TERRESTRIAL BIODIVERSITY, PLANT AND ANIMAL SPECIES THEME IMPACT ASSESSMENT REPORT FOR THE PROPOSED KLIPPUT SOLAR PV, LIMPOPO PROVINCE

Prepared for:

KLIPPUT SOLAR PV (PTY) LTD

Prepared by:

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09 July 2025

Details of Company

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Authors

Tarryn Martin (Botanical Specialist) (*Pri. Sci. Nat* 008745)
Tarryn has over ten years of experience working as a botanist, nine of which are in the environmental sector. She has worked as a specialist and project manager on projects within South Africa, Mozambique, Lesotho, Zambia, Tanzania, Cameroon, Swaziland and Malawi. The majority of these projects required lender finance and consequently met both in-country and lender requirements.

Tarryn has extensive experience writing botanical impact assessments, critical habitat assessments, biodiversity management plans, biodiversity monitoring plans and Environmental Impact Assessments to International Standards, especially to those of the International Finance Corporation (IFC). Her experience includes working on large mining projects such as the Kenmare Heavy Minerals Mine, where she monitored forest health, undertook botanical impact assessments for their expansion projects and designed biodiversity management and monitoring plans. She has also project managed Environmental Impact Assessments for graphite mines in northern Mozambique and has a good understanding of the Mozambique Environmental legislation and processes.

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the recovery of C3 and C4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa.
Tarryn is a professional member of the South African Council for Natural Scientific Professionals (since 2014).

Nicole Dealtry (née Wienand) (Pri. Sci. Nat. 130289)
Nicole is a Senior Botanical Specialist with 7 years' experience. She obtained her BSc Honours in Botany (Environmental Management) from Nelson Mandela University (NMU) in December 2018 and holds a BSc Degree in Environmental Management (Cum Laude) from NMU. Nicole is a professional member of the South African Council for Natural Scientific Professionals (SACNASP) (Pri. Sci. Nat. Botany Reg No. 130289), the International Association for Impact Assessment (IAIAsa) (Membership No. 6176), and the South African Association of Botanists.

During her first four years of working, Nicole gained experience as an Ecological Specialist and an Environmental Assessment Practitioner (EAP) undertaking Basic Assessments and assisting with the general Environmental Impact Assessment (EIA) process, including compiling Scoping and

Environmental Impact Assessment Reports, Environmental Management Programmes, and managing the Public Participation Process. Nicole went on to specialise in the field of ecology, ensuring compliance with the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320 of 2020), Plant and Animal Species (GN R. 1150 of 2020), as well as the Species Environmental Assessment Guidelines (SANBI, 2020).

Nicole has undertaken numerous Ecological Impact Assessments for a range of developments, including Wind Energy Facilities (WEFs), Solar Energy Facilities (SEFs), mines, powerlines, housing developments, and roads and has worked in South Africa, Mozambique, Malawi and Sierra Leone, working closely with developers and Environmental Assessment Practitioners to ensure these developments are environmentally sustainable, as well as financially and technically feasible. Additionally, she has experience in compiling Alien Invasive Species Management Plans, Ecosystem Services Assessments, Rehabilitation and Restoration Plans, Plant Search and Rescue Plans, performing ecological walk-through assessments, and obtaining permits for plant removal and translocation. Some of these assessments have been conducted in accordance with the IFC's Performance Standards.

Amber Jackson (Faunal Specialist) (Pri. *Nat. Sci 007500)*

Amber has over twelve years' experience and holds a BSc (Zoology and Ecology, Environment & Conservation) and BSc (Hons) in Ecology, Environment & Conservation from WITS University and an MPhil in Environmental Management from University of Cape Town. Amber specialises in terrestrial vertebrate faunal assessments. She has conducted large scale faunal impact assessments that are to international lender's standards in Mozambique, Tanzania, Lesotho and Malawi. In South Africa her faunal impact assessments comply with the protocols for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity and follows the SANBI Species Environmental Assessment Guideline. Her specialist input goes beyond impact assessments and includes faunal opportunities and constraints assessments, Critical Habitat Assessments, Biodiversity related Management Plans and Biodiversity Monitoring Programmes. As an environmental consultant she managed projects across various sectors including mining, agriculture, forestry, renewable energy, housing, coastal and wetland recreational infrastructure. Most of these projects required lender finance and therefore met both in-country, lender and sector specific requirements.Amber completed the IFC lead and Swiss funded programme in Environmental and Social Risk Management course in 2018. The purpose of the course was to upskill Sub-Saharan African environmental consultants to increase the uptake of E&S standards by Financial Institutions.

Declaration

I, Tarryn Martin, declare that, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amended Environmental Impact Assessment Regulations, 2017;

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this report are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

11 August 2025

Signed: **Date:**

Declaration

I, Nicole Dealtry, declare that, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amended Environmental Impact Assessment Regulations, 2017;

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this report are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

11 August 2025

Signed: **Date:**

Declaration

I, Amber Jackson, declare that, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Amended Environmental Impact Assessment Regulations, 2017;

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this report are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

11 August 2025

Signed: **Date:**

Executive Summary

Introduction

Klipput Solar PV (Pty) Ltd are proposing the construction of a Solar Photovoltaic (PV) Energy Facility and associated infrastructure, known as Klipput Solar PV, on Portion 1 of Farm 425, Portion 1 of Farm 466 and the Remainder of Farm 466 located South of Louis Trichardt in the Makhado Local Municipality, Vhembe District, Limpopo Province. A study site of approximately 601ha is being assessed as part of this Environmental Process and the infrastructure associated with an up to 240 Megawatt (MW) Solar PV facility.

This report outlines the findings of the Impact Assessment undertaken for the Terrestrial Biodiversity, Plant and Animal Species Themes.

Method

A desktop assessment of the project area was undertaken prior to the field assessment. The purpose of this was to identify any sensitive areas or Species of Conservation Concern (SCC) that needed to be verified. Following the desktop assessment, two field surveys were undertaken for the project area. The initial survey was undertaken from the 18th to the 21st of June 2024 at the start of the dry season when most species were fruiting, and a second survey was undertaken on the 13th of February 2025 when most species were in flower.

A combined total of ninety (90) sample sites were assessed during the field surveys within the Project Area of Influence (PAOI) which is estimated to be 3500 ha. This equates to a density of 1 sample site per 39 ha.

The findings of the desktop assessment and field survey were utilised to determine the actual Site Ecological Importance (SEI) of the project area which ultimately informs the land use guideline and mitigation requirements for the project area.

Results

Animal Species Theme

The Department of Forestry, Fisheries and the Environment (DFFE) screening tool report indicates that entire project area is of medium sensitivity for the animal species theme (excluding birds and insects), due to the possible occurrence of one sensitive species and one mammal species.

Based on the findings from the desktop assessment and field survey, the specialist agrees that the faunal habitat for all intact plant communities as well as the secondary vegetation has a MEDIUM SEI due to the confirmed occurrence of Tsessebe (*Damaliscus lunatus)* (which has been stocked by the landowner) and likely occurrence of three Vulnerable (VU) species (Black-footed Cat – *Felis nigripes,* Leopard – *Panthera pardus* and Temminick's Pangolin – *Smutsia temminckii*) and three Near Threatened (NT) species (African Striped Weasel - *Poecilogale albinucha*, Brown Hyaena - *Parahyaena brunnea*, Southern African Hedgehog - *Atelerix frontalis*). However, transformed areas should be reclassified as LOW sensitivity due to the unlikely occurrence of SCC.

Plant Species Theme

The overall plant species theme was classified as low by the DFFE screening tool report due to the unlikely occurrence of SCC. Based on the results of the desktop analysis and field survey, which confirm that no SCC occur or are highly likely to occur within the project area, the specialist agrees with the DFFE Screening Tool report of Low sensitivity.

Terrestrial Biodiversity Theme

The DFFE Screening Tool Report classifies the Terrestrial Biodiversity Theme sensitivity of the project area as LOW.

The terrestrial biodiversity assessment confirmed the following:

- The project area occurs within one vegetation types, namely Makhado Sweet Bushveld. The overall sensitivity for this vegetation type was determined to be of Medium sensitivity.
- Most of the project area falls within an area classified as "Other Natural Area (ONA)" with minor patches classified as "No Natural Remaining (NNR)". It does not occur in a Critical Biodiversity Area (CBA) or an Ecological Support Area (ESA).
- The project area occurs within the Vhembe Biosphere Reserve (VBR). The VBR supports development that is ecologically and socio-culturally sustainable, promoting both conservation and economic growth. As such, the VBR does not preclude development.
- The project area does not occur within a Key Biodiversity Area (KBA), protected area, or National Protected Areas Expansion Strategy (NPAES) Focus Area.

The specialist disagrees with the findings of the DFFE Screening Tool which indicates a Low Sensitivity and is of the opinion that the overall sensitivity should be MEDIUM as per the SEI analysis for the vegetation types and VERY LOW for the transformed areas.

Conclusion

The ecological assessment found that the proposed SEF is located within an area of medium to low ecological sensitivity, affecting Makhado Sweet Bushveld (classified as Least Concern) and falling outside of formally protected areas and CBAs. No highly sensitive ecological features requiring major design changes were identified.

Fifteen ecological impacts were assessed across all phases of the project. With the implementation of recommended mitigation measures, most impacts can be reduced to low significance. Residual moderate impacts remain, primarily due to the permanent loss of a portion of Makhado Sweet Bushveld and the project's contribution to cumulative habitat loss in the Vhembe Biosphere Reserve. It is the specialist's opinion that the proposed development can proceed from an ecological perspective, provided that all mitigation and management measures are implemented and monitored throughout the project lifecycle.

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Glossary of Terms

Alien Invasive Species refers to an exotic species that can spread rapidly and displace native species causing damage to the environment

Biodiversity is the term that is used to describe the variety of life on Earth and is defined as "*the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems*" (Secretariat of the Convention on Biological Diversity, 2005).

Biome - Groupings based on dominant forms of plant life and prevailing climatic factors. Biomes have plants and/or animals living together with some degree of permanence, and one can observe large-size patterns in global plant cover. Biomes broadly correspond with climatic regions as moisture and temperature strongly influence plant establishment and survival, although other environmental controls are sometimes important (SANBI, 2020).

Ecosystem - A dynamic complex of animal, plant and micro-organism communities and their non-living environment interacting as a functional unit (SANBI, 2020).

Habitat Fragmentation occurs when large expanses of habitat are transformed into smaller patches of discontinuous habitat units isolated from each other by transformed habitats such as farmland.

Natural Habitat refers to habitats composed of viable assemblages of plant and/or animal species of largely native origin and/or where human activity has not essentially modified an area's primary ecological function and species composition.

Project Area is defined as the area that will be directly impacted by project infrastructure such as the roads, solar panels, and offices.

Project area of influence (PAOI) refers to the broader area around the project area that may be indirectly impacted by project activities.

Protected Area is a clearly defined geographical space, recognised, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values *(IUCN Definition 2008).*

Sensitive Species are species that are sensitive to illegal harvesting. As such, their names are obscured and listed as "Sensitive species #". As per the best practice guideline that accompanies the protocol and screening tool, the name of the sensitive species may not appear in any BAR or EIA report, nor any specialist reports released into the public domain.

Species of Conservation Concern (SCC) includes all species that are assessed according the IUCN Red List Criteria as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Data Deficient (DD) or Near Threatened (NT), as well as range-restricted species which are not declining and are nationally listed as Rare or Extremely Rare [also referred to in some Red Lists as Critically Rare] (SANBI, 2021).

Study Area *r*efers to the extent of analysis that extends beyond the project area and includes the broader surrounding area which may not necessarily be impacted by project activities e.g. the Quarter Degree Square in which the project area occurs.

Vegetation Type is defined in terms of dominant, common as well as rare species, as well as association with landscape features such as soil or geology, topography, and climate (SANBI).

Acronyms

BI	Biodiversity Importance
CBA	Critical Biodiversity Area
CI	Conservation Importance
CR	Critically Endangered
DFFE	Department of Forestry, Fisheries and Environment
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EN	Endangered
EOO	Extent of Occupancy
FI	Functional Integrity
GIS	Geographical Information System
GN	Government Notice
IUCN	International Union for Conservation of Nature
LC	Least Concern
NEM:BA	National Environmental Management: Biodiversity Act
NT	Near Threatened
PAOI	Project Area of Influence
POSA	Plants of Southern Africa
PV	Photovoltaic
QDS	Quarter Degree Square
RR	Receptor Resilience
SA	South Africa
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SEF	Solar Energy Facility
SEI	Site Ecological Importance
TOPS	Threatened and Protected Species
VU	Vulnerable

Specialist Check List

The contents of this specialist report complies with the legislated requirements as described in the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity, Plant and Animal Species (GN R. 320 of March 2020 and GN R1150 of 30 October 2020).

SPECIALIST REPORT REQUIREMENTS ACCORDING TO GN 1150			SECTION OF REPORT
3.1	The Terrestrial **ANIMAL SPECIES** Specialist Assessment Report must contain, as a minimum, the following information:		
	3.1.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 3; Appendix 2 & 3
	3.1.2	A signed statement of independence by the specialist;	Page 5
	3.1.3	A statement of the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 1.4 and 2.3
	3.1.4	A description of the methodology used to undertake the site sensitivity verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Chapter 2
	3.1.5	A description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	Section 2.3 and Figure 2.1
	3.1.6	A description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 1.4
	3.1.7	Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	Chapter 3
	3.1.8	The online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	N/A as no SCC observed within the project area
	3.1.9	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Chapter 6
	3.1.10	A discussion on the cumulative impacts;	Chapter 7 and Section 8.2
	3.1.11	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Chapter 7
	3.1.12	A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	Chapter 8
	3.1.13	A motivation must be provided if there were development footprints identified as per paragraph 2.2.12 above that were identified as having a “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate;	N/A
3.2	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.		

SPECIALIST REPORT REQUIREMENTS ACCORDING TO GN R. 320			SECTION OF REPORT
3.1	The Terrestrial **PLANT SPECIES** Specialist Assessment Report must contain, as a minimum, the following information:		
	3.1.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 2-3; Appendix 2 & 3
	3.1.2	A signed statement of independence by the specialist;	Page 4
	3.1.3	A statement of the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 1.4 and 2.3
	3.1.4	A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Chapter 2
	3.1.5	A description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 1.4
	3.1.6	A description of the mean density of observations/number of samples sites per unit area of site inspection observations;	Section 2.3 and Figure 2.1
	3.1.7	Details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	Chapter 4
	3.1.8	The online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	Section 2.3 however no SCC recorded within the project area or likely to occur in the project area
	3.1.9	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Chapter 6
	3.1.10	A discussion on the cumulative impacts;	Chapter 7 and Section 8.2
	3.1.11	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Chapter 7
	3.1.12	A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not, of the development related to the specific theme considered, and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	Chapter 8
	3.1.13	A motivation must be provided if there were any development footprints identified as per paragraph 2.3.12 above that were identified as having “low” or “medium” terrestrial plant species sensitivity and were not considered appropriate.	N/A
3.3	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.		

SPECIALIST REPORT REQUIREMENTS ACCORDING TO GN R. 320		SECTION OF REPORT
3.1	The **TERRESTRIAL BIODIVERSITY** Specialist Assessment Report must contain, as a minimum, the following information:	

	3.1.1	Contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	Page 2-4; Appendix 2 & 3
	3.1.2	A signed statement of independence by the specialist;	Pages 4 & 5
	3.1.3	A statement of the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 1.4 & 2.3
	3.1.4	A description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modelling used, where relevant;	Chapter 2
	3.1.5	A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	Section 1.4
	3.1.6	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Section 5.2, 5.3 and Chapter 6
	3.1.7	Additional environmental impacts expected from the proposed development;	Chapter 7
	3.1.8	Any direct, indirect and cumulative impacts of the proposed development;	
	3.1.9	The degree to which the impacts and risks can be mitigated;	
	3.1.10	The degree to which the impacts and risks can be reversed;	
	3.1.11	The degree to which the impacts and risks can cause loss of irreplaceable resources;	
	3.1.12	Proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Chapter 7
	3.1.13	A motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a “low” terrestrial biodiversity sensitivity and that were not considered appropriate;	N/A
	3.1.14	A substantiated statement, based on the findings of the specialist assessment, regarding the acceptability, or not, of the proposed development, if it should receive approval or not; and	Chapter 8
	3.1.15	Any conditions to which this statement is subjected.	
3.2	The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr where relevant.		
3.3	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.		

1. INTRODUCTION

1.1. Project Description

Klipput Solar PV (Pty) Ltd are proposing the construction of a Solar Photovoltaic (PV) Energy Facility and associated infrastructure, known as Klipput Solar PV, on Portion 1 of Farm 425, Portion 1 of Farm 466 and the Remainder of Farm 466 located South of Louis Trichardt in the Makhado Local Municipality, Vhembe District, Limpopo Province.

A study site of approximately 601ha is being assessed as part of this Environmental Process and the infrastructure associated with an up to 240 Megawatt (MW) PV facility.

The proposed Klipput Solar PV Project will include the following components:

- Solar Field
    - Solar Arrays:
    - PV modules;
    - Single axis tracking technology maximum height of 5m (aligned north-south);
    - Solar module mounting structures comprised of galvanised steel and aluminium;
    - Foundations which will likely be drilled and concreted into the ground;
    - Solar measurement and weather stations;
    - Central/string Inverters and MV transformers in in field;
    - Direct Current (DC) coupled Battery Energy Storage system (BESS) containers distributed through PV field located adjacent to inverters ;
        - Lithium Ion battery Cells, Modules, Racks and containers.
        - Power Conversion Equipment.
        - Battery Management System.
        - Energy Management System.
- Associated Infrastructure:
    - Medium Voltage (MV =22/33 kV) overhead powerlines and underground cables;
    - MV Collector stations;
    - Access road;
    - Internal gravel roads;
    - Fencing;
    - General maintenance area;
    - Storm water channels and berms;
    - Water storage tanks and pipelines;
    - Temporary work area during the construction phase (i.e. laydown area) (up to 7ha);
    - Operations and Maintenance (O&M) buildings (up to 1ha);
    - Storerooms;
    - Diesel storage area (up to 0.25ha).
- Project IPP Substation (up to 1ha);
    - 132kV substation;
    - HV transformer;
    - Substation Control Building;
    - HV metering, Scada and protection building;
    - MV collector switchgear buildings;

    - Compensation equipment (Filters capacitors reactors statcoms).
- Alternating Current (AC) coupled BESS installation at project substation and laydown area (up to 6ha):
    - Solid Sate Battery technology - either Lithium-Ion or Sodium Sulphide (NaS) ▪ Battery Cells, Modules, Racks and containers;
        - Power Conversion Equipment;
        - Battery Management System;
        - Energy Management System;
        - MV transformers;
        - MV cabling and collector stations;
        - Fencing;
        - Offices, workshop;
        - Fire Protection systems.

This environmental application process includes Electrical Grid Connection Infrastructure required to connect the Klipput Solar PV to the National Grid via the existing Tabor Main Transmission Substation (MTS). This Electrical Grid Infrastructure includes:

- Onsite Switching Station (SS) (up to 1ha), adjacent to the IPP Substation.
- 132kV Overhead Power Line (OHPL) – 30m height from the switching station to the existing Eskom Tabor Substation;
- Access Road to Switching Station;
- Maintenance access road below or adjacent to the power line.

Three Grid connection alternatives are under investigation as part of this environmental process. Different land portions are affected by the various grid connection alternatives.

The proposed SEF forms part of a larger solar energy cluster (referred to as the 'Tabor Solar Cluster') comprising four SEFs that are being assessed concurrently. These facilities are located directly adjacent to one another. The cluster includes the following projects:

- Klipput Solar PV (601 ha) – assessed in this report
- Bethel Solar PV (625 ha)
- Draailoop Solar PV (857 ha)
- Makoppa Solar PV (341 ha)

These SEFs, along with data from the South African renewable energy EIA application database, have been considered in the assessment of cumulative impacts associated with the project.

1.2. Reporting Requirements

In accordance with Regulation 16(1)(b)(v) of the NEMA EIA Regulations, an applicant is required to submit a Screening Report generated via the Department of Forestry, Fisheries and the Environment (DFFE) web-based Screening Tool as part of the application for Environmental Authorisation (EA). This Screening Report identifies environmental sensitivities associated with the proposed development area based on available spatial datasets. These identified sensitivities inform the scope of specialist assessments and input required to support the Environmental Impact Assessment (EIA) process for

the project. For this study, the relevant environmental themes include **Terrestrial Biodiversity**, **Plant Species**, and **Animal Species**.

In terms of the *Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity* (GN R. 320 of 2020), and the *Protocol for Terrestrial Plant and Animal Species* (GN R. 1150 of 2020), a **Site Sensitivity Verification (SSV)** must be conducted prior to initiating the specialist assessment. This verification confirms the current land use and the actual on-site sensitivity as indicated by the screening tool. The combination of the screening tool results and the verified site sensitivity determines the minimum reporting requirements for the specialist study.

The DFFE Screening Tool Report generated for the project area classified the sensitivities as follows:

- **Animal Species Theme**: Medium
- **Plant Species Theme**: Low
- **Terrestrial Biodiversity Theme**: Low

The Site Sensitivity Verification (SSV) undertaken for this project determined the sensitivities of the various themes to be as follows:

- **Animal Species Theme:**
  - **Very Low sensitivity** in **transformed areas.**
  - **Medium sensitivity** in areas with **intact vegetation**.
- **Plant Species Theme:**
  - **Low sensitivity overall.**
- **Terrestrial Biodiversity Theme:**
  - **Medium sensitivity** in areas with **intact vegetation**.
  - **Very Low sensitivity** in **secondary vegetation** and **transformed areas**.

Based on the overall MEDIUM SEI of the near-intact portions of the project area, as well as the HIGH likelihood of occurrence of seven animal SCC, a full Terrestrial Biodiversity, Animal and Plant Species Impact Assessment (this report) has been compiled for this project.

1.3. Objectives

The Terms of Reference (ToR) for each of the themes are described below:

Animal Specialist Assessment

- Identify threatened animal SCC, including those listed as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) and Data Deficient (DD), that could occur in the project area and indicate their likelihood of occurrence based on the availability of suitable habitat recorded within the project area. This list will include results from a desktop assessment, the DFFE Screening Tool Report, and the field survey.
- Provide a list of animal species recorded in the project area during the field survey. This will include their red list status.

- When SCC are recorded, provide photographic evidence by uploading these to iNaturalist and including a hyperlink in the report.
- Where feasible, identify the distribution, location and viability of the population, including a description of the population size.
- Provide a review of available literature on the population size and conservation of each SCC confirmed to occur within the project area or which has a high likelihood of occurrence. The review must include:
    - Information on its red list status from the IUCN Red List of Threatened Species, South African Red List of Species and/or other relevant databases.
    - Details of any national or provincial management plans for the SCC and comment on whether the development is compliant with the applicable species management plan and if not, a motivation for deviation must be presented.
- Identify the nature and extent of the impact of the proposed development on the habitat of SCC located in the project area and, where feasible, provide mitigation measures.
- Identify any potential impacts on ecological connectivity in relation to the broader landscape that would impact on the long-term viability of populations of SCC. Where feasible, provide mitigation measures.
- Identify and discuss the cumulative impacts on SCC that have a high likelihood of occurrence, or which were confirmed to occur within the project area.
- Identify ecological drivers in the broader landscape that may be disrupted by the development and describe how this will affect populations of SCC that have a high likelihood of occurrence or were confirmed to occur in the project area.
- Determine buffer distances for populations of SCC.
- Provide a map of areas that need to be avoided and areas where development is feasible.
- Provide a reasoned opinion on whether the development can proceed. If development is acceptable, describe the conditions this is subjected to, if relevant.

Plant Species Assessment

- Identify plant SCC (including CR, EN, VU, NT and DD) that could occur in the project area and indicate their likelihood of occurrence based on the availability of suitable habitat recorded within the project area during the field survey. This list will include results from a desktop assessment, the DFFE Screening Tool Report, and the field survey.
- Provide a list of plant species recorded in the project area during the field survey. This list will include the threat status of each species as well as the relevant legislation under which the species are protected.
- When SCC are recorded, provide photographic evidence by uploading these to iNaturalist and including a hyperlink in the report.
- Where feasible, identify the distribution, location and viability of the population, including a description of the population size.
- Provide a review of available literature on the population size and conservation interventions for each SCC confirmed to occur within the project area or which has a high likelihood of occurrence. The review must include details of any national or provincial management plans for the SCC and provide comment on whether the development is compliant with the applicable species management plan and if not, a motivation for deviation must be presented.

- Identify the nature and extent of the impact of the proposed development on the habitat of SCC located in the project area and, where feasible, provide mitigation measures.
- Identify any potential impacts on ecological connectivity in relation to the broader landscape that would impact on the long-term viability of populations of SCC. Where feasible, provide mitigation measures.
- Identify and discuss the cumulative impacts on SCC that have a high likelihood of occurrence, or which were confirmed to occur within the project area.
- Identify ecological drivers in the broader landscape that may be disrupted by the development and describe how this will affect populations of SCC that have a high likelihood of occurrence or were confirmed to occur in the project area (e.g. disruption of fires in fire driven ecosystems).
- Determine buffer distances for populations of SCC.
- Provide a map of areas that need to be avoided and areas where development is feasible.
- Provide a reasoned opinion on whether the development can proceed. If development is acceptable, describe the conditions this is subjected to, if relevant.

Terrestrial Biodiversity Assessment

Provide a baseline description of the project area that includes the following:

- Description of the ecological drivers and processes present in the project area (e.g. fire, migration, pollination etc) and how the proposed development will impact this, if at all.
- Identification and description of ecological corridors that the proposed development will impede, including the migration of fauna and flora.
- Description of significant terrestrial features (e.g. rare or important fauna-flora interactions, presence of strategic water source areas (SWSA) or freshwater ecosystem priority area (FEPA) sub catchments).
- Description of terrestrial biodiversity and ecosystems present in the project area including:
    - Main vegetation types present and dominant species that characterise each vegetation type.
    - Threatened ecosystems present, including listed ecosystems and locally important habitat types.
    - Description of ecological connectivity, habitat fragmentation, ecological processes and fine-scale habitats
    - Identification of important habitats present that support SCC.
- If the project occurs in a Critical Biodiversity Area (**CBA) or Ecological Support Area (ESA)**, the field survey and terrestrial biodiversity assessment must identify:
    - Why an area has been identified as a CBA and whether these features that are being protected, are present.
    - If present, it must indicate whether the proposed development will impact on the management objectives of the CBA and the features being protected (e.g. threatened ecosystems and populations of SCC) by the CBA.
    - Whether the development will impact on ecological processes within or across the project area.

    - Whether the development will result in the loss of ecological connectivity due to degradation and/or severing of ecological corridors such as barriers that will impede migration and movement of animals and plants.
- If the project occurs in a **protected area**, an opinion on whether the proposed development aligns with the objectives or purpose of the protected area and zoning, as per the protected area management plan, must be provided.
- If the project area occurs in a **protected area expansion strategy** (PAES) area, an opinion on how the project will impact or enhance the expansion of the protected area network must be provided.
- If the project area occurs in a **SWSA**, impacts on the terrestrial habitat of the SWSA and of the proposed development on the SWSA water quality and quantity must be provided.
- If the project area occurs in a **FEPA sub catchment**, impacts on of the proposed development on habitat condition and species in the FEPA sub catchment must be provided.
- If the project area occurs in an **indigenous forest**, impacts on the ecological integrity of the forest and percentage of natural or near natural forest area lost, must be provided with a statement on the implications in relation to the remaining areas.
- The assessment must identify areas of high, medium and low sensitivity and guide development away from sensitive areas.

1.4. Limitations and Assumptions

This report is based on current available information, and, as a result, the following limitations and assumptions are implicit:

- SCC are difficult to find and may be difficult to identify, thus species described in this report do not comprise an exhaustive list. It is possible that additional SCCs are present. However, every effort was made to identify SCC present on site during the field survey. Furthermore, a desktop assessment to identify SCC that could occur within the project area was undertaken, and the likelihood of occurrence assessed based on the species known distribution, available habitat recorded during the field survey within the project area, and previous recorded observations near the project area.
- Sampling was carried out at two stages in the annual or seasonal cycle. The initial survey was undertaken from the 18-21 June 2024 at the start of the dry season when most species were fruiting, and a second survey was undertaken during the peak flowering season on the 13th of February 2025 when most species are in flower or fruiting. Although it is possible that some early flowering species, such as geophytes, have gone undetected, the time available in the field and information gathered during the survey was sufficient to provide enough information to determine the status of the affected area and provide comment on the likelihood of occurrence of SCC with a high level of confidence.
- This assessment includes plants, mammals, amphibians and reptiles. It does not include the assessment of birds or invertebrates. Birds have been assessed separately by a qualified avifaunal specialist.
- The faunal assessment is based on a desktop assessment coupled with a field survey to assess available habitat and active searching.

- The assessment has been undertaken in line with the Protocol for the Specialist Assessment and Minimum Report Requirements for Environmental Impacts on Terrestrial Biodiversity (2020) and Terrestrial Animal and Plant Species (GN R. 1150) as well as the Species Environmental Assessment Guideline (2020).

