PROPOSED LETSOAI SOLAR PHOTOVOLTAIC (PV) PROJECT – BIODIVERSITY BASELINE AND IMPACT ASSESSMENT

Aggeneys, Northern Cape Province

March 2023

CLIENT

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1 Introduction

1.1 Background

The Biodiversity Company was appointed to undertake a Biodiversity Baseline and Impact Assessment for the proposed Letsoai solar photovoltaic (PV) facility and associated infrastructure (Figure 1-1). BioTherm Energy (Pty) Ltd is proposing the development of two (2) solar PV facilities and associated infrastructure on two (2) sites. The project is located approximately 16 km southeast of Aggeneys, within the Khãi-Ma Local Municipality and the Namakwa District Municipality in the Northern Cape Province. The projects will be known as the Letsoai PV1 Project and the Letsoai PV2 Project respectively – each will have a contracted generating capacity of up to 240 MW.

Preferred project sites with a development area of ~1243.5 ha and ~1155.9 ha within the project site has been identified by BioTherm Energy (Pty) Ltd as a technically suitable area for the development of the Letsoai PV1 Project and Letsoai PV2 Project respectively. The sites are adjacent to one another. This report pertains to the Letsoai PV1 Project. The development areas for the PV facilities are located on the remaining extent of the Farm Hartebeest Vlei 86 approximately. The project site is accessible via an existing gravel road off the N14 which is located north of the project site.

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The Letsoai PV facility is proposed to accommodate the following infrastructure, which will enable the PV facility to supply a capacity of up to 240 MW.

- Solar PV array comprising PV modules and mounting structures;
- Inverters and transformers;
- Low voltage cabling between the PV modules to the inverters;
- Fence around the development area;
- Camera surveillance;
- Internet connection;
- 33 kV cabling between the project components and the facility substation;
- 33/132 kV onsite facility substations;
- Battery Energy Storage System (BESS up to 153MW);
- Site offices and maintenance buildings, including workshop areas for maintenance and storage;
- Laydown areas; and
- Access roads (up to 6 m) and internal distribution roads (up to 4 m).

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). The National Web based Environmental Screening Tool has characterised the terrestrial biodiversity theme sensitivity of the project site as “Very High”.

The purpose of the specialist studies is to provide relevant input into the environmental assessment process and provide a report for the proposed activities associated with the project. 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.

1.2 Project Area of Influence

The local setting of the project and reference to this locality is referred to as the study area from hereon. A 500 m buffer area was created from the property boundary provided, and a 200 m buffer was created in the gridline provided, assimilated, resulting in a Project Area of Influence (PAOI) is delineated to incorporate the proposed project components, this represents the total area to be assessed (Figure 1-1).

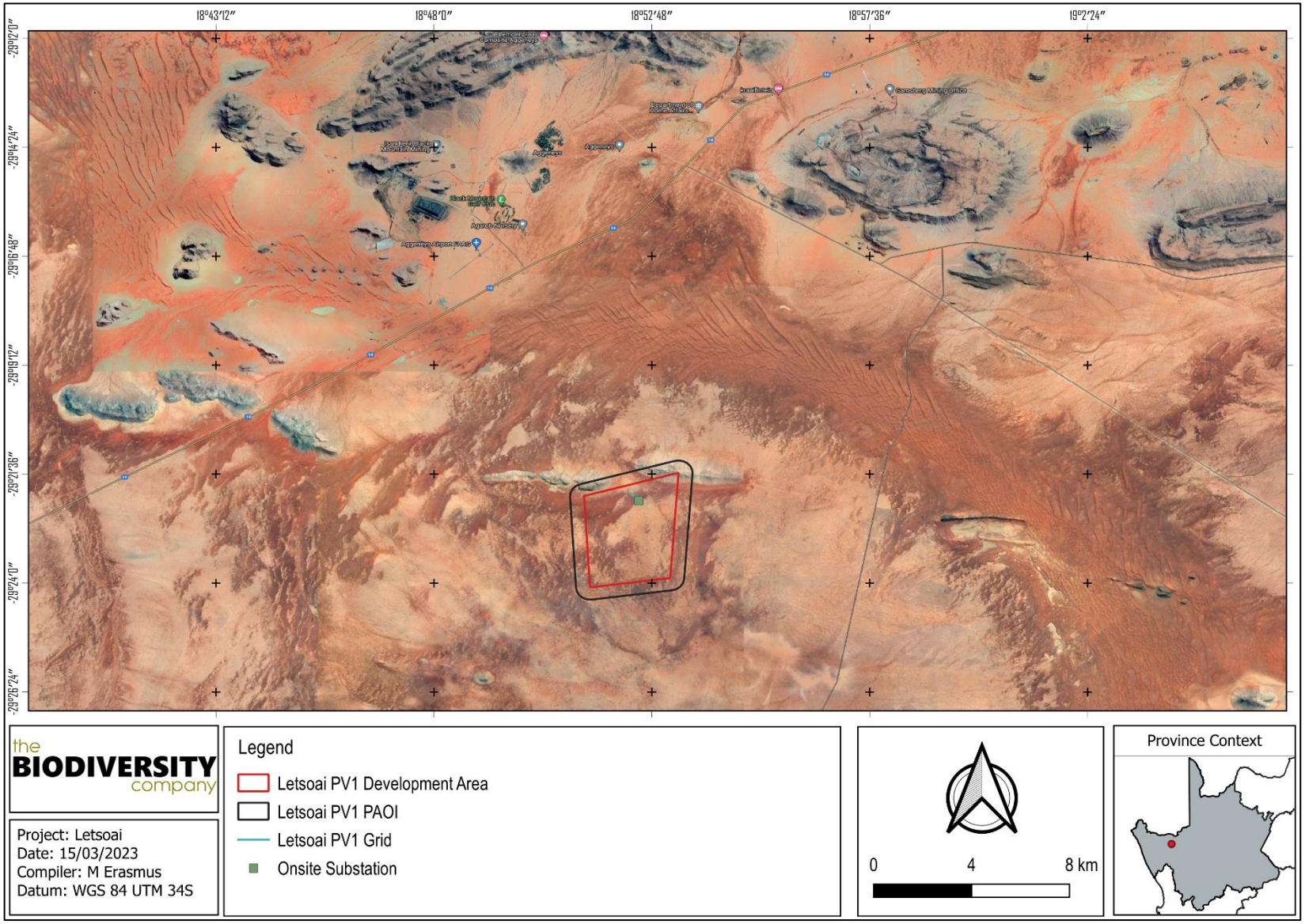


Figure 1-1 The Project Area of Influence in proximity to the nearby towns

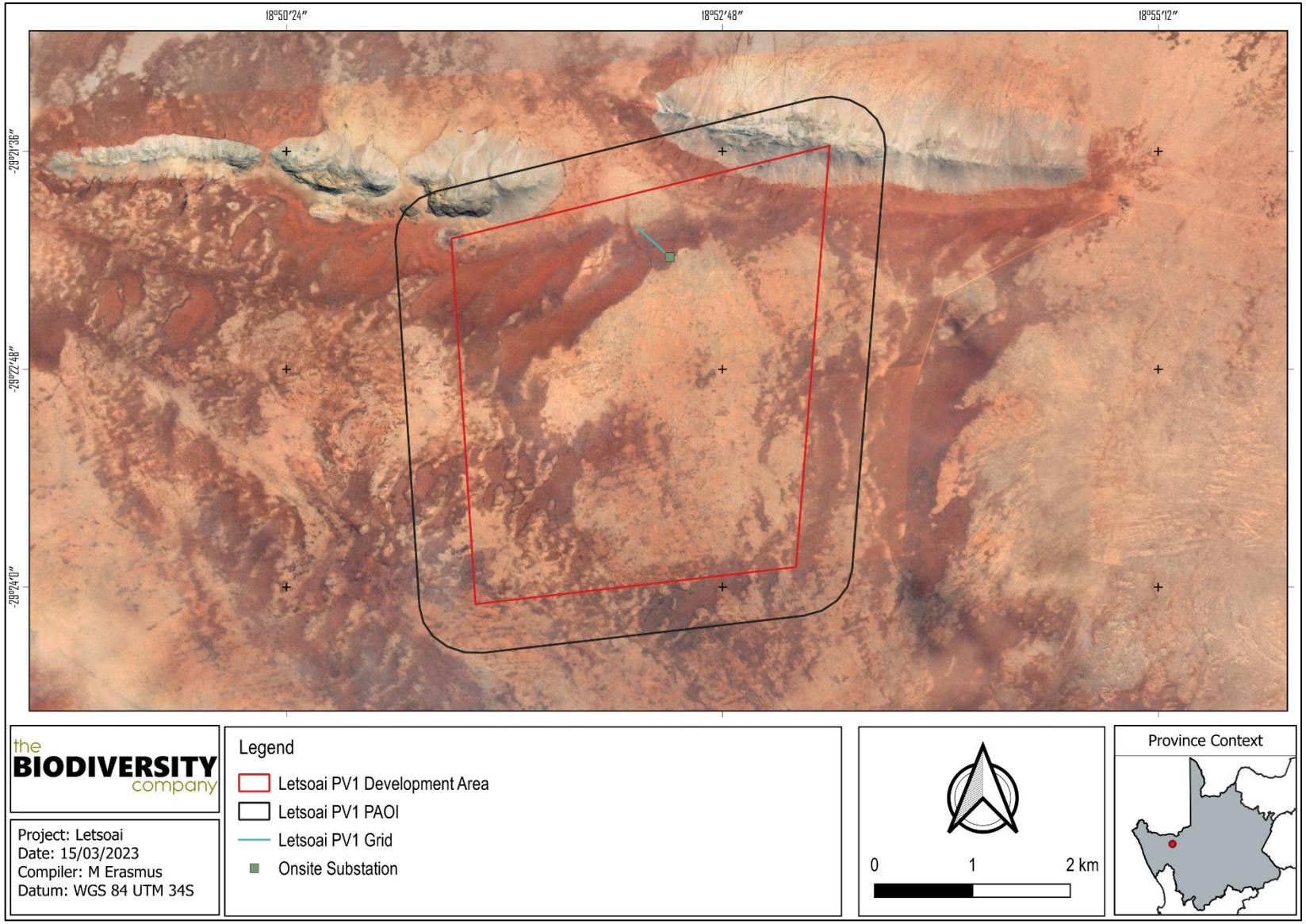


Figure 1-2 The various components of the project

1.3 Scope of Work

The principle scope of work includes the following:

- Desktop assessment to identify the relevant ecologically important geographical features within the study area;
- Desktop assessment to compile an expected species list and possible threatened flora and fauna species that occur within the study area;
- Field survey to ascertain the species composition of the present flora and fauna community within the study area;
- Delineate and map the habitats and their respective sensitivities that occur within the study area;
- Identify the manner that the proposed 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.

