THE TERRESTRIAL BIODIVERSITY BASELINE & IMPACT ASSESSMENT FOR THE MAINSTREAM STILFONTEIN SOLAR PROJECT

Stilfontein, North West Province

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CLIENT

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1. Introduction

1.1. Background

The Biodiversity Company was commissioned to conduct a terrestrial biodiversity assessment for the individual photovoltaic (PV) facilities within the proposed Stilfontein PV Cluster development. South Africa Mainstream Renewable Power Developments (Pty) Ltd (Mainstream) proposes the construction and operation of nine PV facilities with up to 150 MW generation capacity each, including grid connections, battery energy storage system (BESS) and associated infrastructure. The project is located in the JB Marks and City of Matlosana Local Municipalities and Dr Kenneth Kaunda District Municipality in the North-West Province. The project site is located approximately 13 km east of the town of Stilfontein along the N12.

One site visit was conducted from the 21st to the 25th of February 2022, this constitutes a wet season survey. The purpose of the proposed development is to generate and sell electricity to Eskom as part of the Renewable Independent Power Producer Procurement Programme (REIPPPP). Electricity will either be fed directly into the national grid or stored on-site in a BESS and fed into the grid when needed.

The approach was informed by the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017, including subsequent amendments) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and relevant Government Notices, as applicable. The approach has taken cognisance of the recently published Government Notices 320 (20 March 2020) in terms of NEMA, dated 20 March: "*Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation*" (Reporting Criteria). The National Web based Environmental Screening Tool has characterised the terrestrial sensitivity of the project area as "Very High".

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making, as to the ecological viability of the project.

1.2. Overview

Stilfontein Cluster

The project forms part of the larger proposed Stilfontein PV Cluster, which comprises nine PV facilities each generating up to 150 MW, including grid connections, BESS and associated infrastructure. ***Separate Environmental Authorisations (EA) applications will be submitted for the individual PV facilities and grid connections through separate BA processes*** (see Figure 1-1). The Stilfontein Cluster is briefly described here.

The Stilfontein Cluster is entirely located within the Klerksdorp Renewable Energy Development Zones (REDZ) and the Central Strategic Transmission Corridor (STC).

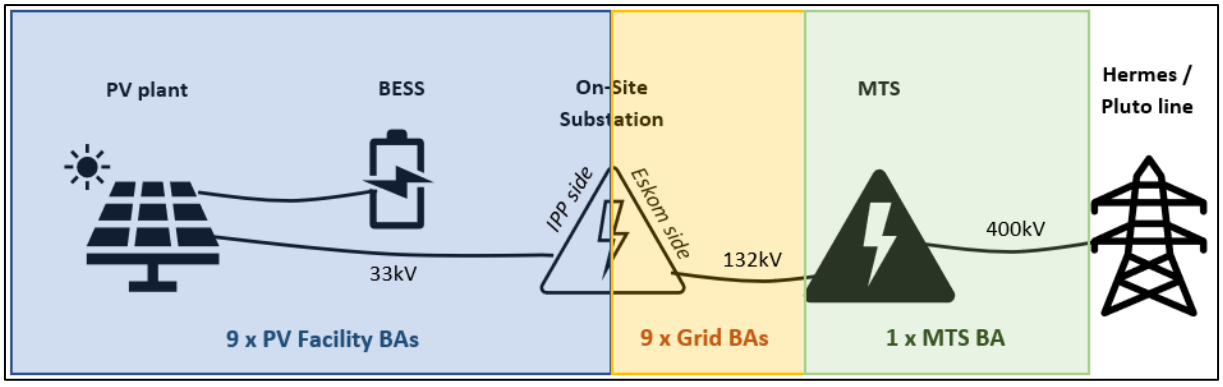


Figure 1-1 Components included in individual BA processes for the Stilfontein Cluster

PV Facilities

The Stilfontein Cluster comprises nine proposed PV facilities, each with a development area of ~220-405 ha: Spoonbill (Project 1), Sunbird (Project 2), Swallow (Project 3), Snipe (Project 4), Shrike (Project 5), Stilfontein (Project 6), Sparrow (Project 7), Starling (Project 8) and Swift (Project 9) (see Figure 4-1).

Each PV facility comprises the following key components:

- PV single axis tracking arrays with a maximum export capacity of up to150 MW and a maximum height of 5 m. Panel technology will be either monofacial or bifacial;
- Internal gravel roads with a maximum width of up to 12 m;
- Power transformers;
- Fencing and lighting;
- Material laydown areas;
- Stormwater infrastructure;
- Water supply and water storage infrastructure;
- Offices, including ablutions with septic / conservancy tank sewage treatment infrastructure;
- Operational control centre and maintenance area;
- Lithium-Ion BESS;
- IPP-side of the 11-33/132kV on-site substation, each serving one PV facility. The proposed step-up substation facility will have a development footprint of up to 4 ha, with a 100 m wide buffer around each on-site substation to accommodate powerline tie-ins at any point of the substation and other associated activities. Two alternative locations are identified for each substation;
- Medium voltage 11-33kV underground cabling and / or overhead power lines between the PV facilities and on-site substation.

Grid Connections

The Stilfontein Cluster, if fully developed, will include nine on-site substations, one Main Transmission Substation (MTS) and associated powerlines (see Figure 4-1):

- Nine 11-33/132kV on-site substations, each serving one PV facility. The proposed step-up substation facility will have a development footprint of up to 4 ha, with a 100 m wide buffer around each on-site substation to accommodate powerline tie-ins at any point of the substation and other associated activities. The substation will consist of an IPP portion (100m x 200m) and an Eskom portion (100m x 200m) that will make up the total 4 hectares assigned for the substation as per the assessment area. This report will cover the Eskom portion, as the IPP portion is covered in the facility avifaunal report as part of a separate environmental authorisation application. Two alternative locations are identified for each substation from which a preferred will be selected.
- 11-33kV underground cabling and overhead power lines between the PV facilities and the on-site substations;
- One 132/400kV Main Transmission Substation (MTS). The proposed step-up MTS will be developed within a ~36 ha development area that is buffered by a 100 m wide powerline buffer interconnection area around the MTS substation to accommodate 132 kV powerline tie-ins at any point of the MTS.
- 132kV above ground powerlines from the 11-33/132kV on-site substations to the 132/400kV MTS;
- 400kV Loop In / Loop Out powerlines from the MTS to connect to the existing 400kV PLUTO / HERMES 1 and 2 powerlines. A total area of ~215 ha, located between the two existing

Hermes/Pluto 400 kV lines east and west of MTS, was assessed to allow flexibility for the proposed 400 kV Loop in – Loop out transmission line to the existing Hermes/Pluto 1 and Hermes/Pluto 2 lines. The exact point of the Loop in – Loop out will be advised by Eskom due to the highly technical nature of the interconnection.

- Offices, including ablutions with septic / conservancy tank sewage treatment infrastructure;
- Material laydown areas (temporary for construction phase and permanent for operation phase).

1.3. Report Structure

The (cumulative) proposed development area of the Stilfontein Cluster was collectively assessed and forms the Project Area Of Influence (PAOI) referred to as the 'project area' from hereon. All baseline findings are presented for the project area, with a supporting Impact Assessment and Environmental Management Programme (EMP) for the project area.

A project-specific appendix (Appendix A) contains the information specific to the project, notably:

- Project-specific baseline aspects;
- Project-specific baseline / sensitivity map;
- Project-specific impact rating;
- Project-specific mitigation measures; and
- Project-specific conclusion / specialist opinion.

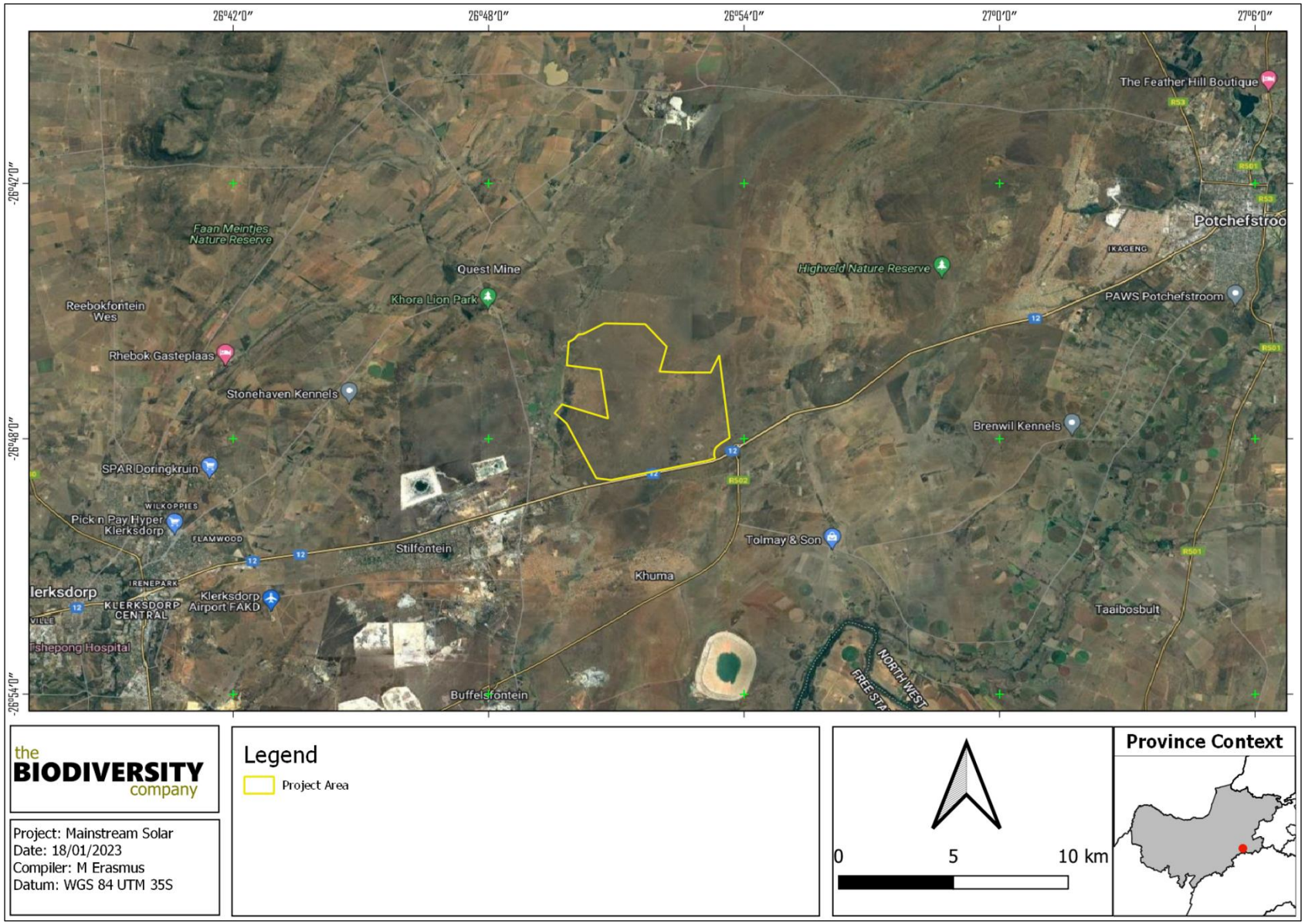


Figure 1-2 Location of the project area (Stilfontein Cluster)

1.4. Specialist Details

Report Name	**THE TERRESTRIAL BIODIVERSITY BASELINE & IMPACT ASSESSMENT FOR THE MAINSTREAM STILFONTEIN SOLAR PROJECT**
Reference	**SRK – Mainstream Stilfontein Solar Project**
Submitted to	srk consulting
Report Writer & Fieldwork	**Martinus Erasmus** 
	Martinus Erasmus obtained his B-Tech degree in Nature Conservation in 2016 at the Tshwane University of Technology. Martinus has been conducting EIAs, IFC standard surveys, basic assessments and assisting specialists in field during his studies since 2015. Martinus is Pr. Sci. Nat. registered (118630) is a specialist terrestrial ecologist and botanist which conducts floral surveys faunal surveys which include mammals, birds, amphibians and reptiles.
Report Writer Desktop	**Michael Schrenk** 
	Michael completed his professional Civil and Environmental engineering degree at the University of the Witwatersrand in 2016. He has been working in the fields of project management, biodiversity and habitat assessment and ecological restoration for over 3 years.
Reviewer	**Andrew Husted** 
	Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

2. Scope of Work

The principal aim of the assessment was to provide information to guide the risk of the activity to the flora and fauna communities of the associated ecosystems within the project area. This was achieved through the following:

- Desktop assessment to identify the relevant ecologically important geographical features within the project area;
- Desktop assessment to compile an expected species list and possible threatened flora and fauna species that occur within the project area;
- Field survey to ascertain the species composition of the present flora and fauna community within the project area;
- Delineate and map the habitats and their respective sensitivities that occur within the project area;
- Identify the manner that the project impacts the flora and fauna community and evaluate the level of risk of these potential impacts; and
- The prescription of mitigation measures and recommendations for identified risks.

3. Key Legislative Requirements

The legislation, policies and guidelines listed in Table 3-1 are applicable to the current project, an accompanying comment has been provided to express the relevance to the project. The list, although extensive, may not be complete and other legislation, policies and guidelines may apply as well.

Table 3-1 A list of key legislative requirements relevant to biodiversity and conservation in the North West Province

Region	Legislation / Guideline	Comment
National	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004), Threatened or Protected Species Regulations	The protection of species and ecosystems that warrant protection
	Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, GNR 320 of Government Gazette 43310 (March 2020)	The minimum criteria for reporting.
	Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, GNR 1150 of Government Gazette 43855 (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);	The regulation of waste management to protect the environment.
	National Water Act (NWA) (Act No. 36 of 1998)	The regulation of water uses.
	Alien and Invasive Species Regulations and, Alien and Invasive Species List 20142020, published under NEMBA	The regulation and management of alien invasive species.
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)	To provide for control over the utilization of the natural agricultural resources including the vegetation and the combating of weeds and invader plants.
	Government Notice No. 113 in Government Gazette No. 41445 and Government Notice No. 383 in Government Gazette No. 44504. Government Notice No. 2313 of Government Gazette No. 47095 of 27 July 2022	Strategic Transmission Corridors (STC) important for the planning of electricity transmission and distribution infrastructure as well as procedure to be followed when applying for environmental authorisation for electricity transmission and distribution expansion when occurring in these corridors.
	Government Notice No. 114 in Government Gazette No. 41445 and Government Notice No. 142, 144 and 145 in Government Gazette No. 44191	The procedure to be followed when applying for environmental authorisation for electricity transmission or distribution infrastructure or large-scale wind and solar photovoltaic energy facilities in these REDZs

Provincial	North West Biodiversity Management Act No. 4 of 2016	To provide for the management and conservation of the North West Province's biophysical environment and protected areas.
	North West Biodiversity Sector Plan, 2015	To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management,

4. Methods

4.1. Project Area

The project area lies between the towns of Potchefstroom and Klerksdorp within the City of Matlosana and JB Marks Local Municipalities that form part of the Dr Kenneth Kaunda District Municipality in the North West province. The project area will accommodate up to nine Solar Photovoltaic (PV) array areas, nine on-site substations, and one Main Transmission Substation (MTS). The total combined project area is approximately 2400 ha, as presented in Figure 4-1 below. Presently, the project area is surrounded by open veld and scattered agricultural land, with the N12 national highway running just south of the area.

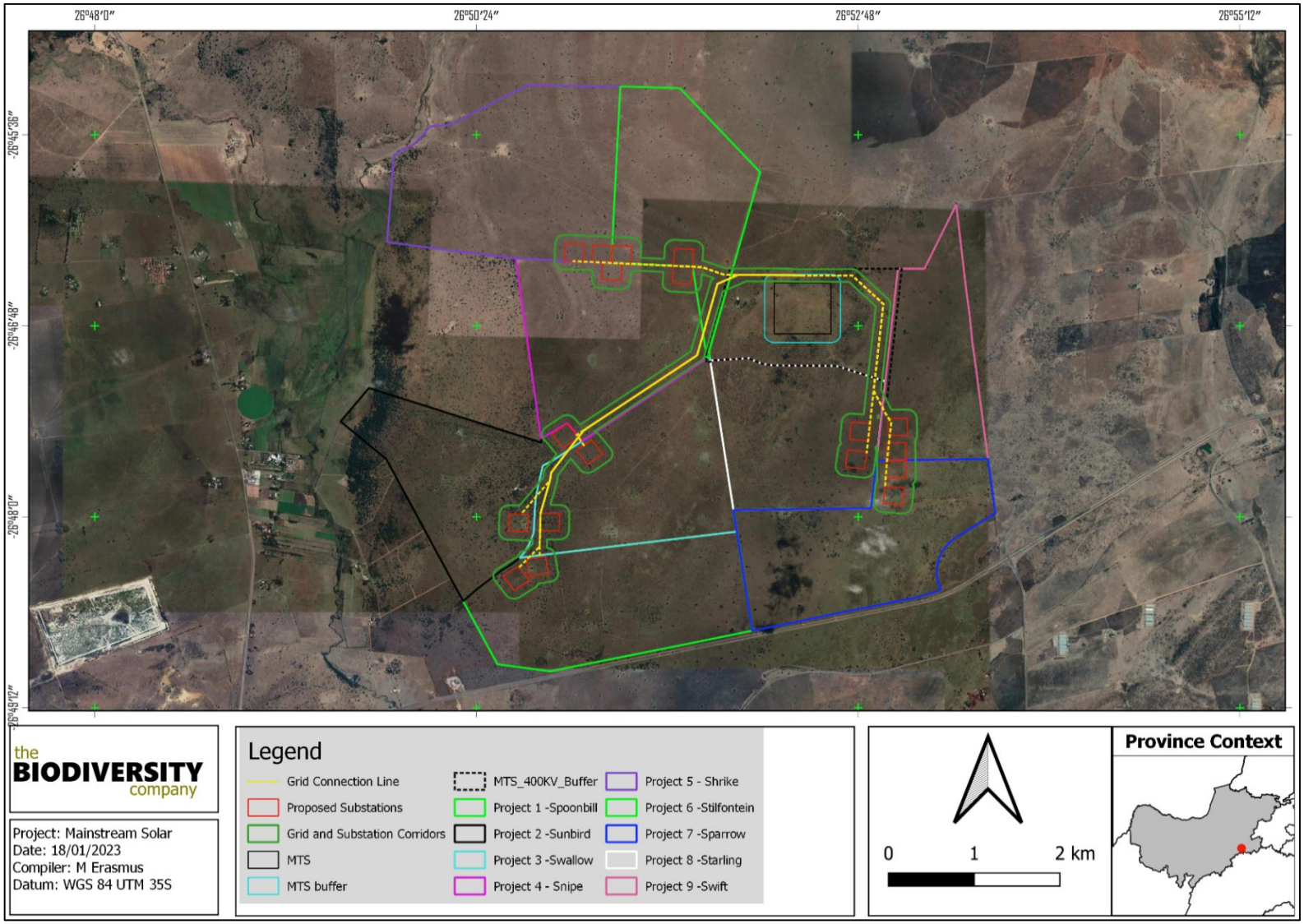


Figure 4-1 Map illustrating the layout of the project area

Note: Two alternative substation-sites are considered per PV project.

4.2. Desktop Assessment

The desktop assessment was principally undertaken using a Geographic Information System (GIS) to access the latest available spatial datasets so as to develop digital cartographs and species lists. These datasets and their date of publishing are provided below.

Ecologically Important Landscape Features

Existing ecologically relevant data layers were incorporated into a GIS to establish how the project might interact with any ecologically important features. The following spatial datasets were analysed:

- National Biodiversity Assessment 2018 (NBA) (Skowno et al., 2019):

The purpose of the NBA is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA deals with all three components of biodiversity: genes, species and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are:

Ecosystem Threat Status – indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition.

Ecosystem Protection Level – indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems.

- Protected areas 2021:

*South Africa Protected Areas Database (*SAPAD) (DEA, 2021*)* – The (SAPAD) Database contains spatial data for the conservation of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection (such as South African Conservation Areas). SAPAD is updated on a continuous basis and forms the basis for the Register of Protected Areas, which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.

*National Protected Areas Expansion Strategy (*NPAES) (DEA, 2016) – The NPAES provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and therefore of high importance for biodiversity, climate resilience and freshwater protection.

- North West Biodiversity Sector Plan 2015 (NWBSP) (READ, 2015):

  The North West Biodiversity Sector Plan was completed in 2015 for the North West Department of Rural, Environment and Agricultural Development (READ). The purpose of the sector plan is to develop the spatial component of a bioregional plan (i.e. map of Critical Biodiversity Areas and associated land-use guidelines). A North West Biodiversity Sector Plan map was produced as part of this plan and sites were assigned the following CBA categories based on their biodiversity characteristics, spatial configuration and requirement for meeting targets for both biodiversity pattern and ecological processes:

  - Critical Biodiversity Area 1 (CBA1);
  - Critical Biodiversity Area 2 (CBA2);

- Ecological Support Area 1 (ESA1);
- Ecological Support Area 2 (ESA2);
- Other Natural Area (ONA);
- No Natural Habitat Remaining (NNR); and
- Protected Area (PA).

CBAs are terrestrial and aquatic areas of the landscape that may need to be maintained in a natural or near-natural state to try achieve the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets may not be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (READ, 2015).

ESAs are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services (READ, 2015). Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic.

ONAs are areas that still contain natural habitat but that are not required to meet biodiversity targets. No Natural Habitat Remaining includes areas without intact habitat remaining (READ, 2015).

PAs are declared and formally protected under the Protected Areas Act, such as National Parks, legally declared Nature Reserves, World Heritage Sites and Protected Environments that are secured by appropriate legal mechanisms. These areas must be managed according to a specific protected area management plan (READ, 2015).

The NWBSP also categorises aquatic areas according to their biodiversity characteristics, spatial configuration, and requirement for meeting targets for both biodiversity pattern and ecological processes. These areas are categorised into CBA and ESA areas much in the same way as the terrestrial areas are, as described above, and they are assigned the same land management objectives. The NWBSP achieves its purpose through providing designated CBAs and ESAs, together with accompanying land use planning and decision-making guidelines

- South African Inventory of Inland Aquatic Ecosystems (Van Deventer et al., 2018):

A South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was established during the National Biodiversity Assessment of 2018. It is a collection of data layers that represent the extent of river and inland wetland ecosystem types as well as pressures on these systems.

- National Freshwater Ecosystem Priority Areas, Rivers and Wetlands (Nel et al., 2011):

To better conserve aquatic ecosystems, South Africa has categorised its inland aquatic systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs).

Desktop Flora Assessment

The Vegetation of South Africa, Lesotho and Swaziland database (Mucina & Rutherford, 2006) was used to identify the vegetation type that would have occurred under natural or pre-anthropogenically altered conditions. Furthermore, the Plants of Southern Africa (POSA) database was accessed to compile a list of expected flora species within the project area (Figure 4-2). The Red List of South African Plants

(Raimondo, 2009; SANBI, 2017) was utilized to provide the most current national conservation status of flora species.

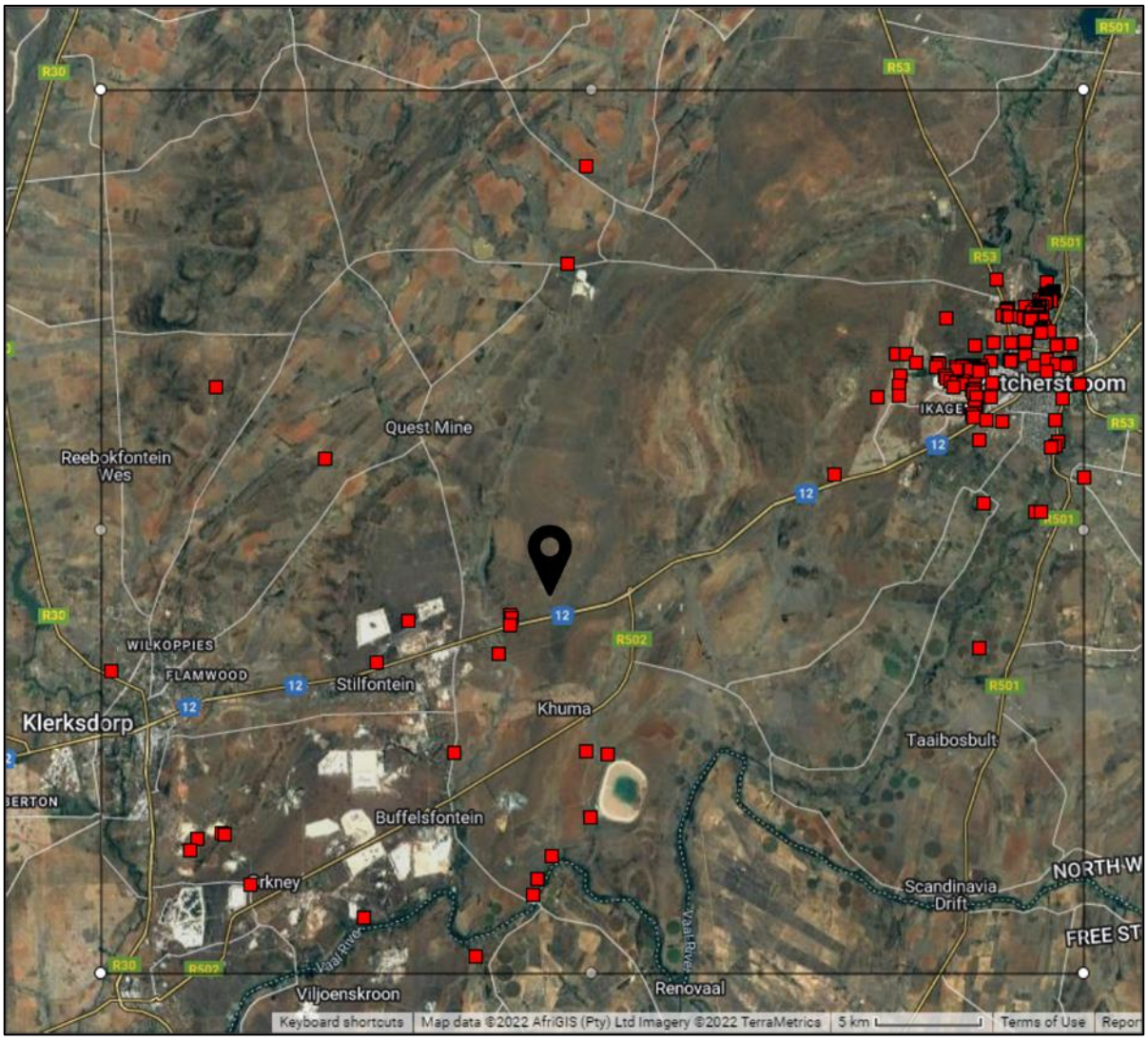


Figure 4-2 ***Map illustrating extent of area used to obtain the expected flora species list from the Plants of South Africa (POSA) database. The red squares are cluster markers of botanical records as per POSA data. The icon indicated the project area location.***

Desktop Faunal Baseline Assessment

The faunal desktop assessment compiled various expected species lists based on the databases noted below:

- Amphibian list, generated from the IUCN spatial dataset (2017) and FrogMap database (Fitzpatrick Institute of African Ornithology, 2021a), using the 2626 quarter degree square;
- Reptile list, generated from the IUCN spatial dataset (2017) and ReptileMap database (Fitzpatrick Institute of African Ornithology, 2021b), using the 2626 quarter degree square;
- Mammal list, generated from the IUCN spatial dataset (2017) and MammalMap database (Fitzpatrick Institute of African Ornithology, 2021c), using the 2626 quarter degree square; and
- Avifauna list, generated from the Southern African Bird Atlas Project 2 (SABAP2, 2019), using the following 5x5 minute pentads: 2645_2655, 2645_2650, 2645_2645, 2640_2655, 2640_2650, and 2640_2645.

4.3. Field Survey

A field survey was undertaken from 21 to 25 February 2022 to determine the presence of Species of Conservation Concern (SCC) and delineate/assess habitat units. Effort was made to survey all habitat types present in the project area, within the limits of time and accessibility. The findings are still valid in 2023.

Flora Survey

The fieldwork was conducted throughout the project area, focusing within habitats perceived as ecologically sensitive based on the preliminary interpretation of satellite imagery (Google Corporation) and GIS analysis (which included the latest applicable biodiversity datasets, see Section 4.2) prior to the fieldwork. The focus of the fieldwork was to maximise coverage and perform a rapid vegetation and ecological assessment throughout the area.

Homogenous vegetation units were subjectively identified using satellite imagery and existing land cover maps. The floristic diversity and presence of flora SCC were determined through timed meanders throughout all habitat units delineated during the desktop assessment, and present within the project area. An example depicting the extent and locality for some of the meanders is presented in Figure 4-3.

The timed random meander method[1] is highly efficient for conducting floristic analysis, specifically in detecting flora SCC and maximising floristic coverage. In addition, the method is time and cost effective and highly suited for compiling flora species lists and therefore gives a rapid indication of flora diversity. The timed meander search was performed based on the original technique described by Goff *et al.* (1982). Suitable habitat for SCC were identified according to Raimondo (2009) and targeted as part of the timed meanders. Basically, the timed meander involves recording species on a field form as they are encountered and after a determined period of examination (5 minutes), the time elapsed is noted on the data form, dividing the species list into sets of species recorded or collected during each time interval.

During meanders the following were recorded: current impacts (e.g., livestock grazing, erosion etc.), dominant vegetation species and any sensitive features (e.g., wetlands, outcrops etc.) and opportunistic observations while navigating through the project area.

[1] The specialist will walk one or more meander routes through the plant community or habitat, and record all the species encountered during the meander. Each meander will be timed.

