TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT REPORT FOR THE PROPOSED MIDAS BESS AND GRID CONNECTION, GAUTENG PROVINCE

Prepared for:

Midas BESS (PTY) Ltd
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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).

Amber Jackson (Faunal Specialist) (*Cand. Nat. Sci)*

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.

Declaration of Independence

Tarryn Martin (Botanical Specialist)

- 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.

Amber Jackson (Faunal Specialist)

- 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;
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Non-Technical Summary

Introduction

Midas BESS (Pty) Ltd ('the Applicant') is proposing the construction of the Midas Battery Energy Storage (BESS) Facility, located on Portion 10 of the Farm Uitval No. 280, situated approximately 18 km east of Carltonville in the Gauteng Province.

The Applicant is also proposing to upgrade the existing access road on Portion 8 and Portion 10 of the Farm Uitval No. 280; and to construct new 132kV grid connection infrastructure on Portion 10 of the Farm Uitval No. 280, Portion 22 of the Farm Driefontein No. 355, Portion 5 of the Farm Doornkloof No. 350, Portion 71 of the Farm Leeuwpoort 356, Portion 70 of the Farm Leeuwpoort 356, Portion 36 of the Farm Leeuwpoort 356, Portion 35 of the Farm Leeuwpoort 356, Portion 33 of the Farm Leeuwpoort 356 and Portion 28 of the Farm Driefontein 355.

The Midas BESS facility will have a total development footprint of up to approximately 15 ha and will have a maximum export capacity of 77 MW. The development area is situated within the Merafong City Local Municipality and the Rand West City Local Municipality. The site is accessible via existing gravel roads from the R501 and N12.

The proposed Midas BESS will cover approximately 15 ha and will include the following infrastructure:

- Solid State Battery Energy Storage System (BESS) (up to 10 ha).
- Inverters and transformers.
- Site and internal access roads (up to 8m wide).
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance (up to 1 ha).
- Laydown areas (3 ha temporary and 1 ha permanent).
- A 132 kV facility substation (up to 1 ha).
- 33 kV cabling between the project components and the facility substation.

The project will also include Grid connection infrastructure consisting of:

- A 132 kV Eskom Switching Station (up to 1 ha).
- 132 kV powerline (up to 4 km long) connecting the Eskom switching station to the Midas Main Transmission Substation (a grid connection corridor of 100m wide will be assessed to allow for environmental sensitivities and/or micro-siting).

The Grid connection infrastructure, although assessed cumulatively with the BESS, will be subject to a separate environmental application process administered by the provincial authority.

Methodology

A desktop assessment was undertaken prior to the site visit to determine whether there are any terrestrial biodiversity features within the site that are considered sensitive. This was followed by field survey undertaken in mid-summer (16 January 2024), during the optimal flowering season, to confirm the site sensitivity for the project area. The site sensitivity verification report determined that the project area was located in an area with a medium site ecological importance (SEI). As such, a Biodiversity Impact Assessment Report was required.

Results

The BESS infrastructure is located in Carletonville Dolomite Grassland and the grid connection is located in an area that has been transformed and used for agriculture. Carletonville Dolomite Grassland is listed as least concern and project infrastructure will only affect 0.003% of the remaining extent of this vegetation type. Impacts of the project on this vegetation type are considered to be low.

No plant species of conservation concern (SCC) were recorded within the project area or have a high likelihood of occurrence within the project area.

Only two animal SCC, the Serval (*Leptailurus serval)* and African Striped Weasel (*Poecilogale albinucha*), have a high likelihood of occurrence within the project area. Both species are listed as NT and are wide ranging and unlikely to be significantly affected by the construction and operation of the BESS and grid infrastructure.

Based on the findings from the field survey, combined with a desktop assessment, the combined SEI for the project area was determined to be Medium for the Carletonville Dolomite Grassland and Very Low for the Transformed Land. Development activities of medium and low significance are acceptable within Carletonville Dolomite Grassland.

Comment on the DFFE Screening Tool Report

Animal Species Theme

The DFFE screening tool report identified the Animal Species Theme as Medium due to the likely presence of two bird species, three invertebrate species and two mammal species (Spotted-necked Otter and Makwassie musk shrew). This assessment only assesses reptiles, amphibians and mammals and as such only comment on these groups have been provided.

Based on the habitat requirements of the Spotted-necked Otter and Makwassie musk shrew combined with the available habitat recorded within the project area, neither of these species has a high likelihood of occurrence within the project area. However, two species (the Serval and Striped Weasel) have a high likelihood of occurrence within the project area. The SEI analysis therefore took this into account and found that the project area has a Low SEI for animal species. The specialist therefore disagrees with the DFFE screening tool report and is of the opinion that the sensitivity should be low rather than medium for the project area.

Plant Species Theme

The DFFE screening tool report identified the Plant Species Theme as Medium due to the likely presence of three plant SCC. The likelihood of occurrence of each of these species was determined to be medium and low. As such, the specialist is of the opinion that the sensitivity for the plant species theme should be low rather than medium.

Terrestrial Biodiversity Theme

The DFFE screening tool report identified the Terrestrial Biodiversity Theme as Very High due to the presence of the following sensitive features:

- CBA 1
- ESA 1 and 2
- National Protected Area Expansion Strategy (NPAES)

Chapter 6 provides comment on how project infrastructure will affect each of these features. The underlying features driving the CBA status of the project area are based on the vegetation type present and plant habitat. Since the vegetation type present is listed as LC and has an SEI of medium, and because there are no likely SCC present within the project area, these features are unlikely to be severely affected by the project development. Furthermore, no project infrastructure is located within a NPAES.

Based on the above, and given the small footprint of the facility, the specialist is of the opinion that the sensitivity for the terrestrial biodiversity theme should be medium rather than very high.

Impacts and Recommendations

Bess

Seven construction phase impacts, two operational phase impacts, two decommissioning phase impacts and two cumulative impacts have been identified for the BESS and associated infrastructure. Of these thirteen impacts, five were of medium significance, seven were of low significance and one was negligible prior to mitigation. However, if the mitigation hierarchy is applied and the recommendations outlined in the report implemented, these can be reduced to twelve impacts of low significance and one impact that is negligible (Table 1).

Table 1: Summary of impacts associated with the BESS

Impact		Significance and Ranking	
		Pre-Mitigation	Post-Mitigation
CONSTRUCTION PHASE			
Impact 1	**Loss of degraded Carletonville Dolomite Grassland**	Low	Low
Impact 2	Loss of faunal habitat	Low	Low
Impact 3	Loss of Plant Species of Conservation Concern	Negligible	Negligible
Impact 4	Loss of Faunal Species of Conservation Concern	Low	Low
Impact 5	Disruption of Ecosystem Function and Process	Low	Low
Impact 6	Disturbance of faunal species and their livelihood activities (shelter, foraging and breeding) due to construction related noise, vibrations, dust and night lighting.	Medium	Low
Impact 7	Mortality of faunal species due to project related activities	Medium	Low
OPERATIONAL PHASE			
Impact 8	Infestation of alien invasive plant species	Medium	Low
Impact 9	Mortality of faunal species due to project related activities	Medium	Low
DECOMMISSIONING PHASE			

Impact 10	Loss of indigenous vegetation and species of conservation concern	Low	Low
Impact 11	Disturbance to faunal species and potential reduction in abundance and mortality of faunal species	Medium	Low
CUMULATIVE IMPACTS			
Impact 12	Loss of indigenous vegetation and species of conservation concern	Low	Low
Impact 13	Increased reduction in faunal habitat and increase disturbance of faunal species	Low	Low

Grid Infrastructure

Six construction phase impacts, two operational phase impacts, two decommissioning phase impacts and two cumulative impacts have been identified for the grid infrastructure. Of these twelve impacts, five were of medium significance, five were of low significance and two were negligible prior to mitigation. However, if the mitigation hierarchy is applied and the recommendations outlined in the report implemented, these can be reduced to ten impacts of low significance and two impacts that are negligible (Table 8.2).

Table 2: Summary of impacts associated with the grid infrastructure

Impact		**Significance and Ranking**	
		Pre-Mitigation	**Post-Mitigation**
CONSTRUCTION PHASE			
Impact 1	Loss of faunal habitat	Negligible	Negligible
Impact 2	Loss of Plant Species of Conservation Concern	Negligible	Negligible
Impact 3	Loss of Faunal Species of Conservation Concern	Low	Low
Impact 4	Disruption of Ecosystem Function and Process	Low	Low
Impact 5	Disturbance of faunal species and their livelihood activities (shelter, foraging and breeding) due to construction related noise, vibrations, dust and night lighting.	Medium	Low
Impact 6	Mortality of faunal species due to project related activities	Medium	Low
OPERATIONAL PHASE			
Impact 7	Infestation of alien invasive plant species	Medium	Low
Impact 8	Mortality of faunal species due to project related activities	Medium	Low
DECOMMISSIONING PHASE			
Impact 9	Loss of indigenous vegetation and species of conservation concern	Low	Low
Impact 10	Disturbance to faunal species and potential reduction in abundance and mortality of faunal species	Medium	Low
CUMULATIVE IMPACTS			
Impact 11	Loss of indigenous vegetation and species of conservation concern	Low	Low
Impact 12	Increased reduction in faunal habitat and increase disturbance of faunal species	Low	Low

Conclusions and Recommendations

Given that all impacts associated with the BESS and grid connection are of low significance after the mitigation hierarchy has been applied, construction of the BESS and grid infrastructure are acceptable, provided the mitigation measures listed in section 8.3 are implemented.

Ecological Statement and Opinion of the Specialist

Given that the project area has a medium (BESS) and very low (Grid Connection) sensitivity, the specialists are of the opinion that the development can proceed, provided the recommendations contained in this report are implemented.

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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).

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).

Acronyms

ADU	Animal Demography Unit
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
PNCO	Provincial Nature Conservation Ordinance
POSA	Plants of Southern Africa
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 2 & 3; Appendix 3 & 4
	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 4
	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 recorded 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 7
	3.1.10	A discussion on the cumulative impacts;	Section 8.1.4 and 8.2
	3.1.11	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 8.3 and Section 9.2
	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 10
	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 3 & 4
	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;	Section 5.2
	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 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 7
	3.1.10	A discussion on the cumulative impacts;	Section 8.1.4 and 8.2
	3.1.11	Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Section 8.3 and Section 9.2
	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 10
	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 & 3; Appendix 3 & 4
	3.1.2	A signed statement of independence by the specialist;	Page 4 & 5
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	3.1.6	A location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	Chapter 7
	3.1.7	Additional environmental impacts expected from the proposed development;	Chapter 8
	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);	Section 8.3 and 9.2
	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 9
	3.1.15	Any conditions to which this statement is subjected.	Section 9.2 and 9.4
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

Midas BESS (Pty) Ltd ('the Applicant') is proposing the construction of the Midas Battery Energy Storage (BESS) Facility, located on Portion 10 of the Farm Uitval No. 280, situated approximately 18 km east of Carltonville in the Gauteng Province (Figure 1.1).

The Applicant is also proposing to upgrade the existing access road on Portion 8 and Portion 10 of the Farm Uitval No. 280; and to construct new 132kV grid connection infrastructure on Portion 10 of the Farm Uitval No. 280, Portion 22 of the Farm Driefontein No. 355, Portion 5 of the Farm Doornkloof No. 350, Portion 71 of the Farm Leeuwpoort 356, Portion 70 of the Farm Leeuwpoort 356, Portion 36 of the Farm Leeuwpoort 356, Portion 35 of the Farm Leeuwpoort 356, Portion 33 of the Farm Leeuwpoort 356 and Portion 28 of the Farm Driefontein 355.

The Midas BESS facility will have a total development footprint of up to approximately 15 ha and will have a maximum export capacity of 77 MW. The development area is situated within the Merafong City Local Municipality and the Rand West City Local Municipality. The site is accessible via existing gravel roads from the R501 and N12.

The proposed Midas BESS will cover approximately 15 ha and will include the following infrastructure (Figure 1.2):

- Solid State Battery Energy Storage System (BESS) (up to 10 ha).
- Inverters and transformers
- Site and internal access roads (up to 8m wide).
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- Laydown areas (3 ha temporary and 1 ha permanent).
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The Grid connection infrastructure, although assessed cumulatively with the BESS, will be subject to a separate environmental application process administered by the provincial authority.

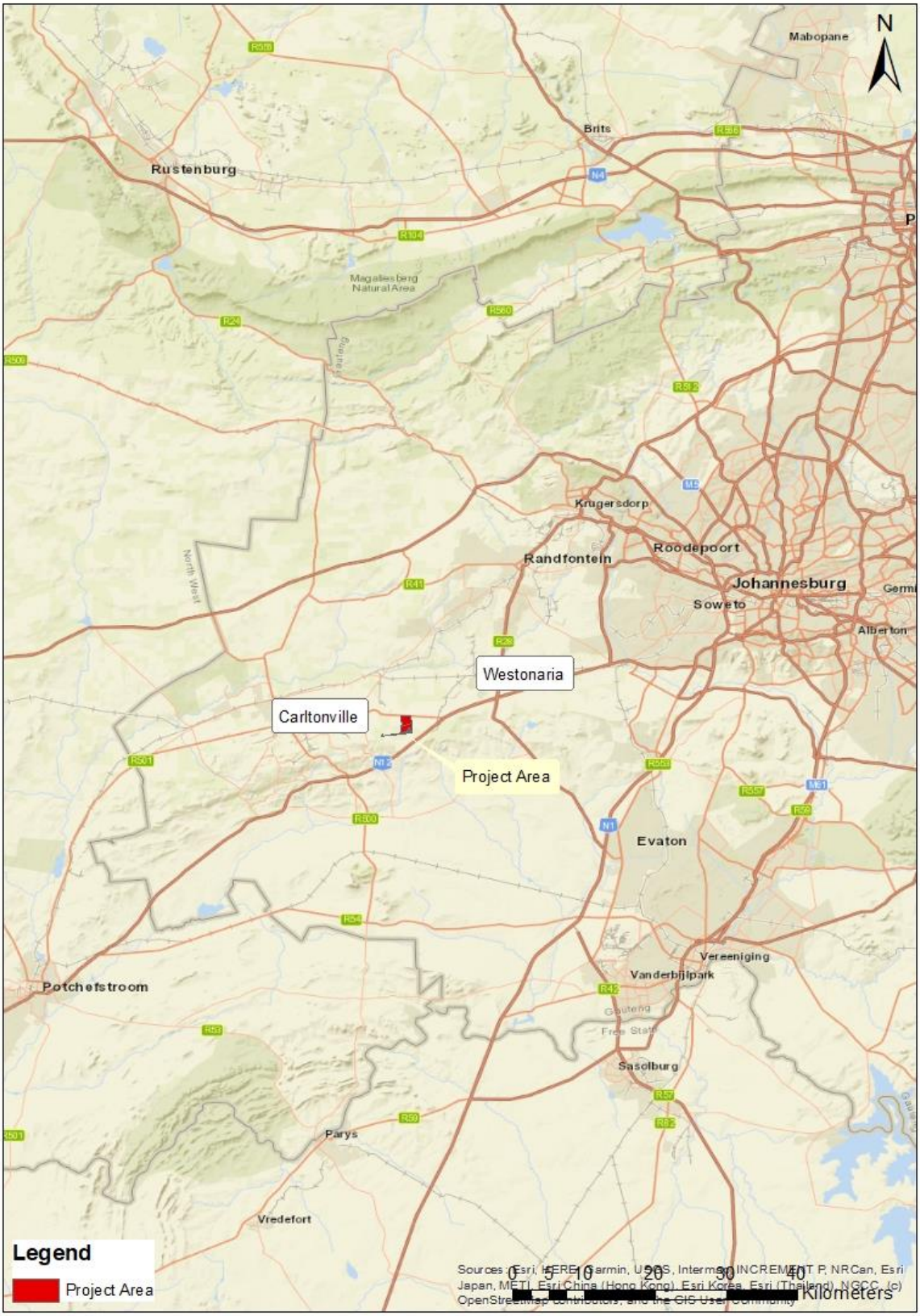


Figure 1.1: Location of the project area in relation to Kroonstad

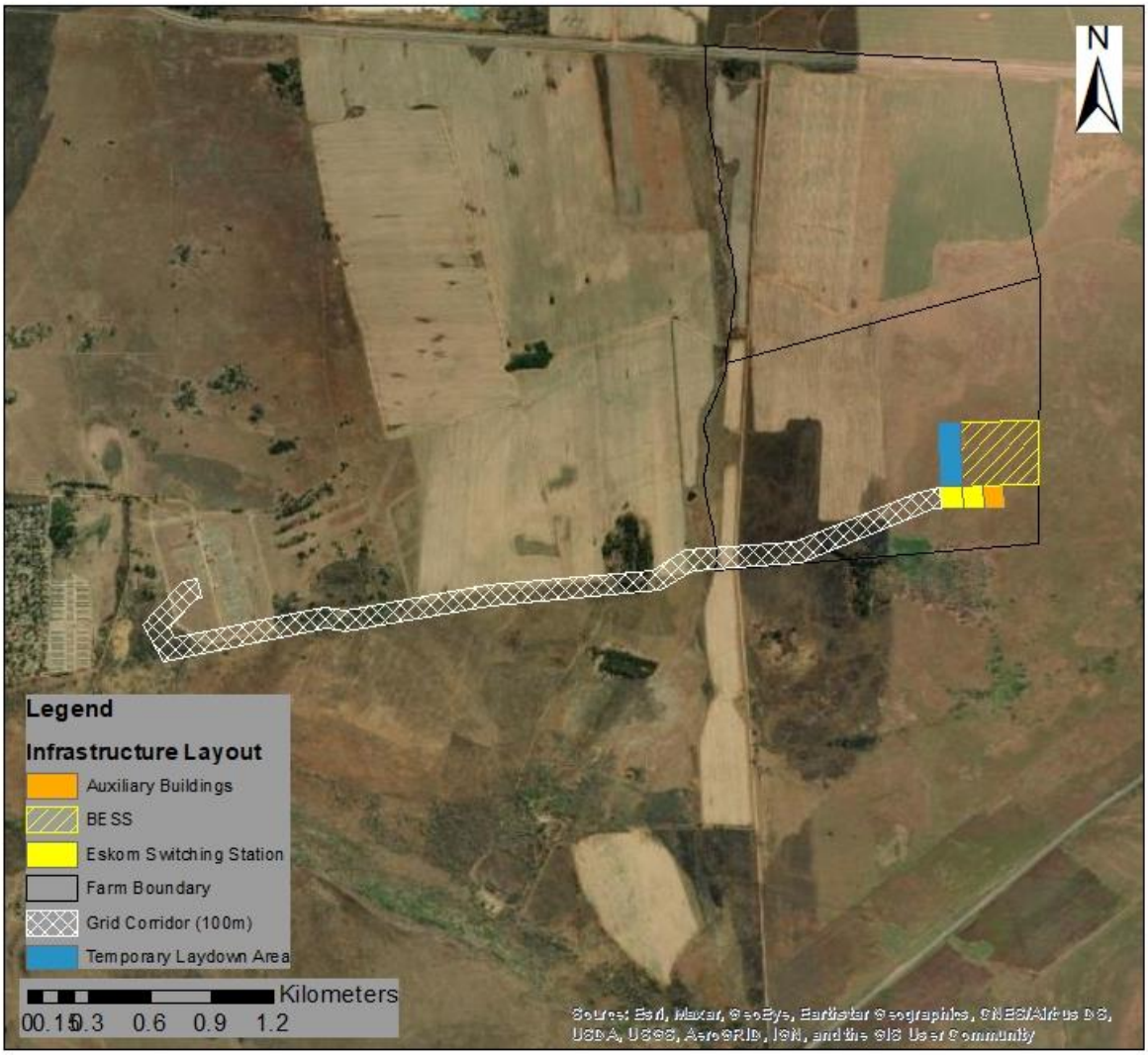


Figure 1.2: Infrastructure Map

1.2. Reporting Requirements

In terms of the Protocol for the Specialist Assessment and Minimum Reporting Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN R. 320 of 2020) and Terrestrial Animal and Plant Species (GN R. 1150), prior to the commencement of a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool, must be confirmed by undertaking a site sensitivity verification. The results of the screening tool, together with the site sensitivity verification, ultimately determines the minimum report content requirements. Where the information gathered from the site sensitivity verification differs from the screening tool designation of 'very high' or 'high' and is found to be of a 'low' sensitivity, then a Compliance Statement must be submitted. However, if the site sensitivity verification confirms the findings of the Screening Report generated for this site, then a full Terrestrial Biodiversity Impact Assessment must be submitted as part of the Application for Environmental Authorisation (EA).

According to the Site Sensitivity Verification Report undertaken for this project, the Animal Species Theme was found to be low, the Plant Species Theme was found to be Low and the Terrestrial Biodiversity Theme was found to be Medium. 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, which in this instance is Medium. Based on these resulst, a full Terrestrial Ecological Impact Assessment, including plants and animals, has been undertaken for the project area.

1.3. Scope, Purpose and Objectives

In accordance with GN R 1150, this report serves as the Terrestrial Biodiversity Impact Assessment, including terrestrial biodiversity, animals (excluding birds, bats and invertebrates), and plants and was prepared as part of the Scoping and Environmental Impact Assessment (S&EIA) for the proposed Midas BESS Facility, Gauteng Province.

The purpose of this report is to confirm the vegetation types, faunal habitat, and Species of Conservation Concern (SCC) present within the project area, assess the Site Ecological Importance (SEI) of the project area, assess the impact of the development on the terrestrial biological features present and, where feasible, provide mitigation measures to reduce the impacts including identifying no-go areas.

Based on the above, the objectives and Terms of Reference for the Terrestrial Ecological Impact Assessment are as follows:

- Undertake a desktop assessment of the site to determine its sensitivity and identify SCC (plants, amphibians, reptiles, mammals) that could be present within the project area.
- Undertake a field survey, to record the following information:
    - Species present

    - Identification of species that are either protected (TOPS and PNCO) or considered threatened (CR, EN, VU) on the South African Red Data List
    - Assess the level of degradation/ecological status of the site (i.e. intact, near natural, transformed).
- Assess the SEI of the project area using the sensitivity analysis outlined in the Species Environmental Assessment Guideline (SANBI, 2020).
- For areas of moderate and high sensitivity, assess the impact that the construction of the project infrastructure will have on the vegetation, faunal habitat, ecological processes and SCC.
- Where necessary, provide mitigation measures to reduce the significance of the impacts associated with the proposed development on the terrestrial biodiversity features of the project area.
- Provide a specialist statement/opinion regarding the acceptability of the proposed development in terms of the terrestrial biodiversity of the project area

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 almost certain that additional SCCs are present. However, every effort was made to identify SCC present in the project area 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, based on observed habitat availability, was determined. The field survey and desktop assessment provided sufficient information to confirm the presence/absence of SCC.
- Sampling was carried out at one stage in the annual or seasonal cycle. The survey was conducted in mid summer (16 January 2024) when most species were flowering. However, some early flowering species may have gone undetected.
- This assessment includes plants, mammals (excluding bats), amphibians and reptiles. It does not include birds, bats or invertebrates. Birds have been assessed separately by specialists within this field.
- The faunal assessment is based on a field survey to assess available habitat present within the project area, coupled with a desktop assessment to determine the likelihood of occurrence of SCC.
- The assessment has been undertaken to meet the Protocol for the Specialist Assessment and Minimum Report Requirements for Environmental Impacts on Terrestrial Biodiversity (2020) and the Species Environmental Assessment Guidelines (2021).

2. METHODOLOGY

2.1. DFFE Screening Report

The DFFE screening 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 animal species theme, plant species theme, and the terrestrial biodiversity theme (Table 2.1). Comment has been provided in the table below indicating how these themes have been assessed.

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

Theme	Sensitivity	Assessment
Animal Species Theme (Figure 2.1)	Medium • Possible presence of two bird species • Possible presence of three invertebrates • Possible presence of two mammals *(Hydrictis maculicollis* and *Crocidura maquassiensis*)	The animal species theme has been categorised as medium due to the possible presence of two bird species, three invertebrates and two mammal species. The field survey assessed whether there was any suitable habitat present for the mammal species. Birds are assessed separately by an avifaunal specialist. The faunal assessment also identifies amphibians, reptiles and mammals that could occur within the project area and provides comment on the likelihood of occurrence of SCC (Refer to Chapter 4).
Plant Species Theme (Figure 2.2)	Medium • Likely presence of three plant species (*Khadia beswickii,* Sensitive Species 1147, Sensitive Species 1248)	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 5).
Terrestrial Biodiversity Theme (Figure 2.3)	Very High • Critical Biodiversity Area 1 (CBA 1) • Ecological Support Area 1 (ESA 1) and 2 (ESA 2)	The field survey confirmed which vegetation types were present within the project area. Furthermore, the implications of project activities on the CBA and NPAES has been assessed in Chapter 6.

	• National Protected Area Expansion Strategy (NPAES)	

2.2. Desktop Assessment

2.2.1. 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 study area, were also included. Literature sources included:

- Amphibians –Du Preez & Carruthers (2017), FrogMap (ADU, 2024).
- Reptiles – Branch (1998), ReptileMap (ADU, 2024).
- Mammals – Stuart & Stuart (2014), MammalMap (ADU, 2024).
- IUCN.
- iNaturalist.

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

- Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland (Bates *et al*., 2014).
- Atlas and Red List of Frogs of South Africa, Lesotho and Swaziland (Minter *et al*., 2004).
- Red List of Mammals of South Africa, Swaziland and Lesotho.

2.2.2. Plant Species Theme

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

- The Plants of Southern Africa (POSA) database.
- iNaturalist.
- The DFFE screening report for the site (January 2024).

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

2.2.3. Terrestrial Biodiversity Theme

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

- The DFFE screening report for the site (January 2024).
- The South African Vegetation Map (Mucina and Rutherford, 2018).

- Gauteng Conservation Plan 3.3 (2011)
- The International Union for the Conservation of Nature (IUCN) Red List of Ecosystems for South Africa (SANBI, 2021).
- National Biodiversity Management: Biodiversity Act (NEM:BA) List of Threatened or Protected Species.
- The National Biodiversity Assessment (SANBI, 2018).

2.3. Field Survey

A field survey was undertaken during mid-summer (16 January 2024) to confirm the current land use, vegetation types and faunal habitat present. The information gathered from the site visit was sufficient to determine the sensitivity of the site. Figure 2.1 indicates the sample sites.

2.3.1. 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, and identifying the current land use.

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. Vegetation communities were then described according to the dominant species recorded from each type, and these were mapped and assigned a sensitivity score.

2.3.2. Animal Species Theme

The purpose of the faunal survey was to determine the types of faunal habitats present within the project area supplemented with a desktop assessment to determine the likelihood of occurrence of SCC present within available habitat. Faunal habitat within the project area was recorded and mapped by the faunal specialist which provided sufficient information to draw conclusions on the likelihood of occurrence of SCC.

2.4. Site Sensitivity Assessment

The Species Environmental Assessment Guideline (SANBI, 2021) 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, functional integrity and receptor resilience (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 available spatial planning tools as well as by applying the SEI sensitivity based on the field survey.

Table 2.2: 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)	

2.5. Description of impact analysis methodology used

The environmental assessment aims to identify the various possible environmental impacts that could result from the proposed project activity. Each impact needs to be evaluated in terms of its significance, and in doing so, highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale (e.g. project site, local, national or global) whereas intensity is defined by the severity of the impact (e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence).

Significance is an indication of the importance of the impact in terms of both physical extent and temporal (time) scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

A full description of the impact assessment methodology has been included in the overall Environmental Impact Assessment Scoping Report and Appendix 2 of this report.