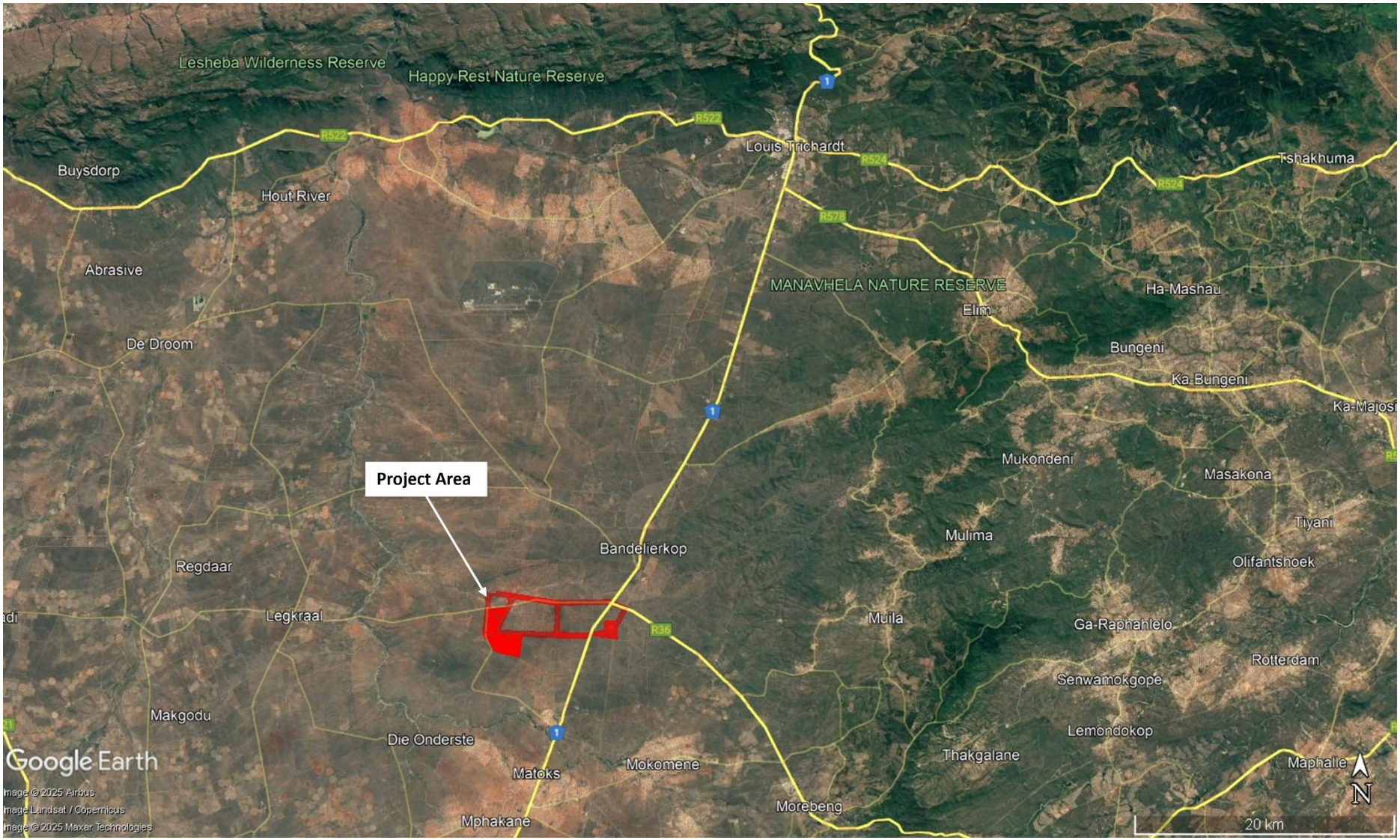

Figure 1.1: Locality Map indicating the location of the project area (in red) in relation to Louis Trichardt.

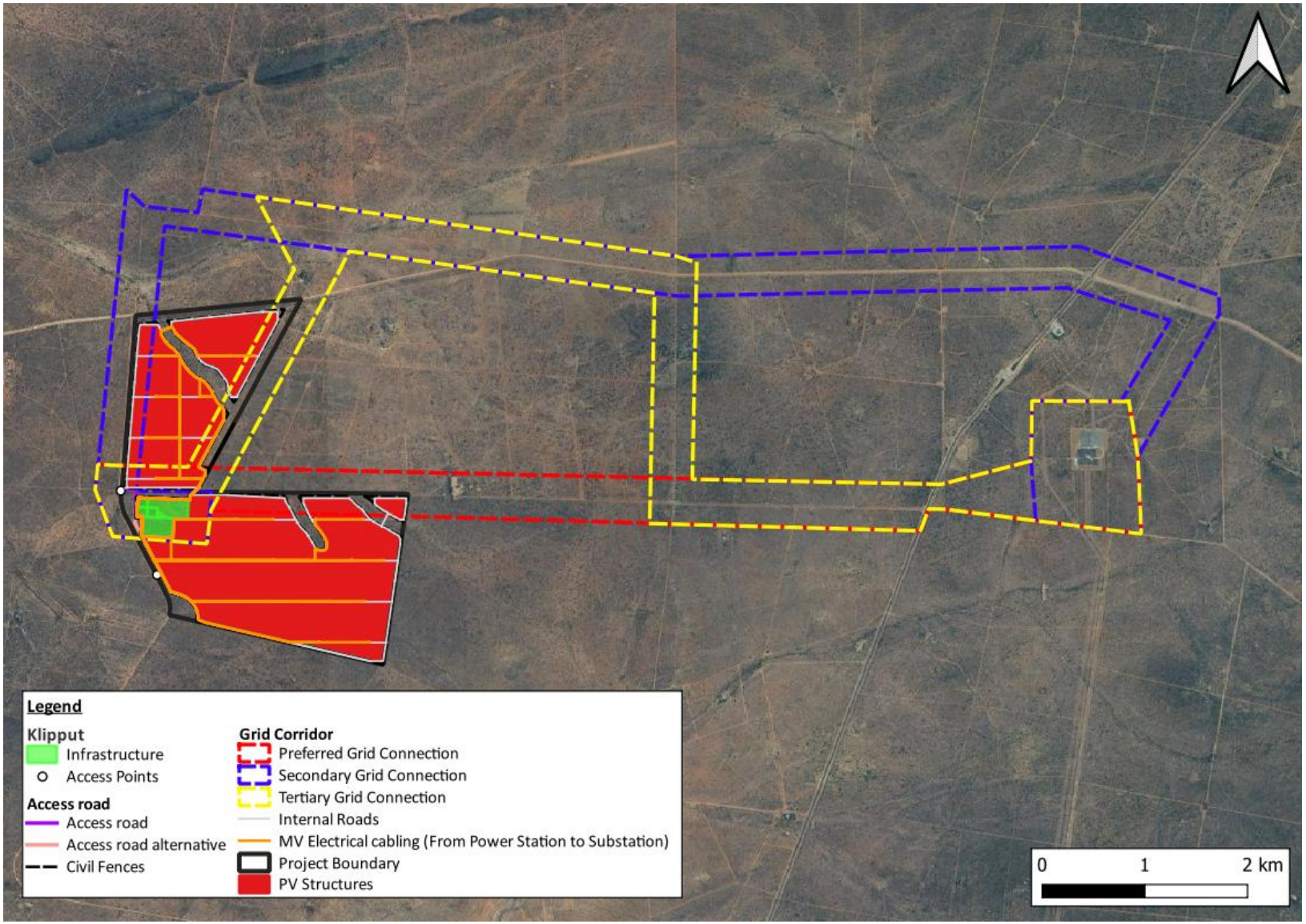

Figure 1.2: Infrastructure map showing the project's footprint.

2. METHODOLOGY

2.1. DFFE Screening Tool Report

The DFFE Screening Tool Report identifies environmental sensitivities for the project area. This is based on available desktop data and requires that a suitably qualified specialist verify the findings. Of relevance to this report is the terrestrial biodiversity, plant, and animal species theme (refer to Table 2.1 below). A desktop assessment of available spatial data and literature resources was undertaken to verify the sensitivity features contributing to the sensitivity rating for each of the themes and this was supplemented with data gathered during the field survey. The key resources that were consulted for each theme are summarised in Section 2.2.1 to 2.2.3 below

Table 2.1: Summary of DFFE screening report themes relevant to this study.

Theme	Sensitivity	Sensitivity Features	Relevant Section of the Report
	Solar PV		
Animal Species	**MEDIUM**[1]	• One Sensitive Bird Species • Sensitive species 5 • One Sensitive invertebrate	The animal species theme has been categorised as medium due to the possible presence of Sensitive Species 5. **Chapter 3** of this report provides an assessment of faunal species occurring in the project area. Birds are addressed separately in the avifaunal assessment.
Plant Species	**LOW**	• None identified	A desktop assessment that includes records from both Plants of Southern Africa (POSA) and iNaturalist databases was undertaken in conjunction with a field survey. For SCC that might occur within the project area, the likelihood of occurrence has been assessed based on distribution records and available habitat on site (Refer to **Chapter 4**).

[1] 'Medium' sensitivity does not indicate the known presence of a threatened species within the proposed development footprint/PAOI but could indicate moderate likelihood of occurrence based on species distribution modelling, which relies on data such as habitat preferences and proximity to known locations of specific species (SANBI, 2020).

Terrestrial Biodiversity	**LOW**	• None Identified	The Solar PV facility was categorised as having a Low Sensitivity. Comment on how development will impact on this has been included in **Chapter 5**.

2.2. Site Sensitivity Verification

A Site Sensitivity Verification (SSV) for the proposed SEF was carried out from the 18th to the 21st of June 2024 (dry season) and the 13th of February 2025 (wet season). The purpose of the SSV was to verify the findings of the desktop assessment and DFFE Screening Tool Report. Based on the SSV findings, the sensitivity of the site was refined and confirmed for each theme and habitat type, as summarised below:

Table 2.2: Summary of Sensitivities per habitat types based on the findings of the SSV.

Theme	DFFE Screening Tool Report	Specialist's Findings
Animal Species Theme	**MEDIUM** Reason: • Sensitive species 5	**MEDIUM** Intact habitat
		VERY LOW Transformed areas
Plant Species Theme	**LOW** Reason: No SCC likely to occur	**LOW**
Terrestrial Biodiversity Theme	**LOW** Reason: No identified sensitive features	**MEDIUM** Intact vegetation **VERY LOW** Secondary Vegetation and Transformed areas

2.3. Desktop Assessment

2.3.1. Animal Species Theme

The known diversity of the vertebrate fauna (excluding birds and bats) in the project area was determined by a literature review. Species known from the region, or from adjacent regions, whose preferred habitat(s) were known to occur within the project area, were also included. The most recent literature sources were consulted and include:

- DFFE Screening Tool Reports (2025)
- Amphibians –Du Preez & Carruthers (2017), FrogMap (Fitz Patrick Institute of African Ornithology, 2024).

- Reptiles – Branch (1998), ReptileMap (Fitz Patrick Institute of African Ornithology, 2024).
- Mammals – Stuart & Stuart (2014), MammalMap (Fitz Patrick Institute of African Ornithology, 2024).
- IUCN, 2024.
- iNaturalist.

To establish which of those species identified in the literature review are SCC, the following sources were consulted:

- Conservation status of the reptiles of South Africa, Eswatini and Lesotho (Tolley *et al*., 2023);
- Ensuring a future for South Africa's frogs: a strategy for conservation research (Measey 2011);
- Red List of Mammals of South Africa, Swaziland and Lesotho (Child, *et al.,* 2016);
- IUCN (2024);
- NEM:BA (10 OF 2004) and TOPS

2.3.2. Plant Species Theme

A species list was compiled for the site and the likelihood of occurrence assessed for species listed as CR, EN, VU and Near Threatened (NT). Key resources consulted include:

- The DFFE Screening Tool Reports (2025)
- The Plants of Southern Africa (POSA) database.
- iNaturalist.

Species threat status was checked against the South African Red Data List.

2.3.3. Terrestrial Biodiversity Theme

A desktop assessment was undertaken prior to the field survey to determine whether there are any terrestrial biodiversity features within the project area that are considered sensitive. The vegetation types present within the project area and key features driving the CBA status of the project area were identified and confirmed during the field survey. Key resources consulted include:

- The DFFE Screening Tool Reports (2025).
- The South African Vegetation Map (SANBI, 2024).
- The 2018 Limpopo Province Map of Critical Biodiversity Areas and Ecological Support Areas.
- The International Union for the Conservation of Nature (IUCN) Red List of Ecosystems for South Africa (SANBI, 2021).
- South African Red List of Terrestrial Ecosystems: assessment details and ecosystem descriptions (SANBI, 2022).
- National Protected Area Expansion Strategy (NPAES) (2018).
- The South African Protected Areas Database (SAPAD, Q4, 2024) and the South African Conservation Areas Database (SACAD, Q4, 2024).
- Key Biodiversity Areas (2024).
- Freshwater Ecosystem Priority Areas (FEPA) subcatchment (2011).
- Strategic Water Source Areas (SWSA) (2021).

2.4. Field Survey

Two surveys were undertaken for the project area. The initial survey was undertaken from the 18th to the 21st of June 2024 at the start of the dry season when most species were fruiting, and a second survey was undertaken on the 13th of February 2025 when most species were in flower. Sufficient information was gathered during the two surveys to provide comment on the species present and the state of the ecosystem.

A combined total of ninety (90) sample sites were assessed during the field surveys within the PAOI which is estimated to be 3500 ha. This equates to a density of 1 sample site per 39 ha. Given the uniformity of the project area, this was considered sufficient to characterise the vegetation and faunal habitats present. Figure 2.1 provides a map of the tracks and sample sites assessed for the project as well as the GPS location of faunal species recorded within the project area.

2.4.1. Terrestrial Biodiversity and Plant Species Theme

The purpose of the botanical survey was to assess the site-specific botanical state of the Project Area of Influence (PAOI) by recording the species present (both indigenous and alien invasive species), identifying sensitive plant communities such as vegetation associated with rocky outcrops, riparian areas, or areas with Species of Conservation Concern (SCC), and identifying the current land use.

During the survey, the project area was driven and walked, and sample plots were analysed by determining the dominant species in each plot, as well as any alien invasive species and potential SCC occurring within the plots (Figure 2.1). Each sample plot was sampled until no new species were recorded. The distance walked at each sample plot depended on the diversity of species present. Distances ranged from 300m in degraded or modified habitat to 1km in habitat with a higher species diversity. Vegetation communities were then described according to the dominant species recorded from each type, and these were mapped and assigned a sensitivity score.

2.4.2. Animal Species Theme

The purpose of the faunal field survey was to determine the faunal habitats present within the project area and conduct searches for mammal, reptile, and amphibian species that may utilise these habitats.

The project area was driven, and active searching conducted in various habitats present (Figure 2.1). Active searching for amphibians, reptiles, and mammals includes direct and indirect observation:

- Direct observations were made by walking and driving through the project area and recording species seen. The GPS location and number of individuals present were recorded using Orux Maps. Where feasible, photographs were taken.
- Indirect observation is the searching for evidence of faunal presence and includes spoor, skat, roadkill, skulls, quills, dens, burrows, hairs, scrapings, and diggings.

In addition, habitats that typically provide refuge for faunal species were targeted to search for specific species:

- Reptiles and terrestrial amphibians were targeted in microhabitats by lifting rocks and logs,

peeling away bark and scraping through leaf litter. A minimum of twenty minutes was spent searching.

- Amphibians were targeted at water bodies where individuals were searched for along the banks and verge vegetation.
- Camera and binoculars were used to view mammal species from a distance without disturbing them. While walking the site, mammals are often flushed from hiding and were recorded.
- Riparian and wetland habitat was targeted to establish the ecological state of the habitat to establish the likelihood of occurrence of SCC.

All species observations were uploaded to iNaturalist:
https://www.inaturalist.org/observations?nelat=-23.28362004838525&nelng=29.813118802100984&subview=map&swlat=-23.453806607150614&swlng=29.563179837257234&user_id=nicole_wienand&view=species

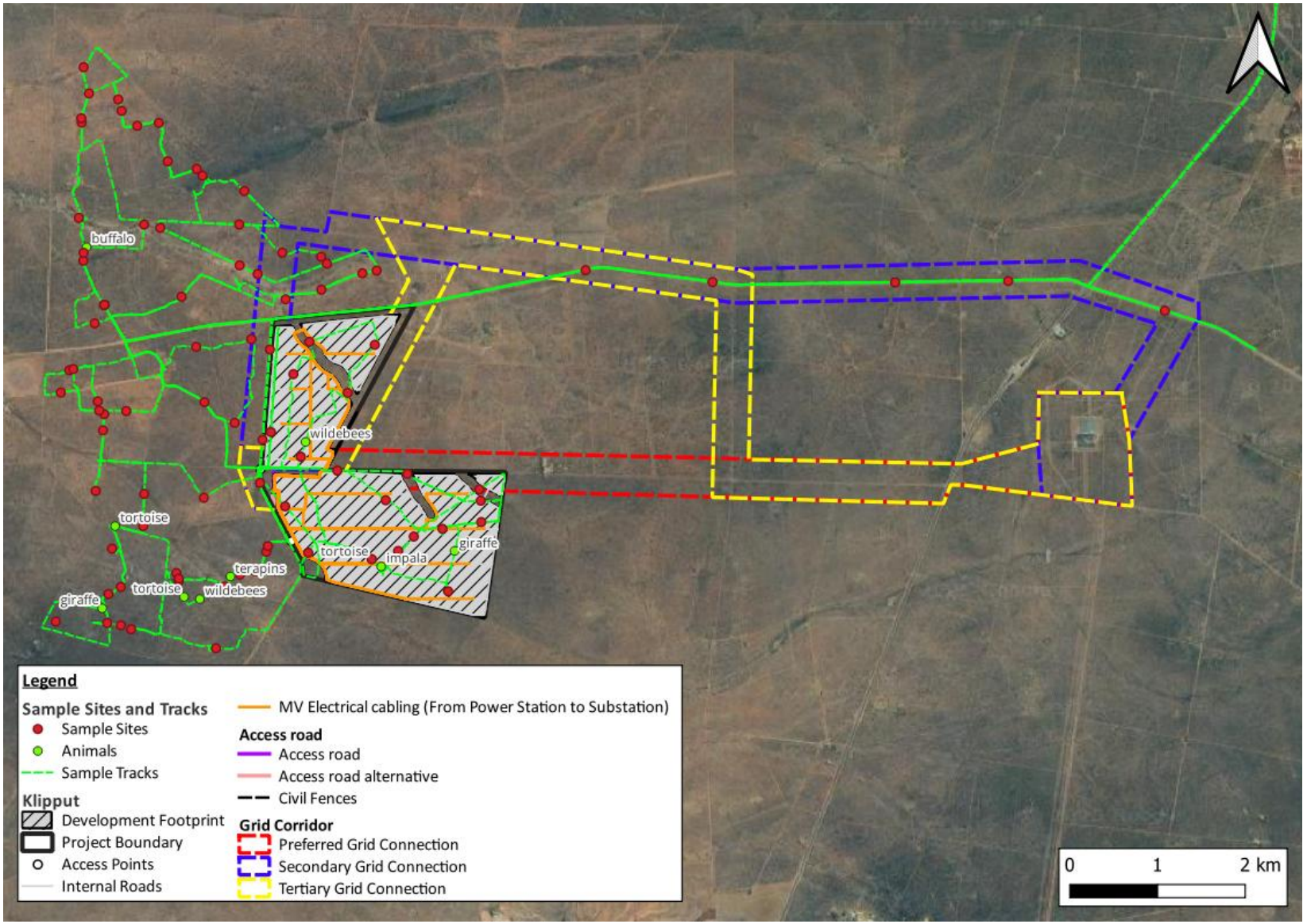

Figure 2.1: Map illustrating sample sites and tracks in relation to the project area.

2.5. Site Sensitivity Assessment

The Species Environmental Assessment Guideline (SANBI, 2020) was applied to assess the Site Ecological Importance (SEI) of the project area. The habitats and the SCC in the project area were assessed based on their conservation importance (CI), functional integrity (FI) and receptor resilience (RR) (Table 2.2). The combination of these resulted in a rating of SEI and interpretation of mitigation requirements based on the ratings.

The sensitivity map was developed using a combination of satellite imagery, information gathered from the desktop assessment, and data gathered from the field survey.

Table 2.3: Criteria for establishing Site Ecological Importance and description of criteria.

Criteria	Description
Conservation Importance (CI)	*The importance of a site for supporting biodiversity features of conservation concern present e.g. populations of Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.*
Functional Integrity (FI)	*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.*
Biodiversity Importance (BI) is a function of Conservation Importance (CI) and the Functional Integrity (FI) of a receptor.	
Receptor Resilience (RR)	*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.*
Site Ecological Importance (SEI) is a function of Biodiversity Importance (BI) and Receptor Resilience (RR)	

2.6. Description of impact analysis methodology

The rating scale developed by Coastal and Environmental Services (CES), in accordance with the requirements outlined in Appendix 1 of the NEMA EIA Regulations (2014 and subsequent 2017 & 2021 amendments), was applied to ensure a balanced and objective approach to the assessment of potential impacts associated with the proposed development. The criteria used to assess the potential impacts is outlined below.

Impact significance pre-mitigation

This rating scale adopts six key factors to determine the overall significance of the impact prior to mitigation:

1. **Nature of impact:** Defines whether the impact has a negative or positive effect on the receiving environment.
2. **Type of impact:** Defines whether the impact has a direct, indirect, or cumulative effect on the environment.

3. **Duration:** Defines the relationship of the impact to temporal scales. The temporal scale defines the significance of the impact at various time scales as an indication of the duration of the impact. This may extend from the short-term (less than 5 years, equivalent to the construction phase) to permanent. Generally, the longer the impact occurs the greater the significance of any given impact.
4. **Extent:** Describes the relationship of the impact to spatial scales i.e. the physical extent of the impact. This may extend from the local area to an impact that crosses international boundaries. The wider the spatial scale the impact extends, the more significant the impact is considered to be.
5. **Probability:** Refers to the likelihood (risk or chance) of the impact occurring. While many impacts generally do occur, there is considerable uncertainty in terms of others. The scale varies from unlikely to definite, with the overall impact significance increasing as the likelihood increases.
6. **Severity or benefits:** The severity/beneficial scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on the receiving environment. The severity of an impact can be evaluated prior and post mitigation to demonstrate the seriousness of the impact if it is not mitigated, as well as the effectiveness of the mitigation measures. The word 'mitigation' does not only refer to 'compensation', but also includes concepts of containment and remedy. For beneficial impacts, optimization refers to any measure that can enhance the benefits. Mitigation or optimisation should be practical, technically feasible and economically viable.

For each impact, the duration, extent and probability are ranked and assigned a score. These scores are combined and used to determine the overall impact significance prior to mitigation. They must then be considered against the severity rating to determine the overall significance of an activity. This is because the severity of the impact is far more important than the other three criteria. The overall significance is either negative or positive (Criterion 1) and direct, indirect or cumulative (Criterion 2).

Table 2.4: Evaluation Criteria.

Duration (Temporal Scale)	
Short term	*Less than 5 years*
Medium term	*Between 5-20 years*
Long term	*Between 20 and 40 years (a generation) and from a human perspective also permanent*
Permanent	*Over 40 years and resulting in a permanent and lasting change that will always be there*
Extent (Spatial Scale)	
Localised	*At localised scale and a few hectares in extent*
Study Area	*The proposed site and its immediate environs*
Regional	*District and Provincial level*
National	*Country*
International	*Internationally*
Probability (Likelihood)	
Unlikely	*The likelihood of these impacts occurring is slight*
May Occur	*The likelihood of these impacts occurring is possible*
Probable	*The likelihood of these impacts occurring is probable*

Definite	*The likelihood is that this impact will definitely occur*	
Severity Scale	*Severity*	*Benefit*
Very Severe/ Beneficial	An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit.
Severe/ Beneficial	Long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming, or some combination of these.	A long-term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
Moderately severe/Beneficial	Medium to long term impacts on the affected system(s) or party (ies), which could be mitigated.	A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way.
Slight	Medium- or short-term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.
No effect/don't or can't know	The system(s) or party(ies) is not affected by the proposed development.	In certain cases, it may not be possible to determine the severity of an impact.

** In certain cases, it may not be possible to determine the severity of an impact thus it may be determined: Don't know/Can't know.*

Table 2.5: Description of Overall Significance Rating

Significance Rate		***Description***
Don't Know		*In certain cases, it may not be possible to determine the significance of an impact. For example, the primary or secondary impacts on the social or natural environment given the available information.*
NO SIGNIFICANCE		*There are no primary or secondary effects at all that are important to scientists or the public.*
LOW NEGATIVE	***LOW POSITIVE***	*Impacts of low significance are typically acceptable impacts for which mitigation is desirable but not essential. The impact by itself is insufficient, even in combination with other low impacts, to prevent the development being approved. These impacts will result in negative medium to short term effects on the natural environment or on social systems.*

MODERATE NEGATIVE	**MODERATE POSITIVE**	*Impacts of moderate significance are impacts that require mitigation. The impact is insufficient by itself to prevent the implementation of the project but in conjunction with other impacts may prevent its implementation. These impacts will usually result in a negative medium to long-term effect on the natural environment or on social systems.*
HIGH NEGATIVE	***HIGH POSITIVE***	*Impacts that are rated as being high are serious impacts and may prevent the implementation of the project if no mitigation measures are implemented, or the impact is very difficult to mitigate. These impacts would be considered by society as constituting a major and usually long-term change to the environment or social systems and result in severe effects.*
VERY HIGH NEGATIVE	***VERY HIGH POSITIVE***	*Impacts that are rated as very high are very serious impact which may be sufficient by itself to prevent the implementation of the project. The impact may result in permanent change. Very often these impacts are unmitigable and usually result in very severe effects or very beneficial effects.*

Impact significance post-mitigation

Once mitigation measures are proposed, the following three factors are then considered to determine the overall significance of the impact after mitigation.

1. **Reversibility Scale**: This scale defines the degree to which an environment can be returned to its original/partially original state.
2. **Irreplaceable loss Scale:** This scale defines the degree of loss which an impact may cause.
3. **Mitigation potential Scale:** This scale defines the degree of difficulty of reversing and/or mitigating the various impacts ranges from very difficult to easily achievable. Both the practical feasibility of the measure, the potential cost and the potential effectiveness is taken into consideration when determining the appropriate degree of difficulty.

Table 2.6: Post-mitigation Evaluation Criteria

Reversibility	
Reversible	*The activity will lead to an impact that can be reversed provided appropriate mitigation measures are implemented.*
Irreversible	*The activity will lead to an impact that is permanent regardless of the implementation of mitigation measures.*
Irreplaceable loss	
Resource will not be lost	*The resource will not be lost/destroyed provided mitigation measures are implemented.*
Resource will be partly lost	*The resource will be partially destroyed even though mitigation measures are implemented.*
Resource will be lost	*The resource will be lost despite the implementation of mitigation measures.*
Mitigation potential	
Easily achievable	*The impact can be easily, effectively and cost effectively mitigated/reversed.*
Achievable	*The impact can be effectively mitigated/reversed without much difficulty or*

	cost.
Difficult	*The impact could be mitigated/reversed but there will be some difficultly in ensuring effectiveness and/or implementation, and significant costs.*
Very Difficult	*The impact could be mitigated/reversed but it would be very difficult to ensure effectiveness, technically very challenging and financially very costly.*

The following assumptions and limitations are inherent in the rating methodology:

- Value Judgements: Although this scale attempts to provide a balance and rigor to assessing the significance of impacts, the evaluation relies heavily on the values of the person making the judgment.
- Cumulative Impacts: These affect the significance ranking of an impact because it considers the impact in terms of both on-site and off-site sources. This is particularly problematic in terms of impacts beyond the scope of the proposed development. For this reason, it is important to consider impacts in terms of their cumulative nature.
- Seasonality: Certain impacts will vary in significance based on seasonal change. Thus, it is difficult to provide a static assessment. Seasonality will need to be implicit in the temporal scale, with management measures being imposed accordingly (e.g. dust suppression measures being implemented during the dry season).

3. ANIMAL SPECIES THEME

The DFFE classifies the Animal Species Theme Sensitivity of the project area as MEDIUM due to the possible occurrence of one bird species, one sensitive species, and one invertebrate species (Figure 3.1). This report only deals with amphibians, reptiles and mammals. This chapter describes the faunal habitats and sensitive species identified for the project area of influence (PAOI).

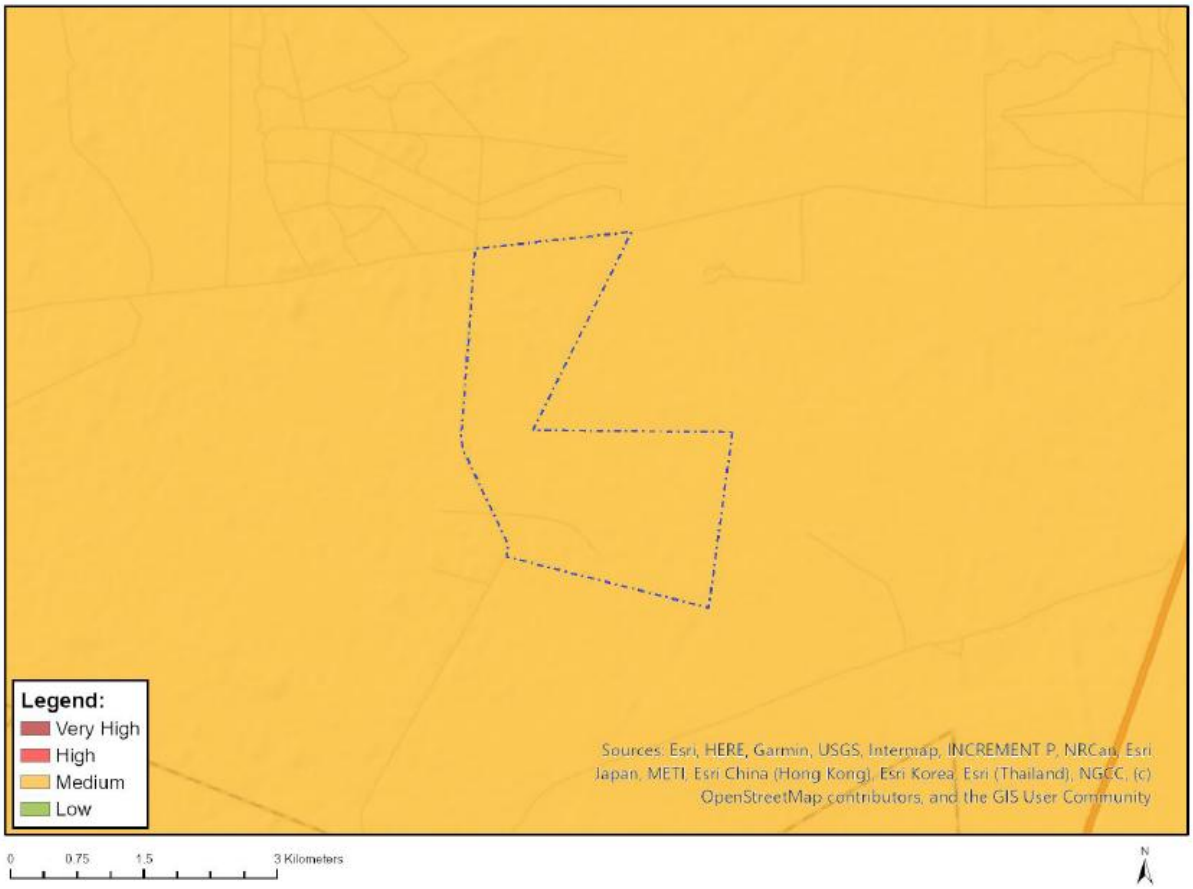

Figure 3.1: Animal Species Theme Sensitivity of the project area as per the DFFE Screening Tool Report.

