rare (Shrader, *et al.,* 2016). Considering the highly fragmented and disturbed nature of the LSA, coupled with the high levels of anthropogenic activity, it is considered unlikely that Oribi is present. Its presence in the regional study area is considered possible; and
- The Serval (Near Threatened, SA & MP): Solitary and territorial cat, that favours wetland, tall grassland and well-watered savanna habitats (Estes, 1991). Population densities range from 0.1 to 1.5 individuals per km^2, with a regional population estimated at 10 264 ±812

individuals (Ramesh, *et al.*, 2016). Based on anecdotal evidence, this species was noted to be present in the LSA and is likely to be fairly abundant across the RSA. Moreover, Serval are able tolerate relatively high levels of anthropogenic activity, and is frequently found in farmland and mining/industrial land, provided sufficient suitable habitat is present and levels of persecution remain low (Ramesh, *et al.*, 2016). In light of these factors, habitat disruptions associated with the proposed Project are unlikely to negatively impact the local Serval population.

Table 5: Mammal species of conservation concern occurring or potentially occurring in the study area.

Family	Scientific Name	Common Name	Global Red List Status (IUCN, 2022-2)	Regional Red List Status (2016)	NEMBA ToPS List (2007)	Mpumalanga Status	Habitat Preferences*	Probability of Occurrence	
								Regional Study Area	Local Study Area
Bathyergidae	*Cryptomys hottentotus*	Common Mole-rat	Least Concern	Data Deficient	-	Data Deficient	Prefers deep sandy soils along rivers.	Probable	Unlikely – limited suitable habitat.
Bathyergidae	*Georychus capensis*	Cape Mole-rat	Least Concern	Data Deficient		-	Prefers deep sandy soils along rivers.	Probable	Unlikely – limited suitable habitat.
Bovidae	*Connochaetes gnou*	Black Wildebeest	Least Concern	Least Concern	Protected	-	Open grassland plains and arid shrubland.	Unlikely	Unlikely – no suitable habitat and high levels of anthropogenic disturbance.
Bovidae	*Ourebia ourebi ourebi*	Oribi	Least Concern	Endangered	Endangered	Endangered / Protected	Short open grassland, with patches of taller grass.	Possible	Unlikely – no suitable habitat and high levels of anthropogenic disturbance.
Bovidae	*Pelea capreolus*	Grey Rhebok	Near Threatened	Near Threatened	-	Protected	Sourveld grassland and scrubland in hills and mountainous areas.	Unlikely	Unlikely – no suitable habitat and high levels of anthropogenic disturbance.
Bovidae	*Raphicerus campestris*	Steenbok	Least Concern	Least Concern	-	Protected	Range of habitats, including grassland and savanna.	Probable	Possible – suitable habitat present
Bovidae	*Redunca arundinum*	Southern Reedbuck	Least Concern	Least Concern	Protected	Protected	Savanna and grassland habitats in mountainous areas.	Probable	Unlikely – limited suitable habitat and high levels of anthropogenic disturbance.
Bovidae	*Redunca fulvorufula fulvorufula*	Mountain Reedbuck	Endangered	Endangered	-	Protected	Rolling grassy hillsides and mountain slopes.	Unlikely	Unlikely – no suitable habitat and high levels of anthropogenic disturbance.
Canidae	*Vulpes chama*	Cape Fox	Least Concern	Least Concern	Protected	-	Range of habitats, including grassland and arid savanna.	Possible	Unlikely – limited suitable habitat and high levels of anthropogenic disturbance.
Chrysochloridae	*Amblysomus robustus*	Robust Golden Mole	Vulnerable	Vulnerable	Endangered	Vulnerable	Sandy soils in grassland areas.	Possible	Possible – suitable habitat present
Chrysochloridae	*Amblysomus septentrionalis*	Highveld Golden Mole	Near Threatened	Near Threatened	-	Near Threatened	Sandy soils in grassland areas.	Possible	Possible – suitable habitat present
Chrysochloridae	*Chrysospalax villosus*	Rough-haired Golden Mole	Vulnerable	Vulnerable	Critically Endangered	-	Sandy soils in grassland areas.	Possible	Possible – suitable habitat present

Family	Scientific Name	Common Name	Global Red List Status (IUCN, 2022-2)	Regional Red List Status (2016)	NEMBA ToPS List (2007)	Mpumalanga Status	Habitat Preferences*	Probability of Occurrence	
								Regional Study Area	Local Study Area
Erinaceidae	*Atelerix frontalis*	South African Hedgehog	Least Concern	Near Threatened	Protected	Near Threatened / Protected	Range of habitats, including grassland and savanna.	Possible	Possible – suitable habitat present
Felidae	*Felis nigripes*	Black-footed Cat	Vulnerable	Vulnerable	Protected	Near Threatened	Open short grass areas in savanna and grassland habitats.	Probable	Unlikely - suitable habitat present
Felidae	*Felis silvestris*	African Wildcat	Least Concern	Least Concern		Near Threatened	Range of habitats, including grassland and savanna.	Probable	Recorded (tentative – based on tracks)
Felidae	*Leptailurus serval*	Serval	Least Concern	Near Threatened	Protected	Near Threatened	Wetland, tall grassland and well-watered savanna habitats.	-	Recorded (anecdotal evidence)
Hyaenidae	*Parahyaena brunnea*	Brown Hyaena	Near Threatened	Near Threatened	Protected	Near Threatened / Protected	Savanna and grassland habitats.	Possible	Unlikely – high levels of anthropogenic disturbance.
Hyaenidae	*Proteles cristata*	Aardwolf	Least Concern	Least Concern	-	Protected	Savanna and grassland habitats.	Possible	Unlikely – high levels of anthropogenic disturbance.
Muridae	*Dasymys robertsii*	African Marsh Rat	-	Vulnerable	-	Near Threatened	Moist grassland and wetland habitats. I unlikely to occur in disturbed wetland habitats.	Probable	Unlikely – high levels of habitat disturbance.
Muridae	*Otomys auratus*	Vlei Rat (Grassland type)	Near Threatened	Near Threatened	-	-	Moist grassland and wetland habitats.	Probable	Possible – suitable habitat present
Mustelidae	*Aonyx capensis*	Cape Clawless Otter	Near Threatened	Near Threatened	Protected	Protected	Riparian habitats, with permanent water.	Probable	Unlikely – limited suitable habitat available.
Mustelidae	*Hydrictis maculicollis*	Spotted-necked Otter	Near Threatened	Vulnerable	Protected	Near Threatened / Protected	Riparian habitats, favouring large, open water bodies.	Probable	Unlikely – limited suitable habitat available.
Mustelidae	*Mellivora capensis*	Honey Badger	Least Concern	Least Concern	Protected	Near Threatened / Protected	Savanna and grassland habitats	Probable	Possible – suitable habitat present
Orycteropodidae	*Orycteropus afer*	Aardvark	Least Concern	Least Concern	-	Protected	Savanna and grassland habitats.	Probable	Unlikely – high levels of anthropogenic disturbance.
Mustelidae	*Poecilogale albinucha*	African Striped Weasel	Least Concern	Near Threatened		Vulnerable	Savanna and grassland habitats.	Probable	Possible – suitable habitat present

Family	Scientific Name	Common Name	Global Red List Status (IUCN, 2022-2)	Regional Red List Status (2016)	NEMBA ToPS List (2007)	Mpumalanga Status	Habitat Preferences*	Probability of Occurrence	
								Regional Study Area	Local Study Area
Soricidae	*Crocidura maquassiensis*	Maquassie Musk Shrew	Least Concern	Vulnerable	-	Vulnerable	Little is known of habitat preferences. Thought to favour rocky or montane grasslands.	Possible	Possible – limited suitable habitat present
Soricidae	*Crocidura mariquensis*	Swamp Musk Shrew	Least Concern	Near Threatened	-	Near Threatened	Reedbeds, wetlands and thick moist grassland in riverine habitats.	Probable	Probable – suitable habitat present
**Habitat preferences as per Skinner and Smithers (1990), Stuart and Stuart (2007) and Childs et al., (2016).*									

7.2. Herpetofauna

7.2.1. Herpetofauna Richness and Habitat Availability

Based on known distribution ranges presented in Du Preez and Carruthers (2009), up to 20 amphibian species are known from the region and potentially occur in the RSA (refer to Appendix D). Of these, 14 taxa have previously been recorded in the QDS in which the LSA is located, as per FrogMAP records (listed in Table 6). These are all common species with widespread distributions.

No amphibians were recorded in the LSA during the field survey. However, considering the availability of suitable habitat, it is expected that several of the species listed in Table 6 are likely to be present.

Table 6: Amphibian species previously recorded in the2629AB and 2629BA QDS.

Family	Scientific Name	Common Name
Bufonidae	*Schismaderma carens*	Red Toad
Bufonidae	*Sclerophrys gutturalis*	Guttural Toad
Bufonidae	*Sclerophrys capensis*	Raucous Toad
Hyperoliidae	*Kassina senegalensis*	Bubbling Kassina
Hyperoliidae	*Semnodactylus wealii*	Rattling Frog
Phrynobatrachidae	*Phrynobatrachus natalensis*	Snoring Puddle Frog
Pipidae	*Xenopus laevis*	Common Platanna
Pyxicephalidae	*Amietia delalandii*	Delalande's River Frog
Pyxicephalidae	*Cacosternum boettgeri*	Common Caco
Pyxicephalidae	*Strongylopus fasciatus*	Striped Stream Frog
Pyxicephalidae	*Amietia fuscigula*	Cape River Frog
Pyxicephalidae	*Tomopterna cryptotis*	Tremelo Sand Frog
Pyxicephalidae	*Tomopterna natalensis*	Natal Sand Frog
Pyxicephalidae	*Tomopterna tandyi*	Tandy's Sand Frog
Source: FrogMAP records for 2629AB and 2629BA QDS.		