1.4 Assumptions and Limitations

The following assumptions and limitations are applicable for this assessment:

- The assessment area was based on the study area provided by the client and any alterations to the route and/or missing GIS information pertaining to the assessment area would have affected the area surveyed;
    - Only a single season survey was be conducted for the respective assessment, this would constitute a dry season survey with its limitations;
    - Flora identification is limited due to the lack of aboveground plant parts used to determine species, especially in regard to bulbous plants, the vegetation was dry, and most plants had lost the presently active growth;
    - It must be noted that during the survey, only a fraction of the expected geophytes/annuals were visible due to their variable emergence patterns.
    - It was noted that the area was in a peak dry season, resulting in the associated effect on results. The nature of any arid area has an effect results due to its ‘reaction’ to climate, mainly moisture, ultimately being highly variable and fluctuating. - It was noted that the area was in a peak dry season, thereby affecting the outcomes of the assessment. The extreme temporal variation in the climate of the region drives considerable seasonal variation in the biota.
    - Whilst every effort is made to cover as much of the site as possible, representative sampling is completed and by its nature, it is possible that some plant and animal species that are present on site were not recorded during the field investigations; and
    - The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by 5 m.

1.5 Specialist Details

Report Name	**PROPOSED LETSOAI SOLAR PHOTOVOLTAIC (PV) PROJECT – BIODIVERSITY BASELINE AND IMPACT ASSESSMENT**
Reference	Letsoai PV 1
Submitted to / Client	savannah environmental
Fieldwork and Report Contributor	**Mahomed Desai**  Mahomed Desai (Pr. Nat. Sci. registered number 134678) obtained his M.Sc. in Environmental Engineering and Ph.D. in Ecological Sciences and has over 12 years of experience in undertaking impact assessments for estuarine, freshwater and terrestrial biodiversity. Mahomed has extensive experience surveying for African fauna and flora as a researcher and consultant, through various national and international projects, including those requiring IFC Performance Standards. Mahomed has also completed training courses in GIS, stable-isotope analysis, and deriving energy from waste amongst others.
Report Writer	Marnus 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) and is a specialist terrestrial ecologist and botanist which conducts floral surveys as well as faunal surveys which include mammals, birds, amphibians and reptiles.
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 13 years' experience in the environmental consulting field.
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.

1.6 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 1-1 are applicable to the current project. The list below, although extensive, may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements relevant to biodiversity and conservation in the Northern Cape 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	Northern Cape Planning and Development Act no. 7 of 1998	To provide for the management and conservation of the province's biophysical environment and protected areas.
	Northern Cape Nature Conservation act no. 9 of 2009	To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management,

1.7 Definitions

1.7.1 Species of Conservation Concern

In accordance with the National Red List of South African Plants website, managed and maintained by the South African National Biodiversity Institute (SANBI), a Species of Conservation Concern (SCC) is a species that has a high conservation importance in terms of preserving South Africa's rich biodiversity. This classification covers a range of red list categories as illustrated in Figure 1-3 below.

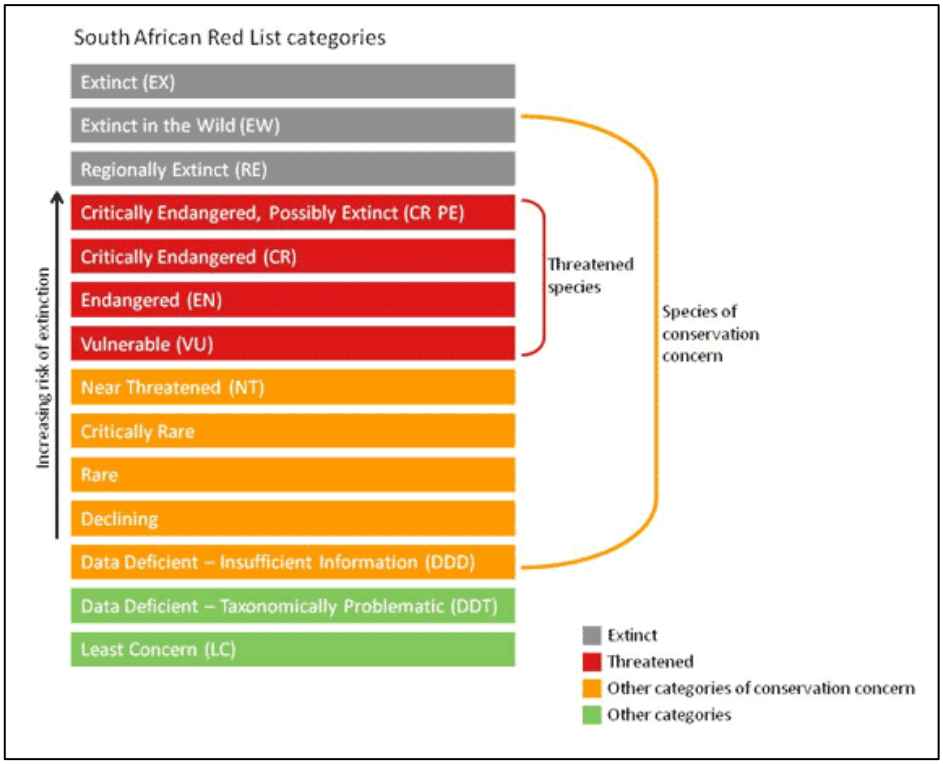


Figure 1-3 Threatened species and Species of Conservation Concern (SANBI, 2016)

South Africa uses the internationally endorsed International Union for Conservation of Nature (IUCN) Red List Categories and Criteria (IUCN, 2012). This scientific system is designed to measure species' risk of extinction and its purpose is to highlight those species that are in need of critical conservation action. As this system has been adopted from the IUCN, the definition of an SCC as described and categorised above is extended to all red list classifications relevant to fauna as well as the IUCN categories, for the purposes of this report.

1.7.2 Protected Species

Protected species include both flora and fauna species that are protected according to some form of relevant legislation, be it provincial, national, or international. Provincial legislation may include that published in the form of a provincial ordinance, bill, or act, and national legislation includes that which is published in terms of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) or the National Forests Act (Act No. 84 of 1998). Relevant international legislation includes the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 2021).

2 Methods

2.1 Desktop Baseline

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

2.1.1 Spatially Relevant Legislative Boundaries

Two aspects of legislation apply with regards to the development of certain project types within South Africa, and these have important implications for the EA processes for these project types. These two aspects are briefly discussed below. Where relevant the spatial orientation of the proposed project is referenced with respect to these important legislative boundaries, as the applicable legislation may be relevant to not only the overall EIA process, but also the specialist assessment process that is to be followed.

- Strategic Transmission Corridors (EGI):

On the 16th of February 2018 Minister Edna Molewa published Government Notice No. 113 in *Government Gazette* No. 41445 which identified 5 strategic transmission corridors 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.

On the 29th of April 2021, Minister Barbara Dallas Creecy published Government Notice No. 383 in *Government Gazette* No. 44504, which expanded the eastern and western transmission corridors and gave notice of the applicability of the application procedures identified in Government Notice No. 113, to these expanded corridors.

In June 2022 the Standard for the Development and Expansion of Power Lines and Substations within Identified Geographical Areas Revision 2, Prepared by the CSIR and SANBI, was published. This standard was then adopted as per Government Notice No. 2313 of *Government Gazette* No. 47095 of 27 July 2022. The Standard was prepared to allow a proponent to achieve planning, routing, siting and remediation objectives that will ensure the acceptability of the impacts of the development of EGI (including substations) on the environment, independently from the need for an assessment by the competent authority. The standard enforces the following key environmental principles as part of its application with regards to the planning of powerline routes and substation positions (Note: several additional principles apply as relevant to avifauna assessments, however these are not included below):

- There must be no removal of threatened plant species;
- There must be no impact on Tier 1 plant species (i.e. threatened species reliant on critical habitat) identified through the screening process and site verification process;
- Clear-cutting during construction must be kept to a maximum of 8 m; and
- Wetlands must be avoided or, where wetland crossing is unavoidable, the power line should be routed over the narrowest part of the wetland. For the most part, wetlands and rivers can be traversed by the power line with little to no impact by placing the pylons outside of the wetland.
- Renewable Energy Development Zones (REDZs):

On 16 February 2018, Minister Edna Molewa published Government Notice No. 114 in *Government Gazette* No. 41445 which identified 8 renewable energy development zones important for the development of large scale wind and solar photovoltaic facilities. The Government Notice included the procedure to be followed when applying for environmental authorisation for large scale wind and solar photovoltaic energy facilities when occurring in these REDZs.

On 26 February 2021, Minister Barbara Dallas Creecy, published Government Notice No. 142, 144 and 145 in Government Gazette No. 44191 which identified 3 additional REDZs for implementation as well as 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.

2.1.2 Ecologically Important Landscape Features

Existing ecologically relevant data layers were incorporated into a GIS to establish how the proposed project might interact with any ecologically important entities. Emphasis was placed around the following spatial datasets:

- Northern Cape Critical Biodiversity Areas (CBAs) (SANBI, 2016a);
- 2018 National Biodiversity Assessment (NBA, 2018) (Skowno et al., 2019);
- Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018);

- South Africa Protected and Conservation Areas Databases, 2022 (DFFE, 2022 & DFFE, 2022a);
- National Protected Areas Expansion Strategy, 2016 (DEA, 2016);
- Important Bird and Biodiversity Areas, 2015 (Marnewick *et al.,* 2015);
- South African Inventory of Inland Aquatic Ecosystems (SAIIAE), NBA 2018 Rivers and Wetlands (Awuah, 2018 & Van Deventer et al., 2019);
- National Freshwater Priority Areas, Rivers and Wetlands, 2011 (Nel, 2011); and
- Strategic Water Source Areas, 2021 (Lötter & Le Maitre, 2021).

Descriptions of these datasets, and their associated relevance to terrestrial biodiversity, are provided below.