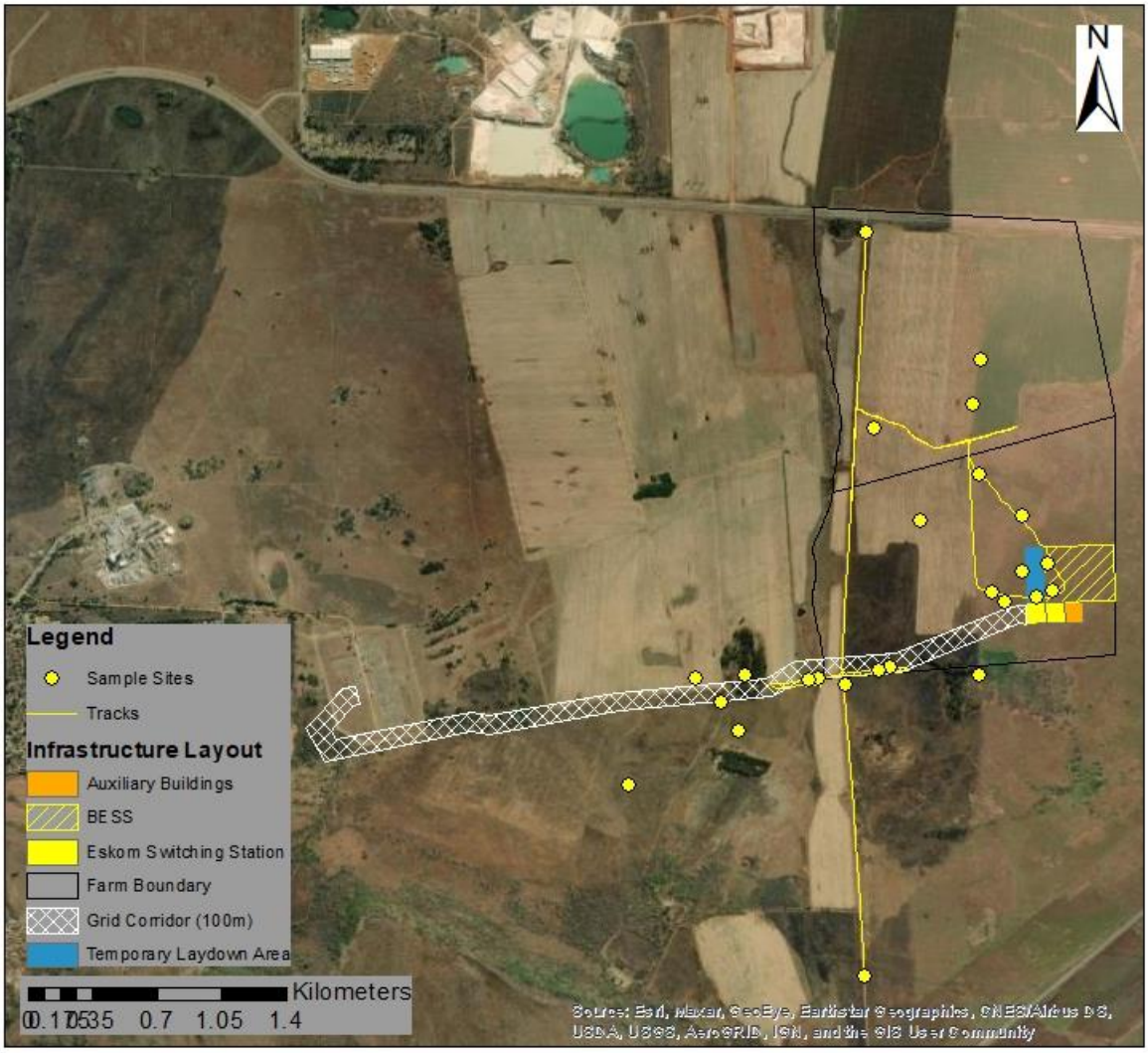


Figure 2.1: Map showing sample sites and tracks in relation to the project area.

3. BIOPHYSICAL DESCRIPTION OF THE PROJECT AREA

3.1. Environmental Factors Influencing the Vegetation Types and Habitats of the Project Area

The project area falls within the Grassland Biome which covers one third of South Africa's land surface, stretching from the Eastern Cape and KwaZulu-Natal, over the high escarpment and onto the central plateau (SANBI, 2013). Grasslands typically boast a high biodiversity, providing important habitat for a range of South Africa's rare, endangered, and endemic animal and plant species, with plant diversity of the grassland biome only second to that of the fynbos biome. This biodiversity underpins a range of ecosystem services which supports most of South Africa's important economic activities and millions of rural livelihoods (SANBI, 2013).

The distribution of this biome in South Africa is determined by the interplay of environmental variables, primarily climate (precipitation, temperature, frost), topography, geology, and soil (Mucina, *et al*., 2006). These environmental variables together with the ecological drivers, namely grazing and fire, influence the structure, species composition and primary productivity of vegetation types within this Biome (Mucina, *et al.,* 2006; SANBI, 2013).

SANBI (2013) have arranged the grassland vegetation types into five broad ecosystem groups based on their species composition, community structure, abiotic environmental factors, ecological characteristics, and management requirements. These include:

- Dry Highveld Grassland.
- Mesic Highveld Grassland (excluding the north-eastern escarpment areas of Mpumalanga).
- High-Altitude Grassland (including the 'Drakensberg Grasslands' as defined in Mucina & Rutherford, 2006, the escarpment along the KwaZulu-Natal/Free State border and the north-eastern escarpment areas of Mpumalanga).
- Sub-Escarpment Grassland.
- Coastal Grassland (grassy vegetation types embedded within the Indian Ocean Coastal Belt Biome).

The project area falls within the Dry Highveld Grassland ecosystem group. The biophysical characteristics that influence this vegetation type are discussed below.

Dry Highveld Grasslands occur at mid-altitudes of 1300-1600 m above sea level (asl) and occupy the central plateau of the country, extending over much of the Free State and into the North West Province, with small areas occurring in the Eastern Cape, Northern Cape and Gauteng. The climate of this area is temperate with summer rainfall and dry winters. The mean annual precipitation is low (400-550 mm) and there is a moderate to high frequency of frost (20 – 50 frost days per year) in winter. The topography is mostly flat to undulating broken by rocky ridges, small outcropping mountains, and river valleys in some areas. The underlying geology is dominated by sandstone and mudstone, the weathering of which gives rise to deep, red soils. Dolerite sheets are associated with shallower, stony soils and in the west, shallow red sands overlie layers of calcrete (SANBI, 2013).

Dry Highveld Grasslands are characterised by semi-arid sweetveld that is adapted to drought. Plants largely persist vegetatively from year to year, but new plants establish after drought from dormant seeds.

The project area is located within the north-western extent of the Grassland Biome at an elevation of ~1600 m asl and the topography of the project area is relatively flat with a gentle slope down to the north of the project are. The average temperature is 24°C, but annual average highs reach 25.9°C and annual average lows drop to 14°C. The average annual precipitation is 553 mm, with the greatest rainfall occurring in December (97 mm). July is the driest month (0.6 mm).

3.2. Ecological Drivers

Ecological drivers are both abiotic and biotic factors that influence the structure, species composition, and the primary productivity of vegetation types. As mentioned above (Section 3.1), the most important ecological drivers in Dry Highveld Grassland ecosystems are grazing and fire:

- **Grazing** is the removal of above-ground plant matter by animals, either indigenous or domestic. It acts as an important agent of disturbance, introducing habitat diversity into the system both spatially and over time. Grazing stimulates biomass production through the removal of dead or dying plant biomass that limits new growth and breaks up the soil surface due to hoof action which allows better infiltration of water and nutrients (especially from animal dung) (SANBI, 2013).

- **Fire** is critical for maintaining the health of grassland ecosystems as it removes the dead and moribund plant material that shades out the next seasons growth; stimulates new growth which enhances primary productivity; releases nutrients and organic material back into the soil; and controls invasion of alien and indigenous woody plants which could cause a shift from grassland to Savanna or Woodland. Fire also increases the diversity of habitats within a landscape, for example recently burnt areas would be dominated by short grasses but areas that have not been burnt would be dominated by long grass. This mosaic of structurally differing habitats provides different habitats for different faunal species (SANBI, 2013).

Although fire plays an important role in Dry Highveld Grasslands, it is not as important as grazing. Because these ecosystems have a slow growth rate and therefore a slow recovery rate, the fuel load does not build up enough to result in regular, intense fires (SANBI, 2013).

It should be noted that over-grazing and the inappropriate use of fire can also have negative impacts on species composition and the overall status of the grassland ecosystem. These impacts are often apparent by the dominance of a few, unpalatable species (e.g., wire grasses such as *Aristida junciformis*), invasion by weedy species, and soil erosion. As such, it is important that the appropriate management best-practises are applied in remaining natural areas of Dry Highveld Grassland.

4. ANIMAL SPECIES THEME

4.1. Faunal Habitat Present

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.

The habitat in the PAOI is primarily Grassland typically interspersed with micro-habitats such as seeps and rocky ridges.

Five faunal habitats were identified in this PAOI, namely (Figure 4.1 and 4.2):

- Rocky Ridges
- Grassland
- Woodlots
- Agricultural Fields
- Seeps, wetlands and streams

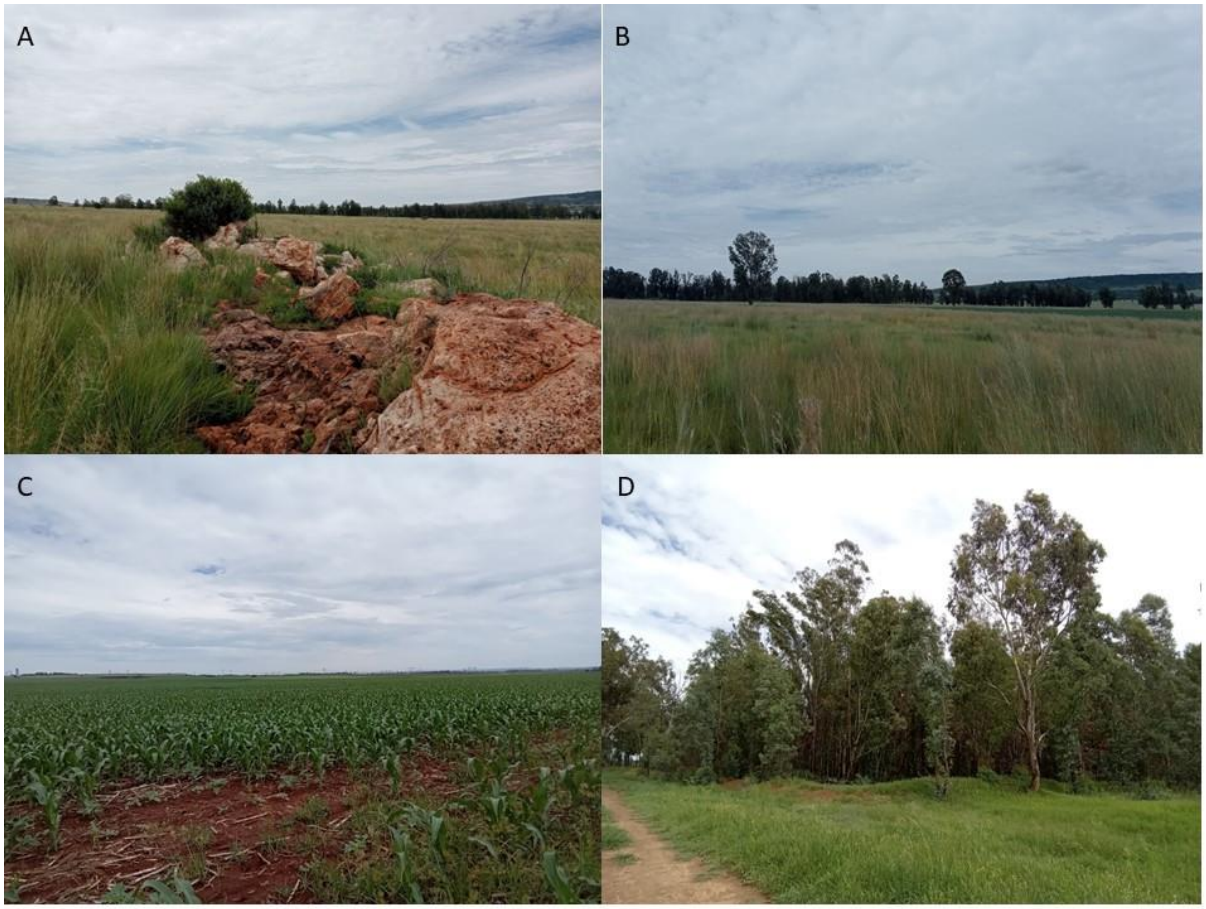


Figure 4.1: Photographs illustrating the faunal habitats present within the PAOI. A) Rocky Ridges, B) Grassland with woodlots in the background C) Agricultural Fields, D) Woodlots of Eucalyptus.

Figure 4.2: Photograph illustrating a stream that runs over the road during the wet season

4.2. Amphibians

The project area intersects with the distribution range of twenty (20) amphibian species, of which four (4) species have been recorded in the Quarter Degree Squares (QDS 2627BC) within which the project area occurs, and a further nine (9) were recorded in the general area (IUCN, 2023; iNaturalist, 2023; FitzPatrick, 2023). All amphibian species with a distribution range that intersects the project area are classified as Least Concern (LC). Amphibian species are likely to occur within the project area but are not likely to solely rely on it.

It should be noted that the Giant Bull Frog (*Pyxicephalus adspersus*), which has a distribution range that includes the project area, was listed as nationally Near-Threatened (Minter, *et al*., 2004) but has since been downgraded to Least Concern by the IUCN SSC Amphibian Specialist Group (IUCN, 2013). However, this species is a protected species under TOPS Schedule B1 in terms of NEM:BA (Act 10 of 2004) and if on site, a permit would be required for their removal. Although not recorded in the area, it is possible this species occurs in the project area and is considered to have a moderate likelihood of occurrence. It inhabits seasonal shallow grassy pans, vleis and other rain filled depressions in open flat grassland in and remains buried 1m underground for much of the year (du Preez and Carruthers, 2017).

4.3. Reptiles

The project area intersects with the distribution range of sixty-three (63) reptile species of which twenty-one (21) species have been recorded in the QDS (2627BC) within which the project area occurs, and a further seventeen (17) were recorded in the general area (IUCN, 2023; iNaturalist, 2023; FitzPatrick, 2023).

Of the sixty-three reptile species that have distribution ranges that intersect the project area, one species (*Kinixys lobatsiana* – Lobatse Hinged Tortoise) is listed as Vulnerable (VU) and one species (*Homoroselaps dorsalis* – Striped Harlequin Snake) is listed as Near Threatened (NT). The remaining species are all listed as LC. The likelihood of occurrence of each SCC is assessed in Table 4.1 below. The Lobatse Hinged Tortoise has a low likelihood of occurrence and the Striped Harlequin Snake as a Medium likelihood of occurrence.

Table 4.1: Likelihood of occurrence of Reptile SCC

Species	Threat Status		Habitat Preference	Known Occurrence	Likelihood of Occurrence
	Threat Status (IUCN)	TOPS			
Lobatse Hinged Tortoise *(Kinixys lobatsiana)*	VU	-	The project area is located on the western edge of this species' distribution range. It is associated with rocky hillsides in savannas that include *Acacia* and *Combretum* Woodland and tropical Bushveld and Thornveld with vegetation that ranges from dense, short shrubland to open tree savanna.	Recorded 30km north and north east of the project area (iNat, 2024)	**Low** Suitable habitat was not present within the project area.
Striped Harlequin Snake (*Homoroselaps dorsalis)*	NT	-	This species has a patchy distribution across most of north eastern South Africa and into western Eswatini. There are six extant populations, one of which occurs around Johannesburg, extending south east to Carletonville and the area in which the project is located. This species is associated with grassland and is partially fossorial, typically inhabiting moribund termitaria in grasslands between 100 to 1800m above sea level (asl).	Recorded 20km north and south west of the project area (iNat, 2024)	**Medium** The area of natural vegetation within the project area is fragmented and did not contain any termite mounds. The likelihood of occurrence for this species is this therefore Medium.

4.4. Mammals

The project area intersects with the distribution of eighty-nine mammal species of which nineteen have been recorded with the QDS (2627BC) within which the project area occurs and a further fifty-two were recorded in the general area (IUCN, 2023; iNaturalist, 2023; FitzPatrick, 2023).

Of the eighty-nine species that have a distribution range that overlaps with the project area, one is listed as Critically Endangered (CR), one as endangered (EN) and seven as Vulnerable. Further to the above, additional SCC recorded on iNaturalist include a further two EN species, two VU species and five NT species. However, species listed such as Rhinocerus, Sable Antelope and Cheetah are unlikely to occur outside of protected areas such as game reserves and national parks, and as such these species have been excluded from the likelihood of occurrence assessment in Table 4.2 below.

Only two species, the Serval (*Leptailurus serval)* and African Striped Weasel (*Poecilogale albinucha*), have a high likelihood of occurrence within the project area. The other SCC have a medium to low likelihood of occurrence, mostly as a result of the project area being highly fragmented and occurring within a busy farming area with a busy road network. Three species have a medium likelihood of occurrence and a further eight species have a low likelihood of occurrence.

Table 4.1: Mammal Species of Conservation Concern and their likelihood of occurrence within the study area.

*CR – Critical; EN -Endangered; VU – Vulnerable; NT -Near Threatened

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
Serval *Leptailurus serval*	NT	Protected	This species depends on vegetation boarding water sources such as wetlands, marshland, rank grass and vleis as well as well-watered savannah with long-grass (Ramesh, *et al*., 2016). Servals prey on small mammals, birds, reptiles, fish, and rarely invertebrates. Their main diet consists of Vlei Rats (*Otomys sp.*) and Striped Mice (*Rhabdomys pumilio*).	The nearest record on iNaturalist is 15km west of the project area.	**High** The project area is within the distribution range of this species and there is suitable habitat present to the west of the proposed project area. The likelihood of occurrence in wetlands and seeps is therefore classified as High.
African Striped Weasel *Poecilogale albinucha*	NT		This species has a wide habitat tolerance including fynbos, lowland rainforest, semi-desert grassland, pine plantations and agricultural fields but is mainly found in savanna. (Child, *et al*., 2016; Stuart, Stuart & Do Linh San, 2015).	There is a record of this species within 15km south of the project area (iNat, 2024).	**High** This species wide habitat tolerance suggests it has a high likelihood of occurrence within the project area.
Maquassie (Makwassie) Musk Shrew *(Crocidura maquassiensis)*	VU	-	This is a rare species, recorded only from disparate localities. Little is known about the habitats and ecology of this species. However, this near endemic species is known to inhabit wetlands, moist grasslands and grasslands. It may tolerate a wider range of habitats as is has been found in rocky or montane grassland, coastal forest, mixed bracken and grassland alongside a river and a garden. (Taylor et al., 2016, Cassola, 2016)	No records of this species within 150km of the project area.	**Medium** No suitable habitat is present within the project area although there is suitable habitat present within the broader PAOI.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
Black-footed Cat *Felis nigripes*	VU	Protected	The Black-footed cat is typically a solitary, ground dweller that is crepuscular[1] and nocturnal (Sliwa *et al.,* 2016). During the day it makes use of dens, preferring hollowed termite mounds when available but also making use of burrows dug by other animals (e.g., Springhares, Ground Squirrels and Aardvark). It hunts small rodents and ground-dwelling birds found in short, open grasslands and is found in dry, open grasslands, savannah and karoo semi-desert. The estimated EOO is 930,000 km^2 and individual home ranges for males have been recorded to be approximately 16-20km^2 and for females were 9-10km^2 (Wilson *et al.* in Child *et al.,* 2016). The project area is surrounded by very large areas of cultivated land in a busy farming community with small, remnant patches of natural vegetation remaining.	No records within a 150km radius (iNat, 2024).	**Medium** Although there is suitable habitat present, this is fragmented and occurs in a busy farming area with a busy road network. As such, the likelihood of occurrence is medium.
Southern African Hedgehog *Atelerix frontalis*	NT	Protected	The species occurs throughout Gauteng, Free State, North West, western Limpopo and Mpumalanga provinces. Northeast and southwards Northern Cape to Eastern Cape. They marginally occur along the northern boundary with Free State and Mpumalanga provinces. This species inhabits savannah, grassland and Northern Upper Karoo vegetation types even suburban gardens. • Grassland vegetation types include the Soweto Highveld, Eastern Highveld, Rand Highveld, Carletonville Dolomite, Vaal-Vet Sandy Grassland and Frankfort Highveld Grasslands. • Savannah vegetation types include Polokwane Plateau Bushveld, Central Sandy Bushveld, Kimberley	The nearest record on iNaturalist is >20km north west of the project area	**Medium** The project area is within the distribution range of this species but the small patches of natural habitat present are fragmented and surrounded by cultivated land and a busy road network.

[1] (of an animal) appearing or active in twilight.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
			Thornveld, Moot Plains Bushveld, and Queenstown Thornveld. The species appears to prefer dense vegetation habitats and rocky outcrops that may provide food, cover and nesting materials. EOO: 748,169 km^2.		
Mountain Reedbuck *Redunca fulvorufula*	EN	None	Mountain Reedbuck are typically found in high altitude grasslands and rocky ridges and hillsides from 1,500 – 5,000m above sea level (IUCN, 2017 and Taylor *et al.*, 2016). They are predominantly grazers and occur in drier hilly areas (such as the Nama Karoo) utilising steep slopes and bases of hills that have a higher moisture content and therefore greener, softer grasses. They avoid open areas with no cover. The availability of drinking water is crucial to their survival and therefore existence. In 1999 this species was estimated to have a population of approximately 33,000 individuals but in 2016 was reported to have unexpectedly declined by 73% (IUCN, 2017; Taylor *et al.*, 2016).	Evidence of this species recorded ±20km west of the project area in 2023 (iNat, 2024).	**Low** No suitable habitat present.
Leopard (*Panthera pardus)*	VU	VU	Leopards are widely distributed throughout southern Africa, typically occurring in densely wooded and rocky areas although it has been shown to have a wide habitat tolerance (grassland savannah, coastal scrub, shrubland, rugged mountainous regions and semidesert) (Swanepoel, *et al*., 2016; Stein, *et al*., 2020).	The nearest record on iNaturalist is >5km south west of the project area	**Low** Although suitable habitat is present, the project area occurs within a busy farming area. If present, this species is likely to be a transient species within the area, using the project are to move through.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
African/Cape Clawless Otter *Aonyx capensis*	NT	-	This species is predominantly aquatic and seldom found far from permanent water. Freshwater is an essential water requirement, but they can occupy rivers with high pollution and eutrophication levels. The are generally found in marine habitats where there is access to freshwater, rocky shores and thick vegetation with an abundant food supply, but they have been recorded in rivers provided suitable sized pools persist (Okes *et al*., 2016 in Child *et al*., 2016).	Recorded >10km south west of the project area (iNat, 2024).	**Low** The project area occurs within the distribution range of this species however, suitable habitat is not present within the project area although it is present within the PAOI. The likelihood of occurrence in the project area is therefore classified as Low. If present, it is likely a transient.
Spotted-necked Otter *Hydrictis maculicollis*	VU	Protected	This species is widespread through Africa, occurring at altitudes of 0-2500m asl. Habitat requirements for this species include streams, rivers, lakes (natural & manmade) and open waters which are unpolluted and are not silted. Shelters along water edges with cover provided by boulders, reeds, long grass, dense bushes and overhanging trees. Feed predominantly on fish and occasionally crabs, frogs, insects (esp. dragonfly larvae) and birds.	No records of this species within 100km of the project area (iNat, 2023).	**Low** The project area occurs within the distribution range of this species however, suitable habitat is not present within the project area although it is present within the PAOI. The likelihood of occurrence in the project area is therefore classified as Low. If

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
					present, it is likely a transient.
Brown Hyena *Parahyaena brunnea*	NT	Protected	The Brown Hyena inhabits desert areas (<100 mm MAR), semi-desert, open scrub and open woodland savannah (<700 mm) (Wiesel, 2015). They typically avoid developed areas but can survive close to them. However, they do require some form of cover to lie under during the day. As such, they prefer rocky, mountainous areas with bush cover in the bushveld areas of South Africa (Yarnell *et al.,* 2016 in Child *et al*., 2016). The Brown Hyena population in SA is thought to be underestimated at 1700 individuals (800-2200) with greatest numbers in Limpopo, North West and Eastern Cape provinces. This species has low levels of occupancy throughout the Free State (Yarnell *et al.,* 2016). Densities are highest in protected areas compared to neighbouring unprotected rangelands but this species is tolerant of land-use change where reliable alternative food resources exist (Yarnell *et al.,* 2016). Brown Hyaenas are considered widespread but rare and secretive, and although 65% of the population live in mixed sex clans (4–14 individuals) they are solitary foragers who spend much of their time alone. The remaining 35% of the population immigrate within home ranges of ±100 km^2 (Yarnell *et al.,* 2016).	There is a record of this species 12km west and north west of the project area (iNat, 2024).	**Low** Although suitable habitat is present within the project area (i.e., grasslands), this species is unlikely to occur outside of protected areas and within a busy farming area.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
African White-tailed Rat *Mystromys albicaudatus*	VU	-	African White-tailed Rats are endemic to South Africa and Lesotho occurring in the highveld grasslands and succulent karoo in southern Mpumulanga, Free State, high-lying areas of KwaZulu Natal, Eastern Cape, south-eastern North-West and marginally into the Northern Cape *(Avenant et al.* in Child *et al., 2016)* and have an AOO of 3,719km^2. This species is nocturnal living in burrows and crevices. Little is known about this species in the wild. They are often associated with calcrete soils in grasslands and are not found on soft, sandy substrates, rocks, wetlands or riverbanks (Avenant *et al.* in Child *et al*., 2016). There is evidence that they survive in disturbed areas and sparse grasslands but are not associated with transformed habitat (e.g., agricultural land).	There are no records of this species within 100km of the project area (iNat, 2023).	**Low to Moderate** Suitable habitat may be present within the intact grassland patches.
Cape Wild Dog *(Lycaon pictus)*	EN		In South Africa, the Wild Dog is a flagship species with three distinct populations and 12 subpopulations: • A protected population in the Kruger National Park • A protected and intensively managed metapopulation in several public and private reserves. • A free-roaming wild population residing and traversing land outside of protected areas, mostly in the northern part of Limpopo, the eastern parts of Northern Cape, northern and northwestern parts of the NorthWest, Mpumalanga, and northern parts of KwaZulu-Natal. Only two to five packs and dispersing groups persist outside protected areas. This species has a population of 519 of which the free roaming population in Limpopo and KZN constitutes 24 individuals across two packs and two groups. Managed sub-populations AOO: 4,570 km^2.	There is a record of this species 25km south west of the project area.	**Low** If this species is present within the PAOI, it is likely to pass through the project area and is unlikely to use it for breeding, shelter or foraging.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
			Wild Dogs can survive in most habitat types provided the habitat is large enough, contains sufficient suitable prey and is free from direct threats (persecution). Their distribution has been limited primarily due to human activities and availability of prey, rather than habitat preferences and they are adept at avoiding human contact. The species primarily occurs in the Lowveld inhabiting short-grass plains, savannahs and uplands forest and reach their highest densities in thicker bush (thicket-type vegetation in the EC). Their main prey sources are the Impala and the remainder includes the Kudu, Duiker, Nyala and Warthogs. They will prey on hares, lizards and even eggs but these are considered to offer an insignificant contribution to their diet (Davies-Mostert, *et al*., 2016)		
Common Tsessebe *(Damaliscus lunatus lunatus)*	VU		This species is generally associated with floodplains and grasslands, typically occurring in the ecotone between grassland and woodland in South Africa. Originally widespread in sub-Saharan Africa, they now occur in South Africa, the eastern sector of Botswana, northeastern parts of Namibia, northwestern and central parts of Zimbabwe and into western Zambia. Within South Africa it has been widely introduced to Kwa-Zulu Natal, Free State, Mpumulanga and Northern Cape Provinces.	There is a record of this species 30km south west of the project area. This record is likely for an introduced individual.	**Low** Although suitable habitat is present, the available habitat is fragmented with a busy road network. Furthermore, if present, this species it likely to have been introduced.

5. PLANT SPECIES THEME

5.1. Floristics

A total of 62 plant species from 25 families were recorded within the project area (Table 5.1) (a full species list has been included in Appendix 1). The Poaceae had the highest number of species (sixteen) followed by the Asteraceae (nine species) and Cyperaceae and Fabaceae each with five species. The remaining families had three or less species.

Table 5.1: Number of families and species recorded within the project site.