3.1. Faunal habitats

To determine the likelihood of occurrence of SCC, an assessment of the habitats available within the project area is required. Habitats are defined in this study as the natural environment or place where faunal species *live, breed and/or forage*. Each habitat type has different environmental conditions and structure which influences a species' distribution range.

Faunal habitats recorded within the project area include (Figure 3.2 and 3.3):

- **Makhado Sweet Bushveld** characterised by a matrix of grasses, shrubs and trees. Trees were typically 3-4m in height with an open canopy of 50% and a grass understory interspersed with shrubs. This habitat was located in the flat, open areas.
- **Riparian Areas** characterised by a dry riverbed material/sediment surrounded by a denser tree/shrub canopy cover along streams and drainage lines.

- **Rocky outcrops** characterised by large rocks with a few trees growing between.
- **Secondary Vegetation** characterised by open areas of grassland and a tree canopy cover of 25-50%.
- **Transformed Areas** characterised by buildings and homesteads.

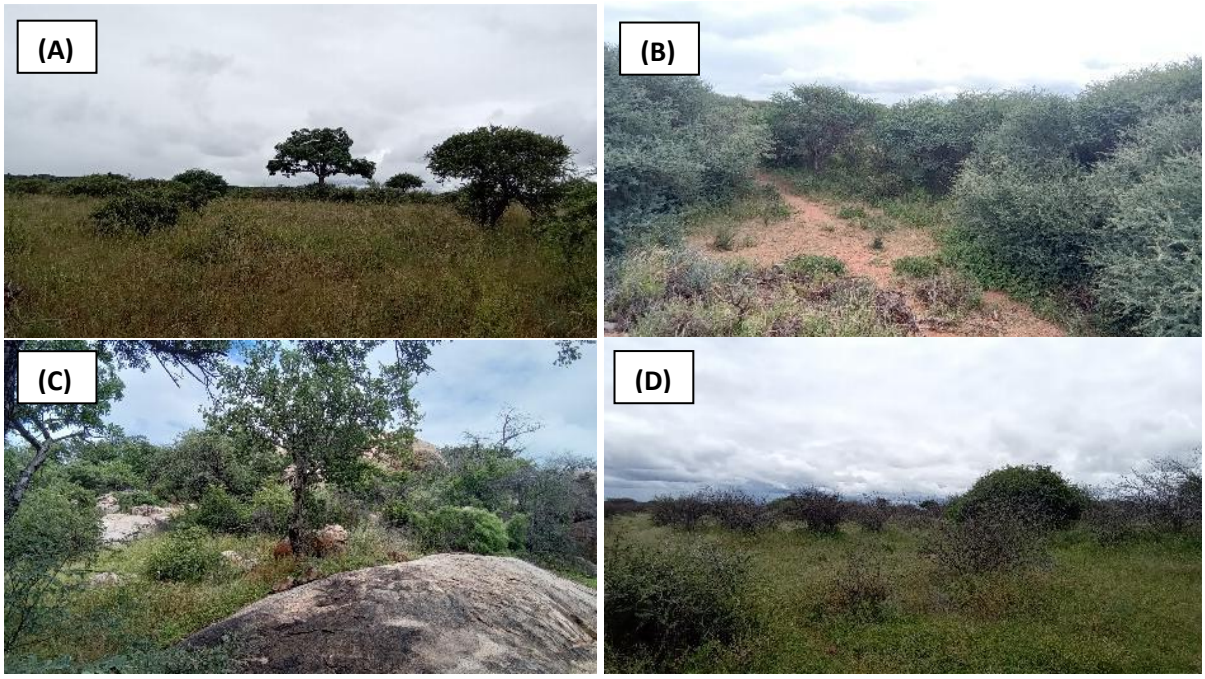

Figure 3.2: Photographs illustrating faunal habitat present within the PAOI. A) Makhado Sweet Bushveld, B) Riparian Areas, C) Rocky Outcrop, D) Secondary Vegetation.

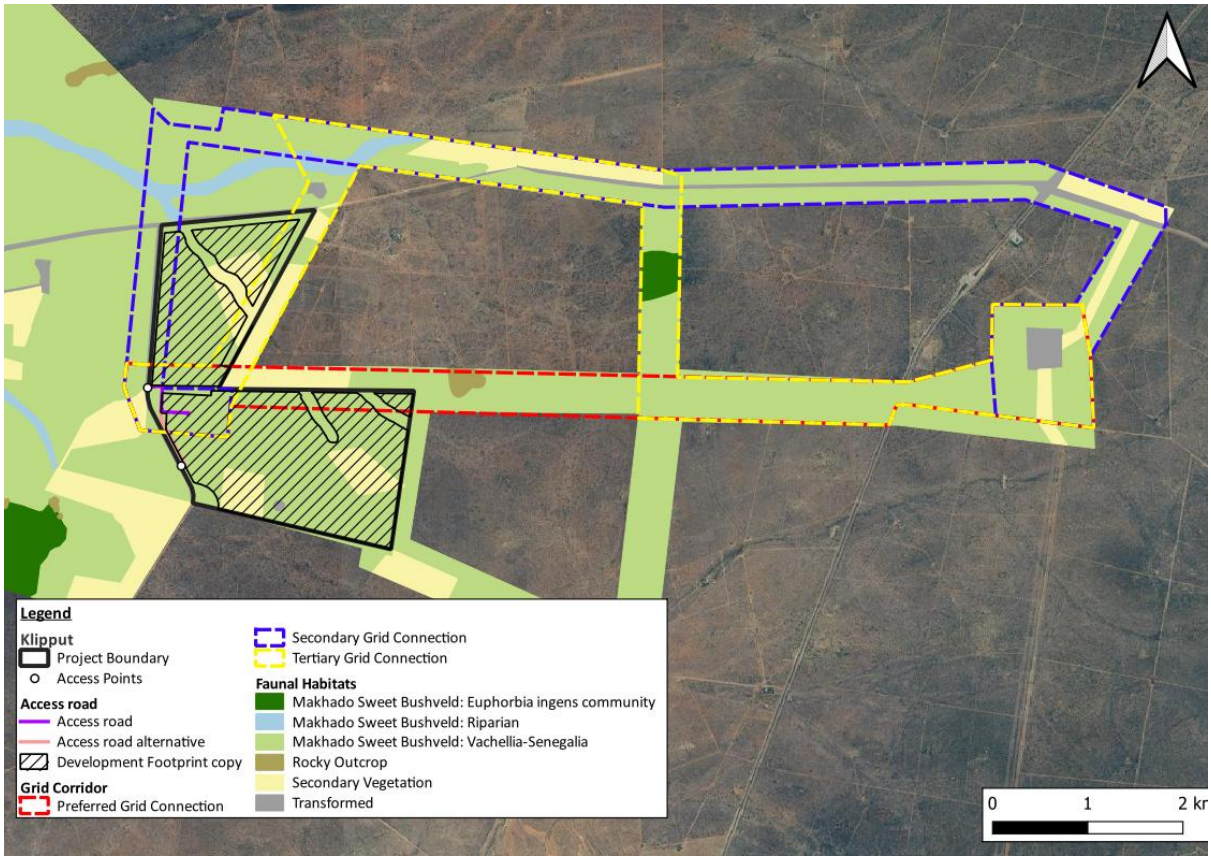

Figure 3.3: Map of the faunal habitats within the project area based on field survey findings.

3.2. Fauna species distribution in relation to the project area

It is important to note that although an area may be within a species distribution, the species may no longer inhabit the area or may not inhabit it permanently. For example, many large mammals have a distribution which includes the project area, but these animals no longer occur outside of reserves and private game farms. Furthermore, a species may occur in the broader area where habitat is available but since its preferred habitat is not present in the project area, it is unlikely to occur there. Therefore, the number of species that could occur in the project area is far fewer than species distributions suggest.

The project area intersects the distribution range of 33 amphibian species, 118 reptile species, and 138 mammal species (IUCN, 2024). Of these five amphibian species, 21 reptile species and 16 mammal species have been recorded from the general area (iNaturalist, 2025).

The project area is currently managed as a game reserve and stocks a number of game species. During the field survey in June 2024 and February 2025 the following species were observed:

- Reptiles: Variable Skink, Serrated Tortoise, Leopard Tortoise and Helmeted Terrapin
- Mammals: Giraffe, Zebra, Kudu, Eland, Vervet Monkey and Grey Mongoose.

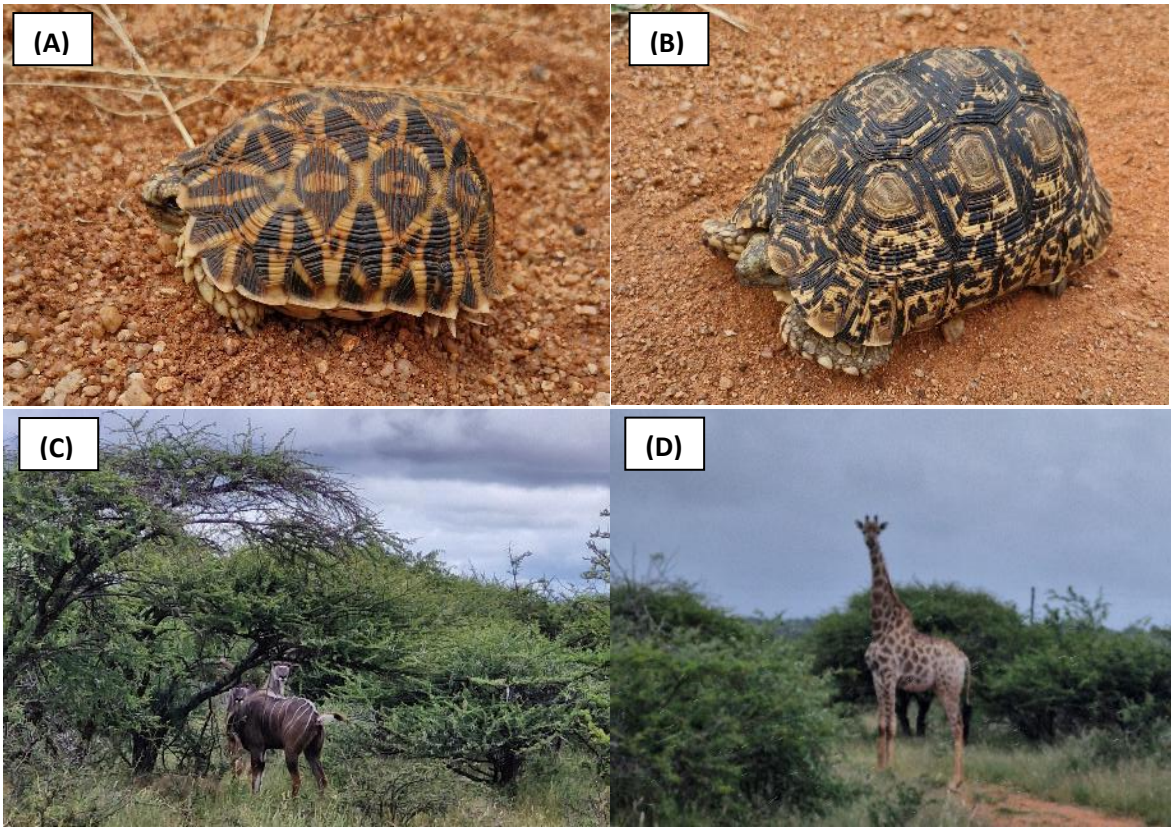

Figure 3.4: Faunal species observed within the project area: (A) Serrated Tortoise - *Psammobates oculifer* (B) Leopard Tortoise - *Stigmochelys pardalis* (C) Greater Kudu - *Tragelaphus strepsiceros* and (D) Giraffe - *Giraffa camelopardalis*.

3.3. Faunal Species of Conservation Concern in relation to the Project Area

3.3.1. Amphibians

No amphibian SCC have a distribution which includes the project area.

3.3.2. Reptiles

No reptile SCC have a distribution which includes the project area.

3.3.3. Mammals

Nine threatened and eleven near-threatened mammal species have a distribution which includes the project area (Table 3.1). Of these, one species has been stocked by the landowner for hunting and six species have a high likelihood of occurrence based on available habitat and species records for the area. Four have a medium likelihood of occurrence, and nine have a low likelihood of occurrence (Table 3.1).

Table 3.1: Summary of threatened and near-threatened mammal species with a distribution that includes the project area

Common Name	Scientific Name	Threat Status	Likelihood of occurrence within project area	Habitat within the Project Area	Likely Impact on the Species
African Striped Weasel	*Poecilogale albinucha*	NT	High	All vegetation types	Loss/Degradation of Habitat, Disturbance
Black-footed Cat	*Felis nigripes*	VU	High	Makhado Sweet Bushveld	Loss/Degradation of Habitat, Disturbance
Brown Hyena	*Parahyaena brunnea*	NT	High	Makhado Sweet Bushveld	Disturbance
Leopard	*Panthera pardus*	VU	High	Makhado Sweet Bushveld Rocky Outcrops	Disturbance
Southern African Hedgehog	*Atelerix frontalis*	NT	High	Rocky Outcrops	Loss/Degradation of Habitat, Disturbance
Temminick's Pangolin	*Smutsia temminckii*	VU	High	Makhado Sweet Bushveld	Loss/Degradation of Habitat, Disturbance
Tsessebe	*Damaliscus lunatus*	VU	Confirmed (stocked by landowner)	Makhado Sweet Bushveld	Disturbance
Maquassie Musk Shrew	*Crocidura maquassiensis*	VU	Medium	No suitable habitat	Loss/Degradation of Habitat, Disturbance
Serval	*Leptailurus serval*	NT	Medium	No suitable habitat	Loss/Degradation of Habitat, Disturbance
Gunnings Golden Mole	*Neamblysomus gunningi*	EN	Medium	No suitable habitat	Loss/Degradation of Habitat, Disturbance
Swamp Musk Shrew	*Crocidura mariquensis*	NT	Medium	No suitable habitat	Loss/Degradation of Habitat, Disturbance
African Marsh Rat	*Dasymys incomtus*	VU	Low	Limited habitat available.	Loss/Degradation of Habitat, Disturbance
African Clawless Otter	*Aonyx capensis*	NT	Low	No permanent water sources available	Disturbance
Grey Rhebok	*Pelea capreolus*	NT	Low	Limited suitable habitat present	Disturbance
Mountain Reedbuck	*Redunca fulvorufula*	EN	Low	Limited suitable habitat present	Disturbance
Spotted Hyena	*Crocuta crocuta*	NT	Low	Species is largely confined to protected areas.	Disturbance
Nyika Climbing Mouse	*Dendromus nyikae*	NT	Low	No suitable habitat	Loss/Degradation of Habitat, Disturbance
South East African Vlei Rat	*Otomys auratus*	NT	Low	No suitable habitat	Loss/Degradation of Habitat, Disturbance
Spotted -necked Otter	*Hydrictis maculicollis*	NT	Low	No suitable habitat	Disturbance
Sensitive Species 5	Sensitive Species 5	VU	Low	Low unless stocked	Disturbance

4. PLANT SPECIES THEME

The plant species theme in the DFFE screening tool report is based on the presence/absence of Species of Conservation Concern (SCC). It does not include an assessment of the vegetation type in which the species occur. Rather, the assessment of each vegetation type is included in the Terrestrial Biodiversity Theme in the DFFE screening tool report. As such, the assessment of the vegetation types (also referred to as ecosystems in the DFFE Screening Tool Report), has been included in chapter 5 below.

According to the DFFE Screening Tool Report, the Plant Species Theme Sensitivity of the project area is classified as LOW with no sensitive plant species identified (Figure 4.1).

Figure 4.1: Map of the Plant Species Theme Sensitivity of the project area as per the DFFE Screening Tool Report.

4.1. Floristics

A total of 119 plant species from 41 families were recorded within the PAOI (Table 4.1) (a full species list has been included in Appendix 1). The Fabaceae and Poaceae families had the highest number of species, both with 17 species each, followed by the Asteraceae family with 11 species, and the Malvaceae family with 8 species. The remaining families each had 5 or less species.

Table 4.1: Number of families and species recorded within the project area.

Family	No. of Species	Family	No. of Species	Family	No. of Species
Fabaceae	17	Combretaceae	2	Iridaceae	1
Poaceae	17	Convolvulaceae	2	Geraniaceae	1
Asteraceae	11	Cucurbitaceae	2	Loranthaceae	1
Malvaceae	8	Lamiaceae	2	Olacaceae	1
Asparagaceae	5	Moraceae	2	Pedaliaceae	1
Anacardiaceae	4	Acanthaceae	1	Portulacaceae	1
Boraginaceae	4	Asphodelaceae	1	Rhamnaceae	1
Burseraceae	4	Bignoniaceae	1	Rubiaceae	1
Cactaceae	4	Campanulaceae	1	Sapindaceae	1
Amaranthaceae	3	Celastraceae	1	Scrophulariaceae	1
Cyperaceae	3	Commelinaceae	1	Solanaceae	1
Hyacinthaceae	3	Crassulaceae	1	Vitaceae	1
Apocynaceae	2	Ebenaceae	1	Zygophyllaceae	1
Capparaceae	2	Euphorbiaceae	1	**Total**	**119**

4.2. Species of Conservation Concern

A list of SCC was created for the project area using records from the Plants of Southern Africa (POSA) database, iNaturalist, and the species list from the DFFE Screening Tool Report. This was supplemented with data collected from the field survey.

No SCC were identified by the DFFE Screening Tool Report. However, a desktop assessment of the broader POAI identified three plant SCC that may occur in the project area. A description of the distribution, habitat requirements and likelihood of occurrence within the project area has been provided in Table 4.2 below. Based on the field survey and desktop assessment, one of the three species has a medium likelihood of occurrence, and two have a low likelihood of occurrence. No SCC were recorded during the field survey.

Table 4.2: Plant Species of Conservation Concern (SCC) identified for the PAOI.

Species	Threat Status	Distribution and Habitat Requirements	Likelihood of Occurrence (Low, Medium, High or Confirmed)
Sensitive Plant Species	VU A2cd	This species is widely distributed throughout South Africa (EOO not specified), occurring in the Western Cape, Eastern Cape, Free State, Gauteng, Limpopo, Mpumalanga, and KwaZulu-Natal. Its habitat includes forested and fairly moist environments, including wetter bushveld regions, coastal thickets, and wooded mountain ravines (Williams *et al*., 2022). Although this species has been recorded 33 km southeast of the project area (iNaturalist, 2025), there was no suitable habitat present in the project area for this species.	LOW
Merwilla plumbea	NT A2bd	This species is fairly widely distributed, occurring in the Eastern Cape, Free State and Mpumalanga Province. It has been recorded 28 km southeast of the project area (iNaturalist, 2025). *M. plumbea* occurs in a wide variety of habitats including forest, grassland, bushveld (Williams *et al*., 2008).	MEDIUM
Mystacidium brayboniae	NT D2	This species is an epiphyte that typically occurs in the Soutspanberg Mountains (EOO 1050 km², AOO <30 km²). It is known from less than 10 subpopulations where it occurs in moist, high altitude misbelt forests and woodland (van Staden, 2008). This species has been recorded 13 km southeast of the project area (iNaturalist, 2025). Although a research grade observation, it is likely that the coordinates are misplaced as this species is typically restricted to the Soutpansberg Mountains and its preferred habitat is not present in the project area or surrounding PAOI.	LOW

4.3. Alien Invasive Plant Species

Fifteen exotic plant species were recorded within the project area (Table 4.3). The density of exotic plant species was highest in disturbed sites, however scattered individuals were recorded through the project area. Of the 15 exotic plant species recorded, six species are listed under the NEM:BA (Act No. 10 0f 2004) and five species are listed under the Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983).

Under the NEM: BA act, Category 1b species must be eradicated and under CARA, Category 1 plant species must be removed & destroyed immediately. No trade in these plants is permitted.

Table 4.3: List of exotic plant species recorded in the Project Area.

Scientific name	Common name	SA Red List	NEM:BA (2016)	CARA (1983)
Alternanthera pungens	Creeping Chaffweed	NE	-	-
Hermbstaedtia odorata albi-rosea		NE	-	-
Acanthospermum hispidum	Bindii	NE	-	-
Bidens pilosa	Hairy Beggarticks	NE	-	-
Schkuhria pinnata	Dwarf Marigold	NE	-	-
Tagetes minuta	Wild Marigold	NE	-	-
Xanthium strumarium	Rough Cocklebur	NE	1b	1
Zinnia peruviana	Peruvian Zinnia	NE	-	-
Cylindropuntia imbricata	Tree Cholla	NE	1b	1
Nyctocereus serpentinus	Serpent Cactus	NE	1b	-
Opuntia ficus-indica	Indian Fig Opuntia	NE	1b	1
Combretum hereroense	Russet Bushwillow	NE	-	-
Tipuana tipu	Pride Of Bolivia	NE	3	3
Paspalum dilatatum	Dallis Grass	NE	-	-
Datura ferox	Long-Spined Thorn-Apple	NE	1b	1

5. TERRESTRIAL BIODIVERSITY THEME

The DFFE Screening Tool Report classifies the Terrestrial Biodiversity Theme sensitivity of the project area as LOW. Section 5.2 assesses the biodiversity priority areas, affected by the project area.

Figure 5.1: Terrestrial Biodiversity Theme Sensitivity of the project area as per the DFFE Screening Tool Report.

5.1. Vegetation Types Present

The project area occurs within the Savanna Biome which constitutes the southernmost extent of the most widespread biome in Africa. In South Africa, it is estimated to cover 32.8% of the total land surface area (399 600 km^2) with the largest portion of the biome occurring in the north of the country, and extending down the eastern seaboard interior and valleys, where it grades into Albany Thicket in the Eastern Cape (Mucina *et al*., 2011).

According to the National Vegetation Map (2018), which was compiled to provide a greater level of detail for floristically based vegetation units in South Africa, the project area occurs within one vegetation type, namely Makhado Sweet Bushveld (Figure 5.2).

The field survey confirmed that the major vegetation type within the project area is Makhado Sweet Bushveld but vegetation communities within this vegetation type has been mapped at a finer scale (Figure 5.3) and described below.

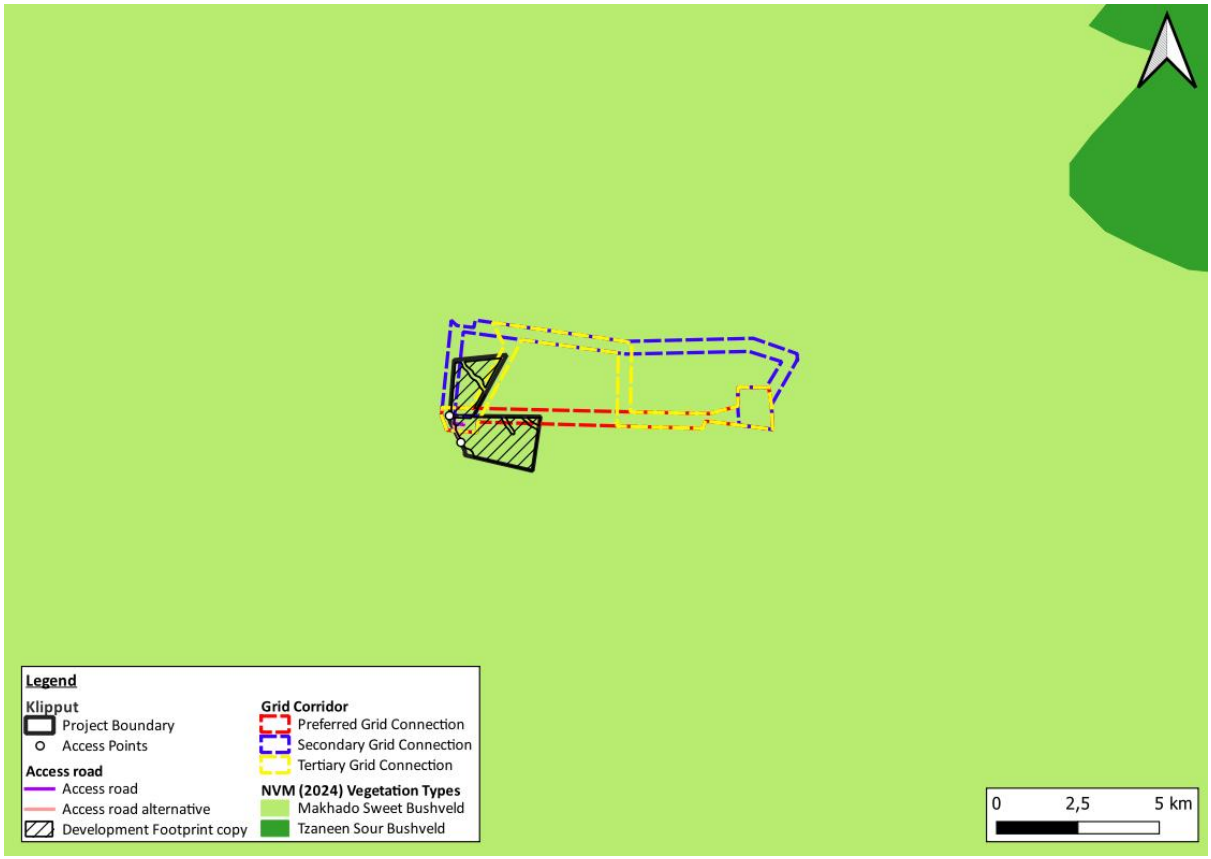

Figure 5.2: SA VEGMAP (2024) of the project area.

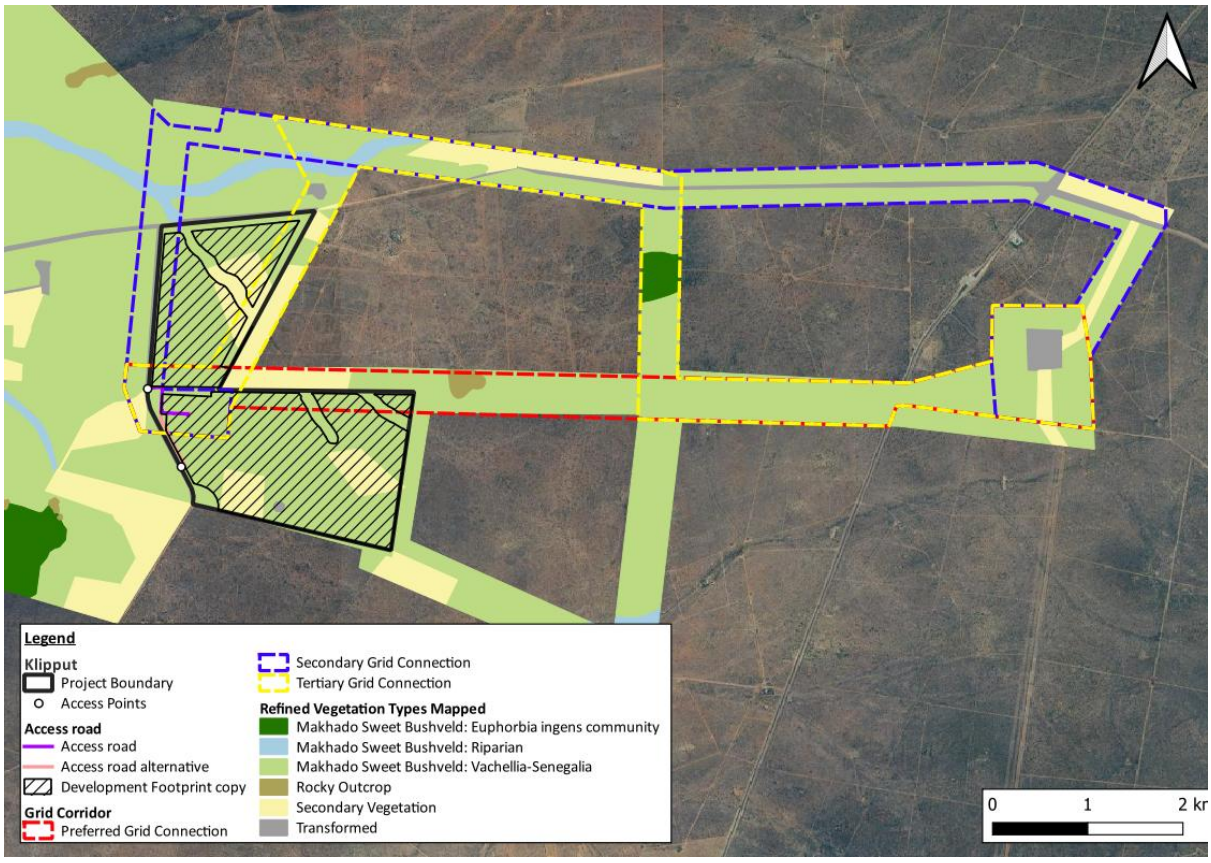

Figure 5.3: Fine-scale vegetation map illustrating vegetation communities within the project area based on field survey findings.

5.1.1. Makhado Sweet Bushveld Communities

Makhado Sweet Bushveld occurs on plains and slopes of the Soutspanberg, east of the Waterberg and surrounding the Blouberg and Lerataupje Mountains, and north of the Polokwane Plateau and west of the escarpment, extending south to Mokopane and north to Vivo in the Limpopo Province. The landscape is characterised by slightly to moderately undulating plains, with altitude ranging from 850-1200 m. The vegetation is described as short stubby bushveld with a poorly developed grass layer (Mucina *et al*., 2011).

Makhado Sweet Bushveld is classified as Least Concern with 63% (~6370 km^2) of the historical extent remaining. The conservation target is 19% and it is considered poorly protected (Government of South Africa, 2022).

The Makhado Sweet Bushveld has been subdivided into three (3) vegetation communities based on the dominant plant species present:

Makhado Sweet Bushveld: *Euphorbia ingens* community characterised by relatively open bushveld with a cover of 50-60% and canopy height of roughly 3-5 m dominated by **trees** and **shrubs** such as *Commiphora glandulosa, C. Africana, C. mollis, Senegalia burkei, Grewia bicolor, Combretum apiculatum, Ormocarpum trichocarpum, Sclerocarya birrea* (Marula), *Dichrostachys cinerea, Boscia albitrunca* (Sheperd's tree), *Grewia bicolor, G. flavescens, G. flava, Peltophorum africanum, Ziziphus mucronata, Ormocarpum trichocarpum, Vachellia tortilis, Ozoroa paniculosa, Senegalia mellifera*, with an abundance of *E. ingens*, surrounded by a matrix of **grasses**, such as *Chloris virgata, Schmidtia pappophoroides, Digitaria eriantha, Urochloa trichopus, Setaria pumila, Dactyloctenium aegyptium, Melinis repens, Themeda triandra, Pogonarthria squarrosa*, and **herbs** such as *Tephrosia capensis, Afrosolen sandersonii, Indigofera filipes, Emilia transvaalensis, Clerodendrum ternatum, Dicoma tomentosa, Hibiscus calyphyllus, Ipomoea obscura, Rhynchosia totta*, and *Commelina* spp. (Figure 5.4).

