TERRESTRIAL BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED VANDERKLOOF SOLAR PV PROJECT

Letsemeng Local Municipality, Xhariep District Municipality, Free State Province, South Africa

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Report Name	**TERRESTRIAL BIODIVERSITY SITE SENSITIVITY VERIFICATION REPORT FOR THE PROPOSED VANDERKLOOF SOLAR PV PROJECT**
Specialist Theme	Terrestrial Biodiversity Theme
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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.

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1 Introduction

1.1 Background

The Biodiversity Company was appointed to conduct a Site Sensitivity Verification (SSV) for the proposed Vanderkloof Solar Farm Development project. The proposed project is located approximately 2.5 km south of Luckhoff on the remainder of farm 113, remainder of farm 634, farm 39, remainder of farm 253, remainder of farm 1132, portion 1 of farm 1132 and farm 654 in the Letsemeng Local and Xhariep District Municipalities of the Free State Province. The field survey was conducted from the 22nd to the 26th of April 2024. The boundaries were assessed, as provided for by the client, and are referred to as the Project Area of Influence (PAOI) for reporting purposes.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: “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).

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 proposed project.

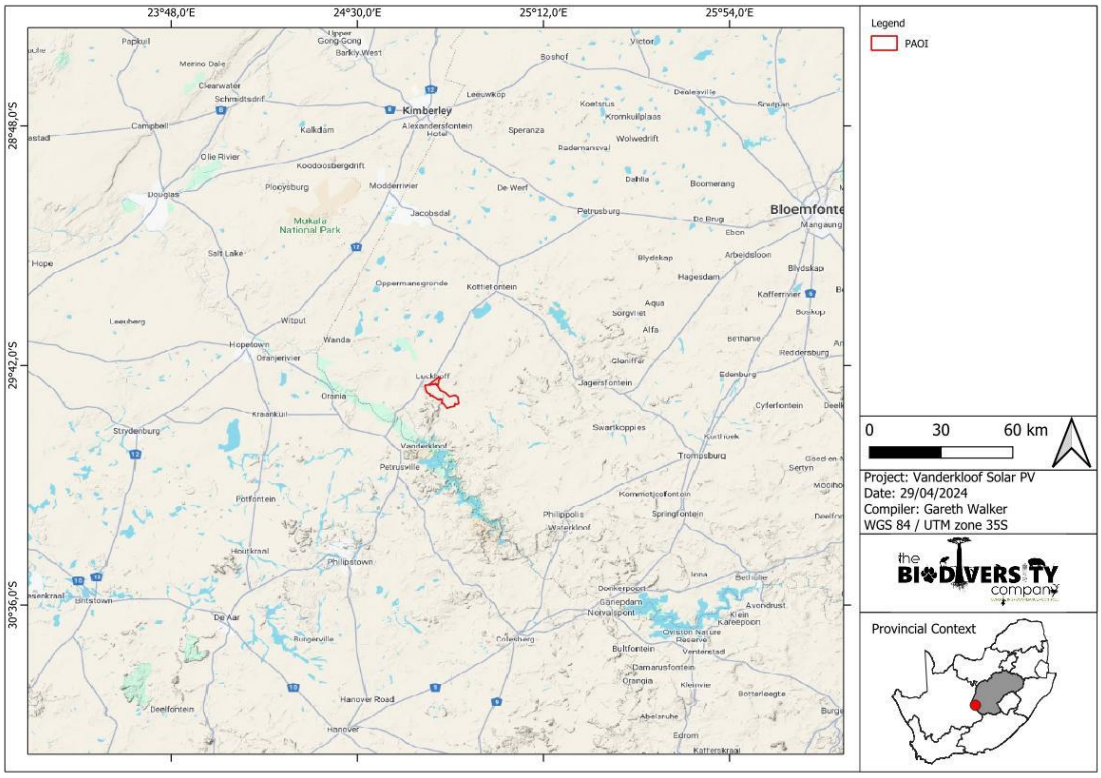


Figure 1-1 Map illustrating the regional locality of the Project Area of Influence (PAOI).