Family	Number	Family	Number
Poaceae	16	Asphodelaceae	1
Asteraceae	9	Boraginaceae	1
Cyperaceae	5	Brassicaceae	1
Fabaceae	5	Caryophyllaceae	1
Commelinaceae	3	Chrysobalanaceae	1
Hyacinthaceae	3	Ebenaceae	1
Convolvulaceae	2	Euphorbiaceae	1
Hypoxidaceae	2	Plantaginaceae	1
Lamiaceae	2	Pteridaceae	1
Myrtaceae	2	Rhamnaceae	1
Agavaceae	1	Rubiaceae	1
Amaryllidaceae	1	Scrophulariaceae	1
Anacardiaceae	1		

5.2. Species of Conservation Concern

Of the 62 recorded species, 56 species are listed as Least Concern (LC), four are listed as Not Evaluated (NE) and two are not listed. No SCC were recorded in the project area and no protected species that occur on the Gauteng Nature Conservation Ordinance (No. 12 of 1983) were recorded or are likely to occur within the project area.

The DFFE Screening Report classifies the Plant Species Theme of the project area as **MEDIUM** with three (3) Species of Conservation identified for the site. Medium sensitivities defined by the screening tool does not indicate the known presence of a threatened plant 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). The three SCC identified for the site by the DFFE screening tool report and their likelihood of occurrence based on available habitat are assessed in Table 5.3 below. *Khadia beswickii* has a medium likelihood of occurrence and sensitive species 1248 and 1147 have a low likelihood of occurrence.

A search of the greater Project Area of Influence (PAOI) on iNaturalist and POSA, as well a cross referencing the list of important taxa contained in Mucina *et al* (2011) for Carletonville Dolomite Grassland, and the Red List of South African Plants, revealed no additional SCC.

5.3. Alien Invasive Plant Species

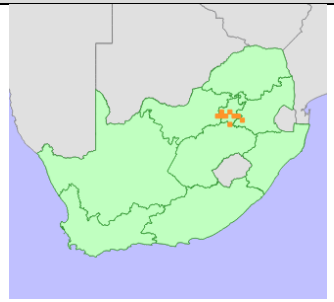
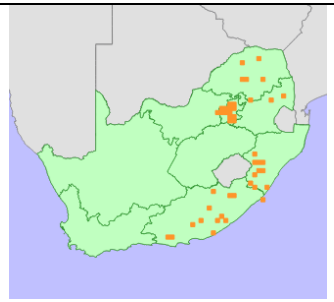
Four exotic species were recorded within the project area (Table 5.2) and were typically found within disturbed sites, such as along road verges and in overgrazed area. Of these four species, two are listed alien invasive plant species on the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 0f 2004) and one is listed as a Category 1 species and one as a Category 2 species on the Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983).

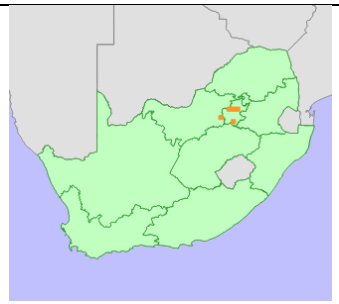
Under the NEM: BA act, Category 1b species must be eradicated and under CARA, Category 1 plant species must be removed & destroyed immediately. No trade in these plants is permitted.

Table 5.2: List of exotic plant species recorded on site.

Family	Species	NEM:BA Alien	CARA
Asteraceae	*Campuloclinium macrocephalum*	Category 1b	Category 1
Asteraceae	*Cosmos bipinnatus*	-	-
Asteraceae	*Tagetes minuta*	-	-
Myrtaceae	*Eucalyptus sp.*	Category 1b	Category 2

Table 5.3: The likelihood of occurrence of SCC occurring within the project area

Species	Sensitivity as per Screening Report	Status	Range and habitat	Distribution Map	Likelihood of occurrence
Khadia beswickii	Medium	Vulnerable B1ab(iii,v)+ 2ab(iii,v)	Range: Occurs in Gauteng, Mpumalanga, and North West. EOO 475 km², AOO 3-7 km², known from 10 locations. Habitat: Open shallow soil over rocks in grassland. Carletonville Dolomite Grassland is considered one of the major habitat types of this species (Victor and Pfab, 2005).		**Medium** According to iNaturalist, this species has been recorded approximately 7.5 km southwest of the project area. Although the project area contains suitable habitat for this species, this species was not recorded during the field survey. As such, it is the opinion of the specialist that the likelihood of occurrence remains Medium.
Sensitive species 1248	Medium	Vulnerable A2ad	Range: Eastern Cape to Limpopo Province. Widespread elsewhere in southern and eastern Africa. EOO not specified. Habitat: Found in a variety of habitats. In Gauteng, this species typically occurs in shaded areas within open woodland or on steep rocky hills. Carletonville Dolomite Grassland is considered one of the major habitats of this species. (Raimondo *et al*., 2007).		**Low** The location of this species on iNaturalist has been obscured. As such, it is not possible to determine the nearest observation of this species in relation to the project area. Although the vegetation of the project area (Carletonville Dolomite Grassland) is considered one of the major habitat types of this species, its preferred habitat including shaded areas within open woodland or on steep rocky hills is not present. As such, the likelihood of occurrence is classified as **LOW**.

Sensitive species 1147	Medium	Endangered C2a(i); D	Range: Johannesburg, Pretoria and Krugersdorp. Only six subpopulations are known. EOO not specified. Habitat: Open grassland on dolomite or in black, sandy soil. Carletonville Dolomite Grassland is considered one of the major habitat types of this species (Pfab and Victor, 2005).		**Low** The location of this species on iNaturalist has been obscured. As such, it is not possible to determine the nearest observation of this species in relation to the project area. Although the project area occurs within the known distribution of this species and contains suitable habitat, the project area does not contain any of the known locations of this species. Furthermore, this species was not recorded during the field survey and the available habitat is highly fragmented. As such, it is the opinion of the specialist that the likelihood of occurrence is low.

6. TERRESTRIAL BIODIVERSITY THEME

The DFFE Screening Report classifies the Terrestrial Biodiversity Theme Sensitivity of the project area as VERY HIGH (Figure 2.3) due to the following sensitivity features:

- CBA 1, ESA 1 and ESA 2 (refer to section 6.1)
- National Protected Area Expansion Strategy (NPAES) (refer to section 6.3)

This chapter reviews the spatial planning tools associated with each of these features and provides comment on the implication these features have on development, should the project proceed.

6.1. Gauteng Conservation Plan 3.3 (C-Plan 3.3)

The Gauteng C-Plan v3.3 (2011), commonly known as the Critical Biodiversity Areas Map, was compiled by Gauteng Nature Conservation - a division with the Gauteng Department of Agriculture and Rural Development (GDARD). The map was developed using a systematic conservation planning approach underpinned by the following characteristics: representation, persistence, quantitative targets, and efficiency and conflict avoidance. The map identifies biodiversity priority areas which includes Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) and Protected Areas. The map is designed to be used at approximately 1:50 000 scale as the integrated biodiversity input into land use planning and decision making.

CBAs include natural or near-natural terrestrial and aquatic features that were selected based on an area's biodiversity characteristics, spatial configuration and requirement for meeting both biodiversity pattern and ecological process targets. CBAs include irreplaceable sites where no other options exist for meeting targets for biodiversity features, as well as best-design sites which represent an efficient configuration of sites to meet targets in an ecologically sustainable way that is least conflicting with other land uses and activities. These areas need be maintained in the appropriate condition for their category. Some CBAs are degraded or irreversibly modified but are still required for achieving specific targets, such as cultivated lands for threatened species.

ESAs are natural, near-natural, degraded or heavily modified areas required to be maintained in an ecologically functional state to support Critical Biodiversity Areas and/or Protected Areas. ESAs maintain the ecological processes on which Critical Biodiversity Areas and Protected Areas depend. Some ESAs are irreversibly modified but are still required as they still play an important role in supporting ecological processes.

Protected Areas are areas which have legal protection under relevant legislation, or which are managed with a primary conservation objective.

According to the Gauteng C-Plan v3.3 (2011), the project area intersects both a CBA (important area not irreplaceable area) and an ESA. The biodiversity features identified as contributing to the selection of these areas as CBAs and ESAs are discussed in Table 6.1 below. Based on the analysis of the reasons for the selection of CBAs and ESAs within the project area, it is the opinion of the specialist that the proposed development is unlikely to affect the biodiversity features identified, as the clearance of vegetation for the proposed development will not affect the conservation status of this vegetation type nor will it impact on any plant SCC as there are none that are likely to occur within the project area.

Table 6.1: Biodiversity features underpinning the project areas CBA status

Biodiversity Priority Area	Biodiversity Feature	Comment
CBA	Primary Vegetation	Only one (1) vegetation type occurs within the project area, including Carletonville Dolomite Grassland. Carletonville Dolomite Grassland is classified as Least Concern. Considering the small development footprint, the clearance of vegetation for the proposed development will not affect the conservation status of this vegetation type. Furthermore, the project area is located on the edge of the CBA and will therefore only erode the edge of the macro corridor. Provided the area to the east remains intact, management objectives of the CBA can still be maintained.
	Orange List (OL) Plant Habitat	The biodiversity feature does not provide details of which species habitat occurs within this area. However, a desktop assessment of available resources indicate that three (3) Species of Conservation Concern (SCC) could potentially occur within the PAOI based on distribution data and habitat requirements (see Section 5.2 above). Of these three SCC, one has a moderate likelihood of occurrence on site and two have a low likelihood of occurrence on site. During the field survey no SCC were recorded. As such, it is unlikely that the proposed development will impact on and SCC and therefore this feature that underpins the CBA status. **It should be noted that the orange list (2004) is outdated and has been superseded by the Red List of South African Plant which is regularly updated.*
ESA	None identified.	N/A.

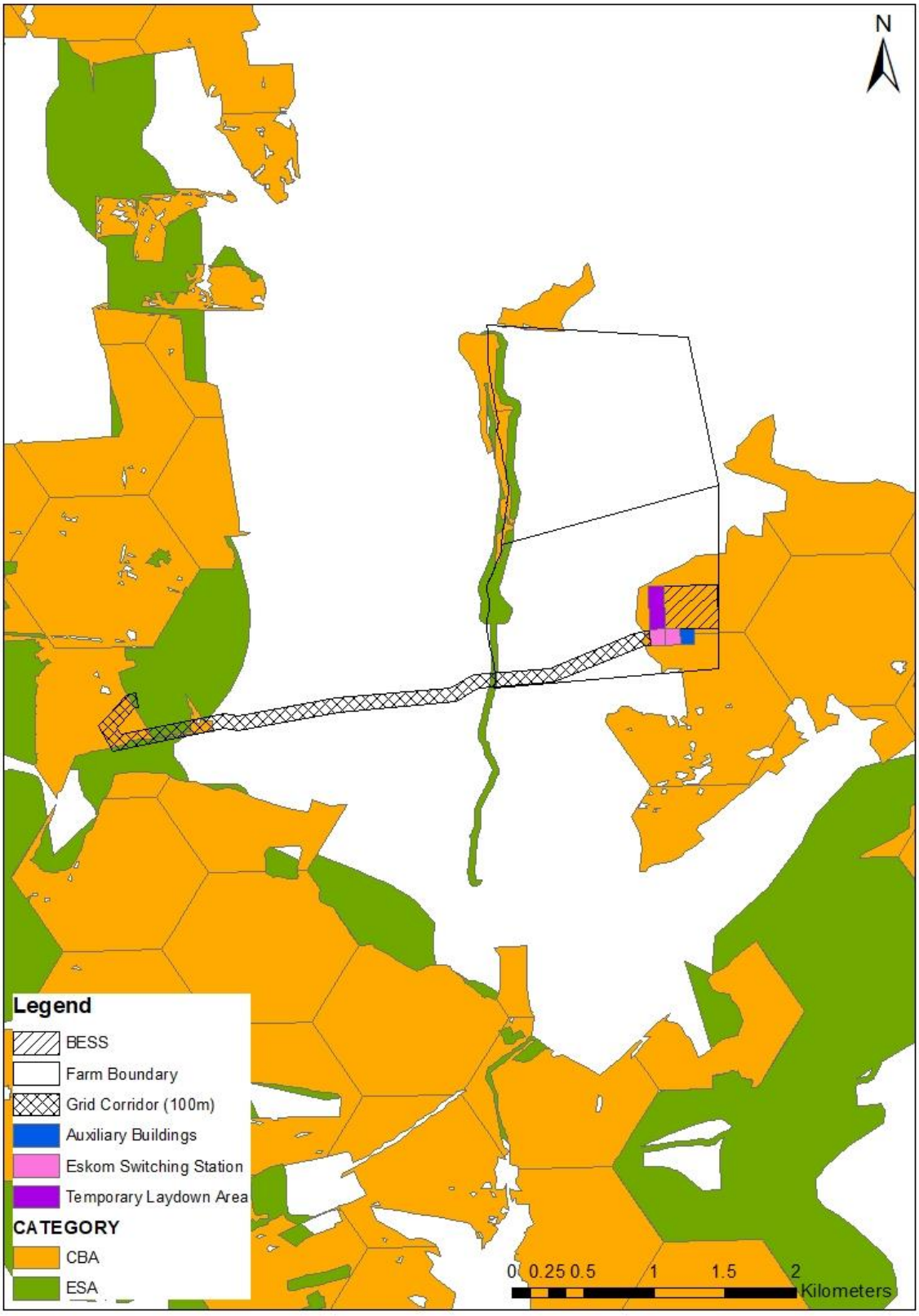


Figure 6.1: The Project area in relation to the CBAs and ESAs.

6.2. Vegetation Types Present

The proposed area occurs within the grassland biome which is the second largest biome in South Africa covering approximately 339 237 km^2. Although 30% of this biome is irreversibly transformed, it remains poorly protected with only 1.9% of the biodiversity target formally conserved.

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 infrastructure occurs within Carletonville Dolomite Grassland (Figure 6.2). The field survey confirmed remnant patches of this vegetation type was present and its distribution has been mapped (Figure 6.3).

6.2.1. ***Carletonville Dolomite Grassland***

Carletonville Dolomite Grassland occurs predominantly in the North West and Gauteng with small patches in the Free State. It is associated with slightly undulating plains interspersed with rocky ridges and is characterised by species-rich grasslands that form a mosaic pattern dominated by multiple species.

Although this vegetation type was present within the project area, it was degraded and fragmented by the past and current land use patterns (Figure 6.4). Dominant species included *Alloteropsis semialata, Cynodon dactylon, Diheteropogon amplectans, Eragrostis curvula, Eragrostis racemose, Hyparrhenia hirta, Melinis repens, Setaria sphacelata, Themeda triandra, Urochloa serrata, Tagetes minuta, Helichrysum nudifloim and Helichrysum rugulosum.* Rehabilitation of this vegetation back to its original state would be costly.

Carletonville Dolomite Grassland is listed as poorly protected with 61% (561,227 ha) of the original extent remaining (RLE, 2021). The construction of the BESS will result in the loss of approximately 17 ha (0.003%) of degraded Carletonville Dolomite Grassland. The loss of such a small area of degraded, fragmented grassland, is unlikely to affect the conservation status of this vegetation type as the ecological function of the area that will be impacted on, is already compromised.

6.3. Protected Areas and National Protected Area Expansion Strategy

The project area does not occur within any protected areas or within 5km of a protected area. However, a small portion of the property boundary in the south eastern corner overlaps with an area designated as a negotiated National Protected Area Expansion Strategy (NPAES) Area (Figure 6.5). Although the property boundary overlaps with this area, project infrastructure has been positioned to avoid this area.

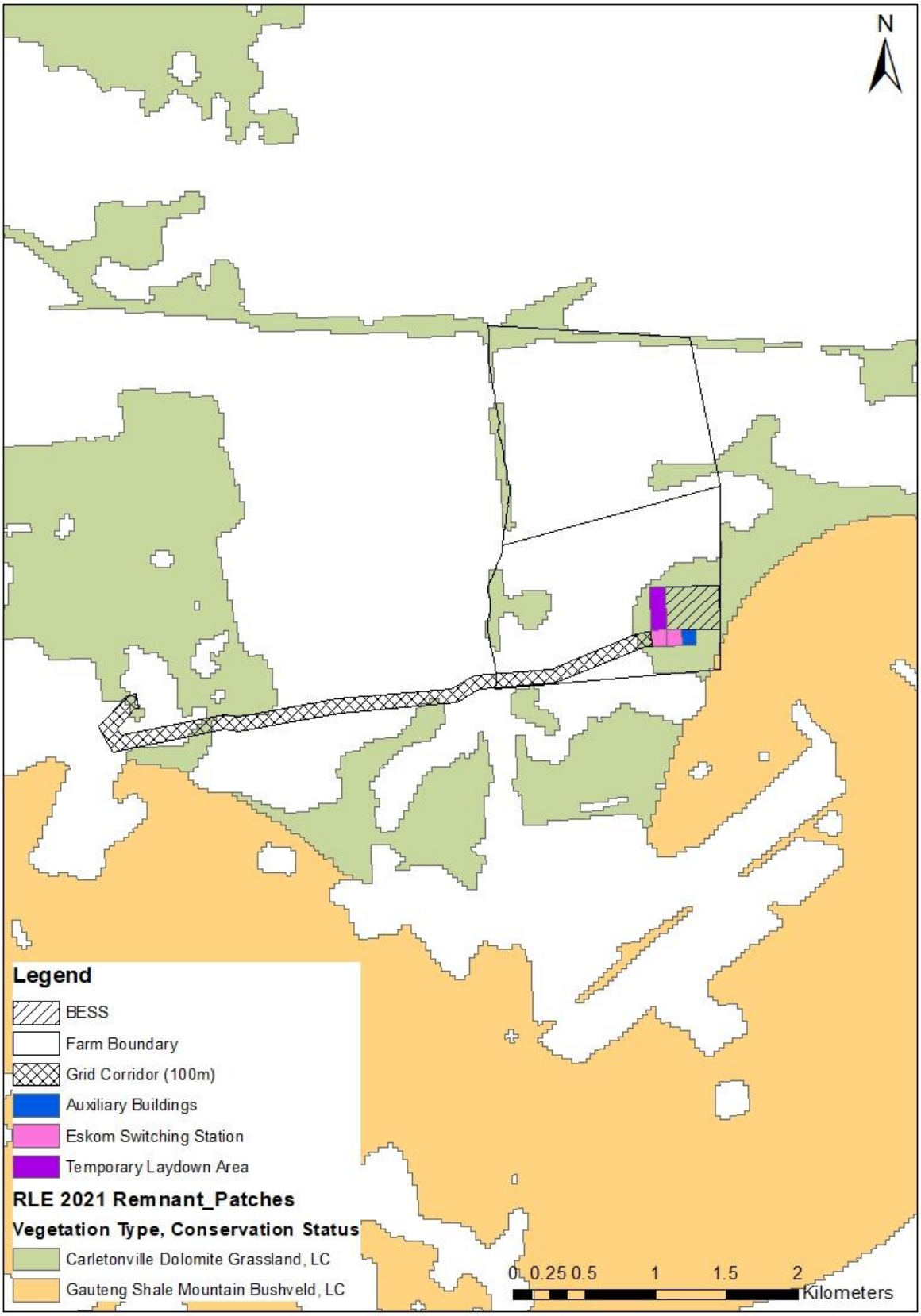


Figure 6.2: National Vegetation Map for the Project Area showing the remaining extent of vegetation (Source: Red List of Threatened Ecosystems, 2021).

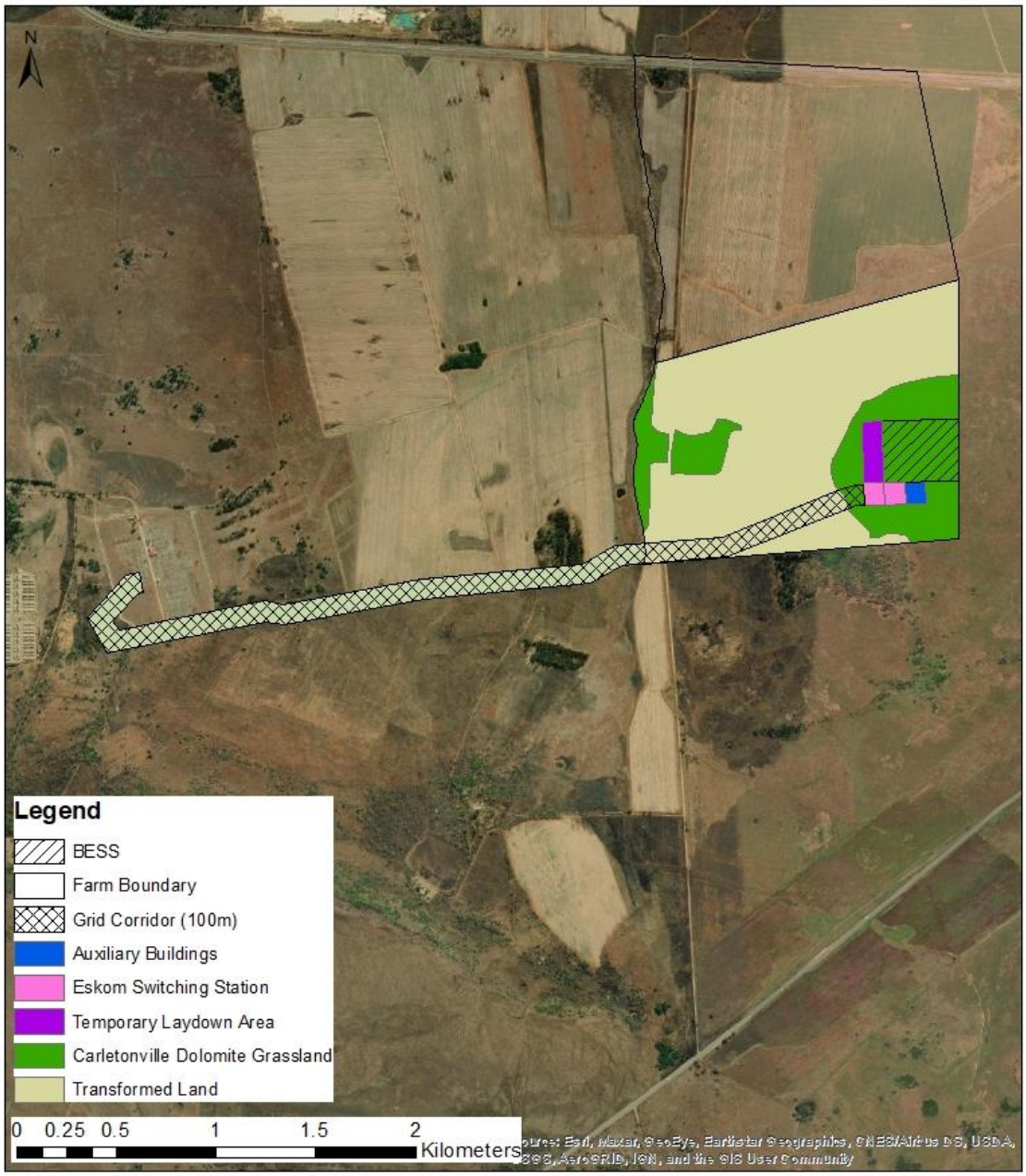


Figure 6.3: Vegetation map for the project area based on data gathered from the field survey.

Figure 6.4: Photographs illustrating the vegetation present within the project area

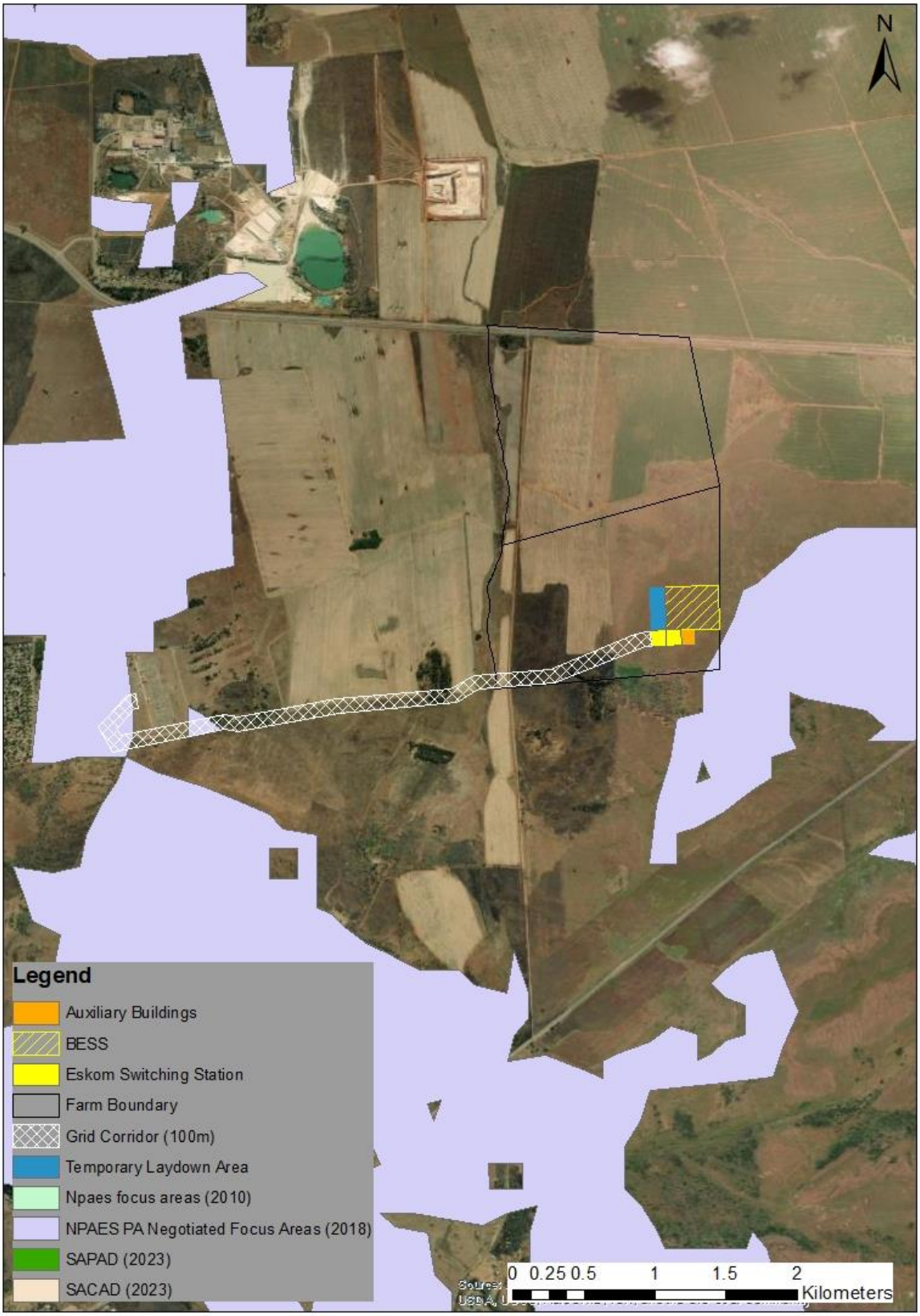


Figure 6.5: Map illustrating the project area in relation to conservation areas and NPAES.

7. SITE ECOLOGICAL IMPORTANCE

The results from the desktop assessment and field survey have been used to calculate the SEI for the vegetation and faunal habitat present within the project area.

7.1. Site Ecological Importance - Fauna

The African Striped Weasel (NT) and Serval (NT) have a high likelihood of occurrence within the project area. As such, the SEI has been assessed for only these species (Table 7.1 and Figure 7.1). The SEI for the overall project area is considered low for each habitat based on a medium CI, high FI and high RR. Given the small size of the proposed facility together with the short construction time frame, it is anticipated that species will return to the PAOI once the disturbance has ceased. As such, the RR for all habitat types is high.

Table 7.1: Sensitivity assessment for faunal species within the project area.