No reptiles were recorded in the LSA during the field survey. The distribution maps presented in Bates *et al*., (2014) indicate that up to 44 reptile species are known from the region in which the RSA is located (Appendix D). Of these, 24 common and widespread taxa have been recorded in the relevant QDS, according to data obtained from ReptileMAP (listed in Table 7).

Table 7: Reptile species previously recorded in the 2629AB and 2629BA QDS.

Family	Scientific Name	Common Name
Agamidae	*Agama aculeata distanti*	Distant's Ground Agama
Colubridae	*Crotaphopeltis hotamboeia*	Red-lipped Snake
Colubridae	*Dasypeltis scabra*	Rhombic Egg-eater
Elapidae	*Naja mossambica*	Mozambique Spitting Cobra
Elapidae	*Hemachatus haemachatus*	Rinkhals
Gekkonidae	*Lygodactylus ocellatus*	Spotted Dwarf Gecko
Gekkonidae	*Pachydactylus affinis*	Transvaal Gecko
Gekkonidae	*Pachydactylus capensis*	Cape Gecko

Gekkonidae	*Pachydactylus vansoni*	Van Son's Gecko
Lamprophiidae	*Boaedon capensis*	Brown House Snake
Lamprophiidae	*Lycodonomorphus inornatus*	Olive House Snake
Lamprophiidae	*Lycodonomorphus rufulus*	Brown Water Snake
Lamprophiidae	*Lycophidion capense capense*	Cape Wolf Snake
Lamprophiidae	*Psammophylax rhombeatus*	Spotted Grass Snake
Lamprophiidae	*Aparallactus capensis*	Black-headed Centipede-eater
Lamprophiidae	*Homoroselaps lacteus*	Spotted Harlequin Snake
Lamprophiidae	*Psammophis crucifer*	Cross-marked Grass Snake
Lamprophiidae	*Pseudaspis cana*	Mole Snake
Leptotyphlopidae	*Leptotyphlops sp.*	-
Leptotyphlopidae	*Leptotyphlops scutifrons conjunctus*	Eastern Thread Snake
Scincidae	*Trachylepis capensis*	Cape Skink
Scincidae	*Trachylepis punctatissima*	Speckled Rock Skink
Typhlopidae	*Afrotyphlops bibronii*	Bibron's Blind Snake
Viperidae	*Causus rhombeatus*	Rhombic Night Adder
Source: ReptileMAP records for 2629AB and 2629BA QDS.		

7.2.2. Herpetofauna of Conservation Concern

The Giant Bullfrog (*Pyxicephalus adspersus*) is the only amphibian of conservation concern potentially occurring in the regional and local study areas. This species is listed as Least Concern on both the Global and Regional Red Lists, but it is listed as 'protected' on the NEMBA ToPs list (2007), as well as 'protected' in Mpumalanga Province according to the Mpumalanga Nature Conservation Act, 1998). It is further listed as Vulnerable on the Mpumalanga Red List. Giant Bullfrog inhabit seasonally shallow pans, wetland and rained-filled depressions in savanna and grassland ecosystems. These habitats are present in both the RSA and LSA. It is possible that the Giant Bullfrog is present in the RSA, however, considering the degree of local habitat disturbances, it is unlikely that Giant Bullfrog are present in the LSA.

Five reptile species potentially occurring in the RSA and LSA are of conservation concern. These are listed in Table 8, along with their conservation status, habitat preferences and a probability of occurrence.

Table 8: Reptile species of conservation concern occurring and potentially occurring in the study area.

Family	Scientific Name	Common Name	Global Red List Status (IUCN, 2022-2)	Regional Red List Status	NEMBA ToPS List (2007)	Mpumalanga Status	Habitat Preferences*	Probability of Occurrence	
								Regional Study Area	Local Study Area
Cordylidae	*Chamaesaura aenea*	Coppery Grass Lizard	Near Threatened	Least Concern	-	Near Threatened	Grassy slopes and plateau.	Possible	Possible – Suitable habitat present.
Cordylidae	*Smaug giganteus*	Giant Dragon Lizard	Vulnerable	Vulnerable	-	Vulnerable	Favours flat to sloping highveld grassland habitats.	Unlikely	Unlikely – known distribution mainly to the south of the study area
Lamprophiidae	*Amplorhinus multimaculatus*	Many-spotted Snake	Least Concern	Least Concern		Near Threatened	Reed beds, wetlands and riparian vegetation in grasslands.	Possible	Possible – Suitable habitat present.
Lamprophiidae	*Homoroselaps lacteus*	Spotted Harlequin Snake	Least Concern	Least Concern	-	Near Threatened	Semi-fossorial, favouring sandy soils, abandoned termitaria and rocky areas.	Probable	Possible – Suitable habitat present.
Scincidae	*Acontias breviceps*	Short-headed Legless Skink	Least Concern	Least Concern	-	Vulnerable	Fossorial and found in montane grassland.	Unlikely	Unlikely – No suitable habitat present.

*Habitat preferences as per Branch (1998) and Bates *et al.,* (2014).

7.3. Invertebrates

Limited invertebrate data are available for the 2629AB and 2629BA QDS. The Virtual Museum platform only lists seven butterfly and four dragonflies for the QDS, but no spiders, scorpions or lacewings. A further review of the distribution maps of members of the Family Theraphosidae (baboon spiders) presented in Dippenaar-Schoeman (2014), also suggests that none of these taxa, which are of conservation concern, have previously been recorded in the region in which the RSA is located.

Notwithstanding the above, one species of butterfly listed on LepiMAP is of conservation concern, namely the Marsh Sylph (*Metisella meninx*). This species is listed as Near Threatened on the Global, Regional and Mpumalanga Red Lists. Marsh Sylph favour marsh and wetland areas, as well as open grassland habitats, from 1 400 to 1 700 m. These habitats are presented in the RSA and LSA and it is therefore possible that the Marsh Sylph is present.

8. Key Ecological Attributes and Processes in the Local Study Area

8.1. Habitat Corridors, Resources and Refugia

The LSA is highly fragmented and large portions are dominated by anthropogenic infrastructure, such as the power station and its associated facilities (ash dams), the Komati village, and cultivated fields. Patches of natural habitat are present; however, these are typically either bounded by built infrastructure or enclosed by fencing (e.g., concrete palisade fence). The immediate landscape surrounding the LSA is similarly transformed and fragmented, and thus habitat connectivity across the LSA and the surrounding landscape is poor. This will affect the ability of fauna, particularly larger mammal species, to move and disperse across the study area and access the surrounding landscape. This is likely to negatively affect the fauna richness of the LSA.

8.2. Key Ecological Processes and Drivers of Change

The following notes summarise the key processes and drivers of change that are present in the LSA and surrounding landscape and their possible influence on the character of on-site terrestrial fauna communities:

8.2.1. Wildfire – Grassland Burning

Fire is considered a natural, albeit often human initiated disturbance agent in grassland ecosystems. Mesic Highveld Grasslands are considered fire-prone and fire-dependent landscapes, and fire is essential to the maintenance of biodiversity patterns and ecological processes (SANBI, 2013). Key ecological benefits of fire, with respect to fauna communities, include *inter alia*:

- Removes moribund vegetation and enhances plant primary productivity and palatability, which improves grazing for wild herbivores. Fire also stimulates germination / flowering of fire-adapted flora species (e.g., certain orchid species);
- Controls the encroachment of both alien and indigenous woody plant species and weeds; and
- Increases overall habitat heterogeneity by creating a structural mosaic of tall- and short grassland.

A review of available historic satellite imagery indicates that grassland habitat in the LSA does burn occasionally. Fires are likely set either intentionally or accidentally by local community members and

are not part of a formal burning programme. This notwithstanding, fire is considered an important driver of change in the LSA.

8.2.2. Alien Invasive Species Colonisation

Nineteen AIS were recorded in the LSA during the field survey. If not actively controlled, many AIS have the capacity to spread into adjacent natural habitat, where they could competitively exclude many indigenous woody and herbaceous species. This will have several deleterious impacts on the integrity and functioning of these habitats, such as *inter alia*:

- A loss of floristic diversity, with the resulting habitat patches unable to support diverse fauna communities;
- A reduction in grass productivity for grazing herbivores, and
- Increased exposed soil surfaces and incidences of erosion.

Several species recorded in the LSA are highly invasive and adept at colonising undisturbed grassland and wetland habitats, such as *Acacia dealbata, Acacia mearnsii, Campuloclinium macrocephalum, Flaveria bidentis* and *Verbena bonariensis.* The spread of alien invasive vegetation is therefore considered a significant driver of change in the LSA and surrounding landscape, and one capable of severely negatively impacting biodiversity.

9. Combined Analysis of Site Ecological Importance

This section presents summary comment on the ecological importance of identified habitat units in the study area, as per the SANBI (2020) protocol. It is informed by the combined findings of both the Terrestrial Animal Species Specialist Assessment (i.e., this report) and the Terrestrial Biodiversity and Terrestrial Plant Species Specialist Assessments for the proposed Project. A map of ecological importance is shown in Figure 11, while a summary matrix is shown in Table 9.