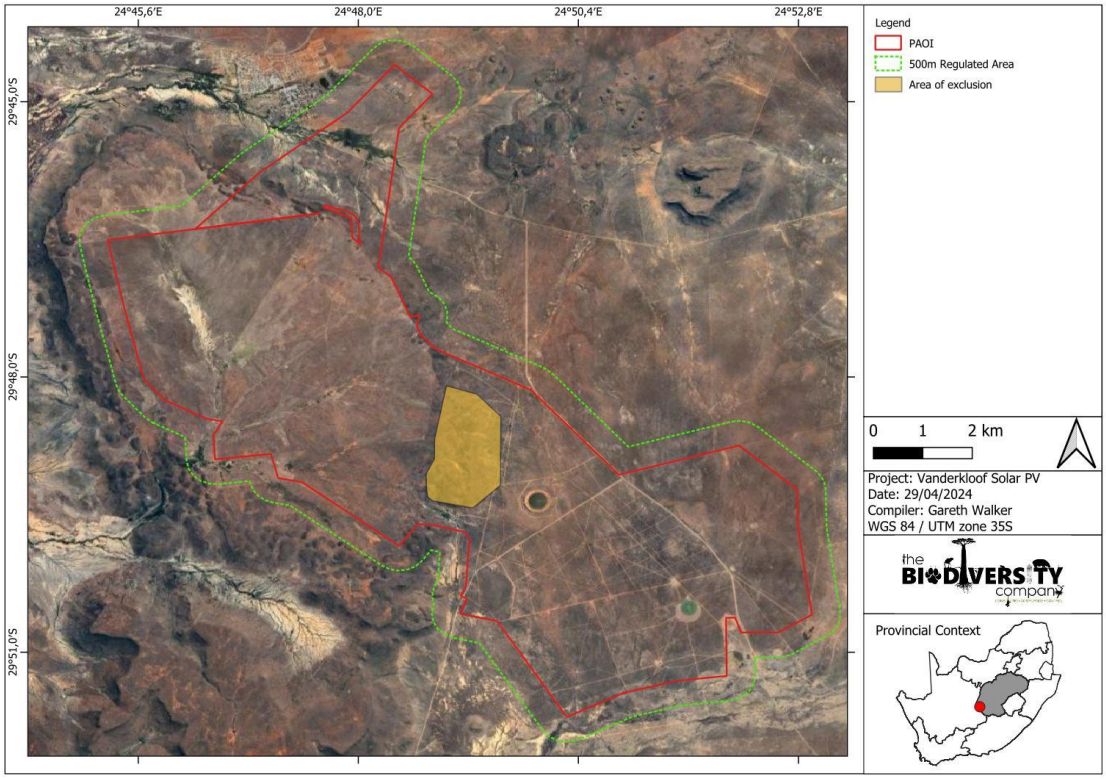


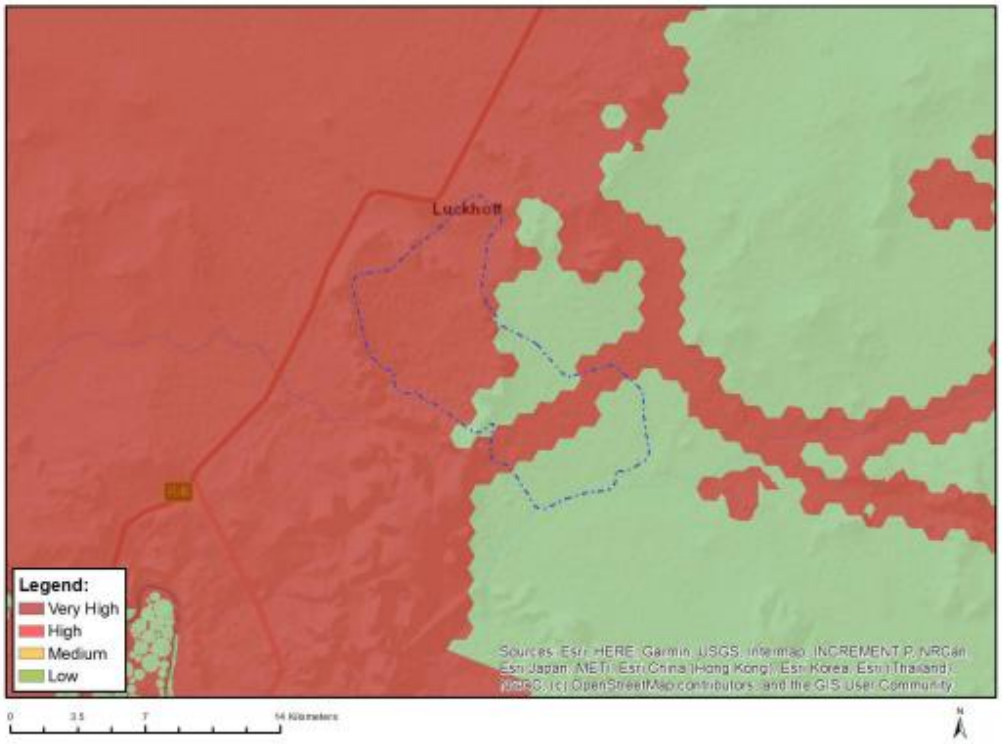
Figure 1-2 Map depicting the layout of the PAOI.

2 Screening Report

The following is deduced from the National Web-based Environmental Screening Tool Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended):

- Terrestrial Biodiversity Theme sensitivity is 'Very High' for the proposed PAOI owing to its overlap with CBA 1 & 2, ESA 1 & 2, and NPAES Ecosystems (Figure 2-1);
- Plant Species Theme sensitivity is 'Medium' for the proposed PAOI owing to the potential presence of a single plant SCC (Figure 2-2); and
- Animal Species Theme is 'High' owing to the potential occurrence of four (4) avifauna and one (1) mammalian SCC within the proposed PAOI (Figure 2-3).

MAP OF RELATIVE TERRESTRIAL BIODIVERSITY THEME SENSITIVITY



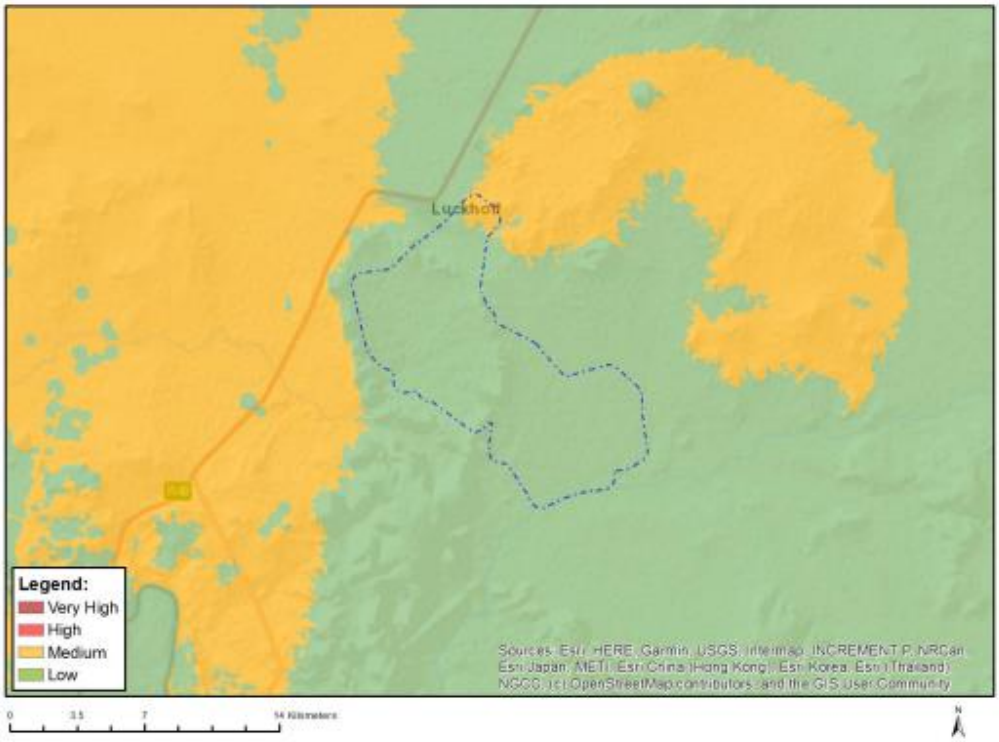
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	CBA 1
Very High	CBA 2
Very High	ESA 1
Very High	ESA 2
Very High	National Protected Area Expansion Strategy (NPAES)