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience	SEI
African Striped Weasel (NT) Occurs in Carletonville Dolomite Grassland	Medium Highly likely occurrence of a NT species.	High Good habitat connectivity with potentially functional corridors to the east of the project area and a regularly used road network.	Medium	High Receptor resilience is based on the specific project activities. In this instance the project footprint is small 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 site once the disturbance has ceased.	**Low**
Serval (NT) in Wetlands and Seeps	Medium Highly likely occurrence of a NT species.	High Good habitat connectivity with potentially functional corridors to the east of the project area and a	Medium	High Receptor resilience is based on the specific project activities. In this instance the project footprint is small and the construction phase will be relatively short meaning that the disturbance to	**Low**

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience	SEI
		regularly used road network.		these species will be in the short term with a small spatial extent. As such, species have a high likelihood of returning to site once the disturbance has ceased.	

7.2. Site Ecological Importance - Flora

One vegetation type and one land use was recorded within the project area:

- Carletonville Dolomite Grassland
- Transformed Land

The Carletonville Dolomite Grassland present within the project area is degraded, listed as Least Concern and SCC are unlikely to be found within this patch. As such the CI is low. However, it does occur on the western edge of a large patch of grassland that is over 100ha in extent and therefore the FI has been classified as High. The RR for this site is medium as it is anticipated that it will take over ten years to restore >75% of the original species composition present. Based on these ratings, the SEI for this site is medium.

Transformed land within this area is of low ecological value and the SEI for this land use has been classified as very low.

Table 7.2: Sensitivity assessment for each vegetation type within the project area.

Habitat/ Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	SEI
Carletonville Dolomite Grassland	**LOW** **Fulfilling Criteria** No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. **Justification** Carltonville Dolomite Grassland is classified as Least Concern. Although the Screening Report identifies three (3) SCC, these have not been confirmed to occur within the project area and were not recorded during the field survey. Less than 50% of the project area contains natural habitat.	**HIGH** **Fulfilling Criteria** Large (>100 ha) intact area for any conservation status of ecosystem type. **Justification** The project area occurs on the western edge of a large (>100 ha) patch of degraded Carletonville Dolomite Grassland surrounded by a regularly used road network and large areas of agricultural land. As such, the FI is classified as high rather than very high.	**MEDIUM**	**MEDIUM** **Fulfilling Criteria** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality. **Justification** Receptor resilience refers to the ability of a receptor to resist major damage from disturbance and or recover to its original state with limited or no human intervention. The restoration of grasslands and rate of recovery is dependent on the nature and extent of degradation or modification. The proposed development will require the removal of vegetation and topsoil (which contains the seedbank). According to the Grassland Ecosystem Guidelines (SANBI, 2013), removal of the primary vegetation cover within grasslands is often irreversible and the original species composition is unlikely to recover naturally even over a long period (20-100 years). However, Dry Highveld Grassland (such as Carletonville Dolomite Grassland) recruit more often from seeds and are therefore able to recover	**Medium**

				quicker depending on whether primary grassland species are scattered throughout the landscape surrounding the proposed development. Considering the small scale of the proposed development, and provided the surrounding grassland remains intact to provide a 'seed source' for the recovery of impacted areas, it is possible that impacted areas can recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor.	
Transformed Land	**VERY LOW** **Fulfilling Criteria** No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining. **Justification** The soil within these areas has largely been disturbed within no to very little vegetation remaining. Due to the transformed nature of these areas, it is very unlikely that SCC would occur in these areas.	**VERY LOW** **Fulfilling Criteria** No habitat connectivity except for flora with wind-dispersed seeds. Several major current negative ecological impacts. **Justification** These areas have been transformed with no habitat connectivity within them.	**VERY LOW**	**VERY HIGH** **Fulfilling Criteria** Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality. **Justification** The resilience criteria is based on the ability of the receptor to resist major damage and recover to its current state. In this case, the current state is transformed agricultural land. As such receptor resilience is very high.	**VERY LOW**

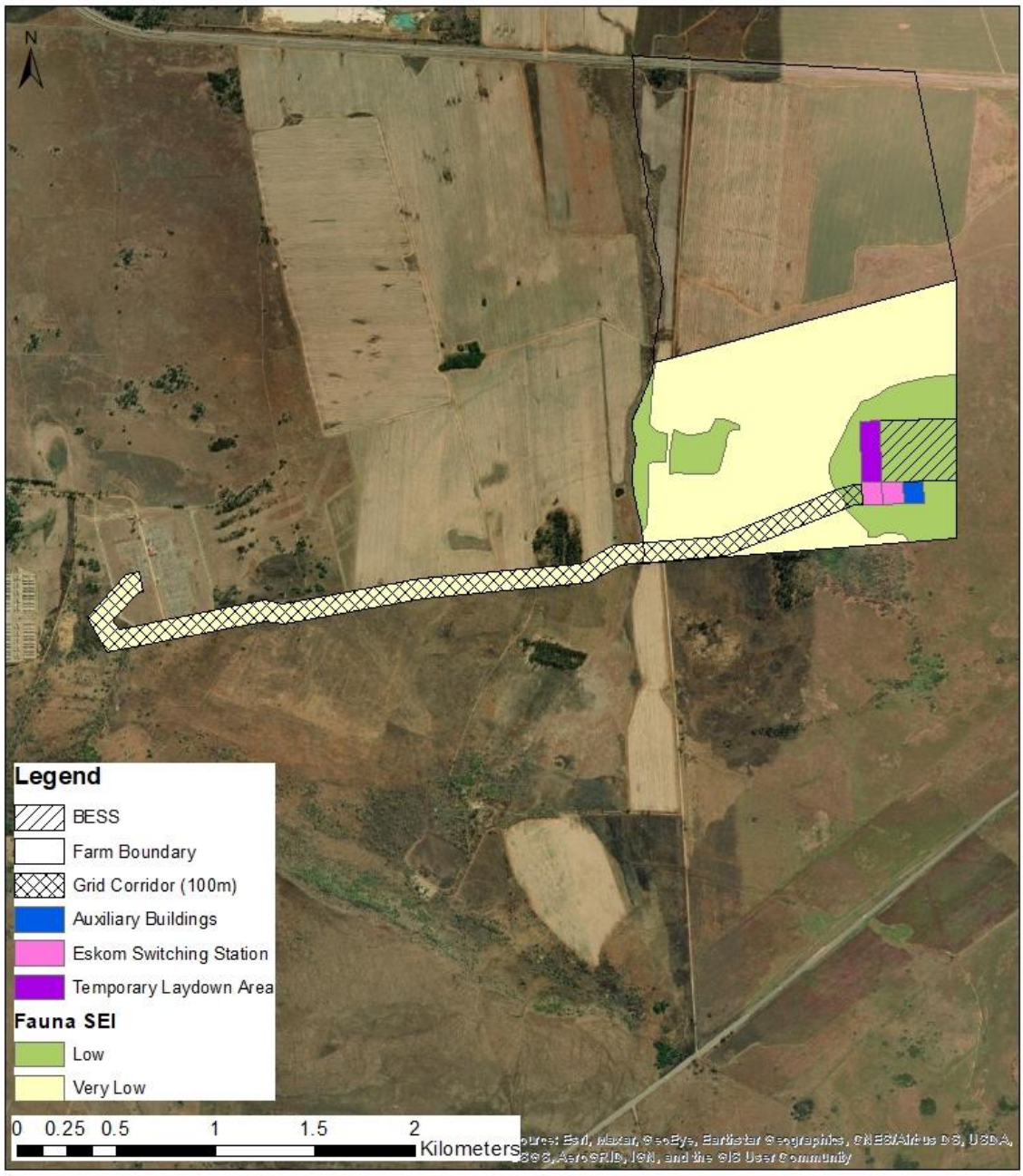


Figure 7.1: Fauna sensitivity map for the project area based on data gathered from the field survey and the desktop assessment.

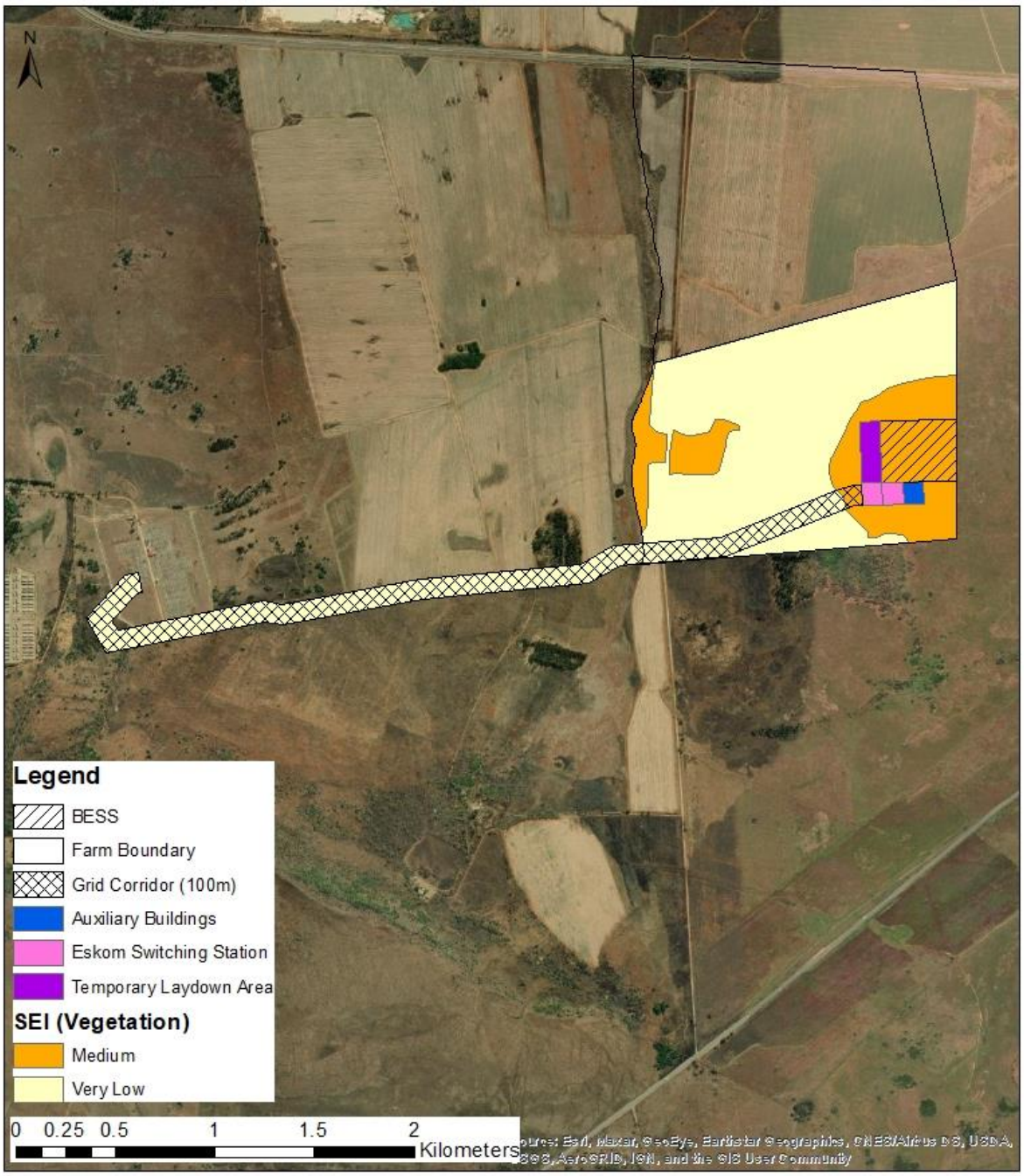


Figure 7.2: Botanical sensitivity map for the project area . This is based on data gathered from the field survey and the desktop assessment.

7.3. 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 7.3 combines the overall SEI for each habitat type based on the assessment in Table 7.1 and 7.2. Carletonville Dolomite Grassland has an overall SEI of Medium and the Transformed Land has an overall SEI of Very Low.

Table 7.3: Combined overall SEI for each habitat type.

Habitat	Floral SEI	FAUNAL SEI	OVERALL COMBINED SEI
Carletonville Dolomite Grassland	Medium	Low	Medium
Transformed	Very Low	-	Very Low

7.4. Management Guidelines

Management guidelines recommend the following:

- For areas with a **high SEI**, avoidance mitigation must be implemented where feasible and where this is not feasible, minimisation mitigation such as reducing the project footprint. Limited development activities of low impact are acceptable in these areas. Offset mitigation may be required for high impact activities.
- For areas of **medium SEI,** development activities of medium impact are acceptable provided appropriate mitigation and management measures are implemented.
- For areas of **low SEI,** development activities of medium to high 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.

Since project infrastructure is located in an area with an overall SEI of medium and very low, development activities of medium impact are acceptable, provided appropriate mitigation and management measures are implemented.

8. IMPACT ASSESSSMENT

8.1. Identification of Potential Impacts

The clearing of vegetation for the construction of the BESS and associated infrastructure could result in the following impacts:

8.1.1. Construction Phase

- The direct and permanent loss of vegetation types and associated plant species, including species of conservation concern.
- The direct and permanent loss of faunal habitat.
- Clearing of vegetation resulting in breaks in habitat that will lead to habitat fragmentation and edge effects.
- Faunal mortality due to roadkill and persecution.
- Disturbance to faunal species due to construction and operation activities that generate noise, dust, vibrations and lighting. This disturbance may cause faunal species to leave the area or disrupt foraging and/or breeding behaviour of those that remain.

8.1.2. Operational Phase

- Clearing of vegetation and subsequent disturbance to the soil, and therefore seed bank, leading to the infestation of alien invasive plant species and other ruderal species. Although disturbance to the soil and seedbank will occur during the construction phase, infestations of alien invasive species may only occur during the operational phase, once construction has ceased.
- Increased mortality of faunal species due to operational activities such as roadkill and persecution.

8.1.3. Decommissioning Phase

- The direct and permanent loss of vegetation types and associated plant species, including SCC.
- Disturbance to faunal species and potential reduction in abundance and mortality of faunal species.

8.1.4. 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."*

The significance of the cumulative impacts has been assessed for all other renewable projects within a 30 km radius of the proposed site, which already have an Environmental Authorisation or which have Basic Assessments/Environmental Impact Assessments underway (Figure 8.1). Only one project is

located within a 30km radius. This is a 200MW PV directly adjacent to the Midas BESS project. The REEA Q3 dataset spatially shows their study area to include Portion 10 of 280 (i.e. where Midas is situated) but is only authorised on the properties to the North.

Each impact has been assessed and rated using the methodology outlined in section 2.5 and Appendix 2. These impacts are presented below in Table 8.1 and proposed mitigation measures are outlined in section 8.3.

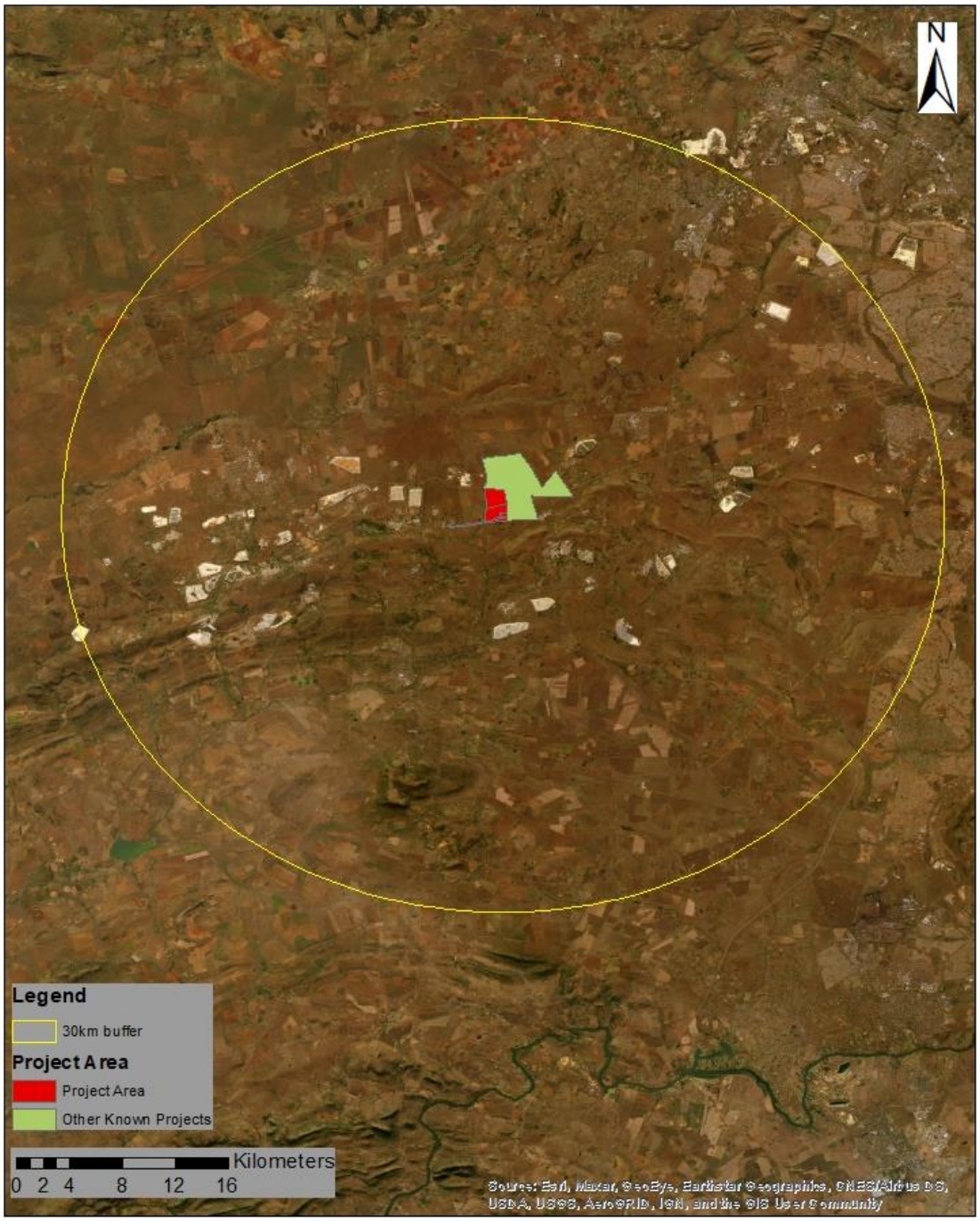


Figure 8.1: Map illustrating other known projects within a 30km radius of the project area

8.2. Rating of potential Impacts

Impacts associated with the BESS have been assessed in Table 8.1 and impacts associated with the grid infrastructure have been assessed in Table 8.2.

Table 8.1: Impacts associated with the BESS

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Construction Phase											
Impact 1: Loss of degraded Carletonville Dolomite Grassland	Preferred	The clearing of vegetation for the construction of project infrastructure will result in the permanent loss of approximately 17 ha of degraded Carletonville Dolomite Grassland. This equates to 0.003% of the remaining extent of this vegetation type. Considering the low overall loss of this vegetation type, and because it is located on the edge of an area that has already been transformed, the overall impact will be of low significance. This impact is difficult to mitigate as the loss of vegetation is definite and permanent and as such the impact will remain of low significance even after mitigation measures have been implemented.	Direct (-)	Permanent	Localised	Definite	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	If the project does not proceed, the properties will continue to be used for grazing livestock and this will likely result in the ongoing loss of vegetation. Impacts under this scenario are low.	Existing (-)	Long-term	Localised	Probable	**LOW (-)**	N/A			**N/A**
Impact 2: Loss of Faunal Habitat	Preferred	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 and fallen trees, and rocks will be removed or relocated. The faunal species that may utilise the habitat within the project area will no longer have access to these habitats for the life of the project and are considered negatively impacted by the project. Given the small size of the project footprint, impacts on faunal habitat are likely to be low.	Direct (-)	Long-term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	If the project does not proceed, faunal habitats will remain intact and the impact will be negligible.	Negligible				Negligible	N/A			**N/A**
Impact 3: Loss of Plant SCC	Preferred	There are no confirmed SCC or SCC that have a high likelihood of occurrence within the project area. As such, impacts on SCC will be negligible.	Negligible				Negligible	Negligible			Negligible
	No-G0	If the project does not proceed, impacts under this scenario are expected to be low as limited SCC will be lost	Negligible				Negligible	Negligible			Negligible

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 4: Loss of Faunal SCC	Preferred	Only two SCC have a high likelihood of occurrence within the project area. If present, these species are likely to move away from construction activities which are anticipated to occur over a short time frame. Given the small footprint of the project area, impacts on SCC are anticipated to be of low significance.	Direct (-)	Short-term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly	Achievable	**LOW (-)**
	No-G0	If the project does not proceed, impacts under this scenario are expected to be low as limited SCC will be lost	Negligible				Negligible	Negligible			Negligible
Impact 5: Disruption of Ecosystem Function and Process	Preferred	Fragmentation is one of the most important impacts on vegetation as it creates breaks in previously continuous vegetation, causing a reduction in the gene pool and a decrease in species richness and diversity. This impact occurs when more and more areas are cleared, resulting in the isolation of functional ecosystems, which results in reduced biodiversity and reduced movement due to the absence of ecological corridors. Fragmentation can also prevent the continuation of important ecological processes and drivers such as seed dispersal and fire, which are important for maintaining ecosystem function. Since the applicant has located infrastructure on the western edge of natural habitat, fragmentation has been limited and impacts on ecosystem function and process, as a result of the construction of the proposed project, is classified as low significance prior to mitigation.	Direct (-)	Long-term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	Habitat fragmentation and edge effects have occurred within the project area due to clearing of large tracts of land for agricultural purposes. Under the no-go scenario, the impact is of moderate significance.	Existing (-)	Permanent	Study Area	Definite	**MEDIUM (-)**	N/A			**N/A**
Impact 6: Disturbance to faunal species and their livelihood activities (shelter, foraging and breeding) due to construction related noise, vibrations, dust, night lighting and obstructions.	Preferred	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 as such, 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. The significance of the impact will be medium prior to mitigation but can be reduced to low if the recommended mitigation measures are successfully implemented.	Direct (-)	Short-Term	Study Area	Definite	**MEDIUM (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	Under the no-go alternative it is unlikely that fauna will be disturbed as the current land use involves livestock farming. As such, the significance of this impact is negligible	Negligible				Negligible	Negligible			Negligible

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 7: Mortality of faunal species due to project related activities	Preferred	Faunal mortalities can occur as a result of the following activities: • Removal of faunal habitat and land levelling machinery may cause accidental mortalities of faunal species sheltering or taking refuge within the habitat, such as reptiles, amphibians and small rodents that shelter in rocky crevices. • Contractor vehicles may cause faunal mortalities due to collision. • Species perceived as a threat (e.g. snakes), may be persecuted.	Direct (-)	Short-Term	Study Area	Definite	**MEDIUM (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	Under the no-go alternative it is unlikely that faunal mortalities will occur as the current land use involves livestock farming. As such, the significance of this impact is low.	Existing (-)	Permanent	Study Area	Definite	**LOW (-)**	N/A			N/A
Operational Phase											
Impact 8: Infestation of alien invasive plant species	Preferred	If laydown areas and roads are not rehabilitated, these disturbed areas can become places for alien invasive species to become established. If left unmitigated, these species can spread and establish themselves in intact vegetation, resulting in the displacement of indigenous species and possible local extinctions of SCC.	Direct (-)	Long-Term	Regional	Probable	**MEDIUM (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-Go	There is limited infestation of alien invasive plant species within the project area. As such, the current impact is of low significance.	Existing (-)	Long-Term	Localised	Probable	**LOW (-)**	N/A			**N/A**
Impact 9: Mortality of faunal species due to operational project related activities	Preferred	Maintenance vehicles and project operation related monitoring may cause accidental faunal mortalities due to collisions. This impact is of moderate significance prior to mitigation but can be reduced to low significance if mitigation measures are successfully implemented.	Direct (-)	Long-term	Study Area	Probable	**MEDIUM (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	The PAOI is currently used for farming activities. As such, under the no-go alternative faunal mortalities may still occur as a result of farming activities. However, the instance of faunal mortalities is lower in comparison to the increased access associated with the maintenance and operation of the proposed project. As such, the no-go alternative is classified as low.	Existing (-)	Short-Term	Localised	Probable	**LOW (-)**	N/A			**N/A**
Decommissioning Phase											
Impact 10: Loss of indigenous vegetation and species of conservation concern	Preferred	The decommissioning of the facility will require laydown areas and will disrupt vegetation that has re-established around the areas that were disturbed during the construction phase. The loss of vegetation will be similar to the construction phase impacts. Given that the majority of the vegetation that will be disturbed will be secondary vegetation, the impact associated with this is low.	Direct (-)	Short-term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 11: Disturbance to faunal species and potential reduction in abundance and mortality of faunal species	Preferred	As with the construction phase, the decommissioning phase will also require heavy machinery and result in the disruption of faunal species that have re-inhabited the area during operation. Impacts will therefore be similar to that of the construction phase disturbance and will be of moderate significance prior to mitigation but can be reduced to low significance if mitigation measures are implemented.	Direct (-)	Short-Term	Study Area	Definite	**MEDIUM (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
Cumulative Impacts											
Impact 12: Loss of indigenous vegetation and species of conservation concern	Preferred	The cumulative impact associated with the additional loss of vegetation and SCC as a result of the development of the BESS is considered fairly small in relation to the other developments in the area. Assuming that other projects within close proximity to the project have implemented suitable mitigation measures to reduce their impact, the overall significance of the impact will be Low.	Direct (-)	Long-Term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
Impact 13: Increased reduction in faunal habitat and increase disturbance of faunal species	Preferred	The cumulative impact associated with the additional loss of vegetation and SCC because of the development of the BESS is considered fairly small in relation to the other developments in the area. Assuming that other projects within close proximity to the project have implemented suitable mitigation measures to reduce their impact, the overall significance of the impact will be Low.	Direct (-)	Long-Term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**

Table 8.2: Impacts associated with the grid infrastructure

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Construction Phase											
Impact 1: Loss of Faunal Habitat	Preferred	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 and fallen trees, and rocks will be removed or relocated. The faunal species that may utilise the habitat within the project area will no longer have access to these habitats for the life of the project and are considered negatively impacted by the project. Given the small size of the project footprint and transformed nature of the vegetation, impacts on faunal habitat are likely to be negligible.	Negligible				Negligible	N/A			**N/A**
	No-G0	If the project does not proceed, faunal habitats will remain intact and the impact will be negligible.	Negligible				Negligible	N/A			**N/A**

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 2: Loss of Plant SCC	Preferred	There are no confirmed SCC or SCC that have a high likelihood of occurrence within the project area. As such, impacts on SCC will be negligible.	Negligible				Negligible	Negligible			Negligible
	No-G0	If the project does not proceed, impacts under this scenario are expected to be low as limited SCC will be lost	Negligible				Negligible	Negligible			Negligible
Impact 3: Loss of Faunal SCC	Preferred	Only two SCC have a high likelihood of occurrence within the project area. If present, these species are likely to move away from construction activities which are anticipated to occur over a short time frame. Given the small footprint of the project area and its transformed nature, impacts on SCC are anticipated to be of low significance.	Direct (-)	Short-term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly	Achievable	**LOW (-)**
	No-G0	If the project does not proceed, impacts under this scenario are expected to be low as limited SCC will be lost	Negligible				Negligible	Negligible			Negligible
Impact 4: Disruption of Ecosystem Function and Process	Preferred	Fragmentation is one of the most important impacts on vegetation as it creates breaks in previously continuous vegetation, causing a reduction in the gene pool and a decrease in species richness and diversity. This impact occurs when more and more areas are cleared, resulting in the isolation of functional ecosystems, which results in reduced biodiversity and reduced movement due to the absence of ecological corridors. Fragmentation can also prevent the continuation of important ecological processes and drivers such as seed dispersal and fire, which are important for maintaining ecosystem function. Since the applicant has located infrastructure in an area that has already been transformed, fragmentation has been limited and impacts on ecosystem function and process, as a result of the construction of the proposed project, is classified as low significance prior to mitigation.	Direct (-)	Long-term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	Habitat fragmentation and edge effects have occurred within the project area due to clearing of large tracts of land for agricultural purposes. Under the no-go scenario, the impact is of moderate significance.	Existing (-)	Permanent	Study Area	Definite	**MEDIUM (-)**	N/A			**N/A**