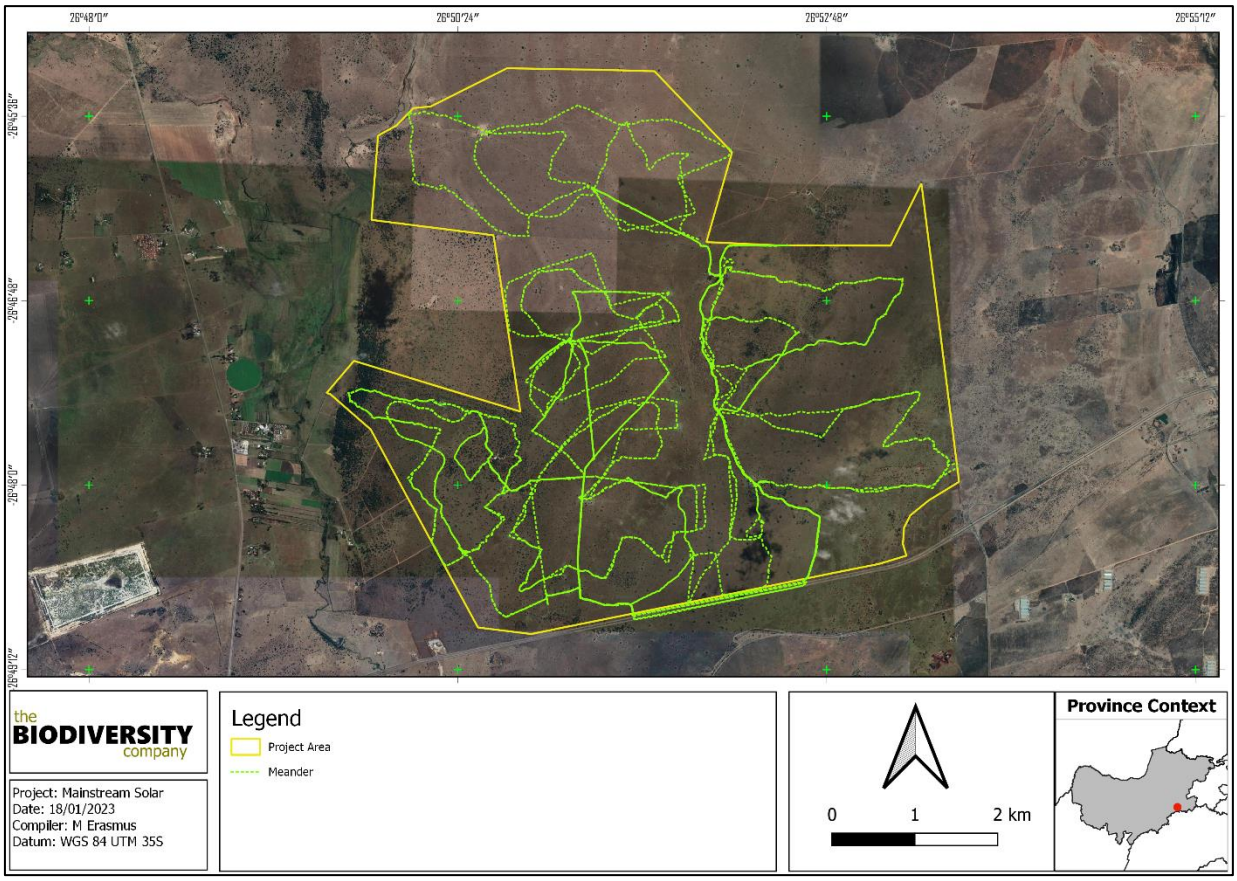


Figure 4-3 Examples of meanders achieved for the project area

Fauna Survey

The faunal assessment within this report pertains to herpetofauna (amphibians and reptiles) and mammals. The faunal field survey comprised of the following techniques:

- Visual and auditory searches - This typically comprised of meandering and using binoculars to view species from a distance without them being disturbed; and listening to species calls;
- Active hand-searches - used for species that shelter in or under particular micro-habitats (typically rocks, exfoliating rock outcrops, fallen trees, leaf litter, bark etc.); and
- Utilization of local knowledge, in this case Herman (Farm Manager) (pers. comm, 21/02/2022);

Field guides and texts consulted for identification purposes included the following:

- Field Guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
- A Complete Guide to the Snakes of Southern Africa (Marais, 2004);
- Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland (Bates *et al,* 2014);
- A Complete Guide to the Frogs of Southern Africa (du Preez and Carruthers, 2009);
- Smithers' Mammals of Southern Africa (Apps, 2008);
- A Field Guide to the Tracks and Signs of Southern and East African Wildlife (Stuart and Stuart, 2000);
- Birds of Africa (Sinclair and Ryan, 2010); and
- Taylor *et al.* (2015), Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. Used for conservation status, nomenclature and taxonomical ordering.

4.4. Terrestrial Site Ecological Importance

The different habitat types within the project area were delineated and identified based on observations during the field assessment, and available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern (SCC) and their ecosystem processes. The SEI for project component can be found in Appendix A below.

Site Ecological Importance (SEI) is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community or habitat type present on the site) and Receptor Resilience (RR) (its resilience to impacts) as follows.

BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor. The criteria for the CI and FI ratings are provided in Table 4-1 and Table 4-2, respectively.

Table 4-1 Summary of Conservation Importance (CI) criteria

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

Table 4-2 Summary of Functional Integrity (FI) criteria

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

Low	Small (> 1 ha but < 5 ha) area. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.
Very Low	Very small (< 1 ha) area. No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current negative ecological impacts.

BI can be derived from a simple matrix of CI and FI as provided in Table 4-3.

Table 4-3 Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI)

Biodiversity Importance (BI)		Conservation Importance (CI)				
		Very high	**High**	**Medium**	**Low**	**Very low**
Functional Integrity (FI)	**Very high**	Very high	Very high	High	Medium	Low
	High	Very high	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very low
	Low	Medium	Medium	Low	Low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor, as summarised in Table 4-4.

Table 4-4 Summary of Receptor Resilience (RR) criteria

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

After the determination of the BI and RR, the SEI can be ascertained using the matrix as provided in Table 4-5.

Table 4-5 Matrix used to derive Site Ecological Importance (SEI) from Receptor Resilience (RR) and Biodiversity Importance (BI)

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

Interpretation of the SEI in the context of the project is provided in Table 4-6.

Table 4-6 Guidelines for interpreting Site Ecological Importance (SEI) in the context of the development activities

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

The SEI is evaluated for each taxon and can be combined into a single multi-taxon SEI for the assessment area. A combination of the maximum SEI for each receptor was applied, and the SEI for the Stilfontein Cluster can be seen in section 7.2, whereas the project specific SEI is presented in Appendix A.

5. Assumptions and Limitations

The following assumptions and limitations are applicable to this assessment:

- No avifaunal component was assessed for this report as a specific avifaunal report was compiled;
- The area was only surveyed during a single site visit and therefore, this assessment does not consider temporal trends, however sufficient to derive meaningful baseline;
    - The validity period that the results are applicable for in terms of when the site assessment was undertaken are still valid for 2023, assuming land use has remained the same; and;
- The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by 5 m.

6. Results & Discussion

This section pertains to the baseline ecological state relevant to the entire PAOI (including ecologically important landscape features, desktop flora and fauna results, and field survey flora and fauna results). **Baseline findings for each project, including the fine-scale habitat assessment and Site Ecological Importance ratings, is presented in Appendix A.**

6.1. Desktop Baseline

Ecologically Important Landscape Features

The findings of the GIS analysis conducted to ascertain the relationship of the project area to ecologically important landscape features are summarised in Table 6-1 below.

Table 6-1 Summary findings of the relationship of the project area to ecologically important landscape features.

Desktop Information Considered	Relevant/Irrelevant	Section
Ecosystem Threat Status	Relevant: The project area overlaps with 'Least Concern' ecosystems	6.1.1.1
Ecosystem Protection Level	Relevant: The project area overlaps with 'Not Protected' and 'Poorly Protected' ecosystems	6.1.1.2
Critical Biodiversity Area	Relevant: The project area overlaps mainly with terrestrial ESA1 and small portions of CBA2 and ESA2 classified areas.	6.1.1.3
South African Inventory of Inland Aquatic Ecosystems	Relevant The project area lies between two 'Critically Endangered' river and wetland systems	6.1.1.4
National Freshwater Priority Area	Relevant The project area lies between two non-priority river systems	6.1.1.5
Strategic Transmission Corridors (STC)	Relevant: The project overlaps with the Central EGI corridor	6.1.1.6
Renewable Energy Database	Relevant: Limited projects in area; "Approved" and "lapsed" projects in regional area.	6.1.1.7
Renewable Energy Development Zones (REDZ)	Relevant The project area falls within the Klerksdorp REDZ.	6.1.1.8
National Protected Areas Expansion Strategy	Relevant: The project area slightly overlaps with a priority focus area however the majority of the site lies outside of any NPAES areas	6.1.1.9
Protected Areas	Irrelevant: The project area is not within 10 km of any formally protected areas	-
Important Bird and Biodiversity Areas	Irrelevant: There are no IBAs nearby to the project area	-
Strategic Water Source Areas	Irrelevant: The project area is not nearby to any Strategic Water Source Areas	-

Ecosystem Threat Status

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. This provides a holistic view of the vegetation type, the threatened species associated with the ecosystem and the overall land use currently in the area. According to the spatial dataset the project area overlaps with a LC ecosystem, and this means that the ecosystem type has experienced little or no loss of natural habitat or deterioration in condition (Figure 6-1).

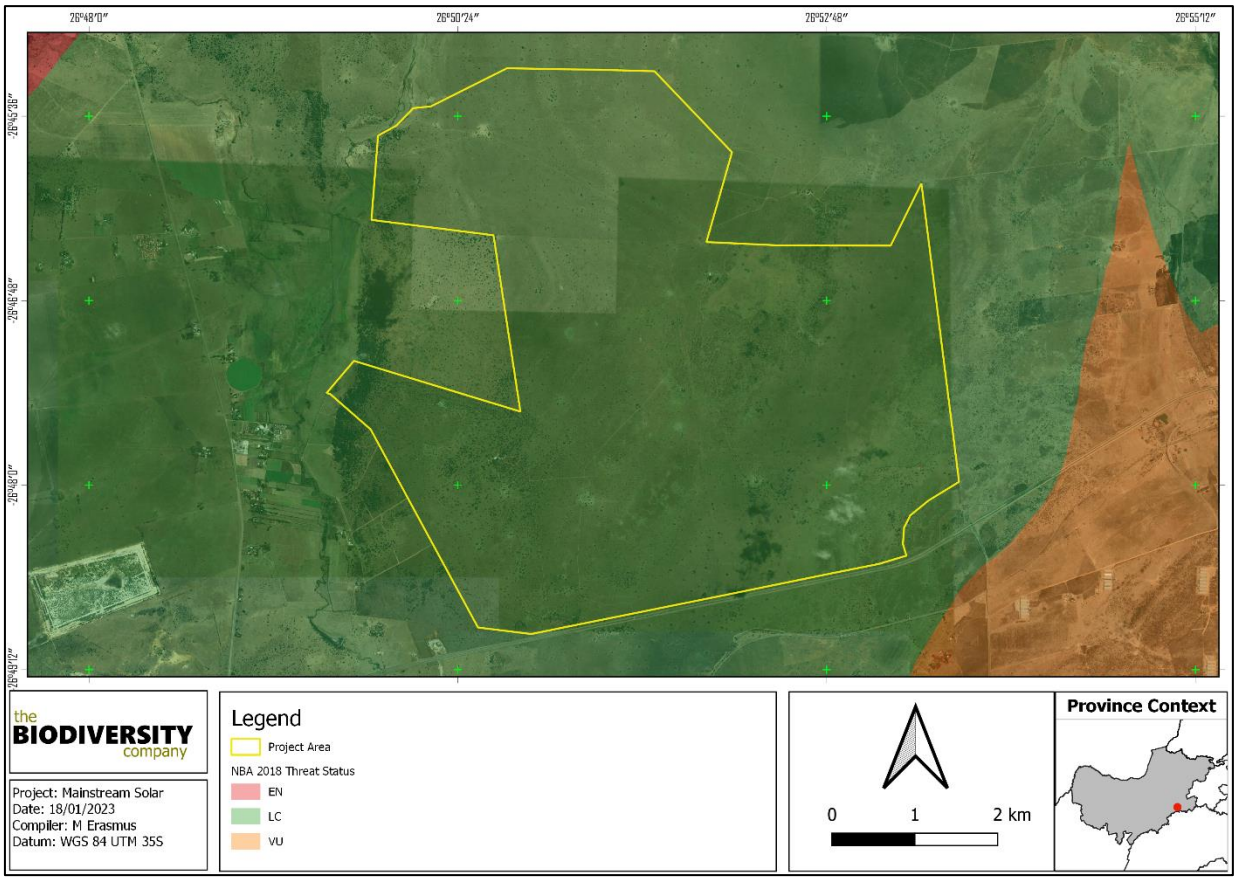


Figure 6-1 Map illustrating the ecosystem threat status associated with the project area.

Ecosystem Protection Level

This is an indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The project area overlaps with NP and PP ecosystems as shown in Figure 6-2. PP ecosystems have between 5 and 50% of their biodiversity targets included in one or more protected areas and NP ecosystems have less than 5% of their biodiversity targets included in one or more protected areas.

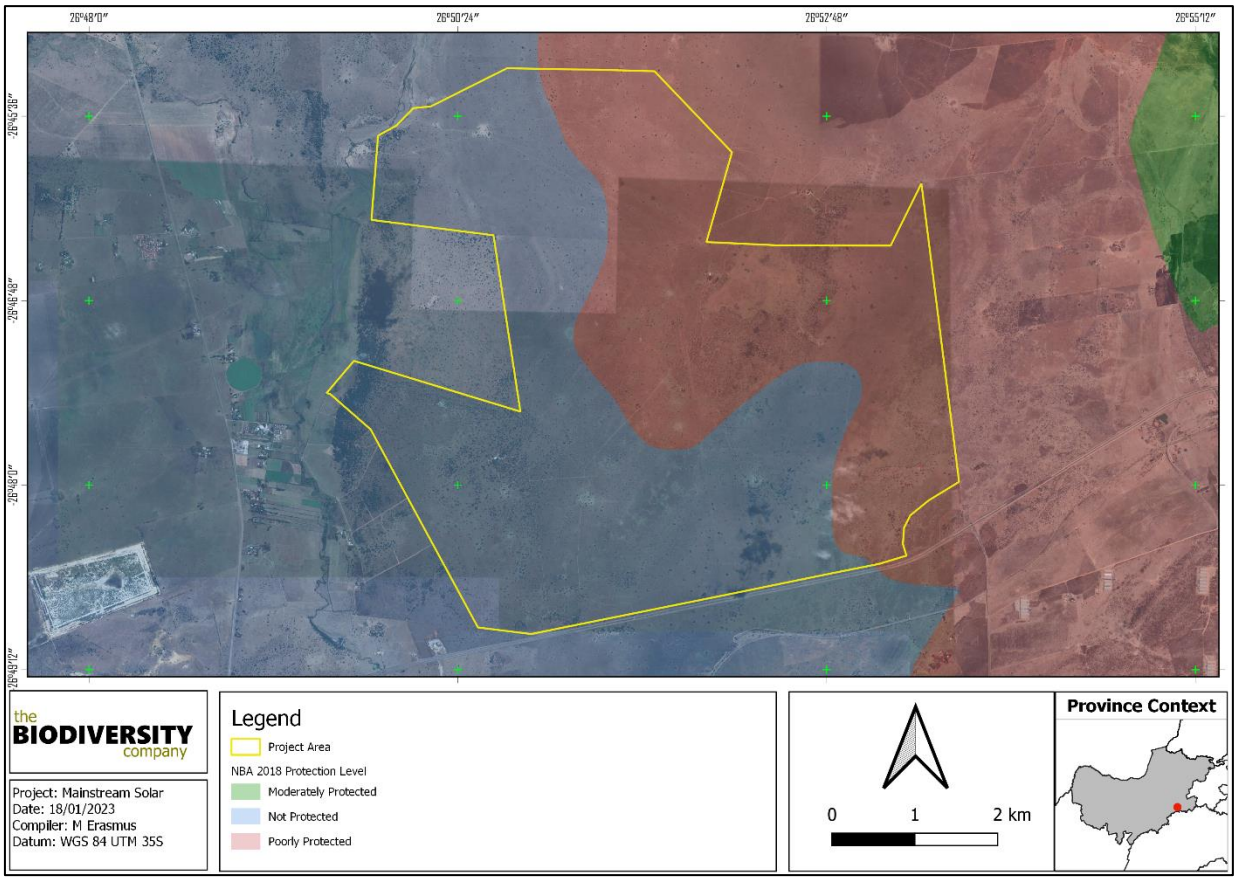


Figure 6-2 Map illustrating the ecosystem protection level associated with the project area

Critical Biodiversity Areas and Ecological Support Areas

The NWBSP dataset contains spatial data for both terrestrial and aquatic CBA and ESA areas as relevant to the province.

Figure 6-3 below shows that the project area mostly overlaps with terrestrial ESA1 areas, with small portions overlapping with terrestrial CBA2 and ESA2 areas.

ESAs are terrestrial and aquatic areas that are not essential for meeting biodiversity representation targets (thresholds), but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree or extent of restriction on land use and resource use in these areas may be lower than that recommended for CBAs.

The land management objective for ESA1 areas is to maintain them in at least a semi-natural state as ecologically functional landscapes that retain basic natural attributes (READ, 2015).

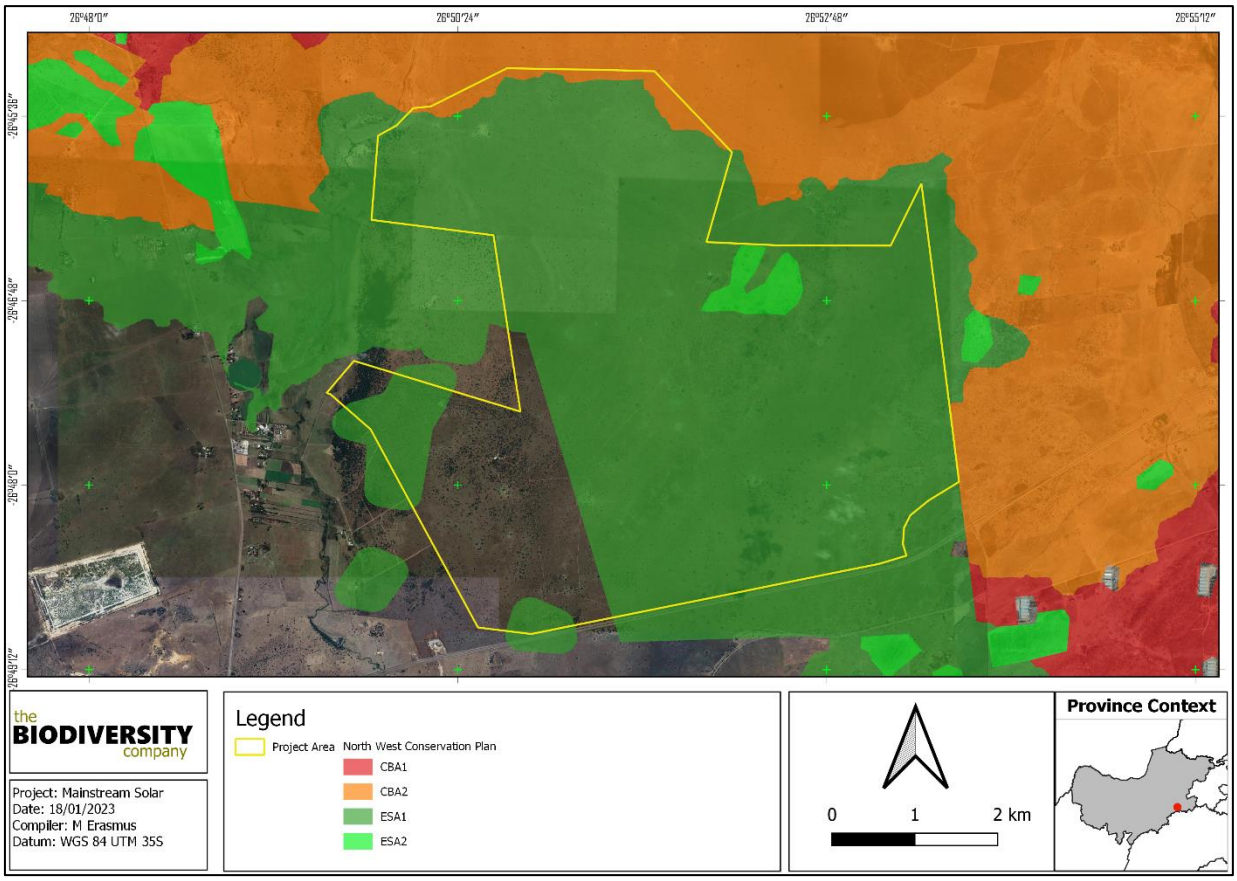


Figure 6-3 Map illustrating the locations of CBA and ESA areas as relevant to the project area

South African Inventory of Inland Aquatic Ecosystems

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.,* 2019). The project area is within 500 m of the Critically Endangered Kromdraaispruit and Koekemoerspruit Rivers, with no overlap with these Rivers. The project area slightly overlaps with Critically Endangered floodplain wetlands (Figure 6-4).

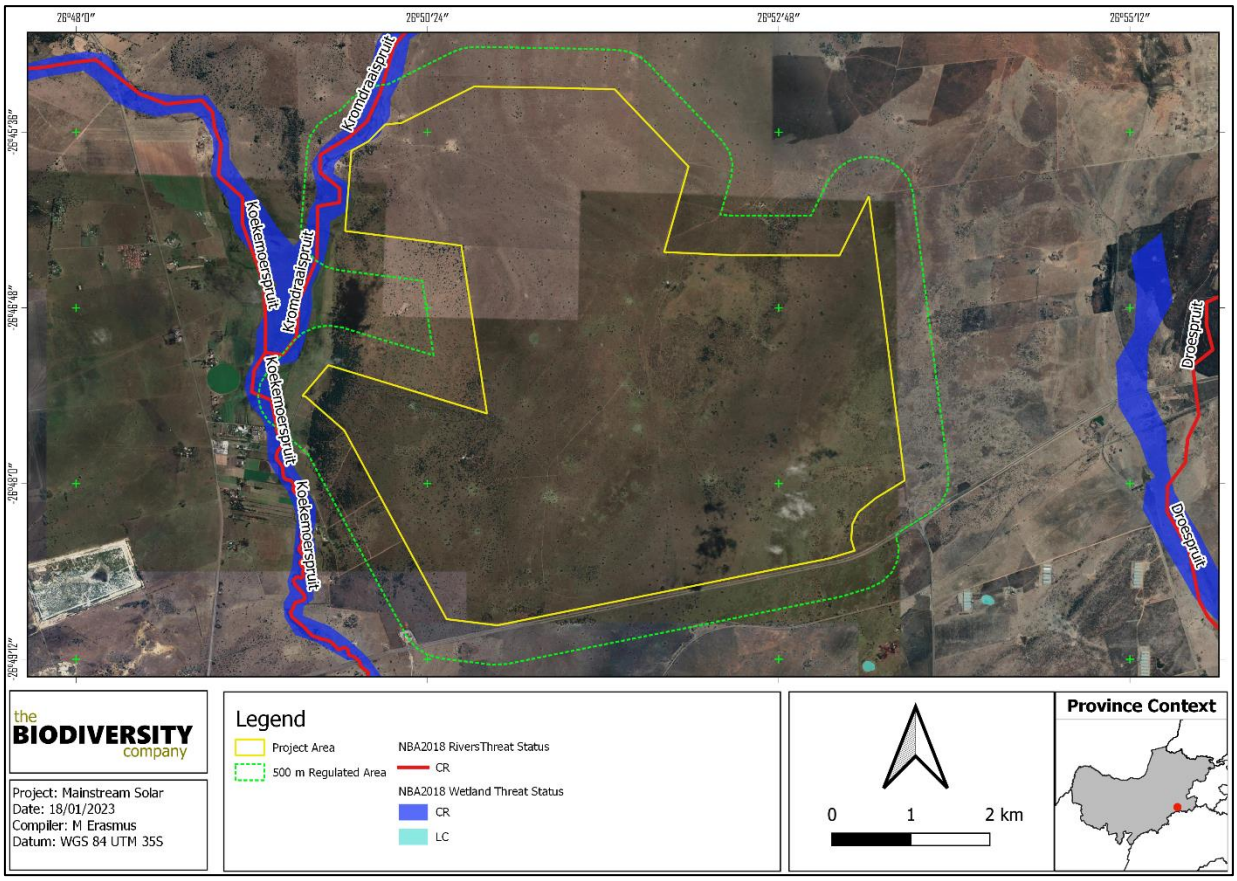


Figure 6-4 Map illustrating the ecosystem threat status of river and wetland ecosystems in the project area

National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs). The FEPAs are intended to be conservation support tools and are envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al*., 2011).

Figure 6-5 shows the location of the project area in relation to any wetland and river FEPAs. The project area is nearby (within 500 m) of the Kromdraaispruit, Koekemoerspruit, and Droespruit rivers, none of which are listed as FEPA priority systems. No significant FEPA wetlands occur nearby.

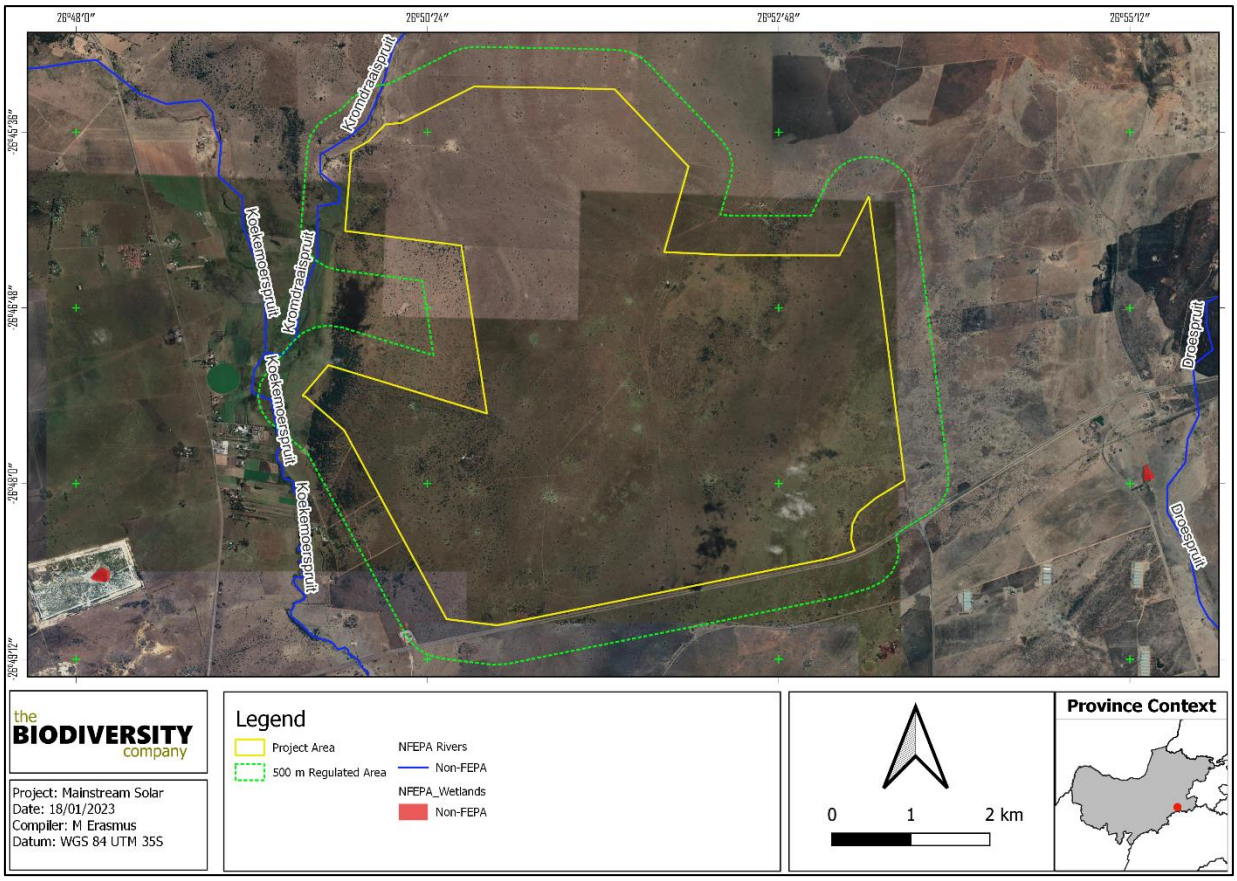


Figure 6-5 The project area in relation to the National Freshwater Ecosystem Priority Area database

Strategic Transmission Corridors (STC)

On the 16 February 2018, Minister Edna Molewa published Government Notice No. 113 in Government Gazette No. 41445, which identified five strategic transmission corridors important for the planning of electricity transmission and distribution infrastructure.

The project lies withing the Central STC corridor.

Renewable Energy Database

The Renewable Energy Database (http://egis.environment.gov.za/), shows that there are limited other projects in the near vicinity (Figure 6-6). This reduces the overall impact on the habitats in the area.

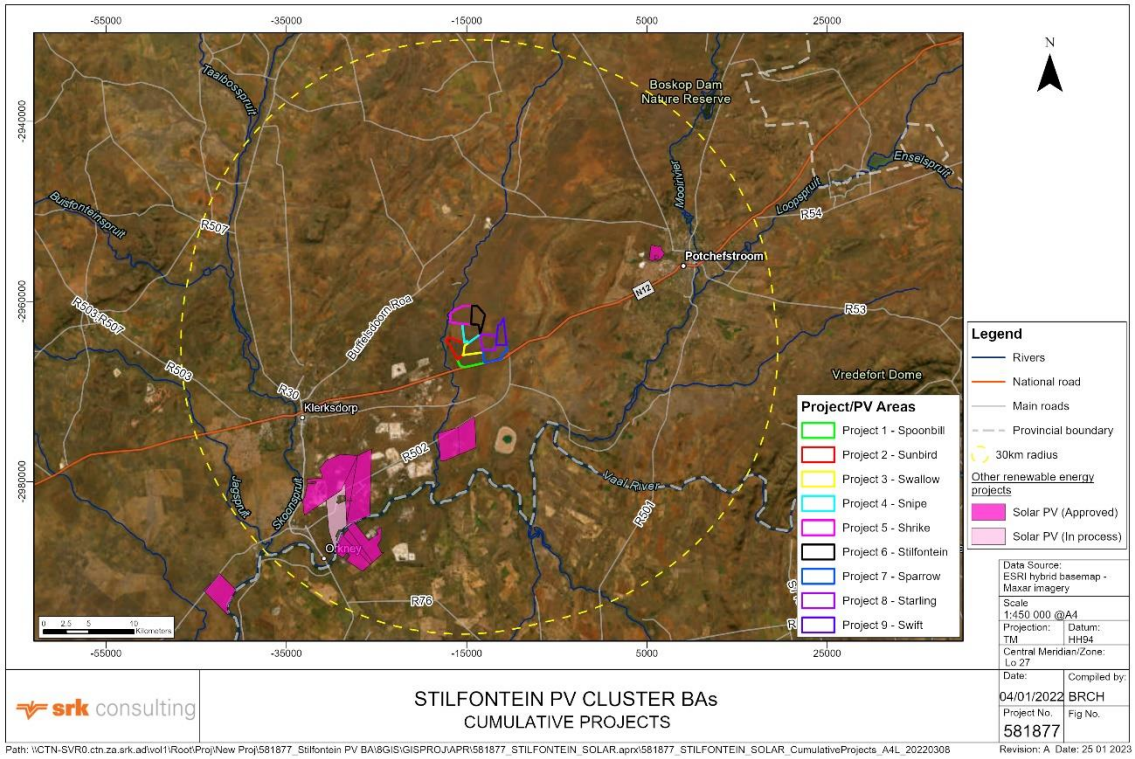


Figure 6-6 The project area in relation to the renewable energy database projects in the area (Source: DFFE Q3 2022 REEA database)

Renewable Energy Development Zones (REDZ)

In 2018 the Government Notice No. 114 in Government Gazette No. 41445 was published, where eight renewable energy development zones important for the development of large-scale wind and solar photovoltaic facilities were identified. In 2021 an additional three sites were identified. The REDZs were identified through the undertaking of two Strategic Environmental Assessments.

More detailed information can be obtained from https://egis.environment.gov.za/redz. Government Notice No. 142, 144 and 145 in Government Gazette No. 44191 specify the procedures to be followed when applying for environmental authorisation for electricity transmission or distribution infrastructure or large-scale wind and solar photovoltaic energy facilities in these REDZs.

The project area falls within the Klerksdorp REDZ

National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2017 (NPAES) focus areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems.

These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine-scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2017).

The project area slightly overlaps with a priority focus area however the majority of the site lies outside of any NPAES areas (Figure 6-7). The goal of the NPAES is to achieve protected area expansion for improved ecosystem representation, ecological sustainability and resilience to climate change. It sets protected area targets, maps priority areas for protected area expansion, and makes recommendations on mechanisms to achieve this.