Figure 5.4: Makhado Sweet Bushveld: *Euphorbia ingens* community within the project area.

Makhado Sweet Bushveld: Riparian characterised by dense, semi-closed bushveld with a cover of 80-90% and canopy height of roughly 3-5 m present along the banks of dry rivers, drainage lines, and streams (Figure 5.5). This vegetation type is characterised by a similar species composition to that listed for Makhado Sweet Bushveld: *Euphorbia ingens* community however with a lower abundance of *E. ingens* and a higher abundance of *Senegalia mellifera*. Some scattered grasses, low shrubs and pioneer species are present within the dry riverbeds.

Figure 5.5: Makhado Sweet Bushveld: River community within the project area.

Makhado Sweet Bushveld: *Vachellia senegalia* community characterised by relatively open bushveld with a cover of 50-60% and canopy height of roughly 3-5 m characterised by a similar species composition to that listed for Makhado Sweet Bushveld: *Euphorbia ingens* community however with a lower abundance of *E. ingens* surrounded by a matrix of grasses and herbs (Figure 5.6). *Vachellia senegalia* is a dominant species in this community.

Figure 5.6: Makhado Sweet Bushveld: *Vachellia senegalia* community within the project area.

5.1.2. Rocky Outcrops

Rocky Outcrops within the project area include large gneiss and granite boulders and flats interspersed with trees and shrubs such as *Ficus tettensis, Boscia albitrunca, Dichrostachys cinerea, Sclerocarya birrea, Pappea capensis*, *Euphorbia ingens* and other species typical to Makhado Sweet Bushveld (see Section 5.1.1 above). Vegetation cover ranged from dense (70-80%) to open (10-20%) depending on the spacing between flats and boulders (Figure 5.7).

Figure 5.7: Rocky outcrops vegetation communities within the project area.

5.1.3. Secondary Vegetation

Secondary vegetation occurs in areas that were previously cultivated. This vegetation community was characterised by low to medium shrubveld dominated by *Vachellia tortilis* and *Dichrostachys cinerea* with a grassy understorey. Species diversity was low (Figure 5.8).

Figure 5.8: Secondary vegetation within the project area.

5.1.4. Transformed

These include areas that have been modified and areas that are devoid of natural vegetation.

5.2. Biodiversity Priority Areas

The 2018 Limpopo Province Map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs) provides a map of important biodiversity areas, outside of the Protected Areas network, which is used to inform planning and land-use authorisation processes. According to the spatial dataset, the project area does not occur within a CBA or ESA. Most of the project area falls within an area classified as "Other Natural Area (ONA)" with a minor patch classified as "No Natural Remaining (NNR)" (Figure 5.9). The areas classified as NNR correlates with the previously transformed portions of the project area.

According to LEDET (2016), ONAs are all remaining natural areas not included in the CBA or ESA categories while NNRs are areas that have been irreversibly modified and do not contribute significantly to maintaining biodiversity pattern or ecological processes and include urban and rural settlements; croplands; mining areas; and forest plantations.

No management guidelines are offered for areas classified as ONA and NNR, however these are considered 'production landscapes' and land management objectives for these areas is to manage land to optimize sustainable utilization of natural areas (LEDET, 2016).

The project development will not impact on any CBAs or ESAs. As such, impacts on the management objectives of these features is not expected.

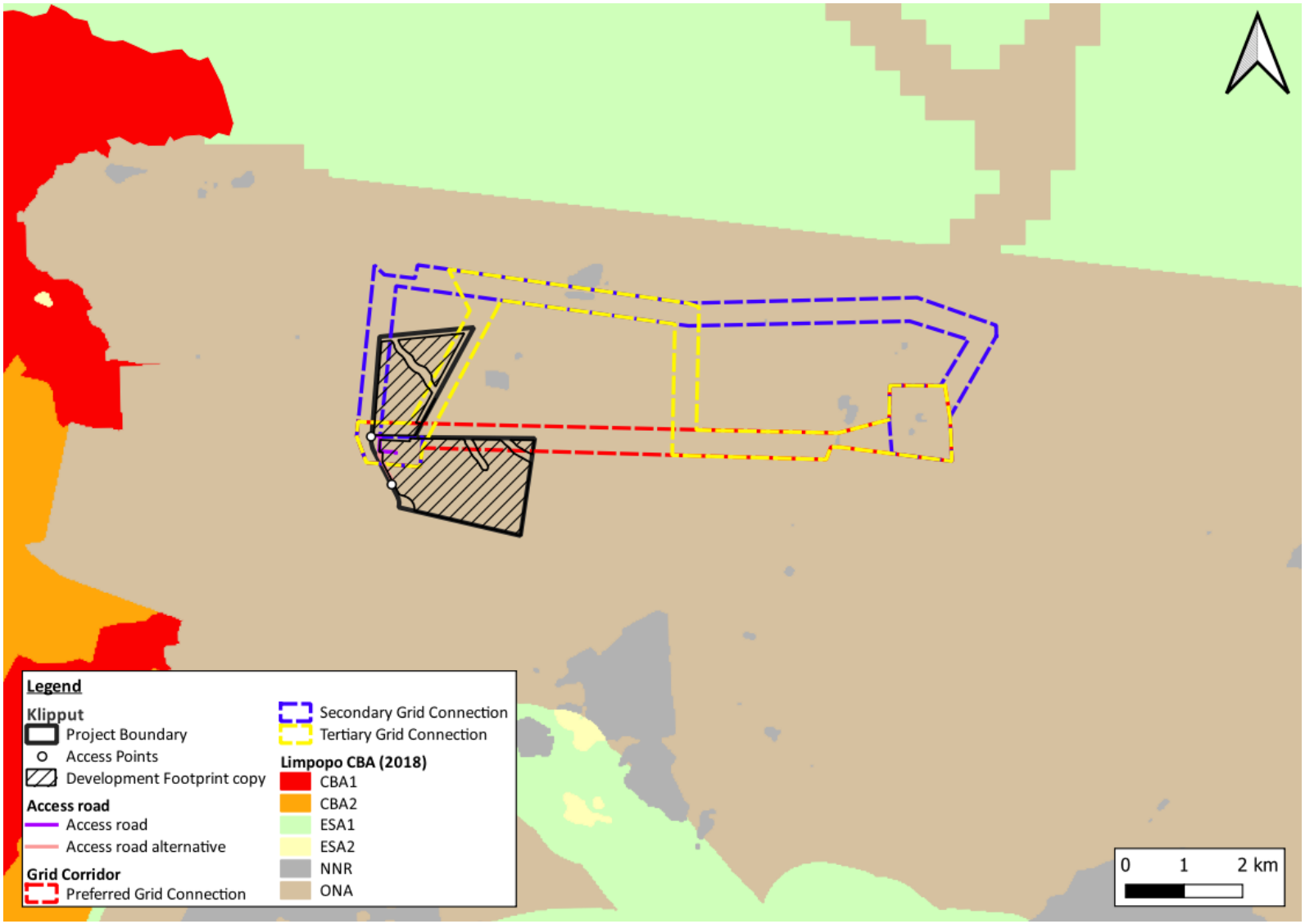

Figure 5.9: The Project area in relation to CBAs and ESAs. The project area occurs in an ONA.

5.3. Protected Areas, Conservation Areas, National Protected Area Expansion Strategy, and Key Biodiversity Areas

5.3.1. Protected Areas and Conservation Areas

The South African Protected Areas Database (SAPAD) and the South African Conservation Areas Database (SACAD) is a spatial dataset that includes all the protected areas (PA) and conservation areas (CA) within South Africa. Data on privately owned PAs are also included in the dataset which is maintained and updated on a quarterly basis. This dataset therefore provides the most up to date information on protected areas and conservation areas in South Africa. According to SAPAD (Q3, 2024), the project area does not occur within a protected area. The nearest protected area is the Blijdschap Private Nature Reserve located approximately 9 km northeast from the edge of the SEF and 8 km north from the grid corridor along the project area (Figure 5.10).

Although the project area is not located within a protected area, it is located within a conservation area – the Vhembe Biosphere Reserve (VBR). The Vhembe Biosphere Reserve (VBR), covering 30,700 square kilometres, is one of South Africa's largest biosphere reserves and part of the Greater Mapungubwe and Great Limpopo Transfrontier Conservation Areas. It collaborates in various national and international conservation initiatives and is recognized as a 'Smart Biosphere Reserve' meaning it actively participates in various national and international conservation initiatives, including World Heritage Sites, Transfrontier Conservation Areas (TFCA), Ramsar Sites, Stewardship Programs, and the Southern African Development Community (SADC).

Locally, the VBR fosters partnerships between communities, the private sector, and government to manage natural resources sustainably. The VBR supports development that is ecologically and socio-culturally sustainable, promoting both conservation and economic growth.

5.3.2. Protected Area Expansion Strategy priority areas (PAES areas)

PAES areas have been strategically mapped to determine the best areas in which to increase South Africa's protected area network. This has been conducted at a National and Provincial level using different criteria. Although these areas have not undergone comprehensive stakeholder engagement and fine-scale feasibility/suitability assessments, development in these areas needs to be carefully considered.

Consultation of the most recent NPAES dataset (2018) confirms that the project area does not occur within an NPAES Focus Area (Figure 5.10).

5.3.3. Key Biodiversity Areas

Key Biodiversity Areas (KBAs) are critical locations for conserving species and their habitats, identified globally for their significant role in maintaining biodiversity. In South Africa, establishing KBAs was essential for enabling the country to report on global conservation targets. These areas will now be included in the range of tools used to monitor and assess biodiversity, guiding policy and decision-making across various sectors.

According to South Africa's Key Biodiversity Areas (2024) spatial dataset, the project area does not occur within a KBA (Figure 5.11). The nearest KBA is the Soutpansberg KBA which is located 33 km north of the project area.

5.4. Freshwater Ecosystems Priority Area (FEPA) Subcatchment and Strategic Water Source Areas (SWSA)

The project area does **not** occur within or near to a FEPA Subcatchment or a Strategic Water Source Area.

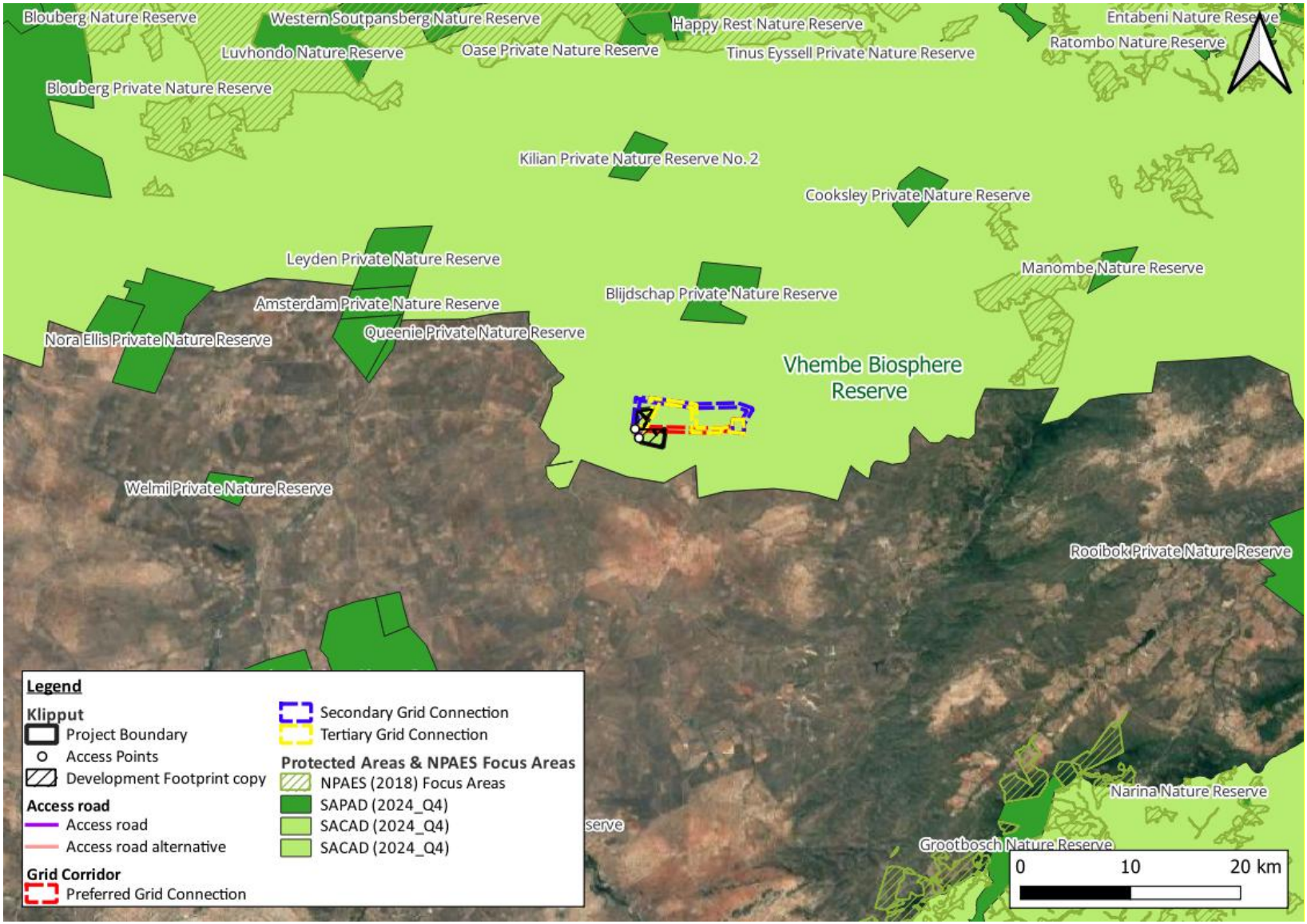

Figure 5.10: Map illustrating the project area in relation to conservation areas and NPAES.

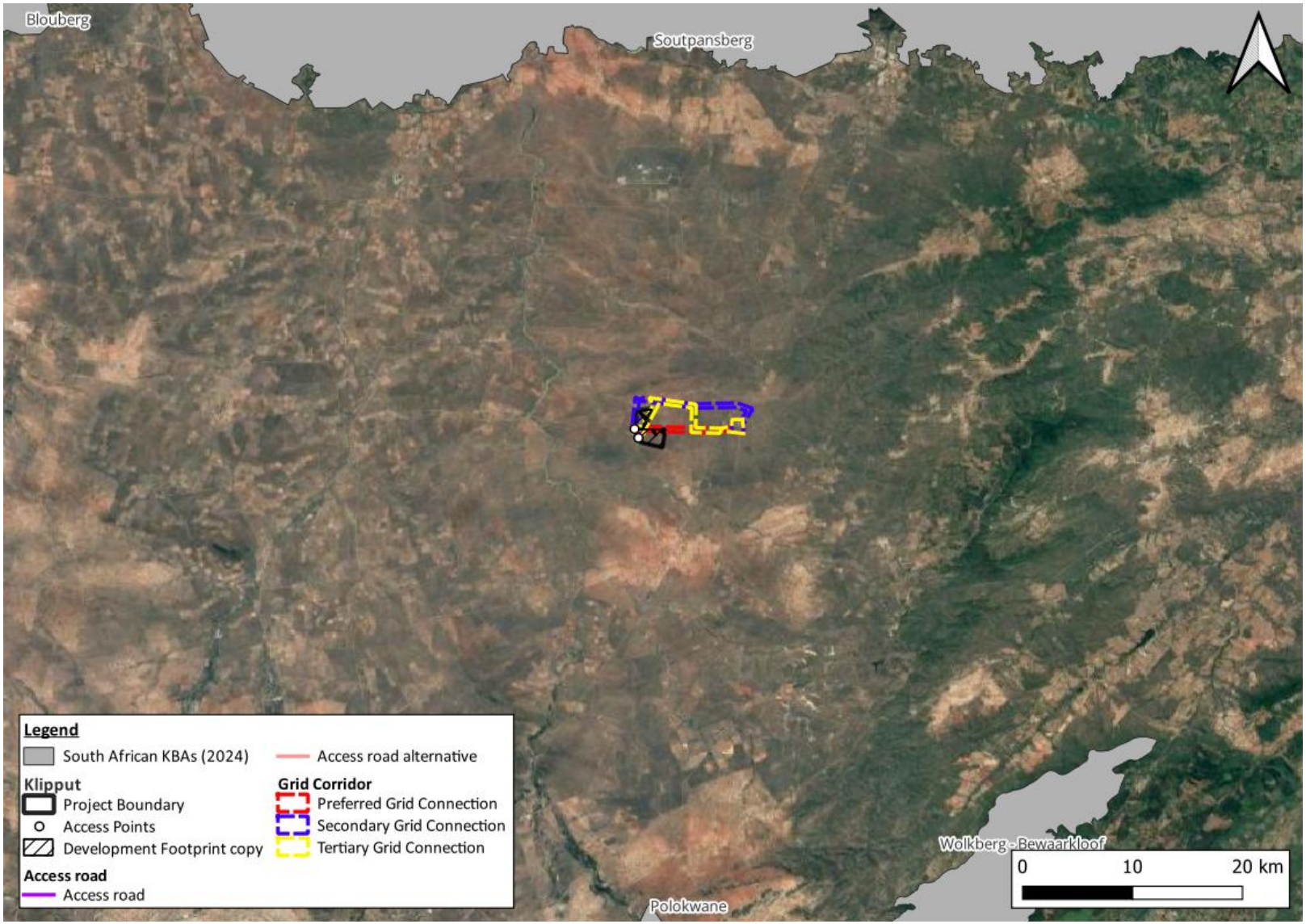

Figure 5.11: Map illustrating the project area in relation to Key Biodiversity Areas (KBAs).

6. SITE ECOLOGICAL IMPORTANCE

This chapter assessed the site ecological importance (SEI) for animal SCC, plant SCC and the ecosystems in which they occur.

The SEI analysis **does not** assess the sensitivity associated with the 2018 Limpopo Province Map of CBAs and ESAs (CBAs and ESAs) nor sensitivities associated with PA and PAES. Comment is provided on these respective plans under sections 5.2 and 5.3 above. It is important to note that the management objective related to these features can include other ecological features which are specific to the project area and require input from the respective specialists e.g. bird specialist, aquatic specialist etc. Where appropriate, this has been discussed in the relevant section above.

6.1. Site Ecological Importance - Fauna

Faunal habitat for all intact plant communities as well as secondary vegetation was determined to have medium sensitivity (Table 6.1 and Figure 6.1). Transformed areas have a very low sensitivity.

6.2. Site Ecological Importance - Flora

Makhado Sweet Bushveld is comprised of three distinct communities, namely Makhado *Sweet Bushveld: Euphorbia ingens* community, *Makhado Sweet Bushveld*: *Vachellia-Senegalia* community and Riparian, all of which have been mapped as medium sensitivity (Table 6.2 and Figure 6.3).

Secondary vegetation and Transformed areas were determined to have a very low sensitivity.

Table 6.1: Sensitivity assessment for faunal species within the project area.

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
Makhado Sweet Bushveld: *Euphorbia ingens* community & Makhado Sweet Bushveld: *Vachellia-Senegalia* community	High	Medium	Medium	Medium	**Medium**
	Highly likely occurrence of four VU species (Tsessebe - *Damaliscus lunatus,* Black-footed Cat – *Felis nigripes*, Leopard – *Panthera pardus* and Temminick's Pangolin – *Smutsia temminckii*) and three NT species (African Striped Weasel - *Poecilogale albinucha,* Brown Hyaena - *Parahyaena brunnea,* Southern African Hedgehog - *Atelerix frontalis)*	The project area is large relatively large. However, the vegetation has been fragmented by establishment of fence lines/gravel roads. Despite these negative ecological impacts, narrow corridors of good habitat connectivity and large areas of poor habitat connectivity between intact patches are present.		Receptor resilience is based on the specific project activities. In this instance the project footprint is relatively small compared to available habitat present within the PAOI and the construction phase will be relatively short meaning that the disturbance to these species will be in the short term with a small spatial extent. As such, species have a high likelihood of returning to the PAOI once the disturbance has ceased.	
Makhado Sweet Bushveld: Riparian	High	Medium	Medium	Medium	**Medium**
	Highly likely occurrence of three VU species (Tsessebe - *Damaliscus lunatus,* Black-footed Cat – *Felis nigripes*, Leopard – *Panthera pardus)* and two NT species (African Striped Weasel - *Poecilogale albinucha,* Brown Hyaena - *Parahyaena brunnea)*	The project area is large relatively large. However, the vegetation has been fragmented by establishment of fence lines/gravel roads. Despite these negative ecological impacts, narrow corridors of good habitat connectivity and large areas of poor habitat connectivity between intact patches are present.		Receptor resilience is based on the specific project activities. In this instance the project footprint is relatively small compared to available habitat present within the PAOI and the construction phase will be relatively short meaning that the disturbance to these species will be in the short term with a small spatial extent. As such, species have a high likelihood of returning to the PAOI once the disturbance has ceased.	
Rocky Outcrop	High	Medium	Medium	Medium	**Medium**

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
	Highly likely occurrence of one VU species (Leopard – *Panthera pardus)*	The project area is large relatively large. However, the vegetation has been fragmented by establishment of fence lines/gravel roads. Despite these negative ecological impacts, narrow corridors of good habitat connectivity and large areas of poor habitat connectivity between intact patches are present.		Receptor resilience is based on the specific project activities. In this instance the project footprint is relatively small compared to available habitat present within the PAOI and the construction phase will be relatively short meaning that the disturbance to these species will be in the short term with a small spatial extent. As such, species have a high likelihood of returning to the PAOI once the disturbance has ceased.	
Secondary Vegetation	Medium	Medium	Medium	Medium	**Medium**
	Habitat has some potential to support foraging for SCC listed for the Makhado Sweet Bushveld: *Euphorbia ingens* community & Makhado Sweet Bushveld: *Vachellia-Senegalia* community	The project area is large relatively large. However, the vegetation has been fragmented by establishment of fence lines/gravel roads. Despite these negative ecological impacts, narrow corridors of good habitat connectivity and large areas of poor habitat connectivity between intact patches are present.		Receptor resilience is based on the specific project activities. In this instance the project footprint is relatively small compared to available habitat present within the PAOI and the construction phase will be relatively short meaning that the disturbance to these species will be in the short term with a small spatial extent. As such, species have a high likelihood of returning to the PAOI once the disturbance has ceased.	
Transformed	Very Low	Low	Very Low	High	**Very Low**
	No confirmed or highly likely populations of SCC.	Major ecological impacts have occurred.		SCC are unlikely using these areas for breeding and foraging. If present, they are only likely to be transient in these areas.	

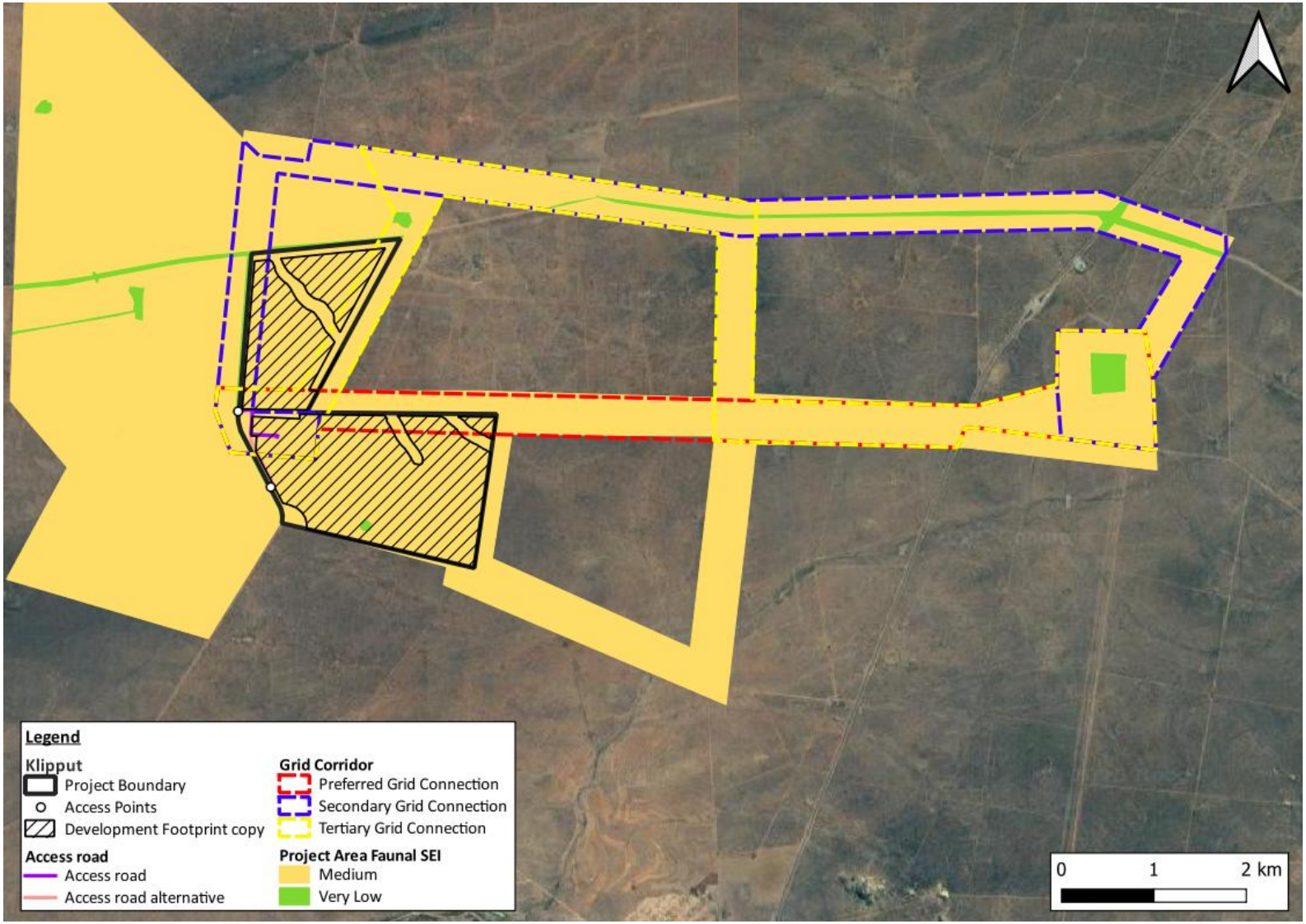

Figure 6.1: Sensitivity map for the Animal Species Theme.

Table 6.2: Sensitivity assessment for each vegetation type within the project area.

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
Makhado Sweet Bushveld: *Euphorbia ingens* community & Makhado Sweet Bushveld: *Vachellia-Senegalia* community	Low No confirmed or highly likely populations of SCC.	Very High Intact areas of more than 100ha with good habitat connectivity serving as functional ecological corridors	Medium	Medium Habitat will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the Receptor functionality. According to the Ecosystem Guidelines for the Savanna Biome (SANBI, 2021), recovery of the woody layer may take longer than 10 years, as pioneer species such as *Dichrostachys cinerea* and *Vachellia tortilis* establish on denuded sites and may exist as dense monospecific stands for a very long time, though this is a natural process under post-disturbance recovery.	**Medium**
Makhado Sweet Bushveld: Riparian	Low No confirmed or highly likely populations of SCC.	High Intact areas with good habitat connectivity serving as functional ecological corridors	Medium	Medium Habitat will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the Receptor functionality. According to the Ecosystem Guidelines for the Savanna Biome (SANBI, 2021), recovery of the	**Medium**

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI)
				woody layer may take longer than 10 years, as pioneer species such as *Dichrostachys cinerea* and *Vachellia tortilis* establish on denuded sites and may exist as dense monospecific stands for a very long time, though this is a natural process under post-disturbance recovery.	
Rocky Outcrop	Low	High	Medium	Medium	**Medium**
	No confirmed or highly likely populations of SCC.	Intact areas with good habitat connectivity serving as functional ecological corridors		Habitat will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the Receptor functionality.	
Secondary Vegetation	Low	Medium	Low	High	**Very Low**
	No confirmed or highly likely populations of SCC.	Semi-intact area of vegetation with good habitat connectivity with intact vegetation. Evidence of minor and major historical ecological impacts.		Habitat will recover relatively quickly (5-10 years) to its current state.	
Transformed	Very Low	Very low	Very Low	Very High	**Very Low**
	No confirmed or highly likely populations of SCC and no natural habitat remaining.	These areas have been cleared and transformed and provide limited ecological functions.		Habitat can recover rapidly (less than 5 years) to its current state.	