The Cultivated Fields, Alien Tree Stands, and Transformed Areas with Disturbed or Landscaped Vegetation habitats units are either transformed or subject to high levels of ongoing anthropogenic disturbance and meet the definition of modified habitat, as per IFC PS6. I.e., anthropogenic activity has substantially modified primary ecological functioning and species composition. In line with the SANBI (2020) rating criteria, the biodiversity importance of Cultivated Fields, Alien Tree Stands, and Transformed Areas with Disturbed and Landscaped Vegetation is rated Very Low.

Mixed *Themeda triandra* Grassland and Mixed Moist Grassland are considered natural habitat, as per the IFC PS 6 definition. I.e., these areas are comprised of viable assemblages of indigenous species and retain their primary ecological functions. The ecological importance of Mixed *Themeda triandra* Grassland is rated high, while that of Mixed Moist Grassland is rated medium.

Table 9: Ecological importance of habitat units identified in the local study area.

Habitat Unit	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Ecological Importance
Cultivated Fields	Very Low	Very Low	Very Low	Low	Very Low
Alien Tree Stands	Very Low	Very Low	Very Low	Low	Very Low
Transformed Areas with Disturbed or Landscaped Vegetation	Very Low	Very Low	Very Low	Low	Very Low

Habitat Unit	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Ecological Importance
Mixed Themeda triandra Grassland	High	High	High	Medium	High
Mixed Moist Grassland	High	Medium	Medium	Medium	Medium

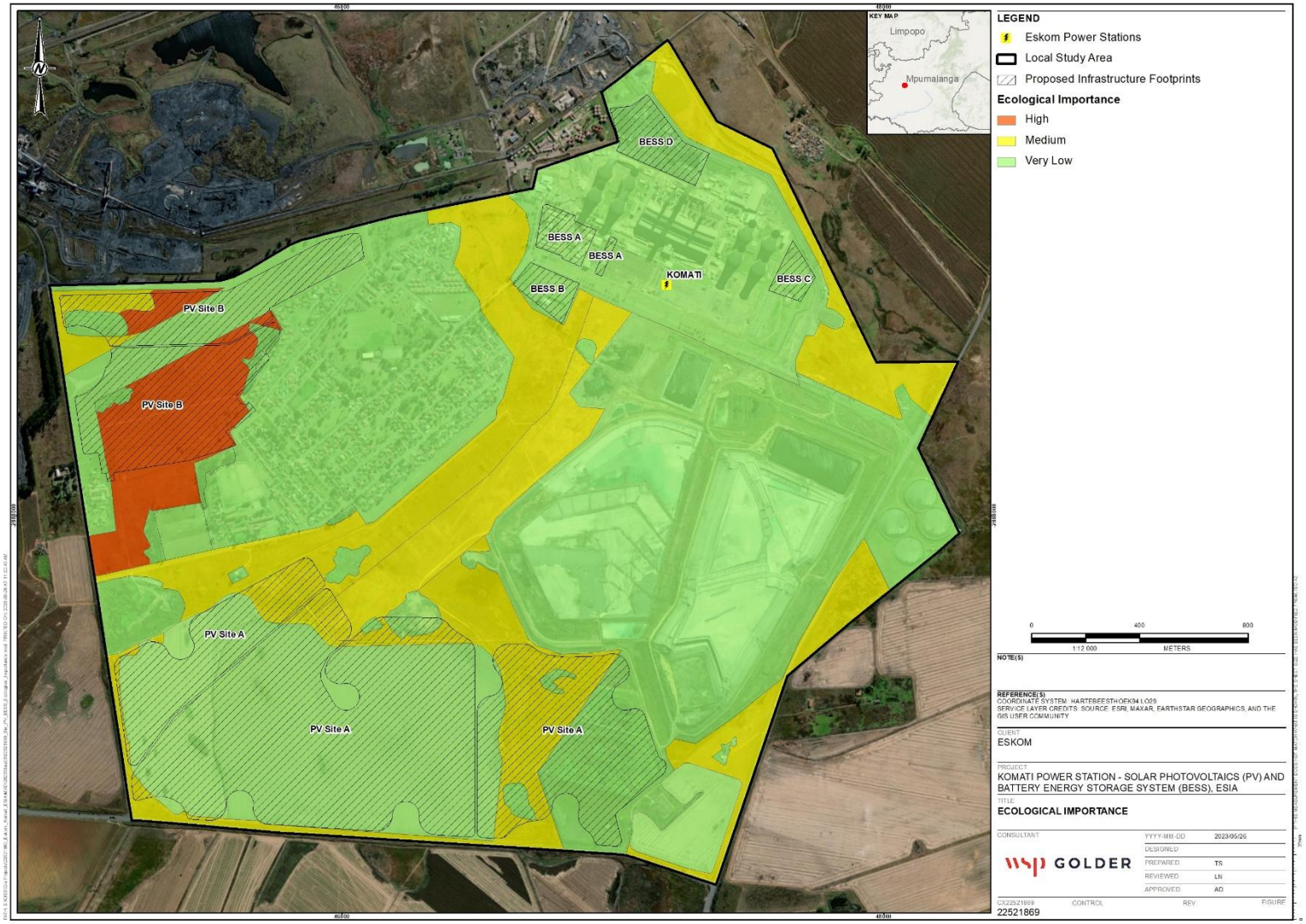

Figure 11: Ecological importance of habitat units in the local study area.

10. Impact Assessment

10.1. Impact Methodology

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct[2], indirect[3], secondary[4] as well as cumulative[5] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e., residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[6] presented in Table 10.

Table 10: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action

[2] Impacts that arise directly from activities that form an integral part of the Project.
[3] Impacts that arise indirectly from activities not explicitly forming part of the Project.
[4] Secondary or induced impacts caused by a change in the Project environment.
[5] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects
[6] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	**4 to 15**	**16 to 30**	**31 to 60**	**61 to 80**	**81 to 100**
Environmental Significance Rating (Negative (-))	**Very low**	**Low**	**Moderate**	**High**	**Very High**
Environmental Significance Rating (Positive (+))	**Very low**	**Low**	**Moderate**	**High**	**Very High**

10.2. Impact Mitigation

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or

restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

The mitigation sequence/hierarchy is shown in Figure 12 below.

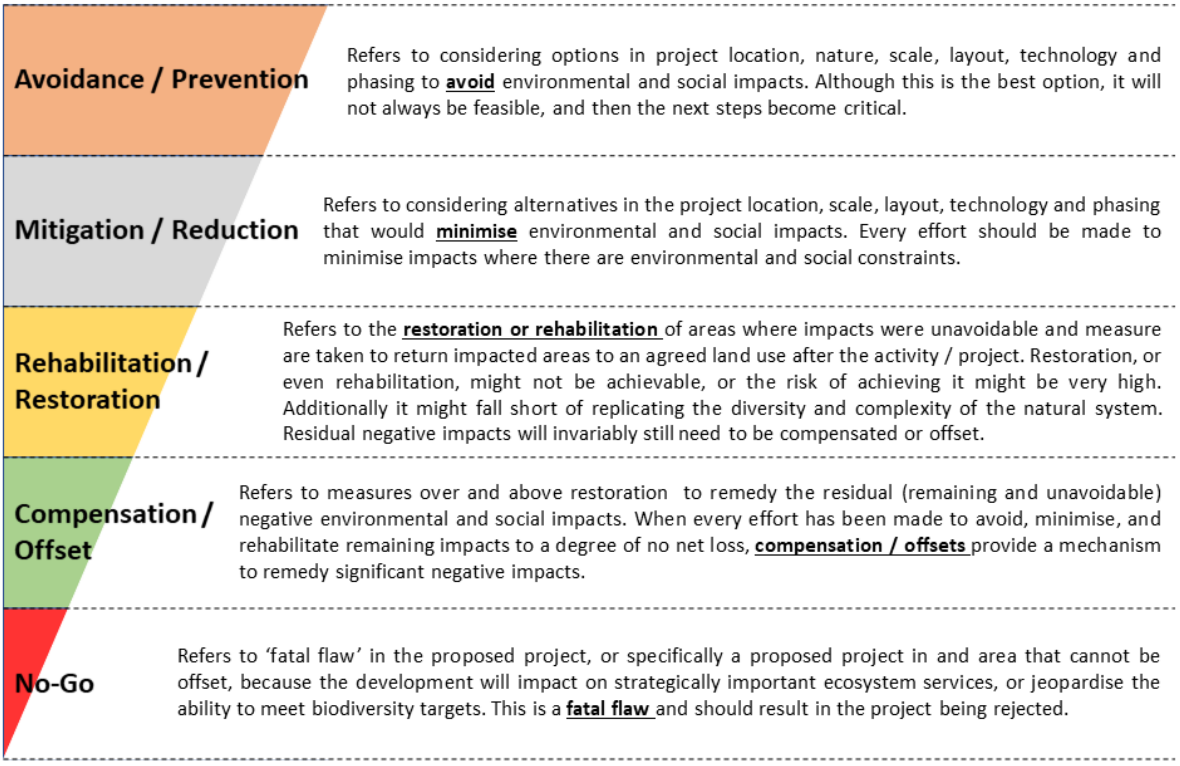

Figure 12: Mitigation Sequence/Hierarchy

A discussion on assessed impacts for each phase (i.e., Construction Operational and Decommissioning) of the proposed Project is provided in Section 10.3 to Section 10.5, with a summary table presented in Table 12.

10.3. Construction Phase

10.3.1. Loss and Disturbance of Fauna Habitat

Habitat loss and disturbance refers to the removal or degradation of natural habitat. In terrestrial ecosystems, this primarily occurs through vegetation clearing and bulk earth works during construction.