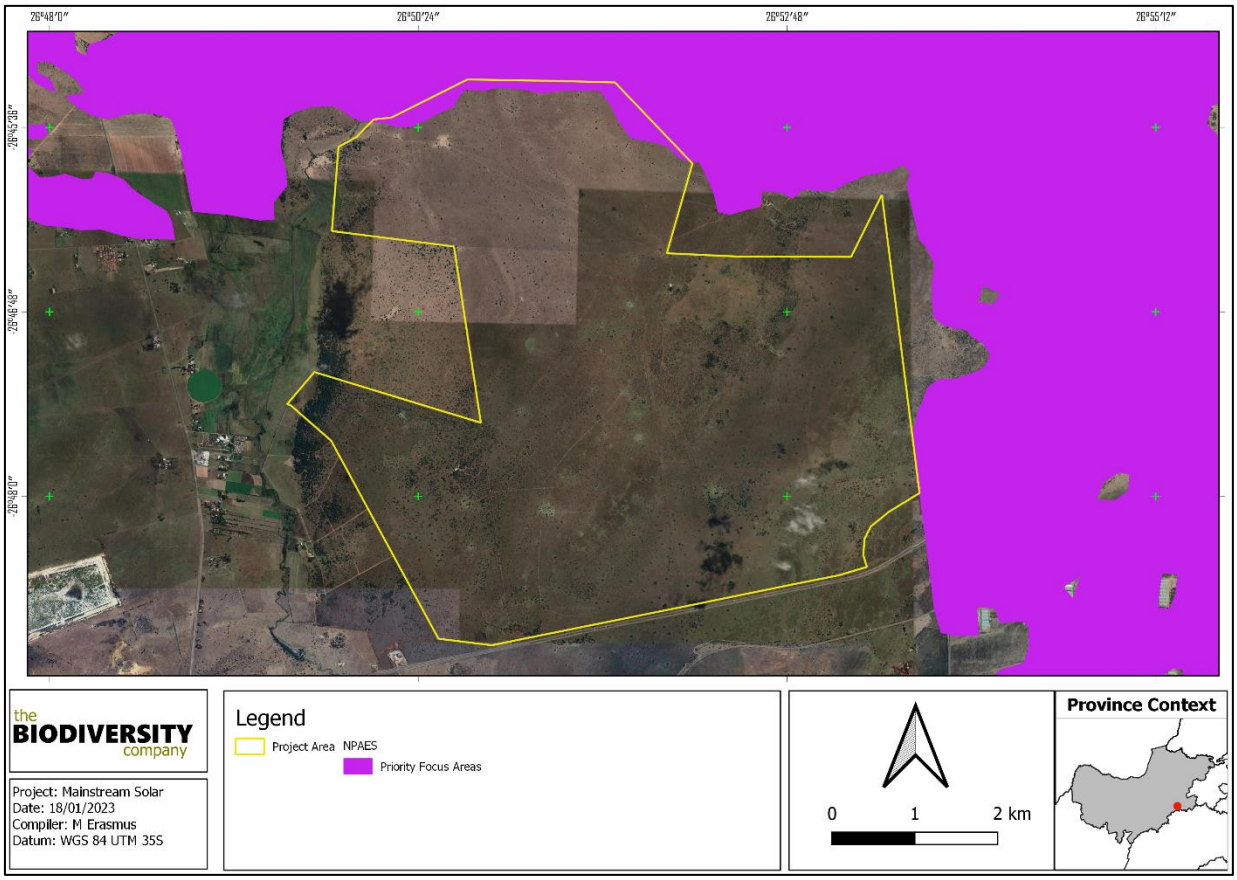
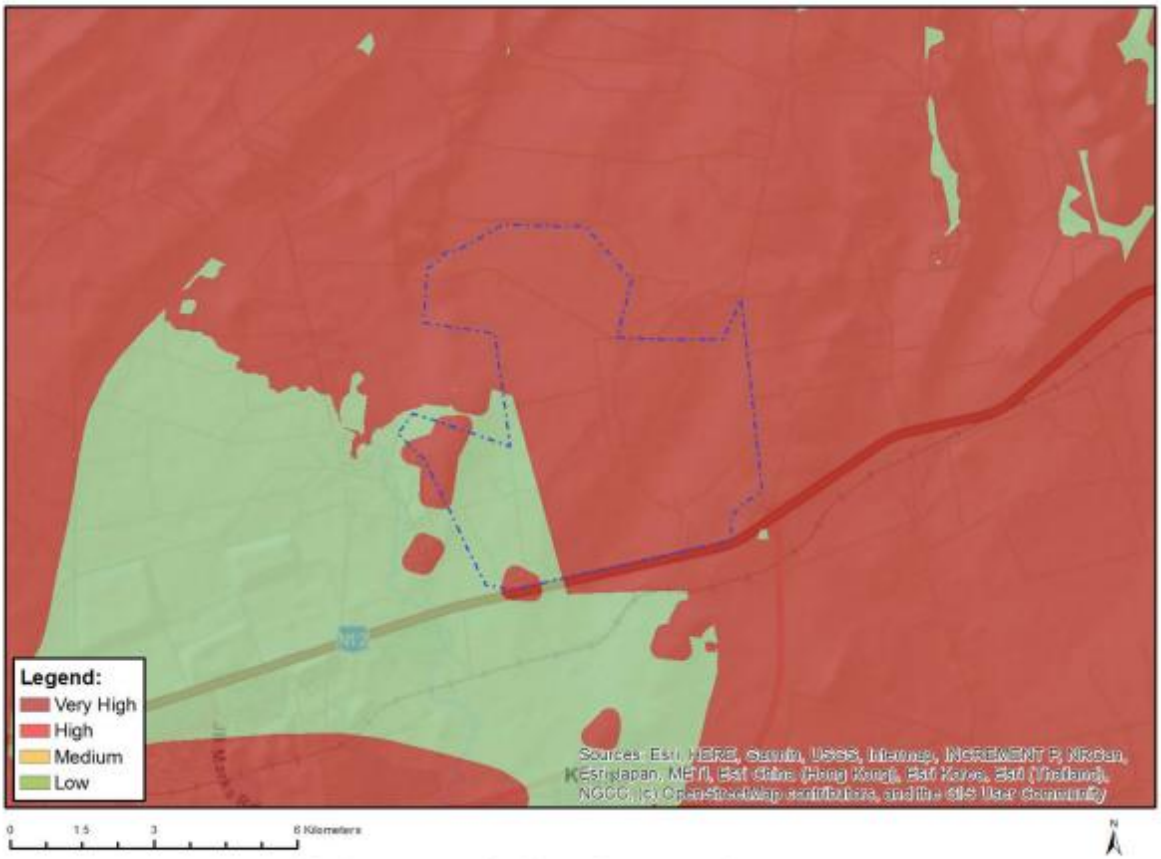


Figure 6-7 The project area in relation to the National Protected Areas Expansion Strategy areas

Screening Baseline

The Terrestrial Biodiversity Sensitivity for the proposed development was overall determined to be a Very High sensitivity according to the Web-based Screening Tool. The very high sensitivity (see Sensitivity Features below) is as a result of a very marginal overlap with CBA2 area on the northern and north-eastern boundary of the cumulative project site and more general overlap with ESA1, ESA 2 and NPAES areas.

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	Critical biodiveristy area 2
Very High	Ecological support area 1
Very High	Ecological support area 2
Very High	Protected Areas Expansion Strategy

Figure 6-8 Map illustrating the Combined Terrestrial Biodiversity Sensitivity as generated from the National Environmental Web Based Screening Tool

Flora Baseline

This section is divided into a description of the vegetation type expected under natural conditions, and the expected flora species.

Vegetation Type

The project area is situated within the Grassland Biome. The Grassland Biome in South Africa occurs mainly on the Highveld, the inland areas of the eastern seaboard, the mountainous areas of KwaZulu-Natal and the central parts of the Eastern Cape. The topography is mainly flat to rolling, but also includes

mountainous regions and the Escarpment (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Grassland Biome include:

- Seasonal precipitation; and
- The minimum temperatures in winter (Mucina & Rutherford, 2006).

Grasslands characteristically contain herbaceous vegetation of a relatively short and simple structure that is dominated by graminoids, usually of the family Poaceae. Woody plants are rare (usually made up of low or medium-sized shrubs), absent, or confined to specific habitats such as smaller escarpments or koppies. Core grassland areas usually have deep, fertile soils although a wide spectrum of soil types occurs (Mucina & Rutherford, 2006).

The Grassland Biome is comprised of four parent bioregions and a total of 72 different vegetation types. The project area is situated within both the Vaal Reefs Dolomite Sinkhole Woodland and the Carletonville Dolomite Grassland – both of the Dry Highveld Grassland Bioregion (Figure 6-9).

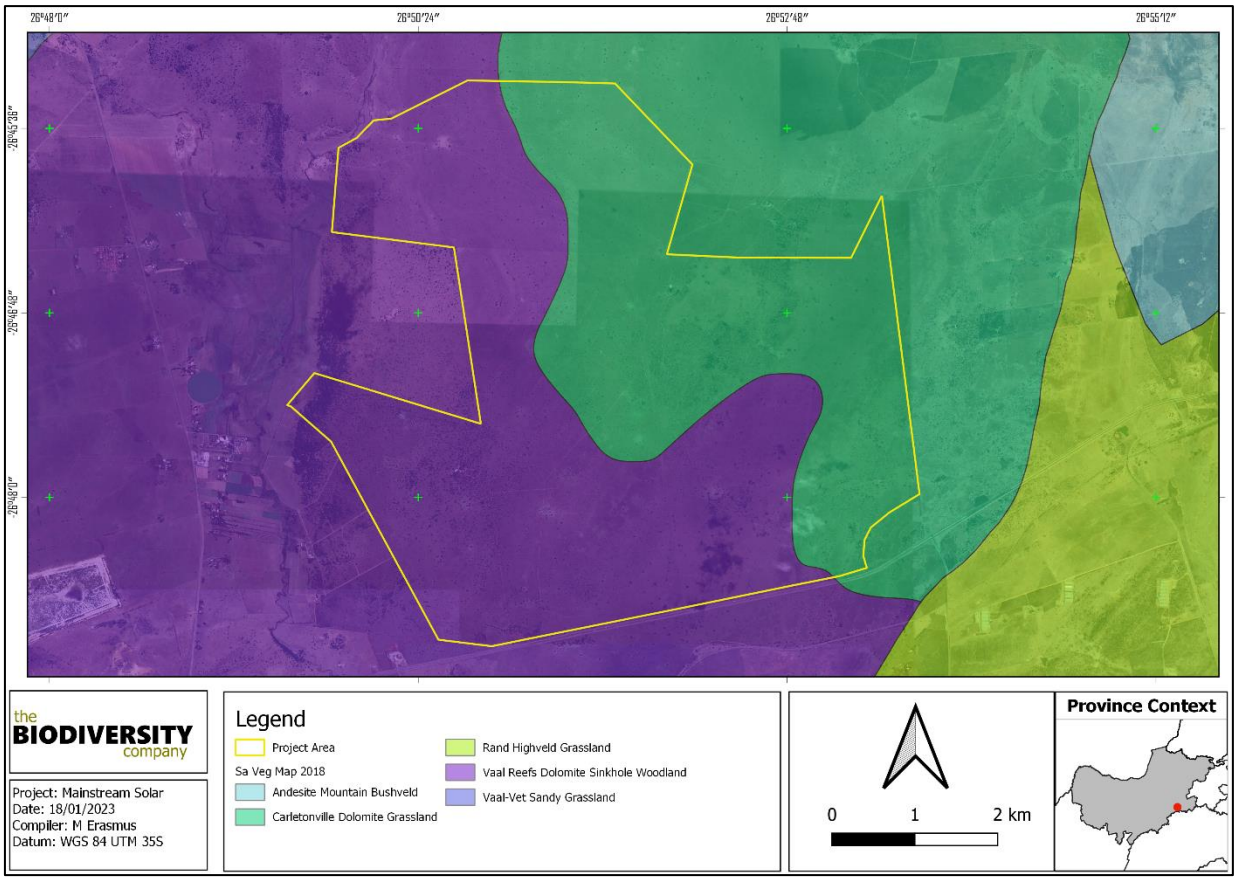


Figure 6-9 Map illustrating the vegetation type associated with the project area

Vaal Reefs Dolomite Sinkhole Woodland

Vaal Reefs Dolomite Sinkhole Woodland is restricted to the North West and Free State Provinces, it covers a small area associated with the dolomite sinkholes in and around Stilfontein and Orkney (Vaal Reefs). The Vaal River forms the southern distribution limit of this vegetation unit. Its main vegetation and landscape features include a slightly undulating landscape dissected by prominent rocky chert ridges and supporting a grassland-woodland vegetation complex. The most typical vegetation feature is the woodland, which occurs naturally in clumps around sinkholes, especially in places of dolomite outcrops.

Important Plant Taxa in Vaal Reefs Dolomite Sinkhole Woodland

Based on Mucina and Rutherford's (2006) vegetation classification, important plant taxa are those species that have a high abundance, a frequent occurrence (not being particularly abundant) or are prominent in the landscape within a particular vegetation type. They note the following species that are important taxa in the Vaal Reefs Dolomite Sinkhole Woodland:

Small trees[2]: *Acacia erioloba (Vachellia erioloba), Celtis africana, Rhus lancea, Acacia caffra (Senegalia caffra), A. karroo (Vachellia karroo, A. robusta (Vachellia robusta)* subsp. *clavigera.*

Tall shrubs: *Diospyros lycioides* subsp*. lycioides, Ehretia rigida, Grewia flava.*

Low shrubs: *Asparagus suaveolens, Gymnosporia heterophylla, Pavonia burchellii, Sida dregei, Anthospermum hispidulum, Asparagus laricinus, Diospyros pallens, Felicia muricata, Indigofera heterotricha, Menodora africana, Phyllanthus incurvus, Triumfetta sonderi, Ziziphus zeyheriana.*

Graminoids: *Aristida congesta, Digitaria eriantha, Eragrostis biflora, E. curvula, Themeda triandra, Anthephora pubescens, Aristida canescens, Bewsia biflora, Brachiaria nigropedata, B. serrata, Chloris pycnothrix, Cymbopogon caesius, C. pospischilii, Cynodon dactylon, Cyperus margaritaceus, Diheteropogon amplectens, Elionurus muticus, Eragrostis chloromelas, E. lehmanniana, E. racemosa, E. superba, Eustachys paspaloides, Heteropogon contortus, Melinis repens* subsp. *repens, Panicum coloratum, Setaria sphacelata, Triraphis andropogonoides.*

Conservation Status

According to Mucina and Rutherford (2006) the Vaal Reefs Dolomite Sinkhole Woodland is classified as Vulnerable. Although the target for conservation is 24%, only a small patch is conserved in the statutory conservation area of Sterkfontein Caves. The proposed 'Highveld National Park' is supposed to conserve a considerable area of this vegetation unit. Aesthetically this is one of the most scenic landscapes in the western Grassland Biome and certainly deserves high conservation priority. Almost a quarter has been transformed already - mainly by mining, cultivation, urban sprawl and infrastructure. The region of this unit contains possibly the highest concentration of mines than any other vegetation in South Africa (Mucina & Rutherford, 2006).

Carletonville Dolomite Grassland

Carletonville Dolomite Grassland is restricted to the North-West (mainly) and Gauteng, and marginally extends into the Free State Province: In the region of Potchefstroom, Ventersdorp and Carletonville, extending westwards to the vicinity of Ottoshoop, but also occurring as far east as Centurion and Bapsfontein in Gauteng Province. Its main vegetation and landscape features include slightly undulating plains dissected by prominent rocky chert ridges. These are a species-rich grasslands, forming a complex mosaic pattern dominated by many species.

Important Plant Taxa in Carletonville Dolomite Grassland

Mucina and Rutherford (2006) note the following species that are important taxa in the Carletonville Dolomite Grassland:

Graminoids: *Aristida congesta, Brachiaria serrata, Cynodon dactylon, Digitaria tricholaenoides, Diheteropogon amplectens, Eragrostis chloromelas, E. racemosa, Heteropogon contortus, Loudetia simplex, Schizachyrium sanguineum, Setaria sphacelata, Themeda triandra, Alloteropsis semialata subsp. eckloniana, Andropogon schirensis, Aristida canescens, A. diffusa, Bewsia biflora, Bulbostylis burchellii, Cymbopogon caesius, C. pospischilii, Elionurus muticus, Eragrostis curvula, E. gummiflua, E. plana, Eustachys paspaloides, Hyparrhenia hirta, Melinis nerviglumis, M. repens subsp. repens,*

[2] Names in brackets is the current nomenclature.

Monocymbium ceresiiforme, Panicum coloratum, Pogonarthria squarrosa, Trichoneura grandiglumis, Triraphis andropogonoides, Tristachya leucothrix, T. rehmannii.

Herbs: *Acalypha angustata, Barleria macrostegia, Chamaecrista mimosoides, Chamaesyce inaequilatera, Crabbea angustifolia, Dianthus mooiensis, Dicoma anomala, Helichrysum caespititium, H. miconiifolium, H. nudifolium var. nudifolium, Ipomoea ommaneyi, Justicia anagalloides, Kohautia amatymbica, Kyphocarpa angustifolia, Ophrestia oblongifolia, Pollichia campestris, Senecio coronatus, Vernonia oligocephala.*

Geophytic Herbs: *Boophone disticha, Habenaria mossii.*

Low Shrubs: *Anthospermum rigidum subsp. pumilum, Indigofera comosa, Pygmaeothamnus zeyheri var. rogersii, Rhus magalismontana, Tylosema esculentum, Ziziphus zeyheriana.*

Geoxylic Suffrutices: *Elephantorrhiza elephantina, Parinari capensis subsp. capensis*

Endemic Taxon - Succulent Shrub: *Delosperma davyi.*

Conservation Status

According to Mucina and Rutherford (2006) the Carletonville Dolomite Grassland is classified as Vulnerable. Although the target for conservation is 24%, only a small extent is conserved statutorily in the Sterkfontein Caves, Oog Van Malmanie, Abe Bailey, Boskop Dam, Schoonspruit, Krugersdorp, Olifantsvlei, and Groenkloof protected areas, and in at least six private conservation areas. Almost a quarter is already transformed for cultivation, by urban sprawl or by mining activity as well as the building of the Boskop and Klerkskraal Dams (Mucina & Rutherford, 2006).

Expected Flora Species

The POSA database indicates that 414 species of plants may occur within the project area. Appendix B – Flora species expected to occur in the project area. provides the list of all the expected species and their respective conservation statuses and endemism classifications. According to the database, two flora SCC may occur (Table 6-2).

Table 6-2 Flora species of conservation concern that may occur within the project area

Family	Species	Author	SANBI Red-List	Ecology
Fabaceae	*Pearsonia bracteata*	(Benth.) Polhill	Near Threatened B1ab(i,ii,iii,iv,v). EOO 9 671-12 822 km², an estimated eight to 14 locations continue to decline due to ongoing habitat loss to urban development, agriculture and mining in Gauteng and North West (SANBI, 2022)	Indigenous; Endemic
Crassulaceae	*Adromischus umbraticola* subsp. *umbraticola*	C.A.Sm.	Near Threatened B1ab(ii,iii,v) EOO 14 600 km², known from 14 locations. The rocky ridges where this subspecies grows are increasingly under threat from urban expansion within Gauteng	Indigenous; Endemic

Faunal Baseline

Amphibians

Based on the IUCN Red List Spatial Data and FrogMap, 20 amphibian species are expected to occur within the area (Appendix C – Amphibian species expected to occur in the project area). One of the expected species is an SCC (

Table 6-3), the Giant Bullfrog. This species has a moderate likelihood of occurrence based on the wetlands found nearby to the project area. The likelihood of occurrence is based on literature (section 0) describing their habitat preferences and the level of adaptability to disturbed areas.

Table 6-3 Amphibians Species of conservation concern that may occur in the project area

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Pyxicephalus adspersus	Giant Bullfrog	NT	LC	Moderate

Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 43 reptile species may occur within the area (Appendix D – Reptile species expected to occur in the project area). One (1) is regarded as threatened (Table 6-4).

Table 6-4 Reptile Species of conservation concern that may occur within the project area

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Psammophis leightoni	Cape Sand Snake	VU	LC	Low

Psammophis leightoni (Cape Sand Snake) is listed as VU on a regional basis. This snake is most commonly found in sand fynbos and strandveld habitat in the Western Cape. The species therefore has a low likelihood of occurrence.

Mammals

The IUCN Red List Spatial Data and the MammalMap database lists 89 mammal species that could be expected to occur within the area (Appendix E – Mammal species expected to occur within the project area). This list excludes large mammal species that are normally limited to protected areas. Thirteen (13) of these expected species are regarded as SCC (Table 6-5), and five of these have a moderate-high likelihood of occurrence based on the suitable habitat and food sources present in the project area.

Table 6-5 Mammal species of conservation concern that are expected to occur within the project area.

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Aonyx capensis	African Clawless Otter	NT	NT	Low
Atelerix frontalis	Southern African Hedgehog	NT	LC	Moderate
Crocidura maquassiensis	Makwassie musk shrew	VU	LC	Low
Crocidura mariquensis	Swamp Musk Shrew	NT	LC	Low
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT	Low
Felis nigripes	Black-footed Cat	VU	VU	Low
Hydrictis maculicollis	Spotted-necked Otter	VU	NT	Low
Leptailurus serval	Serval	NT	LC	High
Mystromys albicaudatus	African White-tailed Rat	VU	EN	Moderate
Otomys auratus	Southern African Vlei Rat (Grassland type)	NT	NT	High
Panthera pardus	Leopard	VU	VU	Low
Parahyaena brunnea	Brown Hyaena	NT	NT	Moderate
Poecilogale albinucha	African Striped Weasel	NT	LC	Low

Atelerix frontalis (South African Hedgehog) has a tolerance for a degree for habitat modification and occurs in a wide variety of semi-arid and sub-temperate habitats (IUCN, 2017). Based on the Red List of Mammals of South Africa, Lesotho and Swaziland (2016), *A. frontalis* populations are decreasing due to the threats of electrocution, veld fires, road collisions, predation from domestic pets and illegal harvesting. Suitable grasslands occur in the project area, although somewhat disturbed, that can function as habitat for this species, as such the likelihood of occurrence is rated as moderate.

Leptailurus serval (Serval) occurs widely through sub-Saharan Africa and is commonly recorded from most major national parks and reserves (IUCN, 2017). The Serval's status outside reserves is not certain, but they are inconspicuous and may be common in suitable habitat as they are tolerant of farming practices provided there is cover and food available. In sub-Saharan Africa, they are found in habitat with well-watered savanna long-grass environments and are particularly associated with reedbeds and other riparian vegetation types. Suitable habitat is present for this species in the project area, as such the likelihood of occurrence is rated as high.

Mystromys albicaudatus (African White-tailed Rat) is endemic to South Africa and Lesotho, where they inhabit Highveld grasslands primarily, but also Succulent Karoo and fynbos. They are often associated with calcrete soils within grasslands, and they are never found on soft, sandy substrate, rocks, wetlands or river banks. Furthermore, records from the Free State Province and Borakalalo Nature Reserve, North West Province show that they can occur in disturbed areas and in sparse grasslands (Avenant *et al.,* 2016). This species has a moderate likelihood of project area occurrence due to the type of grassland habitat present.

Otomys auratus (Southern African Vlei Rat (Grassland type)) is widely distributed throughout the Highveld grasslands and Drakensberg Escarpment of South Africa, Lesotho and Swaziland, with isolated populations found in the Soutpansberg Mountains of northern Limpopo and the Eastern Highlands of Zimbabwe. The species is associated with mesic grasslands and wetlands within alpine, montane and sub-montane regions, typically occurring in dense vegetation in close proximity to water (Taylor *et al.,* 2016). The state of the grasslands and the proximity to water means that this species has a high likelihood of project area occurrence.

Parahyaena brunnea (Brown Hyaena) is endemic to southern Africa except for a marginal extension into the arid parts of southwestern Angola. It mainly occurs in the arid countries of Namibia, Botswana, South Africa and Zimbabwe. This species remains widespread in South Africa, with high levels of occupancy recorded in the northwest regions. It is commonly found in desert and semi-desert, open scrub and open woodland savannah habitats, also showing an ability to survive close to urban areas (Yarnell *et al*., 2016). The large open grassland habitat available, and close proximity to water sources, means that the Brown Hyaena has a moderate likelihood of project area occurrence.

6.2. Field Survey

Flora

Analysis

The vegetation analysis was conducted throughout the extent of the project area. A total of 111 tree, shrub, herbaceous and graminoid plant species were recorded in the project area during the field assessment (Table 6-6). Plants listed as Category 1 alien or invasive species under the NEMBA appear in green text. Plants listed as 'not indigenous' or 'naturalised' according to NEMBA, appear in blue text.

The list of plant species recorded is by no means comprehensive, and repeated surveys during different phenological periods not covered, may likely yield up to 30% additional flora species for the project area. However, floristic analysis conducted to date is regarded as a sound representation of the local flora for the project area. Some of the plants recorded can be seen in Figure 6-10 below.

Table 6-6 Trees, shrub and herbaceous plant species recorded in the project area

Plants listed as Category 1 alien or invasive species under the NEMBA appear in green text. Plants listed as 'not indigenous' or 'naturalised' according to NEMBA, appear in blue text.

Family	*Scientific Name*	Threat Status (SANBI, 2017)	SA Endemic	Alien Category
Acanthaceae	*Crabbea angustifolia*	LC	Endemic	
Acanthaceae	*Blepharis serrulata*	LC	Not Endemic	
Agavaceae	*Chlorophytum cooperi*	LC	Not Endemic	
Aizoaceae	*Delosperma herbeum*	LC	Not Endemic	
Amaranthaceae	*Gomphrena celosioides*			Naturalized exotic
Amaryllidaceae	*Crinum graminicola*	LC	Not Endemic	
Amaryllidaceae	*Boophone disticha*	LC	Not Endemic	
Anacardiaceae	*Searsia lancea*	LC	Not Endemic	
Anacardiaceae	*Searsia pyroides var. pyroides*	LC	Not Endemic	
Asclepiadaceae	*Gomphocarpus fruticosus subsp. fruticosus*	LC	Indigenous	
Asparagaceae	*Asparagus cooperi*	LC	Not Endemic	
Asparagaceae	*Asparagus laricinus*	LC	Not Endemic	
Asphodelaceae	*Aloe greatheadii var. davyana*	LC	Not Endemic	
Asteraceae	*Conyza bonariensis*			Naturalized exotic
Asteraceae	*Dicoma anomala*	LC	Not Endemic	
Asteraceae	*Felicia muricata subsp. muricata*	LC	Not Endemic	
Asteraceae	*Helichrysum callicomum*	LC	Not Endemic	
Asteraceae	*Helichrysum rugulosum*	LC	Not Endemic	
Asteraceae	*Hilliardiella elaeagnoides*	LC	Not Endemic	
Asteraceae	*Macledium zeyheri*	LC	Not Endemic	
Asteraceae	*Nidorella anomala*	LC	Not Endemic	
Asteraceae	*Schkuhria pinnata*			Naturalized exotic
Asteraceae	*Senecio inornatus*	LC	Not Endemic	

Family	*Scientific Name*	Threat Status (SANBI, 2017)	SA Endemic	Alien Category
Asteraceae	*Tagetes minuta*			Naturalized exotic
Asteraceae	*Zinnia peruviana*			Naturalized exotic
Asteraceae	*Bidens pilosa*			Naturalized exotic weed
Asteraceae	*Helichrysum nudifolium var. nudifolium*	LC	Not Endemic	
Asteraceae	*Cirsium vulgare*			NEMBA Category 1b.
Boraginaceae	*Ehretia rigida*	LC	Endemic	
Cactaceae	*Opuntia ficus-indica*			NEMBA Category 1b.
Campanulaceae	*Wahlenbergia undulata*	LC	Not Endemic	
Cannabaceae	*Celtis africana*	LC	Not Endemic	
Caryophyllaceae	*Dianthus mooiensis subsp. kirkii*	LC	Not Endemic	
Caryophyllaceae	*Pollichia campestris*	LC	Not Endemic	
Celastraceae	*Gymnosporia buxifolia*	LC	Not Endemic	
Commelinaceae	*Commelina africana*	LC	Not Endemic	
Commelinaceae	*Commelina erecta*	LC	Not Endemic	
Commelinaceae	*Cyanotis speciosa*	LC	Not Endemic	
Convolvulaceae	*Cuscuta campestris*			Naturalized exotic
Crassulaceae	*Kalanchoe rotundifolia*	LC	Not Endemic	
Cucurbitaceae	*Cucumis zeyheri*	LC	Not Endemic	
Ebenaceae	*Diospyros austro-africana*	LC	Not Endemic	
Ebenaceae	*Euclea crispa*	LC	Not Endemic	
Fabaceae	*Chamaecrista mimosoides*	LC	Not Endemic	
Fabaceae	*Elephantorrhiza elephantina*	LC	Not Endemic	
Fabaceae	*Senegalia caffra*	LC	Not Endemic	
Fabaceae	*Vachellia erioloba*	LC-Protected Tree	Not Endemic	
Fabaceae	*Vachellia hebeclada subsp. hebeclada*	LC	Not Endemic	

Family	*Scientific Name*	Threat Status (SANBI, 2017)	SA Endemic	Alien Category
Fabaceae	*Vachellia karroo*	LC	Not Endemic	
Fabaceae	*Vachellia karroo*	LC	Not Endemic	
Fabaceae	*Vachellia robusta subsp. robusta*	LC	Not Endemic	
Hyacinthaceae	*Ledebouria luteola*	LC	Not Endemic	
Hyacinthaceae	*Ledebouria marginata*	LC	Not Endemic	
Hypoxidaceae	*Hypoxis acuminata*	LC	Not Endemic	
Hypoxidaceae	*Hypoxis hemerocallidea*	LC	Not Endemic	
Hypoxidaceae	*Hypoxis rigidula*	LC	Not Endemic	
Iridaceae	*Gladiolus permeabilis*	LC	Endemic	
Lamiaceae	*Leonotis pentadentate*	LC	Not Endemic	
Lamiaceae	*Salvia disermas*	LC	Not Endemic	
Malvaceae	*Grewia flava*	LC	Not Endemic	
Malvaceae	*Hermannia depressa*	LC	Not Endemic	
Malvaceae	*Hermannia grandistipula*	LC	Not Endemic	
Malvaceae	*Sida rhombifolia subsp. rhombifolia*	LC	Not Endemic	
Malvaceae	*Triumfetta sonderi*	LC	Not Endemic	
Malvaceae	*Hibiscus pusillus*	LC	Not Endemic	
Myrtaceae	*Eucalyptus camaldulensis*			NEMBA Category 1b
Orobanchaceae	*Striga elegans*	LC	Not Endemic	
Pedaliaceae	*Harpagophytum procumbens*	LC	Not Endemic	
Poaceae	*Andropogon chinensis*	LC	Not Endemic	
Poaceae	*Aristida adscensionis*	LC	Not Endemic	
Poaceae	*Aristida canescens subsp. canescens*	LC	Not Endemic	
Poaceae	*Aristida congesta subsp. barbicollis*	LC	Not Endemic	
Poaceae	*Aristida congesta subsp. congesta*	LC	Not Endemic	

Family	*Scientific Name*	Threat Status (SANBI, 2017)	SA Endemic	Alien Category
Poaceae	*Bewsia biflora*	LC	Not Endemic	
Poaceae	*Brachiaria serrata*	LC	Not Endemic	
Poaceae	*Cymbopogon caesius*	LC	Not Endemic	
Poaceae	*Cynodon dactylon*	LC	Not Endemic	
Poaceae	*Digitaria eriantha*	LC	Not Endemic	
Poaceae	*Elionurus muticus*	LC	Not Endemic	
Poaceae	*Eragrostis chloromelas*	LC	Not Endemic	
Poaceae	*Eragrostis curvula*	LC	Not Endemic	
Poaceae	*Eragrostis gummiflua*	LC	Not Endemic	
Poaceae	*Eragrostis rigidior*	LC	Not Endemic	
Poaceae	*Eragrostis superba*	LC	Not Endemic	
Poaceae	*Fingerhuthia africana*	LC	Not Endemic	
Poaceae	*Heteropogon contortus*	LC	Not Endemic	
Poaceae	*Hyparrhenia hirta*	LC	Not Endemic	
Poaceae	*Hyperthelia dissoluta*	LC	Not Endemic	
Poaceae	*Leersia hexandra*	LC	Not Endemic	
Poaceae	*Melinis repens*	LC	Not Endemic	
Poaceae	*Melinis repens*	LC	Not Endemic	
Poaceae	*Microchloa caffra*	LC	Not Endemic	
Poaceae	*Pogonarthria squarrosa*	LC	Not Endemic	
Poaceae	*Schizachyrium sanguineum*	LC	Not Endemic	
Poaceae	*Setaria sphacelata var. sphacelata*	LC	Not Endemic	
Poaceae	*Sporobolus africanus*	LC	Not Endemic	
Poaceae	*Themeda triandra*	LC	Not Endemic	
Poaceae	*Trachypogon spicatus*	LC	Not Endemic	

Family	*Scientific Name*	Threat Status (SANBI, 2017)	SA Endemic	Alien Category
Poaceae	*Trichoneura grandiglumis*	LC	Not Endemic	
Poaceae	*Tristachya leucothrix*	LC	Not Endemic	
Poaceae	*Paspalum dilatatum*	LC	Indigenous	
Polygalaceae	*Polygala leptophylla var. leptophylla*	LC	Not Endemic	
Rhamnaceae	*Ziziphus mucronata subsp. mucronata*	LC	Not Endemic	
Rhamnaceae	*Ziziphus zeyheriana*	LC	Not Endemic	
Rubiaceae	*Oldenlandia herbacea*	LC	Not Endemic	
Solanaceae	*Datura ferox*			NEMBA Category 1b.
Solanaceae	*Solanum campylacanthum*	LC	Not Endemic	
Solanaceae	*Solanum lichtensteinii*	LC	Not Endemic	
Typhaceae	*Typha capensis*	LC	Not Endemic	
Verbenaceae	*Lippia scaberrima*	LC	Not Endemic	
Verbenaceae	*Verbena bonariensis*			NEMBA Category 1b.