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 5: Disturbance to faunal species and their livelihood activities (shelter, foraging and breeding) due to construction related noise, vibrations, dust, night lighting and obstructions.	Preferred	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 as such, 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. The significance of the impact will be moderate prior to mitigation but can be reduced to low if the recommended mitigation measures are successfully implemented.	Direct (-)	Short-Term	Study Area	Definite	**MEDIUM (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	Under the no-go alternative it is unlikely that fauna will be disturbed as the current land use involves livestock farming. As such, the significance of this impact is negligible	Negligible				Negligible	Negligible			Negligible
Impact 6: Mortality of faunal species due to project related activities	Preferred	Faunal mortalities can occur as a result of the following activities: • Removal of faunal habitat and land levelling machinery may cause mortalities of faunal species sheltering or taking refuge within the habitat, such as reptiles, amphibians and small rodents that shelter in rocky crevices. • Contractor vehicles may cause faunal mortalities due to collision. • Species perceived as a threat (e.g. snakes), may be persecuted.	Direct (-)	Short-Term	Study Area	Definite	**MEDIUM (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	Under the no-go alternative it is unlikely that faunal mortalities will occur as the current land use involves livestock farming. As such, the significance of this impact is low.	Existing (-)	Permanent	Study Area	Definite	**LOW (-)**	N/A			N/A
Operational Phase											
Impact 7: Infestation of alien invasive plant species	Preferred	If laydown areas and roads are not rehabilitated, these disturbed areas can become places for alien invasive species to become established. If left unmitigated, these species can spread and establish themselves in intact vegetation, resulting in the displacement of indigenous species and possible local extinctions of SCC.	Direct (-)	Long-Term	Regional	Probable	**MEDIUM (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-Go	There is limited infestation of alien invasive plant species within the project area. As such, the current impact is of low significance.	Existing (-)	Long-Term	Localised	Probable	**LOW (-)**	N/A			**N/A**

Potential Issue	Alternative	Source of Issue	Nature & Type	Duration	Extent	Probability	Severity (Significance before mitigation)	Reversibility	Irreplaceable Loss	Mitigation Potential	Severity (Significance after mitigation)
Impact 8: Mortality of faunal species due to operational project related activities	Preferred	Maintenance vehicles and project operation related monitoring may cause faunal mortalities due to collisions. This impact is of moderate significance prior to mitigation but can be reduced to low significance if mitigation measures are successfully implemented.	Direct (-)	Long-term	Study Area	Probable	**MEDIUM (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
	No-G0	The PAOI is currently used for farming activities. As such, under the no-go alternative faunal mortalities may still occur as a result of farming activities. However, the instance of faunal mortalities is lower in comparison to the increased access associated with the maintenance and operation of the proposed project. As such, the no-go alternative is classified as low.	Existing (-)	Short-Term	Localised	Probable	**LOW (-)**	N/A			**N/A**
Decommissioning Phase											
Impact 9: Loss of indigenous vegetation and species of conservation concern	Preferred	The decommissioning of the facility will require laydown areas and will disrupt vegetation that has re-established around the areas that were disturbed during the construction phase. The loss of vegetation will be similar to the construction phase impacts. Given that the majority of the vegetation that will be disturbed will be secondary vegetation, the impact associated with this is low.	Direct (-)	Short-term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
Impact 10: Disturbance to faunal species and potential reduction in abundance and mortality of faunal species	Preferred	As with the construction phase, the decommissioning phase will also require heavy machinery and result in the disruption of faunal species that have re-inhabited the area during operation. Impacts will therefore be similar to that of the construction phase disturbance and will be of moderate significance prior to mitigation but can be reduced to low significance if mitigation measures are implemented.	Direct (-)	Short-Term	Study Area	Definite	**MEDIUM (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
Cumulative Impacts											
Impact 11: Loss of indigenous vegetation and species of conservation concern	Preferred	The cumulative impact associated with the additional loss of vegetation and SCC as a result of the development of the grid connection is considered fairly small in relation to the other developments in the area. Assuming that other projects within close proximity to the project have implemented suitable mitigation measures to reduce their impact, the overall significance of the impact will be Low.	Direct (-)	Long-Term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**
Impact 12: Increased reduction in faunal habitat and increase disturbance of faunal species	Preferred	The cumulative impact associated with the additional loss of vegetation and SCC because of the development of the grid connection is considered fairly small in relation to the other developments in the area. Assuming that other projects within close proximity to the project have implemented suitable mitigation measures to reduce their impact, the overall significance of the impact will be Low.	Direct (-)	Long-Term	Localised	Probable	**LOW (-)**	Reversible	Resource will be partly lost	Achievable	**LOW (-)**

8.3. Mitigation measures for the BESS and Grid Infrastructure

*8.3.1. **Vegetation and Plant Species***

- Construction vehicles and machinery must not encroach into identified 'no-go' areas or areas outside the project footprint.
- Topsoil (20 cm, where possible) must be collected and stored in an area of low (preferable) and medium sensitivity and used to rehabilitate impacted areas that are no longer required during the operational phase (e.g. laydown areas).
- Only indigenous species must be used for rehabilitation.
- Where possible, lay down areas must be located within previously disturbed sites.
- Laydown areas that are not required once construction has ceased, must be rehabilitated back to their natural state using indigenous vegetation.
- Employees must be prohibited from making open fires during the construction phase to prevent uncontrolled run-away fires.
- Employees must be prohibited from collecting plants. It is recommended that spot checks of pockets and bags are done on a regular basis to ensure that no unlawful harvesting of plant species is occurring.
- The site must be checked regularly for the presence of alien invasive species. When alien invasive species are found, immediate action must be taken to remove them.
- An Alien Invasive Management Plan for the site must be created.
- 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.
- Since there are likely to be SCC present within the project area that will require a permits for their removal, an ecological walkthrough of the project area will be required to confirm which species require permits and to determine their densities for the permit application.
- SCC that can be successfully transplanted should be moved to areas within the property that will not be affected by project infrastructure.
- Use existing access roads and upgrade these where necessary

*8.3.2. **Faunal Habitat and Species***

- The development must consolidate road networks to minimise the loss of faunal habitat.
- All construction and construction related activities (including parking of vehicles and machinery) must remain within the approved project footprint.
- No construction and construction related activities are permitted within identified 'no-go' areas and a fine system must be put in place for transgressions by the developer and included in contractual agreements with all staff and contractors.
- Microhabitats (e.g. rock stacks and logs) in the clearing footprint must be relocated to the same habitat immediately adjacent to the removal site. E.g. Rock stacks should be restacked.
- Rehabilitation efforts must provide habitat for faunal species by placing logs and rocks at strategic sites to provide shelter for small mammals and reptiles.

- A clause must be included in contracts for ALL construction personnel (i.e. including contractors) working on site 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, especially for SCC.
- 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.
- 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 placed as low as possible and installation of low UV emitting lights, such as most LEDs.
- Development must be designed to allow unencumbered movement, especially of small faunal species. e.g.
    - Permeable internal and external fences/walls (if any) must be implemented to 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 450 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. 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 toads to move over them. These must be vegetated with plant species that offer cover.
- Speed restrictions must be implemented on all vehicles within the development footprint (40km/h is recommended) to reduced faunal mortalities on the project roads.
- No night driving should be permitted, if unavoidable, this must be restricted, and speed limits adhered to.
- Any faunal species that may die as a result of construction must be recorded (i.e. be photographed, GPS co-ordinates taken) and the records uploaded to iNaturalist.
- A trained snake handler must be onsite 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 site should any speeding or persecution of animals occur.
- All decommissioning related activities (including parking of vehicles and machinery) must remain within the approved project footprint.
- No decommissioning related activities are permitted within identified ‘no-go’ areas and a fine system must be put in place for transgressions by the developer and included in contractual agreements with all staff and contractors.

8.4. Summary of Impacts

The mitigation hierarchy was applied to all impacts. For negative impacts that can often not be avoided, the mitigation hierarchy then aims to minimise the impact, and should residual impacts remain, mitigation measures are then applied and in extreme cases offsets may be required. Some impacts will remain the same despite mitigation measures having been applied. For example, the development footprint will result in the permanent loss of faunal habitat. This cannot be avoided and although it can be minimised, the habitat where the project infrastructure footprint is located will no longer exist and will not be able to re-establish itself for the lifetime of the project. It should be noted that although a mitigation measure may not reduce the impact significance rating (high, medium and low) they must still be applied because the impact has not been avoided in its entirety and the 'Duty of Care' is placed on the applicant/developer. However, it is also worth noting that in this instance, the faunal habitat that will be lost is not unique and is widespread. As such, the significance of the impact will be low and development in this area is therefore acceptable.

8.4.1. BESS

Seven construction phase impacts, two operational phase impacts, two decommissioning phase impacts and two cumulative impacts have been identified for the BESS and associated infrastructure. Of these thirteen impacts, five were of medium significance, seven were of low significance and one was negligible prior to mitigation. However, if the mitigation hierarchy is applied and the recommendations outlined in the report implemented, these can be reduced to twelve impacts of low significance and one impact that is negligible (Table 8.3).

Table 8.3: Summary of impacts associated with the BESS

Impact		Significance and Ranking	
		Pre-Mitigation	Post-Mitigation
CONSTRUCTION PHASE			
Impact 1	**Loss of degraded Carletonville Dolomite Grassland**	Low	Low
Impact 2	Loss of faunal habitat	Low	Low
Impact 3	Loss of Plant Species of Conservation Concern	Negligible	Negligible
Impact 4	Loss of Faunal Species of Conservation Concern	Low	Low
Impact 5	Disruption of Ecosystem Function and Process	Low	Low
Impact 6	Disturbance of faunal species and their livelihood activities (shelter, foraging and breeding) due to construction related noise, vibrations, dust and night lighting.	Medium	Low
Impact 7	Mortality of faunal species due to project related activities	Medium	Low
OPERATIONAL PHASE			
Impact 8	Infestation of alien invasive plant species	Medium	Low
Impact 9	Mortality of faunal species due to project related activities	Medium	Low
DECOMMISSIONING PHASE			
Impact 10	Loss of indigenous vegetation and species of conservation concern	Low	Low

Impact 11	Disturbance to faunal species and potential reduction in abundance and mortality of faunal species	Medium	Low
CUMULATIVE IMPACTS			
Impact 12	Loss of indigenous vegetation and species of conservation concern	Low	Low
Impact 13	Increased reduction in faunal habitat and increase disturbance of faunal species	Low	Low

8.4.2. Grid Infrastructure

Six construction phase impacts, two operational phase impacts, two decommissioning phase impacts and two cumulative impacts have been identified for the grid infrastructure. Of these twelve impacts, five were of medium significance, five were of low significance and two were negligible prior to mitigation. However, if the mitigation hierarchy is applied and the recommendations outlined in the report implemented, these can be reduced to ten impacts of low significance and two impacts that are negligible (Table 8.4).

Table 8.4: Summary of impacts associated with the grid infrastructure

Impact		Significance and Ranking	
		Pre-Mitigation	**Post-Mitigation**
CONSTRUCTION PHASE			
Impact 1	Loss of faunal habitat	Negligible	Negligible
Impact 2	Loss of Plant Species of Conservation Concern	Negligible	Negligible
Impact 3	Loss of Faunal Species of Conservation Concern	Low	Low
Impact 4	Disruption of Ecosystem Function and Process	Low	Low
Impact 5	Disturbance of faunal species and their livelihood activities (shelter, foraging and breeding) due to construction related noise, vibrations, dust and night lighting.	Medium	Low
Impact 6	Mortality of faunal species due to project related activities	Medium	Low
OPERATIONAL PHASE			
Impact 7	Infestation of alien invasive plant species	Medium	Low
Impact 8	Mortality of faunal species due to project related activities	Medium	Low
DECOMMISSIONING PHASE			
Impact 9	Loss of indigenous vegetation and species of conservation concern	Low	Low
Impact 10	Disturbance to faunal species and potential reduction in abundance and mortality of faunal species	Medium	Low
CUMULATIVE IMPACTS			
Impact 11	Loss of indigenous vegetation and species of conservation concern	Low	Low
Impact 12	Increased reduction in faunal habitat and increase disturbance of faunal species	Low	Low

9. CONCLUSIONS

9.1. Conclusions

The BESS infrastructure is located in Carletonville Dolomite Grassland and the grid connection is located in an area that has been transformed and used for agriculture. Carletoncille Dolomite Grassland is listed as least concern and project infrastructure will only affect 0.003% of the remaining extent of this vegetation type. Impacts of the project on this vegetation type are considered to be low.

No plant SCC were recorded within the project area or have a high likelihood of occurrence within the project area.

Only two animal species, the Serval (*Leptailurus serval)* and African Striped Weasel (*Poecilogale albinucha*), have a high likelihood of occurrence within the project area. Both species are listed as NT and are wide ranging and unlikely to be significantly affected by the construction and operation of the BESS and grid infrastructure.

Based on the findings from the field survey, combined with a desktop assessment, the combined SEI for the project area was determined to be Medium for the Carletonville Dolomite Grassland and Very Low for the Transformed Land. Development activities of medium and low significance are acceptable within Carletonville Dolomite Grassland.

9.2. Summary of Impacts and Recommendations

All impacts associated with the BESS and grid connection are of low significance after the mitigation hierarchy has been applied. Development activities are therefore acceptable within the project area provided the mitigation measures listed in section 8.3 are implemented.

9.3. Comment on the DFFE Screening Tool Report

9.3.1. ***Animal Species Theme***

The DFFE screening tool report identified the Animal Species Theme as Medium due to the likely presence of two bird species, three invertebrate species and two mammal species (Spotted-necked Otter and Makwassie musk shrew). This assessment only assesses reptiles, amphibians and mammals and as such only comment on these groups have been provided.

Based on the habitat requirements of the Spotted-necked Otter and Makwassie musk shrew combined with the available habitat recorded within the project area, neither of these species has a high likelihood of occurrence within the project area. However, two species (the Serval and Striped Weasel) have a high likelihood of occurrence within the project area. The SEI analysis therefore took this into account and found that the project area has a Low SEI for animal species. The specialist therefore

disagrees with the DFFE screening tool report and is of the opinion that the sensitivity should be low rather than medium for the project area.

9.3.2. ***Plant Species Theme***

The DFFE screening tool report identified the Plant Species Theme as Medium due to the likely presence of three plant SCC. The likelihood of occurrence of each of these species was determined to be medium and low. As such, the specialist is of the opinion that the sensitivity for the plant species theme should be low rather than medium.

9.3.3. ***Terrestrial Biodiversity Theme***

The DFFE screening tool report identified the Terrestrial Biodiversity Theme as Very High due to the presence of the following sensitive features:

- CBA 1
- ESA 1 and 2
- National Protected Area Expansion Strategy (NPAES)

Chapter 6 provides comment on how project infrastructure will affect each of these features. The underlying features driving the CBA status of the project area are based on the vegetation type present and plant habitat. Since the vegetation type present is listed as LC and has an SEI of medium, and because there are no likely SCC present within the project area, these features are unlikely to be severely affected by the project development. Furthermore, no project infrastructure is located within a NPAES.

Based on the above, and given the small footprint of the facility, the specialist is of the opinion that the sensitivity for the terrestrial biodiversity theme should be medium rather than very high.

9.4. Ecological Statement and Opinion of the Specialist

Given that the project area has a medium (BESS) and very low (Grid Connection) sensitivity, the specialists are of the opinion that the development can proceed, provided the recommendations contained in this report are implemented

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APPENDIX 1: SPECIES LIST OF PLANTS RECORDED IN THE PROJECT AREA

Family	*Species*	Threat Status	Free State Nature Conservation Ordinance (1969)	NEMBA	CARA
AMARYLLIDACEAE	*Ammocharis coranica*	LC	Schedule 6 (estimated that there are 20-30 individuals within the project area)		
ASTERACEAE	*Arctotis arctotoides*	LC			
PAPAVERACEAE	*Argemone ochroleuca*	NE		Category 1b	Category 1
POACEAE	*Aristida adscensionis*	LC			
POACEAE	*Aristida congesta*	LC			
ASPARAGACEAE	*Asparagus larcinus*	LC			
ASTERACEAE	*Berkheya onopordifolia*	LC			
ASTERACEAE	*Berkheya radula*	LC			
ASTERACEAE	*Bidens pilosa*	NE			
ASTERACEAE	*Conyza bonariensis*	NE			
POACEAE	*Cymbopogon pospischilii*	NE			
POACEAE	*Cynadon dactylon*	LC			
POACEAE	*Eragrostis curvula*	LC			
POACEAE	*Eragrostis lehmanniana*	LC			
MYRTACEAE	*Eucalyptus grandis*	NE		Category 1b	Category 2
FABACEAE	*Gleditsia triacanthos*	NE		Category 1b	Category 2
AMARYLLIDACEAE	*Haemanthus montanus*	LC	Schedule 6 (estimated that there are 100-150 individuals within the project area)		
ASTERACEAE	*Helichrysum nudifolium*	LC			
ASTERACEAE	*Helichrysum rugulosum*	LC			
MALVACEAE	*Hermannia Sp*				
POACEAE	*Hyparrhenia hirta*	LC			
HYPOXIDACEAE	*Hypoxis hemerocallidea*	LC			

FABACEAE	*Indigofera alternans*	LC			
SOLANACEAE	*Lycium cinereum*	LC			
POACEAE	*Melinis repens*	LC			
SCROPHULARIACEAE	*Nemesia fruticans*	LC			
CACTACEA	*Opuntia ficus-indica*	NE		Category 1b	Category 1
CACTACEA	*Opuntia humifusa*	NE		Category 1b	Category 1
ASTERACEAE	*Pentzia globosa*	LC			
ASTERACEAE	*Senecio consanguineus*	LC			
POACEAE	*Setaria sphacelata*	NE			
ASTERACEAE	*Stoebe plumosum*	LC			
POACEAE	*Themeda triandra*	LC			
FABACEAE	*Vachellia karroo*	LC			
VERBENACEAE	*Verbena aristigera*	NE			
VERBENACEAE	*Verbena litoralis*	NE			
RHAMNACEAE	*Ziziphus mucronata*	LC			

APPENDIX 2: IMPACT ASSESSMENT METHODOLOGY

The rating scale developed by Coastal and Environmental Services, 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 A2.1: 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 A2.2: 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.

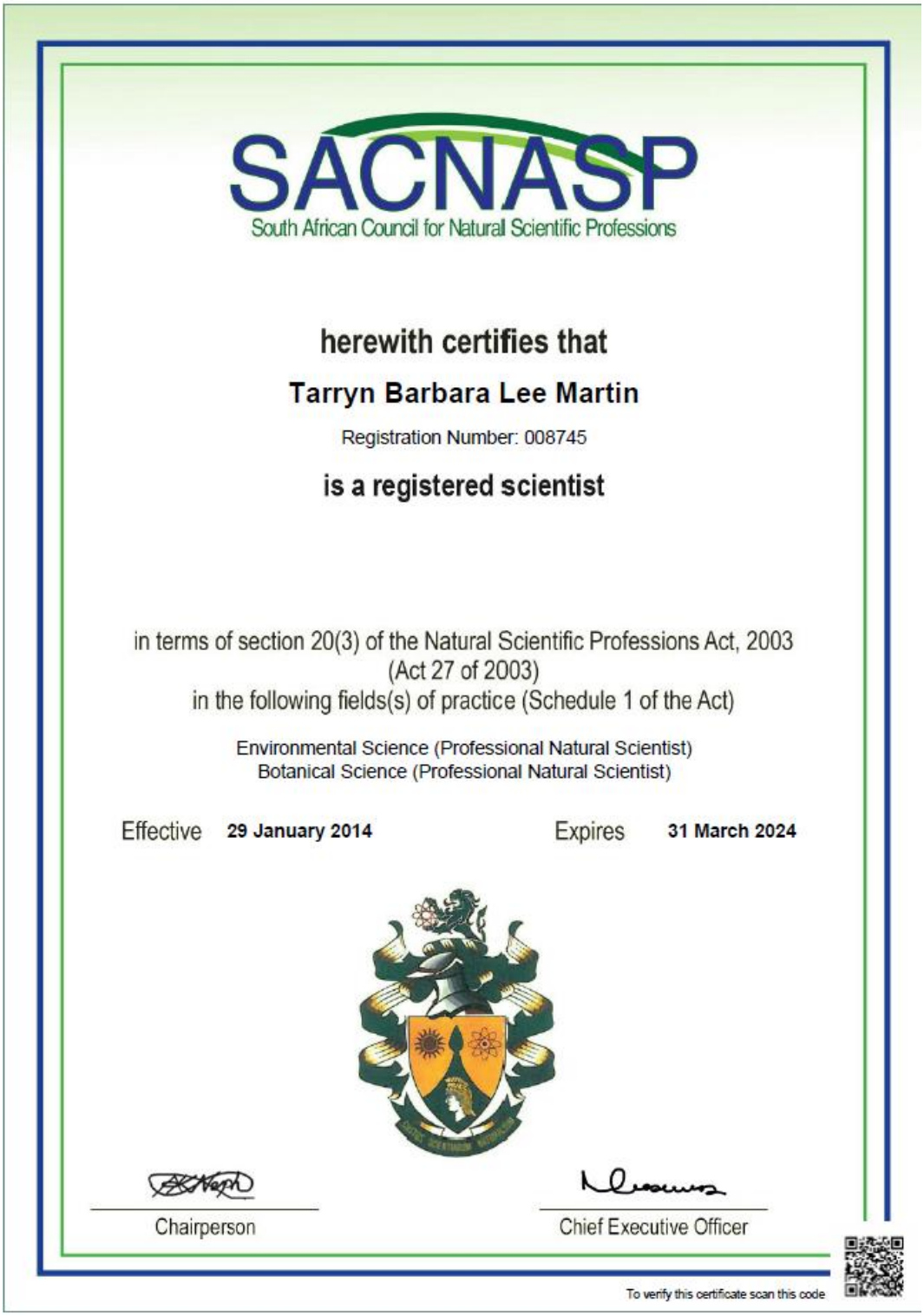
Table A2.3: Post-mitigation Evaluation Criteria

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).

APPENDIX 3: 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 fields(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 2024**

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 registered as a

Candidate Natural 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 I of the Act)

Environmental Science **15 August 2012**

15 August 2012
Pretoria

President

Executive Director

we certify that

Amber Leah Jackson

was admitted to the degree of

Master of Philosophy

in Environmental Management

on 9 June 2011

Vice-Chancellor

Registrar

APPENDIX 4: 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

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- 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

TERRESTRIAL BIODIVERSITY, PLANT AND ANIMAL SPECIES THEME SITE VERIFICATION AND SENSITIVITY REPORT FOR THE PROPOSED MIDAS BESS AND GRID CONNECTION, GAUTENG PROVINCE

Prepared for:

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Cape Town, 8000

Prepared by:

Biodiversity Africa

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February 2024

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).

Amber Jackson (Faunal Specialist) (*Cand. Nat. Sci)*

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.

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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).

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).

Acronyms

ADU	Animal Demography Unit
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
PNCO	Provincial Nature Conservation Ordinance
POSA	Plants of Southern Africa
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

1. INTRODUCTION

1.1. Project Description

Midas BESS (Pty) Ltd ('the Applicant') is proposing the construction of the Midas Battery Energy Storage (BESS) Facility, located on Portion 10 of the Farm Uitval No. 280, situated approximately 18 km east of Carltonville in the Gauteng Province (Figure 1.1).

The Applicant is also proposing to upgrade the existing access road on Portion 8 and Portion 10 of the Farm Uitval No. 280; and to construct new 132kV grid connection infrastructure on Portion 10 of the Farm Uitval No. 280, Portion 22 of the Farm Driefontein No. 355, Portion 5 of the Farm Doornkloof No. 350, Portion 71 of the Farm Leeuwpoort 356, Portion 70 of the Farm Leeuwpoort 356, Portion 36 of the Farm Leeuwpoort 356, Portion 35 of the Farm Leeuwpoort 356, Portion 33 of the Farm Leeuwpoort 356 and Portion 28 of the Farm Driefontein 355.

The Midas BESS facility will have a total development footprint of up to approximately 15 ha and will have a maximum export capacity of 77 MW. The development area is situated within the Merafong City Local Municipality and the Rand West City Local Municipality. The site is accessible via existing gravel roads from the R501 and N12.

The proposed Midas BESS will cover approximately 15 ha and will include the following infrastructure (Figure 1.2):

- Solid State Battery Energy Storage System (BESS) (up to 10 ha).
- Inverters and transformers
- Site and internal access roads (up to 8m wide).
- Operation and Maintenance buildings including a gate house and security building, control centre, offices, warehouses and workshops for storage and maintenance (up to 1 ha).
- Laydown areas (3 ha temporary and 1 ha permanent).
- A 132 kV facility substation (up to 1 ha).
- 33 kV cabling between the project components and the facility substation.

The project will also include Grid connection infrastructure consisting of:

- A 132 kV Eskom Switching Station (up to 1 ha).
- 132 kV powerline (up to 4 km long) connecting the Eskom switching station to the Midas Main Transmission Substation (a grid connection corridor of 100m wide will be assessed to allow for environmental sensitivities and/or micro-siting).

The Grid connection infrastructure, although assessed cumulatively with the BESS, will be subject to a separate environmental application process administered by the provincial authority.