In total, the proposed layout of Project will result in the direct loss of 48.43 ha of natural habitat and 147.28 ha of modified habitat - refer to Table 11: As shown in Figure 8:

- The proposed PV Site A footprint mostly impacts modified habitat, specifically the Cultivated Fields and Transformed Areas with Disturbed or Landscaped Vegetation habitat units, with some Mixed Moist Grassland impacted;
- The proposed PV Site B footprint comprises a mixture of modified and natural habitats, with both Mixed *Themeda triandra* Grassland and Mixed Moist Grassland directly impacted;
- The BESS sites are all located on land designated under the Transformed Areas with Disturbed or Landscaped Vegetation habitat unit; and

The loss of modified habitats is not considered an impact of concern with respects to fauna SCC. However, the loss natural habitat is an impact of concern, and has been assessed separately for the Mixed *Themeda triandra* Grassland and Mixed Moist Grassland habitat units.

Table 11: Extent of habitat loss associated with proposed Project activities.

Habitat Type	Habitat Units	Approx. Extent (Ha) of Loss
Modified Habitats	Cultivated Fields	92.75
	Alien Tree Stands	1.73
	Transformed Areas with Disturbed or Landscaped Vegetation	52.80
	Sub Total	**147.28**
Natural Habitats	Mixed *Themeda triandra* Grassland	21.48
	Mixed Moist Grassland	26.95
	Sub Total	**48.43**

Although localised disturbances are present in the Mixed *Themeda triandra* Grassland, in general, this habitat unit is considered a primary vegetation community, and is rated as having a high ecological importance. This is consistent with the MBSP delineation of this portion of the LSA as CBA Optimal.

Prior to mitigation, the loss of Mixed *Themeda triandra* Grassland habitat is considered an impact of very high magnitude, permanently affecting vegetation within and potentially adjacent to the development footprints (local). It is also considered to have a definite probability, resulting in a before impact rating of “very high” significance.

With the application of standard mitigation, which includes the avoidance of Mixed *Themeda triandra* Grassland habitat that is designated as CBA Optimal (refer to the Terrestrial Biodiversity and Plant Species Specialist Report), the impact magnitude can be reduced to low. Impact extent will be reduced to the site only, and duration will be long-term (i.e., project life), while probability will be

reduced to medium. This results in an after-mitigation impact of “low” significance for the loss of Mixed *Themeda triandra* Grassland.

With respect to the Mixed Moist Grassland, this habitat unit is rated as having a medium ecological importance on account of various disturbances. Prior to mitigation this impact has a magnitude of high and will have a local extent. Duration will be permanent and it is definite that the impact will occur. This results in an impact significance of “high”. With the implementation of standard mitigation measures, this impact can be reduced to a low magnitude, with a long-term duration. Spatial extent will be reduced to the site only and probability will decrease from definite to probable. After mitigation, the loss of Mixed Moist Grassland is rated to be of “low” significance.

10.3.2. Establishment and Spread of Alien Invasive Species

Habitat disturbances caused by vegetation clearing and earth works during construction can facilitate the establishment and spread of AIS. Alien plant infestations can spread exponentially, suppressing or replacing indigenous vegetation. This may compromise ecosystem functioning resulting in a loss of biodiversity.

Nineteen NEMBA listed AIS were recorded in the study area. Proposed Project activities will cause the physical disturbance of vegetation and soils, which will facilitate the spread of AIS.

Before mitigation, impact magnitude is high, while duration is long term and it has a high probability. The spatial extent of AIS spread is local. Prior to mitigation, the establishment and spread of AIS is rated an impact of “moderate” significance.

This impact is relatively easy to mitigate. With the implementation of active control during the construction phase, this impact can be reduced to a low magnitude, with a short-term duration. Spatial extent will be reduced to the site only and the probability of the impact occurring as predicted would be reduced to low. After mitigation, this impact is rated to be of “very low” significance.

10.3.3. Direct Mortality, Injuring and Disturbance of Fauna

Large and mobile fauna are likely to move off to avoid disturbances caused by construction activities. However, smaller and less mobile species may be trapped, injured and killed during vegetation clearing and earth works. Fauna that are particularly susceptible to direct mortality and disturbance include reptiles, amphibians and fossorial (burrowing) mammals. Other common causes of fauna death or injury include vehicle collisions along access roads, hunting and snaring by workers, and trapping of fauna in fences, excavations and trenches.

Before mitigation, impact magnitude is high, while duration is immediate and it has a high probability. The spatial extent will be local. Prior to mitigation, the mortality, injuring and disturbance of mammals is rated an impact of “moderate” significance.

After mitigation, which includes, *inter alia,* active supervision by an environmental control officer (ECO) at all times during the construction phase, this impact can be reduced to a low magnitude, with an immediate duration. The spatial extent will be reduced to the site and probability will also be reduced to low. After mitigation the killing, injuring and disturbance of fauna is rated of “very low” significance.

10.3.4. Loss of Fauna Species of Conservation Concern

Several fauna SCC have historic distribution ranges that encompass the LSA, and thus potentially occur in areas of natural habitat. Habitat suitability assessments indicated that most of these SCC are unlikely to be present in the LSA, due *inter alia*, a lack of suitable habitat as a result of the fragmented and highly disturbed nature of most of the LSA. Based on anecdotal evidence, one Red List taxa was noted to be present in the LSA, namely the Serval. This adaptable species is able to tolerate a high degree of habitat disturbances (pers. obs.), and it is considered unlikely that habitat disruptions associated with the proposed Project will negatively impact the local Serval population. The probability of occurrence of the Maquassie Musk Shrew and African Marsh Rat was assessed to be possible. Both taxa favour moist grassland-type habitat, which is present in the LSA and will be impacted by proposed Project infrastructure. However, considering the already disturbed nature of this habitat unit in the LSA, it is unlikely that these areas constitute important life-cycle habitat for these taxa, and Project disturbances are thus unlikely to negatively affect Maquassie Musk Shrew and African Marsh Rat populations, if they are indeed present.

Before mitigation, impact magnitude is very high, while duration is permanent. It has a moderate probability of occurrence. The spatial extent of the impact is at the local scale. Prior to mitigation, this impact is rated of “moderate” significance. This impact can be reduced to a medium magnitude, and will remain of permanent duration. Spatial extent will be reduced to the site, but probability will be reduced to low. After mitigation this impact is rated to be of “low” significance.

10.4. Operational Phase

10.4.1. Establishment and Spread of Alien Invasive Species

The potential establishment and spread of AIS in the study area will continue to be an impact of concern during the operational phase.

Before mitigation, impact magnitude is high, while duration is long term and the impact has a high probability of occurring as predicted. The spatial extent of alien invasive species spread is local. Prior to mitigation, the establishment and spread of alien invasive species is rated an impact of “moderate” significance.

With the continued implementation of an active alien species control programme during the operational phase this impact can be reduced to a low magnitude, with a short-term duration. Spatial extent will be reduced to the site only and probability at low. After mitigation, this impact is rated to be of “very low” significance.

10.5. Decommissioning Phase

10.5.1. Establishment and Spread of Alien Invasive Species

As Project infrastructure is dismantled and removed from site during the decommissioning phase, the associated disturbances are likely to facilitate alien invasive species colonisation in, and immediately adjacent to, the study area.

Before mitigation, impact magnitude is high, while duration is long term and the impact has a high probability of occurring as predicted. The spatial extent of alien invasive species spread is local. Prior to mitigation, the establishment and spread of alien invasive species is rated an impact of “moderate” significance.

With the continued implementation of an active alien species control programme during decommissioning, this impact can be reduced to a low magnitude, with a short-term duration. Spatial extent will be reduced to the site only and the probability of the impact occurring would be low. After mitigation, this impact is rated to be of “very low” significance.

11. Cumulative Impacts

The RSA is characterised by large areas of modified habitat, principally resulting from agriculture, but also increasingly mining. The progressive loss of natural grassland habitat in the RSA as a consequence of this Project and other development projects, is a cumulative loss of concern.

Cumulative habitat loss is rated an impact of very high magnitude, permanently affecting habitat within and adjacent to the development footprints (local). It is also considered to have a high probability, resulting in a before impact rating of “high” significance. With mitigation, the impact magnitude can be reduced to medium. Impact extent will be retained at local, and duration will be long-term (i.e., project life), while probability will be reduced to low probability. This results in an after-mitigation impact of “low” significance.

Table 12: Summary of Impact Scoring for each phase of the proposed Project.