Figure 6-10 ***Some of the plant species recorded in and around the project area: A) Senecio inornatus, B) Boophone disticha, C) Crabbea angustifolia, D) Harpagophytum procumbens, E) Delosperma herbeum and F) Gladiolus permeabilis.***

Invasive Alien Plants

Invasive Alien Plants (IAPs) tend to dominate or replace indigenous flora, thereby transforming the structure, composition and functioning of ecosystems. Therefore, it is important that these plants are controlled by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species.

NEMBA is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the NEMBA. The Alien and Invasive Species Regulations were published in the Government Gazette No. 44182, 24th of February 2021. The legislation calls for the removal and / or control of IAP species (Category 1 species). In addition, unless authorised thereto in terms of the NWA, no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse. Below is a brief explanation of the three categories in terms of the NEMBA:

- *Category 1a*: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- *Category 1b*: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- *Category 2*: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- *Category 3*: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Note that according to the Alien and Invasive Species Regulations, a person who has under his or her control a category 1b listed invasive species must immediately:

- Notify the competent authority in writing
- Take steps to manage the listed invasive species in compliance with:
    - Section 75 of the NEMBA;
    - The relevant invasive species management programme developed in terms of regulation 4; and
    - Any directive issued in terms of section 73(3) of the NEMBA.

Four IAP species were recorded within the project area. These species are listed under the Alien and Invasive Species List 2021, Government Gazette No. 44182 as Category 1b. Category 1b species must be controlled by implementing an IAP Management Programme, in compliance of section 75 of the NEMBA, as stated above.

Floral Species of Concern

During the field assessment one species of protected trees was observed: *Vachellia erioloba* (Camel Thorn), protected by the List of Protected Tree Species under the National Forests Act, 1998 (Act No. 84 of 1998) (NFA). In terms of the NFA, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a

licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. Contravention of this declaration is regarded as a first category offence. Numerous Camel thorn trees occurred naturally spaced throughout the area (not to be confused with the *Vachellia robusta* found in between). The locations of the Camel thorn (marked) are shown in Figure 6-11. An example of the trees observed can be seen in Figure 6-12. The information provides an overview of the presence of protected trees recorded and is not a representation of the total number of specimens present for the site. A detailed population survey should be completed prior to the commencement of the project to inform the necessary permit application and whether or not an offset strategy is required.

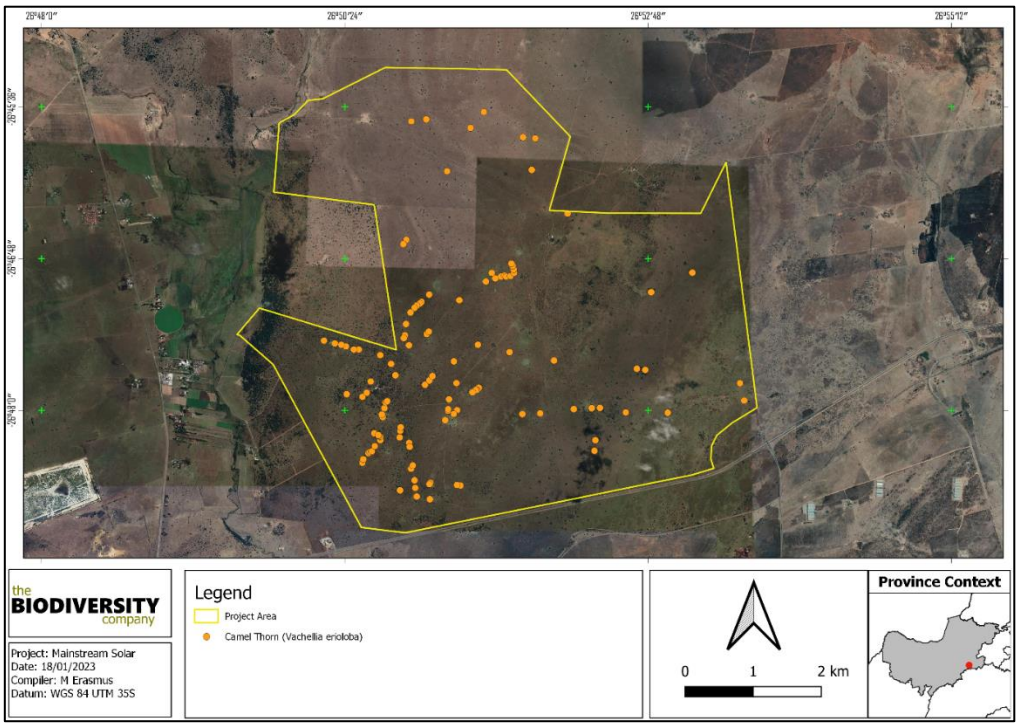


Figure 6-11 The location of Camel Thorn trees observed on-site

Note that not all Camel Thorn trees are indicated on the map.

Figure 6-12 Photograph illustrating some of the Camel Thorns observed in the project area

Fauna

Herpetofauna and mammal observations and recordings are addressed in this section.

Amphibians and Reptiles

Five reptile and three amphibian species were recorded in the project area during the survey. Surveys relied on opportunistic sightings as opposed to intensive and appropriate sampling methods. The only other method utilised was refuge examinations using visual scanning of terrains to record smaller herpetofauna species that often conceal themselves under rocks, in fallen logs, rotten tree stumps, in leaf litter, rodent burrows, ponds, old termite mounds, this method was also not intensively applied in the field. None of the herpetofauna species recorded are regarded as threatened.

The use of the rocky outcrops in the project area by some of these species on the fine-scale habitats is important to consider for mitigation actions when an area is cleared for placement of the infrastructure.

Table 6-7 Summary of herpetofauna species recorded within the project area.

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Amphibians			
Amietia fuscigula	Common River Frog	LC	LC
Cacosternum boettgeri	Common Caco	LC	LC
Kassina senegalensis	Bubbling Kassina	LC	LC
Reptiles			
Acanthocercus atricollis	Southern Tree Agama	LC	LC
Lygodactylus capensis	Cape dwarf gecko	LC	LC
Trachylepis punctatissima	Speckled Rock Skink	LC	LC
Pachydactylus capensis	Cape Gecko	LC	Unlisted
Pelomedusa galeata	South African Marsh Terrapin	Not evaluated	Unlisted

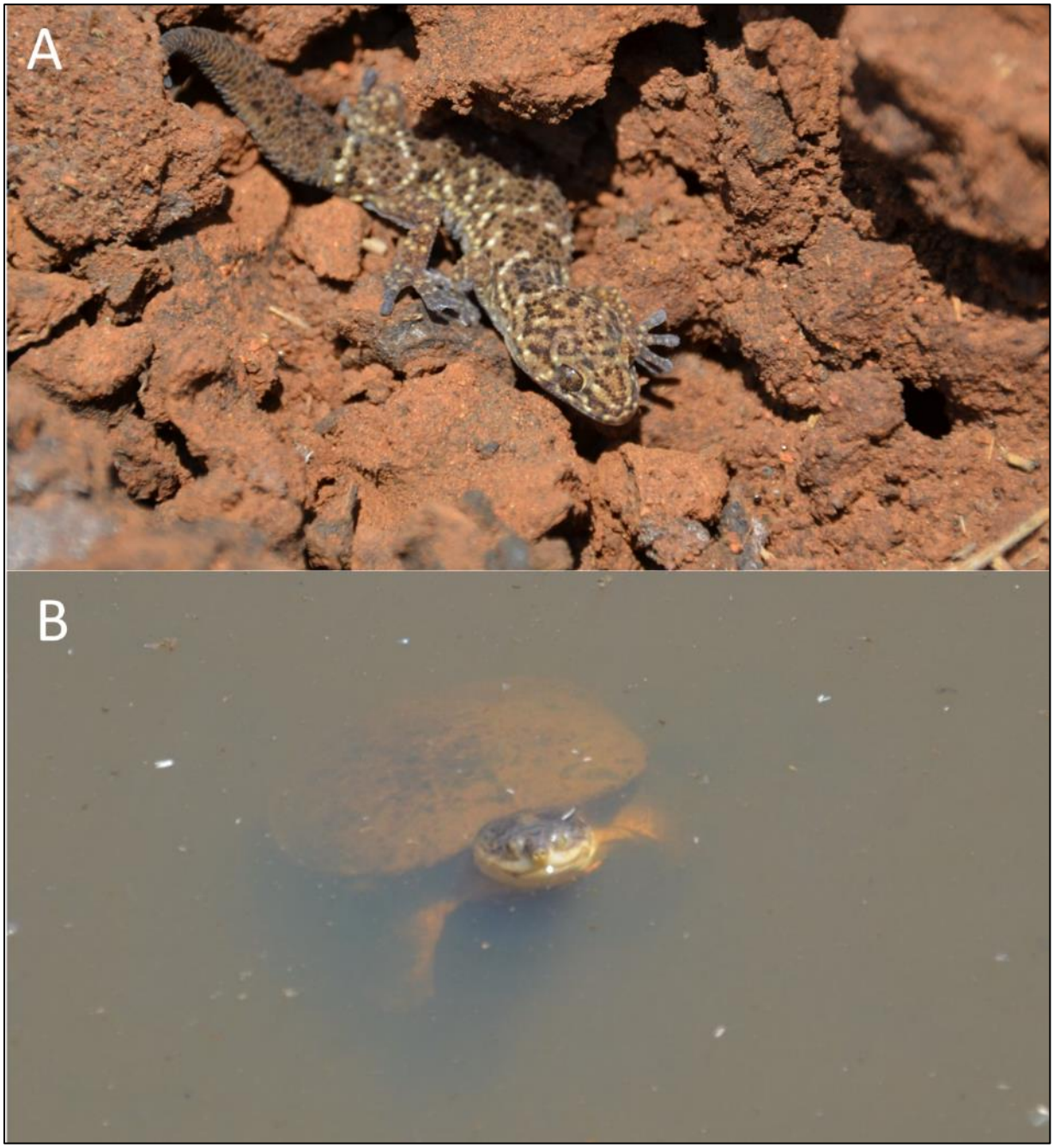


Figure 6-13 ***Some of the reptile species recorded in and around the project area: A) Cape Gecko (Pachydactylus capensis), B) South African Marsh Terrapin (Pelomedusa galeata)***

Mammals

Seventeen mammal species were observed that could naturally occur outside of protected areas, while an additional eight species are expected, however mainly found restricted to protected areas/game farms as 'captive' species (Table 6-8). These observations were based on either direct observation or the presence of visual tracks and signs (Figure 7-1). One of the species recorded are regarded as an SCC (IUCN), namely Plains Zebra, however this species is regarded as a 'captive' species

The use of the rocky outcrops in the project area by some of these species on the fine-scale habitats is important to consider for mitigation actions when an area is cleared for placement of the infrastructure. Where feasible/possible, these habitats should be retained although it is not considered a no-go area for PV development.

Table 6-8 Summary of mammal species recorded within the project area

Mammal species are considered 'captive' species as these were only present within the game farm areas, marked in green text.

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Aepyceros melampus	Impala	LC	LC
Alcelaphus buselaphus caama	Red Hartebeest	LC	LC
Antidorcas marsupialis	Springbok	LC	LC
Canis mesomelas	Black-backed Jackal	LC	LC
Chlorocebus pygerythrus	Vervet Monkey	LC	LC
Connochaetes taurinus	Blue Wildebeest	LC	LC
Cryptomys hottentotus	Southern African Mole-rat	LC	LC
Cynictis penicillata	Yellow Mongoose	LC	LC
Damaliscus pygargus	Blesbok	LC	LC
Equus quagga	Plains Zebra	LC	NT
Herpestes sanguineus	Slender Mongoose	LC	LC
Hystrix africaeaustralis	Cape Porcupine	LC	LC
Kobus ellipsiprymnus	Common Waterbuck	LC	LC
Lepus saxatilis	Scrub Hare	LC	LC
Micaelamys namaquensis	Namaqua Rock Mouse	LC	LC
Oryx gazella	Gemsbok	LC	LC
Phacochoerus africanus	Common Warthog	LC	LC
Procavia capensis	Cape Rock Hyrax	LC	LC
Proteles cristata	Aardwolf	LC	LC
Raphicerus campestris	Steenbok	LC	LC
Suricata suricatta	Meerkat	LC	LC
Sylvicapra grimmia	Common Duiker	LC	LC
Tragelaphus oryx	Common Eland	LC	LC
Tragelaphus strepsiceros	Greater Kudu	LC	LC
Xerus inauris	South African Ground Squirrel	LC	LC

7. Habitat Assessment Site Ecological Importance

7.1. Habitats Observed

This section pertains to the overall habitat delineations that were assigned following the desktop assessment and field survey. For the fine-scale habitat assessment and corresponding Site Ecological Importance pertaining to the project – refer to Appendix A.

The main habitat types identified across the project area were initially identified largely based on aerial imagery. These main habitat types were refined based on the field coverage and data collected during the survey; the delineated habitats can be seen in Figure 7-2. Emphasis was placed on limiting timed meander searches within the natural habitats, i.e., habitats with a higher potential of hosting SCC.

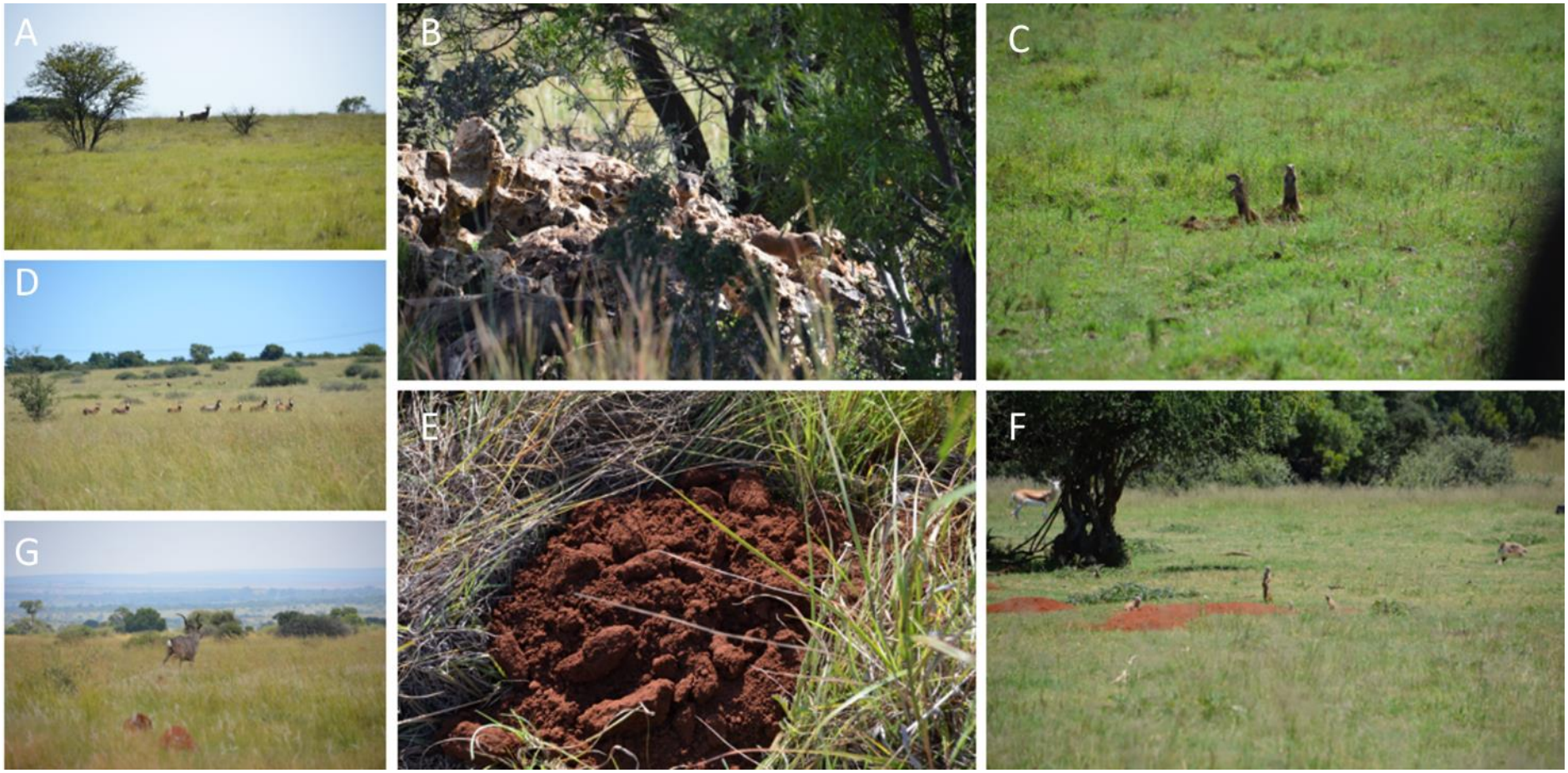


Figure 7-1 ***Some of the mammal species recorded in the project area, A) Red Hartebeest (Alcelaphus buselaphus caama), B) Cape Rock Hyrax (Procavia capensis) , C) South African Ground Squirrel(Xerus inauris), D) Blesbok (Damaliscus pygargus), E) Southern African Mole-rat (Cryptomys hottentotus) , F) Meerkat (Suricata suricatta) & Springbok (Antidorcas marsupialis) and G) Greater Kudu (Tragelaphus strepsiceros)***

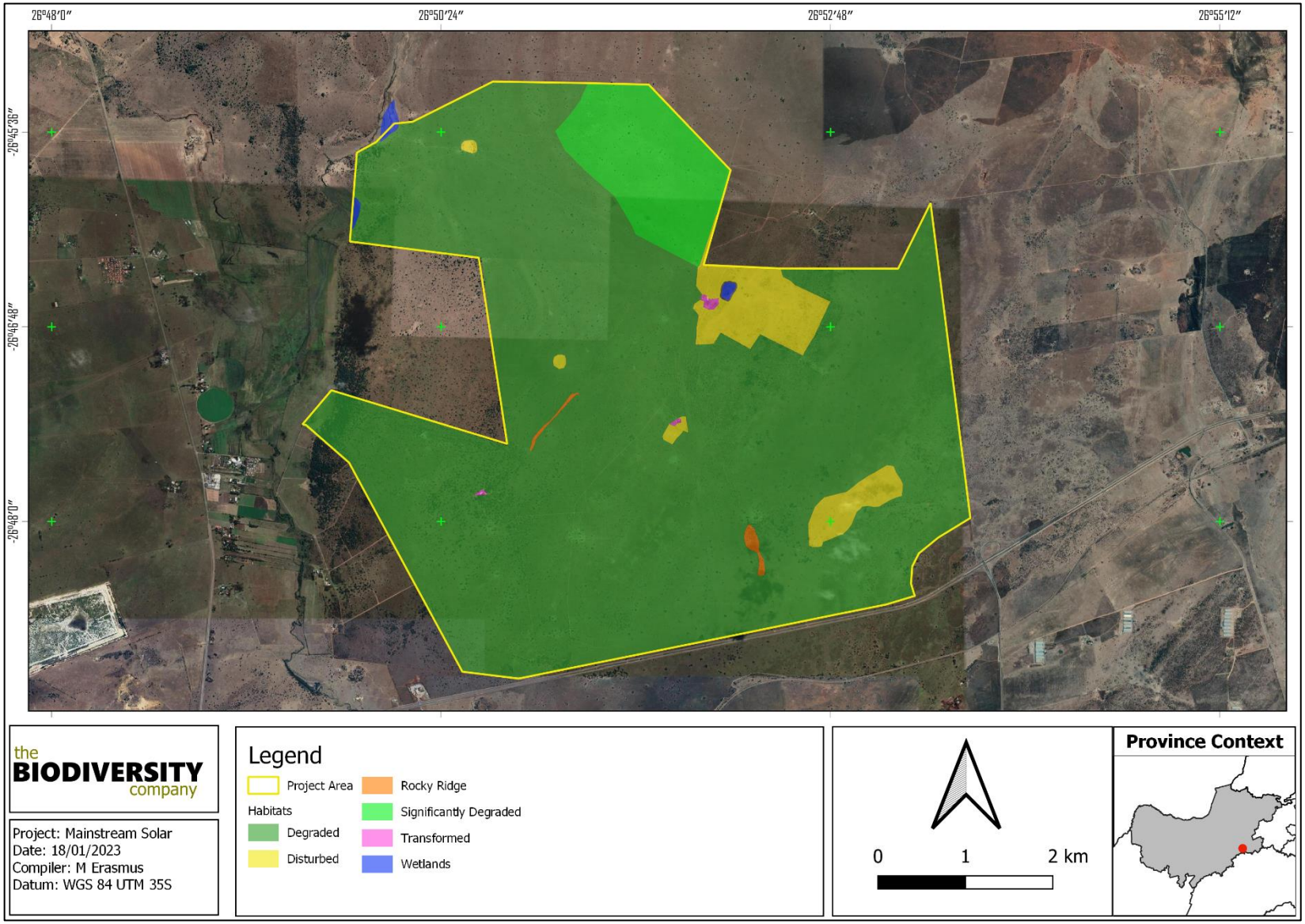


Figure 7-2 Habitats identified in the overall project area of interest

Degraded habitat

This habitat type is regarded as degraded or semi-natural, it is the remainder of the habitat that has not been as disturbed by recent and historic grazing and is used as game farm area. This habitat represents an amalgamation of grassland-woodland vegetation resulting in a complex and slightly undulating landscape dissected by prominent rocky ridges as well as areas with dolomite extrusions in certain areas. Areas where more woody vegetation is found have deeper soils, whereas rocky/dolomite areas were occupied by shrubs and herbaceous plants and grasses.

The current ecological condition of this habitat, with regards to the main driving forces, are intact, which is evident in the amount and importance of the species recorded in the faunal assessment and the high species diversity and number of plant species recorded. Current human infringement occurs, especially in areas close to roads, however it is limited due to the current land use being a game farm.

The difference between this habitat and the significantly degraded habitat is the extent of the grazing, which is more severe in the latter. The unit acts as remaining natural areas which supports viable plant species populations and is also used for foraging. The unit also serves as a movement corridor for fauna within the landscape. Figure 7-3 and Figure 7-4 below shows examples of this habitat type.

Figure 7-3 Example of degraded habitat from the project area, with more woody plants

Figure 7-4 Exposed rock/dolomite are very common throughout the site, with more shrubs and herbaceous plants

Disturbed Habitat

This area has been significantly disturbed and modified from its natural state, it represents habitat that is more disturbed than the 'degraded habitat' area, but not as disturbed as the 'transformed' area. This habitat is linked to areas that have been impacted more by historic overgrazing (waterpoints), mismanagement and land use (historic agriculture).

These habitats are not entirely transformed but exist in a constant disturbed state, as it cannot recover to a more natural state due to ongoing disturbances and impacts it receives from grazing and mismanagement. These areas are considered to have a low sensitivity as they may be used as a movement corridor and in many cases form a barrier between the more degraded bushveld and the transformed areas. (Figure 7-5)

Figure 7-5 The disturbed habitat that is an old agricultural field.

Rocky Habitats

This habitat occurs in small portions within the area and consists of rocky outcrops made up of bedrock protruding from the soil layer with the associated boulders and large rocks. The habitat is used by faunal species as fine-scale habitats and is sensitive, so avoidance mitigation must be considered when these areas may be cleared for placement of the infrastructure. Figure 7-6 shows an example of rocky areas from the project area. Where feasible/possible, these habitats should be retained although it is not considered a no-go area for PV development.

Figure 7-6 A typical example the rocky area habitat from the project area.

Transformed

The transformed areas have little to no remaining natural vegetation due to land transformation by historic infrastructure such as homesteads. These habitats exist in a constant disturbed state as it cannot recover to a more natural state due to ongoing disturbances and impacts it receives.

Wetlands

Wetlands are identified in the wetland report (TBC, 2022). Even though somewhat disturbed, the ecological integrity, importance and functioning of these areas play a crucial role as a water resource system. The preservation of this system is the most important aspect to consider for the proposed development. This habitat needs to be conserved.

Figure 7-7 An example the wetland habitat from the project area.

Present Impacts to Biodiversity

Considering the anthropogenic activities and influences within the landscape, several existing negative impacts on biodiversity were observed within the project area. The impacts were limited and sparse throughout, especially within the degraded habitat. These include:

Past agriculture;

- Clearance of vegetation;
- Farm roads;
- Presence of Alien and/or Invasive Plants (IAP);
- Powerlines;
- Poaching; and
- Fences and associated maintenance.

Figure 7-8 Some of the impacts observed in the project area; A) Wood harvesting, B) Alien invasive species, C) Livestock and D) Powerlines and fences

7.2. Site Ecological Importance

As per the terms of reference for the project, GIS sensitivity maps are required in order to identify sensitive features in terms of the relevant specialist discipline/s within the project area. Based on the criteria provided in Section 4.4 of this report, all habitats within the assessment area of the proposed project were assigned a sensitivity category (Table 7-1). The location and extent of these habitats are illustrated in Figure 7-9. The guidelines for interpreting Site Ecological Importance (SEI) in the context of the development activities can be seen in Table 7 2.

High Sensitivity areas are due to the following and the SEI guidelines can be seen in Table 7-2:

- ESA 1;
- The size (or extent) of each project component; and
- Unique, important (water resource) and low resilience habitats.

Table 7-1 Summary of habitat types delineated within the field assessment area of the project area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Degraded Habitat	Medium 50% of receptor contains natural habitat with potential to support SCC	High Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type. Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts, with no signs of major past disturbance and good rehabilitation potential.	Medium	Low As a result of the low rainfall (MAP 593 mm) in the area, vegetation will not easily be able to recover. This is also true for the seed germination of these species. The habitat is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore. The dolomite habitat, if disturbed won't be able to naturally recover.	High
Rocky Habitat	Medium Confirmed or highly likely occurrence of populations of NT species	Medium (> 5 ha but < 20 ha) semi-intact area; Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity	Medium	Very Low Ridges provide habitat for a wide variety of species. The vegetation found on rocky ridges is unique and highly susceptible to change and disturbance. Disturbance to the vegetation/habitat is unlikely to recover.	High
Wetland	Low The wetland study has determined the ecological significance of the system to be low.	Low The wetland study has determined the overall functionally of the system to be low.	Low	Very Low The system is unique to the catchment and cannot (easily) be re-created for the area if lost or disturbed.	Medium
Significantly degraded	Medium	Low	Low	Low	Medium
Disturbed	Low	Low	Low	Medium	Low
Transformed	Low	Very Low	Very Low	Medium	Very Low

Table 7-2 Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities

Site Ecological Importance	Interpretation in relation to development activities
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

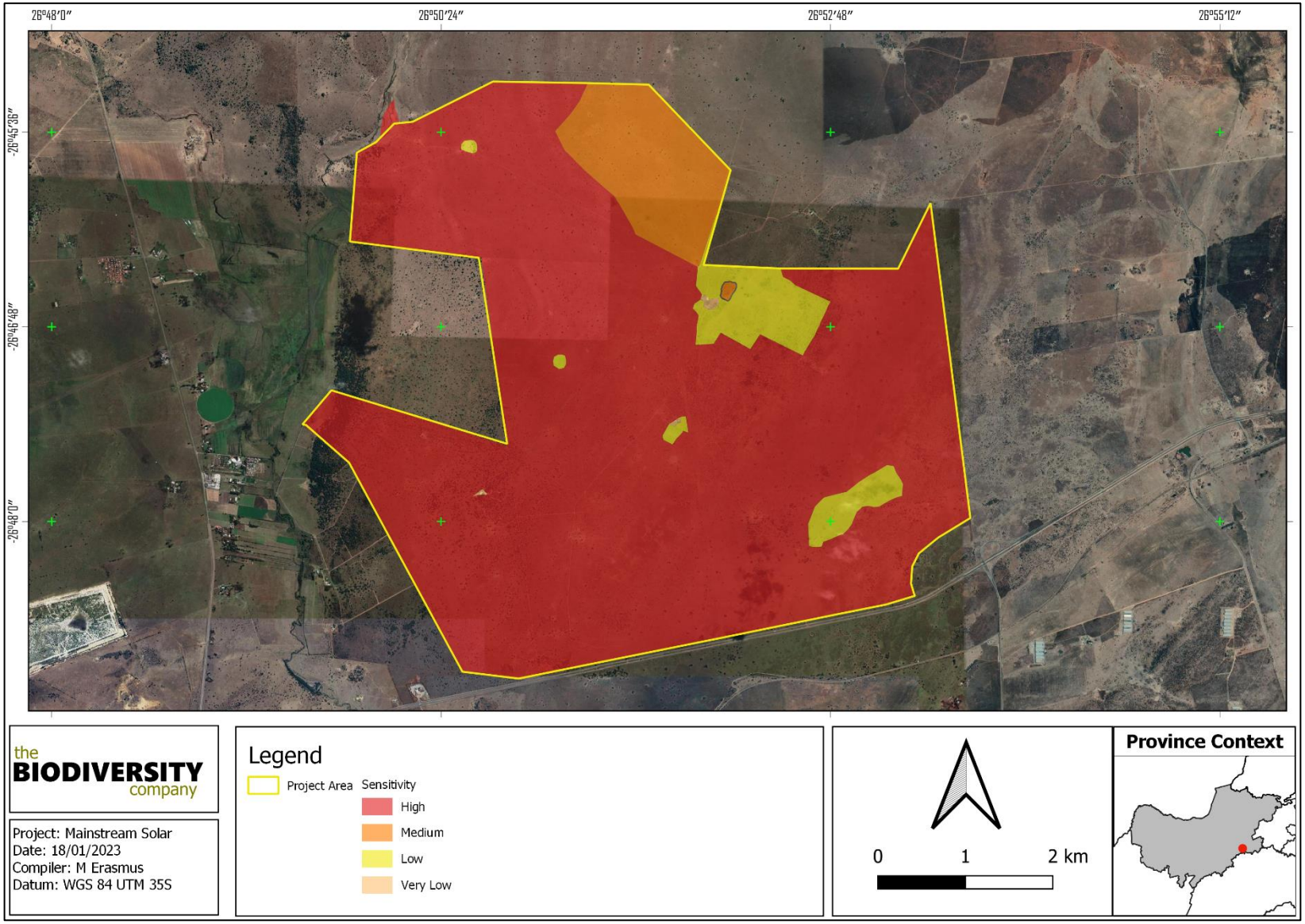


Figure 7-9 Ecological sensitivities in the Stilfontein Cluster project area

8. Impact Risk Assessment

8.1. PV Project

Impacts pertaining to the terrestrial ecology associated with the PVs and associated on-site substations in the project area are summarised below. **Project-specific impact ratings and recommended mitigation measures for the project can be found in Appendix A**.