Figure 2-1 Terrestrial Biodiversity Theme Sensitivity.

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

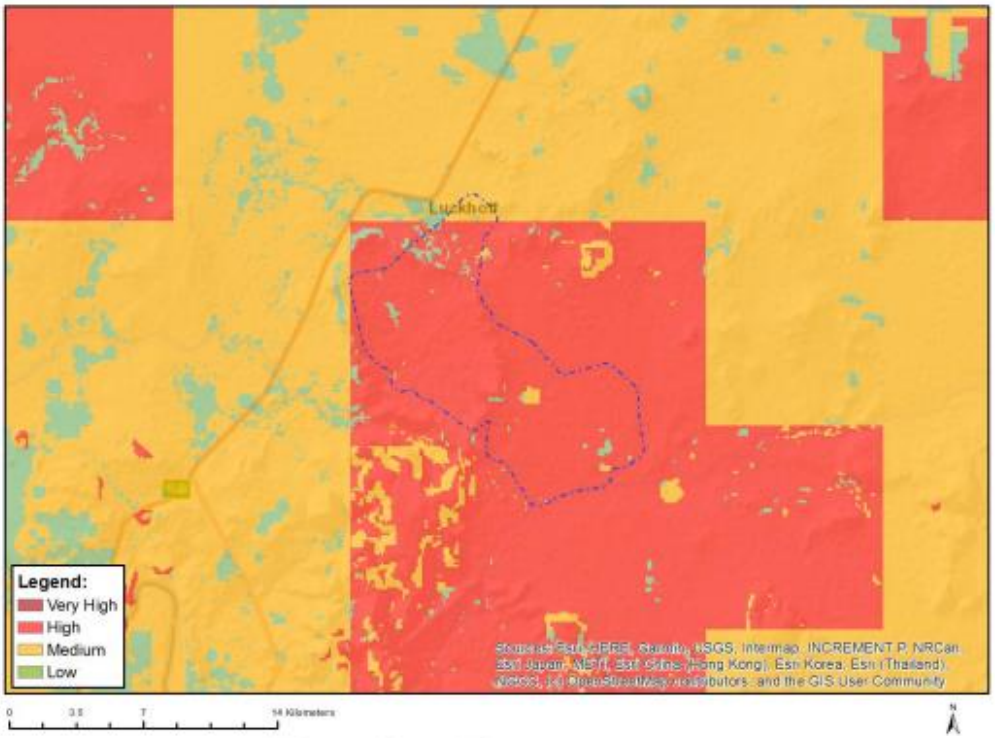
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Sensitive species 184

Figure 2-2 Plant Species Theme Sensitivity.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Aves-Neotis ludwigii
Low	Subject to confirmation
Medium	Aves-Hydroprogne caspia
Medium	Aves-Aquila rapax
Medium	Aves-Neotis ludwigii
Medium	Mammalia-Hydrictis maculicollis

Figure 2-3 Animal Species Theme Sensitivity.

3 Site Sensitivity Verification

3.1 Fauna Species of Conservation Concern

The DEA Screening Tool indicates that five (5) fauna SCC are predicted to occur within the PAOI. However, four (4) of these are avifauna species and are assessed in a separate avifauna report (TBC, 2024).

One (1) mammalian SCC is predicted to occur within the PAOI. The likelihood of occurrence for this species is indicated herein (Table 3-1).

Table 3-1 Threatened fauna species that are expected to occur within the PAOI, VU = Vulnerable, NT = Near Threatened and LC = Least Concern.

Group	Taxonomic name	Common name	SANBI (Regional)	Red List (Global)	Likelihood of Occurrence
Mammalia	*Hydrictis maculicollis*	Spotted-necked Otter	VU	NT	Low

3.2 Flora Species of Conservation Concern

According to the DEA Screening Tool, a single (1) flora SCC is expected to occur within the PAOI. The likelihood of occurrence for this species is stipulated herein (Table 3-2).

Please note that the screening tool report includes a list of birds, mammals, reptiles, amphibians, butterflies, and plant species of conservation concern known or expected to occur on the proposed development footprint. Some of these SCCs are sensitive to illegal harvesting. **Such species have had their names obscured and are listed as sensitive plant/animal with a unique number.** As per the best practice guideline that accompanies the protocol and screening tool, the name of the sensitive species may not appear in the final EIA report nor any of the specialist reports released into the public domain. It should be referred to as a sensitive plant or sensitive animal and its threat status may be included therein (e.g., Critically Endangered (CR) sensitive plant).