CONSTRUCTION

Impact number	Aspect	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S	Rating	(M+	E+	R+	D)x	P=	S	Rating
Impact 1:	Fauna Habitat	Loss and disturbance of natural habitat - Mixed Themeda triandra Grassland	Construction	Negative	Moderate	5	2	5	5	5	**85**	**N5**	2	1	3	4	4	**30**	**N2**
					Significance	**N5 - Very High**							**N2 - Low**						
Impact 2:	Fauna Habitat	Loss and disturbance of natural habitat - Moist Mixed Grassland	Construction	Negative	moderate	4	2	3	5	5	**70**	**N4**	2	1	3	4	3	**30**	**N2**
					Significance	**N4 - High**							**N2 - Low**						
Impact 3:	Fauna Habitat	Establishment and spread of alien invasive species	Construction	Negative	High	4	2	1	4	4	**44**	**N3**	2	1	1	2	2	**12**	**N1**
					Significance	**N3 - Moderate**							**N1 - Very Low**						
Impact 4:	Fauna	Direct mortality, injuring and disturbance of fauna	Construction	Negative	High	4	2	5	1	4	**48**	**N3**	2	1	3	1	2	**14**	**N1**
					Significance	**N3 - Moderate**							**N1 - Very Low**						
Impact 5:	Fauna SCC	Loss of fauna species of conservation concern	Construction	Negative	High	5	2	5	5	3	**51**	**N3**	3	1	3	5	2	**24**	**N2**
					Significance	**N3 - Moderate**							**N2 - Low**						

OPERATIONAL

Impact number	Receptor	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S		(M+	E+	R+	D)x	P=	S	
Impact 1:	Fauna Habitat	Establishment and spread of alien invasive species	Operational	Negative	High	4	2	1	4	4	**44**	**N3**	2	1	1	2	2	**12**	**N1**
					Significance	**N3 - Moderate**							**N1 - Very Low**						

DECOMISSIONING

Impact number	Receptor	Description	Stage	Character	Ease of Mitigation	Pre-Mitigation							Post-Mitigation						
						(M+	E+	R+	D)x	P=	S		(M+	E+	R+	D)x	P=	S	

Impact 1:	Fauna Habitat	Establishment and spread of alien invasive species	Decommissioning	Negative	High	4	2	1	4	4	**44**	**N3**	2	1	1	2	2	**12**	**N1**
					Significance	**N3 - Moderate**							**N1 - Very Low**						

CUMULATIVE

Impact number	**Receptor**	**Description**	**Stage**	**Character**	**Ease of Mitigation**	**Pre-Mitigation**							**Post-Mitigation**						
						(M+	**E+**	**R+**	**D)x**	**P=**	**S**		**(M+**	**E+**	**R+**	**D)x**	**P=**	**S**	
Impact 1:	Fauna Habitat	Loss and disturbance of natural habitat	Cumulative	Negative	Moderate	5	2	5	5	4	**68**	**N4**	3	2	3	4	2	**24**	**N2**
					Significance	**N4 - High**							**N2 - Low**						

12. Mitigation Measures

The following section presents the proposed impact management actions to avoid, minimise and/or manage the potential impacts/risks which were assessed Section 10.

As with the assessment of potential impacts/risks, the impact management actions have been arranged according to the following main Project phases:

- Construction;
- Operational; and
- Decommissioning

For each impact management action, the following information is provided:

- Category: The category within which the potential impact/risk occurs;
- Potential impact/risk: Identified potential impact/risk resulting from the pre-construction, construction, operation, and decommissioning of the proposed Project;
- Description: Description of the possible impact management action;
- Prescribed standards or practices: Prescribed environmental standards or practices with which the impact management action must comply. Note that only key standards or practices have been listed;
- Mitigation type: The type of mitigation measure. This includes the following:
    - Avoidance;
    - Minimisation;
    - Rehabilitation or restoration;
    - Offsetting;
- Time period: The time period when the impact management actions must be implemented; and
- Responsible persons: The persons who will be responsible for the implementation of the impact management actions.

Table 13**Error! Reference source not found.** presents a summary of the proposed impact mitigation actions during the construction, operational, and decommissioning phases of the proposed Project.

Table 13: Summary of proposed impact mitigation actions.

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
1. Construction phase							
1.1	Fauna Habitat	Loss and disturbance of natural habitat	<u>Avoidance and Minimisation</u> • Project infrastructure should positioned to avoid clearing all land designated as CBA Optimal (refer to Terrestrial Biodiversity Specialist Report); • As much of the proposed Project infrastructure as possible should be located on areas of modified habitat; • All vegetation clearing for the Project should be restricted to the proposed Project footprints only, with no clearing permitted outside of these areas; • The footprints to be cleared of vegetation should be clearly demarcated prior to construction to prevent unnecessary clearing outside of these areas. No heavy vehicles should travel beyond the marked works zone; • Temporary facilities associated with construction, such as contractor site offices, portable toilets, storage and laydown areas,	N/A	Avoidance, Minimisation, Rehabilitation	During Construction Phase	Project Manager

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
			should be located on land that is currently transformed or developed; • Removed topsoil should be stockpiled and used to rehabilitate all non-operational disturbed areas. <u>Rehabilitation</u> A comprehensive rehabilitation/ landscaping protocol should be developed and implemented to stabilise and revegetate all non-operational sites that have been disturbed by construction.				
1.2	Fauna Habitat	Establishment and spread of alien invasive species	An AIS control and eradication plan must be developed for the Project that focuses on controlling and eradicating all AIS occurring throughout the LSA. The plan must include: • Identification of AIS management units • Prioritisation of sites and species requiring control; • Targets and indicators of success; • Scheduling of AIS control;	Guidelines for Monitoring, Control and Eradication of AIS (DEA, 2015)	Minimisation	During Construction Phase	Project Manager

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
			• Species-specific control methods, using a combined approach of both chemical and mechanical control methods; and • Provision for follow-up treatments, as informed by regular AIS monitoring.				
1.3	Fauna Species	Mortality and disturbance of fauna	• An Environmental Control Officer (ECO) should be on-site during vegetation clearing to monitor and manage any wildlife-human interactions. The ECO should be trained in *inter alia*, snake handling and basic fauna identification; • Any fauna species trapped in construction areas, should be safely and correctly relocated to an adjacent area of natural habitat; • A low-speed limit (recommended 20-40 km/h) should be enforced on site to reduce wildlife collisions; • The handling, poisoning and killing of on-site fauna by workers and contractors must be strictly prohibited; • The rules and regulations concerning all wildlife should be communicated to workers	N/A	Avoidance / Minimisation	During Construction Phase	ECO

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
			and contractors through on-site signage and awareness training (induction); • An incidence register should be maintained throughout all phases of the Project detailing any wildlife mortalities/injuries caused by on-site activities. The register should be used to identify additional biodiversity management requirements; • As required, active dust suppressions should be implemented on-site to limit dust-related disturbances to fauna.				
1.7	Fauna SCC	Loss of fauna of conservation concern	*Refer to above mitigation measures for: Loss and disturbance of natural habitat, and Mortality and disturbance of fauna.*	N/A	Avoidance / Minimisation	During Construction Phase	Project Manager
2. Operational phase							
2.1	Fauna Habitat	Establish and spread of alien invasive species	Active alien invasive species control should continue throughout the operational phase, as per the approved AIS control and eradication programme.	Guidelines for Monitoring, Control and Eradication of AIS (DEA, 2015)	Minimisation	During Operational Phase	Facility Manager
3. Decommissioning phase							

Ref No.	Category	Potential impact/risk	Description	Prescribed standards or practices	Mitigation type	Time period	Responsible person
3.1	Fauna Habitat	Establish and spread of alien invasive species	Active alien invasive species control should continue during the decommissioning phase and follow up control should be carried out for a five- year period following decommissioning.	Guidelines for Monitoring, Control and Eradication of AIS (DEA, 2015)	Minimisation	During decommissioning and for a five-year period after decommissioning	Facility Manager
3.3	Fauna Habitat	General habitat restoration	To limit the potential for AIS encroachment, soil erosion and dust generation, all Project footprints and sites that were disturbed during decommissioning, should be actively rehabilitated using local occurring indigenous flora species.	N/A	Rehabilitation	During the Decommissioning Phase	Facility Manager

13. Monitoring Measures

The following section presents the proposed monitoring actions for monitoring and reporting on the implementation of the impact mitigation actions presented in the preceding Section 12.

The content of this section is largely based on the monitoring requirements outlined in Appendix 4 of the EIA Regulations, 2014.

For each monitoring action, the following information is provided:

- Category: The category within which the potential impact and/or risk occurs
- Potential impact/risk: Identified potential impact/risk resulting from the pre-construction, construction, operation, and decommissioning of the proposed Project
- Method for monitoring : The method for monitoring the implementation of the recommended mitigation measures
- Time period: The time period over which the monitoring actions must be implemented
- Frequency of monitoring: The frequency of monitoring the implementation of the recommended mitigation measures
- Mechanism for monitoring compliance: The mechanism for monitoring compliance with the impact management actions
- Responsible persons: The persons who will be responsible for the implementation of the monitoring actions

As with the impact management actions, the proposed monitoring actions have been arranged according to the following project phases:

- Construction;
- Operational; and
- Decommissioning.

Table 14 presents a summary of the proposed monitoring actions during the construction, operational and decommissioning phases.

Table 14: Summary of monitoring measures

Ref. No.	Category	Method for monitoring	Time period	Frequency of monitoring	Mechanism for monitoring compliance	Responsible person
1. Construction phase						
1.1	Alien invasive species	• Annual on-site alien invasive species monitoring should be conducted. Monitoring should focus on all sites disturbed during the construction phase; and • Monitoring should assess species type and density, and these data should inform the scope of ongoing alien invasive species control with respects to priority sites and priority species.	Wet/growing season	Annual	Annual Monitoring Report	Project Manager
2. Operational phase						
2.1	Alien invasive species	• Ongoing AIS monitoring should be conducted on an annual basis throughout the operational phase. • AIS monitoring should focus on all sites disturbed by Project activities, and where previous AIS control has been implemented, and • Monitoring should assess species type and density, and these data should inform the	Wet/growing season	Annual	Annual Monitoring Report	Facility Manager

Ref. No.	Category	Method for monitoring	Time period	Frequency of monitoring	Mechanism for monitoring compliance	Responsible person
		scope of ongoing alien invasive species control with respects to priority sites and priority species.				
3. Decommissioning phase						
3.1	Alien invasive species	• Alien invasive species monitoring should be conducted on an annual basis during decommissioning and on a biannual basis for a six-year period following decommissioning; • Monitoring should focus on all sites disturbed by decommissioning activities; • Monitoring should assess species type and density, and these data should inform the scope of ongoing alien invasive species control and the need for additional rehabilitation/revegetation interventions.	Wet/growing season	Annually during decommissioning & biannually for a period of six years after decommissioning	Annual and Biannual Monitoring Report	Facility Manager

14. Reasoned Opinion and Environmental Impact Statement

The following section presents a summary of the key findings of the study:

The LSA is centred on Komati Power Station and Komati residential village. Accordingly, large portions of the LSA are under built infrastructure or are highly modified. Natural habitat that is present, varies in condition and is confined to small fragmented patches of land that are typically bounded or enclosed by infrastructure, such as roads and fences. Connectivity with habitat patches across the broader landscape are thus considered poor.