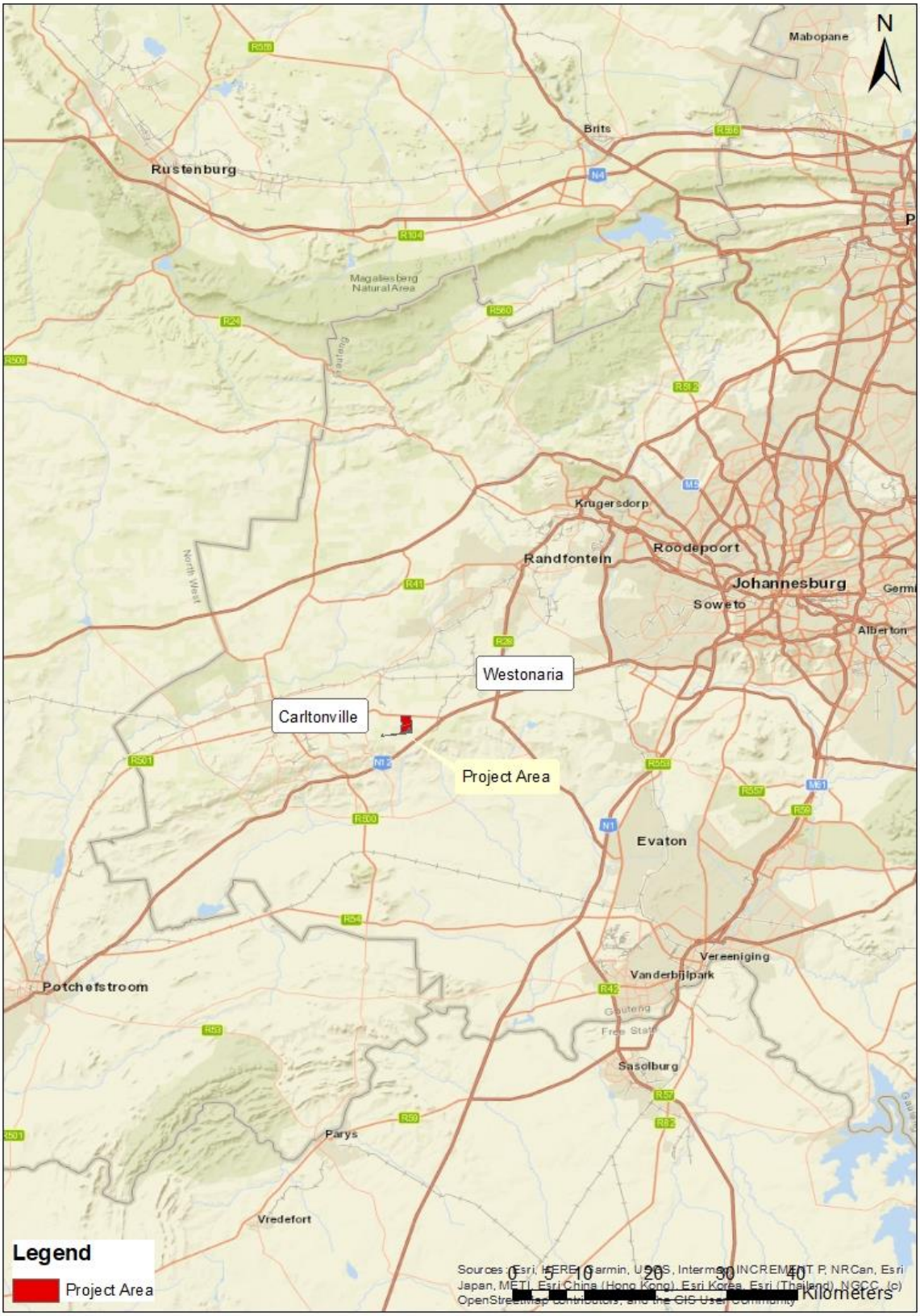


Figure 1.1: Location of the project area in relation to Kroonstad

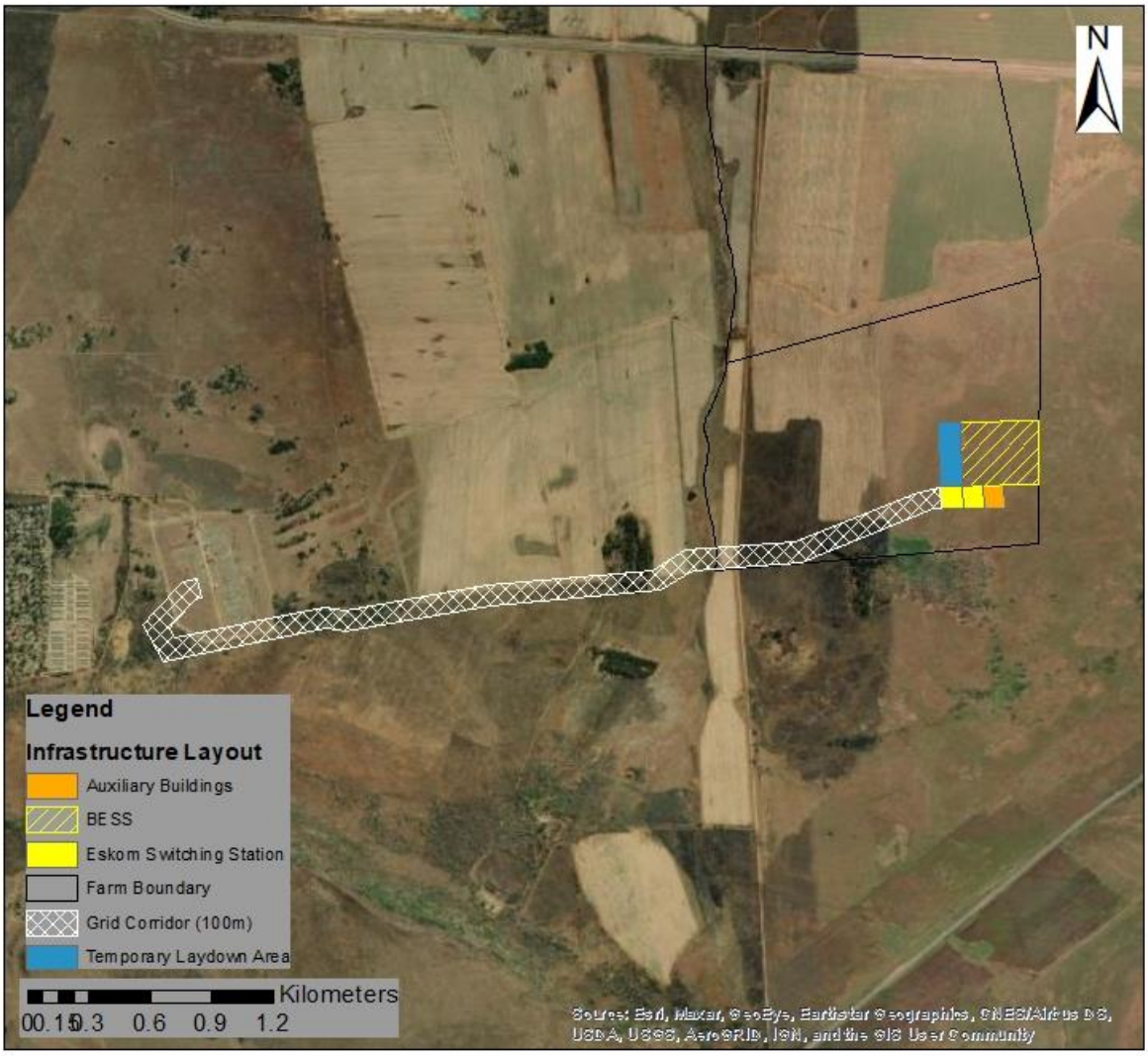


Figure 1.2: Infrastructure Map

1.2. Objectives

The objectives of this site sensitivity verification report are to:

- Undertake a desktop assessment of the site to determine its sensitivity and Species of Conservation Concern (SCC) (plants, amphibians, reptiles, mammals) that could be present within the site.
- Undertake a field survey, to record the following information:
    - Species present
    - Identification of species that are either protected (TOPS and PNCO) or considered threatened (Critically Endangered (CR), Endangered (EN), Vulnerable (VU)) on the South African Red Data List
    - Assess the level of degradation/ecological status of the site (i.e. intact, near natural, transformed).
- Assess the sensitivity of each site using the sensitivity analysis outlined in the Species Guideline Document (2021).
- Provide comment on whether the specialist agrees with the sensitivity for the Animal, Plant and Terrestrial Biodiversity Themes in the screening tool. If the specialist disagrees with the sensitivity rating in the screening tool, a reason will be provided, and the sensitivity provided based on the findings from the field survey.

1.3. 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 almost certain that additional SCCs are present. However, every effort was made to identify SCC present in the project area 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, based on observed habitat availability, was determined. The field survey and desktop assessment provided sufficient information to confirm the presence/absence of SCC.
- Sampling was carried out at one stage in the annual or seasonal cycle. The survey was conducted in mid summer (16 January 2024) when most species were flowering. However, some early flowering species may have gone undetected.
- This assessment includes plants, mammals (excluding bats), amphibians and reptiles. It does not include birds, bats or invertebrates. Birds have been assessed separately by specialists within this field.
- The faunal assessment is based on a field survey to assess available habitat present within the project area, coupled with a desktop assessment to determine the likelihood of occurrence of SCC.

- The assessment has been undertaken to meet the Protocol for the Specialist Assessment and Minimum Report Requirements for Environmental Impacts on Terrestrial Biodiversity (2020) and the Species Environmental Assessment Guidelines (2021).

2. METHODOLOGY

2.1. DFFE Screening Report

The DFFE screening 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 animal species theme, plant species theme, and the terrestrial biodiversity theme (Table 2.1). Comment has been provided in the table below indicating how these themes have been assessed.

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

Theme	Sensitivity	Assessment
Animal Species Theme (Figure 2.1)	Medium • Possible presence of two bird species • Possible presence of three invertebrates • Possible presence of two mammals *(Hydrictis maculicollis* and *Crocidura maquassiensis*)	The animal species theme has been categorised as medium due to the possible presence of two bird species, three invertebrates and two mammal species. The field survey assessed whether there was any suitable habitat present for the mammal species. Birds are assessed separately by an avifaunal specialist. The faunal assessment also identifies amphibians, reptiles and mammals that could occur within the project area and provides comment on the likelihood of occurrence of SCC (Refer to Chapter 4).
Plant Species Theme (Figure 2.2)	Medium • Likely presence of three plant species (*Khadia beswickii,* Sensitive Species 1147, Sensitive Species 1248)	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 5).
Terrestrial Biodiversity Theme (Figure 2.3)	Very High • Critical Biodiversity Area 1 (CBA 1) • Ecological Support Area 1 (ESA 1) and 2 (ESA 2)	The field survey confirmed which vegetation types were present within the project area. Furthermore, the implications of project activities on the CBA and NPAES has been assessed in Chapter 6.

	• National Protected Area Expansion Strategy (NPAES)	

2.2. Desktop Assessment

2.2.1. 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 study area, were also included. Literature sources included:

- Amphibians –Du Preez & Carruthers (2017), FrogMap (ADU, 2024).
- Reptiles – Branch (1998), ReptileMap (ADU, 2024).
- Mammals – Stuart & Stuart (2014), MammalMap (ADU, 2024).
- IUCN.
- iNaturalist.

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

- Atlas and Red List of Reptiles of South Africa, Lesotho and Swaziland (Bates *et al*., 2014).
- Atlas and Red List of Frogs of South Africa, Lesotho and Swaziland (Minter *et al*., 2004).
- Red List of Mammals of South Africa, Swaziland and Lesotho.

2.2.2. Plant Species Theme

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

- The Plants of Southern Africa (POSA) database.
- iNaturalist.
- The DFFE screening report for the site (January 2024).

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

2.2.3. Terrestrial Biodiversity Theme

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

- The DFFE screening report for the site (January 2024).
- The South African Vegetation Map (Mucina and Rutherford, 2018).

- Gauteng Conservation Plan 3.3 (2011)
- The International Union for the Conservation of Nature (IUCN) Red List of Ecosystems for South Africa (SANBI, 2021).
- National Biodiversity Management: Biodiversity Act (NEM:BA) List of Threatened or Protected Species.
- The National Biodiversity Assessment (SANBI, 2018).

2.3. Field Survey

A field survey was undertaken during mid-summer (16 January 2024) to confirm the current land use, vegetation types and faunal habitat present. The information gathered from the site visit was sufficient to determine the sensitivity of the site. Figure 2.1 indicates the sample sites.

2.3.1. 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, and identifying the current land use.

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. Vegetation communities were then described according to the dominant species recorded from each type, and these were mapped and assigned a sensitivity score.

2.3.2. Animal Species Theme

The purpose of the faunal survey was to determine the types of faunal habitats present within the project area supplemented with a desktop assessment to determine the likelihood of occurrence of SCC present within available habitat. Faunal habitat within the project area was recorded and mapped by the faunal specialist which provided sufficient information to draw conclusions on the likelihood of occurrence of SCC.

2.4. Site Sensitivity Assessment

The Species Environmental Assessment Guideline (SANBI, 2021) 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, functional integrity and receptor resilience (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 available spatial planning tools as well as by applying the SEI sensitivity based on the field survey.

Table 2.2: 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)	

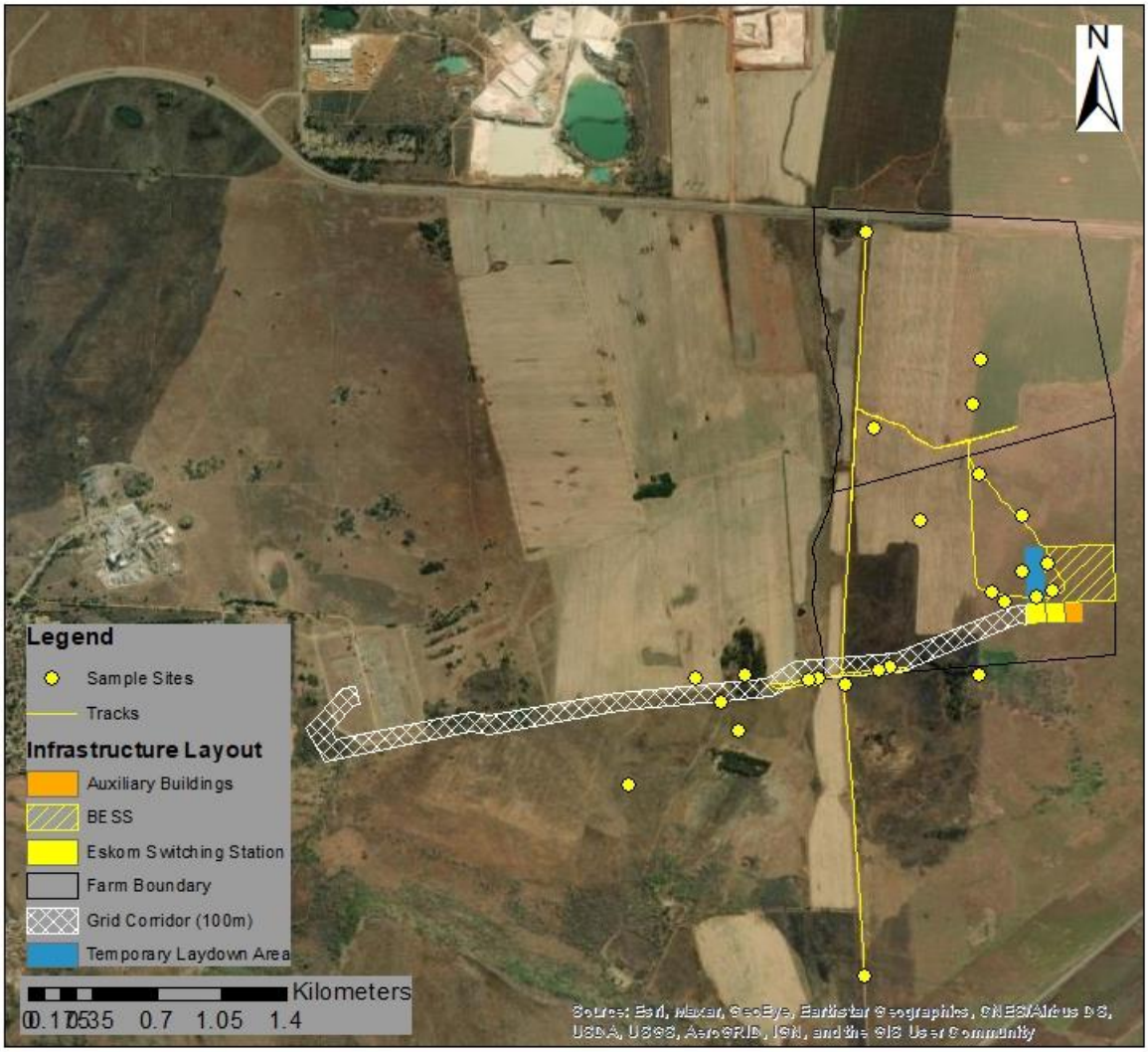


Figure 2.1: Map showing sample sites and tracks in relation to the project area.

3. ANIMAL SPECIES THEME

3.1. Faunal Habitat Present

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.

The habitat in the PAOI is primarily Grassland typically interspersed with micro-habitats such as seeps and rocky ridges.

Five faunal habitats were identified in this PAOI, namely (Figure 3.1 and 3.2):

- Rocky Ridges
- Grassland
- Woodlots
- Agricultural Fields
- Seeps, wetlands and streams

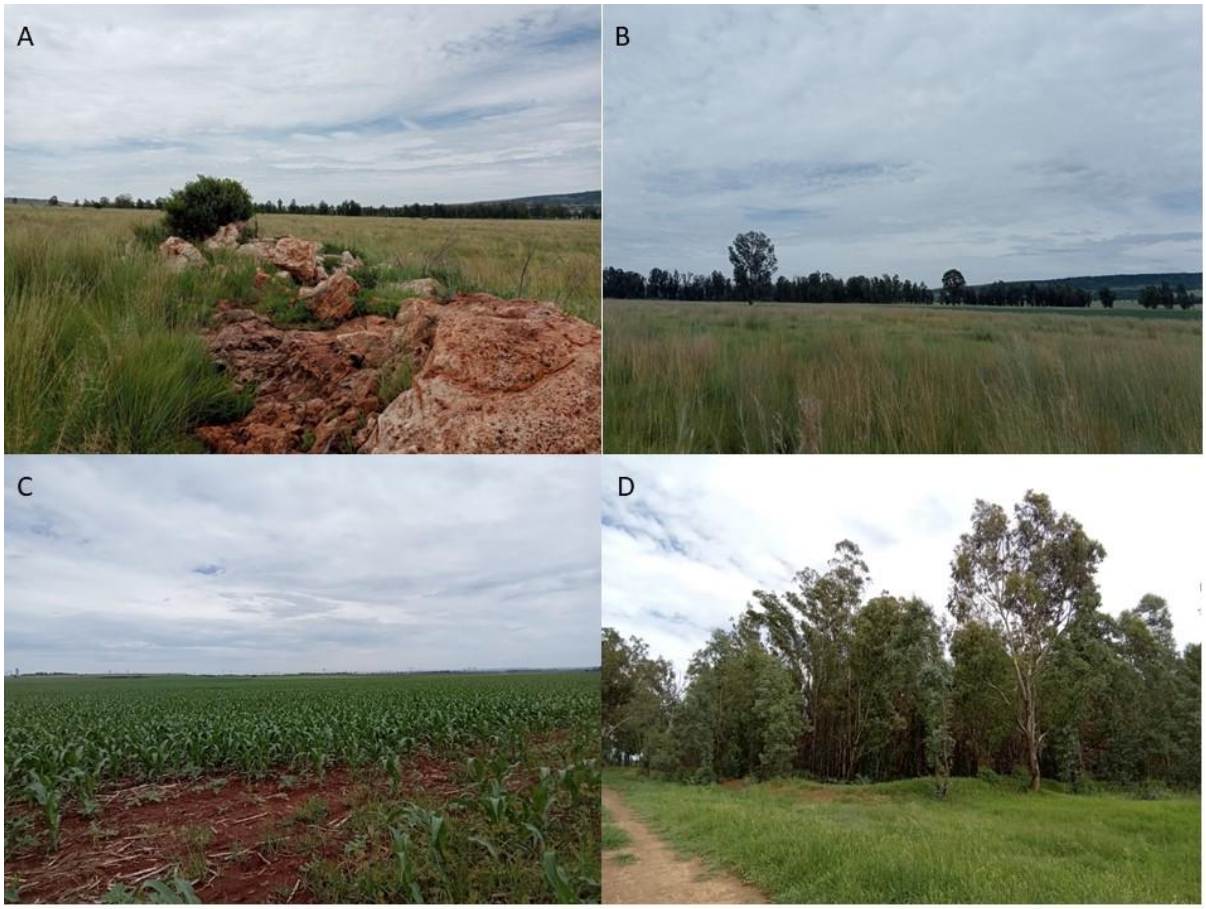


Figure 3.1: Photographs illustrating the faunal habitats present within the PAOI. A) Rocky Ridges, B) Grassland with woodlots in the background C) Agricultural Fields, D) Woodlots of Eucalyptus.

Figure 3.2: Photograph illustrating a stream that runs over the road during the wet season

3.2. Amphibians

The project area intersects with the distribution range of twenty (20) amphibian species, of which four (4) species have been recorded in the Quarter Degree Squares (QDS 2627BC) within which the project area occurs, and a further nine (9) were recorded in the general area (IUCN, 2023; iNaturalist, 2023; FitzPatrick, 2023). All amphibian species with a distribution range that intersects the project area are classified as Least Concern (LC). Amphibian species are likely to occur within the project area but are not likely to solely rely on it.

It should be noted that the Giant Bull Frog (*Pyxicephalus adspersus*), which has a distribution range that includes the project area, was listed as nationally Near-Threatened (Minter, *et al*., 2004) but has since been downgraded to Least Concern by the IUCN SSC Amphibian Specialist Group (IUCN, 2013). However, this species is a protected species under TOPS Schedule B1 in terms of NEM:BA (Act 10 of 2004) and if on site, a permit would be required for their removal. Although not recorded in the area, it is possible this species occurs in the project area and is considered to have a moderate likelihood of occurrence. It inhabits seasonal shallow grassy pans, vleis and other rain filled depressions in open flat grassland in and remains buried 1m underground for much of the year (du Preez and Carruthers, 2017).

3.3. Reptiles

The project area intersects with the distribution range of sixty-three (63) reptile species of which twenty-one (21) species have been recorded in the QDS (2627BC) within which the project area occurs, and a further seventeen (17) were recorded in the general area (IUCN, 2023; iNaturalist, 2023; FitzPatrick, 2023).

Of the sixty-three reptile species that have distribution ranges that intersect the project area, one species (*Kinixys lobatsiana* – Lobatse Hinged Tortoise) is listed as Vulnerable (VU) and one species (*Homoroselaps dorsalis* – Striped Harlequin Snake) is listed as Near Threatened (NT). The remaining species are all listed as LC. The likelihood of occurrence of each SCC is assessed in Table 3.1 below. The Lobatse Hinged Tortoise has a low likelihood of occurrence and the Striped Harlequin Snake as a Medium likelihood of occurrence.

Table 3.1: Likelihood of occurrence of Reptile SCC

Species	Threat Status		Habitat Preference	Known Occurrence	Likelihood of Occurrence
	Threat Status (IUCN)	TOPS			
Lobatse Hinged Tortoise *(Kinixys lobatsiana)*	VU	-	The project area is located on the western edge of this species' distribution range. It is associated with rocky hillsides in savannas that include *Acacia* and *Combretum* Woodland and tropical Bushveld and Thornveld with vegetation that ranges from dense, short shrubland to open tree savanna.	Recorded 30km north and north east of the project area (iNat, 2024)	**Low** Suitable habitat was not present within the project area.
Striped Harlequin Snake (*Homoroselaps dorsalis)*	NT	-	This species has a patchy distribution across most of north eastern South Africa and into western Eswatini. There are six extant populations, one of which occurs around Johannesburg, extending south east to Carletonville and the area in which the project is located. This species is associated with grassland and is partially fossorial, typically inhabiting moribund termitaria in grasslands between 100 to 1800m above sea level (asl).	Recorded 20km north and south west of the project area (iNat, 2024)	**Medium** The area of natural vegetation within the project area is fragmented and did not contain any termite mounds. The likelihood of occurrence for this species is this therefore Medium.

3.4. Mammals

The project area intersects with the distribution of eighty-nine mammal species of which nineteen have been recorded with the QDS (2627BC) within which the project area occurs and a further fifty-two were recorded in the general area (IUCN, 2023; iNaturalist, 2023; FitzPatrick, 2023).

Of the eighty-nine species that have a distribution range that overlaps with the project area, one is listed as Critically Endangered (CR), one as endangered (EN) and seven as Vulnerable. Further to the above, additional SCC recorded on iNaturalist include a further two EN species, two VU species and five NT species. However, species listed such as Rhinocerus, Sable Antelope and Cheetah are unlikely to occur outside of protected areas such as game reserves and national parks, and as such these species have been excluded from the likelihood of occurrence assessment in Table 3.2 below.

Only two species, the Serval (*Leptailurus serval)* and African Striped Weasel (*Poecilogale albinucha*), have a high likelihood of occurrence within the project area. The other SCC have a medium to low likelihood of occurrence, mostly as a result of the project area being highly fragmented and occurring within a busy farming area with a busy road network. Three species have a medium likelihood of occurrence and a further eight species have a low likelihood of occurrence.

Table 3.1: Mammal Species of Conservation Concern and their likelihood of occurrence within the study area.

*CR – Critical; EN -Endangered; VU – Vulnerable; NT -Near Threatened

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
Serval *Leptailurus serval*	NT	Protected	This species depends on vegetation boarding water sources such as wetlands, marshland, rank grass and vleis as well as well-watered savannah with long-grass (Ramesh, *et al*., 2016). Servals prey on small mammals, birds, reptiles, fish, and rarely invertebrates. Their main diet consists of Vlei Rats (*Otomys sp.*) and Striped Mice (*Rhabdomys pumilio*).	The nearest record on iNaturalist is 15km west of the project area.	**High** The project area is within the distribution range of this species and there is suitable habitat present to the west of the proposed project area. The likelihood of occurrence in wetlands and seeps is therefore classified as High.
African Striped Weasel *Poecilogale albinucha*	NT		This species has a wide habitat tolerance including fynbos, lowland rainforest, semi-desert grassland, pine plantations and agricultural fields but is mainly found in savanna. (Child, *et al*., 2016; Stuart, Stuart & Do Linh San, 2015).	There is a record of this species within 15km south of the project area (iNat, 2024).	**High** This species wide habitat tolerance suggests it has a high likelihood of occurrence within the project area.
Maquassie (Makwassie) Musk Shrew *(Crocidura maquassiensis)*	VU	-	This is a rare species, recorded only from disparate localities. Little is known about the habitats and ecology of this species. However, this near endemic species is known to inhabit wetlands, moist grasslands and grasslands. It may tolerate a wider range of habitats as is has been found in rocky or montane grassland, coastal forest, mixed bracken and grassland alongside a river and a garden. (Taylor et al., 2016, Cassola, 2016)	No records of this species within 150km of the project area.	**Medium** No suitable habitat is present within the project area although there is suitable habitat present within the broader PAOI.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
Black-footed Cat *Felis nigripes*	VU	Protected	The Black-footed cat is typically a solitary, ground dweller that is crepuscular[1] and nocturnal (Sliwa *et al.,* 2016). During the day it makes use of dens, preferring hollowed termite mounds when available but also making use of burrows dug by other animals (e.g., Springhares, Ground Squirrels and Aardvark). It hunts small rodents and ground-dwelling birds found in short, open grasslands and is found in dry, open grasslands, savannah and karoo semi-desert. The estimated EOO is 930,000 km^2 and individual home ranges for males have been recorded to be approximately 16-20km^2 and for females were 9-10km^2 (Wilson *et al.* in Child *et al.,* 2016). The project area is surrounded by very large areas of cultivated land in a busy farming community with small, remnant patches of natural vegetation remaining.	No records within a 150km radius (iNat, 2024).	**Medium** Although there is suitable habitat present, this is fragmented and occurs in a busy farming area with a busy road network. As such, the likelihood of occurrence is medium.
Southern African Hedgehog *Atelerix frontalis*	NT	Protected	The species occurs throughout Gauteng, Free State, North West, western Limpopo and Mpumalanga provinces. Northeast and southwards Northern Cape to Eastern Cape. They marginally occur along the northern boundary with Free State and Mpumalanga provinces. This species inhabits savannah, grassland and Northern Upper Karoo vegetation types even suburban gardens. • Grassland vegetation types include the Soweto Highveld, Eastern Highveld, Rand Highveld, Carletonville Dolomite, Vaal-Vet Sandy Grassland and Frankfort Highveld Grasslands. • Savannah vegetation types include Polokwane Plateau Bushveld, Central Sandy Bushveld, Kimberley	The nearest record on iNaturalist is >20km north west of the project area	**Medium** The project area is within the distribution range of this species but the small patches of natural habitat present are fragmented and surrounded by cultivated land and a busy road network.