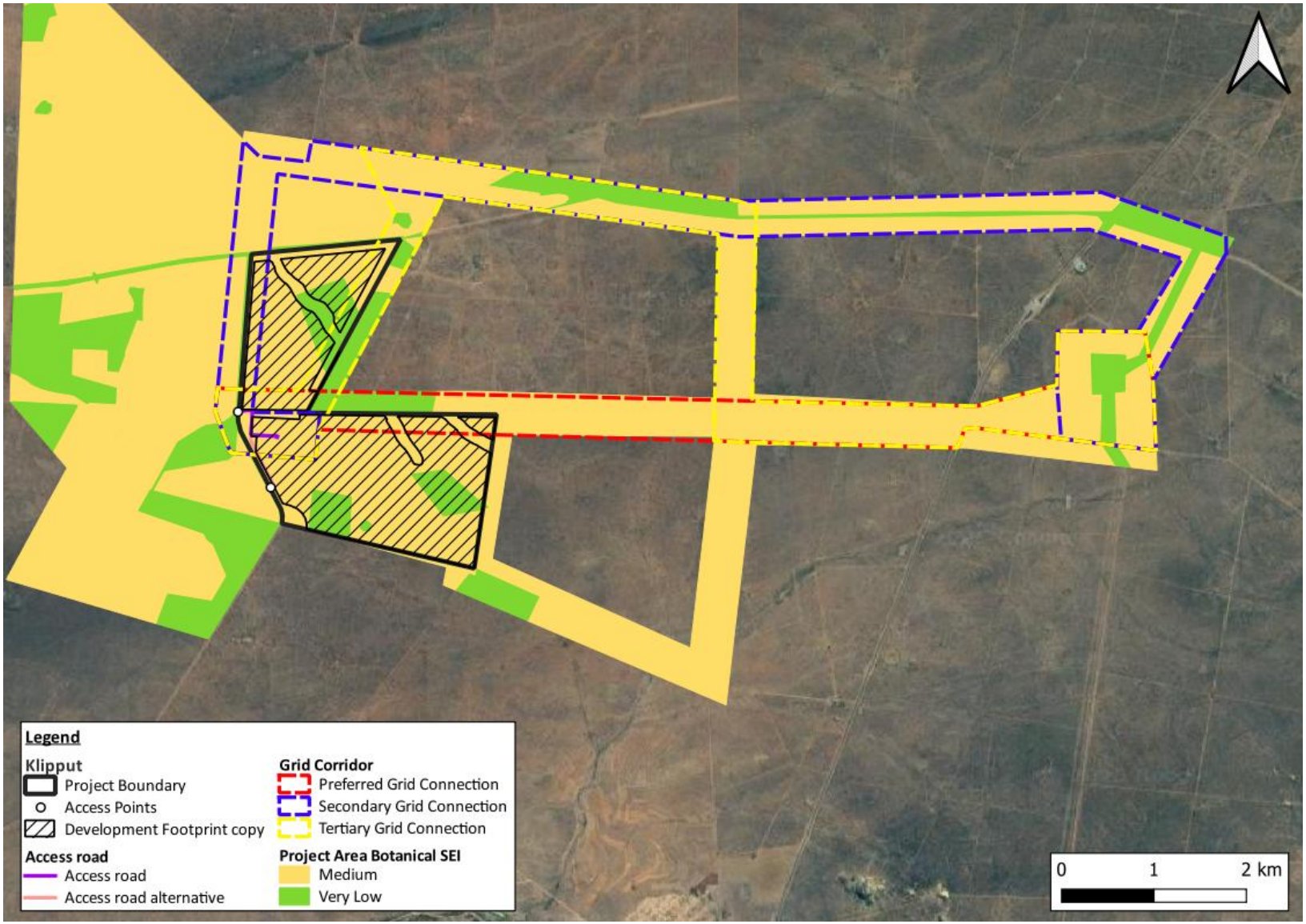

Figure 6.2: Fine scale Sensitivity Map of the vegetation types that occur within the project area.

6.3. Combined SEI

According to the Species Environmental Assessment Guideline (SANBI, 2020), the SEI evaluated for each taxon/receptor should be combined into a single multi-taxon/receptor evaluation of SEI for the project area to allow the component authority to evaluate the SEI for the entire project area rapidly and at a single glance. As such, the highest overall SEI rating has been applied to each habitat type assessed in terms of the faunal and botanical sensitivity. Table 6.3 combines the overall SEI for each habitat type based on the assessment in Table 6.1 and 6.2. The management guidelines for each SEI are summarised below.

Table 6.3: Combined overall SEI for each habitat type.

Habitat	BOTANICAL SEI	FAUNAL SEI	OVERALL COMBINED SEI
Makhado Sweet Bushveld: Euphorbia ingens community & Makhado Sweet Bushveld: Vachellia-Senegalia community	Medium	Medium	**Medium**
Makhado Sweet Bushveld: Riparian	Medium	Medium	**Medium**
Rocky Outcrop	Medium	Medium	**Medium**
Secondary Vegetation	MEDIUM	Very Low	**Medium**
Transformed	VERY LOW	Very Low	**VERY LOW**

The management guidelines for interpreting SEI in the context of the proposed development activities, outlined in the Species Environmental Assessment Guideline (SANBI, 2020), specify the following:

- For areas of **medium SEI,** development activities of medium impact are acceptable provided appropriate mitigation and management measures are implemented.
- For areas of **very low SEI**, development activities of medium to high impact are acceptable and mitigation and management measures may not be required although they are good practice.

7. IMPACT ASSESSMENT

Ten Impacts have been identified for the construction phase, two impacts have been identified for the operational phase, and three impacts have been identified for the decommissioning phase.

7.1. Construction Phase Impacts

- Loss of Makhado Sweet Bushveld and associated plant species
- Loss of Secondary Vegetation and associated plant species
- Loss of individuals of protected plant species
- Fragmentation of Vegetation and Disruption of Ecosystem Processes
- Introduction and Spread of Weeds and Alien Plant Species
- Loss and transformation of natural habitat within the Vhembe Biosphere Reserve
- Loss of Faunal Habitat
- Loss of Faunal SCC
- Disturbance to Faunal Species and their Livelihood due to Project Related Activities
- Mortality of Faunal Species due to Earthworks, Roadkill and Persecution

7.2. Operational Phase Impacts

- Spread of Weeds and Alien Plant Species.
- Disturbance and Mortality of Faunal Species During Operation.

7.3. Decommissioning Phase

Although it is unlikely that the SEF will be decommissioned in the near future, impacts associated with the decommissioning phase include:

- Loss of indigenous vegetation
- Infestation of Alien Plant Species
- Disturbance and Mortality of Faunal Species During Decommissioning

7.4. Cumulative Impacts

The proposed SEF forms part of a larger solar energy cluster, referred to as the 'Tabor Solar Cluster', comprising four SEFs that are being assessed concurrently. These facilities are located directly adjacent to one another and include the following projects:

- Klipput Solar PV (601 ha) – assessed in this report
- Draailoop Solar PV (857 ha)
- Bethel Solar PV (625 ha)
- Makoppa Solar PV (341 ha)

These SEFs, together with data from the South African renewable energy EIA application database, have been considered in the assessment of cumulative impacts. Cumulative impacts are defined by

the IFC as “those that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to as ‘developments’) when added to other existing, planned, and/or reasonably anticipated future ones.” A key challenge in assessing cumulative impacts is the need for accurate information on the extent and scale of habitat loss from other developments in the area. Despite these challenges, this report evaluates the cumulative impacts of renewable energy projects located within a 30 km radius of the project area (Figure 7.1). Given the relatively small extent of the proposed development, the cumulative impacts are generally comparable to the direct impacts. The cumulative impacts are assessed in the tables below.

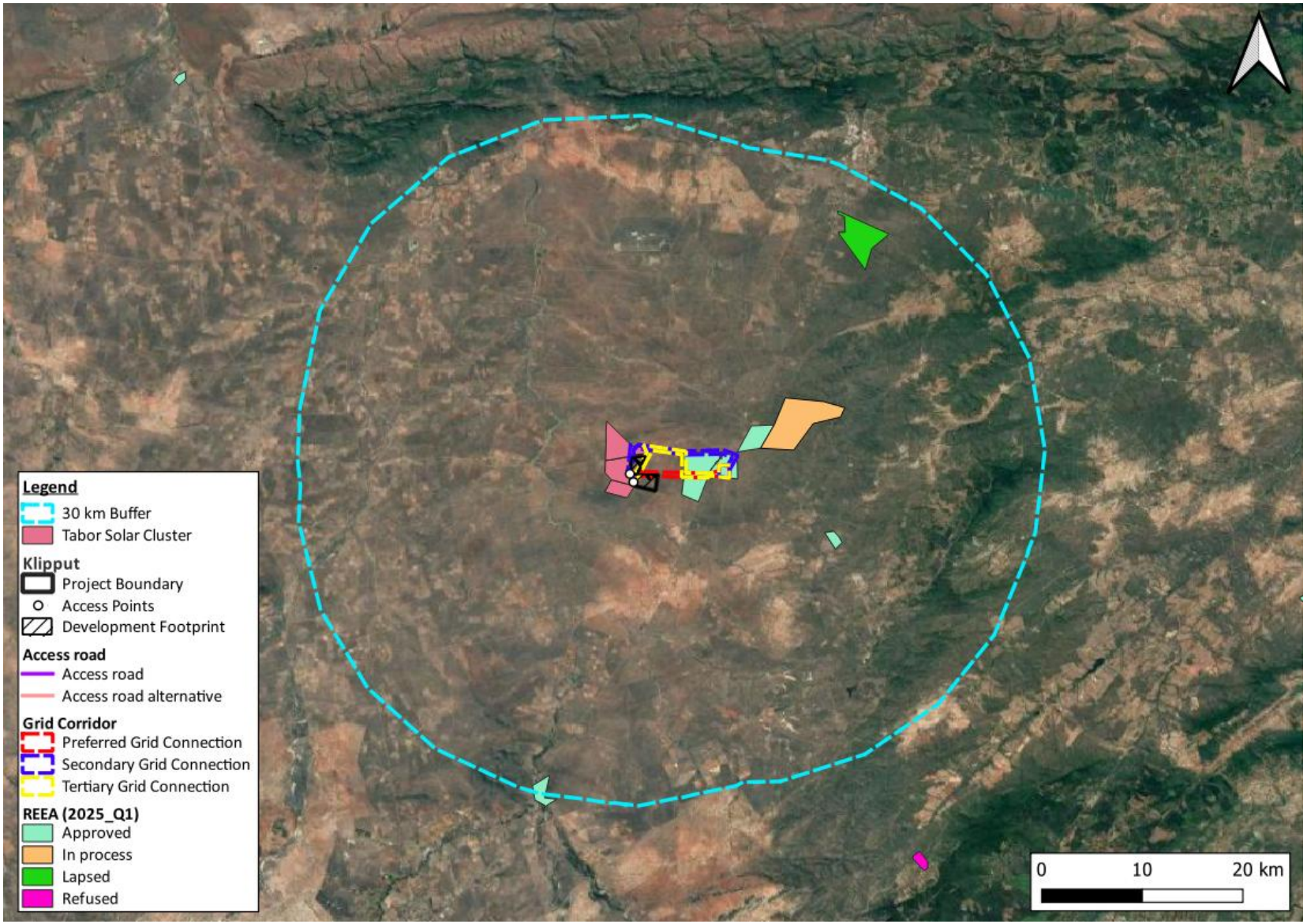

Figure 7.1: Map illustrating the Renewable Energy Projects within a 30 km radius of the proposed SEF.

Table 7.1: Impact assessment.

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
CONSTRUCTION PHASE													
BIODIVERSITY IMPACT ASSESSMENT													
Loss of Makhado Sweet Bushveld and associated plant species	**Direct impacts** The construction of the proposed SEF and associated infrastructure will result in the loss of approximately 498 ha of Makhado Sweet Bushveld, a vegetation type currently classified as Least Concern, with approximately 63% (~6,370 km² or 637,000 ha) of its historical extent remaining. This loss represents about 0.08% of the remaining extent of the vegetation type.	Preferred Alternative	Negative Direct	Study Area	Permanent	Definite	Limited	Moderate	**Moderate (-)**	Moderate	• Clearly demarcate the approved development footprint (including the SEF, access roads, laydown areas, and associated infrastructure) using visible markers such as danger tape or stakes. Construction activities must remain strictly within these boundaries, and no-go zones must be enforced for construction staff, vehicles, and equipment to protect surrounding sensitive or intact areas. • Strip and stockpile topsoil (to a depth of 20 cm, where feasible) from disturbed areas. Store this soil in a designated low-sensitivity area. The stockpile should be stabilised using shade cloth, hessian sheeting, a tarpaulin, or other suitable erosion-control material to prevent wind and water erosion. The stockpiled soil must be used for post-construction. • Rehabilitate all temporary construction areas (e.g., widened road verges) using locally indigenous species. Only indigenous species must be used in all rehabilitation efforts. • Laydown areas must be sited within the demarcated development footprint and may not encroach on surrounding natural vegetation. • Open fires must be strictly prohibited on-site during construction to prevent the risk of wildfires. • Develop and implement an Alien Invasive Plant Management Plan or Method Statement that includes regular site inspections, early detection, rapid response protocols, and manual or chemical control methods. Areas disturbed during construction must be monitored regularly and cleared of invasive species promptly. • Implement appropriate erosion control measures such as berms, fibre mats, or brush packing on disturbed soils to prevent erosion and facilitate vegetation recovery. • Establish a vegetation monitoring programme to assess recovery success of	Moderate	**Moderate (-)**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
											rehabilitation and restoration post construction and identify the need for further intervention. • Prohibit the collection or removal of plant material by any site personnel (other than the vegetation clearance required for the project footprint). Conduct regular spot checks to ensure compliance with this requirement. • Provide site-specific environmental training to all construction personnel, focusing on the ecological sensitivity of the bushveld and associated protection and mitigation measures. • Ensure strict enforcement and protection of the buffer zones around riparian areas as established by the aquatic specialist to maintain their function as ecological corridors.		
	Indirect impacts None (refer to "Fragmentation of Vegetation and Disruption of Ecosystem Processes" below).	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumulative impacts The construction of the proposed SEF and associated infrastructure will contribute to the cumulative loss of Makhado Sweet Bushveld. The transformation of this area contributes to the ongoing habitat loss and fragmentation in the region, reducing available habitat for associated plant species.	Preferred Alternative	Cumulative	Regional (Projects within 30km radius)	Permanent	Definite	Limited	Moderate	**Moderate (-)**	Moderate	• Refer to mitigation measure listed for the impact "Loss of Makhado Sweet Bushveld and associated plant species" above.	Moderate	**Moderate (-)**
	No-go alternative Under the No-Go alternative, the Makhado Sweet Bushveld vegetation within the project area would remain intact, and no further loss or transformation of this vegetation type would occur. The site would continue to be used as a game farm, maintaining the existing natural habitat and allowing associated plant species and ecological processes to persist without disturbance from large-scale development. This would contribute to the retention of the remaining extent of Makhado Sweet	No-Go	No-Go	Study area	Long-term	Definite	None	Negligible	**Negligible**	NA	No mitigation measures can be implemented under the No-Go scenario as the impacts resulting from ongoing activities are unrelated to the proposed project and fall outside the scope of the Environmental Authorisation process.	NA	**NA**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	Bushveld, supporting its conservation in the region.												
Loss of Secondary Vegetation and associated plant species	**Direct impacts** The construction of the proposed SEF and associated infrastructure will result in the permanent loss of secondary vegetation within the development footprint. Although this habitat is already degraded due to historical agricultural use, it still provides ecosystem functions such as soil stability, carbon storage, and habitat for generalist plant species. The plant community is dominated by pioneer and disturbance-tolerant species, with limited floral diversity and no Species of Conservation Concern (SCC) recorded. As such, the overall ecological value of the vegetation is considered low, and the significance of the impact is considered low before and after mitigation.	Preferred Alternative	Negative Direct	Study Area	Permanent	Definite	Limited	Slight	**Low (-)**	Moderate	• Refer to mitigation measure listed for the impact "Loss of Makhado Sweet Bushveld and associated plant species" above.	None	**Low (-)**
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumulative impacts The cumulative impact associated with the loss of secondary vegetation is considered low, given the already degraded condition of this vegetation type due to historical agricultural activities. While the proposed development will result in the permanent transformation of additional secondary vegetation, the affected area has low ecological value, supports no Species of Conservation Concern, and is dominated by disturbance-tolerant species. However, if other nearby developments—such as the adjacent SEF clusters—are constructed concurrently, the combined loss of remaining secondary vegetation in the local landscape may contribute incrementally to reduced ecosystem	Preferred Alternative	Cumulative	Projects 30km radius	Permanent	Definite	Limited	Slight	**Low (-)**	Moderate	• Refer to mitigation measure listed for the impact "Loss of Makhado Sweet Bushveld and associated plant species" above.	Low	**Low (-)**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	function, diminished habitat availability for generalist species, and increased susceptibility to erosion and invasive species. That said, the grass beneath the solar panel structures is likely to re-establish over time, particularly if soil disturbance is minimised and rehabilitation measures are implemented. As a result, the cumulative impact remains limited in scale and significance, with a low residual risk.												
	No-go alternative Under the No-Go alternative, the Secondary Vegetation within the project area would remain, and no further loss or transformation of this vegetation type would occur. The site would continue to be used as a game farm, maintaining the existing habitat and allowing associated plant species and ecological processes to persist without disturbance from large-scale development.	No-Go	No-Go	Study area	Long-term	Definite	None	Negligible	**Negligible**	NA	No mitigation measures can be implemented under the No-Go scenario as the impacts resulting from ongoing activities are unrelated to the proposed project and fall outside the scope of the Environmental Authorisation process.	NA	**NA**
Loss of individuals of protected plant species	**Direct impacts** The construction of the proposed SEF will result in the loss of individual protected plant species recorded within the project area, including species such as *Sclerocarya birrea* (Marula), *Boscia albitrunca* (Shepherd's Tree), *Boscia foetida* (Stink Shepherd's Tree), and *Balanites maughamii* (Greenthorn), which are protected under the National Forests Act (Act No. 84 of 1998) and the Limpopo Environmental Management Act (Act No. 7 of 2003). These species are all currently listed as Least Concern and are widespread in the region. The localised loss of individuals within the project footprint is unlikely to have a measurable effect on the overall population viability of these species or alter their conservation status.	Preferred Alternative	Negative Direct	Study Area	Permanent	Definite	Limited	Moderate	**Moderate (-)**	Moderate	• Obtain a Protected Species Removal Permit from the Department of Forestry, Fisheries and the Environment (DFFE) and Limpopo Department of Economic Development, Environment and Tourism (LEDET) prior to removing any protected trees. • Clearly demarcate and avoid individuals of protected species where possible. • Relocate viable individuals of smaller species (*Boscia foetida*, young *Sclerocarya birrea*, etc.) to nearby suitable habitat prior to clearing. • Incorporate some protected species into rehabilitation/landscaping where appropriate. • Educate construction staff on protected species and no-go areas. • Avoid individuals of *Adansonia digitata* (Baobab) around the Makoppa Lodge.	None	**Low (-)**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	Notably, *Adansonia digitata* (Baobab) individuals were only recorded outside of the project area and will not be affected by the proposed development.												
	Indirect impacts	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumulative impacts The proposed SEF will contribute to the cumulative loss of individual protected plant species within the broader region. While the affected species are currently classified as Least Concern and remain widespread, ongoing habitat transformation due to agriculture, urban development, and infrastructure projects in the region is steadily reducing the number of mature individuals in the landscape. The loss of additional individuals from this project, though small in scale, adds to this broader trend of vegetation clearing and may, over time, reduce the density and ecological function of these species in the local landscape if not managed. However, the overall contribution of the proposed SEF to this cumulative impact is expected to be low, given the limited extent of the project and the continued availability of suitable habitat elsewhere.	Preferred Alternative	Negative Cumulative	Study Area	Permanent	Definite	Limited	Moderate	**Moderate (-)**	Moderate	Refer to mitigation measures listed for the direct impact above.	None	**Low (-)**
	No-go alternative Under the No-Go alternative, the proposed SEF would not be developed, and no additional loss of protected plant species would occur as a result of the project. The site would likely continue to be used for game farming, where natural vegetation and existing protected plant species would remain intact. However, some ongoing habitat modification associated with game farming, such as browsing by game	No-Go	No-Go	Study area	Long-term	Definite	None	Negligible	**Negligible**	NA	No mitigation measures can be implemented under the No-Go scenario as the impacts resulting from ongoing activities are unrelated to the proposed project and fall outside the scope of the Environmental Authorisation process.	NA	**NA**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	species, selective clearing for roads or infrastructure, and controlled hunting activities, may still affect plant communities over time. Importantly, no further cumulative loss of these protected species from large-scale vegetation clearance would result from the project itself.												
Fragmentation of Vegetation and Disruption of Ecosystem Processes	**Direct impacts** The loss of vegetation for the construction of the proposed SEF will lead to habitat fragmentation, which can disrupt ecological connectivity and reduce the movement and genetic exchange of plant and animal species in the surrounding landscape. This fragmentation can also alter microclimatic conditions, increase edge effects (such as invasive species colonisation), and degrade adjacent habitats. Furthermore, the reduction in natural vegetation may impact ecosystem services such as soil stability, water regulation, and pollination networks beyond the direct area cleared. These indirect effects could reduce the overall resilience of the local bushveld ecosystem, making it more vulnerable to further disturbance.	Preferred Alternative	Negative Direct & Indirect	Study Area	Permanent	Probable	Limited	Slight	**Low (-)**	Moderate	• Refer to mitigation measure listed for the impact "Loss of Makhado Sweet Bushveld and associated plant species" above.	Low	**Low (-)**
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumulative impacts The loss of natural vegetation for the construction of the proposed SEF, when considered together with existing and future developments in the broader landscape, contributes to the progressive fragmentation of Makhado Sweet Bushveld and associated ecosystems. This cumulative habitat transformation reduces ecological connectivity, disrupts the movement and genetic exchange of plant and animal species, and increases the vulnerability of remaining natural areas to edge effects such as	Preferred Alternative	Negative Cumulative	Regional (Projects within 30km radius)	Permanent	Definite	Limited	Moderate	**Moderate (-)**	Moderate	• Refer to mitigation measure listed for the impact "Loss of Makhado Sweet Bushveld and associated plant species" above.	Low	**Low (-)**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	invasive species encroachment, altered microclimates, and human disturbance. Over time, these cumulative impacts degrade ecosystem processes such as soil stabilisation, water regulation, and pollination, reducing the resilience and ecological functioning of the bushveld vegetation within the region. While the project's contribution to cumulative loss is small in isolation, it adds to the broader pattern of habitat transformation and fragmentation occurring in the area.												
	No-go alternative Under the No-Go alternative, the proposed solar energy facility would not be developed, and no additional habitat loss or fragmentation would occur within the project area. The existing fragmentation from farm roads, game fencing, and historical land uses would persist, but the broader ecological connectivity and functioning of the Makhado Sweet Bushveld would largely remain intact. The site would continue to provide habitat and contribute to landscape-scale connectivity, supporting species movement and ecological processes such as pollination, seed dispersal, and water regulation. While cumulative pressures from other developments in the region may continue, the project area itself would not add further to the fragmentation of natural vegetation.	No-Go	No-Go	Study area	Long-term	Definite	Limited	Slight	**Low (-)**	NA	No mitigation measures can be implemented under the No-Go scenario as the impacts resulting from ongoing activities are unrelated to the proposed project and fall outside the scope of the Environmental Authorisation process.	NA	**NA**
Introduction and Spread of Weeds and Alien Plant Species	**Direct impacts** Fifteen exotic plant species were recorded within the project area, six of which are listed under the NEM:BA (Act No. 10 0f 2004) and five of which are listed under the Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983). Construction activities—particularly ground disturbance, soil	Preferred Alternative	Negative Direct	Study Area	Long term	Probable	Moderate	Moderate	**Moderate (-)**	Moderate	• Confine all construction and associated activities strictly to the approved development footprint to prevent unnecessary loss of additional vegetation. • Stabilise and revegetate disturbed areas not required for permanent infrastructure using fast-growing, locally indigenous plant species. • The site must be checked regularly for the presence of alien invasive species and	None	**Low (-)**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	movement, and the movement of vehicles and equipment—pose a risk of facilitating the introduction and spread of alien invasive species beyond the immediate development footprint. If not properly managed, these activities could accelerate the invasion of non-native plants, leading to the displacement of indigenous flora, a reduction in native biodiversity, and further degradation of local ecosystem health and function.										weeds. When alien invasive species are found, immediate action must be taken to remove them. • Alien Invasive Plant Species and Weeds must be disposed on in line with the recommendations outlined in the Working for Water Programme. • Any equipment brought onto site must be clean to ensure no transfer or introduction of seeds. • No exotic species are permitted to be planted on site. Only indigenous plant species can be used for rehabilitation/landscaping. • The ECO must create a list with accompanying photographs of possible alien invasive species that could occur on site prior to construction. This photo guide must be used to determine if any alien invasive species are present. • An alien invasive method statement must be incorporated into the EMPr. • Focus rehabilitation efforts on restoring general vegetation structure and cover using hardy, locally appropriate secondary grassland species, rather than restoring exact pre-clearance diversity. • Develop and implement an Alien Invasive Plant Management Plan or Method Statement that includes regular site inspections, early detection, rapid response protocols, and manual or chemical control methods. Disturbed areas must be monitored regularly and cleared of invasive species promptly.		
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumulative impacts The proposed SEF development, combined with other projects and land disturbances within the 30 km radius, could contribute incrementally to the local spread of invasive species if not effectively managed. This spread can further displace indigenous vegetation, reduce habitat quality, and disrupt ecosystem processes over time. However, with proper	Preferred Alternative	Cumulative	Projects 30km radius	Long-term	Probable	Moderate	Moderate	**Moderate (-)**	Moderate	• Refer to mitigation measures listed for the impact “Introduction and Spread of Weeds and Alien Plant Species” above.	None	**Low (-)**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	implementation of alien invasive species management plans—such as regular monitoring, early detection, rapid response, and control measures—the cumulative risk of significant ecological degradation from invasive species can be minimised.												
	No-go alternative Under the No-Go alternative, no new construction activities would occur, thereby eliminating the risk of spreading alien invasive species due to development-related disturbance. However, given the existing presence of invasive species within the broader landscape the risk of invasive species spread and establishment would persist. Without active management and control measures, invasive plants may continue to expand, potentially further displacing indigenous vegetation and degrading ecosystem health over time. Thus, while the No-Go alternative avoids development-related impacts, it does not address the ongoing challenges posed by invasive species in the area.	No-Go	No-Go	Study area	Long-term	Definite	Moderate	Moderate	**Moderate (-)**	NA	No mitigation measures can be implemented under the No-Go scenario as the impacts resulting from ongoing activities are unrelated to the proposed project and fall outside the scope of the Environmental Authorisation process.	NA	**NA**
Loss and transformation of natural habitat within the Vhembe Biosphere Reserve	**Direct impacts** The proposed project will result in the transformation of approximately 625 ha of natural habitat along the edge of the Vhembe Biosphere Reserve, representing a small fraction (~0.02%) of the reserve's total area. However, despite its relatively small size, the project footprint contributes to habitat loss and fragmentation along the edge of the biosphere reserve, an area intended to support compatible land uses while safeguarding the ecological integrity and connectivity of the broader landscape.	Preferred Alternative	Negative Direct	Study Area	Permanent	Definite	Limited	Moderate	**Moderate (-)**	Moderate	• Refer to mitigation measure listed for the impact "Loss of Makhado Sweet Bushveld and associated plant species" above. • Engage with the Vhembe Biosphere Reserve Management during the EIA process.	Moderate	**Moderate (-)**
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	Cumulative impacts The construction of the proposed SEF will result in the direct transformation of approximately 625 hectares of natural habitat within the transition zone of the Vhembe Biosphere Reserve. While this represents a small fraction (~0.02%) of the total reserve area, it contributes incrementally to the broader cumulative loss of natural vegetation within the reserve. This additive loss, combined with other existing and planned developments such as agriculture, infrastructure, and settlement expansion, reduces the overall extent and connectivity of natural habitats. The cumulative effect of these losses may lead to increased habitat fragmentation, disruption of ecosystem processes, and reduced resilience of the biosphere reserve's ecological networks. Therefore, the SEF's footprint, although relatively small, forms part of an ongoing pattern of natural habitat transformation that could compromise the long-term conservation and sustainable use objectives of the reserve if not managed appropriately.	Preferred Alternative	Cumulative	Regional (Projects within 30km radius)	Permanent	Definite	Limited	Moderate	**Moderate (-)**	Moderate	• Refer to mitigation measure listed for the impact "Loss of Makhado Sweet Bushveld and associated plant species" above. • Engage with the Vhembe Biosphere Reserve Management during the EIA process.	Moderate	**Moderate (-)**
	No-go alternative Under the No-Go alternative, the proposed solar energy facility would not be developed, so no additional direct loss or transformation of natural habitat would occur within the project area. However, existing landscape modifications—such as roads, fences, agricultural activities, and other developments—would persist and continue to contribute to habitat fragmentation and cumulative ecological impacts. Farming and infrastructure expansion in the region are likely to continue under current land use patterns, maintaining a baseline level of habitat loss and ecosystem	No-Go	No-Go	Study area	Long-term	Definite	Limited	Slight	**Low (-) to negligible**	NA	No mitigation measures can be implemented under the No-Go scenario as the impacts resulting from ongoing activities are unrelated to the proposed project and fall outside the scope of the Environmental Authorisation process.	NA	**NA**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	disruption. While the project site itself would remain undeveloped, broader cumulative pressures on the reserve's natural habitats would still challenge the ecological integrity and connectivity of the landscape. The No-Go alternative avoids adding to these pressures but does not reverse or reduce existing impacts..												
Loss of Faunal Habitat	**Direct impacts** The clearing of vegetation for the project infrastructure will result in the loss of faunal habitat. Vegetation will be removed, earthworks and heavy machinery will impact microhabitats such as burrows, fallen trees and rocks that will be removed or relocated. The faunal species that may utilise the habitat within the project footprint will no longer have access to these habitats for the life of the project and are considered negatively impacted by the project. However, ample suitable faunal habitat is present within the broader project area for these species.	Preferred Alternative	Negative Direct	Study Area	Permanent	Definite	Moderate	Slight	**Low (-)**	Moderate	• All construction and construction related activities (including parking of vehicles and machinery) must remain within the approved project footprint. • Rehabilitation efforts of temporary construction areas must also provide habitat for faunal species by placing log stacks and rock piles to provide shelter for small mammals and reptiles. • Refer to mitigation measure listed for the impact "Loss of Makhado Sweet Bushveld and associated plant species" above.	Low	**Low (-)**
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumulative impacts The construction of the proposed SEF and associated infrastructure will contribute to the cumulative loss of faunal habitat within the region; however, the impact is considered low given the small scale of habitat loss and the extent of remaining habitat surrounding the proposed project area.	Preferred Alternative	Cumulative	Regional (Projects within 30km radius)	Permanent	Definite	Moderate	Slight	**Low (-)**	Moderate	Same as above	Low	**Low (-)**
	No-go alternative Under the No-Go alternative, no vegetation clearing or construction activities would occur, so existing faunal habitats within the project area would remain intact. Faunal species would continue to have uninterrupted access to their	No-Go	No-Go	Study area	Long-term	Definite	Moderate	Slight	**Low (-) to negligible**	NA	NA	NA	**NA**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	current habitats, including microhabitats such as burrows, fallen trees, and rocky refuges. However, ongoing land uses such as farming, existing roads, and infrastructure outside the project footprint would continue to influence habitat quality and availability in the broader landscape.												
Loss of Faunal SCC	**Direct impacts** The construction of the proposed Solar Energy Facility and associated infrastructure will lead to the loss and disturbance of habitats important to several faunal Species of Conservation Concern (SCC) known or highly likely to occur within the project area, including the African Striped Weasel, Black-footed Cat, Brown Hyena, Leopard, Southern African Hedgehog, Temminick's Pangolin, and Tsessebe. Vegetation clearing, earthworks, and heavy machinery use will directly destroy or alter critical microhabitats such as burrows, dens, foraging grounds, and movement corridors that these species rely on for shelter, hunting, and breeding. This habitat loss may cause displacement, forcing individuals of these species to move away from the immediate area in search of suitable habitat, which could increase competition and stress in adjacent areas. While this local disturbance may impact individuals and populations during construction and operation, suitable habitat remains available in the broader landscape surrounding the project footprint, so regional populations are expected to persist, provided that appropriate	Preferred Alternative	Negative	Regional	Medium Term	Likely	Moderate	Moderate	**Moderate (-)**	Moderate	• A clause must be included in contracts for ALL construction personnel (i.e. including contractors) working on the project stating that: "no wild animals will be hunted, killed, poisoned or captured. No wild animals will be imported into, exported from or transported in or through the province. No wild animals will be sold, bought, donated and no person associated with the development will be in possession of any live wild animal, carcass or anything manufactured from the carcass." A clause relating to fines, possible dismissal and legal prosecution must be included should any of the above transgressions occur for SCC. • Should any fauna SCC be encountered during construction and operation, these must be recorded (i.e. be photographed, GPS co-ordinates taken) and placed on iNaturalist, where possible. • The ECO must create a list with accompanying photographs of possible faunal SCC that could occur in the project area prior to construction. This photo guide must be used to determine if faunal SCC are encountered. • Provide environmental awareness training for construction personnel on the identification and importance of SCC, including Pangolins and Black-footed Cats. • Train staff in protocols for reporting wildlife encounters and handling any injured or trapped animals promptly and humanely. • If the development requires electric fencing, ensure that it is wildlife-friendly electric fencing that is designed to minimise injury or mortality to nocturnal and burrowing species such as pangolins and	Low	**Low (-)**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	mitigation measures to minimise disturbance and maintain ecological connectivity are implemented.										black-footed cats. Specific specification include: ○ Ensure the lowest live wire is no less than 30–40 cm above the ground. ○ If additional wires below 40 cm are needed for security, use plain (non-electrified) wire or coated fencing wire at ground level to prevent electrocution. ○ Ensure regular fence check to locate and free any fauna that are stuck (e.g., tortoises, pythons, etc.). ○ Install smart energizers that regulate the electrical current in the fence, limiting the duration and frequency of the current flow through specific strands, to reduce the risk of faunal electrocution. ○ Consider attaching small reflective markers or tags at pangolin head height (~30 cm) to increase visibility, reducing the chance of accidental contact at night. ○ Provide wildlife gaps or crawl-unders in strategic locations such as riparian buffer zones/ecological corridors to allow safe wildlife movement where possible, particularly in non-sensitive operational zones. • Conduct pre-construction surveys and burrow checks by qualified reputable ecologists to identify active dens, burrows, and resting sites used by Pangolins, Black-footed Cats, and other SCC. Where active burrows or dens are found within the construction footprint, ○ delay clearing, ○ Implement exclusion zones (no-go areas) around confirmed dens during construction to avoid disturbance and ○ If not breeding, and where feasible, relocate these structures and/or individuals, under expert guidance, to nearby suitable habitat. ○ If young are present and relocation is unfeasible adhere to exclusion zone until young move away from den/burrow.		