Based on historic distribution ranges, several fauna SCC potentially occur in the landscape in which the LSA is located. However, because the LSA is mostly transformed, disturbed and fragmented, the site is not considered to constitute important life-cycle habitat for local populations of fauna SCC, with the results of habitat suitability assessments indicating that most SCC are unlikely to be present. The Environmental Screening Tool maps the terrestrial animal species theme for most of the LSA as 'Medium Sensitivity', with a very small area in the south-west corner rated 'High Sensitivity'. The findings of this study indicate that the LSA is rated 'Medium Sensitivity' with respects to terrestrial animals.

This notwithstanding, proposed Project activities are likely to have some impact on general fauna through direct habitat loss and disturbance, amongst other identified impacts (refer to Table 15 for a summary of the before- and after mitigation significance of identified impacts). These impacts can be restricted to the proposed development footprints and/or successfully mitigated, through the correct application of the management and mitigation measures outlined in this report.

Table 15: Summary of identified impacts on terrestrial fauna

Aspect	Potential Impact/Risk	Significance without Mitigation	Significance with Mitigation
Construction			
Fauna Habitat	Loss and disturbance of habitat – Mixed *Themeda triandra* grassland	Very High	Low
Fauna Habitat	Loss and disturbance of habitat – Mixed Moist Grassland	High	Low
Fauna Habitat	Establishment and spread of alien invasive species	Moderate	Very Low
Fauna Species	Direct mortality, injury and disturbance of fauna	Moderate	Very Low
Fauna SCC	Loss of fauna of conservation concern	Moderate	Low
Operational Phase			
Fauna Habitat	Establishment and spread of alien invasive species	Moderate	Very Low
Decommissioning			
Fauna Habitat	Establishment and spread of alien invasive species	Moderate	Very Low

14.1. Conditions to be Included in the Environmental Authorisation

No additional conditions are recommended for inclusion in the EA.

14.2. Specialist Opinion

In accordance with the outcomes of the impact assessment (Section 10) and taking cognisance of the baseline conditions as presented in this report, as well as the impact management measures prescribed in Section 12, Section 13 and Section 14.1, the proposed Project, is not deemed to present significant negative environmental issues or impacts, and it should thus be authorised.

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Appendix A: Curricula vitae for Andrew Zinn

Hawkhead Consulting

Curriculum Vitae of Andrew Zinn (Pr.Sci.Nat.)

Details

Andrew David Zinn
Terrestrial Ecologist
B.Sc. (Hons.), M.Sc., Pr.Sci.Nat.

Email: andrew@hawkhead.com
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Address: 58 Central Rd, Linden Ext., Johannesburg, 2195
South Africa
Date of birth: 14 July 1982
Nationality: South African

Profile

I am an ecologist with an M.Sc. Degree in Resource Conservation Biology and 15 years of experience working in biodiversity consulting and ecological research. I am registered with the South African Council of Natural Scientific Professions as a Professional Natural Scientist. I currently work as an independent consulting ecologist, with Hawkhead Consulting. During my career I have worked on projects in remote areas in several African countries including South Africa, Botswana, Democratic Republic of the Congo, Ethiopia, Ghana, Mozambique, Tanzania and Zambia. I have also previously worked in the United Kingdom and the United Arab Emirates.

Education and Qualifications

- University of the Witwatersrand, M.Sc. Resource Conservation Biology (2013).
- University of KwaZulu-Natal, BSc. Hons. Ecology and Conservation Biology (2005).
- University of KwaZulu-Natal, BSc. Zoology and Grassland Science (2004).
- Bryanston High School, Johannesburg. Matric Exemption. (2000).

Affiliations

- Member of the South African Wildlife Management Association
- Member of the South African Council of Natural Scientific Professions – Professional Natural Scientist (400687/15).

Work Experience

1. **Independent Ecologist**

Hawkhead Consulting, South Africa
September 2020 – Present

Consulting ecologist focusing on terrestrial ecology. I specialise in conducting baseline flora and fauna surveys, ecological impact assessments, and developing mitigation and management programmes for projects and operations in various industry sectors. Core services and responsibilities include, amongst others:

- Biodiversity study design and implementation;
- Biodiversity baseline and impact assessment reporting;
- Mitigation measure design and application;
- Vegetation surveys and vegetation community mapping;
- Fauna surveys for mammals, birds, reptiles and amphibians;
- Development of biodiversity management plans;
- Development of rehabilitation and revegetation plans; and
- Alien invasive species control and eradication plans.

2. Ecologist

Golder Associates Africa, South Africa
June 2011 – September 2020

Ecologist responsible for the management and implementation of baseline biodiversity studies and ecological impact assessments for development projects in the mining, power generation, transport, land development and industrial development sectors throughout sub-Saharan Africa. Role responsibilities included project management, technical review, biodiversity study design and implementation, flora and fauna surveys, biodiversity baseline and impact assessment reporting, development of biodiversity management plans, rehabilitation plans and alien invasive species control and eradication plans. These studies were conducted to satisfy national environmental regulations and/or international financing requirements, including the International Finance Corporation's (IFC) Performance Standard 6 (PS6)

3. Independent Ecologist

Subcontracted to KPMG, United Arab Emirates
March – April 2011

Subcontracted to KPMG as a subject matter expert (ecology) on the internal audit of Sir Bani Yas Island's Conservation Department (United Arab Emirates). The audit focused on evaluating the efficacy of the island's various conservation practices, including game management, feed provisioning, carnivore breeding and monitoring, veterinary care and vegetation maintenance.

4. Environmental Consultant

WSP Environment and Energy, South Africa
August 2008 – March 2011

Environmental consultant, responsible for a range of environmental projects and services including managing environmental authorisation processes (BAs and EIAs), facilitating stakeholder engagement processes,
conducting compliance audits, developing environmental management programmes and conducting specialist ecological studies.

5. Research Technician

Yale University, Kruger National Park, South Africa
October 2007 – May 2008

Research technician on the Savanna Convergence Experiment (SCE). The SCE project was a long-term cross-continental study that investigated the role of mega-herbivores in fire-grazing interactions and their influence on vegetation dynamics. Responsible for collecting and analysing vegetation composition and productivity data, as well as herbivore distribution data.

Publications

- Zinn, A.D., D.E., Burkepile and D.I. Thompson (In prep). Impacts of fire and herbivores on tree seedling establishment in a South African savanna.
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- Knapp, A.K., D.L. Hoover, J.M. Blair, G. Buis, D.E. Burkepile, A. Chamberlain, S.L. Collins, R.W.S Fynn, K.P. Kirkman, M.D. Smith, D. Blake, N. Govender, P. O'Neal, T. Schreck and A. Zinn (2012). A test of two mechanisms proposed to optimize grassland aboveground primary productivity in response to grazing. Journal of Plant Ecology, 5, 357-365.
- Zinn, A.D., D. Ward and K. Kirkman (2007). Inducible defences in *Acacia sieberiana* in response to giraffe browsing. African Journal of Range and Forage Science, 24, 123-129.
- Zinn, A.D. (2007). Exploitation vs. Conservation: A Burgeoning Fifth Column. African Wildlife, 61, 9-11.
- Andrew Zinn (2006). Conflict Resolution. Africa Birds and Birding. Vol. 11, No. 5, 12-13.

Appendix B: Methodology Supplement:

Appendix B (1): Location of surveying locations.


KEY MAP
Limpopo
Mpumalanga
KOMATI
LEGEND
Survey locations
Tracks
Eskom Power Stations
Local Study Area
0
400
800
1:12 000
METERS
NOTE(S)
REFERENCE(S)
COORDINATE SYSTEM: HARTEBEESTHOEK94 LO29
SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY
CLIENT
ESKOM
PROJECT
KOMATI POWER STATION - SOLAR PHOTOVOLTAICS (PV) AND BATTERY ENERGY STORAGE SYSTEM (BESS), ESIA
TITLE
SURVEY SITE LOCATIONS
CONSULTANT
GOLDER
YYYY-MM-DD 2023/03/16
DESIGNED
PREPARED TS
REVIEWED LN
APPROVED AD
CONTROL
REV.
FIGURE
22521869

Appendix B (2): Rating criteria for Conservation Importance, Functional Integrity and Receptor Resilience and the scoring matrices, as per (SANBI, 2020).

The ecological sensitivity of habitats in the study area was determined using the protocol for evaluating site ecological importance (SEI) as published in SANBI's Species Assessment Guideline (SANBI, 2020). SEI is considered to be a function of the biodiversity importance (BI) of a receptor and its resilience to impacts (receptor resilience, RR), as per:

$$SEI = BI + RR.$$

Biodiversity importance is a function of conservation importance (CI) and the functional integrity (FI) of the receptor, as per:

$$BI = CI + FI$$

- **Conservation Importance** is defined as "the importance of a site for supporting biodiversity features of conservation concern present, e.g., populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), Rare species, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystems types, through predominantly natural processes" (SANBI, 2020).
- **Functional Integrity** is defined as "A measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts" (SANBI, 2020).
- **Receptor Resilience** is defined as "the intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention" (SANBI, 2020).