2.1.2.1 Provincial Conservation Plan

The Northern Cape Department of Environment and Nature Conservation has developed the Northern Cape CBA Map which identifies biodiversity priority areas for the province, called Critical Biodiversity Areas (CBAs) and 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. The identification of Critical Biodiversity Areas for the Northern Cape was undertaken using a Systematic Conservation Planning approach. Available data on biodiversity features (incorporating both pattern and process, and covering terrestrial and inland aquatic realms), their condition, current Protected Areas and Conservation Areas, and opportunities and constraints for effective conservation were collated.

- **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 a CBA1 ‘Irreplaceable Critical Biodiversity Area’ which usually represents pristine natural habitat that is very important for conservation.

2.1.2.2 National Biodiversity Assessment 2018

The National Biodiversity Assessment (NBA) was completed as a collaboration between the South African National Biodiversity Institute (SANBI), the then Department of Environmental Affairs (DEA), and other stakeholders including scientists and biodiversity management experts throughout the country over a three-year period (Skowno *et al.,* 2019).

The purpose of the NBA is to assess the state of South Africa’s biodiversity with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The two headline indicators assessed in the NBA are Ecosystem Threat Status and Ecosystem Protection Level (Skowno et al., 2019).

- **Ecosystem Threat Status (ETS)** outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function, and composition, on which their ability to provide ecosystem services ultimately depends. Ecosystem types are categorised as Critically

Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Concern (LC), based on the proportion of each ecosystem type that remains in a good or healthy ecological condition (Skowno et al., 2019). CR, EN, or VU ecosystem types are collectively referred to as threatened ecosystems.

- **Ecosystem Protection level (EPL)** informs on whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Not Protected (NP), Poorly Protected (PP), Moderately Protected (MP) or Well Protected (WP), based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Skowno *et al.,* 2019). NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems.

2.1.2.3 South Africa Protected and Conservation Areas

The South African Protected Areas Database (SAPAD) and the South Africa Conservation Areas Database (SACAD) contains spatial data critical for the conservation of South Africa's natural resources. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection, such as conservation areas. These databases are updated regularly and form 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).

Formally protected areas are categorised according to several different types, and each type is subject to specific legislative restrictions and management guidelines, many of which restrict development to some degree. Generally, these areas are assigned a buffer of influence of between 5 and 10 km (the latter pertaining to National Parks and World Heritage Sites), within which certain laws and management actions may apply. Many of the protected area types are further classified into sub-types as well. Formally protected area types include:

- National Parks;
- Nature Reserves;
- Special Nature Reserves;
- Mountain Catchment Areas;
- World Heritage Sites;
- Protected Environments;
- Forest Nature Reserves and Forest Wilderness Areas;
- Specially Protected Forest Areas; and
- Marine Protected Areas.

2.1.2.4 National Protected Areas Expansion Strategy

The Department of Environmental Affairs (now the Department of Forestry, Fisheries and the Environment) led the development of the National Protected Areas Expansion Strategy (NPAES) in consultation with the protected area agencies and other key private and public sector stakeholders. The need for the development of the NPAES was established in the National Biodiversity Framework in 2009. The NPAES is a 20-year strategy with 5-year implementation targets aligned with a 5-year revision cycle. (DEA, 2016).

South Africa's protected area network currently falls far short of representing all ecosystems and maintaining healthy functioning ecological processes. In this context, the goal of the NPAES is to achieve cost effective protected area expansion thus enabling better ecosystem representation, ecological sustainability, and resilience to climate change. A comprehensive set of priority areas was compiled

based on the priorities identified by provincial and other agencies in their respective protected area expansion strategies. These focus areas are generally large, intact and unfragmented and are therefore of high importance for biodiversity, climate resilience and freshwater protection (DEA, 2016).

2.1.2.5 Important Bird and Biodiversity Areas

Important Bird & Biodiversity Areas (IBAs) are sites of international significance for the conservation of the world's birds, and other conservation significant species, as identified through multi-stakeholder processes using globally standardised, quantitative, and scientifically agreed criteria. These sites are also Key Biodiversity Areas; sites that contribute significantly to the global persistence and health of biodiversity (Birdlife, 2020).

The selection of IBAs is achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge on the sizes and trends of bird populations. The criteria ensures that sites selected as IBAs have true significance for the international conservation of bird populations, and it also ensures classification consistency among sites at all geographic levels.

IBAs constitute a global network of over 13 500 sites, of which 112 sites are found in South Africa. Approximately 60% of the IBA network is unprotected, leaving these sites vulnerable to habitat transformation and mismanagement. Additionally, habitats within many IBAs are poorly managed, leading to habitat degradation, especially in unprotected sites. (BirdLife SA, 2022)

2.1.2.6 Aquatic Habitats

Three inland aquatic habitat datasets are used to identify the ecological sensitivity of the project area with regards to local aquatic habitat, which is critical for the healthy functioning of both aquatic and terrestrial biodiversity. The presence of aquatic ecosystems is often a strong indicator for the presence of unique flora as well as the regular presence of fauna. Many national SCC are only found within or near to aquatic habitat.

- **The South African Inventory of Inland Aquatic Ecosystems (SAIIAE):** Established during the 2018 NBA, the SAIIAE is a collection of spatial data layers that represent the extent of river and inland wetland ecosystem types as well as the pressures on these systems. The same two headline indicators, and their associated categorisations, are applied as with the terrestrial ecosystem NBA, namely Ecosystem Threat Status and Ecosystem Protection Level. The Ecosystem Threat Status of river and wetland ecosystem types are based on the extent to which each ecosystem type had been altered from its natural condition.
- **National Freshwater Ecosystem Priority Areas, Rivers and Wetlands (NFEPA):** In an attempt 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). The FEPAs are intended to be conservation support tools and it is envisioned that they will guide the effective implementation of measures to achieve the National Environment Management: Biodiversity Act's biodiversity conservation goals (Nel *et al.,* 2011).
- **Strategic Water Source Areas (SWSAs):** SWSAs are defined as areas of land that supply a disproportionate quantity of mean annual surface water runoff in relation to their size, and therefore contribute considerably to the overall water supply of the country, as well as national aquatic and terrestrial biodiversity resources. These are considered key ecological infrastructure assets and the effective protection of SWSAs is vital for national security because a lack of water security will compromise national security and human wellbeing on all levels.

2.1.3 Desktop Flora Assessment

The Vegetation of South Africa, Lesotho and Swaziland (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 study area (Figure 2-1). The Red List of South African Plants (Raimondo et al., 2009; SANBI, 2020) was utilized to provide the most current national conservation status of flora species.

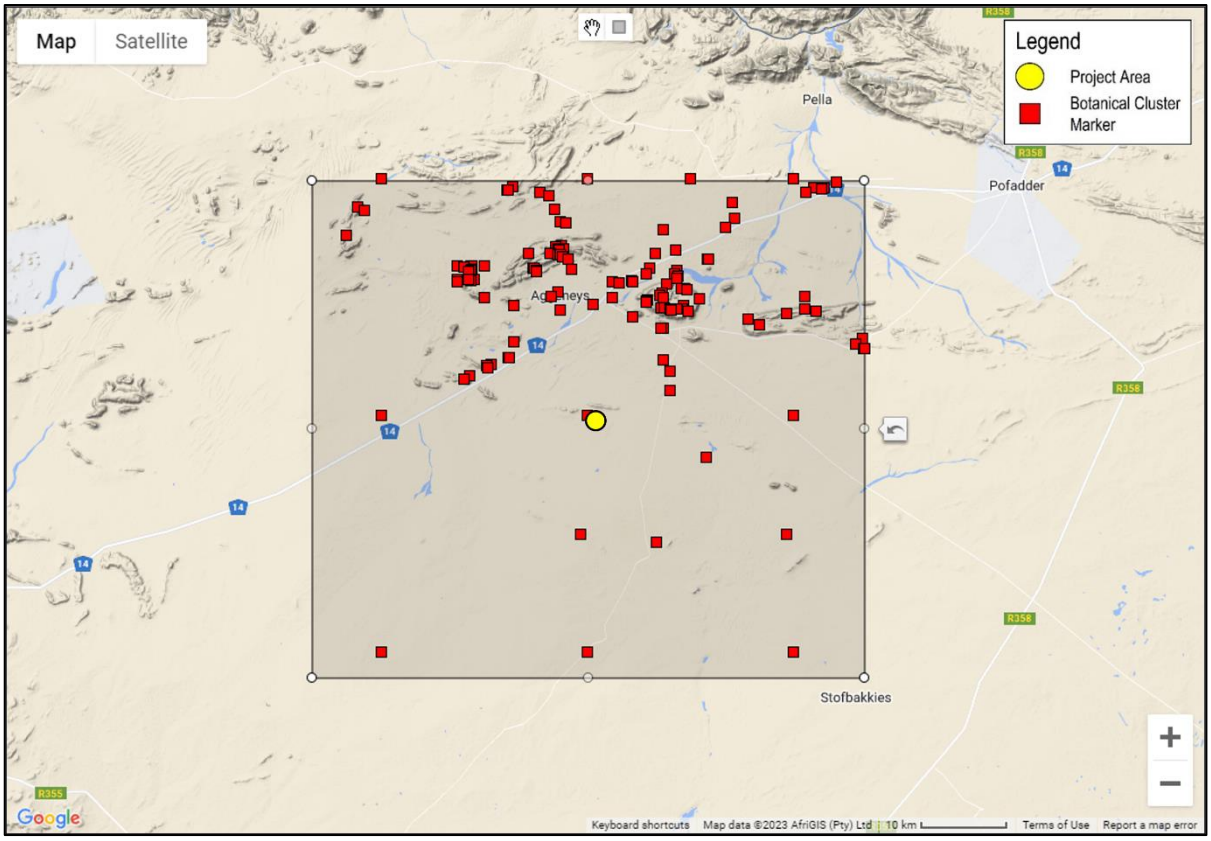


Figure 2-1 Map illustrating extent of area used to obtain the expected flora species list from the Plants of South Africa (POSA) database.

The latest information regarding provincially, and nationally protected flora was obtained from the following published legislative sources:

- Provincially Protected Plant Species (Schedules 1 and 2 of the Northern Cape Nature Conservation Act No. 9 Of 2009); and
- List of Nationally Protected Tree Species (DEFF, 2022).