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
											• Schedule ground disturbance activities outside sensitive periods such as breeding or rearing seasons for these species to reduce impacts on reproduction and juvenile survival. • Establish a monitoring programme throughout construction and early operation phases to detect any wildlife injuries or mortalities linked to fencing or machinery, snares (poaching) or roadkill. • Adapt mitigation measures as necessary based on monitoring results to reduce risks to these species. • Rehabilitate disturbed areas post-construction with native vegetation to restore foraging and shelter habitat for these species and support their long-term persistence near the site. • Ensure strict enforcement and protection of the buffer zones around riparian areas as established by the aquatic specialist to maintain their function as ecological corridors. • Liaise with the landowner to ensure all game species currently stocked within the project footprint are translocated outside of the development footprint prior to construction.		
Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cumulative impacts The construction of the proposed SEF will contribute to the cumulative loss and fragmentation of habitat for faunal Species of Conservation Concern (SCC) such as Temminck's Ground Pangolin, Black-footed Cat, and others. While the project footprint is relatively small, it adds to existing pressures from agriculture, roads, and infrastructure that are steadily reducing suitable habitat and movement corridors in the region. This cumulative habitat loss may lead to the displacement of species, disrupt breeding and foraging	Preferred Alternative	Cumulative	Regional (Projects within 30km radius)	Permanent	Definite	Moderate	Moderate	**Moderate (-)**	Moderate	Refer to the mitigation measures listed for the direct impact above.	Low	**Low (-)**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	activities, and increase vulnerability to threats such as poaching and human-wildlife conflict. If unmanaged, these combined pressures could lead to local population declines over time, although suitable habitat remains available in the wider landscape to support regional persistence.												
	No-go alternative Under the No-Go scenario, the proposed development would not proceed, and the status quo would be maintained. If SCC occur in the area, they are likely to continue to do so.	No-Go	No-Go	Study area	Long-term	Definite	Moderate	Slight	**Low (-) to negligible**	NA	NA	NA	**NA**
Disturbance to Faunal Species and their Livelihood due to Project Related Activities	**Direct impacts** Construction activities (earthworks, blasting, night lighting) create noise, dust and vibrations that fauna experience for the duration of the construction phase. It is unlikely that animals in the area are habituated to these activities and their livelihood activities are likely to be disturbed to some extent. The construction activities may cause individuals to move away from the immediate area into surrounding areas, increasing competition for food and shelter in those areas, and may even disrupt their current breeding cycle causing them to skip a season.	Preferred Alternative	Negative	Regional	Medium Term	Likely	Limited	Slight	**Low (-)**	Low	• In addition to the mitigation measures listed for the Loss of Faunal SCC, the following mitigation measures must be implemented: • Where possible, limit construction to daylight hours to reduce nocturnal faunal disturbance. • The ECO should appoint a member of staff to walk ahead of construction machinery directly prior to vegetation clearance. Should any faunal species be identified during the walk through, these should be allowed to move out of harm's way prior to vegetation clearance. • Dust suppression measures must be implemented in the dry and/or windy months. • All machinery, vehicles and earth moving equipment must be maintained and the noise these create must meet industry minimum standards. e.g. the sound generated by a machine must be below a certain decibel as prescribed in the relevant noise control regulations. • A Storm Water Management Plan must be drafted and implemented to prevent runoff entering aquatic systems and causing siltation and pollution of this faunal habitat. Hard surfaces should be avoided. • No construction night lighting must be allowed. If required, minimise lighting in open space areas within development and any external lights must be down lights		

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
											placed as low to the ground as possible and installation of low UV emitting lights, such as most LEDs. Alights should also be on a sensor to minimise disturbance • Development must be designed to allow unencumbered movement, especially of small faunal species. Such as: • Internal and external fences/walls (if any) must allow for the movement of fauna through the development. These must have ground level gaps of 10cm x 10cm at 10m intervals. These gaps must be kept free of obstructions, including plant growth and debris. • All guttering and kerbstones must be sloped i.e. must be less than 45° on either side or kerbstones should be slanted or lowered (less than 10cm) at 10m intervals to allow for easy movement of toads • Steep sided drains, gutters, canals and open pits/trenches must be covered with mesh (5mm x 5mm) to prevent fauna falling in and getting stuck alternatively long trenches (e.g. cabling) must have exit ramps (< 45° slope) at 10m intervals. • No unnecessary structures that would act as pitfall traps for animals must be constructed • If there are retaining walls, steps should be formed to allow for small animals to move over them. These must be vegetated with plant species that offer cover.		
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumulative impacts The proposed SEF will contribute to the cumulative disturbance of faunal species; however, the impact is considered low given the isolated and short timeframe of the project construction phase.	Preferred Alternative	Cumulative	Regional (Projects within 30km radius)	Permanent	Definite	Limited	Slight	**Low (-)**	Moderate	• Refer to mitigation measures list for the impact "loss of faunal SCC" and "Disturbance to Faunal Species and their Livelihood due to Project Related Activities.	Low	**Low (-)**
	No-go alternative Under the No-Go scenario, the proposed development would not proceed, and the status quo would be maintained. The project area would likely continue to be used as a	No-Go	No-Go	Study area	Long-term	Definite	Limited	Slight	**Low (+)**	NA	NA	NA	**NA**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	game farm, allowing faunal species currently occupying the site to persist without additional habitat loss or disturbance.												
Mortality of Faunal Species due to Earthworks, Roadkill and Persecution	**Direct impacts** The removal of faunal habitat and the use of land-levelling machinery may result in the accidental mortality of species sheltering within the vegetation and microhabitats, including reptiles, amphibians, and small mammals that inhabit rocky crevices. Construction vehicles also pose a risk of collisions with wildlife. Additionally, species perceived as dangerous, such as snakes, are often subject to persecution by personnel on site.	Preferred Alternative	Negative	Regional	Permanent	Probable	Limited	Moderate	**Moderate (-)**	Low	• Speed restrictions must be implemented on all vehicles within the development footprint (30km/h is recommended) to reduced faunal mortalities on the project roads. • Any faunal SCC that may die as a result of construction the ECO must keep a record (i.e. be photographed, GPS co-ordinates taken) and if the carcass is somewhat intact preserved (placed in a plastic bag and frozen) and donated to the nearest university, museum or SANBI. • A trained snake handler must be on call during construction to remove any snakes within construction areas. • A clause relating to fines, possible dismissal and legal prosecution must be included in all contracts for ALL personnel (i.e. including contractors) working on the project should any speeding or persecution of animals occur. • On-site induction must include an awareness section on the safety of animals and personnel aimed at preventing persecution and injury.	Low	**Low (-)**
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumulative impacts The construction of the SEF could contribute to the cumulative increase in faunal mortalities caused by habitat clearing, vehicle collisions, and human-wildlife conflict. Although the project's contribution is small, when combined with other developments in the region, it adds to the ongoing decline of local faunal populations, particularly for small, slow-moving, or persecuted species like reptiles and amphibian	Preferred Alternative	Cumulative	Regional (Projects within 30km radius)	Permanent	Probable	Moderate	Moderate	**Moderate (-)**	Low	• Refer to mitigation measures listed above.	Low	**Low (-)**
	No-go alternative Under the No-Go alternative, construction-related faunal mortalities would not occur, as the	No-Go	No-Go	Study area	Long-term	Definite	Limited	Slight	**Low to negligible (-)**	NA	NA	NA	**NA**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	area would continue to be used for game farming. However, faunal mortalities associated with controlled hunting activities would continue as part of the existing land use, although these are likely to be regulated and managed according to applicable permits and farm management practices.												
OPERATIONAL PHASE													
Spread of Weeds and Alien Plant Species.	**Direct impacts** If invasive species are not adequately controlled during the construction phase, there is a risk that these plants could establish and spread during the operation phase of the SEF. Ground disturbance and soil movement from construction activities, combined with ongoing maintenance and site access during operation, may facilitate the further proliferation of alien invasive species beyond the immediate footprint. This could result in the displacement of indigenous flora, reduced native biodiversity, and a decline in overall ecosystem health and function if appropriate management measures are not implemented and maintained throughout the operational lifespan of the facility.	Preferred Alternative	Negative Direct	Study Area	Long term	Probable	Moderate	Moderate	**Moderate (-)**	Moderate	• Stabilise and revegetate disturbed areas not required for permanent infrastructure using fast-growing, locally indigenous species. • The site must be checked regularly for the presence of alien invasive species and weeds. When alien invasive species are found, immediate action must be taken to remove them. • Alien Invasive Plant Species and Weeds must be disposed on in line with the recommendations outlined in the Working for Water Programme. • Any equipment brought onto site must be clean to ensure no transfer or introduction of seeds. • No exotic species are permitted to be planted on site. Only indigenous plant species can be used for rehabilitation/landscaping. • The ECO must create a list with accompanying photographs of possible alien invasive species that could occur on site prior to construction. This photo guide must be used to determine if any alien invasive species are present. • Develop and implement an Alien Invasive Plant Management Plan or Method Statement that includes regular site inspections, early detection, rapid response protocols, and manual or chemical control methods.	None	**Low (-)**
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	Cumulative impacts The cumulative impact of alien invasive species spread during the operation phase is considered moderate if not properly managed. Given the existing presence of invasive species across the broader landscape, the operation of the SEF could contribute incrementally to the further establishment and spread of invasive plants in the region. This spread can exacerbate the displacement of indigenous vegetation, reduce habitat quality, and disrupt ecological processes across multiple sites. However, with consistent implementation of invasive species management protocols—including monitoring, early detection, and rapid response—the cumulative ecological risk can be substantially reduced, limiting long-term degradation of biodiversity and ecosystem function in the area.	Preferred Alternative	Cumulative	Projects 30km radius	Long-term	Probable	Moderate	Moderate	**Moderate (-)**	Moderate	Same as above	Low	**Low (-)**
	No-go alternative Under the No-Go alternative, no new development or operational activities would occur, eliminating the risk of additional spread of alien invasive species related to the proposed project. However, given the existing presence of invasive species in the broader landscape and ongoing land uses such as agriculture and infrastructure development, the spread and establishment of invasive plants would likely continue regardless. Without proactive management, invasive species may further displace indigenous vegetation and degrade ecosystem health over time. Therefore, while the No-Go alternative avoids development-related impacts, it does not address the ongoing challenge of invasive species proliferation in the area.	No-Go	No-Go	Study area	Long-term	Definite	Moderate	Moderate	**Moderate (-)**	NA	N/A	NA	**NA**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
Disturbance and Mortality of Faunal Species During Operation	**Direct impacts** During the operational phase, faunal disturbance and mortality are expected to be low but may occur intermittently from maintenance activities, vehicle movements, and security presence. Occasional vehicle collisions may affect small, slow-moving species, while artificial lighting and fencing could disrupt behaviour and movement patterns. Although the operational footprint is largely static and transformed, measures should be taken to minimise these impacts and maintain habitat connectivity.	Preferred Alternative	Negative	Regional	Medium Term	Likely	Limited	Slight	**Low (-)**	Low	• Speed restrictions must be implemented on all vehicles within the project area (30km/h is recommended) to reduced faunal mortalities on the project roads. • Design and maintain perimeter fencing to allow safe passage of small and medium-sized wildlife (e.g., include wildlife gaps or crawl-unders), minimizing entrapment and movement barrier (refer to fence specifications listed above for construction phase impacts). • Use wildlife-sensitive lighting such as downward-facing, low-intensity, and motion-activated lights to reduce disturbance to nocturnal fauna. • Conduct periodic inspections to identify and release any trapped animals and repair fence damage to prevent mortality or injury. • Provide ongoing training for operational staff on wildlife protection, including how to report and respond to wildlife sightings or incidents. • Maintain ecological corridors such as the buffers around riparian areas that have been delineated by the aquatic specialist. • Keep the contact details of a qualified snake handler readily available at the operations and maintenance building for prompt removal of any snakes found within buildings or infrastructure.	Low	**Low (-)**
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumulative impacts The operation of the proposed SEF will contribute to the cumulative disturbance and mortality of faunal species within the region. However, considering that operational solar energy facilities are generally quiet, low-disturbance sites with minimal noise, dust, and human activity beyond occasional maintenance, the contribution of the SEF to these cumulative impacts is expected to be low to negligible**.**	Preferred Alternative	Cumulative	Regional (Projects within 30km radius)	Permanent	Definite	Limited	Slight	**Low (-) to negligible**	Moderate	Refer to mitigation measures listed for the direct impact above.	Low	**Low (-) to negligible**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	No-go alternative Under the No-Go alternative, the proposed SEF would not be constructed or operated, and no new operational-phase disturbance or faunal mortality would occur as a result of the project. The area would continue to be used as a game farm, where existing activities such as controlled hunting, farming, and the presence of roads and fences would persist. These activities contribute to some level of ongoing faunal disturbance and mortality in the region, but no additional cumulative pressure from the SEF would be added.	No-Go	No-Go	Study area	Long-term	Definite	Limited	Slight	**Low (-) to negligible**	NA	NA	NA	**NA**
DECOMMISSIONING PHASE													
Loss of indigenous vegetation	**Direct impacts** Decommissioning activities, including the removal of infrastructure and site rehabilitation, have the potential to cause the loss of indigenous vegetation that has re-established following construction. Disturbance from heavy machinery, soil compaction, and clearance of vegetation during dismantling could damage recovering plant communities, reduce vegetation cover, and disrupt soil structure. If not carefully managed, these activities may set back ecological recovery progress achieved during the operational phase and reduce habitat availability for local flora and fauna. The extent of impact will largely depend on the decommissioning methods employed and the effectiveness of post-removal rehabilitation efforts.	Preferred Alternative	Negative Direct	Study Area	Long term	Definite	Limited	Slight	**Low (-)**	Moderate	• Appoint a suitably qualified specialist to compile a rehabilitation management plan for the site. • Plan decommissioning activities to avoid unnecessary disturbance to re-established vegetation, restricting heavy machinery movement to designated areas. • Clearly mark and fence off sensitive areas with recovering vegetation to prevent accidental damage during infrastructure removal. • Salvage and stockpile topsoil and seed banks from disturbed areas prior to decommissioning for use in rehabilitation. • Implement phased removal of infrastructure to minimize large-scale disturbance at any one time. • Use low-impact machinery and techniques wherever possible to reduce soil compaction and vegetation damage. • Rehabilitate disturbed areas immediately after infrastructure removal using locally indigenous plant species reflective of the pre-disturbance vegetation. • Monitor rehabilitated areas for at least two years post-decommissioning to assess vegetation recovery and address any erosion or invasive species issues. Ensure	None	**Low (+)**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
											funds are placed aside and earmarked for monitoring post decommissioning. • Develop and implement an invasive alien plant management plan or method statement throughout the decommissioning and rehabilitation phases to prevent colonization of disturbed soils. • Provide environmental training for all personnel involved in decommissioning on the importance of protecting recovering vegetation and adhering to rehabilitation protocols.		
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumulative impacts The cumulative impact of vegetation loss during the decommissioning phase is expected to be low to moderate, depending on the scale and timing of infrastructure removal across the region. While individual projects may cause localized disturbance to re-established indigenous vegetation, multiple simultaneous or sequential decommissioning activities within the broader landscape could collectively reduce habitat availability and disrupt ecological recovery efforts. However, with proper planning and implementation of rehabilitation measures, these cumulative impacts can be minimized, allowing vegetation to recover and maintaining landscape-level ecological function over time.	Preferred Alternative	Cumulative	Projects 30km radius	Long-term	Definite	Limited	Slight	**Low (-)**	Moderate	Same as above	None	**Low (+)**
	No-go alternative Under the No-Go alternative, the SEF would not be developed, and no decommissioning activities would occur. Consequently, there would be no risk of loss to indigenous vegetation due to infrastructure removal or associated disturbances. The existing vegetation condition would remain stable, subject only to natural ecological processes and other land-use pressures unrelated	No-Go	No-Go	Study area	Long-term	Definite	Limited	Slight	**Low (-)**	NA	No mitigation	NA	**NA**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	to the project. However, this alternative does not promote active restoration or improvement of degraded habitats within the site.												
Infestation of Alien Plant Species	**Direct impacts** Decommissioning activities, such as the removal of infrastructure and soil disturbance, can create conditions conducive to the establishment and spread of alien invasive plant species. Disturbed soils and exposed areas provide opportunities for invasive plants to colonize, potentially outcompeting indigenous vegetation that has re-established since construction. Without proper management, this can lead to increased invasive species cover, reduced native biodiversity, and long-term degradation of ecosystem health on the site.	Preferred Alternative	Negative Direct	Study Area	Long term	Probable	Moderate	Moderate	**Moderate (-)**	Moderate	• Stabilise and revegetate disturbed areas using fast-growing, locally indigenous species. • The site must be checked regularly for the presence of alien invasive species and weeds. When alien invasive species are found, immediate action must be taken to remove them. • Alien Invasive Plant Species and Weeds must be disposed on in line with the recommendations outlined in the Working for Water Programme. • Any equipment brought onto site must be clean to ensure no transfer or introduction of seeds. • No exotic species are permitted to be planted on site. Only indigenous plant species can be used for rehabilitation/landscaping. • The ECO must create a list with accompanying photographs of possible alien invasive species that could occur on site prior to construction. This photo guide must be used to determine if any alien invasive species are present. • An alien invasive method statement must be incorporated into the EMPr. • Focus rehabilitation efforts on restoring general vegetation structure and cover using hardy, locally appropriate secondary grassland species, rather than restoring exact pre-clearance diversity. • Develop and implement an Alien Invasive Plant Management Plan or Method Statement that includes regular site inspections, early detection, rapid response protocols, and manual or chemical control methods. Disturbed areas must be monitored regularly and cleared of invasive species promptly.	None	**Low (-)**
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	Cumulative impacts The cumulative impact of alien plant infestation during decommissioning is considered moderate if multiple projects within the region undergo decommissioning simultaneously or sequentially without adequate invasive species control. The spread of invasive species can compound across the landscape, further displacing native flora, degrading habitat quality, and disrupting ecological processes on a broader scale. Effective coordination of invasive species management across projects and ongoing monitoring can reduce these cumulative impacts and help maintain regional biodiversity.	Preferred Alternative	Cumulative	Projects 30km radius	Long-term	Probable	Moderate	Moderate	**Moderate (-)**	Moderate	Same as above	Low	**Low (-)**
	No-go alternative Under the No-Go alternative, no decommissioning activities would occur, thereby avoiding new soil disturbance and reducing the risk of spreading alien invasive species associated with infrastructure removal. However, existing invasive species populations within the broader landscape would likely persist or expand due to ongoing land use and natural spread. Without active management, invasive species infestation may continue to threaten indigenous vegetation and ecosystem health over time, independent of this project.	No-Go	No-Go	Study area	Long-term	Probable	Moderate	Moderate	**Moderate (-)**	NA	No mitigation	NA	**NA**
Disturbance and Mortality of Faunal Species During Decommissioning	**Direct impacts** Decommissioning activities will involve the dismantling of solar infrastructure, removal of equipment, and possible site rehabilitation, all of which may disturb faunal habitats that have re-established around the facility over the operational period. The use of heavy machinery, earthworks, and increased human activity may result in the accidental mortality of fauna	Preferred Alternative	Negative	Regional	Short Term	Probable	Moderate	Slight	**Low (-)**	Low	• The ECO should appoint a member of staff to walk ahead of machinery directly prior to decommissioning. Should any faunal species be identified during the walk through, these should be allowed to move out of harm's way prior to vegetation clearance. • External lighting should be avoided. If required, this should be down lighting and/or of low wattage.	Low	**Low (-)**

ISSUE	IMPACT	ALTERNATIVE	NATURE	EXTENT	DURATION	PROBABILITY	IRREPLACEABLE LOSS	SEVERITY	SIGNIFICANCE BEFORE MITIGATION	REVERSIBILITY AND MITIGATION POTENTAL	MITIGATION	RESIDUAL RISK	SIGNIFICANCE AFTER MITIGATION
	sheltering within the site, particularly small, slow-moving species such as reptiles, amphibians, and small mammals inhabiting crevices, vegetation, or burrows. If not carefully managed, these activities could also disturb fauna using the site margins. However, with appropriate pre-clearance searches and careful timing of activities, faunal mortalities can be minimised.										• Dust suppression measures must be implemented in the dry and/or windy months. • All machinery, vehicles and earth moving equipment must be maintained and the noise these create must meet industry minimum standards. e.g. the sound generated by a machine must be below a certain decibel as prescribed in the relevant noise control regulations. • Limit decommissioning to daylight hours to reduce nocturnal faunal disturbance. • Enforce speed limits on-site (30 km/hr). • Provide environmental awareness training for decommissioning personnel. • Rehabilitate disturbed areas.		
	Indirect impacts None	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumulative impacts The proposed SEF will contribute to the cumulative disturbance of faunal species; however, the impact is considered low given the isolated are and short timeframe of the decommissioning phase.	Preferred Alternative	Cumulative	Regional (Projects within 30km radius)	Permanent	Definite	Moderate	Slight	**Low (-)**	Moderate	Same as above	Low	**Low (-)**
	No-go alternative Under the No-Go scenario, the proposed development would not proceed, and the status quo would be maintained. The faunal species that occupy the project footprint are likely to continue to do so.	No-Go	No-Go	Study area	Long-term	Definite	Moderate	Slight	**Low (+) to negligible**	NA	NA	NA	**NA**

8. CONCLUSIONS

8.1. Summary of Key Findings

The DFFE Screening Tool Report suggests the following sensitivity for the project area:

- Medium Sensitivity for the **Animal Species Theme** based on the presence of one sensitive species. Sensitive bird species have been addressed by the avifaunal specialist and are therefore not included in this report.
- Low Sensitivity for the **Plant Species Theme** based on the unlikely occurrence of SCC.
- Low Sensitivity for the **Terrestrial Biodiversity Theme** as there are no sensitive features present.

The specialists' findings for each theme are summarised below.

Animal Species Theme

Based on the findings from the desktop assessment and field survey, the specialist agrees that the faunal habitat for all intact plant communities as well as the secondary vegetation has a **MEDIUM** SEI due to the confirmed occurrence of Tsessebe (*Damaliscus lunatus)* (which has been stocked by the landowner) and likely occurrence of three VU species (Black-footed Cat – *Felis nigripes,* Leopard – *Panthera pardus* and Temminick's Pangolin – *Smutsia temminckii*) and three NT species (African Striped Weasel - *Poecilogale albinucha*, Brown Hyaena - *Parahyaena brunnea*, Southern African Hedgehog - *Atelerix frontalis*). However, transformed areas should be reclassified as **VERY LOW** sensitivity due to the unlikely occurrence of SCC.

Plant Species Theme

The overall plant species theme was classified as low by the DFFE screening tool report due to the unlikely occurrence of SCC. Based on the results of the desktop analysis and field survey, which confirm that no SCC occur or are highly likely to occur within the project area, the specialist agrees with the DFFE Screening Tool report of **LOW** sensitivity.

Terrestrial Biodiversity Theme

The terrestrial biodiversity assessment confirmed the following:

- The project area occurs within one vegetation types, namely Makhado Sweet Bushveld. The overall sensitivity for this vegetation type was determined to be of medium sensitivity.
- The project area (including the powerline corridor) falls within an area classified as "Other Natural Area (ONA)" with a minor patch classified as "No Natural Remaining (NNR)". It does not occur within a CBA or an ESA. It does not occur within a CBA or ESA.
- The project area occurs within the Vhembe Biosphere Reserve (VBR). The VBR supports development that is ecologically and socio-culturally sustainable, promoting both conservation and economic growth. As such, the VBR does not preclude development.
- The project area does not occur within a KBA, protected area, or NPAES Focus Area.

- The project area does not occur within a FEPA subcatchment or Strategic Water Source Area (SWSA).

The specialist disagrees with the findings of the DFFE Screening Tool which indicates a LOW Sensitivity and is of the opinion that the overall sensitivity should be **MEDIUM** as per the SEI analysis for the vegetation types and **VERY LOW** for secondary vegetation and transformed areas.

8.2. Summary of Impact Assessment

Direct and Indirect Impacts

A total of fifteen potential ecological impacts were identified for the proposed SEF and associated infrastructure: ten impacts relate to the construction phase, two to the operational phase, and three to the decommissioning phase. Of these, eight impacts are rated as Moderate Negative before mitigation and seven as Low Negative. With the implementation of the recommended mitigation measures, the overall risk profile of the project improves substantially: only two impacts are expected to remain Moderate Negative, while twelve are reduced to Low Negative, and one impact improves to Low Positive following site rehabilitation during decommissioning.

The remaining moderate impacts relate primarily to Loss of Makhado Sweet Bushveld despite mitigation as the proposed construction of the SEF will result in the permanent loss of a portion of this vegetation type despite the implementation of mitigation measures. The No-Go alternative represents the baseline scenario where the status quo would be maintained, with most impacts avoided or remaining at negligible to low negative significance due to ongoing game farming and existing land uses.

The table below summarises the assessed significance of each impact across the project phases:

Table 8.1: Summary of direct impacts associated with the proposed SEF and associated infrastructure.

IMPACT	SIGNIFICANCE BEFORE MITIGATION	SIGNIFICANCE AFTER MITIGATION	No-go
Construction Phase			
Loss of Makhado Sweet Bushveld and associated plant species	Moderate (-)	Moderate (-)	Negligible
Loss of Secondary Vegetation and associated plant species	Low (-)	Low (-)	Negligible
Loss of individuals of protected plant species	Moderate (-)	Low (-)	Negligible
Fragmentation of Vegetation and Disruption of Ecosystem Processes	Low (-)	Low (-)	Low (-)
Introduction and Spread of Weeds and Alien Plant Species	Moderate (-)	Low (-)	Moderate (-)
Loss and transformation of natural habitat within the Vhembe Biosphere Reserve	Moderate (-)	Moderate (-)	Low (-) To Negligible
Loss of Faunal Habitat	Low (-)	Low (-)	Low (-) To Negligible

Loss of Faunal SCC	Moderate (-)	Low (-)	Low (-) To Negligible
Disturbance to Faunal Species and their Livelihood due to Project Related Activities	Low (-)	Low (-)	Low (+)
Mortality of Faunal Species due to Earthworks, Roadkill and Persecution	Moderate (-)	Low (-)	Low (-) to negligible
Operational Phase			
Spread of Weeds and Alien Plant Species.	Moderate (-)	Low (-)	Moderate (-)
Disturbance and Mortality of Faunal Species During Operation	Low (-)	Low (-)	Low (-) to negligible
Decommissioning Phase			
Loss of indigenous vegetation	Low (-)	Low (+)	Low (-)
Infestation of Alien Plant Species	Moderate (-)	Low (-)	Moderate (-)
Disturbance and Mortality of Faunal Species During Decommissioning	Low (-)	Low (-)	Low (-)

Cumulative Impacts

A total of fifteen cumulative impacts were identified across all phases of the proposed SEF and associated infrastructure: ten impacts relate to the construction phase, two impacts to the operational phase and three impacts to the decommissioning phase. Prior to the implementation of mitigation measures, eight impacts were rated as moderate negative, and seven impacts were rated as low negative. With the implementation of the recommended mitigation measures, the overall cumulative risk profile of the project improves substantially: the number of moderate negative impacts is reduced to three, and eleven impacts are reduced to low negative, and one is reduced to low positive.