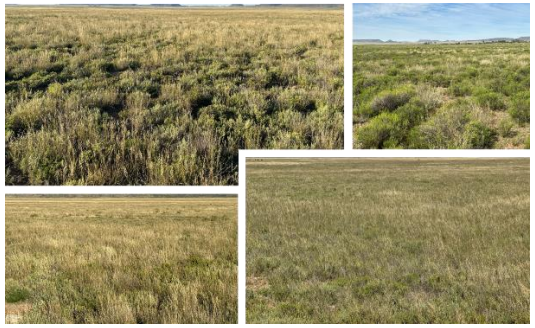
Table 3-2 Threatened flora species that are expected to occur within the PAOI. CR = Critically Endangered, EN = Endangered, VU = Vulnerable, NT = Near Threatened, and LC = Least Concern.

Family	Taxonomic name	Common name	IUCN (SANBI, 2022)	Likelihood of Occurrence
Apocynaceae	Sensitive Species 184	N/A	Critically Rare	Low

3.3 Habitats

The main habitat types identified across the PAOI 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 Table 3-3. Emphasis was placed on limiting timed meander searches within the natural habitats and therefore habitats with a higher potential of hosting SCC. Five (5) habitats (i.e., Karoo Shrubland, Karroid Grassland, Transformed Grassland, Modified and Water Resources) were identified in the PAOI. The water resource habitat comprises of wetlands, drainage lines and an artificial water resource. Each of the habitats identified are depicted in Figure 3-1.

Table 3-3 Habitat types delineated for the PAOI.

Habitat	Description and condition	Ecosystem Processes and Services	Photographs
Karoo Shrubland	This habitat type comprises a very small proportion (i.e., < 5%) of the total area of the PAOI. This habitat is characterized as a vast, open, arid region dominated by low-shrub vegetation, interspersed by rocky relief. Shrubs and grasses dominate the current vegetation, the abundance of which is predominantly dictated by rainfall and soil. Some of the more abundant shrubs include species of *Drosanthemum, Eriocephalus, Galenia, Pentzia, Pteronia,* and *Ruschia*. The principal perennial grasses include species of *Aristida, Digitaria, Enneapogon*, and *Stipagrostis*. Trees are restricted mainly to water courses that dissect the habitat. Although this habitat has been modified in parts owing to historic and current livestock grazing pressures (i.e., agriculture), most of the habitat is intact and provides grazing and foraging resources for indigenous and livestock fauna.	Provides grazing and foraging resources for indigenous fauna and livestock. Biodiversity associated with Karoo shrublands contributes to important ecological functions including pollination, seed dispersal, and regulation of climate and soil nutrients.	
Karroid Grassland	This habitat type comprises the vast majority of the total surface area of the PAOI. This habitat is characterised by extensive, even, or slightly undulating bottom-land flats forming a matrix of large landscape patches interrupted by high dolerite sills and koppies. Karroid Grassland support low- to medium-height, open grasslands interspersed with small patches of dwarf karoo shrubs. Grass species such as *Themeda triandra*, *Cympogon pospichilii* and *Digitaria erianthra* are dominant throughout. The overall condition of this habitat type within the PAOI is intact, however, sections have been exposed to historic and ongoing livestock grazing pressures.	Karroid grasslands provide several key ecosystem services including support (e.g., water and nutrient cycling), provisioning (e.g., food production for indigenous fauna and livestock), regulating (e.g., climate regulation), cultural (e.g., recreational), and biocontrol (e.g., source of predatory organisms) services.	

Transformed Grassland	This habitat type includes all areas that maintain little to no native vegetation and/or where anthropogenic activity attributed predominantly to sustained agricultural practices and development has substantially modified the area's primary ecological functions and species composition.	This habitat unit no longer maintains its functional ecological integrity and does not significantly contribute to ecosystem services. Some common faunal species will still use these areas as movement corridor.	
Modified	This habitat unit includes all areas that maintain little to no native vegetation and/or where anthropogenic activity has substantially modified an area's primary ecological functions and species composition. This habitat unit represents all areas that have been cleared of natural vegetation and include agricultural fields, roads, and power stations. These habitats exist in a predominantly modified state where it cannot recover to a more natural state without human intervention.	The ecological services provided by this habitat are limited due to the extensive cover of impermeable surfaces and the large amount of bare land. Some common faunal species will still use these areas as movement corridor.	
Water Resources	Wetland and river features were identified within the PAOI. The ecological integrity, importance and functioning of these areas play a crucial role as a water resource system and an important habitat for various fauna and flora	Act as a water resource for faunal species in the area. Provides refuge, grazing and foraging resources for indigenous fauna and livestock. Important corridor for fauna dispersion within the landscape. Habitat is used by faunal species as and is important for several life stages. Provides surface water within the landscape. Aids in trapping sediment and nutrients derived from land runoff.	