2.1.4 Desktop Faunal Assessment

The faunal desktop assessment comprised of the following, compiling an expected:

- Amphibian list, generated from the IUCN spatial dataset (2017) and FrogMap database (Fitzpatrick Institute of African Ornithology, 2021a), using the 2918 quarter degree square;
- Reptile list, generated from the IUCN spatial dataset (2017) and ReptileMap database (Fitzpatrick Institute of African Ornithology, 2021b), using the 2918 quarter degree square;and
- Mammal list from the IUCN spatial dataset (2017) and MammalMap database (Fitzpatrick Institute of African Ornithology, 2021C), using the 2918 quarter degree square.

The latest information regarding provincially, and nationally protected fauna was obtained from the following published legislative lists:

- Provincially Protected Wildlife Species (Schedules 1 and 2 of the Northern Cape Nature Conservation Act No. 9 Of 2009); and

- Nationally Protected Wildlife species (The 2007 lists of Threatened or Protected Species (TOPS), published in terms of Section 56(1) of the National Environmental Management: Biodiversity Act, No. 10 of 2004).

2.2 Biodiversity Field Assessment

Field surveys for the area were undertaken during the week of the 27th of February till 3 March 2023, which is a dry-season surveys, to determine the presence of Species of Conservation Concern (SCC). Effort was made to cover all the different habitat types, within the limits of time and access (Figure 2-2)

2.2.1 Flora Survey

The fieldwork and sample sites were placed within targeted areas (i.e. target sites) perceived as ecologically sensitive based on the preliminary interpretation of satellite imagery (Google Corporation) and GIS analysis (which included the latest applicable biodiversity datasets) available prior to the fieldwork. The focus of the fieldwork was therefore to maximise coverage and navigate to each target site in the field, to perform a rapid vegetation and ecological assessment at each sample site. Emphasis was placed on sensitive habitats, especially those overlapping with the proposed project area.

Homogenous vegetation units were subjectively identified using satellite imagery and existing land cover maps. The floristic diversity and search for flora SCC were conducted through timed meanders within representative habitat units delineated during the scoping fieldwork. Emphasis was placed mostly on sensitive habitats overlapping with the proposed project areas.

The timed random meander method 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 *et al.* (2009) and targeted as part of the timed meanders.

At each sample site notes were made regarding current impacts (e.g. livestock grazing, erosion etc.), subjective recording of dominant vegetation species and any sensitive features (e.g. wetlands, outcrops etc.). In addition, opportunistic observations were made while navigating through the study area.

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

- Identification Guide to Southern African Grasses: An Identification Manual with Keys, Descriptions, and Distributions (Fish *et al,* 2015);
- iNaturalist;
- Flowering Plants of the Southern Kalahari (Van Rooyen and Van Rooyen, 2019);
- Problem Plants and Alien Weeds of South Africa (Bromilow, 2010);
- Field Guide to Succulents in Southern Africa (Smith *et al,* 2017);
- Guide to the Aloes of South Africa (Van Wyk & Smith, 2014);
- Medicinal Plants of South Africa (Van Wyk *et al.,* 2013).

2.2.2 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 - are used for species that shelter in or under particular micro-habitats (typically rocks, exfoliating rock outcrops, fallen trees, leaf litter, bark etc.); and
- Camera trapping as well as small mammal trapping.

Relevant 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);
- The Mammals of the Southern African Subregion Skinner, J.D. & Chimimba, C.T. (2005).
- A Field Guide to the Tracks and Signs of Southern and East African Wildlife (Stuart and Stuart, 2000).

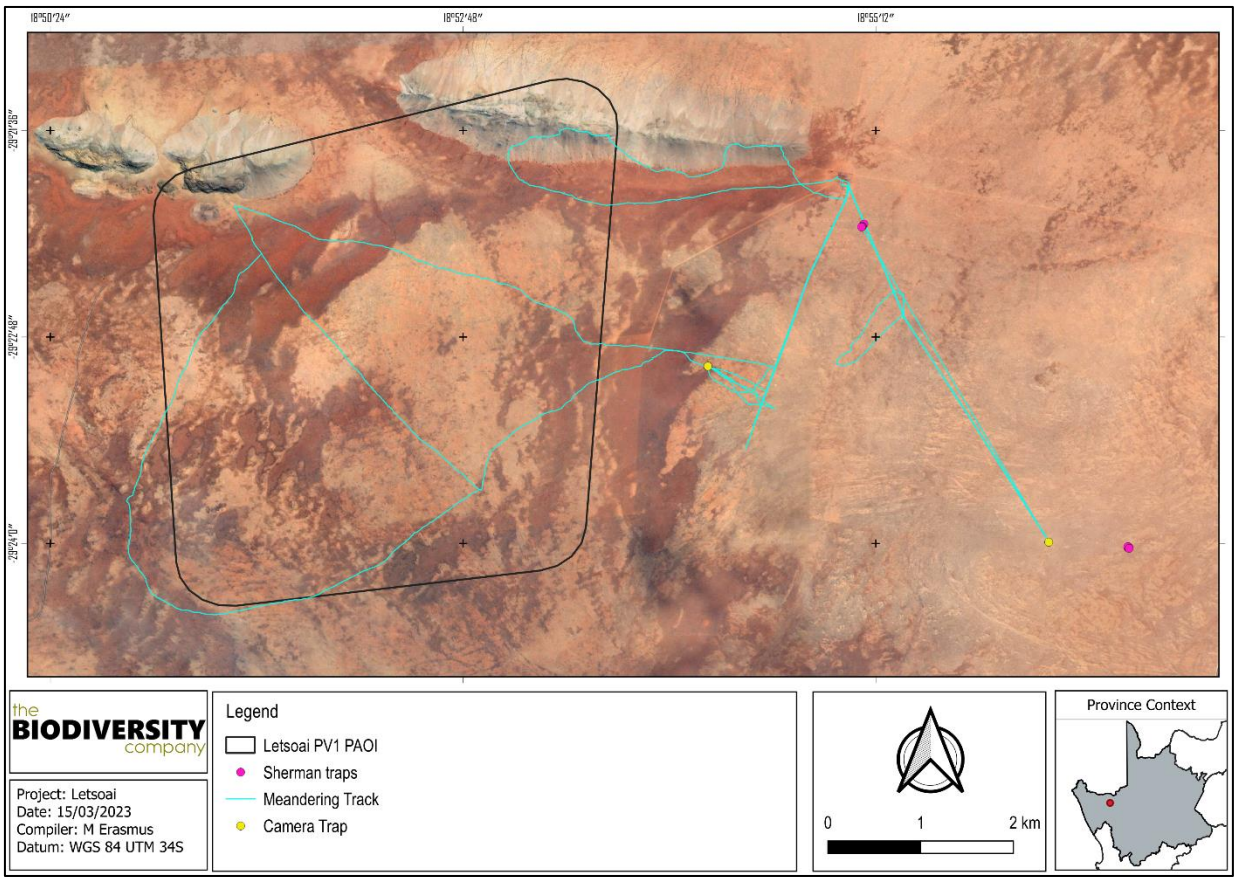


Figure 2-2 Map illustrating the field survey efforts including meandering track and trap locations within the area.

2.3 Terrestrial Site Ecological Importance (SEI)

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 species of conservation concern and their ecosystem processes.

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

Table 2-1 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 2-2 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 2-3.

Table 2-3 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 2-4.

Table 2-4 Summary of Resource 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 2-5.

Table 2-5 Matrix used to derive Site Ecological Importance (SEI) from Receptor Resilience (RR) and Biodiversity Importance (BI)

Site Ecological Importance (SEI)		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 2-6.

Table 2-6 Guidelines for interpreting Site Ecological Importance (SEI) in the context of the proposed development activities

Site Ecological Importance (SEI)	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.

3 Results & Discussion

3.1 Desktop Baseline

3.1.1 Spatially Relevent Legislative Boundaries

Due to the scope of planned infrastructure, the proposed project is relevant to both the Strategic Transmission Corridors (EGI) and Renewable Energy Development Zones (REDZs) legislation. As presented in Figure 3-1 and Figure 3-2 below, the PAOI overlaps with both the 'Northern' EGI corridor, as well as the phase 1 Springbok Wind REDZ.

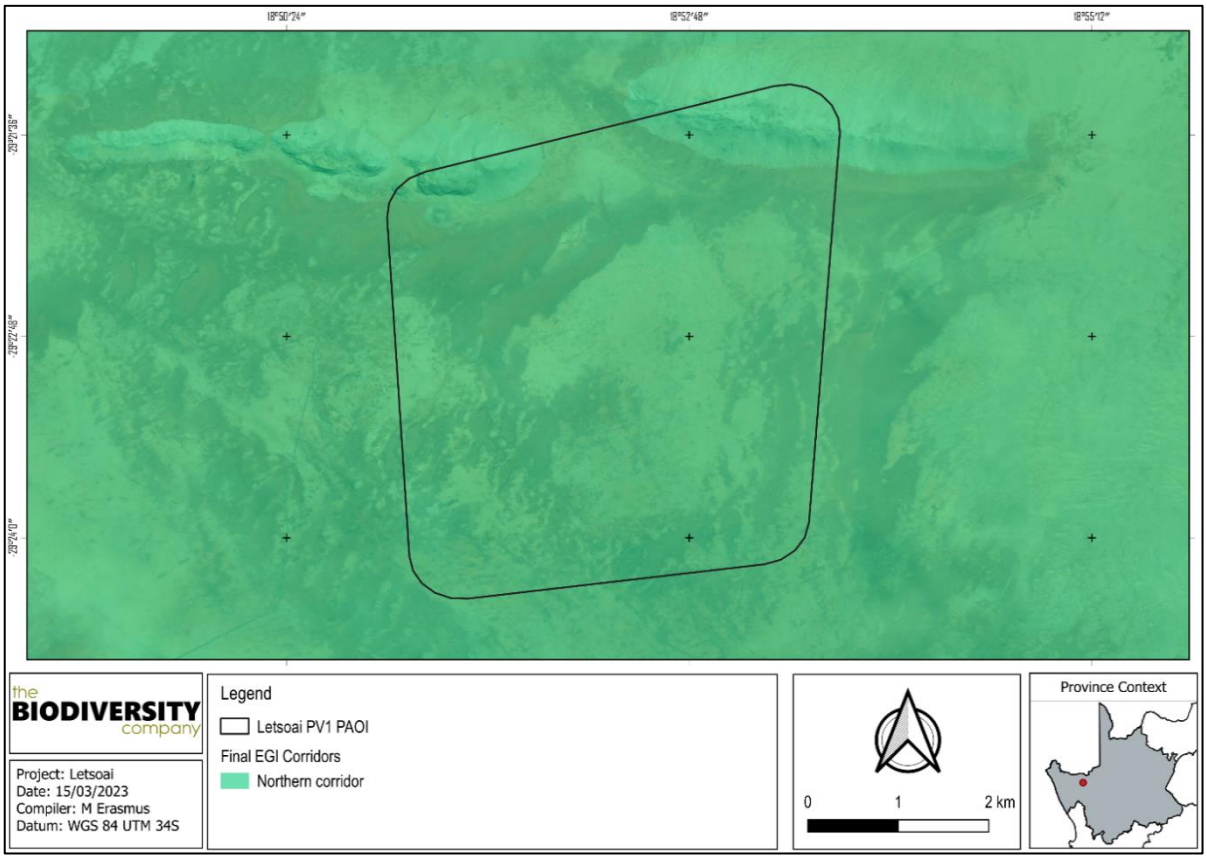


Figure 3-1 Map illustrating the Strategic Transmission Corridors (EGI) dataset relevance

Figure 3-2 Map showing the Renewable Energy Development Zones (REDZs) dataset relevance

3.1.2 Ecologically Important Landscape Features

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features are summarised in Table 3-1.