Table 1: Conservation Importance (CI) criteria.

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

Table 2: Functional Integrity (FI) criteria.

Functional Integrity (FI)	Fulfilling Criteria
Very High	• Very large (>100 ha) intact area for any conservation status of ecosystem type or >5a ha for CR ecosystem type; • High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches; • No or minimal current negative ecological impacts with no signs of major disturbance (e.g., ploughing)
High	• Large (>5 ha but < 100 ha) intact area for any conservation status ecosystem types; • Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches; and • Only minor current negative ecological impacts (e.g., few livestock utilising area) with no signs of major past disturbance (e.g., ploughing) and good rehabilitation potential.
Medium	• Medium (>5ha but< 20 ha) semi-intact area for any conservation status ecosystem type or >20 ha for VU ecosystem type; • Only narrow corridors of good connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches; • Mostly minor current negative ecological impacts with some major impacts (e.g., established population of alien invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.
Low	• Small (> 1 ha but <5ha) area; • Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential; and • Several minor and major current negative ecological impacts.
Very Low	• Very small (<1 ha) area; • No habitat connectivity except for flying species or flora with wind-dispersed seeds; • Several major current negative ecological impacts.

BI = CI + FI

Biodiversity Importance (BI) Rating Matrix

Biodiversity Importance (BI)		Conservation Importance				
		Very High	**High**	**Medium**	**Low**	**Very Low**
Functional Integrity	**Very High**	Very High	Very High	High	Medium	Low
	High	Very High	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very Low
	Low	Medium	Medium	Low	Low	Very Low
	Very Low	Medium	Low	Very Low	Very Low	Very Low

Table 3: Receptor Resilience criteria (RR)

Resilience	Fulfilling Criteria
Very High	Habitat that can recover rapidly (˜less than 5 years) to restore >75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impacts occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (˜ 5-10 years) to restore >75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impacts occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
Medium	Habitat that can 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 impacts occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ˜less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impacts occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.
Very Low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

SEI = BI + RR

Site Ecological Importance (SEI) Rating Matrix

Site Ecological Importance		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

Table 4: 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 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.

Appendix C: List of Mammals Recorded and Potentially Occurring in the Regional Study Area

Species **bold** text were recorded in the LSA during the field survey.

Family	Scientific Name	Common Name	Global Red List Status (IUCN, 2022-2)	Regional Red List Status (2016)	NEMBA ToPS List (2007)	Mpumalanga Status
Bathyergidae	*Cryptomys hottentotus*	Common Mole-rat	Least Concern	Least Concern	-	-
Bathyergidae	*Georychus capensis*	Cape Mole-rat	Least Concern	Data Deficient	-	-
Bovidae	*Damaliscus pygargus phillipsi*	Blesbok	Least Concern	Least Concern	-	-
Bovidae	*Ourebia ourebi ourebi*	Oribi	Least Concern	Endangered	Endangered	Endangered / Protected
Bovidae	*Pelea capreolus*	Grey Rhebok	Near Threatened	Near Threatened	-	Protected
Bovidae	*Raphicerus campestris*	Steenbok	Least Concern	Least Concern	-	Protected
Bovidae	*Redunca arundinum*	Southern Reedbuck	Least Concern	Least Concern	Protected	Protected
Bovidae	*Redunca fulvorufula fulvorufula*	Mountain Reedbuck	Endangered	Endangered	-	Protected
Bovidae	*Sylvicapra grimmia*	Common Duiker	Least Concern	Least Concern	-	-
Canidae	*Canis mesomelas*	Black-backed Jackal	Least Concern	Least Concern	-	-
Canidae	*Vulpes chama*	Cape Fox	Least Concern	Least Concern	Protected	-
Cercopithecidae	*Chlorocebus pygerythrus*	Vervet Monkey	Least Concern	Least Concern	-	-
Cercopithecidae	*Papio ursinus*	Chacma Baboon	Least Concern	Least Concern	-	-
Chrysochloridae	*Amblysomus septentrionalis*	Highveld Golden Mole	Near Threatened	Near Threatened	-	Near Threatened
Chrysochloridae	*Chrysospalax villosus*	Rough-haired Golden Mole	Vulnerable	Vulnerable	Critically Endangered	-
Erinaceidae	*Atelerix frontalis*	South African Hedgehog	Least Concern	Near Threatened	Protected	Protected
Felidae	*Caracal caracal*	Caracal	Least Concern	Least Concern	-	-
Felidae	*Felis nigripes*	Black-footed Cat	Vulnerable	Vulnerable	Protected	Near Threatened
Felidae	***Felis silvestris***	**African Wildcat**	**Least Concern**	**Least Concern**	**-**	**Near Threatened**
Felidae	***Leptailurus serval***	**Serval**	**Least Concern**	**Near Threatened**	**Protected**	**Near Threatened**
Gliridae	*Graphiurus murinus*	Woodland Dormouse	Least Concern	Least Concern	-	-
Herpestidae	***Atilax paludinosus***	**Water Mongoose**	**Least Concern**	**Least Concern**	**-**	**-**
Herpestidae	*Cynictis penicillata*	Yellow Mongoose	Least Concern	Least Concern	-	-
Herpestidae	*Herpestes sanguineus*	Slender Mongoose	Least Concern	Least Concern	-	-
Herpestidae	*Ichneumia albicauda*	White-tailed Mongoose	Least Concern	Least Concern	-	-

Family	Scientific Name	Common Name	Global Red List Status (IUCN, 2022-2)	Regional Red List Status (2016)	NEMBA ToPS List (2007)	Mpumalanga Status
Herpestidae	*Mungos mungo*	Banded Mongoose	Least Concern	Least Concern	-	-
Herpestidae	*Suricata suricatta*	Suricate	Least Concern	Least Concern	-	-
Hyaenidae	*Parahyaena brunnea*	Brown Hyaena	Near Threatened	Near Threatened	Protected	Near Threatened / Protected
Hyaenidae	*Proteles cristata*	Aardwolf	Least Concern	Least Concern	-	Protected
Hystricidae	***Hystrix africaeaustralis***	**Cape Porcupine**	**Least Concern**	**Least Concern**	**-**	**-**
Leporidae	*Lepus saxatilis*	Scrub Hare	Least Concern	Least Concern	-	-
Leporidae	*Pronolagus rupestris*	Smith's Red Rock Rabbit	Least Concern	Least Concern	-	-
Macroscelididae	*Elephantulus myurus*	Eastern Rock Sengi	Least Concern	Least Concern	-	-
Muridae	*Aethomys chrysophilus*	Red Veld Rat	Least Concern	Least Concern	-	-
Muridae	*Dasymys robertsii*	African Marsh Rat	Least Concern	Vulnerable	-	-
Muridae	*Gerbilliscus brantsii*	Highveld Gerbil	Least Concern	Least Concern	-	-
Muridae	*Gerbilliscus leucogaster*	Bushveld Gerbil	Least Concern	Least Concern	-	-
Muridae	*Lemniscomys rosalia*	Single-striped Mouse	Least Concern	Least Concern	-	-
Muridae	*Mastomys natalensis*	Natal Multimammate Mouse	Least Concern	Least Concern	-	-
Muridae	*Micaelamys namaquensis*	Namaqua Rock Mouse	Least Concern	Least Concern	-	-
Muridae	*Mus minutoides*	Pygmy Mouse	Least Concern	Least Concern	-	-
Muridae	*Otomys angoniensis*	Angoni Vlei Rat	Least Concern	Least Concern	-	-
Muridae	*Otomys auratus*	Southern African Vlei Rat	Near Threatened	Near Threatened	-	Near Threatened
Muridae	*Rhabdomys pumilio*	Xeric Four-striped Mouse	Least Concern	Least Concern	-	-
Muridae	*Thallomys paedulcus*	Tree Rat	Least Concern	Least Concern	-	-
Muridae	*Dendromus melanotis*	Grey Climbing Mouse	Least Concern	Least Concern	-	-
Muridae	*Dendromus mesomelas*	Brant's Climbing Mouse	Least Concern	Least Concern	-	-
Muridae	*Dendromus mystacalis*	Chestnut Climbing Mouse	Least Concern	Least Concern	-	-
Muridae	*Mystromys albicaudatus*	White-tailed Rat	Vulnerable	Vulnerable	-	-
Muridae	*Saccostomus campestris*	Pouched Mouse	Least Concern	Least Concern	-	-
Muridae	*Steatomys pratensis*	Fat Mouse	Least Concern	Least Concern	-	-
Mustelidae	*Aonyx capensis*	Cape Clawless Otter	Near Threatened	Near Threatened	Protected	Protected