Potential impacts were evaluated against the baseline. Impacts associated with the development are rated based on the prescribed impact assessment methodology provided by SRK.

Alternatives considered

As per the provided project description, vegetation in and near the solar arrays, transmission line servitude and substation will be trimmed, and shrubs and trees will be removed to ensure sufficient space to place solar arrays and clearance between vegetation and the transmission line. The preparation of the substrate beneath solar arrays depends on the panel technology alternative that is implemented (both are assessed):

- Panel Technology One (monofacial panels): Retain vegetative (grass) ground cover, shrubs and trees will be removed; and
- Panel Technology Two (bifacial panels): Remove vegetation and place white gravel underneath panels.

Two alternative locations are identified for each substation from which a preferred location will be selected.

Description of Impacts

The impacts are discussed for both alternatives, however, due to the retaining of grass cover for Panel Technology One, some impacts will either be more limited or absent for this alternative. The impacts are also considered for the substations.

During **construction**, the proposed project will require partial vegetation clearance and some soil stripping for the PVs and all other infrastructure including new access roads, substations and laydown areas. The removal of vegetation will result in a reduction in extent of available habitat, and also create fragmented communities/ ecosystems. The removal of topsoil in areas where access roads and infrastructure foundations will be required will result in the removal of a seedbank for the area, and the exposed areas will become more susceptible to wind and run-off erosion.

The disruption in natural areas of phytomass, the disturbance of soil and the potential introduction of exotic species due to movements will increase the potential for the establishment of alien and invasive vegetation. The loss/removal of vegetation and infestation of alien vegetation has the potential to result in the destruction, further loss and fragmentation of the vegetation community/ ecosystems.

Due to a larger area of vegetation being cleared for Panel technology Two, a larger (cumulative) area will be disturbed and indigenous vegetation cleared, this will increase the potential of alien vegetation to become established on the periphery of these cleared areas.

The removal of vegetation will result in the direct loss of habitat forcing fauna to move into adjacent areas, which could result in over-population of selected habitats, and more competition for natural resources by faunal species. This will cause further disruption to faunal population structures by interfering with their movements and/or breeding activities. Direct mortalities or potential injury could result from collisions with earth moving or transport vehicles and increased traffic as a result of the project. An increase in traffic in the area, and the increase in potential encounters by fauna with vehicles due to new roads/parking areas increases the probability for mortalities or injury caused to fauna. The necessary movement of contractors to areas adjacent to (and beyond) the project area must be

regulated. Unauthorised access to these areas increases the likelihood of poaching of species in what was previously seen as secluded habitat for fauna species. The (new) introduction of diseases and feral species such as cats and dogs to the area is unlikely due to the proximity of the project area to adjacent settlements and nearby homesteads.

During the **operational phase** daily vehicle activities entering/exiting the project area are anticipated to further spread the alien invasive plants, which can lead to the deterioration of the habitats caused by 'edge effects'. It is also likely that bare areas and dirt roads will also be a source for dust, contributing impacts to the local habitats.

Due to the vegetation communities that were cleared within the footprint area during the construction phase, now being entirely transformed (Panel Technology Two), indirect impacts to the surrounding vegetation communities and ecosystems as a result of edge effects have been considered. The edges of the PVs, servitudes as well as the areas directly adjacent to the infrastructure will likely be degraded by impacts such as dust (reduces the effectiveness of photosynthesis and pollination) and alien vegetation encroachment will become a concern in these disturbed areas.

Ongoing sensory disturbance during operation (noise, light, traffic, dust, pollution) may cause fauna to emigrate from the area (however limited). The area may be impacted by poaching, mortality, litter and introduction of diseases and feral species such as cats, vermin and dogs due to the increase in human presence as the operations continue. Sensory impacts from, light and noise will further disrupt lifecycles and ultimately continue to displace the faunal community.

The **decommissioning phase** refers to impacts at the end of the project lifecycle when removal of pertinent surface infrastructure and the closing of areas commences. Scaling down of activities ahead of temporary or permanent closure, cessation of energy generation/transmission is initiated. During this phase, the operational phase impacts will persist until of the activity reduces and the rehabilitation measures are implemented. Impacts regarding this phase may be detrimental but could be beneficial to the vegetation communities/ ecosystems in the long term, this is dependent on the extent and effort of the rehabilitation measures. Removal of all infrastructure is required to enable the recovery of vegetation communities/ ecosystems within the footprint area. The recovery of the area will also re-create habitat suitable for fauna, allowing the faunal communities to re-establish in rehabilitated areas. Due to the already transformed state to the area, the potential of further impacting the vegetation community/ecosystem directly is unlikely.

Construction Phase

This phase refers to the period when the proposed features are constructed and is considered to have the largest direct impact on biodiversity.

The following potential impacts to terrestrial biodiversity were considered:

- Destruction, further loss and fragmentation of habitats, ecosystems (ESA areas) and vegetation community, including protected species;
- Spread and/or establishment of alien and/or invasive species;
- Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration, fencing and poaching); and
- Dust generation from construction activities.

The impact significance of construction activities, concerning the alternatives as well as pre-and post-mitigation, will mainly differ in regard to **intensity** and **duration** of the impact. The impact significance can be seen in the impact tables provided in Appendix A.

Retaining the vegetation (Panel Technology One) as well as mitigation efforts such as minimising and demarcating the construction footprint to limit the extent of the disturbance, will reduce the impacts to an acceptable low level.

Panel Technology Two may also be considered but requires more extensive mitigation, such as limiting dust generation and implementing progressive rehabilitation and IAP control, to reduce the impacts to an acceptable low level.

Operational Phase

Activities during the operational phase are anticipated to further spread the alien invasive plants, primarily due to the entry/exit of vehicles to the project area from elsewhere. The access road can also be a source for dust, caused both by wind and also vehicle driving activity. The establishment of alien vegetation and dust generation can lead to the deterioration of habitat quality. Dust reduces the ability of plants to photosynthesize and thus leads to degradation/retrogression of the veld.

The following potential impacts were considered:

- Continued fragmentation and degradation of habitats, ecosystems and ESA areas;
- Spread of alien and/or invasive species;
- Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, noise, dust, fencing and poaching).

The impact of dust suppression is insignificant on the understanding that water will be used to clean the PV panels.

The impact significance of operational activities, concerning the alternatives as well as pre-and post-mitigation, will mainly differ in regard to **intensity** and **duration** of the impact. The impact significance can be seen in the impact tables provided in Appendix A.

Choosing to retain the vegetation (Panel Technology One) will allow maintaining habitat connectivity to some extent. Additional mitigation efforts such as the implementation of an alien vegetation management plan, controlling waste and edge effect impacts as well as limiting infringement, will further reduce the impacts to an acceptable low level.

Panel Technology Two requires more extensive post-construction mitigation efforts, such as rehabilitation and IAP control.

Decommissioning Phase

During this phase, the installations of the solar plant will be removed ahead of permanent closure of the facility. During this phase, the operational phase impacts will persist until the activity reduces and the rehabilitation measures are implemented.

The following potential impacts were considered:

- Continued fragmentation and degradation of habitats and ecosystems; and
- Spread of alien and/or invasive species.

The impact significance of decommissioning activities, concerning the alternatives as well as pre-and post-mitigation, will mainly differ in regard to **intensity** and **duration** of the impact. The impact significance can be seen in the impact tables provided in Appendix A.

Retaining the vegetation for Panel Technology One will facilitate the rehabilitation and recovery of the area. The reduced extent required for rehabilitation, and the connectivity with intact habitats will facilitate

the recovery of the area. Mitigation measures must include measures to avoid unnecessary clearance of vegetated areas.

Panel Technology Two requires more intensive rehabilitation and management to achieve an acceptable residual level of impact.

8.2. Mitigation Measures[3]

The following mitigation measures are applicable to the different technology alternatives. However, the level of effort to implement these measures and the associated extent, particularly in regards to vegetation rehabilitation, would be higher for Panel Technology Two. The following measures must be incorporated into the EMPr:

- Do not clear areas of indigenous vegetation outside of the direct project footprint;
- Minimise vegetation clearing to the minimum required. Areas should be cleared and disturbed on a needs basis only, as opposed to clearing and disturbing a number of sites simultaneously;
- Demarcate work areas during the construction phase to avoid affecting outside areas. Use physical barriers e.g., safety tape, not painted lines, and use signage;
- Collect and dump waste only in designated areas;
- Use hand cutting for vegetation clearing and avoid heavy machinery, as far as possible;
- Use existing access routes and paths wherever possible;
- Avoid the disturbance or destruction of Rocky habitat, as far as possible;
- Existing roads/servitudes should be considered first option over the construction of new roads/servitudes and must only be made where necessary;
- Any holes/deep excavations must be done in a progressive manner on a needs basis only. No holes/excavations may be left open overnight. In the event holes/excavations are required to remain open overnight, these areas must be covered to prevent fauna falling into these areas;
- Where possible, work should be restricted to one area at a time and be systematic. This is to reduce the number and extent of on-site activities, allowing fauna to move off as the project progresses. This will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories;
- Prior to vegetation clearing activities, the area to be cleared should be walked on foot by 1-2 individuals to create a disturbance in order for fauna to move off. Sites should be disturbed only prior to the area having to be cleared, not more than 1 day in advance;
- Limit construction of new roads as much as possible;
- Minimise the number (and size) of laydown, storage and staff facilities for the duration of the project;
- Consult a fire expert and compile and implement a fire management plan to minimise the risk of veld fires around the project site;
- Compile and implement a rehabilitation plan from the onset of the project. Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank. Surplus rehabilitation material can be applied to others in need of stabilisation and vegetation cover;
- Rehabilitate areas as soon as they are no longer impacted by construction;

[3] Mitigation measures for the overall project as a whole, including general best practice.

- Ensure that all remaining construction materials are removed from the project area once the construction phase ends;
- Use preferably prefabricated buildings or those constructed of re-usable/recyclable materials;
- Ensure that staff do not bring onto or remove from the site any plants, to prevent the spread of exotic or invasive species or the illegal collection of plants;
- Store topsoil stockpiles on flat ground with minimal run-off and use bunds and/or other stabilisation methods (e.g., netting) if required to avoid erosion;
- Obtain relocation or destruction permits before any protected trees (*Vachellia erioloba*) are destroyed, if destruction cannot be avoided;
    - In situations where the protected plants must be removed, the proponent may only do so after the required permission/permits have been obtained in accordance with national legislation. In the abovementioned situation the development of a search, rescue and recovery program is suggested for the protection of these species.
- Provide Environmental Awareness Training to all personnel and contractors. A signed register of attendance must be kept for proof. The training must include:
    - Sensitive environmental receptors within the project area;
    - Management requirements in the Environmental Authorisation and the EMPr;
    - How to deal with any fauna species encountered during the construction process;
- Compile and implement a hydrocarbon spill management plan;
- Compile and implement an alien vegetation management plan from the onset of construction. The plan must identify areas for action (if any) and prescribe the necessary removal methods and frequencies to be applied. This plan must be also prescribe a monitoring plan and be updated as/when new data is collated;
- It should be made an offence for any staff to take/bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants
- Implement a waste management plan, this plan must be also prescribe a monitoring plan and be updated as/when new data is collated. Waste management must be a priority and all waste must be collected, stored and disposed of adequately. It is recommended that all waste be removed from site on a weekly basis (as a minimum) to prevent rodents and pests entering the site;
- Refuse bins must be emptied regularly and secured;
- Temporary storage of domestic waste shall be in covered waste skips; and
- Maximum domestic waste storage period will be 7 days.
- A pest control plan must be put in place and implemented; it is imperative that poisons not be used;
- The timing between clearing of an area and subsequent development must be minimized to avoid fauna from re-entering the site to be disturbed;
- Minimise traffic of the road during the night;
- Limiting the closure and rehabilitation activities to the footprint areas only. Avoid entry/access to previously undisturbed or already rehabilitated areas;
- The rehabilitated areas must be revegetated with indigenous vegetation;

- Areas other than the footprint areas and existing surface infrastructure areas, should be declared as 'no-go' areas to vehicles (only). All essential operational staff - machinery must be limited to development area (no need to go outside the authorised area);
- Prohibit the intentional killing, trapping or poisoning of any animals on-site, including snakes, lizards, birds or other animals;
- Outside lighting should be designed and limited to minimize impacts on fauna. Lighting fixtures should be fitted with baffles, hoods or louvres and directed downward. Outside lighting should be directed away from highly sensitive areas such as the wetland. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (yellow) lights should be used wherever possible;
- Where feasible, motion detection lighting must be used to minimise the unnecessary illumination of areas;
- Minimise traffic and the use of vehicle lights of road during the night;
- Noise must be kept to a minimum from dusk to dawn to minimize all possible disturbances to amphibian species and nocturnal mammals;
- Speed limits must be enforced to ensure that road killings and erosion is limited;
- Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas;
- Reduce the dust generated by operational vehicles and earth moving machinery, through wetting the soil surface (with “dirty water”) and putting up signs to enforce speed limits to enforce reduced speeds; and
- No non-environmentally friendly dust suppressants may be used as this could result in pollution of water sources.

8.3. Cumulative Impact Assessment

The impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation this provides a good method of assessing a project’s impact. However, in areas where baselines have already been affected, or where future development will continue to add to the impacts in an area or region, it is appropriate to consider the cumulative effects of development. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a point in time may represent a significant change from the original state of the system. This section describes the potential impacts of the project that are cumulative for fauna and flora.

Localised cumulative impacts include the cumulative effects of the whole Stilfontein development together; other developments in the area that are close enough to potentially cause additive effects on the environment or sensitive receivers (such as nearby renewable energy or PV activities within the area) (Table 8-2) and general habitat loss and transformation resulting from other activities in the area. Potential cumulative impacts include dust deposition, noise and vibration and loss or disturbance of ecological corridors and habitat.

The proposed facilities and accompanying infrastructure are located in two vegetation types, namely the Vaal Reefs Dolomite Sinkhole Woodland and the Carletonville Dolomite Grassland. The total footprint area proposed to be developed for the project measures 2,470 ha (Table 8-1). A total area of the habitat types within the 30 km radius equates to approximately 63,618 ha of very similar habitat. A total area of 34,740 ha is associated with the Vaal Reefs Dolomite Sinkhole Woodland and an area measuring 28,878 ha is associated with the Carletonville Dolomite Grassland. Due to the development in these habitat types, a total area measuring 1,343 ha of Vaal Reefs Dolomite Sinkhole Woodland will be lost and an area measuring 1,118 ha of Carletonville Dolomite Grassland will be lost. This equates

to 3.9% of habitat area being lost due to the combined Stilfontein Cluster development (Table 8-1). Based on this, the overall impact of the proposed Stilfontein Cluster development considered in isolation is expected to be low.

However, considering the number of known and planned (Table 8-2) other PV facilities and the associated powerlines in the area, the cumulative impact is expected to be medium. These would collectively result in a large area of habitat disturbance/loss. Long-term cumulative impacts due to extensive solar farm footprint, powerlines and substations can lead to the loss of endemic species and threatened species, loss of habitat and vegetation types and even degradation of well conserved areas.

The PV panels and associated infrastructure of all solar projects considered in the area are expected to have a medium detrimental cumulative impact, as they significantly add to the existing disturbance from mining, urban areas and agriculture in the region (

Kabi Vaalkop PV Facility	12/12/20/2513/4/AM1	n/a	Approved
Kabi Vaalkop PV Facility	12/12/20/2513/4	75 MW	Approved
YMS Mineral Resources PV Plant	12/12/20/2629/AM1	20 MW	Approved
Buffels Solar PV 1	14/12/16/3/3/2/777	75 MW	Approved
Buffels Solar PV 2	14/12/16/3/3/2/778	100 MW	Approved
Orkney Solar PV	14/12/16/3/3/2/954/AM1	100 MW	Approved
Vaal River Solar 3 PV facility	12/12/20/2513/3/AM6	250 MW	Approved
Witkop Solar PV II	12/12/20/2507/2	61 MW	In process
Paleso Solar PV	14/12/16/3/3/1/2365	150 MW	Approved
Siyanda Solar PV	14/12/16/3/3/2/1/2369	150 MW	Approved

Table 8-3). Cumulatively these developments will be responsible for the destruction of a large portion of grassland in the area

Table 8-1 Calculations for the loss of habitats as a result of the project

Vegetation Type	Pre-Development (ha)	Post-Development (ha)	Area Lost (ha)	Overall Percentage
Carletonville Dolomite Grassland	28 878	27 760	1 118	3.9%
Vaal Reefs Dolomite Sinkhole Woodland	34 740	33 397	1 343	3.9%
Total	**63 618**	**61 157**	**2 461**	**3.9%**

Table 8-2 Table below lists approved / under investigation RE projects within 30 km, based on the DFFE Q3 2021 REEA database.

Project	DFFE Reference	Capacity	EA Status
Kabi Vaalkop PV Facility	12/12/20/2513/4/AM1	n/a	Approved
Kabi Vaalkop PV Facility	12/12/20/2513/4	75 MW	Approved
YMS Mineral Resources PV Plant	12/12/20/2629/AM1	20 MW	Approved
Buffels Solar PV 1	14/12/16/3/3/2/777	75 MW	Approved
Buffels Solar PV 2	14/12/16/3/3/2/778	100 MW	Approved
Orkney Solar PV	14/12/16/3/3/2/954/AM1	100 MW	Approved
Vaal River Solar 3 PV facility	12/12/20/2513/3/AM6	250 MW	Approved

Witkop Solar PV II	12/12/20/2507/2	61 MW	In process
Paleso Solar PV	14/12/16/3/3/1/2365	150 MW	Approved
Siyanda Solar PV	14/12/16/3/3/2/1/2369	150 MW	Approved

Table 8-3 Cumulative impact assessed

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Overall impact of the Stilfontein cluster development considered in isolation	Local	Low	Long-term	**Medium**	Definite	**LOW**	– ve	High
	1	1	3	**6**				
Cumulative impact of the Stilfontein cluster and other PV projects in the area	Local	Medium	Long-term	**Medium**	Definite	**MEDIUM**	– ve	High
	1	2	3	**6**				

9. Conclusion & Specialist Opinion

Overall, the completion of a comprehensive desktop study in conjunction with the results from the field survey, suggests there is good confidence in the information collated and generated for this project.

The current project layout overlaps within sensitive habitats and other areas of good biodiversity potential. Portions of the current development would be considered to pose a high unmitigated negative impact as it may fully transform the habitat of protected plant species and expected listed faunal species that use these ecosystems, depending on the nature and size of the developments.

Development within confirmed high sensitivity areas may be considered favourably but the mitigation measures stipulated in this report must be implemented.

Any development in the high sensitivity areas may lead the direct destruction and loss of portions of functional ESA, and the floral and faunal species that are expected to utilise this habitat. However, the project area is located within the Klerksdorp REDZ as well as the Central STC and facilitates the process for responsible renewable development. All project aspects can be effectively mitigated to an acceptable residual impact in support of the renewable development project.

9.1. Impact Statement

PV Projects

The PV projects are expected to have a significant impact, especially regarding the destruction, further loss and fragmentation of the vegetation community/ ecosystems, mainly attributed to the larger footprints. If mitigation measures as described in this report is implemented, it will reduce the significance of the risk to an acceptable level. Development within the high sensitivity area is not regarded as a fatal flaw for the project and can be effectively mitigated.

Regarding the panel technology, it is the opinion of the specialists that Panel Technology One is preferred, but Panel Technology Two is also acceptable.

The project may be favourably considered for environmental authorisation, and that all prescribed mitigation measures and supporting recommendations be implemented.

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11. Appendix A - Project Specific Results: Project 8 – Starling PV

Specific Project Area

The project component is presented as a map in Figure 11-1 below.

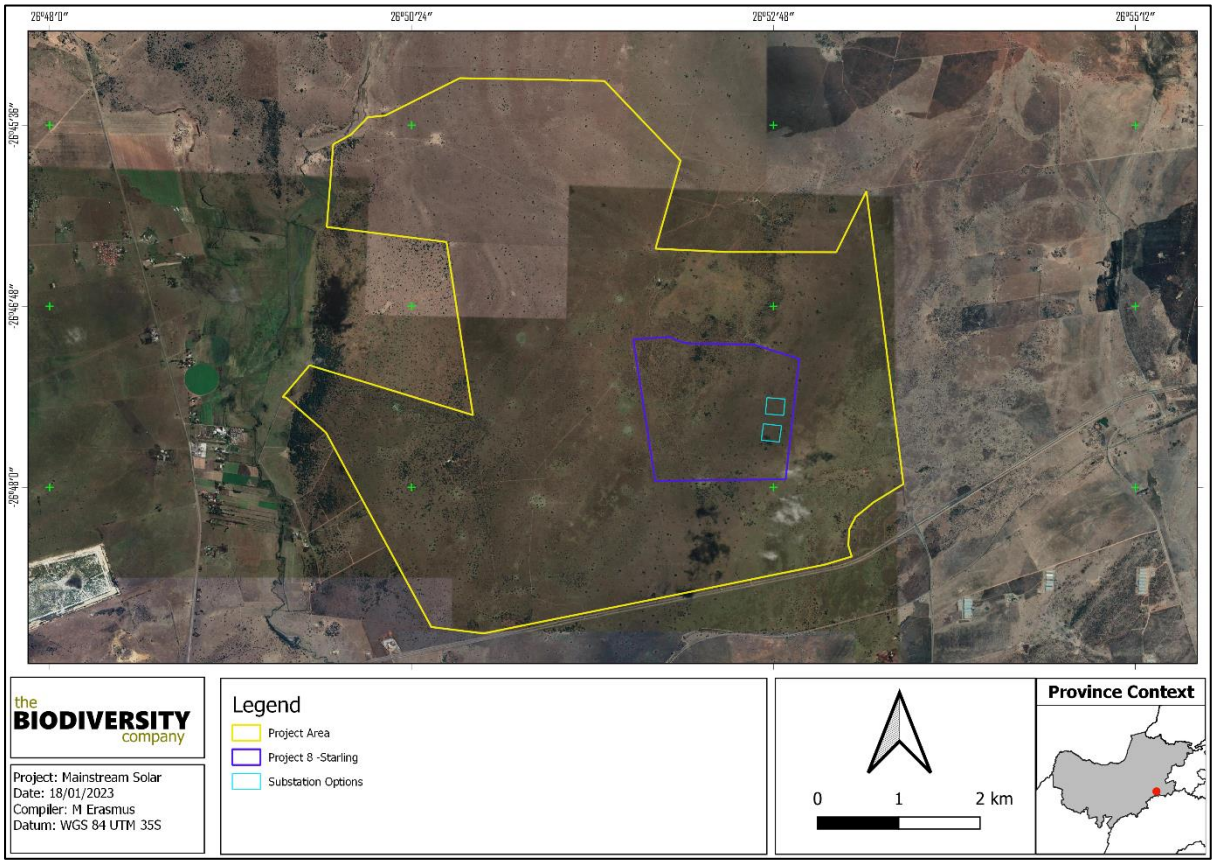

Figure 11-1 Map illustrating an overview of the Starling PV

Fine-scale Habitat Assessment

Figure 11-2 shows the identified habitats in relation to the specific PV. The majority of the Starling PV area occurs in degraded habitat, with disturbed and transformed habitats occurring in smaller areas. Both substations have equal preference.

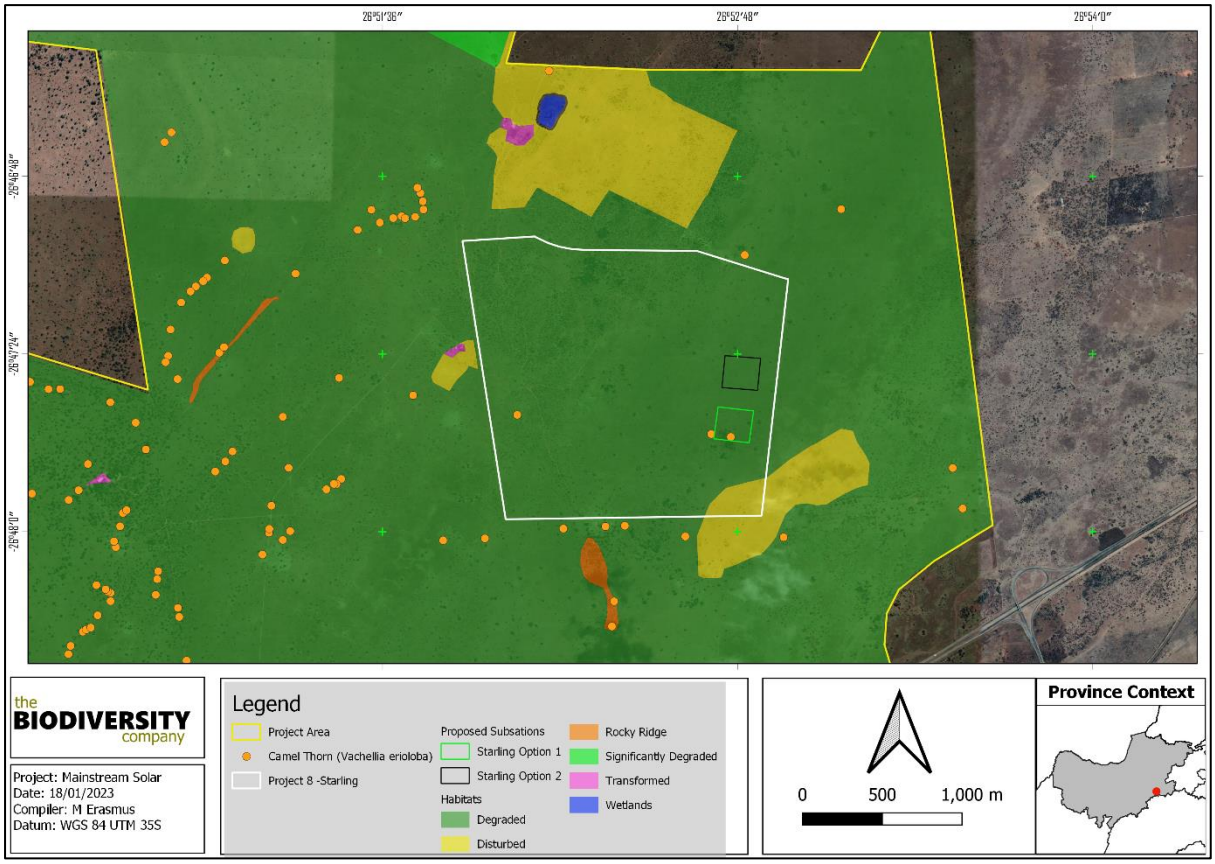

Figure 11-2 Map illustrating the fine-scale habitats of the Starling PV

Project Site Ecological Importance

The location and extent of all habitats are illustrated in Figure 7-2 above. Based on the criteria provided in Section 4.4 of this report, all habitats within the assessment area of the project were allocated a sensitivity category (Table 11-1). The sensitivities of the habitat types delineated are illustrated in Figure 11-3 below.

The completion of the terrestrial biodiversity assessment confirmed the high sensitivity of certain habitats that overlap with the project area and therefore the assessment findings corroborate the screening report. The plant and animal species themes are validated as being of medium sensitivity. The high sensitivity habitats include the degraded habitats. Guidelines for the development in high sensitivity areas require avoidance mitigation wherever possible and also minimisation mitigation to limit the amount of habitat impacted.