Table 3-1 Summary of relevance of the PAOI to ecologically important landscape features.

Desktop Information Considered	Relevant/Irrelevant	Section
Ecosystem Threat Status	Relevant – Overlaps with a Least Concern Ecosystem.	3.2.1.1
Ecosystem Protection Level	Relevant – Overlaps with a Not Protected Ecosystem.	3.2.1.2
National Protected Areas Expansion Strategy	Relevant – Falls within a 'Priority Focus Area'	3.2.1.3
Critical Biodiversity Area	Relevant –Falls within an ESA and CBA2	3.2.1.4
Renewable Energy EIA Application Database (REEA)	Relevant – Overlaps with 'Approved' Areas	3.2.1.5
National Freshwater Priority Area	Irrelevant – The project area does not overlap with any NFEPA's	-
South African Inventory of Inland Aquatic Ecosystems	Irrelevant – The PAOI does not overlap with any SAIIAE	-
Strategic Water Source Areas	Irrelevant – The PAOI does not overlap with any SWSAs	-
Protected Areas	Irrelevant – The nearest protected area is the 'Gamsberg Nature Reserve' situated ~11.5 km north-east of the PAOI	-

3.1.2.1 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. According to the spatial dataset the proposed PAOI overlaps with a LC ecosystem (Figure 3-3).

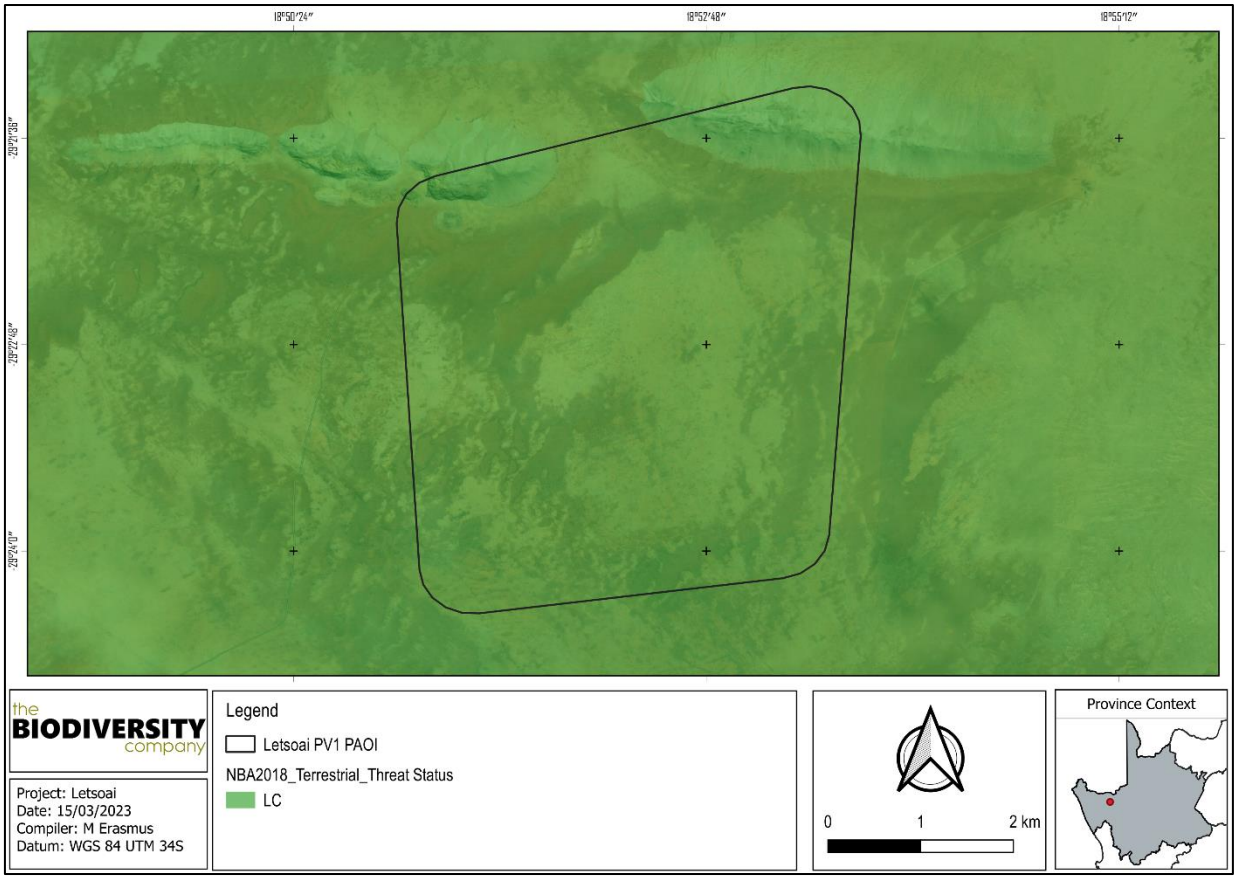


Figure 3-3 Map illustrating the ecosystem threat status associated with the study area.

3.1.2.2 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 PAOI overlaps with a NP ecosystem (Figure 3-4).

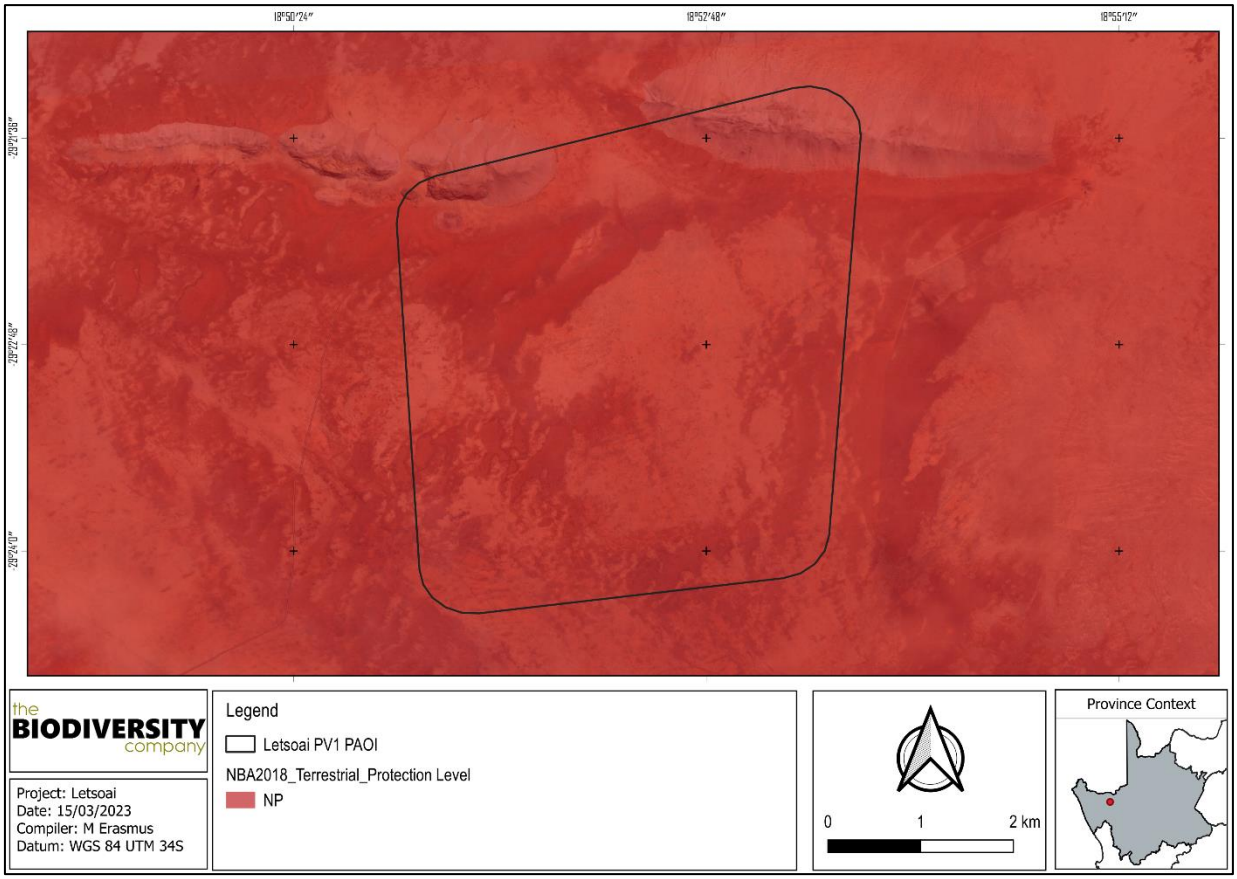


Figure 3-4 Map illustrating the ecosystem protection level associated with the study area

3.1.2.3 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2016 (NPAES) 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 a 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, 2016).

The PAOI overlaps with a priority focus area (Figure 3-5).