[1] (of an animal) appearing or active in twilight.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
			Thornveld, Moot Plains Bushveld, and Queenstown Thornveld. The species appears to prefer dense vegetation habitats and rocky outcrops that may provide food, cover and nesting materials. EOO: 748,169 km^2.		
Mountain Reedbuck *Redunca fulvorufula*	EN	None	Mountain Reedbuck are typically found in high altitude grasslands and rocky ridges and hillsides from 1,500 – 5,000m above sea level (IUCN, 2017 and Taylor *et al.*, 2016). They are predominantly grazers and occur in drier hilly areas (such as the Nama Karoo) utilising steep slopes and bases of hills that have a higher moisture content and therefore greener, softer grasses. They avoid open areas with no cover. The availability of drinking water is crucial to their survival and therefore existence. In 1999 this species was estimated to have a population of approximately 33,000 individuals but in 2016 was reported to have unexpectedly declined by 73% (IUCN, 2017; Taylor *et al.*, 2016).	Evidence of this species recorded ±20km west of the project area in 2023 (iNat, 2024).	**Low** No suitable habitat present.
Leopard (*Panthera pardus)*	VU	VU	Leopards are widely distributed throughout southern Africa, typically occurring in densely wooded and rocky areas although it has been shown to have a wide habitat tolerance (grassland savannah, coastal scrub, shrubland, rugged mountainous regions and semidesert) (Swanepoel, *et al*., 2016; Stein, *et al*., 2020).	The nearest record on iNaturalist is >5km south west of the project area	**Low** Although suitable habitat is present, the project area occurs within a busy farming area. If present, this species is likely to be a transient species within the area, using the project are to move through.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
African/Cape Clawless Otter *Aonyx capensis*	NT	-	This species is predominantly aquatic and seldom found far from permanent water. Freshwater is an essential water requirement, but they can occupy rivers with high pollution and eutrophication levels. The are generally found in marine habitats where there is access to freshwater, rocky shores and thick vegetation with an abundant food supply, but they have been recorded in rivers provided suitable sized pools persist (Okes *et al*., 2016 in Child *et al*., 2016).	Recorded >10km south west of the project area (iNat, 2024).	**Low** The project area occurs within the distribution range of this species however, suitable habitat is not present within the project area although it is present within the PAOI. The likelihood of occurrence in the project area is therefore classified as Low. If present, it is likely a transient.
Spotted-necked Otter *Hydrictis maculicollis*	VU	Protected	This species is widespread through Africa, occurring at altitudes of 0-2500m asl. Habitat requirements for this species include streams, rivers, lakes (natural & manmade) and open waters which are unpolluted and are not silted. Shelters along water edges with cover provided by boulders, reeds, long grass, dense bushes and overhanging trees. Feed predominantly on fish and occasionally crabs, frogs, insects (esp. dragonfly larvae) and birds.	No records of this species within 100km of the project area (iNat, 2023).	**Low** The project area occurs within the distribution range of this species however, suitable habitat is not present within the project area although it is present within the PAOI. The likelihood of occurrence in the project area is therefore classified as Low. If

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
					present, it is likely a transient.
Brown Hyena *Parahyaena brunnea*	NT	Protected	The Brown Hyena inhabits desert areas (<100 mm MAR), semi-desert, open scrub and open woodland savannah (<700 mm) (Wiesel, 2015). They typically avoid developed areas but can survive close to them. However, they do require some form of cover to lie under during the day. As such, they prefer rocky, mountainous areas with bush cover in the bushveld areas of South Africa (Yarnell *et al.,* 2016 in Child *et al*., 2016). The Brown Hyena population in SA is thought to be underestimated at 1700 individuals (800-2200) with greatest numbers in Limpopo, North West and Eastern Cape provinces. This species has low levels of occupancy throughout the Free State (Yarnell *et al.,* 2016). Densities are highest in protected areas compared to neighbouring unprotected rangelands but this species is tolerant of land-use change where reliable alternative food resources exist (Yarnell *et al.,* 2016). Brown Hyaenas are considered widespread but rare and secretive, and although 65% of the population live in mixed sex clans (4–14 individuals) they are solitary foragers who spend much of their time alone. The remaining 35% of the population immigrate within home ranges of ±100 km^2 (Yarnell *et al.,* 2016).	There is a record of this species 12km west and north west of the project area (iNat, 2024).	**Low** Although suitable habitat is present within the project area (i.e., grasslands), this species is unlikely to occur outside of protected areas and within a busy farming area.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
African White-tailed Rat *Mystromys albicaudatus*	VU	-	African White-tailed Rats are endemic to South Africa and Lesotho occurring in the highveld grasslands and succulent karoo in southern Mpumulanga, Free State, high-lying areas of KwaZulu Natal, Eastern Cape, south-eastern North-West and marginally into the Northern Cape *(Avenant et al.* in Child *et al., 2016)* and have an AOO of 3,719km^2. This species is nocturnal living in burrows and crevices. Little is known about this species in the wild. They are often associated with calcrete soils in grasslands and are not found on soft, sandy substrates, rocks, wetlands or riverbanks (Avenant *et al.* in Child *et al*., 2016). There is evidence that they survive in disturbed areas and sparse grasslands but are not associated with transformed habitat (e.g., agricultural land).	There are no records of this species within 100km of the project area (iNat, 2023).	**Low to Moderate** Suitable habitat may be present within the intact grassland patches.
Cape Wild Dog *(Lycaon pictus)*	EN		In South Africa, the Wild Dog is a flagship species with three distinct populations and 12 subpopulations: • A protected population in the Kruger National Park • A protected and intensively managed metapopulation in several public and private reserves. • A free-roaming wild population residing and traversing land outside of protected areas, mostly in the northern part of Limpopo, the eastern parts of Northern Cape, northern and northwestern parts of the NorthWest, Mpumalanga, and northern parts of KwaZulu-Natal. Only two to five packs and dispersing groups persist outside protected areas. This species has a population of 519 of which the free roaming population in Limpopo and KZN constitutes 24 individuals across two packs and two groups. Managed sub-populations AOO: 4,570 km^2.	There is a record of this species 25km south west of the project area.	**Low** If this species is present within the PAOI, it is likely to pass through the project area and is unlikely to use it for breeding, shelter or foraging.

Name	Threat Status		Habitat	Known Occurrence	Likelihood of Occurrence
	National (SA red list, 2016)	TOPS			
			Wild Dogs can survive in most habitat types provided the habitat is large enough, contains sufficient suitable prey and is free from direct threats (persecution). Their distribution has been limited primarily due to human activities and availability of prey, rather than habitat preferences and they are adept at avoiding human contact. The species primarily occurs in the Lowveld inhabiting short-grass plains, savannahs and uplands forest and reach their highest densities in thicker bush (thicket-type vegetation in the EC). Their main prey sources are the Impala and the remainder includes the Kudu, Duiker, Nyala and Warthogs. They will prey on hares, lizards and even eggs but these are considered to offer an insignificant contribution to their diet (Davies-Mostert, *et al*., 2016)		
Common Tsessebe *(Damaliscus lunatus lunatus)*	VU		This species is generally associated with floodplains and grasslands, typically occurring in the ecotone between grassland and woodland in South Africa. Originally widespread in sub-Saharan Africa, they now occur in South Africa, the eastern sector of Botswana, northeastern parts of Namibia, northwestern and central parts of Zimbabwe and into western Zambia. Within South Africa it has been widely introduced to Kwa-Zulu Natal, Free State, Mpumulanga and Northern Cape Provinces.	There is a record of this species 30km south west of the project area. This record is likely for an introduced individual.	**Low** Although suitable habitat is present, the available habitat is fragmented with a busy road network. Furthermore, if present, this species it likely to have been introduced.

4. PLANT SPECIES THEME

4.1. Floristics

A total of 62 plant species from 25 families were recorded within the project area (Table 4.1) (a full species list has been included in Appendix 1). The Poaceae had the highest number of species (sixteen) followed by the Asteraceae (nine species) and Cyperaceae and Fabaceae each with five species. The remaining families had three or less species.

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

Family	Number	Family	Number
Poaceae	16	Asphodelaceae	1
Asteraceae	9	Boraginaceae	1
Cyperaceae	5	Brassicaceae	1
Fabaceae	5	Caryophyllaceae	1
Commelinaceae	3	Chrysobalanaceae	1
Hyacinthaceae	3	Ebenaceae	1
Convolvulaceae	2	Euphorbiaceae	1
Hypoxidaceae	2	Plantaginaceae	1
Lamiaceae	2	Pteridaceae	1
Myrtaceae	2	Rhamnaceae	1
Agavaceae	1	Rubiaceae	1
Amaryllidaceae	1	Scrophulariaceae	1
Anacardiaceae	1		

4.2. Species of Conservation Concern

Of the 62 recorded species, 56 species are listed as Least Concern (LC), four are listed as Not Evaluated (NE) and two are not listed. No SCC were recorded in the project area and no protected species that occur on the Gauteng Nature Conservation Ordinance (No. 12 of 1983) were recorded or are likely to occur within the project area.

The DFFE Screening Report classifies the Plant Species Theme of the project area as **MEDIUM** with three (3) Species of Conservation identified for the site. Medium sensitivities defined by the screening tool does not indicate the known presence of a threatened plant 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). The three SCC identified for the site by the DFFE screening tool report and their likelihood of occurrence based on available habitat are assessed in Table 4.3 below. *Khadia beswickii* has a medium likelihood of occurrence and sensitive species 1248 and 1147 have a low likelihood of occurrence.

A search of the greater Project Area of Influence (PAOI) on iNaturalist and POSA, as well a cross referencing the list of important taxa contained in Mucina *et al* (2011) for Carletonville Dolomite Grassland, and the Red List of South African Plants, revealed no additional SCC.

4.3. Alien Invasive Plant Species

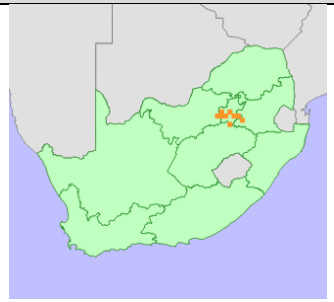
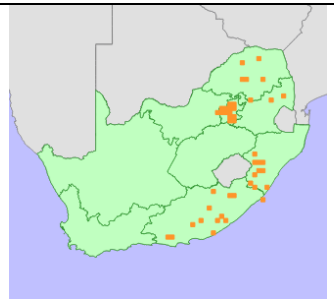
Four exotic species were recorded within the project area (Table 5.2) and were typically found within disturbed sites, such as along road verges and in overgrazed area. Of these four species, two are listed alien invasive plant species on the National Environmental Management: Biodiversity Act (NEM:BA) (Act No. 10 0f 2004) and one is listed as a Category 1 species and one as a Category 2 species on the Conservation of Agricultural Resources Act (CARA) (Act No. 43 of 1983).

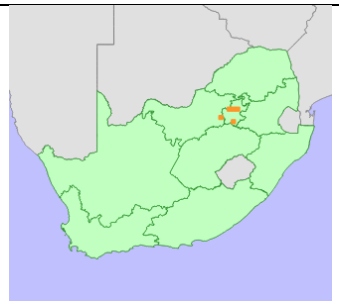
Under the NEM: BA act, Category 1b species must be eradicated and under CARA, Category 1 plant species must be removed & destroyed immediately. No trade in these plants is permitted.

Table 4.2: List of exotic plant species recorded on site.

Family	Species	NEM:BA Alien	CARA
Asteraceae	*Campuloclinium macrocephalum*	Category 1b	Category 1
Asteraceae	*Cosmos bipinnatus*	-	-
Asteraceae	*Tagetes minuta*	-	-
Myrtaceae	*Eucalyptus sp.*	Category 1b	Category 2

Table 4.3: The likelihood of occurrence of SCC occurring within the project area

Species	Sensitivity as per Screening Report	Status	Range and habitat	Distribution Map	Likelihood of occurrence
Khadia beswickii	Medium	Vulnerable B1ab(iii,v)+ 2ab(iii,v)	Range: Occurs in Gauteng, Mpumalanga, and North West. EOO 475 km², AOO 3-7 km², known from 10 locations. Habitat: Open shallow soil over rocks in grassland. Carletonville Dolomite Grassland is considered one of the major habitat types of this species (Victor and Pfab, 2005).		**Medium** According to iNaturalist, this species has been recorded approximately 7.5 km southwest of the project area. Although the project area contains suitable habitat for this species, this species was not recorded during the field survey. As such, it is the opinion of the specialist that the likelihood of occurrence remains Medium.
Sensitive species 1248	Medium	Vulnerable A2ad	Range: Eastern Cape to Limpopo Province. Widespread elsewhere in southern and eastern Africa. EOO not specified. Habitat: Found in a variety of habitats. In Gauteng, this species typically occurs in shaded areas within open woodland or on steep rocky hills. Carletonville Dolomite Grassland is considered one of the major habitats of this species. (Raimondo *et al*., 2007).		**Low** The location of this species on iNaturalist has been obscured. As such, it is not possible to determine the nearest observation of this species in relation to the project area. Although the vegetation of the project area (Carletonville Dolomite Grassland) is considered one of the major habitat types of this species, its preferred habitat including shaded areas within open woodland or on steep rocky hills is not present. As such, the likelihood of occurrence is classified as **LOW**.

Sensitive species 1147	Medium	Endangered C2a(i); D	Range: Johannesburg, Pretoria and Krugersdorp. Only six subpopulations are known. EOO not specified. Habitat: Open grassland on dolomite or in black, sandy soil. Carletonville Dolomite Grassland is considered one of the major habitat types of this species (Pfab and Victor, 2005).		**Low** The location of this species on iNaturalist has been obscured. As such, it is not possible to determine the nearest observation of this species in relation to the project area. Although the project area occurs within the known distribution of this species and contains suitable habitat, the project area does not contain any of the known locations of this species. Furthermore, this species was not recorded during the field survey and the available habitat is highly fragmented. As such, it is the opinion of the specialist that the likelihood of occurrence is low.

5. TERRESTRIAL BIODIVERSITY THEME

The DFFE Screening Report classifies the Terrestrial Biodiversity Theme Sensitivity of the project area as VERY HIGH (Figure 2.3) due to the following sensitivity features:

- CBA 1, ESA 1 and ESA 2 (refer to section 5.1)
- National Protected Area Expansion Strategy (NPAES) (refer to section 5.3)

This chapter reviews the spatial planning tools associated with each of these features and provides comment on the implication these features have on development, should the project proceed.

5.1. Gauteng Conservation Plan 3.3 (C-Plan 3.3)

The Gauteng C-Plan v3.3 (2011), commonly known as the Critical Biodiversity Areas Map, was compiled by Gauteng Nature Conservation - a division with the Gauteng Department of Agriculture and Rural Development (GDARD). The map was developed using a systematic conservation planning approach underpinned by the following characteristics: representation, persistence, quantitative targets, and efficiency and conflict avoidance. The map identifies biodiversity priority areas which includes Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs) and Protected Areas. The map is designed to be used at approximately 1:50 000 scale as the integrated biodiversity input into land use planning and decision making.

CBAs include natural or near-natural terrestrial and aquatic features that were selected based on an area's biodiversity characteristics, spatial configuration and requirement for meeting both biodiversity pattern and ecological process targets. CBAs include irreplaceable sites where no other options exist for meeting targets for biodiversity features, as well as best-design sites which represent an efficient configuration of sites to meet targets in an ecologically sustainable way that is least conflicting with other land uses and activities. These areas need be maintained in the appropriate condition for their category. Some CBAs are degraded or irreversibly modified but are still required for achieving specific targets, such as cultivated lands for threatened species.

ESAs are natural, near-natural, degraded or heavily modified areas required to be maintained in an ecologically functional state to support Critical Biodiversity Areas and/or Protected Areas. ESAs maintain the ecological processes on which Critical Biodiversity Areas and Protected Areas depend. Some ESAs are irreversibly modified but are still required as they still play an important role in supporting ecological processes.

Protected Areas are areas which have legal protection under relevant legislation, or which are managed with a primary conservation objective.

According to the Gauteng C-Plan v3.3 (2011), the project area intersects both a CBA (important area not irreplaceable area) and an ESA. The biodiversity features identified as contributing to the selection of these areas as CBAs and ESAs are discussed in Table 6.1 below. Based on the analysis of the reasons for the selection of CBAs and ESAs within the project area, it is the opinion of the specialist that the proposed development is unlikely to affect the biodiversity features identified, as the clearance of vegetation for the proposed development will not affect the conservation status of this vegetation type nor will it impact on any plant SCC as there are none that are likely to occur within the project area.

Table 5.1: Biodiversity features underpinning the project areas CBA status

Biodiversity Priority Area	Biodiversity Feature	Comment
CBA	Primary Vegetation	Only one (1) vegetation type occurs within the project area, including Carletonville Dolomite Grassland. Carletonville Dolomite Grassland is classified as Least Concern. Considering the small development footprint, the clearance of vegetation for the proposed development will not affect the conservation status of this vegetation type. Furthermore, the project area is located on the edge of the CBA and will therefore only erode the edge of the macro corridor. Provided the area to the east remains intact, management objectives of the CBA can still be maintained.
	Orange List (OL) Plant Habitat	The biodiversity feature does not provide details of which species habitat occurs within this area. However, a desktop assessment of available resources indicate that three (3) Species of Conservation Concern (SCC) could potentially occur within the PAOI based on distribution data and habitat requirements (see Section 5.2 above). Of these three SCC, one has a moderate likelihood of occurrence on site and two have a low likelihood of occurrence on site. During the field survey no SCC were recorded. As such, it is unlikely that the proposed development will impact on and SCC and therefore this feature that underpins the CBA status. **It should be noted that the orange list (2004) is outdated and has been superseded by the Red List of South African Plant which is regularly updated.*
ESA	None identified.	N/A.

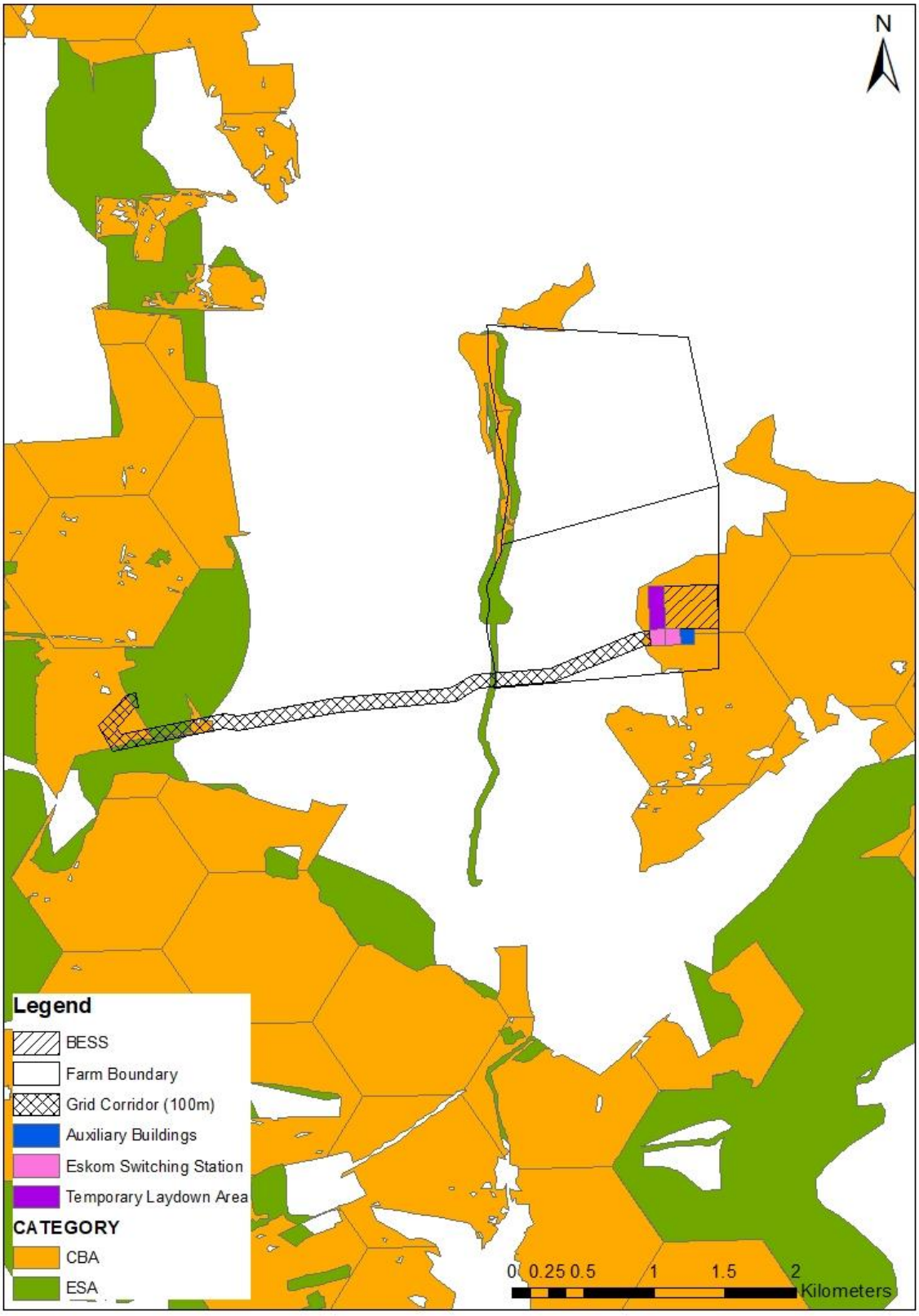


Figure 5.1: The Project area in relation to the CBAs and ESAs.

5.2. Vegetation Types Present

The proposed area occurs within the grassland biome which is the second largest biome in South Africa covering approximately 339 237 km^2. Although 30% of this biome is irreversibly transformed, it remains poorly protected with only 1.9% of the biodiversity target formally conserved.

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 infrastructure occurs within Carletonville Dolomite Grassland (Figure 6.2). The field survey confirmed remnant patches of this vegetation type was present and its distribution has been mapped (Figure 5.3).

5.2.1. ***Carletonville Dolomite Grassland***

Carletonville Dolomite Grassland occurs predominantly in the North West and Gauteng with small patches in the Free State. It is associated with slightly undulating plains interspersed with rocky ridges and is characterised by species-rich grasslands that form a mosaic pattern dominated by multiple species.

Although this vegetation type was present within the project area, it was degraded and fragmented by the past and current land use patterns (Figure 6.4). Dominant species included *Alloteropsis semialata, Cynodon dactylon, Diheteropogon amplectans, Eragrostis curvula, Eragrostis racemose, Hyparrhenia hirta, Melinis repens, Setaria sphacelata, Themeda triandra, Urochloa serrata, Tagetes minuta, Helichrysum nudifloim and Helichrysum rugulosum.* Rehabilitation of this vegetation back to its original state would be costly.

Carletonville Dolomite Grassland is listed as poorly protected with 61% (561,227 ha) of the original extent remaining (RLE, 2021). The construction of the BESS will result in the loss of approximately 17 ha (0.003%) of degraded Carletonville Dolomite Grassland. The loss of such a small area of degraded, fragmented grassland, is unlikely to affect the conservation status of this vegetation type as the ecological function of the area that will be impacted on, is already compromised.

5.3. Protected Areas and National Protected Area Expansion Strategy

The project area does not occur within any protected areas or within 5km of a protected area. However, a small portion of the property boundary in the south eastern corner overlaps with an area designated as a negotiated National Protected Area Expansion Strategy (NPAES) Area (Figure 5.5). Although the property boundary overlaps with this area, project infrastructure has been positioned to avoid this area.

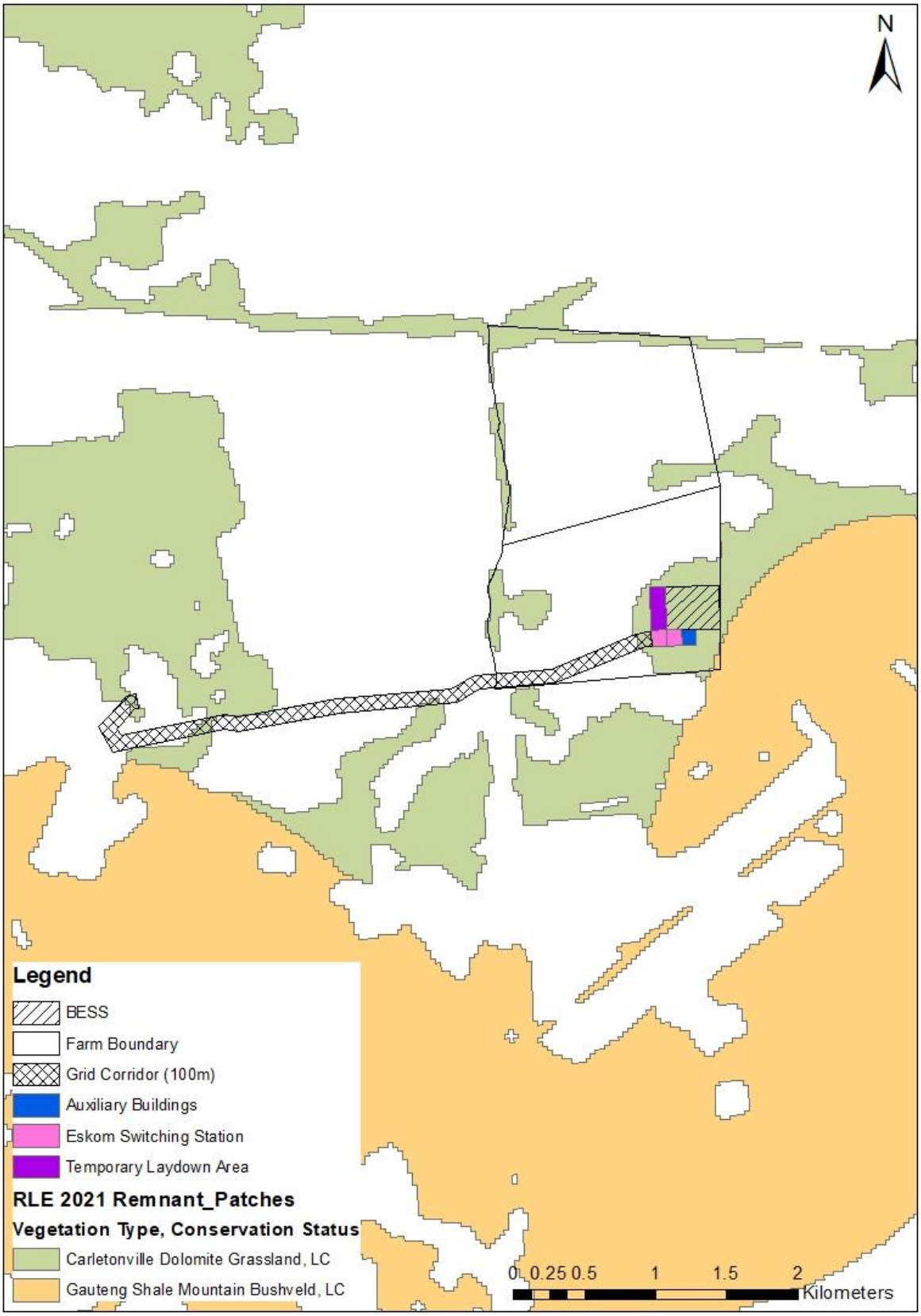


Figure 5.2: National Vegetation Map for the Project Area showing the remaining extent of vegetation (Source: Red List of Threatened Ecosystems, 2021).

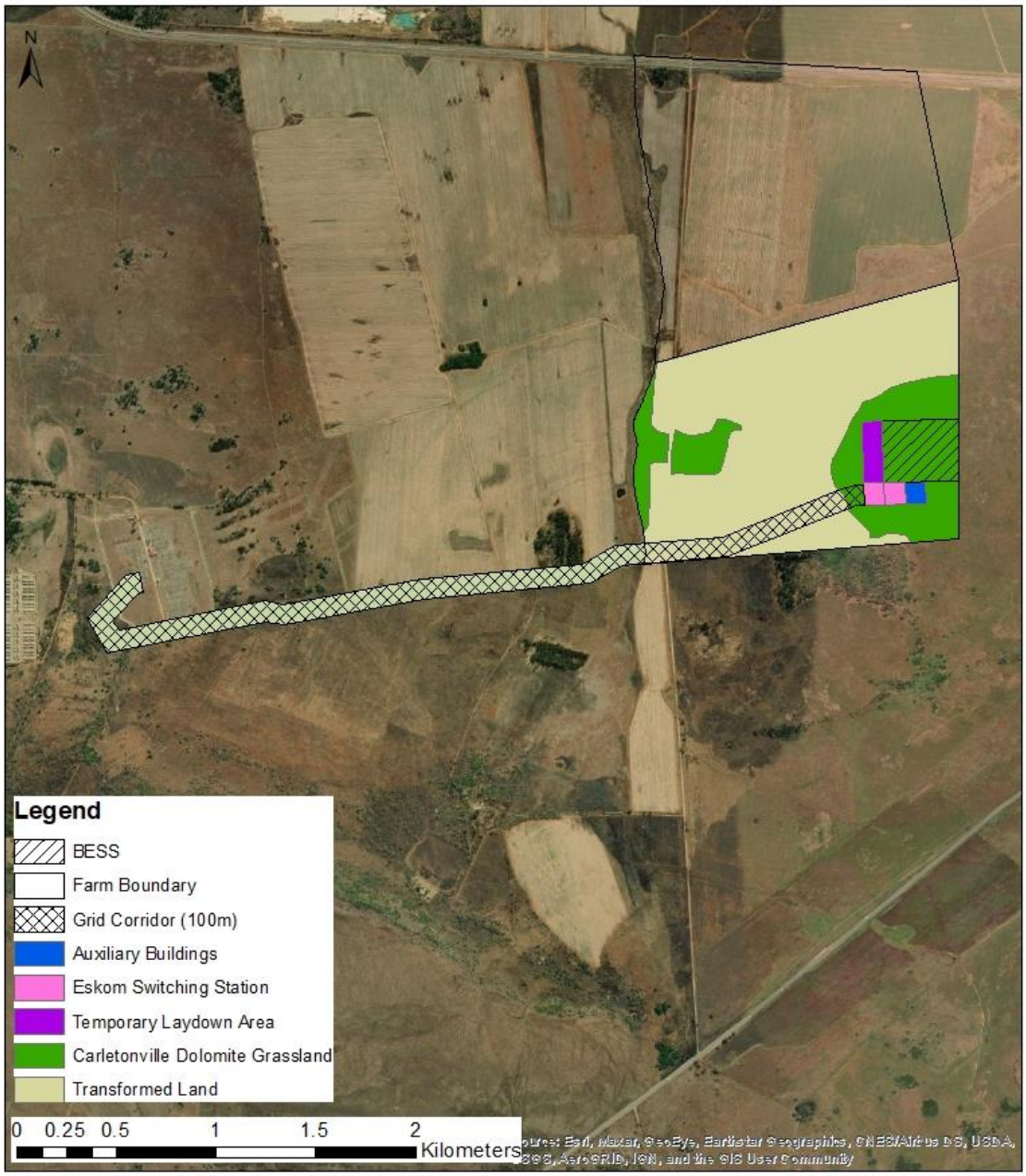


Figure 5.3: Vegetation map for the project area based on data gathered from the field survey.