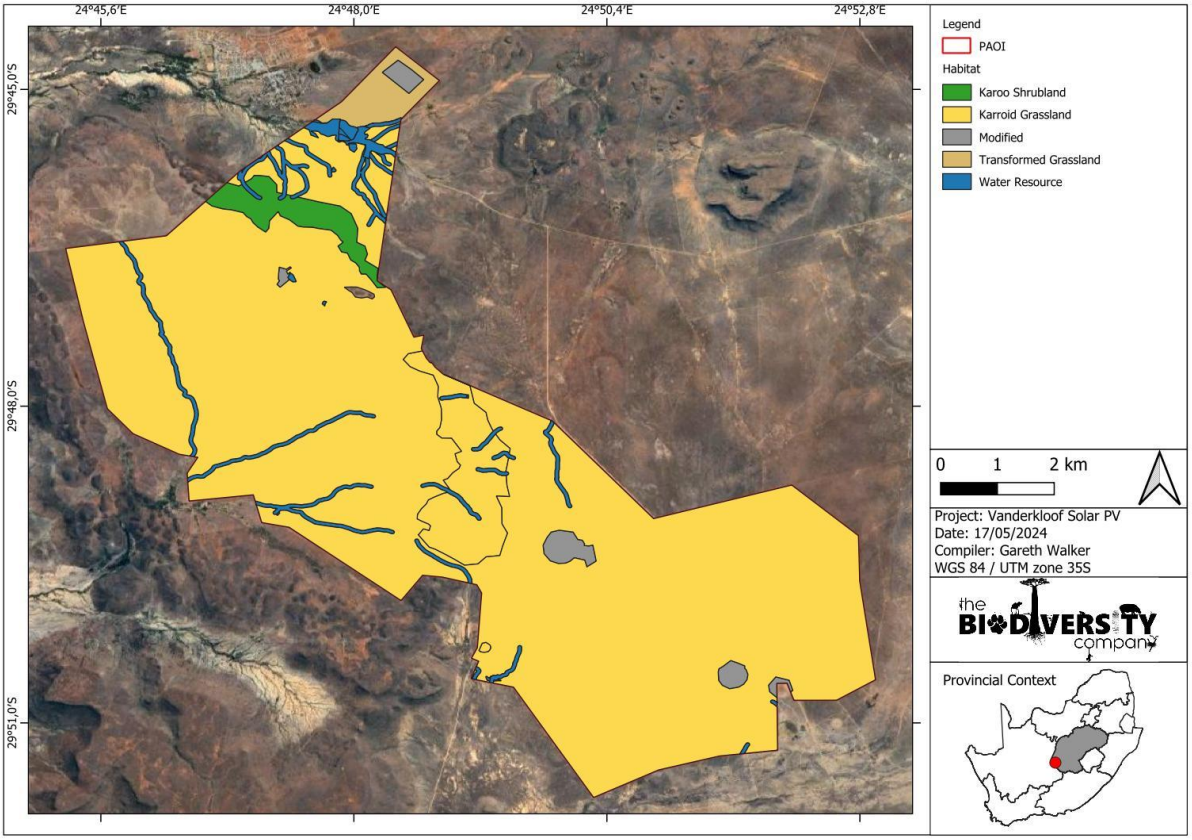


Figure 3-1 Map of the habitat types delineated within the boundaries of the PAOI.

3.4 Site Ecological Importance

The different habitat types within the PAOI 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 and their ecosystem processes. As per the terms of reference for the project, GIS sensitivity maps are required to identify sensitive features in terms of the relevant specialist discipline/s within the PAOI. The sensitivity scores identified during the field survey for each terrestrial habitat are mapped.

Five (5) habitat types were delineated within the PAOI; namely Karoo Shrubland, Karroid Grassland, Transformed Grassland, Modified, and Water Resources. All habitats within the assessment area of the proposed PAOI were allocated a sensitivity (i.e., Site Ecological Importance (SEI)) category Table 3-4. The delineated sensitivities per habitat type are illustrated in Figure 3-2.

Table 3-4 Summary of habitat types and their associated sensitivities (SEI) delineated within PAOI.

Habitat Type	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR). Assuming full clearance for development.	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
Karoo Shrubland	Medium > 50% of receptor contains natural habitat with potential to support SCC.	Medium Only narrow corridors of good habitat connectivity. Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance.	Medium	Medium Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of: (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 Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Karroid Grassland	Medium > 50% of receptor contains natural habitat with potential to support SCC.	Medium Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance.	Medium	Medium Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of: (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 Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Transformed Grassland	Low < 50% of receptor contains natural habitat with limited potential to support SCC.	Low 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	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	Low Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.

Habitat Type	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR). Assuming full clearance for development.	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
				disturbance or impact has been removed.	
Modified	Very Low No natural habitat remaining.	Very Low Several major current negative ecological impacts.	Very Low	High Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality	Very Low Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.
Water Resources	High Confirmed or highly likely occurrence of CR, EN, VU species that have a global EOO of > 10 km^2.	Medium Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.	Medium	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.	High