Table 11-1 SEI Summary of habitat types delineated within the project area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Degraded Habitat	Medium 50% of receptor contains natural habitat with potential to support SCC	High Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type. Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts,	Medium	Low As a result of the low rainfall (MAP 593 mm) in the area, vegetation will not easily be able to recover. This is also true for the seed germination of these species. The habitat is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore. The	High

		with no signs of major past disturbance and good rehabilitation potential.		dolomite habitat, if disturbed won't be able to naturally recover.	
Disturbed	Low	Low	Low	Medium	Low
Transformed	Low	Very Low	Very Low	Medium	Very Low

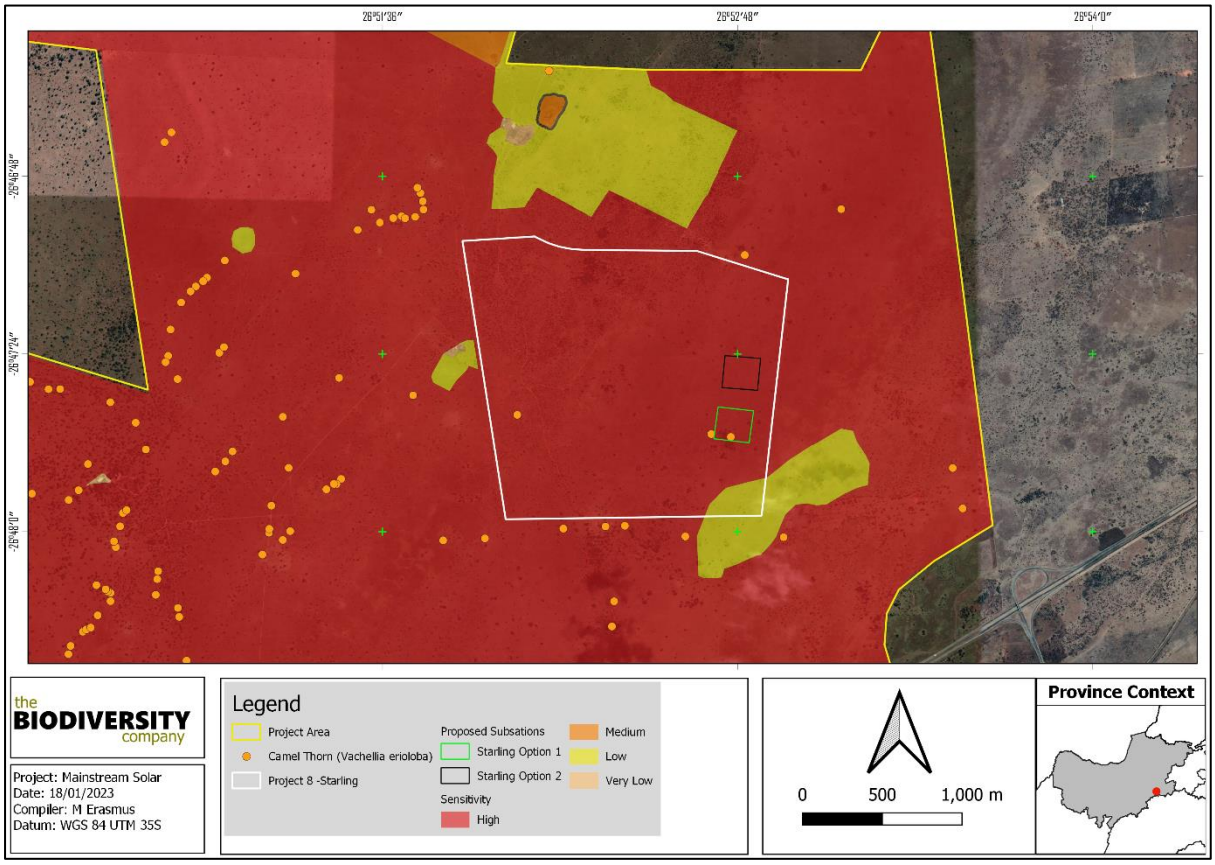

Figure 11-3 Sensitivity of the Starling PV project area

Impact Assessment

Panel Technology One

Table Assessment of significance of potential impacts on terrestrial biodiversity associated with the construction phase of the project

Destruction, further loss and fragmentation of the of habitats, ecosystems (ESA1) and vegetation community, including protected species								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local	Medium	Medium-term	**Low**	Definite	**LOW**	– ve	High
	1	2	2	**5**				
Essential mitigation measures: • **Demarcate work areas during the construction phase to avoid affecting outside areas. Use physical barriers e.g., safety tape, not painted lines, and use signage.** • **Do not clear areas of indigenous vegetation outside of the direct project footprint.** • **Minimise vegetation clearing to the minimum required.** • **Consult a fire expert and compile and implement a fire management plan to minimise the risk of veld fires around the project site.** • **Compile and implement a rehabilitation plan from the onset of the project;** • **Rehabilitate areas as soon as they are no longer impacted by construction.** • **The rehabilitated areas must be revegetated with indigenous vegetation.**								

• **Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank. Surplus rehabilitation material can be applied to other others in need of stabilisation and vegetation cover.**								
With mitigation	Local	Low	Short-term	**Very low**	Definite	**VERY LOW**	– ve	High
	1	1	1	**3**				

Spread of alien and/or invasive species								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local	Low	Medium-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	2	**4**				
Essential mitigation measures:								
• **Compile and implement an alien vegetation management plan from the onset of construction. The plan must identify areas for action (if any) and prescribe the necessary removal methods and frequencies to be applied. This plan must also prescribe a monitoring plan and be updated as/when new data is collated;** • **Implementation of a waste management plan, this plan must also prescribe a monitoring plan and be updated as/when new data is collated. Waste management must be a priority and all waste must be collected, stored and disposed of adequately. It is recommended that all waste be removed from site on a weekly basis (as a minimum) to prevent rodents and pests entering the site.** • **Refuse bins will be emptied and secured.** • **Temporary storage of domestic waste shall be in covered waste skips.** • **Maximum domestic waste storage period will be 7 days.** • **A pest control plan must be put in place and implemented; it is imperative that poisons not be used.**								
With mitigation	Local	Low	Short-term	**Very low**	Probable	**VERY LOW**	– ve	High
	1	1	1	**3**				

Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration, fencing and poaching)								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local	Medium	Short-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	2	1	**4**				
Essential mitigation measures:								
• **Demarcate work areas during the construction phase to avoid affecting outside areas. Use physical barriers e.g., safety tape, not painted lines, and use signage.** • **Minimise vegetation clearing to the minimum required. Areas should be cleared and disturbed on a needs basis only, as opposed to clearing and disturbing a number of sites simultaneously.** • **Provide All personnel and contractors to undergo Environmental Awareness Training to all personnel and contractors. A signed register of attendance must be kept for proof.** • **The timing between clearing of an area and subsequent development must be minimized to avoid fauna from re-entering the site to be disturbed.** • **Any holes/deep excavations must be made in a progressive manner on a needs basis only. No holes/excavations may be left open overnight. In the event holes/excavations are required to remain open overnight, these areas must be covered to prevent fauna falling into these areas.** • **Where possible, work should be restricted to one area at a time and be systematic. This is to reduce the number and extent of on-site activities, allowing fauna to move off as the project progresses. This will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories.** • **Prior to vegetation clearing activities, the area to be cleared should be walked on foot by 1-2 individuals to create a disturbance in order for fauna to move off. Sites should be disturbed only prior to the area having to be cleared, not more than 1 day in advance.**								
With mitigation	Local	Low	Short-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	1	**3**				

Dust generation from construction activities								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local	Low	Medium-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	2	**4**				
Essential mitigation measures:								
• **Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas.** • **Reduce the dust generated by operational vehicles and earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limits to enforce reduced speeds.** • **No non-environmentally friendly suppressants may be used as this could result in pollution of water sources.**								
With mitigation	Local	Low	Short-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	1	**3**				

Table Assessment of significance of potential impacts on terrestrial biodiversity associated with the operational phase of the project

Continued fragmentation and degradation of habitats, ecosystems and ESA areas								
	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Local	Low	Medium-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	2	**4**				
Essential mitigation measures:								
• **It should be made an offence for any staff to /take bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.** • **Implementation of an alien vegetation management plan.**								
With mitigation	Local	Low	Medium-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	2	**4**				

Spread and establishment of alien and/or invasive species								
	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Local	Low	Medium-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	2	**4**				
Essential mitigation measures:								
• **Implementation of an alien vegetation management plan.** • **Implementation of a waste management plan.**								
With mitigation	Local	Low	Short-term	**Very low**	Probable	**VERY LOW**	– ve	High
	1	1	1	**3**				

Ongoing displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, fencing and poaching)								
	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Local	Low	Medium-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	2	**4**				
Essential mitigation measures:								

• Outside lighting should be designed and limited to minimize impacts on fauna. Lighting fixtures should be fitted with baffles, hoods or louvres and directed downward.. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (yellow) lights should be used wherever possible; • Where feasible, motion detection lighting must be used to minimise the unnecessary illumination of areas • Minimise traffic and the use of vehicle lights of the road during the night. • Noise must be kept to a minimum from dusk to dawn to minimize all possible disturbances to amphibian species and nocturnal mammals.								
With mitigation	Local	Low	Short-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	1	**3**				

Table Assessment of significance of potential impacts on terrestrial biodiversity associated with the decommissioning phase of the project

Continued fragmentation and degradation of habitats, ecosystems and ESA areas								
	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Local	Low	Medium-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	2	**4**				
Essential mitigation measures:								
• Limiting the closure and rehabilitation activities to the footprint areas only. Avoid entry/access to previously undisturbed or already rehabilitated areas. • Areas other than the footprint areas and existing surface infrastructure areas, should be declared as 'no-go' areas to vehicles (only). All essential operational staff – machinery must be limited to development area (no need to go outside the authorised area). • The rehabilitated areas must be revegetated with indigenous vegetation. • Reduce the dust generated by operational vehicles and earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limits to enforce reduced speeds. • Implementation of rehabilitation plan. • Implementation of an alien vegetation management plan.								
With mitigation	Local	Low	Short-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	1	**3**				

Spread and establishment of alien and/or invasive species								
	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Local	Low	Medium-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	2	**4**				
Essential mitigation measures:								
• Ongoing implementation of an alien vegetation management plan. The updated plan must advise on the monitoring frequency post closure of the project, and then advise on the 'completion' the plan as data is collated.								
With mitigation	Local	Low	Short-term	**Very low**	Possible	**INSIGNIFI-CANT**	– ve	Medium
	1	1	1	**3**				

Panel Technology Two

The loss of habitat cannot be mitigated completely, it can be reduced somewhat with mitigations such as the restriction of the footprint and ensuring areas adjacent to the footprint are not disturbed.

Table Assessment of significance of potential impacts on terrestrial biodiversity associated with the construction phase of the project

Destruction, further loss and fragmentation of the of habitats, ecosystems (ESA1) and vegetation community, including protected species								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local	High	Long-term	**High**	Definite	**HIGH**	– ve	High
	1	3	3	**7**				
Essential mitigation measures:								
• **Demarcate work areas during the construction phase to avoid affecting outside areas. Use physical barriers e.g., safety tape, not painted lines, and use signage.** • **Do not clear areas of indigenous vegetation outside of the direct project footprint.** • **Minimise vegetation clearing to the minimum required.** • **Consult a fire expert and compile and implement a fire management plan to minimise the risk of veld fires around the project site.** • **Compile and implement a rehabilitation plan from the onset of the project;** • **Rehabilitate areas as soon as they are no longer impacted by construction.** • **The rehabilitated areas must be revegetated with indigenous vegetation.** • **Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank. Surplus rehabilitation material can be applied to other others in need of stabilisation and vegetation cover.**								
With mitigation	Local	Medium	Long-term	**Medium**	Definite	**MEDIUM**	– ve	High
	1	2	3	**6**				

Spread of alien and/or invasive species								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local	Medium	Medium-term	**Medium**	Probable	**LOW**	– ve	Medium
	1	2	2	**6**				
Essential mitigation measures:								
• **Compile and implement an alien vegetation management plan from the onset of construction. The plan must identify areas for action (if any) and prescribe the necessary removal methods and frequencies to be applied. This plan must also prescribe a monitoring plan and be updated as/when new data is collated;** • **Implementation of a waste management plan, this plan must also prescribe a monitoring plan and be updated as/when new data is collated. Waste management must be a priority and all waste must be collected, stored and disposed of adequately. It is recommended that all waste be removed from site on a weekly basis (as a minimum) to prevent rodents and pests entering the site.** • **Refuse bins will be emptied and secured.** • **Temporary storage of domestic waste shall be in covered waste skips.** • **Maximum domestic waste storage period will be 7 days.** • **A pest control plan must be put in place and implemented; it is imperative that poisons not be used.**								
With mitigation	Local	Low	Short-term	**Very low**	Probable	**VERY LOW**	– ve	High
	1	1	1	**3**				

Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration, fencing and poaching)								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Regional	Medium	Medium-term	**Medium**	Probable	**MEDIUM**	– ve	Medium
	2	2	2	**6**				

Essential mitigation measures:								
• Demarcate work areas during the construction phase to avoid affecting outside areas. Use physical barriers e.g., safety tape, not painted lines, and use signage. • Minimise vegetation clearing to the minimum required. Areas should be cleared and disturbed on a needs basis only, as opposed to clearing and disturbing a number of sites simultaneously. • Provide All personnel and contractors to undergo Environmental Awareness Training to all personnel and contractors. A signed register of attendance must be kept for proof. • The timing between clearing of an area and subsequent development must be minimized to avoid fauna from re-entering the site to be disturbed. • Any holes/deep excavations must be made in a progressive manner on a needs basis only. No holes/excavations may be left open overnight. In the event holes/excavations are required to remain open overnight, these areas must be covered to prevent fauna falling into these areas. • Where possible, work should be restricted to one area at a time and be systematic. This is to reduce the number and extent of on-site activities, allowing fauna to move off as the project progresses. This will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories. • Prior to vegetation clearing activities, the area to be cleared should be walked on foot by 1-2 individuals to create a disturbance in order for fauna to move off. Sites should be disturbed only prior to the area having to be cleared, not more than 1 day in advance.							
With mitigation	Local	Low	Medium-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	2	**4**				

Dust generation from construction activities								
	Extent	***Intensity***	***Duration***	***Consequence***	***Probability***	***Significance***	***Status***	***Confidence***
Without mitigation	Local	Medium	Medium-term	**Low**	Probable	**LOW**	– ve	Medium
	1	2	2	**5**				
Essential mitigation measures:								
• Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas. • Reduce the dust generated by operational vehicles and earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limits to enforce reduced speeds. • No non-environmentally friendly suppressants may be used as this could result in pollution of water sources.								
With mitigation	Local	Low	Short-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	1	**3**				

Table Assessment of significance of potential impacts on terrestrial biodiversity associated with the operational phase of the project

Continued fragmentation and degradation of habitats, ecosystems and ESA areas								
	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Local	Medium	Medium-term	**Low**	Probable	**LOW**	– ve	Medium
	1	2	2	**5**				
Essential mitigation measures:								
• It should be made an offence for any staff to /take bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants. • Implementation of an alien vegetation management plan.								
With mitigation	Local	Low	Medium-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	2	**4**				

Spread and establishment of alien and/or invasive species								
	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Local	Medium	Medium-term	**Low**	Probable	**LOW**	– ve	Medium
	1	2	2	**5**				
Essential mitigation measures:								
• **Implementation of an alien vegetation management plan.** • **Implementation of a waste management plan.**								
With mitigation	Local	Low	Short-term	**Very low**	Probable	**VERY LOW**	– ve	High
	1	1	1	**3**				

Ongoing displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, fencing and poaching)								
	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Local	Medium	Medium-term	**Low**	Probable	**LOW**	– ve	Medium
	1	2	2	**5**				
Essential mitigation measures:								
• **Outside lighting should be designed and limited to minimize impacts on fauna. Lighting fixtures should be fitted with baffles, hoods or louvres and directed downward. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (yellow) lights should be used wherever possible;** • **Where feasible, motion detection lighting must be used to minimise the unnecessary illumination of areas** • **Minimise traffic and the use of vehicle lights of the road during the night.** • **Noise must be kept to a minimum from dusk to dawn to minimize all possible disturbances to amphibian species and nocturnal mammals.**								
With mitigation	Local	Low	Short-term	**Very low**	Probable	**VERY LOW**	– ve	Medium
	1	1	1	**3**				

Table Assessment of significance of potential impacts on terrestrial biodiversity associated with the decommissioning phase of the project

Continued fragmentation and degradation of habitats, ecosystems and ESA areas								
	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Local	Medium	Medium-term	**Low**	Probable	**LOW**	– ve	Medium
	1	2	2	**5**				
Essential mitigation measures:								
• **Limiting the closure and rehabilitation activities to the footprint areas only. Avoid entry/access to previously undisturbed or already rehabilitated areas.** • **Areas other than the footprint areas and existing surface infrastructure areas, should be declared as 'no-go' areas to vehicles (only). All essential operational staff – machinery must be limited to development area (no need to go outside the authorised area).** • **The rehabilitated areas must be revegetated with indigenous vegetation.** • **Reduce the dust generated by operational vehicles and earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limits to enforce reduced speeds.** • **Implementation of rehabilitation plan.** • **Implementation of an alien vegetation management plan..**								
With mitigation	Local	Low	Medium-term	**Very low**	Probable	**VERY LOW**	+ve	Medium
	1	1	2	**4**				

Spread and establishment of alien and/or invasive species								
	Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**Status**	**Confidence**
Without mitigation	Local	Medium	Medium-term	**Low**	Probable	**LOW**	– ve	Medium
	1	2	2	**5**				
Essential mitigation measures:								
• **Ongoing implementation of an alien vegetation management plan. The updated plan must advise on the monitoring frequency post closure of the project, and then advise on the 'completion' the plan as data is collated.**								
With mitigation	Local	Low	Short-term	**Very low**	Possible	**INSIGNIFI-CANT**	+ve	Medium
	1	1	1	**3**				

Mitigation Measures

Mitigation measures can be seen in section 8.2

Conclusion & Specialist Opinion

The completion of a comprehensive desktop study, in conjunction with the results from the field survey, suggests there is good confidence in the information collated and generated for this project. The survey ensured that there was suitable ground-truth coverage of the area, and that habitats and ecosystems were adequately assessed to generate a species (fauna and flora) overview and to identify the major current impacts for the area.

The current layout overlaps within sensitive habitats and other areas of good biodiversity potential. Portions of the current development would be considered to pose a high unmitigated negative impact in regards to Panel Technology Two as it would fully transform the habitat of protected plant species and expected listed faunal species that use these ecosystems. Panel Technology One however results in a limited impact (reduced intensity) and is considered most favoured.

Development within confirmed high sensitivity areas, may be considered favourably and implementation of the mitigation hierarchy must be demonstrated. This must include concerted efforts to avoid these highly sensitive areas where feasible, and disturbances must be kept to a minimum. In conclusion of the baseline, the specialist can confirm that the high sensitivity terrestrial areas still:

- Serve as and represent ESA 1 as per the Conservation Plan;
- Supports and protects fauna and flora (including protected species); and
- Support various organisms and may play a more important role in the ecosystem if left to recover from the superficial impacts.

The ecological integrity, importance and functioning of these ecosystems provide a variety of ecological services considered beneficial, with one key service being the maintenance of biodiversity and connectivity across the landscape. The preservation of these systems is the most important aspect to consider for the proposed project.

An impact assessment was undertaken for the proposed project and a summary of the key considerations include the following:

- Panel Technology One, associated with vegetation clearing on construction footprints only, has overall low to very low impacts and is deemed acceptable; and
- Panel Technology Two, associated with vegetation clearing throughout the project footprint to lay gravel for bifacial panels, is expected to have some high pre-mitigation significance impacts, which can be mitigated to acceptable levels.

Any development in the high sensitivity areas may lead the direct destruction and loss of portions of functional ESA, and also the floral and faunal species that are expected to utilise this habitat. However, the project area is located within the Klerksdorp REDZ as well as the Central STC and facilitates the process for responsible renewable development. With the exception of Panel Technology Two, all project aspects can be effectively mitigated to an acceptable residual impact in support of the renewable development project.

Impact Statement

The main expected impacts of the proposed project will include the following:

- habitat loss and fragmentation;
- degradation of surrounding habitat; and
- Mortality, disturbance, and displacement caused during the construction and operational phases.

Mitigation measures as described in this report must be implemented to reduce the significance of the risk to an acceptable level.

Development within the high sensitivity is not regarded as a fatal flaw for the project and can be effectively mitigated.

It is the opinion of the specialists that Panel Technology One is preferred, but Panel Technology Two is also acceptable. Both substation alternatives are equally acceptable.

The project may be favourably considered for environmental authorisation, and that all prescribed mitigation measures and supporting recommendations be implemented.

12. Appendix B – Flora species expected to occur in the project area.

Family	Species	Author	SANBI – Red List	Ecology
Fabaceae	*Acacia mearnsii*	De Wild.	NE	Not indigenous; Naturalised; Invasive
Fabaceae	*Acacia sp.*			
Euphorbiaceae	*Acalypha angustata*	Sond.	LC	Indigenous
Euphorbiaceae	*Acalypha caperonioides var. caperonioides*	Baill.	DD	Indigenous
Sapindaceae	*Acer buergerianum*	Miq.		Not indigenous; Naturalised; Invasive
Sapindaceae	*Acer negundo*	L.		Not indigenous; Naturalised; Invasive
Crassulaceae	***Adromischus umbraticola subsp. umbraticola***	**C.A.Sm.**	**NT**	**Indigenous; Endemic**
Amaranthaceae	*Aerva leucura*	Moq.	LC	Indigenous
Podocarpaceae	*Afrocarpus falcatus*	(Thunb.) C.N.Page		Indigenous
Loranthaceae	*Agelanthus natalitius subsp. zeyheri*	(Meisn.) Polhill & Wiens (Harv.) Polhill & Wiens	LC	Indigenous
Poaceae	*Agrostis lachnantha var. lachnantha*	Nees	LC	Indigenous
Hyacinthaceae	*Albuca glauca*	Baker	LC	Indigenous; Endemic
Hyacinthaceae	*Albuca setosa*	Jacq.	LC	Indigenous
Amaranthaceae	*Alternanthera pungens*	Kunth		Not indigenous; Naturalised
Amaranthaceae	*Amaranthus deflexus*	L.		Not indigenous; Naturalised
Amaranthaceae	*Amaranthus hybridus subsp. cruentus*	L. (L.) Thell.		Not indigenous; Naturalised
Amaranthaceae	*Amaranthus hybridus subsp. hybridus var. hybridus*	L.		Not indigenous; Naturalised
Amaranthaceae	*Amaranthus viridis*	L.		Not indigenous; Naturalised
Lythraceae	*Ammannia anagalloides*	Sond.		Indigenous
Apiaceae	*Ammi majus*	L.		Not indigenous; Naturalised
Poaceae	*Andropogon appendiculatus*	Nees	LC	Indigenous
Malvaceae	*Anisodontea scabrosa*	(L.) Bates	LC	Indigenous; Endemic
Poaceae	*Anthephora pubescens*	Nees	LC	Indigenous
Scrophulariaceae	*Aptosimum elongatum*	(Hiern) Engl.	LC	Indigenous
Papaveraceae	*Argemone ochroleuca subsp. ochroleuca*	Sweet		Not indigenous; Naturalised; Invasive
Poaceae	*Aristida adscensionis*	L.	LC	Indigenous
Poaceae	*Aristida canescens subsp. canescens*	Henrard	LC	Indigenous
Poaceae	*Aristida congesta subsp. barbicollis*	Roem. & Schult. (Trin. & Rupr.) De Winter	LC	Indigenous
Poaceae	*Aristida congesta subsp. congesta*	Roem. & Schult.	LC	Indigenous
Asteraceae	*Artemisia afra var. afra*	Jacq. ex Willd.	LC	Indigenous
Poaceae	*Arundo donax*	L.	NE	Not indigenous; Naturalised; Invasive
Apocynaceae	*Asclepias aurea*	(Schltr.) Schltr.	LC	Indigenous

Apocynaceae	*Asclepias brevipes*	(Schltr.) Schltr.	LC	Indigenous; Endemic
Apocynaceae	*Asclepias meyeriana*	(Schltr.) Schltr.	LC	Indigenous
Asparagaceae	*Asparagus africanus*	Lam.	LC	Indigenous
Asparagaceae	*Asparagus cooperi*	Baker	LC	Indigenous
Asparagaceae	*Asparagus laricinus*	Burch.	LC	Indigenous
Asparagaceae	*Asparagus suaveolens*	Burch.	LC	Indigenous
Apocynaceae	*Aspidoglossum biflorum*	E.Mey.	LC	Indigenous
Amaranthaceae	*Atriplex semibaccata*	R.Br.		Not indigenous; Naturalised; Invasive
Salviniaceae	*Azolla filiculoides*	Lam.	NE	Not indigenous; Naturalised; Invasive
Iridaceae	*Babiana bainesii*	Baker	LC	Indigenous
Acanthaceae	*Barleria macrostegia*	Nees	LC	Indigenous
Berberidaceae	*Berberis julianae*	C.K.Schneid.		Not indigenous; Cultivated; Naturalised; Invasive
Elatinaceae	*Bergia decumbens*	Planch. ex Harv.	LC	Indigenous
Betulaceae	*Betula pendula*	Roth		Not indigenous; Cultivated; Naturalised
Asteraceae	*Bidens bipinnata*	L.		Not indigenous; Naturalised
Asteraceae	*Bidens pilosa*	L.		Not indigenous; Naturalised
Acanthaceae	*Blepharis serrulata*	(Nees) Ficalho & Hiern	LC	Indigenous
Acanthaceae	*Blepharis sp.*			
Nyctaginaceae	*Boerhavia erecta*	L.		Not indigenous; Naturalised
Orchidaceae	*Bonatea antennifera*	Rolfe	LC	Indigenous
Capparaceae	*Boscia albitrunca*	(Burch.) Gilg & Gilg-Ben.	LC	Indigenous
Poaceae	*Bothriochloa insculpta*	(Hochst. ex A.Rich.) A.Camus	LC	Indigenous
Poaceae	*Brachiaria eruciformis*	(Sm.) Griseb.	LC	Indigenous
Poaceae	*Bromus catharticus*	Vahl	NE	Not indigenous; Naturalised; Invasive
Scrophulariaceae	*Buddleja salviifolia*	(L.) Lam.	LC	Indigenous
Asphodelaceae	*Bulbine capitata*	Poelln.	LC	Indigenous
Asphodelaceae	*Bulbine narcissifolia*	Salm-Dyck	LC	Indigenous
Cannaceae	*Canna generalis*	L.H.Bailey	NE	Not indigenous; Naturalised; Invasive
Brassicaceae	*Capsella bursa-pastoris*	(L.) Medik.		Not indigenous; Naturalised
Cannabaceae	*Celtis africana*	Burm.f.	LC	Indigenous
Cannabaceae	*Celtis sinensis*	Pers.		Not indigenous; Cultivated; Naturalised; Invasive
Poaceae	*Cenchrus ciliaris*	L.	LC	Indigenous
Ceratophyllaceae	*Ceratophyllum muricatum subsp. muricatum*	Cham.	LC	Indigenous
Solanaceae	*Cestrum parqui*	L'Her.		Not indigenous; Naturalised; Invasive

Fabaceae	*Chamaecrista mimosoides*	(L.) Greene	LC	Indigenous
Verbenaceae	*Chascanum adenostachyum*	(Schauer) Moldenke	LC	Indigenous
Amaranthaceae	*Chenopodiastrum murale*	(L.) S.Fuentes, Uotila & Borsch		Not indigenous; Naturalised; Invasive
Amaranthaceae	*Chenopodium album*	L.		Not indigenous; Naturalised; Invasive
Poaceae	*Chloris pycnothrix*	Trin.	LC	Indigenous
Poaceae	*Chloris virgata*	Sw.	LC	Indigenous
Asteraceae	*Cichorium intybus subsp. intybus*	L.		Not indigenous; Naturalised; Invasive
Asteraceae	*Cineraria lyratiformis*	Cron	LC	Indigenous
Lauraceae	*Cinnamomum camphora*	(L.) J.Presl	NE	Not indigenous; Naturalised; Invasive
Asteraceae	*Cirsium vulgare*	(Savi) Ten.		Not indigenous; Naturalised; Invasive
Ranunculaceae	*Clematis brachiata*	Thunb.	LC	Indigenous
Cleomaceae	*Cleome monophylla*	L.	LC	Indigenous
Combretaceae	*Combretum erythrophyllum*	(Burch.) Sond.	LC	Indigenous
Commelinaceae	*Commelina africana var. barberae*	L. (C.B.Clarke) C.B.Clarke	LC	Indigenous
Commelinaceae	*Commelina africana var. lancispatha*	L. C.B.Clarke	LC	Indigenous
Commelinaceae	*Commelina erecta*	L.	LC	Indigenous
Commelinaceae	*Commelina livingstonii*	C.B.Clarke	LC	Indigenous
Nyctaginaceae	*Commicarpus pentandrus*	(Burch.) Heimerl	LC	Indigenous
Convolvulaceae	*Convolvulus sagittatus*	Thunb.	LC	Indigenous
Asteraceae	*Conyza podocephala*	DC.		Indigenous
Malvaceae	*Corchorus asplenifolius*	Burch.	LC	Indigenous
Malvaceae	*Corchorus schimperi*	Cufod.	LC	Indigenous
Apocynaceae	*Cordylogyne globosa*	E.Mey.	LC	Indigenous
Asteraceae	*Coreopsis lanceolata*	L.		Not indigenous; Cultivated; Naturalised; Invasive
Rosaceae	*Cotoneaster glaucophyllus*	Franch.		Not indigenous; Naturalised; Invasive
Rosaceae	*Cotoneaster pannosus*	Franch.		Not indigenous; Cultivated; Naturalised; Invasive
Crassulaceae	*Cotyledon orbiculata var. orbiculata*	L.	LC	Indigenous
Acanthaceae	*Crabbea angustifolia*	Nees	LC	Indigenous; Endemic
Crassulaceae	*Crassula sp.*	A.DC.		
Fabaceae	*Crotalaria lotoides*	Benth.	LC	Indigenous
Convolvulaceae	*Cuscuta campestris*	Yunck.		Not indigenous; Naturalised; Invasive
Araliaceae	*Cussonia paniculata subsp. sinuata*	Eckl. & Zeyh. (Reyneke & Kok) De Winter	LC	Indigenous
Apiaceae	*Cyclospermum leptophyllum*	(Pers.) Sprague ex Britton & P.Wilson		Not indigenous; Naturalised
Poaceae	*Cymbopogon caesius*	(Hook. & Arn.) Stapf	LC	Indigenous
Poaceae	*Cynodon dactylon*	(L.) Pers.	LC	Indigenous

Poaceae	*Cynodon nlemfuensis*	Vanderyst	NE	Not indigenous; Naturalised; Invasive
Cyperaceae	*Cyperus margaritaceus var. margaritaceus*	Vahl	LC	Indigenous
Cyperaceae	*Cyperus obtusiflorus var. flavissimus*	Vahl (Schrad.) Boeckeler	LC	Indigenous
Cyperaceae	*Cyperus sphaerospermus*	Schrad.	LC	Indigenous
Cyperaceae	*Cyperus uitenhagensis*	(Steud.) C.Archer & Goetgh.	LC	Indigenous
Lobeliaceae	*Cyphia persicifolia*	C.Presl	LC	Indigenous; Endemic
Poaceae	*Dactyloctenium australe*	Steud.	LC	Indigenous
Solanaceae	*Datura ferox*	L.		Not indigenous; Naturalised; Invasive
Solanaceae	*Datura stramonium*	L.		Not indigenous; Naturalised; Invasive
Hyacinthaceae	*Daubenya comata*	(Burch. ex Baker) J.C.Manning & A.M.van der Merwe	LC	Indigenous; Endemic
Aizoaceae	*Delosperma herbeum*	(N.E.Br.) N.E.Br.	LC	Indigenous
Aizoaceae	*Delosperma sp.*	L.Bolus		
Fabaceae	*Desmanthus virgatus*	(L.) Willd.	NE	Not indigenous; Naturalised
Caryophyllaceae	*Dianthus mooiensis subsp. kirkii*	F.N.Williams (Burtt Davy) S.S.Hooper	NE	Indigenous
Fabaceae	*Dichilus strictus*	E.Mey.	LC	Indigenous
Acanthaceae	*Dicliptera leistneri*	K.Balkwill	LC	Indigenous; Endemic
Iridaceae	*Dierama reynoldsii*	I.Verd.	LC	Indigenous; Endemic
Poaceae	*Digitaria debilis*	(Desf.) Willd.	LC	Indigenous
Poaceae	*Digitaria eriantha*	Steud.	LC	Indigenous
Poaceae	*Digitaria sanguinalis*	(L.) Scop.	NE	Not indigenous; Naturalised
Amaranthaceae	*Dysphania carinata*	(R.Br.) Mosyakin & Clemants		Not indigenous; Naturalised; Invasive
Poaceae	*Ehrharta erecta var. erecta*	Lam.	LC	Indigenous
Cyperaceae	*Eleocharis dregeana*	Steud.	LC	Indigenous
Fabaceae	*Elephantorrhiza elephantina*	(Burch.) Skeels	LC	Indigenous
Poaceae	*Eleusine coracana subsp. africana*	(L.) Gaertn. (Kenn.-O'Byrne) Hilu & de Wet	LC	Indigenous
Polygonaceae	*Emex australis*	Steinh.	LC	Indigenous
Poaceae	*Enneapogon cenchroides*	(Licht. ex Roem. & Schult.) C.E.Hubb.	LC	Indigenous
Onagraceae	*Epilobium hirsutum*	L.	LC	Indigenous
Poaceae	*Eragrostis barbinodis*	Hack.	LC	Indigenous
Poaceae	*Eragrostis barrelieri*	Daveau	NE	Not indigenous; Naturalised
Poaceae	*Eragrostis biflora*	Hack. ex Schinz	LC	Indigenous
Poaceae	*Eragrostis chloromelas*	Steud.	LC	Indigenous
Poaceae	*Eragrostis cilianensis*	(All.) Vignolo ex Janch.	LC	Indigenous
Poaceae	*Eragrostis curvula*	(Schrad.) Nees	LC	Indigenous
Poaceae	*Eragrostis echinochloidea*	Stapf	LC	Indigenous
Poaceae	*Eragrostis gummiflua*	Nees	LC	Indigenous