Family	Scientific Name	Common Name	Global Red List Status (IUCN, 2022-2)	Regional Red List Status (2016)	NEMBA ToPS List (2007)	Mpumalanga Status
Mustelidae	*Hydrictis maculicollis*	Spotted-necked Otter	Near Threatened	Vulnerable	Protected	Near Threatened / Protected
Mustelidae	*Ictonyx striatus*	Striped Polecat	Least Concern	Least Concern	-	--
Mustelidae	*Mellivora capensis*	Honey Badger	Least Concern	Least Concern	Protected	Near Threatened / Protected
Mustelidae	*Poecilogale albinucha*	African Striped Weasel	Least Concern	Near Threatened	-	Vulnerable
Orycteropodidae	*Orycteropus afer*	Aardvark	Least Concern	Least Concern	-	-
Pedetidae	*Pedetes capensis*	Springhare	Least Concern	Least Concern	-	-
Procaviidae	*Procavia capensis*	Rock Hyrax	Least Concern	Least Concern	-	-
Soricidae	*Crocidura cyanea*	Reddish-grey Musk Shrew	Least Concern	Least Concern	-	-
Soricidae	*Crocidura fuscomurina*	Tiny Musk Shrew	Least Concern	Least Concern	-	-
Soricidae	*Crocidura hirta*	Lesser Red Musk Shrew	Least Concern	Least Concern	-	-
Soricidae	*Crocidura maquassiensis*	Maquassie Musk Shrew	Least Concern	Vulnerable	-	Vulnerable
Soricidae	*Crocidura mariquensis*	Swamp Musk Shrew	Least Concern	Near Threatened	-	Near Threatened
Soricidae	*Crocidura silacea*	Lesser Grey-brown Musk Shrew	Least Concern	Least Concern	-	-
Soricidae	*Myosorex cafer*	Dark-Footed Forest Shrew	Vulnerable	Vulnerable	-	-
Soricidae	*Myosorex varius*	Forest Shrew	Least Concern	Least Concern	-	-
Suidae	*Potamochoerus larvatus*	Bushpig	Least Concern	Least Concern	-	-
Viverridae	*Genetta genetta*	Small-spotted Genet	Least Concern	Least Concern	-	-
Viverridae	*Genetta maculata*	Rusty-spotted Genet	Least Concern	Least Concern	-	Data Deficient

Appendix D: List of Herpetofauna Potentially Occurring in the Regional Study Area

Reptiles

Family	Scientific Name	Common Name	Global Red List Status (IUCN, 2022-2)	Regional Red List Status	NEMBA TOPS List (2007)	Mpumalanga Status
Agamidae	*Agama aculeata*	Eastern Ground Agama	Least Concern	Least Concern	-	Least Concern
Agamidae	*Agama atra*	Southern Rock Agama	Least Concern	Least Concern	-	Least Concern
Colubridae	*Crotaphopeltis hotamboeia*	Red-lipped Snake	Least Concern	Least Concern	-	Least Concern
Colubridae	*Dasypeltis scabra*	Rhombic Egg-eater	Least Concern	Least Concern	-	Least Concern
Colubridae	*Philothamnus semivariegatus*	Spotted Bush Snake	Least Concern	Least Concern	-	Least Concern
Cordylidae	*Chamaesaura aenea*	Coppery Grass Lizard	Near Threatened	Least Concern	-	Near Threatened
Cordylidae	*Chamaesaura anguina*	Cape Grass Lizard	Least Concern	Least Concern	-	Least Concern
Cordylidae	*Cordylus vittifer*	Common Girdled Lizard	Least Concern	Least Concern	-	Least Concern
Cordylidae	*Pseudocordylus melanotus melanotus*	Common Crag Lizard	Least Concern	Least Concern	-	Least Concern
Cordylidae	*Smaug giganteus*	Giant Dragon Lizard	Vulnerable	Vulnerable	-	Vulnerable
Elapidae	*Hemachatus haemachatus*	Rinkhals	Least Concern	Least Concern	-	Least Concern
Elapidae	*Naja mossambica*	Mozambique Spitting Cobra	Least Concern	Least Concern	-	Least Concern
Gekkonidae	*Lygodactylus ocellatus*	Spotted Dwarf Gecko	Least Concern	Least Concern	-	Least Concern
Gekkonidae	*Pachydactylus affinis*	Transvaal Gecko	Least Concern	Least Concern	-	Least Concern
Gekkonidae	*Pachydactylus capensis*	Cape Gecko	Least Concern	Least Concern	-	Least Concern
Gekkonidae	*Pachydactylus vansoni*	Van Son's Gecko	Least Concern	Least Concern	-	Least Concern
Gerrhosauridae	*Gerrhosaurus flavigulari*	Yellow-throated Plated Lizard	Least Concern	Least Concern	-	Least Concern
Lacertidae	*Nucras lalandii*	Delalande's Sandveld Lizard	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Amplorhinus multimaculatus*	Many-spotted Snake	Least Concern	Least Concern	-	Near Threatened
Lamprophiidae	*Aparallactus capensis*	Cape centipede-eater	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Boaedon capensis*	Common House Snake	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Duberria lutrix*	South African Slug Eater	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Homoroselaps lacteus*	Spotted Harlequin Snake	Least Concern	Least Concern	-	Near Threatened
Lamprophiidae	*Lamprophis aurora*	Aurora Snake	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Lamprophis guttatus*	Spotted Rock Snake	Least Concern	Least Concern	-	Least Concern

Family	Scientific Name	Common Name	Global Red List Status (IUCN, 2022-2)	Regional Red List Status	NEMBA TOPS List (2007)	Mpumalanga Status
Lamprophiidae	*Lycodonomorphus inornatus*	Live Ground Snake	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Lycodonomorphus rufulus*	Brown Water Snake	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Lycophidion capense*	Cape Wolf Snake	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Psammophis brevirostris*	Short-snouted Grass Snake	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Psammophis crucifer*	Montane Grass Snake	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Psammophylax tritaeniatus*	Striped Grass Snake	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Psammophylax rhombeatus*	Spotted Grass Snake	Least Concern	Least Concern	-	Least Concern
Lamprophiidae	*Pseudaspis cana*	Mole Snake	Least Concern	Least Concern	-	Least Concern
Leptotyphlopidae	*Leptotyphlops scutifrons*	Peter's Thread Snake	Least Concern	Least Concern	-	Least Concern
Scincidae	*Acontias breviceps*	Short-headed Legless Skink	Least Concern	Least Concern	-	Vulnerable
Scincidae	*Acontias gracilicauda*	Thin-tailed Legless Skink	Least Concern	Least Concern	-	Least Concern
Scincidae	*Trachylepis capensis*	Cape Skink	Least Concern	Least Concern	-	Least Concern
Scincidae	*Trachylepis punctatissima*	Montane Rock Skink	Least Concern	Least Concern	-	Least Concern
Scincidae	*Trachylepis varia*	Variable Skink	Least Concern	Least Concern	-	Least Concern
Typhlopidae	*Afrotyphlops bibronii*	Bibron's Blind Snake	Least Concern	Least Concern	-	Least Concern
Typhlopidae	*Rhinotyphlops lalandei*	Delalande's Beaked Blind Snake	Least Concern	Least Concern	-	Least Concern
Varanidae	*Varanus niloticus*	Water Monitor	Least Concern	Least Concern	-	Least Concern
Viperidae	*Bitis arietans arietans*	Puff Adder	Least Concern	Least Concern	-	Least Concern
Viperidae	*Causus rhombeatus*	Rhombic Night Adder	Least Concern	Least Concern	-	Least Concern

Amphibians

Family	Scientific Name	Common Name	Global Red List Status (IUCN, 2022-2)	Regional Red List Status	NEMBA ToPS List (2007)	Mpumalanga Status
Breviceptidae	*Breviceps adspersus*	Bushveld Rain Frog	Least Concern	Least Concern	-	Least Concern
Bufonidae	*Amietophrynus gutturalis*	Guttural Toad	Least Concern	Least Concern	-	Least Concern
Bufonidae	*Amietophrynus rangeri*	Raucous Toad	Least Concern	Least Concern	-	Least Concern
Bufonidae	*Schismaderma carens*	Red Toad	Least Concern	Least Concern	-	Least Concern
Hyperoliidae	*Hyperolius marmoratus*	Painted Reed Frog	Least Concern	Least Concern	-	Least Concern
Hyperoliidae	*Kassina senegalensis*	Bubbling Kassina	Least Concern	Least Concern	-	Least Concern
Hyperoliidae	*Semnodactylus wealii*	Rattling Frog	Least Concern	Least Concern	-	Least Concern
Phrynobatrachidae	*Phrynobatrachus natalensis*	Snoring Puddle Frog	Least Concern	Least Concern	-	Least Concern
Pipidae	*Xenopus laevis*	Common Platanna	Least Concern	Least Concern	-	Least Concern
Ptychadenidae	*Ptychadena anchietae*	Plan Grass Frog	Least Concern	Least Concern	-	Least Concern
Pyxicephalidae	*Amietia angolensis*	Common River Frog	Least Concern	Least Concern	-	Least Concern
Pyxicephalidae	*Amietia fuscigula*	Cape River Frog	Least Concern	Least Concern	-	Least Concern
Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	Least Concern	Least Concern	-	Least Concern
Pyxicephalidae	*Cacosternum nanum*	Bronze Caco	Least Concern	Least Concern	-	Least Concern
Pyxicephalidae	*Pyxicephalus adspersus*	Giant Bullfrog	Least Concern	Least Concern	-	Vulnerable / Protected
Pyxicephalidae	*Strongylopus fasciatus*	Striped Stream Frog	Least Concern	Least Concern	-	Least Concern
Pyxicephalidae	*Strongylopus grayii*	Clicking Stream Frog	Least Concern	Least Concern	-	Least Concern
Pyxicephalidae	*Tomopterna cryptotis*	Tremolo Sand Frog	Least Concern	Least Concern	-	Least Concern
Pyxicephalidae	*Tomopterna natalensis*	Natal Sand Frog	Least Concern	Least Concern	-	Least Concern
Pyxicephalidae	*Tomopterna tandyi*	Tandy's Sand Frog	Least Concern	Least Concern	-	Least Concern