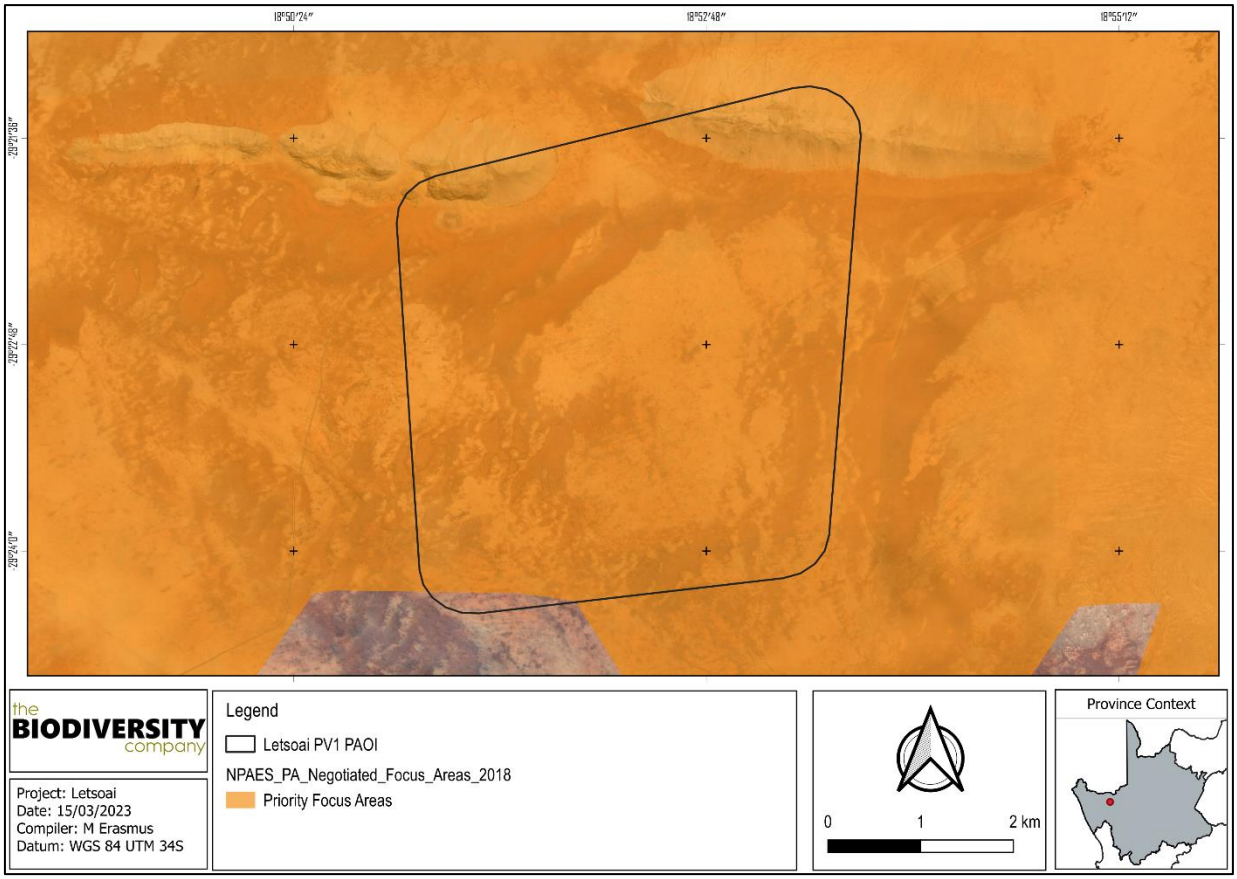


Figure 3-5 The project area in relation to the National Protected Area Expansion Strategy

3.1.2.4 Critical Biodiversity Areas and Ecological Support Areas

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure 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 cannot be met.

Figure 3-6 shows the PAOI superimposed on the Northern Cape Conservation Plan. The project area overlaps with an ESA and a CBA2.

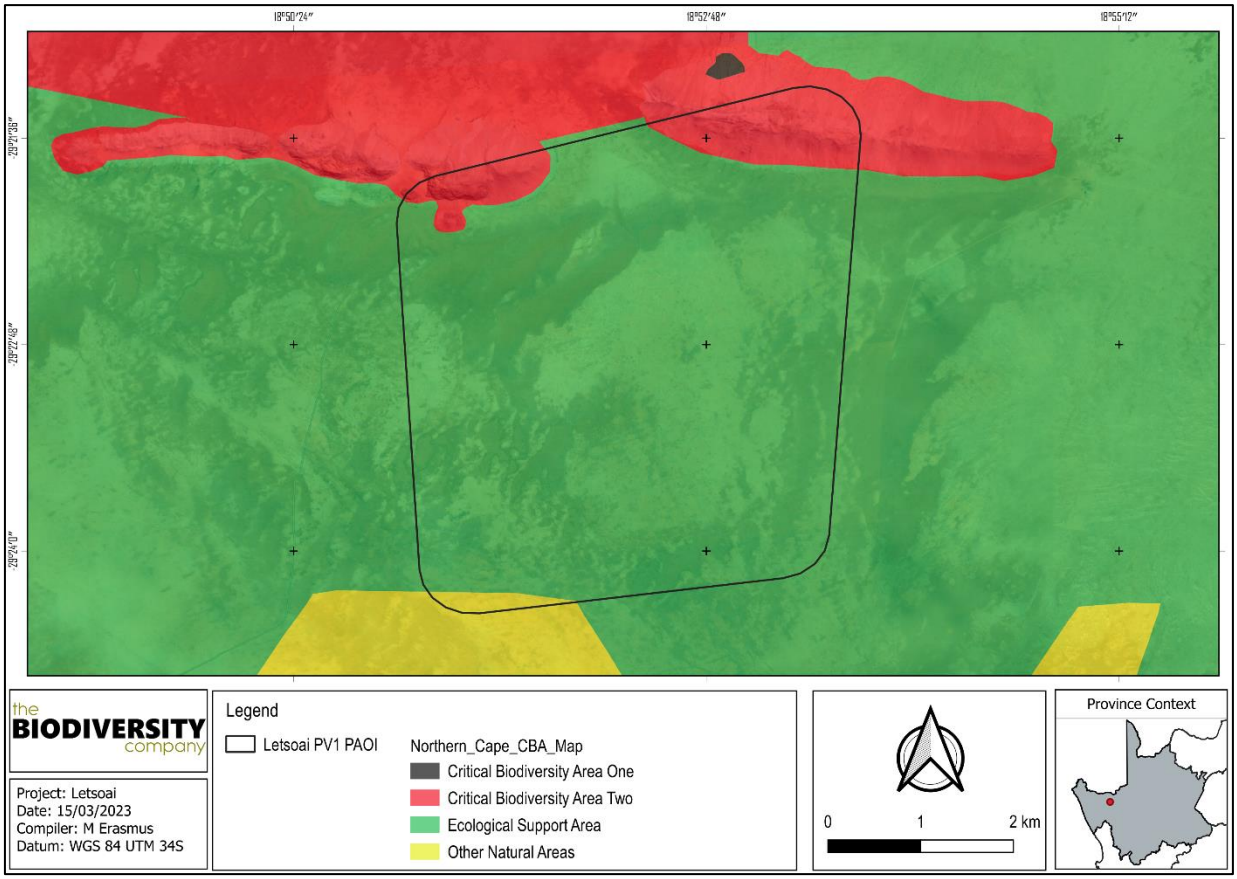


Figure 3-6 The PAOI superimposed on the Northern Cape Conservation Plan.

3.1.2.5 Renewable Energy EIA Application Database

The Renewable Energy Database (http://egis.environment.gov.za/), shows that there several other projects in the near vicinity (Figure 3-7). This increases the overall impact on the habitats in the area. Several “approved” projects occur in the vicinity of the PAOI.

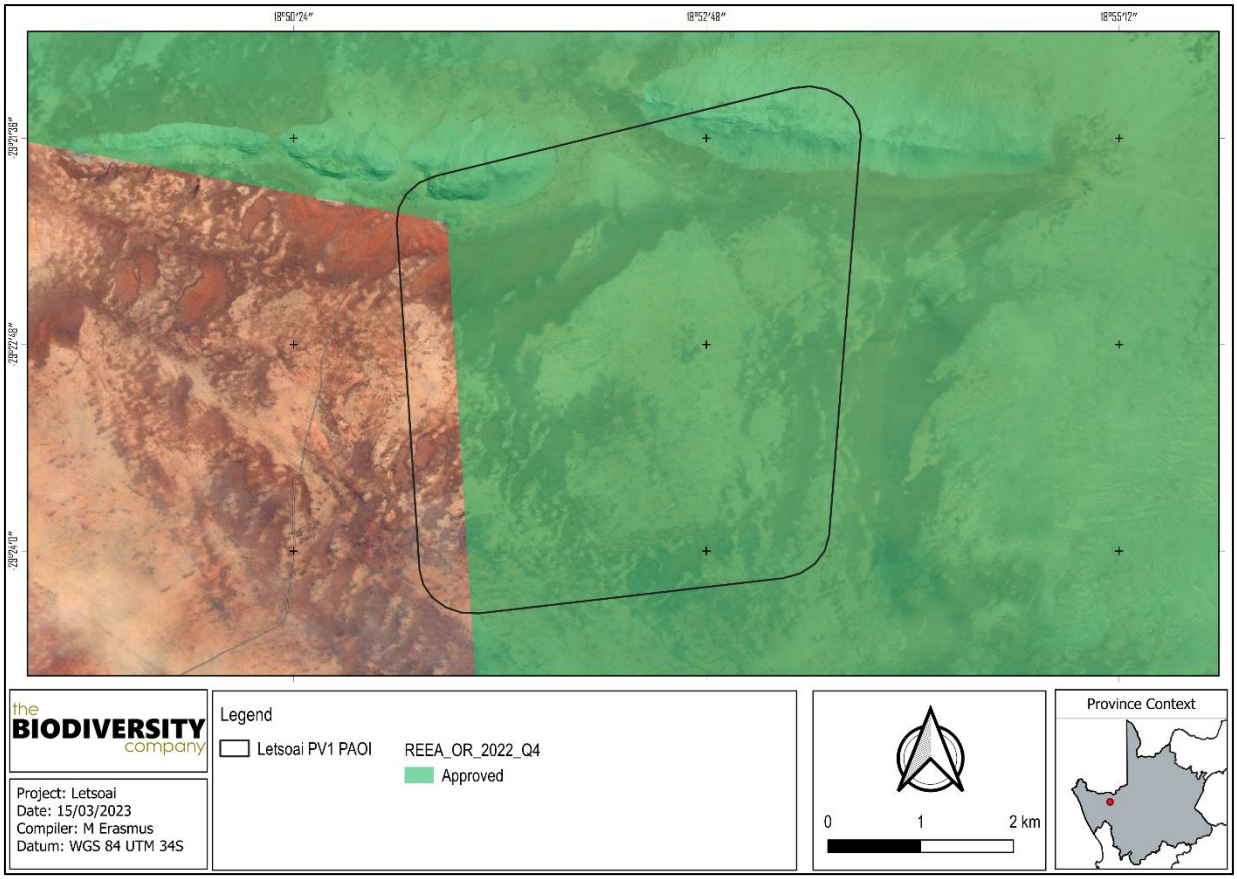


Figure 3-7 The project area in relation to the renewable energy database projects in the area

3.1.3 Flora Baseline

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

3.1.3.1 Vegetation Type

The project area falls within the Nama Karoo and Succulent Karoo Biomes.