Figure 5.4: Photographs illustrating the vegetation present within the project area

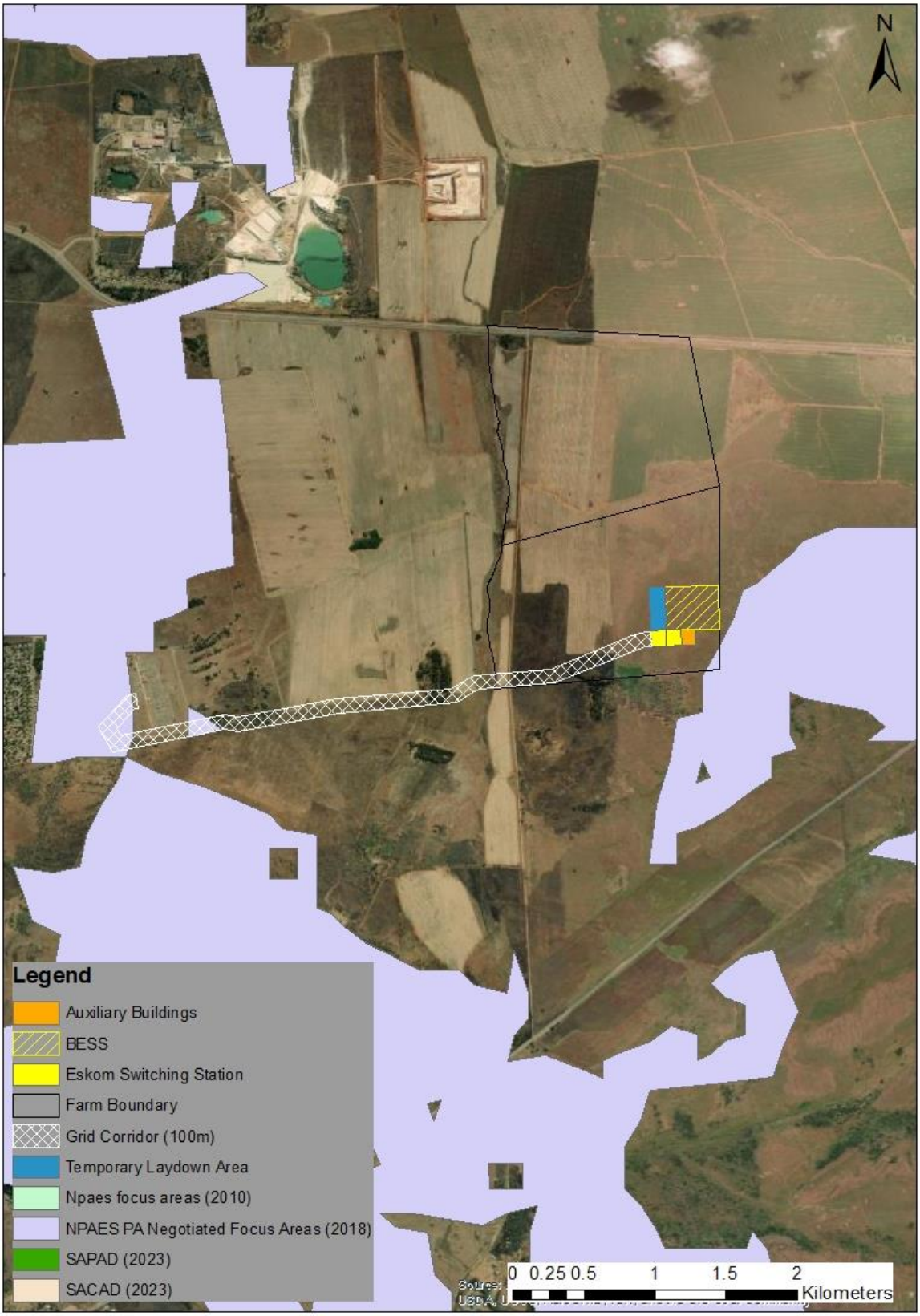


Figure 5.5: Map illustrating the project area in relation to conservation areas and NPAES.

6. SITE ECOLOGICAL IMPORTANCE

The results from the desktop assessment and field survey have been used to calculate the SEI for the vegetation and faunal habitat present within the project area.

6.1. Site Ecological Importance - Fauna

The African Striped Weasel (NT) and Serval (NT) have a high likelihood of occurrence within the project area. As such, the SEI has been assessed for only these species (Table 6.1 and Figure 6.1). The SEI for the overall project area is considered low for each habitat based on a medium CI, high FI and high RR. Given the small size of the proposed facility together with the short construction time frame, it is anticipated that species will return to the PAOI once the disturbance has ceased. As such, the RR for all habitat types is high.

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	SEI
African Striped Weasel (NT) Occurs in Carletonville Dolomite Grassland	Medium Highly likely occurrence of a NT species.	High Good habitat connectivity with potentially functional corridors to the east of the project area and a regularly used road network.	Medium	High Receptor resilience is based on the specific project activities. In this instance the project footprint is small 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 site once the disturbance has ceased.	**Low**
Serval (NT) in Wetlands and Seeps	Medium Highly likely occurrence of a NT species.	High Good habitat connectivity with potentially functional corridors to the east of the project area and a	Medium	High Receptor resilience is based on the specific project activities. In this instance the project footprint is small and the construction phase will be relatively short meaning that the disturbance to	**Low**

Habitat / Species	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience	SEI
		regularly used road network.		these species will be in the short term with a small spatial extent. As such, species have a high likelihood of returning to site once the disturbance has ceased.	

6.2. Site Ecological Importance - Flora

One vegetation type and one land use was recorded within the project area:

- Carletonville Dolomite Grassland
- Transformed Land

The Carletonville Dolomite Grassland present within the project area is degraded, listed as Least Concern and SCC are unlikely to be found within this patch. As such the CI is low. However, it does occur on the western edge of a large patch of grassland that is over 100ha in extent and therefore the FI has been classified as High. The RR for this site is medium as it is anticipated that it will take over ten years to restore >75% of the original species composition present. Based on these ratings, the SEI for this site is medium.

Transformed land within this area is of low ecological value and the SEI for this land use has been classified as very low.

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)	SEI
Carletonville Dolomite Grassland	**LOW** **Fulfilling Criteria** No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. **Justification** Carltonville Dolomite Grassland is classified as Least Concern. Although the Screening Report identifies three (3) SCC, these have not been confirmed to occur within the project area and were not recorded during the field survey. Less than 50% of the project area contains natural habitat.	**HIGH** **Fulfilling Criteria** Large (>100 ha) intact area for any conservation status of ecosystem type. **Justification** The project area occurs on the western edge of a large (>100 ha) patch of degraded Carletonville Dolomite Grassland surrounded by a regularly used road network and large areas of agricultural land. As such, the FI is classified as high rather than very high.	**MEDIUM**	**MEDIUM** **Fulfilling Criteria** Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality. **Justification** Receptor resilience refers to the ability of a receptor to resist major damage from disturbance and or recover to its original state with limited or no human intervention. The restoration of grasslands and rate of recovery is dependent on the nature and extent of degradation or modification. The proposed development will require the removal of vegetation and topsoil (which contains the seedbank). According to the Grassland Ecosystem Guidelines (SANBI, 2013), removal of the primary vegetation cover within grasslands is often irreversible and the original species composition is unlikely to recover naturally even over a long period (20-100 years). However, Dry Highveld Grassland (such as Carletonville Dolomite Grassland) recruit more often from seeds and are therefore able to recover	**Medium**

				quicker depending on whether primary grassland species are scattered throughout the landscape surrounding the proposed development. Considering the small scale of the proposed development, and provided the surrounding grassland remains intact to provide a 'seed source' for the recovery of impacted areas, it is possible that impacted areas can recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor.	
Transformed Land	**VERY LOW** **Fulfilling Criteria** No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining. **Justification** The soil within these areas has largely been disturbed within no to very little vegetation remaining. Due to the transformed nature of these areas, it is very unlikely that SCC would occur in these areas.	**VERY LOW** **Fulfilling Criteria** No habitat connectivity except for flora with wind-dispersed seeds. Several major current negative ecological impacts. **Justification** These areas have been transformed with no habitat connectivity within them.	**VERY LOW**	**VERY HIGH** **Fulfilling Criteria** Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality. **Justification** The resilience criteria is based on the ability of the receptor to resist major damage and recover to its current state. In this case, the current state is transformed agricultural land. As such receptor resilience is very high.	**VERY LOW**

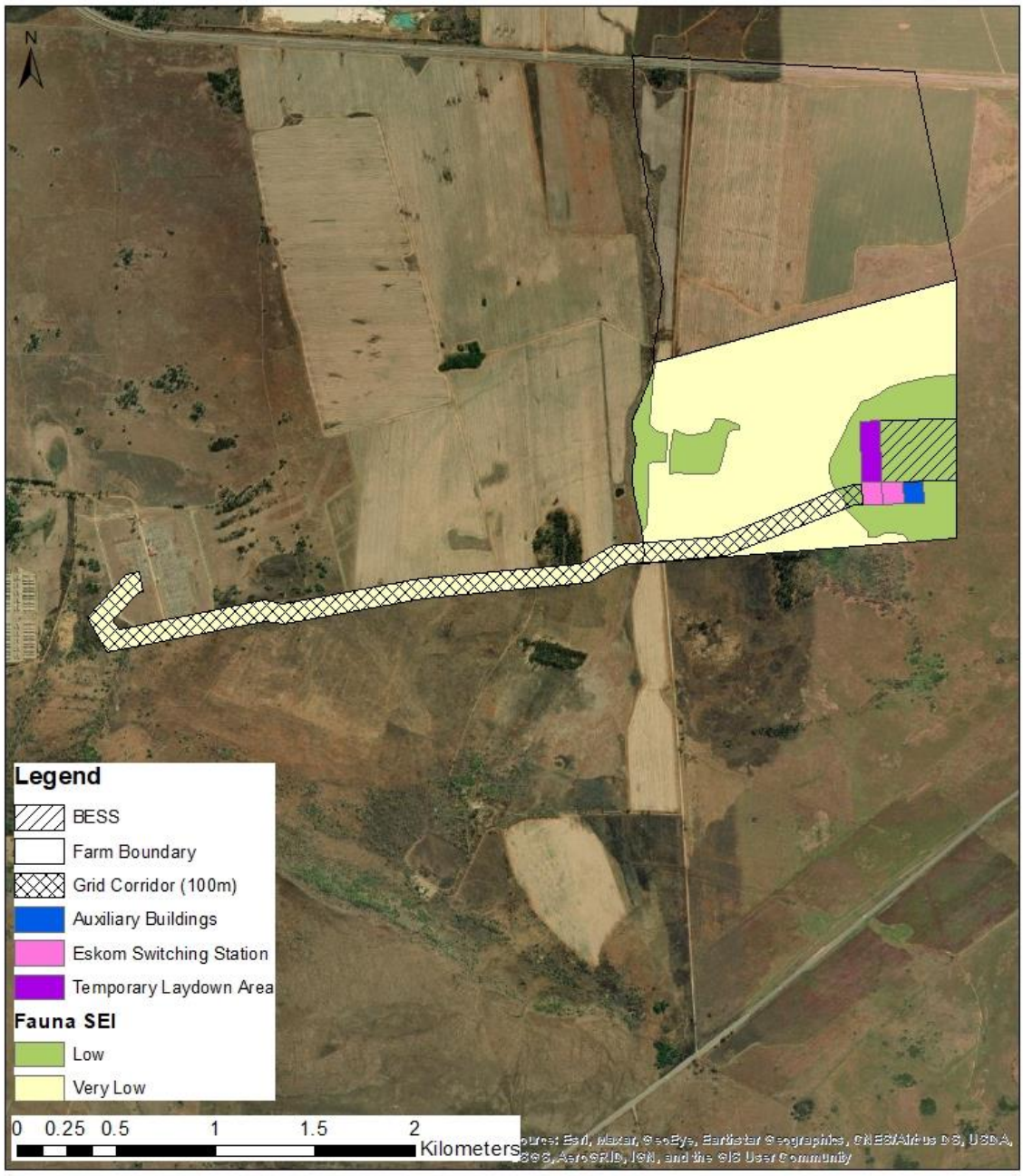


Figure 6.1: Fauna sensitivity map for the project area based on data gathered from the field survey and the desktop assessment.

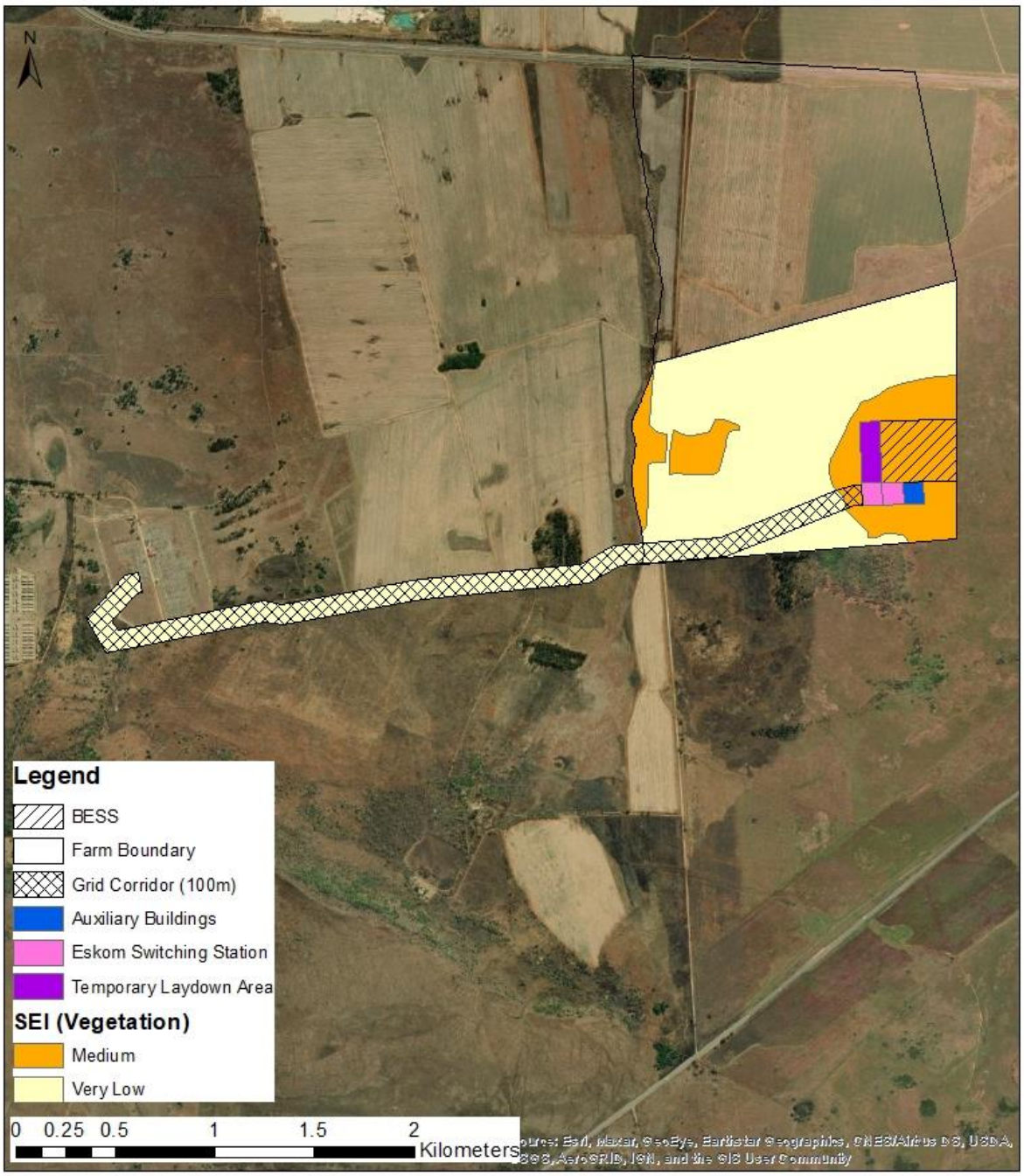


Figure 6.2: Botanical sensitivity map for the project area . This is based on data gathered from the field survey and the desktop assessment.

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. Carletonville Dolomite Grassland has an overall SEI of Medium and the Transformed Land has an overall SEI of Very Low.

Table 6.3: Combined overall SEI for each habitat type.

Habitat	Floral SEI	FAUNAL SEI	OVERALL COMBINED SEI
Carletonville Dolomite Grassland	Medium	Low	Medium
Transformed	Very Low	-	Very Low

6.4. Management Guidelines

Management guidelines recommend the following:

- For areas with a **high SEI**, avoidance mitigation must be implemented where feasible and where this is not feasible, minimisation mitigation such as reducing the project footprint. Limited development activities of low impact are acceptable in these areas. Offset mitigation may be required for high impact activities.
- For areas of **medium SEI,** development activities of medium impact are acceptable provided appropriate mitigation and management measures are implemented.
- For areas of **low SEI,** development activities of medium to high 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.

Since project infrastructure is located in an area with an overall SEI of medium and very low, development activities of medium impact are acceptable, provided appropriate mitigation and management measures are implemented.

7. CONCLUSIONS

7.1. Conclusions

The BESS infrastructure is located in Carletonville Dolomite Grassland and the grid connection is located in an area that has been transformed and used for agriculture. Carletoncille Dolomite Grassland is listed as least concern and project infrastructure will only affect 0.003% of the remaining extent of this vegetation type. Impacts of the project on this vegetation type are considered to be low.

No plant SCC were recorded within the project area or have a high likelihood of occurrence within the project area.

Only two animal species, the Serval (*Leptailurus serval)* and African Striped Weasel (*Poecilogale albinucha*), have a high likelihood of occurrence within the project area. Both species are listed as NT and are wide ranging and unlikely to be significantly affected by the construction and operation of the BESS and grid infrastructure.

Based on the findings from the field survey, combined with a desktop assessment, the combined SEI for the project area was determined to be Medium for the Carletonville Dolomite Grassland and Very Low for the Transformed Land. Development activities of medium and low significance are acceptable within Carletonville Dolomite Grassland.

7.2. Comment on the DFFE Screening Tool Report

7.2.1. ***Animal Species Theme***

The DFFE screening tool report identified the Animal Species Theme as Medium due to the likely presence of two bird species, three invertebrate species and two mammal species (Spotted-necked Otter and Makwassie musk shrew). This assessment only assesses reptiles, amphibians and mammals and as such only comment on these groups have been provided.

Based on the habitat requirements of the Spotted-necked Otter and Makwassie musk shrew, combined with the available habitat recorded within the project area, neither of these species has a high likelihood of occurrence within the project area. However, two species (the Serval and Striped Weasel) have a high likelihood of occurrence within the project area. The SEI analysis therefore took this into account and found that the project area has a Low SEI for animal species. The specialist therefore disagrees with the DFFE screening tool report and is of the opinion that the sensitivity should be low rather than medium for the project area.

7.2.2. ***Plant Species Theme***

The DFFE screening tool report identified the Plant Species Theme as Medium due to the likely presence of three plant SCC. The likelihood of occurrence of each of these species was determined to

be medium and low. As such, the specialist is of the opinion that the sensitivity for the plant species theme should be low rather than medium.

7.2.3. ***Terrestrial Biodiversity Theme***

The DFFE screening tool report identified the Terrestrial Biodiversity Theme as Very High due to the presence of the following sensitive features:

- CBA 1
- ESA 1 and 2
- National Protected Area Expansion Strategy (NPAES)

Chapter 5 provides comment on how project infrastructure will affect each of these features. The underlying features driving the CBA status of the project area are based on the vegetation type present and plant habitat. Since the vegetation type present is listed as LC and has an SEI of medium, and because there are no likely SCC present within the project area, these features are unlikely to be severely affected by the project development. Furthermore, no project infrastructure is located within a NPAES.

Based on the above, and given the small footprint of the facility, the specialist is of the opinion that the sensitivity for the terrestrial biodiversity theme should be medium rather than very high.

7.3. Ecological Statement and Opinion of the Specialist

Based on the results of the Site Sensitivity Verification Report, the botanical and faunal specialists are of the opinion that a full impact assessment is required for the proposed project area since the combined SEI for the project footprint is medium.

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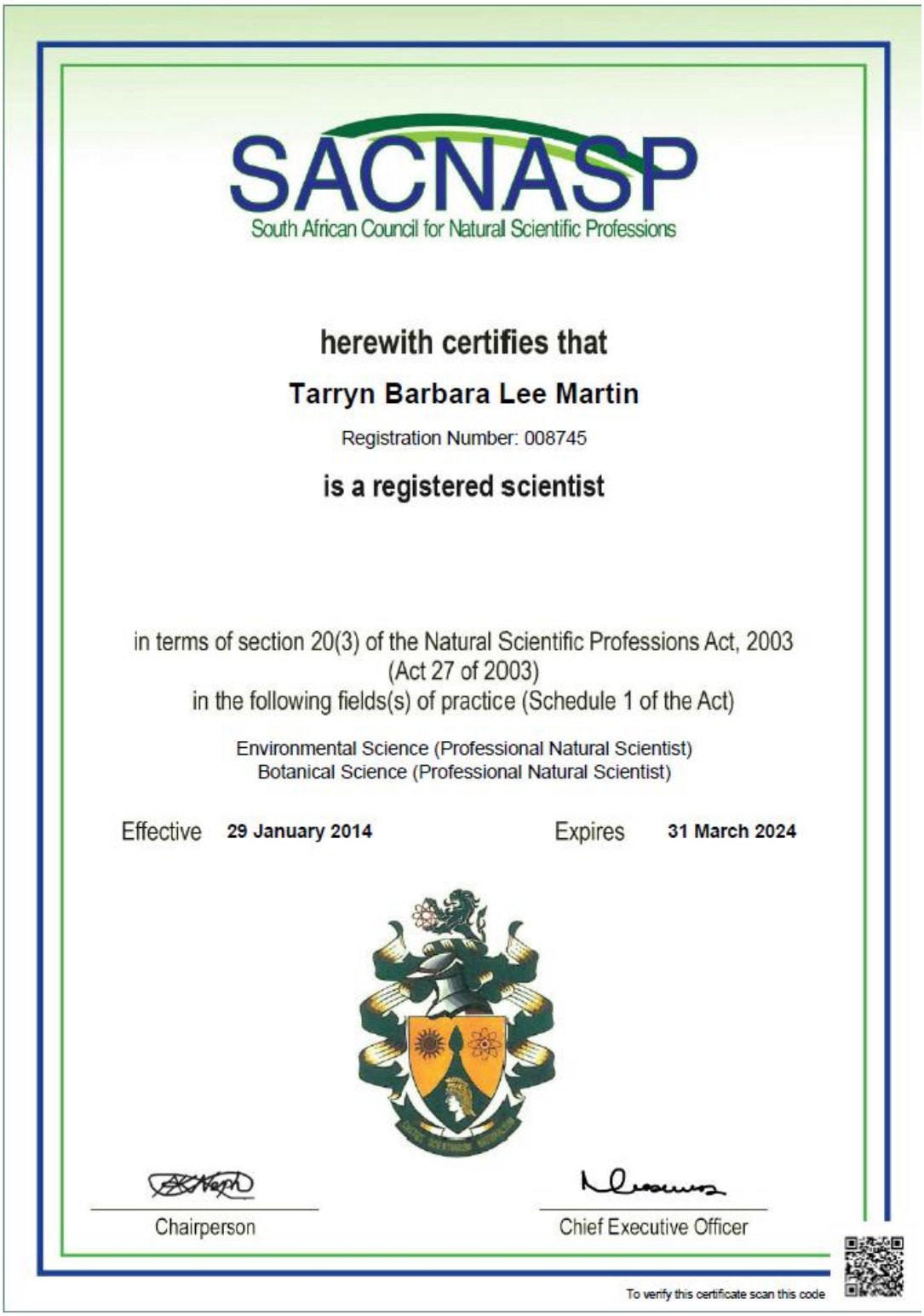
APPENDIX 1: SPECIES LIST OF PLANTS RECORDED IN THE PROJECT AREA

Family	*Species*	Threat Status	Free State Nature Conservation Ordinance (1969)	NEMBA	CARA
AMARYLLIDACEAE	*Ammocharis coranica*	LC	Schedule 6 (estimated that there are 20-30 individuals within the project area)		
ASTERACEAE	*Arctotis arctotoides*	LC			
PAPAVERACEAE	*Argemone ochroleuca*	NE		Category 1b	Category 1
POACEAE	*Aristida adscensionis*	LC			
POACEAE	*Aristida congesta*	LC			
ASPARAGACEAE	*Asparagus larcinus*	LC			
ASTERACEAE	*Berkheya onopordifolia*	LC			
ASTERACEAE	*Berkheya radula*	LC			
ASTERACEAE	*Bidens pilosa*	NE			
ASTERACEAE	*Conyza bonariensis*	NE			
POACEAE	*Cymbopogon pospischilii*	NE			
POACEAE	*Cynadon dactylon*	LC			
POACEAE	*Eragrostis curvula*	LC			
POACEAE	*Eragrostis lehmanniana*	LC			
MYRTACEAE	*Eucalyptus grandis*	NE		Category 1b	Category 2
FABACEAE	*Gleditsia triacanthos*	NE		Category 1b	Category 2
AMARYLLIDACEAE	*Haemanthus montanus*	LC	Schedule 6 (estimated that there are 100-150 individuals within the project area)		
ASTERACEAE	*Helichrysum nudifolium*	LC			
ASTERACEAE	*Helichrysum rugulosum*	LC			
MALVACEAE	*Hermannia Sp*				
POACEAE	*Hyparrhenia hirta*	LC			
HYPOXIDACEAE	*Hypoxis hemerocallidea*	LC			

FABACEAE	*Indigofera alternans*	LC			
SOLANACEAE	*Lycium cinereum*	LC			
POACEAE	*Melinis repens*	LC			
SCROPHULARIACEAE	*Nemesia fruticans*	LC			
CACTACEA	*Opuntia ficus-indica*	NE		Category 1b	Category 1
CACTACEA	*Opuntia humifusa*	NE		Category 1b	Category 1
ASTERACEAE	*Pentzia globosa*	LC			
ASTERACEAE	*Senecio consanguineus*	LC			
POACEAE	*Setaria sphacelata*	NE			
ASTERACEAE	*Stoebe plumosum*	LC			
POACEAE	*Themeda triandra*	LC			
FABACEAE	*Vachellia karroo*	LC			
VERBENACEAE	*Verbena aristigera*	NE			
VERBENACEAE	*Verbena litoralis*	NE			
RHAMNACEAE	*Ziziphus mucronata*	LC			

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 fields(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 2024**

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 registered as a

Candidate Natural 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 I of the Act)

Environmental Science **15 August 2012**

15 August 2012
Pretoria

President

Executive Director

University of Cape Town • iYunivesithi yaseKapa • Universiteit van Kaapstad

we certify that

Amber Leah Jackson

was admitted to the degree of

Master of Philosophy

in Environmental Management

on 9 June 2011

Vice-Chancellor

Registrar

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