Poaceae	*Eragrostis obtusa*	Munro ex Ficalho & Hiern	LC	Indigenous
Poaceae	*Eragrostis rigidior*	Pilg.	LC	Indigenous
Poaceae	*Eragrostis rotifer*	Rendle	LC	Indigenous
Poaceae	*Eragrostis sp.*			
Poaceae	*Eragrostis superba*	Peyr.	LC	Indigenous
Poaceae	*Eragrostis trichophora*	Coss. & Durieu	LC	Indigenous
Asteraceae	*Erigeron sumatrensis*	Retz.		Not indigenous; Naturalised; Invasive
Brassicaceae	*Erucastrum austroafricanum*	Al-Shehbaz & Warwick	LC	Indigenous
Papaveraceae	*Eschscholzia californica subsp. californica*	Cham.		Not indigenous; Cultivated; Naturalised
Myrtaceae	*Eucalyptus camaldulensis*	Dehnh.		Not indigenous; Cultivated; Naturalised; Invasive
Myrtaceae	*Eucalyptus microtheca*	F.Muell.		Not indigenous; Naturalised
Euphorbiaceae	*Euphorbia hirsuta*	L.		Not indigenous; Naturalised; Invasive
Euphorbiaceae	*Euphorbia hirta*	L.	NE	Not indigenous; Naturalised
Euphorbiaceae	*Euphorbia peplus*	L.	NE	Not indigenous; Naturalised
Euphorbiaceae	*Euphorbia prostrata*	Aiton	NE	Not indigenous; Naturalised
Euphorbiaceae	*Euphorbia serpens*	Kunth	NE	Not indigenous; Naturalised
Asteraceae	*Felicia muricata subsp. muricata*	(Thunb.) Nees	LC	Indigenous
Poaceae	*Festuca arundinacea*	Schreb.	NE	Not indigenous; Naturalised
Asteraceae	*Flaveria bidentis*	(L.) Kuntze		Not indigenous; Naturalised; Invasive
Apiaceae	*Foeniculum vulgare var. vulgare*	Mill.		Not indigenous; Cultivated; Naturalised; Invasive
Oleaceae	*Fraxinus angustifolia*	Vahl		Not indigenous; Naturalised; Invasive
Asteraceae	*Galinsoga parviflora*	Cav.		Not indigenous; Naturalised; Invasive
Rubiaceae	*Galium capense subsp. capense*	Thunb.	LC	Indigenous
Asteraceae	*Gazania krebsiana*	Less.		Indigenous
Asteraceae	*Gazania krebsiana subsp. serrulata*	Less. (DC.) Roessler	LC	Indigenous
Asteraceae	*Geigeria brevifolia*	(DC.) Harv.	LC	Indigenous
Asteraceae	*Geigeria ornativa*	O.Hoffm.		Indigenous
Geraniaceae	*Geranium multisectum*	N.E.Br.	LC	Indigenous
Gisekiaceae	*Gisekia africana var. africana*	(Lour.) Kuntze	LC	Indigenous
Verbenaceae	*Glandularia aristigera*	(S.Moore) Tronc.		Not indigenous; Naturalised; Invasive
Fabaceae	*Gleditsia triacanthos*	L.	NE	Not indigenous; Naturalised; Invasive
Apocynaceae	*Gomphocarpus rivularis*	Schltr.	LC	Indigenous
Scrophulariaceae	*Gomphostigma virgatum*	(L.f.) Baill.	LC	Indigenous
Amaranthaceae	*Gomphrena celosioides*	Mart.		Not indigenous; Naturalised
Malvaceae	*Grewia flava*	DC.	LC	Indigenous

Malvaceae	*Grewia occidentalis var. occidentalis*	L.	LC	Indigenous
Amaranthaceae	*Guilleminea densa*	(Humb. & Bonpl. ex Schult.) Moq.		Not indigenous; Naturalised; Invasive
Celastraceae	*Gymnosporia buxifolia*	(L.) Szyszyl.	LC	Indigenous
Poaceae	*Harpochloa falx*	(L.f.) Kuntze	LC	Indigenous
Araliaceae	*Hedera canariensis*	Willd.		Not indigenous; Cultivated; Naturalised
Asteraceae	*Helichrysum caespititium*	(DC.) Harv.	LC	Indigenous
Asteraceae	*Helichrysum callicomum*	Harv.	LC	Indigenous
Asteraceae	*Helichrysum paronychioides*	DC.	LC	Indigenous
Asteraceae	*Helichrysum rugulosum*	Less.	LC	Indigenous
Asteraceae	*Helichrysum zeyheri*	Less.	LC	Indigenous
Asteraceae	*Helminthotheca echioides*	(L.) Holub		Not indigenous; Naturalised; Invasive
Poaceae	*Hemarthria altissima*	(Poir.) Stapf & C.E.Hubb.	LC	Indigenous
Malvaceae	*Hermannia depressa*	N.E.Br.	LC	Indigenous
Malvaceae	*Hermannia grandistipula*	(Buchinger ex Hochst.) K.Schum.	LC	Indigenous
Malvaceae	*Hermannia quartiniana*	A.Rich.	LC	Indigenous
Malvaceae	*Hermannia stellulata*	(Harv.) K.Schum.	LC	Indigenous
Poaceae	*Heteropogon contortus*	(L.) Roem. & Schult.	LC	Indigenous
Malvaceae	*Hibiscus calyphyllus*	Cav.	LC	Indigenous
Malvaceae	*Hibiscus microcarpus*	Garcke	LC	Indigenous
Malvaceae	*Hibiscus pusillus*	Thunb.	LC	Indigenous
Malvaceae	*Hibiscus syriacus*	L.		Not indigenous; Naturalised
Asteraceae	*Hilliardiella elaeagnoides*	(DC.) Swelank. & J.C.Manning		Indigenous
Poaceae	*Hyparrhenia hirta*	(L.) Stapf	LC	Indigenous
Acanthaceae	*Hypoestes aristata var. alba*	(Vahl) Sol. ex Roem. & Schult. K.Balkwill	LC	Indigenous
Hypoxidaceae	*Hypoxis acuminata*	Baker	LC	Indigenous
Hypoxidaceae	*Hypoxis argentea var. sericea*	Harv. ex Baker Baker	LC	Indigenous
Hypoxidaceae	*Hypoxis hemerocallidea*	Fisch., C.A.Mey. & Ave-Lall.	LC	Indigenous
Fabaceae	*Indigofera daleoides var. daleoides*	Benth. ex Harv.	NE	Indigenous
Fabaceae	*Indigofera heterotricha*	DC.	LC	Indigenous
Fabaceae	*Indigofera torulosa var. torulosa*	E.Mey.	LC	Indigenous
Fabaceae	*Indigofera vicioides subsp. vicioides*	Jaub. & Spach	LC	Indigenous
Convolvulaceae	*Ipomoea bathycolpos*	Hallier f.	LC	Indigenous; Endemic
Convolvulaceae	*Ipomoea crassipes var. crassipes*	Hook.	LC	Indigenous
Convolvulaceae	*Ipomoea oblongata*	E.Mey. ex Choisy	LC	Indigenous
Convolvulaceae	*Ipomoea obscura var. obscura*	(L.) Ker Gawl.	LC	Indigenous
Convolvulaceae	*Ipomoea purpurea*	(L.) Roth		Not indigenous; Naturalised; Invasive

Convolvulaceae	*Ipomoea sp.*			
Poaceae	*Ischaemum afrum*	(J.F.Gmel.) Dandy	LC	Indigenous
Euphorbiaceae	*Jatropha zeyheri*	Sond.	LC	Indigenous
Juncaceae	*Juncus rigidus*	Desf.	LC	Indigenous
Crassulaceae	*Kalanchoe rotundifolia*	(Haw.) Haw.	LC	Indigenous
Achariaceae	*Kiggelaria africana*	L.	LC	Indigenous
Sapindaceae	*Koelreuteria paniculata*	Laxm.		Not indigenous; Cultivated; Naturalised
Asteraceae	*Lactuca inermis*	Forssk.	LC	Indigenous
Asteraceae	*Lactuca serriola*	L.		Not indigenous; Naturalised
Verbenaceae	*Lantana rugosa*	Thunb.	LC	Indigenous
Poaceae	*Leersia hexandra*	Sw.	LC	Indigenous
Euphorbiaceae	*Leidesia procumbens*	(L.) Prain	LC	Indigenous
Araceae	*Lemna minor*	L.	LC	Indigenous
Lamiaceae	*Leonotis pentadentata*	J.C.Manning & Goldblatt	LC	Indigenous
Brassicaceae	*Lepidium africanum subsp. africanum*	(Burm.f.) DC.	LC	Indigenous
Brassicaceae	*Lepidium bonariense*	L.		Not indigenous; Naturalised
Rosaceae	*Leucosidea sericea*	Eckl. & Zeyh.	LC	Indigenous
Oleaceae	*Ligustrum lucidum*	W.T.Aiton		Not indigenous; Cultivated; Naturalised; Invasive
Verbenaceae	*Lippia scaberrima*	Sond.	LC	Indigenous
Fabaceae	*Listia bainesii*	(Baker) B.-E.van Wyk & Boatwr.	LC	Indigenous
Fabaceae	*Listia heterophylla*	E.Mey.	LC	Indigenous
Boraginaceae	*Lithospermum cinereum*	A.DC.	LC	Indigenous
Poaceae	*Lolium temulentum*	L.	NE	Not indigenous; Naturalised; Invasive
Berberidaceae	*Mahonia oiwakensis*	Hayata		Not indigenous; Cultivated; Naturalised
Malvaceae	*Malva arborea*	(L.) Webb & Berthel.		Not indigenous; Naturalised; Invasive
Malvaceae	*Malva parviflora*	L.		Not indigenous; Naturalised
Malvaceae	*Malva parviflora var. parviflora*	L.		Not indigenous; Naturalised
Malvaceae	*Malva sylvestris*	L.		Not indigenous; Naturalised
Malvaceae	*Malvastrum coromandelianum*	(L.) Garcke		Not indigenous; Naturalised; Invasive
Euphorbiaceae	*Manihot esculenta*	Crantz	NE	Not indigenous; Cultivated; Naturalised
Marsileaceae	*Marsilea farinosa subsp. farinosa*	Launert	LC	Indigenous
Marsileaceae	*Marsilea sp.*			
Fabaceae	*Medicago polymorpha*	L.	NE	Not indigenous; Naturalised; Invasive
Fabaceae	*Medicago sativa*	L.	NE	Not indigenous; Cultivated; Naturalised; Invasive
Myrtaceae	*Melaleuca citrina*	(Curtis) Dum.Cours.		Not indigenous; Cultivated; Naturalised; Invasive

Myrtaceae	*Melaleuca viminalis subsp. viminalis*	(Sol. ex Gaertn.) Byrnes		Not indigenous; Cultivated; Naturalised; Invasive
Meliaceae	*Melia azedarach*	L.	NE	Not indigenous; Naturalised; Invasive
Melianthaceae	*Melianthus comosus*	Vahl	LC	Indigenous
Fabaceae	*Melilotus albus*	Medik.	NE	Not indigenous; Naturalised; Invasive
Oleaceae	*Menodora africana*	Hook.	LC	Indigenous
Phrymaceae	*Mimulus gracilis*	R.Br.	LC	Indigenous
Nyctaginaceae	*Mirabilis jalapa*	L.		Not indigenous; Naturalised; Invasive
Malvaceae	*Modiola caroliniana*	(L.) G.Don		Not indigenous; Naturalised
Cucurbitaceae	*Momordica balsamina*	L.	LC	Indigenous
Moraceae	*Morus alba*	L.		Not indigenous; Naturalised; Invasive
Moraceae	*Morus alba var. alba*	L.		Not indigenous; Naturalised
Fabaceae	*Mundulea sericea*	(Willd.) A.Chev.		Indigenous
Haloragaceae	*Myriophyllum spicatum*	L.		Not indigenous; Cultivated; Naturalised; Invasive
Berberidaceae	*Nandina domestica*	Thunb.		Not indigenous; Cultivated; Naturalised; Invasive
Scrophulariaceae	*Nemesia fruticans*	(Thunb.) Benth.	LC	Indigenous
Fabaceae	*Neorautanenia ficifolia*	(Benth.) C.A.Sm.	LC	Indigenous
Amaryllidaceae	*Nerine krigei*	W.F.Barker	LC	Indigenous; Endemic
Apocynaceae	*Nerium oleander*	L.	NE	Not indigenous; Naturalised; Invasive
Asteraceae	*Nidorella anomala*	Steetz	LC	Indigenous
Alliaceae	*Nothoscordum borbonicum*	Kunth	NE	Not indigenous; Naturalised; Invasive
Alliaceae	*Nothoscordum gracile*	(Aiton) Stearn		Not indigenous; Naturalised; Invasive
Onagraceae	*Oenothera rosea*	L'Her. ex Aiton		Not indigenous; Naturalised; Invasive
Onagraceae	*Oenothera tetraptera*	Cav.		Not indigenous; Naturalised; Invasive
Oleaceae	*Olea europaea subsp. cuspidata*	L. (Wall. ex G.Don) Cif.		Indigenous
Resedaceae	*Oligomeris dregeana*	(Mull.Arg.) Mull.Arg.	LC	Indigenous
Cactaceae	*Opuntia ficus-indica*	(L.) Mill.	NE	Not indigenous; Cultivated; Naturalised; Invasive
Asteraceae	*Osteospermum scariosum var. scariosum*	DC.	NE	Indigenous
Oxalidaceae	*Oxalis corniculata*	L.		Not indigenous; Naturalised; Invasive
Oxalidaceae	*Oxalis latifolia*	Kunth		Not indigenous; Naturalised; Invasive
Poaceae	*Panicum coloratum*	L.	LC	Indigenous
Poaceae	*Panicum maximum*	Jacq.	LC	Indigenous
Poaceae	*Panicum schinzii*	Hack.	LC	Indigenous
Poaceae	*Paspalum dilatatum*	Poir.	NE	Not indigenous; Naturalised; Invasive
Rubiaceae	*Pavetta zeyheri subsp. zeyheri*	Sond.	LC	Indigenous
Malvaceae	*Pavonia burchellii*	(DC.) R.A.Dyer	LC	Indigenous

Fabaceae	***Pearsonia bracteata***	**(Benth.) Polhill**	**NT**	**Indigenous; Endemic**
Poaceae	*Pennisetum clandestinum*	Hochst. ex Chiov.	NE	Not indigenous; Naturalised; Invasive
Poaceae	*Pennisetum macrourum*	Trin.	LC	Indigenous
Poaceae	*Pennisetum setaceum*	(Forssk.) Chiov.	NE	Not indigenous; Naturalised; Invasive
Poaceae	*Perotis patens*	Gand.	LC	Indigenous
Polygonaceae	*Persicaria hystricula*	(J.Schust.) Sojak	LC	Indigenous
Polygonaceae	*Persicaria lapathifolia*	(L.) Delarbre		Not indigenous; Naturalised; Invasive
Molluginaceae	*Pharnaceum sp.*			
Arecaceae	*Phoenix canariensis*	Chabaud		Not indigenous; Cultivated; Naturalised; Invasive
Poaceae	*Phragmites australis*	(Cav.) Steud.	LC	Indigenous
Poaceae	*Phragmites mauritianus*	Kunth	LC	Indigenous
Phyllanthaceae	*Phyllanthus incurvus*	Thunb.	LC	Indigenous
Phyllanthaceae	*Phyllanthus maderaspatensis*	L.	LC	Indigenous
Solanaceae	*Physalis viscosa*	L.		Not indigenous; Naturalised; Invasive
Plantaginaceae	*Plantago lanceolata*	L.	LC	Indigenous
Plantaginaceae	*Plantago major*	L.		Not indigenous; Naturalised
Plumbaginaceae	*Plumbago auriculata*	Lam.	LC	Indigenous
Poaceae	*Poa annua*	L.	NE	Not indigenous; Naturalised
Podocarpaceae	*Podocarpus henkelii*	Stapf ex Dallim. & A.B.Jacks.	LC	Indigenous; Endemic
Poaceae	*Pogonarthria squarrosa*	(Roem. & Schult.) Pilg.	LC	Indigenous
Polygalaceae	*Polygala leptophylla var. leptophylla*	Burch.	LC	Indigenous
Polygonaceae	*Polygonum aviculare*	L.		Not indigenous; Naturalised
Salicaceae	*Populus canescens*	(Aiton) Sm.		Not indigenous; Naturalised; Invasive
Salicaceae	*Populus deltoides subsp. deltoides*	Bartram ex Marshall		Not indigenous; Naturalised; Invasive
Salicaceae	*Populus nigra var. italica*	L. Munchh.		Not indigenous; Naturalised; Invasive
Portulacaceae	*Portulaca sp.*			
Potamogetonaceae	*Potamogeton pectinatus*	L.	LC	Indigenous
Asteraceae	*Pseudognaphalium luteoalbum*	(L.) Hilliard & B.L.Burtt	LC	Cryptogenic
Asteraceae	*Pseudognaphalium oligandrum*	(DC.) Hilliard & B.L.Burtt	LC	Indigenous
Asteraceae	*Pseudopegolettia tenella*	(DC.) H.Rob., Skvarla & V.A.Funk		Indigenous
Pedaliaceae	*Pterodiscus speciosus*	Hook.	LC	Indigenous
Rosaceae	*Pyracantha angustifolia*	(Franch.) C.K.Schneid.		Not indigenous; Cultivated; Naturalised; Invasive
Rosaceae	*Pyracantha koidzumii*	(Hayata) Rehder		Not indigenous; Cultivated; Naturalised; Invasive
Rosaceae	*Pyracantha sp.*			
Fagaceae	*Quercus robur*	L.		Not indigenous; Cultivated; Naturalised; Invasive

Ranunculaceae	*Ranunculus dregei*	J.C.Manning & Goldblatt	LC	Indigenous
Ranunculaceae	*Ranunculus multifidus*	Forssk.	LC	Indigenous
Apocynaceae	*Raphionacme hirsuta*	(E.Mey.) R.A.Dyer	LC	Indigenous
Apocynaceae	*Raphionacme velutina*	Schltr.	LC	Indigenous
Brassicaceae	*Rapistrum rugosum*	(L.) All.		Not indigenous; Naturalised; Invasive
Rhamnaceae	*Rhamnus prinoides*	L'Her.	LC	Indigenous
Rosaceae	*Rhaphiolepis indica*	(L.) Lindl.		Not indigenous; Cultivated; Naturalised
Fabaceae	*Rhynchosia totta var. totta*	(Thunb.) DC.	LC	Indigenous
Fabaceae	*Robinia pseudoacacia*	L.	NE	Not indigenous; Naturalised; Invasive
Polygonaceae	*Rumex crispus*	L.		Not indigenous; Naturalised; Invasive
Salicaceae	*Salix babylonica var. babylonica*	L.		Not indigenous; Naturalised
Salicaceae	*Salix fragilis var. fragilis*	L.		Not indigenous; Cultivated; Naturalised; Invasive
Salicaceae	*Salix mucronata subsp. mucronata*	Thunb.	LC	Indigenous
Amaranthaceae	*Salsola kali*	L.		Not indigenous; Naturalised; Invasive
Lamiaceae	*Salvia disermas*	L.	LC	Indigenous
Lamiaceae	*Salvia runcinata*	L.f.	LC	Indigenous
Adoxaceae	*Sambucus nigra*	L.		Not indigenous; Naturalised; Invasive
Anacardiaceae	*Schinus molle*	L.	NE	Not indigenous; Naturalised; Invasive
Anacardiaceae	*Schinus terebinthifolius*	Raddi	NE	Not indigenous; Cultivated; Naturalised; Invasive
Poaceae	*Schizachyrium sanguineum*	(Retz.) Alston	LC	Indigenous
Asteraceae	*Schkuhria pinnata*	(Lam.) Kuntze ex Thell.		Not indigenous; Naturalised
Cyperaceae	*Schoenoplectus muricinux*	(C.B.Clarke) J.Raynal	LC	Indigenous
Anacardiaceae	*Searsia erosa*	(Thunb.) Moffett	LC	Indigenous
Anacardiaceae	*Searsia lancea*	(L.f.) F.A.Barkley	LC	Indigenous
Anacardiaceae	*Searsia pyroides var. pyroides*	(Burch.) Moffett	LC	Indigenous
Convolvulaceae	*Seddera capensis*	(E.Mey. ex Choisy) Hallier f.	LC	Indigenous
Scrophulariaceae	*Selago burkei*	Rolfe	LC	Indigenous; Endemic
Scrophulariaceae	*Selago welwitschii var. australis*	Rolfe Hilliard	LC	Indigenous
Asteraceae	*Senecio consanguineus*	DC.	LC	Indigenous
Asteraceae	*Senecio sp.*			
Asteraceae	*Senecio venosus*	Harv.	LC	Indigenous
Fabaceae	*Senegalia caffra*	(Thunb.) P.J.H.Hurter & Mabb.	LC	Indigenous
Fabaceae	*Senna corymbosa*	(Lam.) H.S.Irwin & Barneby	NE	Not indigenous; Cultivated; Naturalised
Fabaceae	*Senna italica subsp. arachoides*	Mill. (Burch.) Lock	LC	Indigenous

Fabaceae	*Sesbania punicea*	(Cav.) Benth.	NE	Not indigenous; Naturalised; Invasive
Poaceae	*Setaria incrassata*	(Hochst.) Hack.	LC	Indigenous
Poaceae	*Setaria sphacelata var. torta*	(Schumach.) Stapf & C.E.Hubb. ex M.B.Moss (Stapf) Clayton	LC	Indigenous
Poaceae	*Setaria verticillata*	(L.) P.Beauv.	LC	Indigenous
Malvaceae	*Sida chrysantha*	Ulbr.	LC	Indigenous
Malvaceae	*Sida dregei*	Burtt Davy	LC	Indigenous
Malvaceae	*Sida rhombifolia subsp. rhombifolia*	L.	LC	Indigenous
Malvaceae	*Sida spinosa var. spinosa*	L.	LC	Indigenous
Caryophyllaceae	*Silene burchellii subsp. pilosellifolia*	Otth ex DC. (Cham. & Schltdl.) J.C.Manning & Goldblatt		Indigenous
Caryophyllaceae	*Silene gallica*	L.		Not indigenous; Naturalised
Brassicaceae	*Sisymbrium irio*	L.		Not indigenous; Naturalised
Solanaceae	*Solanum chenopodioides*	Lam.		Not indigenous; Naturalised; Invasive
Solanaceae	*Solanum elaeagnifolium*	Cav.		Not indigenous; Naturalised; Invasive
Solanaceae	*Solanum mauritianum*	Scop.		Not indigenous; Naturalised; Invasive
Solanaceae	*Solanum nigrum*	L.		Not indigenous; Naturalised
Asteraceae	*Sonchus asper subsp. asper*	(L.) Hill		Not indigenous; Naturalised; Invasive
Asteraceae	*Sonchus oleraceus*	L.		Not indigenous; Naturalised; Invasive
Malvaceae	*Sphaeralcea bonariensis*	(Cav.) Griseb.		Not indigenous; Naturalised
Poaceae	*Sporobolus africanus*	(Poir.) Robyns & Tournay	LC	Indigenous
Poaceae	*Sporobolus fimbriatus*	(Trin.) Nees	LC	Indigenous
Poaceae	*Sporobolus pyramidalis*	P.Beauv.	LC	Indigenous
Lamiaceae	*Stachys spathulata*	Burch. ex Benth.	LC	Indigenous
Apocynaceae	*Stenostelma capense*	Schltr.	LC	Indigenous
Poaceae	*Stipagrostis uniplumis var. neesii*	(Licht.) De Winter (Trin. & Rupr.) De Winter	LC	Indigenous
Strelitziaceae	*Strelitzia reginae*	Banks		Indigenous
Strelitziaceae	*Strelitzia reginae subsp. reginae*	Banks	LC	Indigenous
Asteraceae	*Tagetes minuta*	L.		Not indigenous; Naturalised; Invasive
Talinaceae	*Talinum caffrum*	(Thunb.) Eckl. & Zeyh.	LC	Indigenous
Asteraceae	*Taraxacum officinale*	Weber		Not indigenous; Naturalised
Cupressaceae	*Taxodium distichum var. distichum*	(L.) Rich.		Not indigenous; Cultivated; Naturalised
Santalaceae	*Thesium costatum var. juniperinum*	A.W.Hill A.W.Hill	LC	Indigenous
Santalaceae	*Thesium impeditum*	A.W.Hill	LC	Indigenous
Santalaceae	*Thesium procerum*	N.E.Br.	LC	Indigenous; Endemic
Santalaceae	*Thesium resedoides*	A.W.Hill	LC	Indigenous
Santalaceae	*Thesium sp.*	L.		

Santalaceae	*Thesium transvaalense*	Schltr.	LC	Indigenous; Endemic
Santalaceae	*Thesium utile*	A.W.Hill	LC	Indigenous
Fabaceae	*Tipuana tipu*	(Benth.) Kuntze		Not indigenous; Naturalised; Invasive
Commelinaceae	*Tradescantia pallida*	(Rose) D.R.Hunt		Not indigenous; Cultivated; Naturalised
Asteraceae	*Tragopogon dubius*	Scop.		Not indigenous; Naturalised
Poaceae	*Tragus berteronianus*	Schult.	LC	Indigenous
Zygophyllaceae	*Tribulus terrestris*	L.	LC	Indigenous
Fabaceae	*Trifolium burchellianum subsp. burchellianum*	Ser.	LC	Indigenous
Fabaceae	*Trifolium repens*	L.	NE	Not indigenous; Naturalised
Poaceae	*Triraphis andropogonoides*	(Steud.) E.Phillips	LC	Indigenous
Malvaceae	*Triumfetta sonderi*	Ficalho & Hiern	LC	Indigenous; Endemic
Alliaceae	*Tulbaghia acutiloba*	Harv.	LC	Indigenous
Alliaceae	*Tulbaghia simmleri*	P.Beauv.	LC	Indigenous; Endemic
Alliaceae	*Tulbaghia violacea subsp. violacea*	Harv.	LC	Indigenous; Endemic
Ulmaceae	*Ulmus minor*	Mill.		Not indigenous; Cultivated; Naturalised
Ulmaceae	*Ulmus parvifolia*	Jacq.		Not indigenous; Cultivated; Naturalised; Invasive
Poaceae	*Urochloa mosambicensis*	(Hack.) Dandy	LC	Indigenous
Fabaceae	*Vachellia karroo*	(Hayne) Banfi & Galasso	LC	Indigenous
Fabaceae	*Vachellia robusta subsp. robusta*	(Burch.) Kyal. & Boatwr.	LC	Indigenous
Vahliaceae	*Vahlia capensis subsp. vulgaris var. linearis*	(L.f.) Thunb. Bridson E.Mey. ex Bridson	NE	Indigenous
Verbenaceae	*Verbena bonariensis*	L.		Not indigenous; Naturalised; Invasive
Verbenaceae	*Verbena officinalis*	L.		Not indigenous; Naturalised
Fabaceae	*Vigna unguiculata subsp. stenophylla*	(L.) Walp. (Harv.) Marechal, Mascherpa & Stainier	LC	Indigenous
Fabaceae	*Vigna vexillata var. vexillata*	(L.) A.Rich.	LC	Indigenous
Apocynaceae	*Vinca major*	L.	NE	Not indigenous; Naturalised; Invasive
Poaceae	*Vulpia myuros*	(L.) C.C.Gmel.	NE	Not indigenous; Naturalised; Invasive
Campanulaceae	*Wahlenbergia denticulata var. transvaalensis*	(Burch.) A.DC. (Adamson) Welman	LC	Indigenous; Endemic
Campanulaceae	*Wahlenbergia magaliesbergensis*	Lammers	LC	Indigenous; Endemic
Asteraceae	*Xanthium spinosum*	L.		Not indigenous; Naturalised; Invasive
Asteraceae	*Zinnia peruviana*	(L.) L.		Not indigenous; Naturalised; Invasive
Rhamnaceae	*Ziziphus mucronata subsp. mucronata*	Willd.	LC	Indigenous
Rhamnaceae	*Ziziphus zeyheriana*	Sond.	LC	Indigenous

13. Appendix C – Amphibian species expected to occur in the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Amietia angolensis	Angolan River Frog	Unlisted	LC
Amietia delalandii	Delalande's River Frog	LC	Unlisted
Amietia fuscigula	Cape River Frog	LC	LC
Breviceps adspersus	Bushveld Rain Frog	LC	LC
Cacosternum boettgeri	Common Caco	LC	LC
Kassina senegalensis	Bubbling Kassina	LC	LC
Phrynobatrachus natalensis	Snoring Puddle Frog	LC	LC
Phrynomantis bifasciatus	Banded Rubber Frog	LC	LC
Ptychadena anchietae	Plain Grass Frog	LC	LC
Pyxicephalus adspersus	**Giant Bull Frog**	**NT**	**LC**
Schismaderma carens	Red Toad	LC	LC
Sclerophrys capensis	Raucous Toad	LC	LC
Sclerophrys garmani	Olive Toad	LC	LC
Sclerophrys gutturalis	Guttural Toad	LC	LC
Sclerophrys poweri	Power's Toad	LC	LC
Strongylopus fasciatus	Striped Stream Frog	LC	LC
Tomopterna cryptotis	Tremelo Sand Frog	LC	LC
Tomopterna natalensis	Natal Sand Frog	LC	LC
Tomopterna tandyi	Tandy's Sand Frog	LC	LC
Xenopus laevis	Common Platanna	LC	LC

14. Appendix D – Reptile species expected to occur in the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Acontias gracilicauda	Thin-tailed Legless Skink	LC	LC
Afroedura nivaria	Drankensberg Flat Gecko	LC	LC
Afrotyphlops bibronii	Bibron's Blind Snake	LC	LC
Agama aculeata distanti	Distant's Ground Agama	LC	LC
Agama atra	Southern Rock Agama	LC	LC
Aparallactus capensis	Black-headed Centipede-eater	LC	LC
Bitis arietans arietans	Puff Adder	LC	Unlisted
Boaedon capensis	Brown House Snake	LC	LC
Causus rhombeatus	Rhombic Night Adder	LC	LC
Chamaeleo dilepis	Common Flap-neck Chameleon	LC	LC
Cordylus vittifer	Common Girdled Lizard	LC	LC
Crotaphopeltis hotamboeia	Red-lipped Snake	LC	Unlisted
Dasypeltis scabra	Rhombic Egg-eater	LC	LC
Gerrhosaurus flavigularis	Yellow-throated Plated Lizard	LC	Unlisted
Hemachatus haemachatus	Rinkhals	LC	LC
Hemidactylus mabouia	Common Tropical House Gecko	LC	Unlisted
Kinixys lobatsiana	Lobatse Hinged Tortoise	LC	LC
Lamprophis aurora	Aurora House Snake	LC	LC
Leptotyphlops scutifrons scutifrons	Peters' Thread Snake	LC	Unlisted
Lycodonomorphus rufulus	Brown Water Snake	LC	Unlisted
Lycophidion capense capense	Cape Wolf Snake	LC	Unlisted
Lygodactylus capensis	Common Dwarf Gecko		
Monopeltis capensis	Cape Worm Lizard	LC	LC
Naja nivea	Cape Cobra	LC	Unlisted
Nucras holubi	Holub's Sandveld Lizard	LC	Unlisted
Pachydactylus capensis	Cape Gecko	LC	Unlisted
Panaspis wahlbergii	Wahlberg's Snake-eyed Skink		
Pelomedusa galeata	South African Marsh Terrapin	Not evaluated	Unlisted
Prosymna ambigua	Angolan Shovel-snout	Unlisted	LC
Prosymna sundevallii	Sundevall's Shovel-snout	LC	LC
Psammophis brevirostris	Short-snouted Grass Snake	LC	Unlisted
Psammophis leightoni	**Cape Sand Snake**	**VU**	**LC**
Psammophylax rhombeatus	Spotted Grass Snake	LC	Unlisted
Psammophylax tritaeniatus	Striped Grass Snake	LC	LC
Pseudaspis cana	Mole Snake	LC	Unlisted
Rhinotyphlops lalandei	Delalande's Beaked Blind Snake	LC	Unlisted
Stigmochelys pardalis	Leopard Tortoise	LC	LC