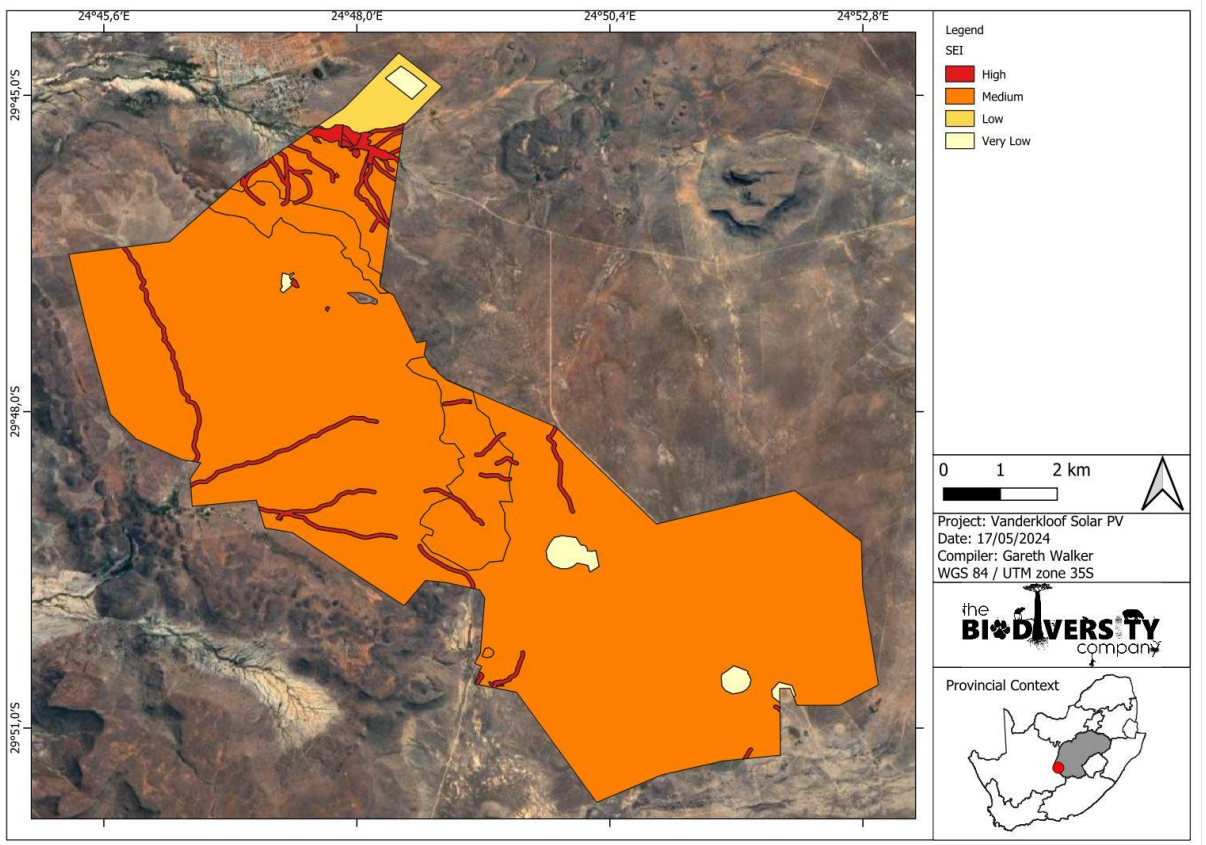


Figure 3-2 Site Ecological Importance (SEI) of habitats associated with the PAOI.

3.5 Screening Tool Comparison

The allocated sensitivities for each of the relevant themes are either disputed or validated for the assessed areas in Table 3-5 below. A summative explanation for each result is provided as relevant. The specialist-assigned sensitivity ratings are based largely on the SEI process followed in the previous section, and consideration is given to any observed or likely presence of SCC or protected species.

Table 3-5 Summary of the screening tool vs specialist assigned sensitivities.

Screening Tool Theme	Screening Tool	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Animal Theme	**High**	**High**	Validated – Although mostly introduced for recreational hunting, there was a high diversity of mammalian species present within the PAOI (including tracks of a single mammalian SCC). Further, given the habitat heterogeneity associated with the PAOI, it is expected that there will be a high herpetofauna diversity that could include SCC.
Plant Theme	**Medium**	**Medium**	Validated – Indigenous vegetation still present throughout all habitats within PAOI. Despite indigenous vegetation occurring throughout the PAOI, there is an overall low likelihood of any flora SCC occurring within PAOI.
Terrestrial Theme	**Very High**	**Medium (Karoo Shrubland)**	Disputed - Although this habitat has been modified in parts owing to historic and current livestock grazing pressures (i.e., agriculture), most of the habitat is intact comprising a high diversity of indigenous flora and provides grazing and foraging resources for indigenous fauna.
		Medium (Karroid Grassland)	Disputed – The overall condition of this habitat type is intact and is home to a high fauna and flora diversity.
		Low (Transformed Grassland)	Disputed - This habitat type includes all areas that maintain little to no native vegetation and/or where anthropogenic activity attributed predominantly to sustained agricultural practices and development has substantially modified the area's primary ecological functions and species composition.
		Very Low (Modified)	Disputed - This habitat type includes all areas that maintain little to no native vegetation and/or where anthropogenic activity attributed predominantly to sustained agricultural practices and development has substantially modified the area's primary ecological functions and species composition.
		High (Water Resources)	Disputed – The ecological integrity, importance and functioning of these areas play a crucial role as a water resource system and an important habitat for various fauna and flora.

4 Impact Assessment

Negative impacts to biodiversity associated with anthropogenic activities can be seen in Figure 4-1.