Despite the small footprint of the proposed SEF relative to the broader landscape, the project contributes incrementally to the ongoing loss and fragmentation of natural vegetation, faunal habitat, and the spread of alien species in the region. Effective mitigation will substantially reduce the cumulative contribution of the project to these impacts, although some residual moderate impacts relating to habitat loss and alien plant spread remain.

Table 8.2: Summary of cumulative impacts associated with the proposed SEF and associated infrastructure.

IMPACT	SIGNIFICANCE BEFORE MITIGATION	SIGNIFICANCE AFTER MITIGATION
Construction Phase		
Loss of Makhado Sweet Bushveld and associated plant species	Moderate (-)	Moderate (-)
Loss of Secondary Vegetation and associated plant species	Low (-)	Low (-)
Loss of individuals of protected plant species	Moderate (-)	Low (-)
Fragmentation of Vegetation and Disruption of Ecosystem Processes	Moderate (-)	Low (-)
Introduction and Spread of Weeds and Alien Plant Species	Moderate (-)	Low (-)
Loss and transformation of natural habitat within the Vhembe Biosphere Reserve	Moderate (-)	Moderate (-)
Loss of Faunal Habitat	Low (-)	Low (-)
Loss of Faunal SCC	Moderate (-)	Low (-)

Disturbance to Faunal Species and their Livelihood due to Project Related Activities	Low (-)	Low (-)
Mortality of Faunal Species due to Earthworks, Roadkill and Persecution	Moderate (-)	Low (-)
Operational Phase		
Spread of Weeds and Alien Plant Species.	Moderate (-)	Low (-)
Disturbance and Mortality of Faunal Species During Operation	Low (-) to negligible	Low (-) to negligible
Decommissioning Phase		
Loss of indigenous vegetation	Low (-)	Low (+)
Infestation of Alien Plant Species	Moderate (-)	Low (-)
Disturbance and Mortality of Faunal Species During Decommissioning	Low (-)	Low (-)

8.3. Preferred Alternative

Three grid connection alternatives were assessed: a preferred, secondary, and tertiary grid connection. While the ecological impacts associated with all three alternatives are expected to be similar, with minimal differences in impact significance, the preferred grid connection is ecologically favourable as it follows the shortest route. This reduces the extent of vegetation fragmentation and aligns with an existing fence line and gravel road, further limiting additional habitat disturbance.

8.4. Conclusion and Opinion of the Specialist

The ecological assessment confirmed that the proposed SEF is located within an area of generally medium to low ecological sensitivity. The vegetation type affected, Makhado Sweet Bushveld, is classified as Least Concern, and no Critical Biodiversity Areas, Ecological Support Areas, or other formally protected features occur within the project footprint. Although several faunal Species of Conservation Concern may utilise the area, no highly sensitive ecological features were identified that would require major changes to the project layout.

The impact assessment concluded that, with the implementation of the recommended mitigation measures, most ecological impacts can be reduced to low significance. Residual moderate impacts remain due to the permanent loss of a portion of Makhado Sweet Bushveld and the cumulative habitat loss within the Vhembe Biosphere Reserve, although these impacts are considered limited in the context of the regional extent of these habitats.

It is the specialist's professional opinion that the proposed development can proceed from an ecological perspective, provided that all recommended mitigation and management measures are strictly implemented and monitored for the duration of the project lifecycle.

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APPENDIX 1: LIST OF PLANT SPECIES RECORDED DURING THE FIELD SURVEY

Family	Scientific name	Common name	SA Red List	Limpopo EMA (2003)	NEM:BA (2007)	DFFE (2024)
Acanthaceae	*Blepharis subvolubilis*	Eye Lashes	LC	-	-	-
Amaranthaceae	*Alternanthera pungens*	creeping chaffweed	NE	-	-	-
Amaranthaceae	*Cyphocarpa angustifolia*	Silky Burweed	LC	-	-	-
Amaranthaceae	*Hermbstaedtia odorata albi-rosea*		NE	-	-	-
Anacardiaceae	*Ozoroa paniculosa*	bushveld ozoroa	LC	-	-	-
Anacardiaceae	*Sclerocarya birrea*	marula	LC	-	-	Schedule A
Anacardiaceae	*Searsia leptodictya*	Mountain Karree	LC	-	-	-
Anacardiaceae	*Searsia magalismontana*	Mountain Currentrhus	LC	-	-	-
Apocynaceae	*Cynanchum viminale*	Caustic Vine	LC	-	-	-
Apocynaceae	*Pergularia daemia*	Trellis-Vine	LC	-	-	-
Asparagaceae	*Asparagus africanus*	Bush Asparagus	LC	-	-	-
Asparagaceae	*Asparagus aspergillus*		LC	-	-	-
Asparagaceae	*Asparagus buchananii*		LC	-	-	-
Asparagaceae	*Asparagus suaveolens*	Catthorn Asparagus	LC	-	-	-
Asparagaceae	*Sansevieria aethiopica*	Mother-in-law's Tongue	LC	-	-	-
Asphodelaceae	*Aloe marlothii*	mountain aloe	LC	-	-	-
Asteraceae	*Acanthospermum hispidum*	Bindii	NE	-	-	-
Asteraceae	*Bidens pilosa*	Hairy Beggarticks	NE	-	-	-
Asteraceae	*Dicoma tomentosa*	Woolly Karmedik	LC	-	-	-
Asteraceae	*Emilia transvaalensis*	Transvaal Tasselflower	LC	-	-	-
Asteraceae	*Geigeria burkei*	Button Vomitdaisy	LC	-	-	-
Asteraceae	*Psiadia punctulata*	Sticky Psiadia	LC	-	-	-
Asteraceae	*Schkuhria pinnata*	dwarf marigold	NE	-	-	-
Asteraceae	*Senecio madagascariensis*	Madagascar Ragwort	LC	-	-	-

Family	Scientific name	Common name	SA Red List	Limpopo EMA (2003)	NEM:BA (2007)	DFFE (2024)
Asteraceae	*Tagetes minuta*	wild marigold	NE	-	-	-
Asteraceae	*Xanthium strumarium*	rough cocklebur	NE	-	-	-
Asteraceae	*Zinnia peruviana*	Peruvian zinnia	NE	-	-	-
Bignoniaceae	*Rhigozum brevispinosum*	Kalahari Gold	LC	-	-	-
Boraginaceae	*Cordia quercifolia*	Bushveld Saucerberry	LC	-	-	-
Boraginaceae	*Ehretia alba*	Puzzlebush	LC	-	-	-
Boraginaceae	*Ehretia rigida*	Puzzle Bush	LC	-	-	-
Boraginaceae	*Heliotropium nelsonii*	Common String-of-Stars	LC	-	-	-
Burseraceae	*Commiphora africana africana*	Poison-Grub Commiphora	LC	-	-	-
Burseraceae	*Commiphora glandulosa*	Tall Common Corkwood	LC	-	-	-
Burseraceae	*Commiphora marlothii*	Paperbark Corkwood	LC	-	-	-
Burseraceae	*Commiphora mollis*	Velvet Corkwood	LC	-	-	-
Cactaceae	*Cylindropuntia imbricata*	tree cholla	NE	-	-	-
Cactaceae	*Nyctocereus serpentinus*	Serpent Cactus	NE	-	-	-
Cactaceae	*Opuntia ficus-indica*	Indian fig opuntia	NE	-	-	-
Cactaceae	*Opuntia ficus-indica*	Prickly Pear	NE	-	-	-
Campanulaceae	*Wahlenbergia undulata*	African Blue Bell	LC	-	-	-
Capparaceae	*Boscia albitrunca*	Shepherds tree	LC	-	-	Schedule A
Capparaceae	*Boscia foetida*	Stink Shepherdstree	LC	Schedule 12	-	-
Celastraceae	*Gymnosporia buxifolia*	Common Spikethorn	LC	-	-	-
Combretaceae	*Combretum apiculatum*	red bushwillow	LC	-	-	-
Combretaceae	*Combretum hereroense*	Russet Bushwillow	NE	-	-	-
Commelinaceae	*Commelina africana*	African Yellow Dayflower	LC	-	-	-
Convolvulaceae	*Evolvulus alsinoides*	tropical speedwell	LC	-	-	-
Convolvulaceae	*Ipomoea obscura*	Obscure Morning Glory	LC	-	-	-
Crassulaceae	*Kalanchoe brachyloba*	short-lobed kalanchoe	LC	-	-	-
Cucurbitaceae	*Coccinia rehmannii*	Cucumber Bushpumpkin	LC	-	-	-
Cucurbitaceae	*Cucumis hirsutus*	Hairy Wild Cucumber	LC	-	-	-

Family	Scientific name	Common name	SA Red List	Limpopo EMA (2003)	NEM:BA (2007)	DFFE (2024)
Cyperaceae	*Cyperus cristatus*	White Flat-Sedge	LC	-	-	-
Cyperaceae	*Cyperus decurvatus*		LC	-	-	-
Cyperaceae	*Cyperus rupestris*	Red Sedge	LC	-	-	-
Ebenaceae	*Euclea divinorum*	Magic Gwarrie	LC	-	-	-
Euphorbiaceae	*Euphorbia ingens*	Common Tree Euphorbia	LC	-	-	-
Fabaceae	*Chamaecrista absus*	Hairy Cassia	LC	-	-	-
Fabaceae	*Crotalaria capensis*	Cape Rattle Pod	LC	-	-	-
Fabaceae	*Dichrostachys cinerea*	aroma	LC	-	-	-
Fabaceae	*Elephantorrhiza elephantina*	Dwarf Elephantroot	LC	-	-	-
Fabaceae	*Indigofera filipes*	Finefoot Indigo	LC	-	-	-
Fabaceae	*Ormocarpum trichocarpum*	Caterpillar Bush	LC	-	-	-
Fabaceae	*Otoptera burchellii*	Purple Desert Bean	LC	-	-	-
Fabaceae	*Peltophorum africanum*	Weeping wattle	LC	-	-	-
Fabaceae	*Ptycholobium contortum*		LC	-	-	-
Fabaceae	*Rhynchosia totta*	Carpet Snoutbean	LC	-	-	-
Fabaceae	*Senegalia burkei*	Black Monkeythorn	LC	-	-	-
Fabaceae	*Senegalia mellifera*	Black thorn	LC	-	-	-
Fabaceae	*Senegalia senegal leiorhachis*	Three-Hooked Thorn	LC	-	-	-
Fabaceae	*Tephrosia capensis*	Cape Hoarypea	LC	-	-	-
Fabaceae	*Tipuana tipu*	Pride of Bolivia	NE	-	-	-
Fabaceae	*Vachellia permixta*	Slender Thorn	LC	-	-	-
Fabaceae	*Vachellia tortilis*	umbrella thorn	LC	-	-	-
Geraniaceae	*Monsonia angustifolia*	Narrow-leaved Dysentry-herb	LC	-	-	-
Hyacinthaceae	*Albuca abyssinica*		LC	-	-	-
Hyacinthaceae	*Drimia altissima*	Tall Squill	LC	-	-	-
Hyacinthaceae	*Ledebouria marginata*	Tough-leaved African Hyacinth	LC	-	-	-
Iridaceae	*Afrosolen sandersonii*	Autumn Painted Petals	LC	-	-	-
Lamiaceae	*Clerodendrum ternatum*	Tube Flower	LC	-	-	-

Family	Scientific name	Common name	SA Red List	Limpopo EMA (2003)	NEM:BA (2007)	DFFE (2024)
Lamiaceae	*Leucas sexdentata*	Bushveld Tumbleweed	LC	-	-	-
Loranthaceae	*Erianthemum ngamicum*		LC	-	-	-
Malvaceae	*Adansonia digitata*	African baobab	LC	Schedule 12	-	Schedule A
Malvaceae	*Grewia bicolor*	Bastard Raisin Bush	LC	-	-	-
Malvaceae	*Grewia flava*	Velvet Raisin	LC	-	-	-
Malvaceae	*Grewia flavescens*	Sandpaper Raisin	LC	-	-	-
Malvaceae	*Hermannia depressa*	Purpleleaf Dollsrose	LC	-	-	-
Malvaceae	*Hibiscus calyphyllus*	Lemonyellow Rosemallow	LC	-	-	-
Malvaceae	*Sterculia rogersii*	Common Star-Chestnut	LC	-	-	-
Malvaceae	*Waltheria indica*	Sleepy Morning	LC	-	-	-
Moraceae	*Ficus abutilifolia*	Large-leaved Rock Fig	LC	-	-	-
Moraceae	*Ficus tettensis*	Small-leaved Rock Fig	LC	-	-	-
Olacaceae	*Ximenia caffra*	smooth sourplum	LC	-	-	-
Pedaliaceae	*Sesamum triphyllum triphyllum*	Wild Sesame	LC	-	-	-
Poaceae	*Cenchrus ciliaris*	Buffelgrass	LC	-	-	-
Poaceae	*Chloris virgata*	feather finger grass	LC	-	-	-
Poaceae	*Dactyloctenium aegyptium*	Durban Crowfoot	LC	-	-	-
Poaceae	*Digitaria eriantha*	Digitgrass	LC	-	-	-
Poaceae	*Eragrostis lehmanniana*	Lehmann's Lovegrass	LC	-	-	-
Poaceae	*Eragrostis sp.*	Lovegrass	LC	-	-	-
Poaceae	*Eragrostis superba*	Wilman lovegrass	LC	-	-	-
Poaceae	*Eragrostis tenella*	Feather Lovegrass	LC	-	-	-
Poaceae	*Heteropogon contortus*	Tanglehead	LC	-	-	-
Poaceae	*Melinis repens*	Natal grass	LC	-	-	-
Poaceae	*Paspalum dilatatum*	Dallis Grass	NE	-	-	-
Poaceae	*Pogonarthria squarrosa*	Herringbone Grass	LC	-	-	-
Poaceae	*Schmidtia pappophoroides*	Kalahari Sand Quick	LC	-	-	-
Poaceae	*Setaria pumila*	Yellow Foxtail	LC	-	-	-

Family	Scientific name	Common name	SA Red List	Limpopo EMA (2003)	NEM:BA (2007)	DFFE (2024)
Poaceae	*Themeda triandra*	Kangaroo Grass	LC	-	-	-
Poaceae	*Tragus berteronianus*	African Bur-Grass	LC	-	-	-
Poaceae	*Urochloa trichopus*	Gonyagrass	LC	-	-	-
Portulacaceae	*Portulaca obtusa*		LC	-	-	-
Rhamnaceae	*Ziziphus mucronata*	buffalo-thorn	LC	-	-	-
Rubiaceae	*Vangueria parvifolia*	mountain medlar	LC	-	-	-
Sapindaceae	*Pappea capensis*	Jacket plum	LC	-	-	-
Scrophulariaceae	*Antherothamnus pearsonii*	False-Honeythorn	LC	-	-	-
Solanaceae	*Datura ferox*	long-spined thorn-apple	NE	-	-	-
Vitaceae	*Cyphostemma cirrhosum*	Pucker Grape	LC	-	-	-
Zygophyllaceae	*Balanites maughamii*	greenthorn	LC	-	-	Schedule A

APPENDIX 2: PROOF OF SACNASP REGISTRATION AND HIGHEST QUALIFICATION

SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Tarryn Barbara Lee Martin

Registration Number: 008745

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Environmental Science (Professional Natural Scientist)
Botanical Science (Professional Natural Scientist)

Effective **29 January 2014** Expires **31 March 2026**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

RHODES UNIVERSITY

THIS IS TO CERTIFY THAT

TARRYN BARBARA LEE MARTIN

WAS THIS DAY AT A CONGREGATION OF THE UNIVERSITY
ADMITTED TO THE DEGREE OF

MASTER OF SCIENCE

IN

BOTANY

WITH DISTINCTION

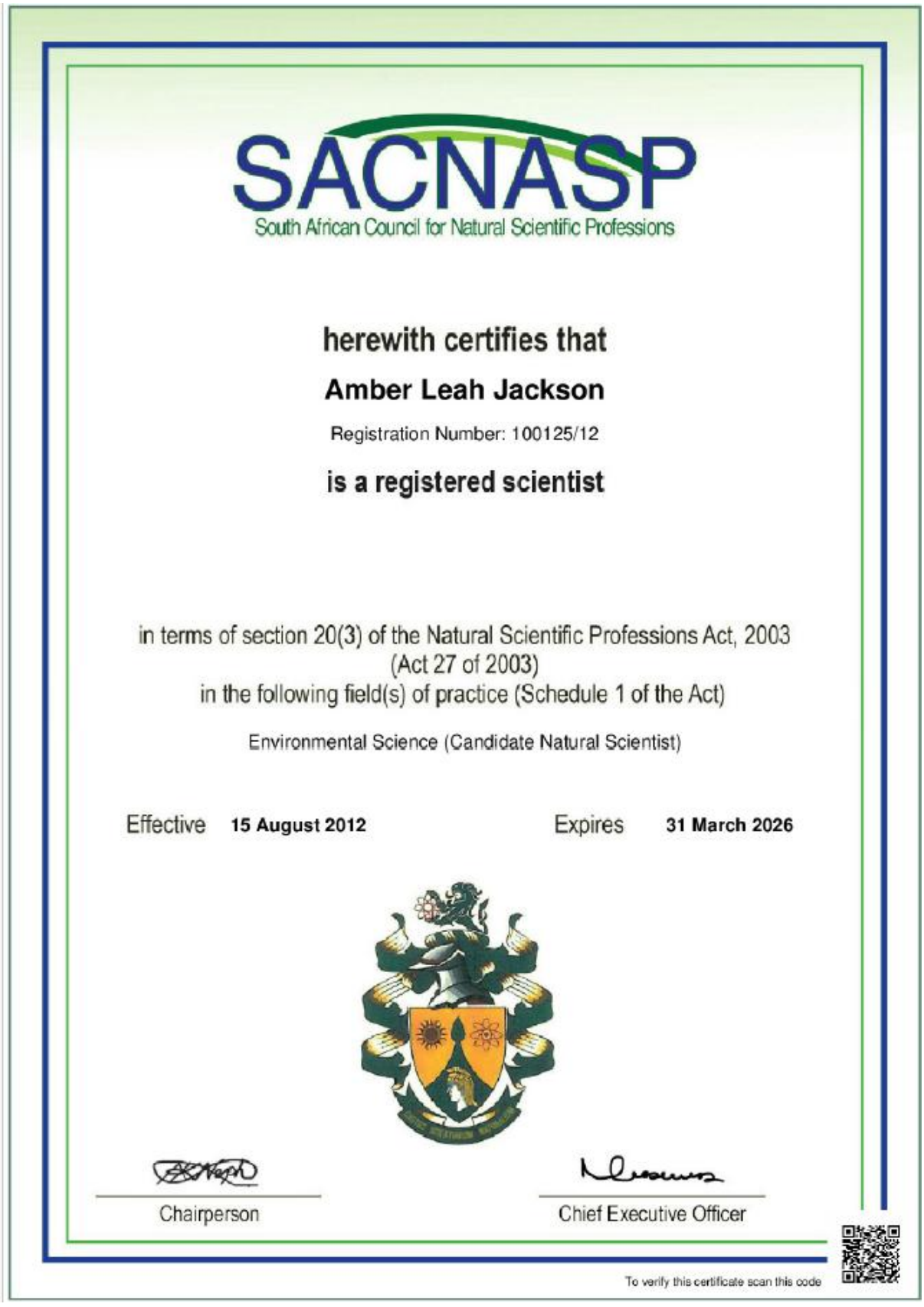
VICE CHANCELLOR

DEAN OF THE FACULTY OF SCIENCE

REGISTRAR

GRAHAMSTOWN
10 APRIL 2010

Application for Professional Natural Science in the field of Zoology is currently awaiting approval.



SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Amber Leah Jackson

Registration Number: 100125/12

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Environmental Science (Candidate Natural Scientist)

Effective **15 August 2012** Expires **31 March 2026**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

University of Cape Town • iYunivesithi yaseKapa • Universiteit van Kaapstad

SPES BONA

we certify that

Amber Leah Jackson

was admitted to the degree of

Master of Philosophy

in Environmental Management

on 9 June 2011

Vice-Chancellor

UNIVERSITY OF CAPE TOWN MDCCCLXVIII

Hugh Amoore

Registrar

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

Nicole Nadine Wienand

Registration Number: 130289

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following field(s) of practice (Schedule 1 of the Act)

Environmental Science (Certificated Natural Scientist)
Botanical Science (Professional Natural Scientist)

Effective **3 March 2021** Expires **31 March 2026**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

NELSON MANDELA
UNIVERSITY

This is to certify that, all the requirements having been met, the degree

Bachelor of Science Honours in Botany

with all the associated rights and privileges, was conferred upon

Nicole Nadine Wienand
ID no.: 9501170150088

at a congregation of the Nelson Mandela University on
13 December 2018

Certificate no.: 20185249

Vice-Chancellor

Registrar

00008632

APPENDIX 3: CV

CONTACT DETAILS

Name	**Tarryn Martin**
Name of Company	**Biodiversity Africa**
Designation	Director
Profession	Botanical Specialist and Environmental Manager
E-mail	tarryn@biodiversityafrica.com
Office number	+27 (0)71 332 3994
Education	2010: Master of Science with distinction (Botany) 2004: Bachelor of Science (Hons) in African Terrestrial Vertebrate Biodiversity 2003: Bachelor of Science
Nationality	**South African**
Professional Body	**SACNASP**: South African Council for Natural Scientific Profession: Professional Natural Scientist (400018/14) **SAAB**: Member of the South African Association of Botanists **IAIASa**: Member of the International Association for Impact Assessments South Africa Member of Golden Key International Honour Society
Key areas of expertise	• Biodiversity Surveys and Impact Assessments • Environmental Impact Assessments • Critical Habitat Assessments • Biodiversity Management and Monitoring Plans

PROFILE

Tarryn has over ten years of experience working as a botanist, nine of which are in the environmental sector. She has worked as a specialist and project manager on projects within South Africa, Mozambique, Lesotho, Zambia, Tanzania, Cameroon and Malawi.

She has extensive experience writing botanical impact assessments, critical habitat assessments, biodiversity management plans, biodiversity monitoring plans and Environmental Impact Assessments to International Standards, especially to those of the International Finance Corporation (IFC). Her experience includes working on large mining projects such as the Kenmare Heavy Minerals Mine, where she monitored forest health, undertook botanical impact assessments for their expansion projects and designed biodiversity management and monitoring plans. She has also project managed Environmental Impact Assessments for graphite mines in northern Mozambique and has a good understanding of the Mozambique Environmental legislation and processes.

Tarryn holds a BSc (Botany and Zoology), a BSc (Hons) in African Vertebrate Biodiversity and an MSc with distinction in Botany from Rhodes University. Tarryn's Master's thesis examined the impact of fire on the

recovery of C_3 and C_4 Panicoid and non-Panicoid grasses within the context of climate change for which she won the Junior Captain Scott-Medal (Plant Science) for producing the top MSc of 2010 from the South African Academy of Science and Art as well as an Award for Outstanding Academic Achievement in Range and Forage Science from the Grassland Society of Southern Africa. Tarryn is a professional member of the South African Council for Natural Scientific Professionals (since 2014).

EMPLOYMENT EXPERIENCE

Director and Botanical Specialist, Biodiversity Africa

July 2021 - present

- Botanical and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping vegetation communities and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Designing rehabilitation plans
- Designing alien management plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets

Principal Environmental Consultant, Branch Manager and Botanical Specialist, Coastal and Environmental Services

May 2012-June 2021

- Botanical and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping vegetation communities and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Designing rehabilitation and biodiversity offset plans
- Designing alien management plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets
- Cape Town branch manager
- Coordinating specialists and site visits

Accounts Manager, Green Route DMC

October 2011- January 2012

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Administrator and Project Co-ordinator, Windsor Mountain International Summer Camp, USA

April 2011 - September 2012

- Co-ordinated staff and camper travel arrangements, main camp events and assisted with marketing the camp to prospective families.

Freelance Project Manager, Green Route DMC

November 2010 - April 2011

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction.

Camp Counselor, Windsor Mountain Summer Camp, USA

June 2010 - October 2010

NERC Research Assistant, Botany Department, Rhodes University, Grahamstown in collaboration with Sheffield University, Sheffield, England

April 2009 - May 2010

- Set up and maintained experiments within a common garden plot experiment
- collected, collated and entered data
- Assisted with the analysis of the data and writing of journal articles

Head Demonstrator, Botany Department, Rhodes University

March 2007 - October 2008

Operations Assistant, Green Route DMC

September 2005 - February 2007

- Project and staff co-ordination
- Managing large budgets for incentive and conference groups travelling to southern Africa
- Creating tailor-made programs for clients
- Negotiating rates with vendors and assisting with the ground management of inbound groups to ensure client satisfaction

PUBLICATIONS

- Ripley, B.; Visser, V.; Christin, PA.; Archibald, S.; Martin, T and Osborne, C. Fire ecology of C_3 and C_4 grasses depends on evolutionary history and frequency of burning but not photosynthetic type. *Ecology.* 96 (10): 2679-2691. 2015
- Taylor, S.; Ripley, B.S.; Martin, T.; De Wet, L-A.; Woodward, F.I.; Osborne, C.P. Physiological advantages of C_4 grasses in the field: a comparative experiment demonstrating the importance of drought. *Global Change Biology*. 20 (6): 1992-2003. 2014
- Ripley, B; Donald, G; Osborne, C; Abraham, T and Martin, T. Experimental investigation of fire ecology in the C3 and C4 subspecies of *Alloteropsis semialata. Journal of Ecology.* 98 (5): 1196 - 1203. 2010
- South African Association of Botanists (SAAB) conference, Grahamstown. Title: Responses of C3 and C4 Panicoid and non-Panicoid grasses to fire. January 2010
- South African Association of Botanists (SAAB) conference, Drakensberg. Title: Photosynthetic and Evolutionary determinants of the response of selected C3 and C4 (NADP-ME) grasses to fire. January 2008

COURSES

- Rhodes University and CES, Grahamstown
- EIA Short Course 2012
- Fynbos identification course, Kirstenbosch, 2015.
- Photography Short Course, Cape Town School of Photography, 2015.
- Using Organized Reasoning to Improve Environmental Impact Assessment, 2018, International IAIA conference, Durban

CONSULTING EXPERIENCE

International Projects

- 2020 – 2021: Project manager for the 2Africa subsea cable ESIA in Mozambique.
- 2020 – 2021: Project manager for the Category B EIA for the Wihinana Graphite Mine, Cabo delgado, Mozambique
- 2020 – 2021: Project manager for the category B exploration ESIA for Sofala Heavy Minerals Mine, Inhambane, Mozambique
- 2020: Critical Habitat Assessment for a graphite mine in Cabo Delgado, Mozambique. This assessment was to IFC standards.
- 2020: Analysed the botanical dataset for Lurio Green Resources and provided comment on the findings and gaps.
- 2020: Biodiversity Management Plan and Monitoring Plan for mine at Pilivilli in Nampula Province, Mozambique. This assessment was to IFC standards.
- 2019: Botanical Assessment for a cocoa plantation, Tanzania. This assessment was to IFC standards.
- 2019: Critical Habitat Assessment, Biodiversity Management Plan and Ecosystem Services Assessment for JCM Solar Farm in Cameroon. This assessment was to IFC standards.
- 2019: Undertook the Kenmare Road and Infrastructure Botanical Baseline Survey and Impact Assessment for an infrastructure corridor that will link the existing mine at Moma to the new proposed mine at Pillivilli in Nampula Province, Mozambique. This assessment was to IFC standards.
- 2012 – Present: Kenmare Terrestrial Monitoring Program Project Manager and Specialist Survey, Nampula Province, Mozambique.
- 2018: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Balama Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
- 2018: Co-authored the critical habitat assessment chapter for the proposed Kenmare Pilivilli Heavy Minerals Mine.
- 2018: Authored the Conservation Efforts chapter for the Kenmare Pilivilli Heavy Minerals Mine.
- 2017-2018: Co-authored and analysed data for the Kenmare Bioregional Survey of *Icuria dunensis* (species trigger for critical habitat) in Nampula Province, Mozambique. This was for a mining project that needed to be IFC compliant.
- 2017: Conducted a field survey and wrote a botanical report to IFC standards for the proposed Ancuabe Graphite Mine Environmental and Social Impact Assessment (ESIA) in Cabo Delgado Province, Mozambique.
- 2017-2018: Managed the Suni Resources Montepuez Graphite Mine Environmental Impact Assessment. This included the management of ten specialists, the co-ordination of their field surveys, regular client liaison and the writing of the Environmental Impact Assessment Report which summarised the specialists findings, assessed the impacts of the proposed mine on the environment and provided mitigation measures to reduce the impact.
  I was also the lead botanist for this baseline survey and impact assessment and undertook the required field work and analysed the data and wrote the report.
- 2017: Undertook the botanical baseline survey and impact assessment for the proposed Kenmare Pilivili Heavy Mineral Mine in Nampula Province, Mozambique. This was to IFC Standards.
- 2017: Ecological Survey for the Megaruma Mining Limitada Ruby Mine Exploration License, Cabo Delgado, Mozambique.

- 2016: Undertook the botanical baseline survey and impact assessment, wrote an alien invasive management plan and co-authored the biodeiveristy monitoring plan for this farm. The project was located in Zambezia Province, Mozambique.
- 2015-2016: Conducted the Triton Minerals Nicanda Hills Graphite Mine Botanical Survey and Impact Assessment. Was also the project manager and specialist co-ordinator for this project. The project was located in Cabo Delgado Province, Mozambique.
- 2015: Was part of the team that undertook a Critical Habitat Assessment for the Nhangonzo Coastal Stream site at Inhassora in Mozambique that Sasol intend to establish drill pads at. This project needed to meet the IFC standards.
- 2014: Lurio Green Resources Wood Chip Mill and Medium Density Fibre-board Plant, Project Manager and Ecological Specialist, Nampula Province, Mozambique. 2014-2015.
- 2013-2014: LHDA Botanical Survey, Baseline and Impact assessment, Lesotho.
- 2014: Biotherm Solar Voltaic Ecological Assessment, Zambia.
- 2013-2014: Lurio Green Resources Plantation Botanical Assessment, Vegetation and Sensitivity Mapping, Specialist Co-ordination, Nampula Province, Mozambique.
- 2013: Syrah Resources Botanical Baseline Survey and Ecological Assessment., Cabo Delgado Mozambique.
- 2013-2014: Baobab Mining Ecological Baseline Survey and Impact Assessment, Tete, Mozambique.