The Nama Karoo biome is found in the central plateau of the western half of South Africa. The geology underlying the biome is varied, as the distribution of this biome is determined primarily by rainfall. The rain falls in summer and varies between 100 and 520 mm per year. This also determines the predominant soil type - over 80% of the area is covered by a lime-rich, weakly developed soil over rock. Although less than 5% of rain reaches the rivers, the high erodibility of soils poses a major problem where overgrazing occurs (SANBI, 2019).

The dominant vegetation is a grassy, dwarf shrubland. Grasses tend to be more common in depressions and on sandy soils, and less abundant on clayey soils. Grazing rapidly increases the relative abundance of shrubs. Most of the grasses are of the C4 type and, like the shrubs, are deciduous in response to rainfall events (SANBI, 2019).

Most of the Succulent Karoo biome covers a flat to gently undulating plain, with some hilly and "broken" veld, mostly situated to the west and south of the escarpment, and north of the Cape Fold Belt. The altitude is mostly below 800 m, but in the east it may reach 1 500 m (SANBI, 2019).

The Succulent Karoo Biome is primarily determined by the presence of low winter rainfall and extreme summer aridity. Rainfall varies between 20 and 290 mm per year. Because the rains are cyclonic, and not due to thunderstorms, the erosive power is far less than of the summer rainfall biomes. During

summer, temperatures in excess of 40°C are common, while fog is common nearer to the coast (SANBI, 2019).

The vegetation is dominated by dwarf, succulent shrubs, of which the Vygies (Mesembryanthemaceae) and Stonecrops (Crassulaceae) are particularly prominent. Mass flowering displays of annuals (mainly Daisies Asteraceae) occur in spring, often on degraded or fallow lands. Grasses are rare, except in some sandy areas, and are of the C3 type. The number of plant species mostly succulents - is very high and unparalleled elsewhere in the world for an arid area of this size (SANBI, 2019).

On a fine-scale vegetation type, the project area overlaps with the Bushmanland Arid Grassland (Nama Karoo) and the Bushmanland Inselberg Shrubland (Succulent Karoo) vegetation types (Figure 3-8).

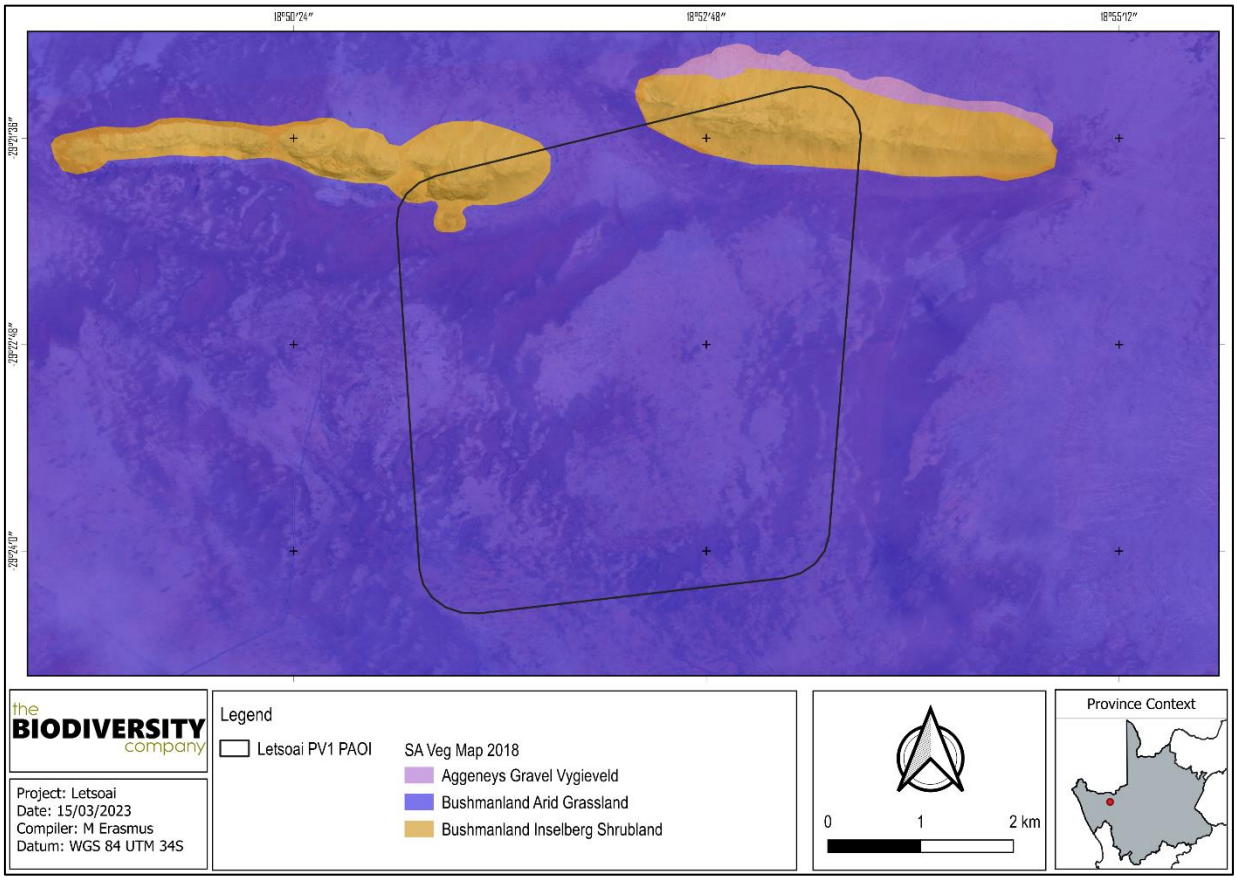


Figure 3-8 Map illustrating the vegetation types associated with the project area

3.1.3.1.1 Bushmanland Arid Grassland

The Bushmanland Arid Grassland consists of extensive to irregular plains on a slightly sloping plateau. It is sparsely vegetated by grasslands, mainly dominated by white grasses (*Stipagrostis* species) giving this vegetation type the character of semidesert 'steppe'. In places low shrubs of *Salsola* change the vegetation structure. In years of abundant rainfall rich displays of annual herbs can be expected.

Important Taxa ([W]Western and [E]Eastern regions of the unit only)

Graminoids: *Aristida adscensionis* (d), *A. congesta* (d), *Enneapogon desvauxii* (d), *Eragrostis nindensis* (d), *Schmidtia kalahariensis* (d), *Stipagrostis ciliata* (d), *S. obtusa* (d), *Cenchrus ciliaris*, *Enneapogon scaber*, *Eragrostis annulata*[E], *E. porosa*[E], *E. procumbens*, *Panicum lanipes*[E], *Setaria verticillata*[E], *Sporobolus nervosus*, *Stipagrostis brevifolia*[W], *S. uniplumis*, *Tragus berteronianus*, *T. racemosus*[E].

Small Trees: *Senegalia mellifera* subsp. *detinens*[E], *Boscia foetida* subsp. *foetida*.

Tall Shrubs: *Lycium cinereum* (d), *Rhigozum trichotomum* (d), *Cadaba aphylla*, *Parkinsonia africana*.

Low Shrubs: *Aptosimum spinescens* (d), *Hermannia spinosa* (d), *Pentzia spinescens* (d), *Aizoon asbestinum*[E], *A. schellenbergii*[E], *Aptosimum elongatum*, *A. lineare*[E], *A. marlothii*[E], *Barleria rigida*, *Berkheya annectens*, *Blepharis mitrata*, *Eriocephalus ambiguus*, *E. spinescens*, *Limeum aethiopicum*, *Lophiocarpus polystachyus*, *Monechma incanum*, *M. spartioides*, *Pentzia pinnatisecta*, *Phaeoptilum spinosum*[E], *Polygala seminuda*, *Pteronia leucoclada*, *P. mucronata*, *P. sordida*, *Rosenia humilis*, *Senecio niveus*, *Sericocoma avolans*, *Solanum capense*, *Talinum arnotii*[E], *Tetragonia arbuscula*, *Zygophyllum microphyllum*.

Succulent Shrubs: *Kleinia longiflora*, *Lycium bosciifolium*, *Salsola tuberculata*, *S. glabrescens*.

Herbs: *Acanthopsis hoffmannseggiana*, *Aizoon canariense*, *Amaranthus praetermissus*, *Barleria lichtensteiniana*[E], *Chamaesyce inaequilatera*, *Dicoma capensis*, *Indigastrum argyraeum*, *Lotononis platycarpa*, *Sesamum capense*, *Tribulus pterophorus*, *T. terrestris*, *Vahlia capensis*.

Succulent Herbs: *Gisekia pharnacioides*[E], *Psilocaulon coriarium*, *Trianthema parvifolia*.

Geophytic Herb: *Moraea venenata*.

Biogeographically Important Taxon (Bushmanland endemic)

Succulent Herb: *Tridentea dwequensis*.

Endemic Taxa

Succulent Shrubs: *Dinteranthus pole-evansii*, *Larryleachia dinteri*, *L. marlothii*, *Ruschia kenhardtensis*.

Herbs: *Lotononis oligocephala*, *Nemesia maxii.*

Conservation Status

According to Mucina and Rutherford (2006), this vegetation type is classified as least Threatened. The national target for conservation protection for this vegetation types is 21%, with only small patches statutorily conserved in Augrabies Falls National Park and Goegab Nature Reserve. Very little of the area has been transformed. The risk of erosion in this vegetation type is very low (60%) and low (33%).