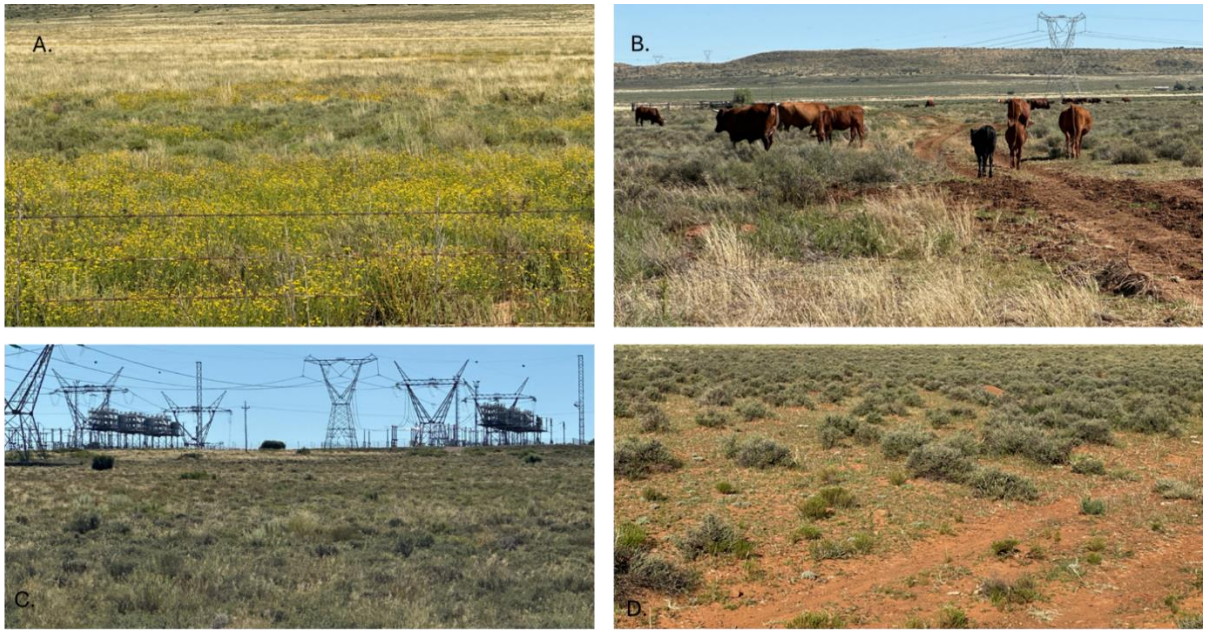


Figure 4-1 Photographs illustrating current negative impacts to biodiversity associated with the PAOI: A. Fencing, B. Livestock grazing, C. Infrastructure development, and D. Roads.

A summary of the potential impacts expected during the construction and operational phases of the proposed activity are presented in Table 4-1.

Table 4-1 Potential impacts to biodiversity associated with the proposed activity.

Impact	Project activities that can cause loss/impacts to habitat (especially regarding the proposed infrastructure areas):	Secondary impacts anticipated
1. Destruction, fragmentation and degradation of habitats and ecosystems	Physical removal of vegetation, including potential SCCs and protected species.	Displacement/loss of flora & fauna (including potential SCCs) Increased potential for soil erosion Habitat fragmentation Increased potential for establishment of alien & invasive vegetation
	Access roads and servitudes	
	Soil dust precipitation	
	Water leakages	
	Dumping of waste products	
	Random events such as fire (cooking fires or cigarettes)	
Main Impact	**Project activities that can cause the spread and/or establishment of alien and/or invasive species**	**Secondary impacts anticipated**
2. Spread and/or establishment of alien and/or invasive species	Vegetation removal	Habitat loss for native flora & fauna (including SCC) Spreading of potentially dangerous diseases due to invasive and pest species Alteration of fauna assemblages due to habitat modification
	Vehicles potentially spreading seed	
	Unsanitary conditions surrounding infrastructure promoting the establishment of alien and/or invasive rodents	
	Creation of infrastructure suitable for breeding activities of alien and/or invasive birds	
Main Impact	**Project activities that can cause direct mortality of fauna**	**Secondary impacts anticipated**
3. Direct mortality of fauna	Clearing of areas	Secondary impacts anticipated. Loss of ecosystem services Increase in rodent populations and associated disease risk
	Roadkill due to vehicle collision	
	Pollution of water resources due to dust effects, chemical spills etc.	

	Intentional killing of fauna for food (hunting)	
Main Impact	**Project activities that can cause reduced dispersal/migration of fauna**	**Secondary impacts anticipated**
4. Reduced dispersal/migration of fauna	Loss of landscape used as corridor	Secondary impacts associated with reduced dispersal/migration of fauna. Loss of ecosystem services Reduced plant seed dispersal
	Roads	
	Removal of vegetation	
Main Impact	**Project activities that can cause pollution in water courses and the surrounding environment**	**Secondary impacts anticipated**
5. Environmental pollution due to water/ mine drainage runoff	Project activities that can cause pollution in water courses and the surrounding environment	Secondary impacts associated with pollution in water courses and the surrounding environment. Faunal mortality (direct and indirectly) Groundwater pollution Loss of ecosystem services
	Chemical (organic/inorganic) spills	
	Erosion	
Main Impact	**Project activities that can cause disruption/alteration of ecological life cycles due to sensory disturbance.**	**Secondary impacts anticipated**
6.Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust, and light pollution.	Operation of machinery (Large earth moving machinery, generators, vehicles)	Secondary impacts associated with disruption/alteration of ecological life cycles due to noise Loss of ecosystem services
	Project activities that can cause disruption/alteration of ecological life cycles due to dust	Secondary impacts associated with disruption/alteration of ecological life cycles due to dust Loss of ecosystem services
Main Impact	**Project activities that can cause staff to interact directly with potentially dangerous fauna**	**Secondary impacts anticipated**
8. Staff and others interacting directly with fauna (potentially dangerous) or poaching of animals	All unregulated/supervised activities outdoors	

5 Conclusion

The completion of a comprehensive desktop study, in conjunction with the results from the field survey, suggest there is a medium-high confidence in the information provided. The survey ensured that there was suitable ground-truth coverage of the open-spaces or natural habitats, and ecosystems were assessed to obtain a general species (fauna and flora) overview and current impacts were observed and assessed.

The landscape associated with the PAOI is heterogeneous. Five habitat types that vary in terms of sensitivity were delineated and evaluated. Although there are signs of historical impacts attributed to [mainly] agriculture (i.e., livestock) and development, most of the PAOI comprises intact vegetation capable of housing a high diversity of fauna and flora species. Further, most of the habitat units within the PAOI have the potential to provide vital ecosystem services that were highlighted previously. Having said this, however, no significant impacts from a terrestrial ecological perspective are expected, subject to the implementation of the recommended mitigation measures. Care should be taken to largely avoid water resources (i.e., rivers, dams, wetlands, etc.). Further, the findings of this report should be further considered in conjunction with the corresponding avifauna report (TBC, 2024).

Completion of the terrestrial biodiversity assessment led to a disputing of the 'Very High' classification for the terrestrial biodiversity theme sensitivity across all five delineated habitats as allocated by the National Environmental Screening Tool. The habitats within the PAOI, instead, range from 'Very Low' to 'High' and should be assessed as such.