South African Projects

- 2021 - Present: Project Manager for the Sturdee Energy Solar PV facility, Western Cape
- 2021: Ecological Assessment for the Sturdee Energy Solar PV facility, Western Cape
- 2021: Rehabilitation plan for a housing development (Hope Village)
- 2020: Ecological Assessment for the Eskom Juno-Gromis Powerline deviation, Western Cape
- 2020: Project Manager for the Basic Assessment for SANSA development at Matjiesfontein (Western Cape). Project received authorization in 2021.
- 2020: Ecological Assessment for construction of satellite antennae, Matjiesfontein, Western Cape
- 2019: Ecological Assessment for a wind farm EIA, Kleinzee, Northern Cape
- 2019: Ecological Assessment for two housing developments in Zeerust, North West Province
- 2019: Botanical Assessment in Retreat, Cape Town for the DRDLR land claim.
- 2019: Cape Agulhas Municipality Botanical Assessment for the expansion of industrial zone, Western Cape, South Africa, 2019.
- 2018: Ecological Assessment for the construction of a farm dam in Greyton, Western Cape.
- 2018: Conducted the Ecological Survey for a housing development in Noordhoek, Cape Town
- 2018: Conducted the field survey and developed an alien invasive management plan for the Swartland Municipality, Western Cape.
- 2017: Undertook the field survey and co-authored a coastal dune study that assesses the impacts associated with the proposed rezoning and subdivision of Farm Bookram No. 30 to develop a resort.
- 2017: Project managed and co-authored a risk assessment for the use of Marram Grass to stabilise dunes in the City of Cape Town.
- 2015-2016: iGas Saldanha to Ankerlig Biodiversity Assessment Project Manager, Saldanha.
- 2015: Innowind Ukomoleza Wind Energy Facility Alien Invasive Management Plan, Eastern Cape Province, South Africa.

- 2015: Savannah Nxuba Wind Energy Facility Powerline Ecological Assessment, ground truthing and permit applications, Eastern Cape South Africa.
- 2014: Cob Bay botanical groundtruthing assessment, Eastern Cape, South Africa.
- 2013-2016: Dassiesridge Wind Energy Facility Project Manager, Eastern Cape, South Africa.
- 2013: Harvestvale botanical groundtruthing assessment, Eastern Cape, South Africa.
- 2012: Tsitsikamma Wind Energy Facility Community Power Line Ecological Assessment, Eastern Cape, South Africa.
- 2012: Golden Valley Wind Energy Facility Power Line Ecological Assessment, Eastern Cape, South Africa.
- 2012: Middleton Wind Energy Facility Ecological Assessment and Project Management, Eastern Cape, South Africa.
- 2012: Mossel Bay Power Line Ecological Assessment, Western Cape, South Africa.
- 2012: Groundtruthing the turbine sites for the Waainek Wind Energy Facility, Eastern Cape, South Africa.
- 2012: Toliara Mineral Sands Rehabilitation and Offset Strategy Report, Madagascar.

CONTACT DETAILS

Name	**Amber Jackson**
Name of Company	**Biodiversity Africa**
Designation	Director
Profession	Faunal Specialist and Environmental Manager
E-mail	amber@biodiversityafrica.com
Office number	+27 (0)78 340 6295
Education	2011 M. Phil Environmental Management (University of Cape Town) 2008 BSc (Hons) Ecology, Environment and Conservation (University of the Witwatersrand) 2007 BSc 'Ecology, Environment and Conservation' and Zoology (WITS)
Nationality	**South African**
Professional Body	**SACNASP**: South African Council for Natural Scientific Profession (100125/12) **ZSSA**: Zoological Society of Southern Africa **HAA**: Herpetological Association of Southern Africa **IAIASa**: Member of the International Association for Impact Assessments South Africa
Key areas of expertise	• Biodiversity Surveys and Impact Assessments • Environmental Impact Assessments • Critical Habitat Assessments • Biodiversity Management and Monitoring Plans

PROFILE

Amber has over ten years' experience in environmental consulting and has managed projects across various sectors including mining, agriculture, forestry, renewable energy, housing, coastal and wetland recreational infrastructure. Most of these projects required lender finance and therefore met both in-country, lender and sector specific requirements.

Amber completed the IFC lead and Swiss funded programme in Environmental and Social Risk Management course in 2018. The purpose of the course was to upskill Sub-Saharan African environmental consultants to increase the uptake of E&S standards by Financial Institutions.

Amber specialises in terrestrial vertebrate faunal assessments. She has conducted large scale faunal impact assessments that are to international lender's standards in Mozambique, Tanzania, Lesotho and Malawi. In South Africa her faunal impact assessments comply with the protocols for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity and follows the SANBI Species Environmental Assessment Guideline. Her specialist input goes beyond impact assessments and includes faunal opportunities and constraints assessments, Critical Habitat Assessments, Biodiversity related Management Plans and Biodiversity Monitoring Programmes.

Amber holds a BSc (Zoology and Ecology, Environment & Conservation) and BSc (Hons) in Ecology, Environment & Conservation from WITS University and an MPhil in Environmental Management from University of Cape Town. Amber's honours focused on the landscape effects on Herpetofauna in Kruger National Park and her Master's thesis focused on the management of social and natural aspects of environmental systems with a dissertation in food security that investigated the complex food system of informal and formal distribution markets

EMPLOYMENT EXPERIENCE

Director and Faunal Specialist, Biodiversity Africa

July 2021 - present

- Faunal assessments for local and international EIAs in Southern Africa
- Identifying and mapping habitats and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Critical Habitat Assessments
- Large ESIA studies
- Managing budgets

Principal Environmental Consultant and Faunal,

Coastal and Environmental Services

September 2011-June 2021

- Faunal and ecological assessments for local and international EIAs in Southern Africa
- Identifying and mapping habitat and sensitive areas
- Designing and implementing biodiversity management and monitoring plans
- Critical Habitat Assessments
- Large ESIA studies
- Coordinating specialists and site visits
- Faunal Impact Assessment
- Project Management, including budgets, deliverables and timelines.
- Environmental Impact Assessments and Basic Assessments project
- Environmental Control Officer
- Public/client/authority liaison
- Mentoring and training of junior staff

COURSES

- **Herpetological Association of Southern Africa Conference- Cape St Frances** September 2019
- **International Finance Corporation Environmental and Social Risk Management (ESRM) Program** January – November 2018
- **IAIA WC EMP Implementation Workshop** 27 February 2018
- **IAIAsa National Annual Conference** August 2017
  Goudini Spa, Rawsonville.
- **Biodiversity & Business Indaba, NBBN** April 2017
  Theme: Moving Forward Together (Partnerships & Collaborations)
- **Snake Awareness, Identification and Handling course, Cape Reptile Institute (CRI)** November 2016
- **Coaching Skills programme, Kim Coach** November 2016
- **Western Cape Biodiversity Information Event, IAIAsa** May 2016
  Theme: Biodiversity offsets & the launch of a Biodiversity Information Tool
- **Photography Short Course** 2015.
  Cape Town School of Photography,
- **Mainstreaming Biodiversity into Business: WHAT, WHY, WHEN and HOW** June 2014 Hosted by Dr Marie Parramon Gurney on behalf of the NBBN at the Rhodes Business School
- **IAIAsa National Annual Conference** September 2013
  Thaba'Nchu Sun, Bloemfontein
- **St Johns Life first aid course** July 2012

CONSULTING EXPERIENCE

International Projects

- 2018-Crooks Brothers Post EIA Work- Environmental and Social EMPr, Policies, E&S Management Plans and Monitoring Programmes
- 2018-Triton Ancuabe Graphite Mine (ESHIA), Mozambique. IFC Standards.
- 2016-Bankable Feasibility Study of Simandou Infrastructure Project – Port and Railway Summary of critical habitat, biodiversity offset plan and monitoring and evaluation plan.
- 2016-Lurio Green Resources Forestry Projects ESIA project upgrade to Lender standards including IFC, EIB, FSC and AfDB.
- 2014-Green Resources Woodchip and MDF plant (EPDA).
- 2014-Niassa Green Resources Forestry Projects ESIA to Lender standards including IFC, EIB, FSC and AfDB.

- 2020-Kenmare Faunal Biodiversity Management Plan, Mozambique.
- 2020-Kenmare Faunal Monitoring Pogramme (year 1)- Baseline, Mozambique.
- 2019-Kenmare addendum ESIA Faunal Impact Assessment, Mozambique.
- 2019-Kenmare infrastructure corridor ESIA Faunal Impact Assessment, Mozambique.
- 2019/20-Olam Cocoa Plantation Faunal Impact Assessment, Tanzania.
- 2019-JCM Solar Voltaic project Faunal desktop critical habitat assessment, Cameroon.
- 2018-Suni Resources Balama Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017/18-Battery Minerals Montepuez Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017-Triton Minerals Nicanda Hills Graphite Mine Project Faunal Impact Assessment, Mozambique.
- 2017-Sasol Biodiversity Assessment, Mozambique.
- 2014-Lesotho Highlands Water Project Faunal Impact Assessment, Lesotho.
- 2012-Malawi Monazite mine Projects (ESIA) EMP ecological management contribution
- Liberia Palm bay & Butow (ESIA)
- PGS Seismic Project (ESIA), Mozambique.

South African Projects

- 2018-Port St Johns Second Beach Coastal Infrastructure Project - E&S Risk Assessment
- 2015-Blouberg Development Initiative- E&S Risk Assessment
- 2019-Boulders Powerline BA Faunal desktop impact assessment, WC, SA.
- 2019-Ramotshere housing development BA Faunal desktop impact assessment, NW, SA.
- 2019-Cape Agulhas Municipality Industrial development faunal impact assessment, WC, SA.
- 2019-SANSA Solar PV BA Faunal desktop impact assessment, WC, SA.
- 2019-Wisson Coal to Urea Faunal desktop assessment, Mpumalanga.
- 2019-Assessment Boschendal Estate Faunal Opportunities and Constraints, WC, SA.
- 2019-Ganspan-Pan Wetland Reserve Recreational and Tourist Development Avifaunal Impact Assessment, NC, SA.
- 2018-City of Johannesburg Municipal Reserve Proclamation for Linksfield Ridge and Northcliff Hill Faunal Assessment, South Africa.
- 2017-Augrabies falls hydro-electric project Hydro-SA Faunal Impact Assessment.
- Port St Johns Second Beach Coastal Infrastructure Project (EIA), South Africa.
- Woodbridge Island Revetment checklist.
- Belmont Valley Golf Course and Makana Residential Estate (EIA)
- Belton Farm Eco Estate (BA).
- Ramotshere housing development (BA).
- G7 Brandvalley Wind Energy Project (EIA)
- G7 Rietkloof Wind Energy Project (EIA)
- G7 Brandvalley Powerlines (BA)
- G7 Rietkloof Powerlines (BA)
- Boschendal wine estate Hydro-electric schemes (BA, 24G and WULA)
- Mossel Bay Wind Energy Project (EIA)
- Mossel Bay Powerline (BA) 132kV interconnection
- Inyanda Farm Wind Energy (EIA)
- Middleton Wind Energy (EIA)
- Peddie Wind Energy (EIA)

- Cookhouse Wind Energy Project (EIA)
- Haverfontein Wind Energy Project (EIA)
- Plan 8 Wind Energy Project (EIA)
- Brakkefontein Wind Energy Project (EIA)
- Grassridge Wind Energy Project (EIA) (Coega)
- St Lucia Wind Energy Project (EIA)
- ACSA ECO CT (Lead ECO)
- Enel Paleisheuwel Solar farm (Lead ECO)
- NRA Caledon road upgrade ECO
- Solar Capital DeAar Solar farm annual audits
- Eskom Pinotage substation WUL offset compliance

CONTACT DETAILS

Name	**Nicole Dealtry**
Name of Company	**Biodiversity Africa**
Designation	Senior Botanist
E-mail	nicole@biodiversityafrica.com
Contact Number	+27 (0)81 044 1925
Education	April 2018: Bachelor of Science (BSc) Bontany and Geology December 2018: Bachelor of Science (BSc) Honours (Hons) Botany
Nationality	**South African**
Professional Affiliations	**SACNASP** Pri. Sci. Nat. Botany Reg No. 130289 **IAIAsa** Membership No. 6176 **SAAB:** Member of the South African Association of Botanists
Key areas of expertise	• Terrestrial Biodiversity Specialist Assessments • Plant Species Specialist Assessments • Alien Invasive Management Plans • Plant Search and Rescue Plans • GIS Mapping • Biodiversity Management and Monitoring Plans

PROFILE

Nicole is a Senior Botanical Specialist with over 5 and a half years' experience. She obtained her BSc Honours in Botany (Environmental Management) from Nelson Mandela University (NMU) in December 2018 and holds a BSc Degree in Environmental Management (Cum Laude) from NMU. Nicole is a professional member of the South African Council for Natural Scientific Professionals (SACNASP) (Pri. Sci. Nat. Botany Reg No. 130289), the International Association for Impact Assessment (IAIAsa) (Membership No. 6176), and the South African Association of Botanists.

During her first four years of working, Nicole gained experience as an Ecological Specialist and an Environmental Assessment Practitioner (EAP) undertaking Basic Assessments and assisting with the general Environmental Impact Assessment (EIA) process, including compiling Scoping and Environmental Impact Assessment Reports, Environmental Management Programmes, and managing the Public Participation Process. Nicole went on to specialise in the field of ecology, ensuring compliance with the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320 of 2020), Plant and Animal Species (GN R. 1150 of 2020), as well as the Species Environmental Assessment Guidelines (SANBI, 2020).

Nicole has undertaken numerous Ecological Impact Assessments for a range of developments, including Wind Energy Facilities (WEFs), Solar Energy Facilities (SEFs), mines, powerlines, housing developments, and roads and has worked in South Africa, Mozambique and Sierra Leone, working closely with developers and Environmental Assessment Practitioners to ensure these developments are environmentally sustainable, as well as financially and technically feasible. Additionally, she has experience in compiling Alien Invasive Species Management Plans, Ecosystem Services Assessments, Rehabilitation and Restoration Plans, Plant Search and Rescue Plans, performing ecological walk-through assessments, and obtaining permits for plant removal and translocation. Some of these assessments have been conducted in accordance with the IFC's Performance Standards.

EMPLOYMENT EXPERIENCE

Botanical Specialist, Biodiversity Africa

March 2023 – present

- Terrestrial Biodiversity Impact Assessments
- Plant Species Specialist Assessments
- Alien Management Plans
- Plant Search and Rescue Plans
- Ecological Walk-through/micro-siting Assessments
- Assistant for Animal Species Specialist
- GIS Mapping
- Ecosystem Services Assessments

Environmental Consultant and Botanical Specialist, Coastal and Environmental Services (CES)

07 January 2019 – February 2023

- Basic Assessments
- Scoping and Environmental Impact Assessments
- Environmental Management Programmes (EMPrs)
- Ecological Impact Assessments
- Botanical Micro-siting
- GIS Mapping
- Public Participation
- Environmental Auditing/Compliance Monitoring

ACADEMIC QUALIFICATIONS

Nelson Mandela University, Port Elizabeth

BSc Honours Botany (Environmental Management)

2018

Nelson Mandela Metropolitan University, Port Elizabeth

BSc Environmental Sciences

2015-2017

RECENT CONSULTING EXPERIENCE

Ecological Impact Assessments and Related Work

- **2024**: Ecological Baseline and Sensitivity Screening Assessment Report for The Proposed Dunoon and Doornbach Stormwater Master Plan, City Of Cape Town, Western Cape Province (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024**: Terrestrial Biodiversity, Plant and Animal Species Site Sensitivity Verification (SSV) Reports (x6) for the proposed Mokolo Solar 1-6 Photovoltaic Solar Energy Facilities and Associated Infrastructure Near Lephalale, Limpopo Province (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024**: Terrestrial Biodiversity, Plant and Animal Species Compliance Statement Reports (x6) for the Proposed Mokolo Solar 1-6 Photovoltaic Solar Energy Facilities and Associated Infrastructure Located Near Lephalale, Limpopo Province (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024**: Terrestrial Biodiversity, Plant and Animal Species Specialist Assessment Report for The Proposed House Naidoo Located Near Rooi-Els, Western Cape Province (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024**: Terrestrial Biodiversity, Plant and Animal Species Site Sensitivity Verification (SSV) Report for the Proposed Electrical Grid Infrastructure (EGI) Corridor near Lephalale, Limpopo Province (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024**: Terrestrial Biodiversity, Plant and Animal Species Site Sensitivity Verification (SSV) Report for the Proposed Lephalale Solar Pv Facility, Limpopo Province (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024**: Terrestrial Biodiversity, Plant and Animal Species Site Sensitivity Verification (SSV) Report for a proposed WEF located near Kareedouw, Eastern Cape Province (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024**: Terrestrial Biodiversity, Plant and Animal Species Compliance Statement Report for the Proposed Mixed Development on Erf 139, Zandhoogte, Located Near Groot Brakrivier, Western Cape Province (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024**: Terrestrial Biodiversity Compliance Statement for the proposed Wild Olive Chicken Farm near Tulbagh, Western Cape Province (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024:** Terrestrial Animal Species Compliance Statement for the Proposed Bushmanskrantz Water Treatment Works and Associated Infrastructure (Role: Lead Report Writer).
- **2024:** Louis Fourie Corridor Mixed-Use Development Terrestrial Animal Species Specialist Assessment Report (Role: Report Review and Update).
- **2024**: Ecological Baseline and Sensitivity Screening Assessment Report for The Proposed Elsieskraal River Corridor Plan, City Of Cape Town, Western Cape Province (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024**: Terrestrial Biodiversity, Plant and Animal Species Compliance Statement for the Proposed Kany Wine Farm Development near Stellenbosch, Western Cape Province (Role: Lead Report Writer and GIS).
- **2024**: Terrestrial Biodiversity, Plant and Animal Species Site Sensitivity Verification Report for the proposed 1000 MW Liquified Natural Gas (LNG) To Power Plant; LNG Storage and Regassification Facility, Overhead Electrical Transmission Line, And Associated Infrastructure Across Various Farm Portions, Saldanha, Western Cape (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024**: Terrestrial Biodiversity, Plant and Animal Species Site Sensitivity Verification Report for the Proposed Development of A 100 MW Liquified Petroleum Gas (LPG)–To–Power Facility, Overhead Electricity Transmission

Line And Associated Infrastructure Across Various Farm Portions, Saldanha, Western Cape (Role: Project management, Lead Report Writer, GIS, and field survey).

- **2024**: Terrestrial Biodiversity, Plant and Animal Species Site Sensitivity Verification Report the Proposed Development of a Liquified Petroleum Gas (LPG)–To–Power Facility, Overhead Electricity Transmission Line And Associated Infrastructure Across Various Farm Portions (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2024**: Alien Invasive Plant Management Plan for The Kudusberg Wind Energy Facility Near Sutherland, Northern Cape and Western Cape Province (Role: Lead Report Writer and Field Survey).
- **2024**: Plant Rescue and Protection Plan for the Kudusberg Wind Energy Facility and Associated Infrastructure (Role: Lead Report Writer and Field Survey).
- **2024**: Alien Invasive Plant Management Plan for the Rondekop Wind Energy Facility Near Sutherland, Northern Cape Province (Role: Lead Report Writer and Field Survey).
- **2024:** Plant Rescue and Protection Plan for the Rondekop Wind Energy Facility Near Sutherland, Northern Cape Province (Role: Lead Report Writer and Field Survey).
- **2023**: Ecological Screening Assessment for The Proposed Development of Erf 4833 And Erf 4831 In Hermanus, Western Cape (Role: Lead Report Writer and GIS).
- **2023**: Terrestrial Ecological Compliance Statement for Erf 7105 And 7131, Bellville, Cape Town, Western Cape Province (Role: Project management, Lead Report Writer, GIS, and field survey).
- **2023**: Ecosystem Services Assessment Report for The Karreebosch Wind Energy Facility and Electrical Gridline Infrastructure, Northern Cape and Western Cape Provinces, South Africa (Role: Lead Report Writer).
- **2023**: Alien invasive Management Plan for Portion 31 of Klipheuvel Farm No. 143 located along the banks of the Kleinbrak River, in the Western Cape Province (Role: Lead Report Writer and GIS).
- **2023**: Botanical Specialist Input regarding the Suitability of Biodiversity Offset Sites for the proposed Nordex Concrete Tower Manufacturing Facility near Jeffreys Bay, Eastern Cape Province (Role: Site Visit and Author).
- **2023**: Terrestrial Ecological Compliance Statement For The Proposed Cape Flats Wastewater Treatment Works (Wwtw) Upgrade, Situated In Cape Town, Western Cape (Role: Lead Report Writer, GIS, and field survey).
- **2023**: Terrestrial Ecological Compliance Statement for The Proposed Landsdowne Housing Development on Erf 62594, Cape Town, Western Cape Province (Role: Lead Report Writer, GIS, and field survey).
- **2023**: Terrestrial Plant Species Specialist Assessment Report for The Proposed Plettenberg Bay Lagoon Residential Estate, Western Cape Province (Role: Lead Report Writer, GIS, and field survey).
- **2023**: Terrestrial Biodiversity Compliance Statement for The Proposed Plettenberg Bay Lagoon Residential Estate (Role: Lead Report Writer, GIS, and field survey).
- **2023**: Method Statement for the Translocation of the Cape Dwarf Chameleon (*Bradypodion pumilum*) (Role: Lead Report Writer).

Older:

- ZMY Steel Traders (Pty) Ltd., Steel Recycling Plant, Zone 5 of the Coega SEZ, Eastern Cape Province (Role: Ecological Specialist and Ecological Chapter Writer).
- Ecological Impact Assessment for the proposed Kareekrans Boerdery Agricultural Development near Kirkwood Eastern Cape Province (Role: Botanical specialist and Lead Report Writer).

- Ecological Impact Assessment for the proposed Sitrusrand Dwarsleegte Farm Citrus Development near Kirkwood, Eastern Cape Province – Ecological Impact Assessment and Report Writing (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the proposed Uitsig Boerdery Trust Citrus Development near Kirkwood, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ground Truthing Survey for *Aloe bowiea* on Portion 2 of Farm 683 for the proposed Uitsig Boerdery Trust Citrus Development near Kirkwood, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Mosselbankfontein Coastal Dune and Ecological Impact Assessment near Witsand, Western Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Mangrove Forest Survey for the Kenmare Biodiversity Management Plan, Topuito, Mozambique (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the proposed Refele Village Sports Facility, Mount Fletcher, Elundini Local Municipality, Eastern Cape Province of South Africa (Role: Lead Report Writer).
- Ecological Impact Assessment for the proposed Hamburg Quarry Expansion, R72, Ngqushwa Local Municipality (Role: Lead Report Writer).
- Ecological Opinion and Site Sensitivity Report for the proposed Woodlands Dairy 22kV Overhead Line near Humandsdorp, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment Report for the proposed Edendale Quarry, R56, Matatiele Local Municipality, Eastern Cape Province (Role: Report Writer).
- Ecological Impact Assessment for the proposed TWFT Piggery near Tsitsikamma, Koukama Local Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the proposed Oudtshoorn Cemetery Expansion, Oudtshoorn Local Municipality, Western Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Tyolomnqa River Estuary Situation Assessment (Role: Assistant Report Writer).
- Ecological Opinion Letter for the Proposed Umsobomvu Infrastructure Development, Eastern and Northern Cape Provinces (DEFF Reference Number: 14/12/16/3/3/1/2040) (Role: Report Writer).
- Ecological Opinion Letter for the Proposed Coleskop Infrastructure Development, Eastern and Northern Cape Provinces (DEFF Reference Number: 14/12/16/3/3/1/2039) (Role: Report Writer).
- Quinera Estuary Draft Situation Assessment Report (Role: Report Writer).
- Ecological Impact Assessment for the Proposed Umoyilanga 132 kV Overhead Line in the Sundays River Valley Local Municipality and the Nelson Mandela Bay Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the Proposed Umoyilanga Ancillary Infrastructure near Uitenhage, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment Report for the proposed Marine Servitude Project, Zone 10, Coega SEZ, Eastern Cape Province, South Africa (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micro-siting Report for the proposed Umoyilanga 132 kV Overhead Line in the Sundays River Valley Local Municipality and the Nelson Mandela Bay Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micro-siting Report for the Proposed Dassiesridge (Umoyilanga) Wind Energy Facility near Uitenhage, Nelson Mandela Bay Municipality and Sundays River Valley Local Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).

- Ecological Screening Report for the Proposed Hlaziya 400-132 kV Powerline Project (the MTS Integration Project) from close to Jeffrey's Bay to Grassridge, near the Coega Sez, Eastern Cape Province (Role: Lead Report Writer).
- Ecological Impact Assessment for the proposed Umsobomvu Substation, Concrete Tower Manufacturing Facilities and Temporary Laydown Area, situated in the Umsobomvu Local Municipality (Northern Cape Province) and the Inxuba Yethemba Local Municipality (Eastern Cape Province) (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micro-siting Report for the Eskom Infrastructure MTS situated in the Umsobomvu Local Municipality (Northern Cape Province) (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micro-siting Report for the Proposed Coleskop Wind Energy Facility situated in the Umsobomvu Local Municipality (Northern Cape Province) and the Inxuba Yethemba Local Municipality (Eastern Cape Province) (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micro-siting Report for the Proposed Umsobomvu Wind Energy Facility situated in the Umsobomvu Local Municipality (Northern Cape Province) and the Inxuba Yethemba Local Municipality (Eastern Cape Province) (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the Proposed Ganspan Pering 132 kV Overhead Line near Pampierstand, North West and Northern Cape Provinces (Role: Botanical Specialist and Lead Report Writer).
- Botanical Micro-Siting Investigation for the R342 Road Upgrade Between Paterson and Addo, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Terrestrial Biodiversity Compliance Statement for the proposed Stedin College, Walmer, Nelson Mandela Bay Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment Report for a proposed Hippo Enclosure on Glen Boyd Farm, Makana Local Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the Proposed Senqu Rural Water Supply Scheme, Joe Gqabi District Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Environmental Management Site Specification for the Rehabilitation of Land within the Coastal Dune System Impacted by the Zone 10 Services Project, Coega SEZ, Eastern Cape Province (Role: Site Visit and Assistant Report Writer).
- Botanical Assessment Report for the proposed Agricultural Development on the Remainder of Erf 60845, Zone 1, East London Industrial Development Zone, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Botanical Impact Assessment for the proposed FG Gold Limited Baomahun Gold Project, Sierra Leone (Role: Botanical Specialist and Lead Report Writer).
- Biodiversity Management Plan for the proposed FG Gold Limited Baomahun Gold Project, Sierra Leone (Role: Lead Report Writer).
- Ecological Baseline Assessment for the proposed Jeffreys Bay Eco-Estate, Eastern Cape Province (Role: Botanical Specialist and Co-Author).
- Ecological Impact Assessment for the proposed Mulilo Newcastle Wind Energy Facility, KwaZulu-Natal Province (Role: Botanical Specialist and Assistant Report Writer).
- Ecological Impact Assessment for the proposed Ngxwabangu Wind Energy Facility and Grid Connection near Cofimvaba, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).
- Ecological Impact Assessment for the proposed Umoyilanga Buffer Yard, Site Camp and Site Camp Access Road near Uitenhage, Nelson Mandela Bay Municipality and Sundays River Valley Local Municipality, Eastern Cape Province (Role: Botanical Specialist and Lead Report Writer).

- Terrestrial Biodiversity Compliance Statement for the proposed Reverse Osmosis Plant for the Matla Power Station near Kriel, Mpumalanga Province (Role: Lead Report Writer).
- Ecological Impact Assessment for the proposed Great Kei Ancillary Infrastructure located near Komga, Eastern Cape Province.

Basic Assessments

- Basic Assessment Report (BAR) for the proposed Duyker Island Prospecting Right, North West Province (Role: Assistant Report Writer).
- Basic Assessment Report (BAR) for the proposed Fairview Sand Mine near Port Alfred, Eastern Cape Province (Role: Report Writer).
- Basic Assessment Report (BAR) for the proposed Kareekrans Boerdery Agricultural Development near Kirkwood, Eastern Cape Province (Role: Report Writer).
- Basic Assessment Report (BAR) for the proposed Sitrusrand Dwarsleegte Farm Citrus Development near Kirkwood, Eastern Cape Province (Role: Report Writer).
- Basic Assessment Report (BAR) for the Proposed Private Jetty in Bushman's Estuary near Kenton-On-Sea, within the Eastern Cape Province (Role: Report Writer).

Environmental Auditing

- Khayamnandi Extension on Erven 114, 609, 590 and 24337, Bethelsdorp, within the Nelson Mandela Bay Municipality;
- Aberdeen Bulk Water Supply Phase 2, Dr Beyers Naude Local Municipality, Eastern Cape Province, South Africa;
- The Milkwoods Integrated Residential Development, Remainder Erf 1953, Victoria Drive, Walmer, Nelson Mandela Bay Municipality, Eastern Cape Province;
- Fishwater Flats Wastewater Treatment Works Refurbishment, Nelson Mandela Bay Municipality, Eastern Cape Province;
- The Refurbishment of the Kwanobuhle Wastewater Treatment Plant, Nelson Mandela Bay Municipality, Eastern Cape Province, South Africa; and
- Driftsands Sewer Collector Augmentation (Phase Ii), Within the Nelson Mandela Bay Municipality, Eastern Cape Province.

Public Participation process

- Duyker Island Prospecting Right, North West Province St Francis Coastal Protection Scheme.
- Fairview Sand Mine near Port Alfred, Eastern Cape Province.
- Kareekrans Boerdery Agricultural Development near Kirkwood Eastern Cape Province,
- Proposed Coastal Protection Scheme, St Francis Bay, Kouga Local Municipality, Eastern Cape Province; and
- Sitrusrand Dwarsleegte Farm Citrus Development near Kirkwood, Eastern Cape Province.
- Marine Intake and Outfall Infrastructure Servitude Project, Zone 10, Coega SEZ, Eastern Cape Province, South Africa.
- Proposed Hlaziya 400-132 kV Powerline Project (the MTS Integration Project) from close to Jeffrey's Bay to Grassridge, near the Coega Sez, Eastern Cape Province.

Social Auditing

- Malawi Millennium Development Trust – Resettlement Action Plan Implementation Auditing.