Trachylepis capensis	Cape Skink	LC	Unlisted
Trachylepis punctatissima	Speckled Rock Skink	LC	LC
Trachylepis punctulata	Speckled Sand Skink		
Trachylepis varia sensu lato	Common Variable Skink Complex		
Varanus albigularis albigularis	Rock Monitor	LC	Unlisted
Varanus niloticus	Water Monitor	LC	Unlisted

15. Appendix E – Mammal species expected to occur within the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Aethomys ineptus	Tete Veld Aethomys	LC	LC
Aethomys namaquensis	Namaqua Rock Mouse	LC	LC
Aonyx capensis	**African Clawless Otter**	**NT**	**NT**
Atelerix frontalis	**Southern African Hedgehog**	**NT**	**LC**
Atilax paludinosus	Marsh Mongoose	LC	LC
Canis mesomelas	Black-backed Jackal	LC	LC
Caracal caracal	Caracal	LC	LC
Chaerephon pumilus	Little Free-tailed Bat	LC	LC
Chlorocebus pygerythrus	Vervet Monkey	LC	LC
Crocidura cyanea	Reddish-grey Musk Shrew	LC	LC
Crocidura fuscomurina	Tiny Musk Shrew	LC	LC
Crocidura maquassiensis	**Makwassie musk shrew**	**VU**	**LC**
Crocidura mariquensis	**Swamp Musk Shrew**	**NT**	**LC**
Cryptomys hottentotus	Southern African Mole-rat	LC	LC
Cynictis penicillata	Yellow Mongoose	LC	LC
Dama dama	Fallow Deer		
Dendromus melanotis	Gray African Climbing Mouse	LC	LC
Desmodillus auricularis	Short-tailed Gerbil	LC	LC
Eidolon helvum	**African Straw-colored Fruit Bat**	**LC**	**NT**
Elaphurus davidianus	Père David's Deer		
Elephantulus myurus	Eastern Rock Elephant Shrew	LC	LC
Epomophorus wahlbergi	Wahlberg's epauletted fruit bat	LC	LC
Eptesicus hottentotus	Long-tailed Serotine Bat	LC	LC
Felis nigripes	**Black-footed Cat**	**VU**	**VU**
Felis silvestris	African Wildcat	LC	LC
Galerella sp.	Slender Mongooses		
Genetta genetta	Common Genet	LC	LC
Genetta maculata	Common Large-spotted Genet	LC	LC
Genetta tigrina	Cape Genet (Cape Large-spotted Genet)	LC	LC
Gerbilliscus brantsii	Highveld Gerbil	LC	LC
Gerbilliscus leucogaster	Bushveld Gerbil	LC	LC
Graphiurus (Graphiurus) platyops	Flat-headed African Dormouse		
Herpestes sanguineus	Slender Mongoose	LC	LC
Hydrictis maculicollis	**Spotted-necked Otter**	**VU**	**NT**
Hystrix africaeaustralis	Cape Porcupine	LC	LC
Ichneumia albicauda	White-tailed Mongoose	LC	LC
Ictonyx striatus	Striped Polecat	LC	LC

Leptailurus serval	**Serval**	**NT**	**LC**
Lepus capensis	Cape Hare	LC	LC
Lepus saxatilis	Scrub Hare	LC	LC
Lepus victoriae	African Savanna Hare	LC	LC
Malacothrix typica	Gerbil Mouse	LC	LC
Mastomys coucha	Southern African Mastomys	LC	LC
Mastomys natalensis	Natal Mastomys	LC	LC
Mastomys sp.	Multimammate Mice		
Mellivora capensis	Honey Badger	LC	LC
Miniopterus natalensis	Natal Long-fingered Bat		
Mus (Nannomys) indutus	Desert Pygmy Mouse		
Mus (Nannomys) minutoides	Southern African Pygmy Mouse		
Mus musculus	House Mouse	Unlisted	LC
Myosorex varius	Forest Shrew	LC	LC
Myotis tricolor	Temminck's Myotis	LC	LC
Mystromys albicaudatus	**African White-tailed Rat**	**VU**	**EN**
Neoromicia capensis	Cape Serotine	LC	LC
Neoromicia zuluensis	Aloe Bat	LC	LC
Nycteris thebaica	Egyptian Slit-faced Bat	LC	LC
Orycteropus afer	Aardvark	LC	LC
Otocyon megalotis	Bat-eared Fox	LC	LC
Otomys auratus	**Southern African Vlei Rat (Grassland type)**	**NT**	**NT**
Otomys irroratus	Vlei Rat (Fynbos type)	LC	LC
Panthera pardus	**Leopard**	**VU**	**VU**
Papio ursinus	Chacma Baboon	LC	LC
Parahyaena brunnea	**Brown Hyaena**	**NT**	**NT**
Paraxerus cepapi	Smith's Bush Squirrel	LC	LC
Pedetes capensis	South African Spring Hare	LC	LC
Phacochoerus africanus	Common Warthog	LC	LC
Poecilogale albinucha	**African Striped Weasel**	**NT**	**LC**
Potamochoerus larvatus koiropotamus	Bush-pig (subspecies koiropotamus)		
Potamochoerus porcus	Red River Hog		
Procavia capensis	Cape Rock Hyrax	LC	LC
Pronolagus randensis	Jameson's Red Rock Hare	LC	LC
Pronolagus sp.	Rock-hares		
Proteles cristata	Aardwolf	LC	LC
Raphicerus campestris	Steenbok	LC	LC
Rattus rattus	House Rat	Exotic (Not listed)	LC
Rhabdomys pumilio	Xeric Four-striped Grass Rat	LC	LC

Rhinolophus clivosus	Geoffroy's Horseshoe Bat	LC	LC
Rhinolophus darlingi	Darling's Horseshoe Bat	LC	LC
Saccostomus campestris	Southern African Pouched Mouse	LC	LC
Scotophilus dinganii	Yellow House Bat	LC	LC
Steatomys krebsii	Krebs's Fat Mouse	LC	LC
Steatomys pratensis	Fat Mouse	LC	LC
Suncus varilla	Lesser Dwarf Shrew	LC	LC
Suricata suricatta	Meerkat	LC	LC
Sylvicapra grimmia	Bush Duiker	LC	LC
Tadarida aegyptiaca	Egyptian Free-tailed Bat	LC	LC
Thryonomys swinderianus	Greater Cane Rat	LC	LC
Vulpes chama	Cape Fox	LC	LC
Xerus inauris	South African Ground Squirrel	LC	LC

16. Appendix F – Avifauna species expected to occur within the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Accipiter badius	Shikra	Unlisted	LC
Accipiter melanoleucus	Black Sparrowhawk	Unlisted	LC
Acridotheres tristis	Common Myna	Unlisted	LC
Acrocephalus arundinaceus	Great Reed Warbler	Unlisted	LC
Acrocephalus baeticatus	African Reed Warbler	Unlisted	Unlisted
Acrocephalus gracilirostris	Lesser Swamp Warbler	Unlisted	LC
Acrocephalus palustris	Marsh Warbler	Unlisted	LC
Actitis hypoleucos	Common Sandpiper	Unlisted	LC
Afrotis afraoides	Northern Black Korhaan	Unlisted	LC
Alopochen aegyptiaca	Egyptian Goose		
Amadina erythrocephala	Red-headed Finch	Unlisted	LC
Amadina fasciata	Cut-throat Finch	Unlisted	Unlisted
Amandava subflava	Orange-breasted Waxbill	Unlisted	Unlisted
Amblyospiza albifrons	Thick-billed Weaver	Unlisted	LC
Anas capensis	Cape Teal	Unlisted	LC
Anas erythrorhyncha	Red-billed Teal	Unlisted	LC
Anas platyrhynchos	Mallard	Unlisted	LC
Anas sparsa	African Black Duck	Unlisted	LC
Anas undulata	Yellow-billed Duck	Unlisted	LC
Anhinga rufa	African Darter	Unlisted	LC
Anomalospiza imberbis	Cuckoo Finch	Unlisted	LC
Anser anser	Domestic Goose	Unlisted	LC
Anthoscopus minutus	Cape Penduline Tit	Unlisted	LC
Anthus cinnamomeus	African Pipit	Unlisted	LC
Anthus leucophrys	Plain-backed Pipit	Unlisted	LC
Anthus nicholsoni	Nicholson's Pipit		
Anthus vaalensis	Buffy Pipit	Unlisted	LC
Apalis thoracica	Bar-throated Apalis	Unlisted	LC
Apus affinis	Little Swift	Unlisted	LC
Apus apus	Common Swift	Unlisted	LC
Apus barbatus	African Black Swift	Unlisted	LC
Apus caffer	White-rumped Swift	Unlisted	LC
Apus horus	Horus Swift	Unlisted	LC
Ardea alba	Great Egret		
Ardea cinerea	Grey Heron	Unlisted	LC
Ardea goliath	Goliath Heron	Unlisted	LC
Ardea intermedia	Intermediate Egret	Unlisted	LC

Ardea melanocephala	Black-headed Heron	Unlisted	LC
Ardea purpurea	Purple Heron	Unlisted	LC
Ardeola ralloides	Squacco Heron	Unlisted	LC
Asio capensis	Marsh Owl	Unlisted	LC
Batis molitor	Chinspot Batis	Unlisted	LC
Batis pririt	Pririt Batis	Unlisted	LC
Bostrychia hagedash	Hadada Ibis	Unlisted	LC
Bradypterus baboecala	Little Rush Warbler	Unlisted	LC
Brunhilda erythronotos	Black-faced Waxbill		
Bubo africanus	Spotted Eagle-Owl	Unlisted	LC
Bubulcus ibis	Western Cattle Egret	Unlisted	LC
Buphagus erythrorynchus	Red-billed Oxpecker		
Burhinus capensis	Spotted Thick-knee	Unlisted	LC
Buteo buteo	Common Buzzard	Unlisted	LC
Buteo rufofuscus	Jackal Buzzard	Unlisted	LC
Calandrella cinerea	Red-capped Lark	Unlisted	LC
Calendulauda sabota	Sabota Lark	Unlisted	LC
Calidris ferruginea	**Curlew Sandpiper**	**LC**	**NT**
Calidris minuta	Little Stint	LC	LC
Calidris pugnax	Ruff		
Campethera abingoni	Golden-tailed Woodpecker	Unlisted	LC
Caprimulgus rufigena	Rufous-cheeked Nightjar	Unlisted	LC
Cecropis abyssinica	Lesser Striped Swallow	Unlisted	LC
Cecropis cucullata	Greater Striped Swallow	Unlisted	LC
Cecropis semirufa	Red-breasted Swallow	Unlisted	LC
Centropus burchellii	Burchell's Coucal	Unlisted	Unlisted
Cercotrichas leucophrys	White-browed Scrub Robin	Unlisted	LC
Cercotrichas paena	Kalahari Scrub Robin	Unlisted	LC
Certhilauda semitorquata	Eastern Long-billed Lark	Unlisted	LC
Ceryle rudis	Pied Kingfisher	Unlisted	LC
Chalcomitra amethystina	Amethyst Sunbird	Unlisted	LC
Charadrius pecuarius	Kittlitz's Plover	Unlisted	LC
Charadrius tricollaris	Three-banded Plover	Unlisted	LC
Chersomanes albofasciata	Spike-heeled Lark	Unlisted	LC
Chlidonias hybrida	Whiskered Tern	Unlisted	LC
Chlidonias leucopterus	White-winged Tern	Unlisted	LC
Chroicocephalus cirrocephalus	Grey-headed Gull	Unlisted	LC
Chrysococcyx caprius	Diederik Cuckoo	Unlisted	LC
Chrysococcyx klaas	Klaas's Cuckoo	Unlisted	LC
Ciconia nigra	**Black Stork**	**VU**	**LC**

Cinnyris talatala	White-bellied Sunbird	Unlisted	LC
Circaetus pectoralis	Black-chested Snake Eagle	Unlisted	LC
Circus macrourus	**Pallid Harrier**	**NT**	**NT**
Circus ranivorus	**African Marsh Harrier**	**EN**	**LC**
Cisticola aridulus	Desert Cisticola	Unlisted	LC
Cisticola ayresii	Wing-snapping Cisticola	Unlisted	LC
Cisticola chiniana	Rattling Cisticola	Unlisted	LC
Cisticola fulvicapilla	Neddicky	Unlisted	LC
Cisticola juncidis	Zitting Cisticola	Unlisted	LC
Cisticola lais	Wailing Cisticola	Unlisted	LC
Cisticola rufilatus	Tinkling Cisticola	Unlisted	LC
Cisticola textrix	Cloud Cisticola	Unlisted	LC
Cisticola tinniens	Levaillant's Cisticola	Unlisted	LC
Clamator glandarius	Great Spotted Cuckoo	Unlisted	LC
Clamator jacobinus	Jacobin Cuckoo	Unlisted	LC
Colius colius	White-backed Mousebird	Unlisted	LC
Colius striatus	Speckled Mousebird	Unlisted	LC
Columba guinea	Speckled Pigeon	Unlisted	LC
Columba livia	Rock Dove	Unlisted	LC
Coracias caudatus	Lilac-breasted Roller	Unlisted	LC
Coracias garrulus	**European Roller**	**NT**	**LC**
Corvus albus	Pied Crow	Unlisted	LC
Corythornis cristatus	Malachite Kingfisher		
Cossypha caffra	Cape Robin-Chat	Unlisted	LC
Cossypha humeralis	White-throated Robin-Chat	Unlisted	LC
Creatophora cinerea	Wattled Starling	Unlisted	LC
Crinifer concolor	Grey Go-away-bird		
Crithagra atrogularis	Black-throated Canary	Unlisted	LC
Crithagra flaviventris	Yellow Canary	Unlisted	LC
Crithagra gularis	Streaky-headed Seedeater	Unlisted	LC
Crithagra mozambica	Yellow-fronted Canary		
Cuculus solitarius	Red-chested Cuckoo	Unlisted	LC
Curruca communis	Common Whitethroat		
Curruca subcoerulea	Chestnut-vented Warbler		
Cursorius temminckii	Temminck's Courser	Unlisted	LC
Cypsiurus parvus	African Palm Swift	Unlisted	LC
Delichon urbicum	Common House Martin	Unlisted	LC
Dendrocygna bicolor	Fulvous Whistling Duck	Unlisted	LC
Dendrocygna viduata	White-faced Whistling Duck	Unlisted	LC
Dendropicos fuscescens	Cardinal Woodpecker	Unlisted	LC

Egretta ardesiaca	Black Heron	Unlisted	LC
Egretta garzetta	Little Egret	Unlisted	LC
Elanus caeruleus	Black-winged Kite	Unlisted	LC
Emberiza capensis	Cape Bunting	Unlisted	LC
Emberiza flaviventris	Golden-breasted Bunting	Unlisted	LC
Emberiza tahapisi	Cinnamon-breasted Bunting	Unlisted	LC
Eremomela icteropygialis	Yellow-bellied Eremomela	Unlisted	LC
Eremopterix leucotis	Chestnut-backed Sparrow-Lark	Unlisted	LC
Estrilda astrild	Common Waxbill	Unlisted	LC
Euplectes afer	Yellow-crowned Bishop	Unlisted	LC
Euplectes albonotatus	White-winged Widowbird	Unlisted	LC
Euplectes ardens	Red-collared Widowbird	Unlisted	LC
Euplectes orix	Southern Red Bishop	Unlisted	LC
Euplectes progne	Long-tailed Widowbird	Unlisted	LC
Falco amurensis	Amur Falcon	Unlisted	LC
Falco biarmicus	**Lanner Falcon**	**VU**	**LC**
Falco naumanni	Lesser Kestrel	Unlisted	LC
Falco rupicoloides	Greater Kestrel	Unlisted	LC
Falco rupicolus	Rock Kestrel	Unlisted	LC
Fulica cristata	Red-knobbed Coot	Unlisted	LC
Gallinago nigripennis	African Snipe	Unlisted	LC
Gallinula chloropus	Common Moorhen	Unlisted	LC
Glareola nordmanni	**Black-winged Pratincole**	**NT**	**NT**
Granatina granatina	Violet-eared Waxbill	Unlisted	LC
Grus paradisea	Blue Crane		
Gymnoris superciliaris	Yellow-throated Bush Sparrow	Unlisted	LC
Gyps africanus	**White-backed Vulture**	**CR**	**CR**
Halcyon albiventris	Brown-hooded Kingfisher	Unlisted	LC
Halcyon senegalensis	Woodland Kingfisher	Unlisted	LC
Haliaeetus vocifer	African Fish Eagle	Unlisted	LC
Himantopus himantopus	Black-winged Stilt	Unlisted	LC
Hippolais icterina	Icterine Warbler	Unlisted	LC
Hirundo albigularis	White-throated Swallow	Unlisted	LC
Hirundo dimidiata	Pearl-breasted Swallow	Unlisted	LC
Hirundo rustica	Barn Swallow	Unlisted	LC
Indicator minor	Lesser Honeyguide	Unlisted	LC
Jynx ruficollis	Red-throated Wryneck	Unlisted	LC
Lagonosticta rhodopareia	Jameson's Firefinch	Unlisted	LC
Lagonosticta rubricata	African Firefinch	Unlisted	LC
Lagonosticta senegala	Red-billed Firefinch	Unlisted	LC

Lamprotornis bicolor	Pied Starling	Unlisted	LC
Lamprotornis nitens	Cape Starling	Unlisted	LC
Laniarius atrococcineus	Crimson-breasted Shrike	Unlisted	LC
Laniarius ferrugineus	Southern Boubou	Unlisted	LC
Lanius collaris	Southern Fiscal	Unlisted	LC
Lanius collurio	Red-backed Shrike	Unlisted	LC
Lanius minor	Lesser Grey Shrike	Unlisted	LC
Lophaetus occipitalis	Long-crested Eagle	Unlisted	LC
Lybius torquatus	Black-collared Barbet	Unlisted	LC
Macronyx capensis	Cape Longclaw	Unlisted	LC
Megaceryle maxima	Giant Kingfisher		
Melaenornis mariquensis	Marico Flycatcher		
Melaenornis silens	Fiscal Flycatcher		
Melaniparus cinerascens	Ashy Tit		
Melierax canorus	Pale Chanting Goshawk	Unlisted	LC
Merops apiaster	European Bee-eater	Unlisted	LC
Merops bullockoides	White-fronted Bee-eater	Unlisted	LC
Merops hirundineus	Swallow-tailed Bee-eater	Unlisted	LC
Merops persicus	Blue-cheeked Bee-eater	Unlisted	LC
Merops pusillus	Little Bee-eater	Unlisted	LC
Microcarbo africanus	Reed Cormorant		
Micronisus gabar	Gabar Goshawk		
Milvus aegyptius	Yellow-billed Kite	Unlisted	Unlisted
Mirafra africana	Rufous-naped Lark	Unlisted	LC
Mirafra cheniana	**Melodious Lark**	**LC**	**NT**
Mirafra fasciolata	Eastern Clapper Lark	Unlisted	LC
Motacilla capensis	Cape Wagtail	Unlisted	LC
Muscicapa striata	Spotted Flycatcher	Unlisted	LC
Mycteria ibis	**Yellow-billed Stork**	**EN**	**LC**
Myrmecocichla formicivora	Ant-eating Chat	Unlisted	LC
Myrmecocichla monticola	Mountain Wheatear		
Netta erythrophthalma	Southern Pochard	Unlisted	LC
Nilaus afer	Brubru	Unlisted	LC
Numida meleagris	Helmeted Guineafowl	Unlisted	LC
Nycticorax nycticorax	Black-crowned Night Heron	Unlisted	LC
Oena capensis	Namaqua Dove	Unlisted	LC
Oenanthe familiaris	Familiar Chat		
Oenanthe pileata	Capped Wheatear	Unlisted	LC
Oriolus larvatus	Black-headed Oriole	Unlisted	LC
Ortygospiza atricollis	Quailfinch	Unlisted	LC

Oxyura maccoa	**Maccoa Duck**	**NT**	**VU**
Passer diffusus	Southern Grey-headed Sparrow	Unlisted	LC
Passer domesticus	House Sparrow	Unlisted	LC
Passer melanurus	Cape Sparrow	Unlisted	LC
Pavo cristatus	Indian Peafowl	Unlisted	LC
Pernis apivorus	European Honey-buzzard	Unlisted	LC
Petrochelidon spilodera	South African Cliff Swallow	Unlisted	LC
Phalacrocorax lucidus	White-breasted Cormorant	Unlisted	LC
Phoeniconaias minor	Lesser Flamingo		
Phoeniculus purpureus	Green Wood Hoopoe	Unlisted	LC
Phylloscopus trochilus	Willow Warbler	Unlisted	LC
Platalea alba	African Spoonbill	Unlisted	LC
Plectropterus gambensis	Spur-winged Goose	Unlisted	LC
Plegadis falcinellus	Glossy Ibis	Unlisted	LC
Plocepasser mahali	White-browed Sparrow-Weaver	Unlisted	LC
Ploceus capensis	Cape Weaver	Unlisted	LC
Ploceus velatus	Southern Masked Weaver	Unlisted	LC
Podiceps cristatus	Great Crested Grebe	Unlisted	LC
Podiceps nigricollis	Black-necked Grebe	Unlisted	LC
Polemaetus bellicosus	**Martial Eagle**	**EN**	**EN**
Porphyrio madagascariensis	African Swamphen	Unlisted	Unlisted
Prinia flavicans	Black-chested Prinia	Unlisted	LC
Prinia subflava	Tawny-flanked Prinia	Unlisted	LC
Prodotiscus regulus	Brown-backed Honeybird	Unlisted	LC
Pternistis natalensis	Natal Spurfowl	Unlisted	LC
Pternistis swainsonii	Swainson's Spurfowl	Unlisted	LC
Pterocles namaqua	Namaqua Sandgrouse	Unlisted	LC
Pycnonotus nigricans	African Red-eyed Bulbul	Unlisted	LC
Pycnonotus tricolor	Dark-capped Bulbul	Unlisted	Unlisted
Pytilia melba	Green-winged Pytilia	Unlisted	LC
Quelea quelea	Red-billed Quelea	Unlisted	LC
Rallus caerulescens	African Rail	Unlisted	LC
Recurvirostra avosetta	Pied Avocet	Unlisted	LC
Rhinopomastus cyanomelas	Common Scimitarbill	Unlisted	LC
Riparia cincta	Banded Martin	Unlisted	LC
Riparia paludicola	Brown-throated Martin	Unlisted	LC
Sagittarius serpentarius	**Secretarybird**	**VU**	**EN**
Sarothrura rufa	Red-chested Flufftail	Unlisted	LC
Saxicola torquatus	African Stonechat	Unlisted	LC
Scleroptila gutturalis	Orange River Francolin	Unlisted	LC

Scopus umbretta	Hamerkop	Unlisted	LC
Spatula hottentota	Blue-billed Teal		
Spatula smithii	Cape Shoveler		
Spilopelia senegalensis	Laughing Dove		
Sporopipes squamifrons	Scaly-feathered Weaver	Unlisted	LC
Stenostira scita	Fairy Flycatcher	Unlisted	LC
Streptopelia capicola	Cape Turtle Dove	Unlisted	LC
Streptopelia semitorquata	Red-eyed Dove	Unlisted	LC
Struthio camelus	Common Ostrich	Unlisted	LC
Sylvietta rufescens	Long-billed Crombec	Unlisted	LC
Tachybaptus ruficollis	Little Grebe	Unlisted	LC
Tadorna cana	South African Shelduck	Unlisted	LC
Tchagra australis	Brown-crowned Tchagra	Unlisted	LC
Telophorus zeylonus	Bokmakierie	Unlisted	LC
Terpsiphone viridis	African Paradise Flycatcher	Unlisted	LC
Thalassornis leuconotus	White-backed Duck	Unlisted	LC
Threskiornis aethiopicus	African Sacred Ibis	Unlisted	LC
Trachyphonus vaillantii	Crested Barbet	Unlisted	LC
Tricholaema leucomelas	Acacia Pied Barbet	Unlisted	LC
Tringa glareola	Wood Sandpiper	Unlisted	LC
Tringa nebularia	Common Greenshank	Unlisted	LC
Tringa stagnatilis	Marsh Sandpiper	Unlisted	LC
Turdus litsitsirupa	Groundscraper Thrush	Unlisted	Unlisted
Turdus smithi	Karoo Thrush	Unlisted	LC
Tyto alba	Western Barn Owl	Unlisted	LC
Upupa africana	African Hoopoe	Unlisted	LC
Uraeginthus angolensis	Blue Waxbill	Unlisted	LC
Urocolius indicus	Red-faced Mousebird	Unlisted	LC
Vanellus armatus	Blacksmith Lapwing	Unlisted	LC
Vanellus coronatus	Crowned Lapwing	Unlisted	LC
Vanellus senegallus	African Wattled Lapwing	Unlisted	LC
Vidua chalybeata	Village Indigobird	Unlisted	LC
Vidua funerea	Dusky Indigobird	Unlisted	LC
Vidua macroura	Pin-tailed Whydah	Unlisted	LC
Vidua paradisaea	Long-tailed Paradise Whydah	Unlisted	LC
Vidua purpurascens	Purple Indigobird	Unlisted	LC
Vidua regia	Shaft-tailed Whydah	Unlisted	LC
Zapornia flavirostra	Black Crake		
Zosterops pallidus	Orange River White-eye	Unlisted	LC
Zosterops virens	Cape White-eye	Unlisted	LC

17. Appendix G - Specialist Declarations and CVs

I, Michael Schrenk, declare that:

- 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 form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Michael Schrenk

Terrestrial Ecologist

The Biodiversity Company

April 2022

Michael Schrenk

B.Sc Civil and Environmental Engineering

Cell: +76 529 2652

Email: mike@thebiodiversitycompany.com

Identity Number: 9204165023085

Date of birth: 16 April 1992

Profile Summary

Working experience throughout Southern and West Africa.

Specialist experience in exploration, mining, engineering, private sector and renewable energy.

Experience with project management for national and international multi-disciplinary projects.

Specialist expertise include Terrestrial Ecology, Ecological Restoration and Ecosystem Services.

Areas of Interest

Sustainability and Conservation.

Species specific research and monitoring.

Community Development.

Key Experience

- Environmental, Social and Health Impact Assessments (ESHIA) and Basic Assessments
- Environmental Management Programmes (EMP)
- Rehabilitation Plans and Monitoring
- Terrestrial biodiversity assessments and surveys
- Specialist ecological assessments
- Invasive species management plans
- Search and Rescue plans

Country Experience

Botswana

Ghana

South Africa

Eswatini

Nationality

South African

Languages

English – Proficient

Afrikaans – Basic

Qualifications

- BSc (University of the Witwatersrand) – Civil and environmental engineering
- Cand Sci Nat (Pending)

OVERVIEW

An overview of the specialist technical expertise include the following:

- Faunal surveys which includes mammals, birds, amphibians and reptiles.
- The design, compilation and implementation of Biodiversity and Land Management Plans and strategies.
- Project Management.
- Ecological assessments and management plans.
- Terrestrial biodiversity surveys and monitoring.
- Rehabilitation plans and monitoring, Invasive species plans, Search and Rescue plans.
- GIS spatial analysis and digital cartography.

TRAINING

Some of the more pertinent training undergone includes the following:

- Tree Identification and Analysis; University of the Witwatersrand
- Ecological management and Assessment; GDARD and Department of Environmental Affairs

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (October 2021 – Present)

Terrestrial Ecologist / Terrestrial Unit Manager

PREVIOUS EMPLOYMENT: Wild Serve NPC (March 2016 – September 2021)

Director / Project Manager

ACADEMIC QUALIFICATIONS

University of the Witwatersrand, Johannesburg (2016): Bachelor of Science (BSc) in Civil and Environmental Engineering (with honours).

I, Martinus Erasmus, declare that:

- 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 form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Martinus Erasmus

Terrestrial Ecologist

The Biodiversity Company

April 2022

Martinus Erasmus

B-Tech Nature Conservation (*Pr Sci Nat*)

Cell: +27 82 448 1667

Email: martinus@thebiodiversitycompany.com

Identity Number: 9209035136082

Date of birth: 03 September 1992

Profile Summary

Working experience throughout Southern Africa as well as West Africa.

Specialist experience in exploration, mining, engineering, hydropower, private sector and renewable energy.

Specialist guidance, support and facilitation for the compliance with legislative processes, for in-country requirements, and international lenders.

Specialist expertise includes Botany and Terrestrial Ecology.

Areas of Interest

Mining, Oil & Gas, Renewable Energy & Bulk Services Infrastructure Development, Sustainability and Conservation

Key Experience

- Familiar with World Bank and the International Finance Corporation requirements
- Environmental, Social and Health Impact Assessments (ESHIA)
- Environmental Management Programmes (EMP)
- Rehabilitation Plans and Monitoring
- Botany, especially in the Limpopo, Mpumalanga, Gauteng and North-West provinces in South-Africa.
- Veld management and Veld condition

Country Experience

Eswatini

Guinea

Lesotho

Liberia

Mozambique

Nigeria

South Africa

Swaziland

Zambia

Zimbabwe

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient l

Qualifications

- B-Tech in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa.
- National Diploma in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa.
- Cand Sci Nat (118630)

OVERVIEW

An overview of the specialist technical expertise includes the following:

- Ecological Assessments to identify critical habitats for fauna pertaining to International Finance Corporation (IFC) financed projects;
- Faunal surveys which include mammals, birds, amphibians, and reptiles;
- Floral surveys;
    - Veld management and Veld condition;
    - Alien Invasive Plant Management Plans; and
    - Plant Rescue Management Plans.
- Rehabilitation and Monitoring; and
- GIS spatial analysis and digital cartography.

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (August 2017 – Present)

Terrestrial Ecologist

EMPLOYMENT: Enviro-Insight (January 2015 – July 2017)

General and Field assistant.

ACADEMIC QUALIFICATIONS

B-Tech in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa:

National Diploma in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed development the Stilfontein Cluster, North West Province, with separate EA applications for:
- Nine Photovoltaic (PV) facilities and associated infrastructure: Spoonbill, Sunbird, Swallow, Snipe, Shrike, Stilfontein, Sparrow, Starling and Swift;
- Three collector substations and associated infrastructure: Voelnessie A, Voelnessie B, Voelnessie C; and
- One Main Transmission Substation and associated infrastructure.

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

Details of Specialist, Declaration and Undertaking Under Oath

Page 1 of 3

1. SPECIALIST INFORMATION

Specialist Company Name:	The Biodiversity Company			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	Martinus Erasmus			
Specialist Qualifications:	B-TECH			
Professional affiliation/registration:	SACNASP # 118630			
Physical address:	771 Pendet Street, Faksen Park, 2158			
Postal address:	As above			
Postal code:	2158	Cell:	0824681667	
Telephone:		Fax:		
E-mail:	martinus@thebiodiversitycompany.com			

2. DECLARATION BY THE SPECIALIST

I, Martinus Erasmus, declare that –

- 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 form 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.

Signature of the Specialist

The Biodiversity Company

Name of Company:

17/05/2022

Date

Details of Specialist, Declaration and Undertaking Under Oath

Page 2 of 3

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Marianus Grasmus, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

The Biodiversity Company
Name of Company

17/05/2022
Date

Signature of the Commissioner of Oaths

17/05/2022
Date

Stamp

Certified as a true copy of original

Farai Shadreck Mbirimi BD52805
Minister of Religion / Commissioner of Oaths
391 11th Road, Erand, Midrand 1685

Date 17/05/2022