It is the specialist's opinion that the proposed developability of the PAOI is as follows:

- Avoidance mitigation wherever possible (High SEI Areas): 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;
- Minimisation and restoration mitigation (Medium SEI Areas): Any development activities of medium impact acceptable followed by appropriate restoration activities;
- Minimisation and restoration mitigation (Low SEI Areas): Development activities of medium to high impact acceptable followed by appropriate restoration activities; and
- Minimisation and restoration mitigation (Very Low SEI Areas): Any development activities of medium-high impact acceptable and restoration activities may not be required.

6 Appendix Items

6.1 Appendix A: Methods

6.1.1 Desktop Assessment: Landscapes

The following information sources were consulted to compile this report:

- National Biodiversity Assessment 2018 (Skowno *et al,* 2019) - The purpose of the National Biodiversity Assessment (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), 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. Not Protected, Poorly Protected or Moderately Protected ecosystem types are collectively referred to as under-protected ecosystems.
- Protected areas:
    - South Africa Protected Areas Database (SAPAD) and South Africa Conservation Areas Database (SACAD) (DEA, 2022) – The South African Protected Areas Database (SAPAD) and South Africa Conservation Areas Database (SACAD) 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. The database 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) (SANBI, 2018) – The National Protected Area Expansion Strategy (NPAES) provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and are therefore, of high importance for biodiversity, climate resilience and freshwater protection.
- Free State Province Biodiversity Plan:

  The Free State Province Biodiversity Plan classifies areas within the province on the basis of their contributions to reaching the associated conservation targets within the province. These areas are primarily classified as either Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs). These biodiversity priority areas, together with protected areas, are important

for the persistence of a viable representative sample of all ecosystem types and species, as well as the long-term ecological functioning of the landscape as a whole.

- **CBAs** are areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and healthy functioning of important species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then provincial biodiversity targets cannot be met (SANBI, 2017).
- **ESAs** are areas that are not essential for meeting biodiversity representation targets but play an important role in supporting the ecological functioning of ecosystems as well as adjacent Critical Biodiversity Areas, and/or in delivering ecosystem services that support socio-economic development (SANBI, 2017).

  Provincial CBAs and ESAs are often further classified into sub-categories, such as CBA1 and CBA2 or ESA1 and ESA2. These present fine scale habitat and biodiversity area baseline requirements and associated land management objectives or outcomes. The highest categorisation level is often referred to as an 'Irreplaceable Critical Biodiversity Area' which usually represents pristine natural habitat that is very important for conservation.

6.1.2 Desktop Assessment: Species

6.1.3 Fauna

The faunal desktop assessment comprised of the following:

- Expected faunal SCC taken from the Screening Tool report from the site.

Additional species, including SCC could potentially occur on site, however, this level of detail is pertinent to a full specialist assessment and not needed at this stage, which either confirms or refutes the Screening Tool outcomes.

6.1.4 Flora

Flora was briefly assessed as a separate Flora Assessment will be conducted. The flora desktop assessment comprised the following:

- Expected floral SCC taken from the Screening Tool report from the site.

Additional species, including SCC could potentially occur on site however, this level of detail is pertinent to a full specialist assessment and not needed at this stage, which either confirms or refutes the Screening Tool outcomes.

6.1.5 Field Assessment

Sampling consisted of an a-priori classification of vegetation of the site based on Google Earth imagery as well as various mapping tools associated with the vegetation and conservation importance of the site. Meanders were then conducted within each of these vegetation community types and adaptive field techniques employed where the site differed from what was expected.

Individual species of fauna and flora and signs thereof (especially in the case of fauna) were noted and photographed. Any potential SCC were noted and photographed. Photographs were taken of all habitat types within the Project Area. Important points or species locations were taken on a GPS device.

Relevant field guides and texts consulted for identification purposes included the following:

- Identification Guide to Southern African Grasses: An Identification Manual with Keys, Descriptions, and Distributions (Fish *et al*., 2015);

- A Field Guide to Wild Flowers (Pooley, 1998);
- Problem Plants and Alien Weeds of South Africa (Bromilow, 2018);
- Field Guide to Wildflowers of South Africa (Manning, 2009);
- The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005);
- A Field Guide to the Tracks and Signs of Southern and East African Wildlife (Stuart and Stuart, 2000); and
- iNaturalist (available at https://www.inaturalist.org/home).

6.1.6 Site Ecological Importance

The different habitat types within the study 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 SCC and their ecosystem processes.

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 as follows. The criteria for the CI and FI ratings are provided in Table 6-1 and Table 6-2, respectively.

Table 6-1 Summary of Conservation Importance (CI) criteria

Conservation Importance	Fulfilling Criteria
Very High	Confirmed or highly likely occurrence of CR, EN, 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 6-2 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 6-3.

Table 6-3 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 6-4.

Table 6-4 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.

Subsequent to the determination of the BI and RR, the SEI can be ascertained using the matrix as provided in Table 6-5.

Table 6-5 Matrix used to derive Site Ecological Importance 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 proposed project is provided in Table 6-6.

Table 6-6 Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities.

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

The SEI evaluated for each taxon can be combined into a single multi-taxon evaluation of SEI for the assessment area. Either a combination of the maximum SEI for each receptor should be applied, or the SEI may be evaluated only once per receptor but for all necessary taxa simultaneously. For the latter, justification of the SEI for each receptor is based on the criteria that conforms to the highest CI and FI, and the lowest RR across all taxa.

6.2 Appendix B: Specialist Declaration of Independence

I, Gareth Walker, 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.

Gareth Walker

Biodiversity Specialist

The Biodiversity Company

May 2024

I, Lindi Steyn, 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.

Lindi Steyn

Ecologist

The Biodiversity Company

May 2024