3.1.3.1.2 Bushmanland Inselberg Shrubland

The Bushmanland Inselberg Shrubland is comprised of a group of prominent solitary mountain (inselbergs) and smaller koppies. These overshadow the surrounding flat plains in northern Bushmanland in the Aggeneys and Pofadder regions. The unit is made up of shrubland with both succulent and nonsucculent elements, with sparse grassy undergrowth on the steep slopes (Mucina & Rutherford, 2006).

Important Taxa

Succulent Shrubs: *Adromischus diabolicus (d), Euphorbia gregaria (d), Ihlenfeldtia vanzy!ii (d), Ruschia divaricata (d), Schwantesia pillansii (d), Tylecodon sulphureus (d), Euphorbia gariepina, Kleinia longiflora, Othonna euphorbioides, Psilocau/on subnodosum, Tetragonia reduplicata, Tylecodon rubrovenosus.*

Tall Shrub: *Boscia foetida*.

Low Shrubs: *Eriocephalus pauperrimus (d), Pteronia unguiculata*.

Woody Succulent Climber: *Sarcostemma viminale (d).*

Herb: *Acanthopsis hoffmannseggiana*.

Succulent Herbs: *Anacampseros baeseckei (d), A. karasmontana (d), Avonia ruschii (d), Conophytum fulleri (d), Avonia quinarian subsp. alstonii, Conophytum marginatum var. haramoepense*.

Graminoids: *Aristida adscensionis (d), Eragrostis annulata, Stipagrostis obtusa*.

Biogeographically Important Taxa ([NQ]Namaqualand endemic, [G]Gariep endemic)

Succulent Shrubs: (d), *Ceraria fruticulosa*[G], *Cheiridopsis pillansi*[F].

Geophytic Herb: *Whiteheadia bifolia*[NQ].

Succulent Shrub: *Hoodia alstonii*[G].

Endemic Taxon

Succulent Herb: *Huernia barbata subsp. ingeae*.

Conservation Status

According to Mucina & Rutherford (2006) this vegetation type is classified as threatened. The national target for conservation protection is 34%, with none of the unit conserved in statutory conservation areas. Erosion is very low.

3.1.3.2 Expected Flora Species

The POSA database indicates that 534 species of indigenous plants are expected to occur within the project area (Appendic A). Ten (10) SCCs based on their conservation status could be expected to occur within the project area and are provided in Table 3-2 below. Numerous provincially and nationally (National Forest Act (Act No. 84 of 1998)) protected species could be expected to occur, including all species from the families Aizoaceae, Amaryllidaceae and Crassulaceae, and the nationally protected tree species, *Boscia albitrunca*, *Euclea pseudebenus* and *Vachellia erioloba* .

Table 3-2 Threatened flora species that may occur within the project area

Family	Taxon	Author	IUCN	Ecology
Aizoaceae	*Conophytum limpidum*	S.A.Hammer	NT	Indigenous; Endemic
Aizoaceae	*Conophytum achabense*	S.A.Hammer	VU	Indigenous; Endemic
Aizoaceae	*Lithops olivacea*	L.Bolus	VU	Indigenous; Endemic
Amaryllidaceae	*Strumaria massoniella*	(D.Mull.-Doblies & U.Mull.-Doblies) Snijman	VU	Indigenous; Endemic
Anacampserotaceae	*Anacampseros recurvata*	Schonland	DDD	Indigenous; Endemic
Asphodelaceae	*Bulbine ophiophylla*	G.Will.	EN	Indigenous
Asteraceae	*Helichrysum marmarolepis*	S.Moore	NT	Indigenous; Endemic
Crassulaceae	*Crassula decumbens*	Thunb.	NT	Indigenous; Endemic
Fabaceae	*Crotalaria pearsonii*	Baker f.	VU	Indigenous; Endemic
Scrophulariaceae	*Microdon capitatus*	(P.J.Bergius) Levyns	EN	Indigenous; Endemic

3.1.4 Faunal Baseline

3.1.4.1 Amphibians

Based on the IUCN Red List Spatial Data and FrogMap, nine (9) amphibian species are expected to occur within the project area (Appendix B). No amphibian SCC are expected to occur within the project area.

3.1.4.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 60 reptile species are expected to occur within the area (Appendic C). One (1) species is regarded as a SCC (Table 3-3).

Table 3-3 Threatened reptile species that are expected to occur within the project area

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional	Global	
Psammobates tentorius verroxii	Verrox's Tent Tortoise	NT	LC	Moderate

Psammobates tentorius veroxii (Tent Tortoise) is categorised as NT locally. This species can be found in low densities in the Karoo and semi-desert areas of South Africa and Namibia. It is threatened because of the pet trade and destruction of its habitat. The likelihood of occurrence in the project area is rated as moderate due to the presence of suitable habitat and climate.

3.1.4.3 Mammals

The IUCN Red List Spatial Data and MammalMap lists 71 mammal species that could be expected to occur within the area (Appendix D). This list excludes large mammal species that are normally restricted to protected areas. Seven (7) of these expected species are regarded as threatened (Table 3-4). Of these seven SCCs, six have been assigned a low likelihood of occurrence based on the lack of suitable habitat in the project area. One (1) species has been assigned a moderate likelihood of occurrence.

Table 3-4 Threatened mammal species that are expected to occur within the project area

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional	Global	
Cistugo seabrae	Angolan Wing-gland Bat	VU	Unlisted	Low
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT	Low
Felis nigripes	Black-footed Cat	VU	VU	Low
Graphiurus rupicola	Stone Dormouse	NT	LC	Moderate
Panthera pardus	Leopard	VU	VU	Low
Parotomys littledalei	Littledale's Whistling Rat	NT	LC	Low
Thallomys shortridgei	Shortridge's Rat	DD	DD	Low

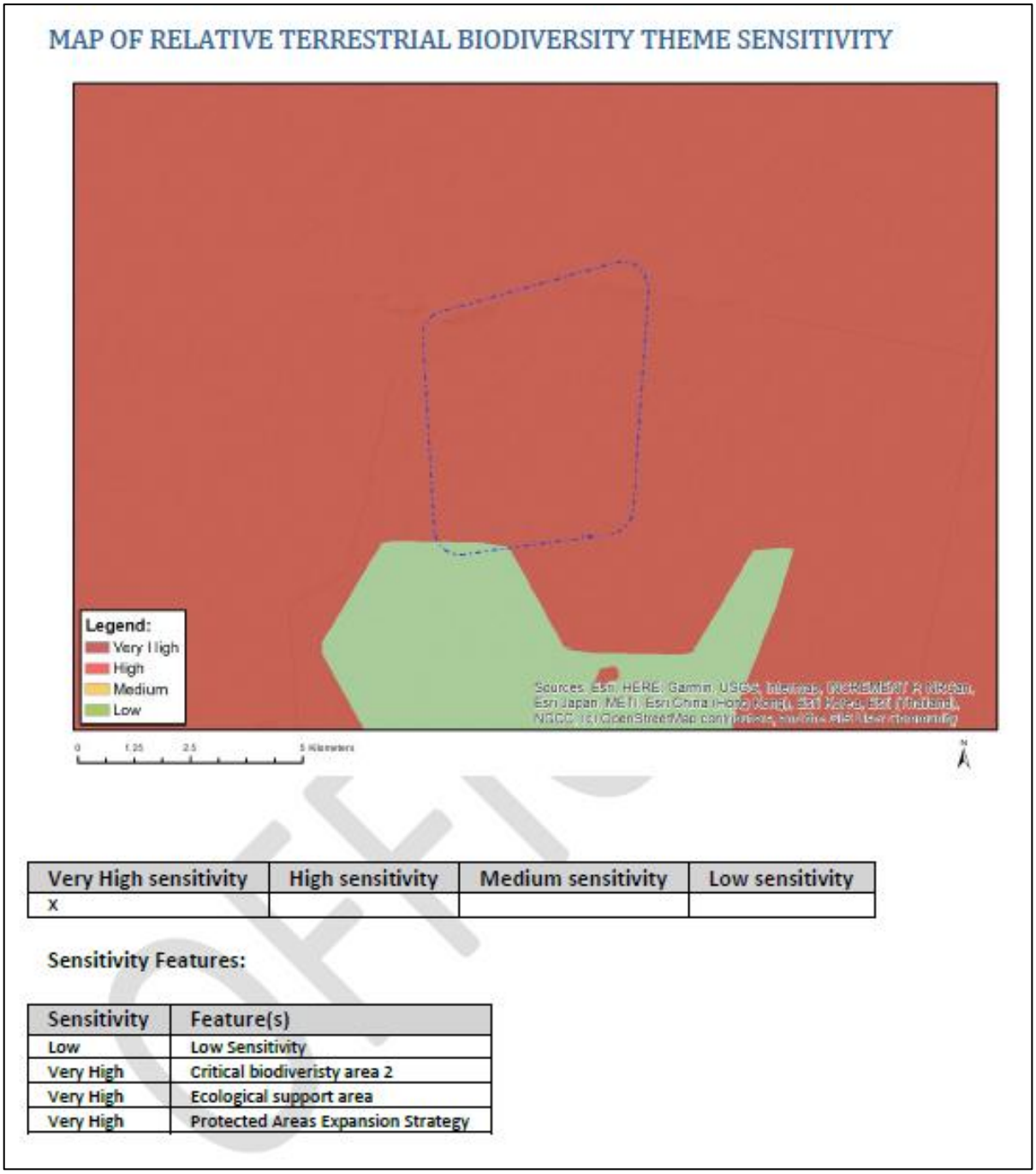
Graphiurus rupicola (Stone Dormouse) is categorised as near threatened on a regional scale. This species occurs in a narrow belt predominantly along the escarpment of Namibia and marginally into north-western South Africa. The reason for their decline is said to be mainly range restriction. The likelihood of occurrence in the project area is listed as moderate due to the presence of suitable habitat in the form of rocky areas situated near the project area.

3.1.5 DEA Screening Tool

- Theme sensitivity is Very High for the PAOI (Figure 3-9);

Plant Species Theme sensitivity is Medium for the PAOI, with the possibility of multiple medium and low sensitivity plant According to the Screening Tool Report generated (Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended), the following sensitivity classifications were gathered from the National Web-based Environmental Screening Tool:

- Terrestrial Biodiversity species being present (Figure 3-10); and
- Animal Species Theme sensitivity is High for the PAOI, with the possibility of multiple medium sensitivity species being present (Figure 3-11);



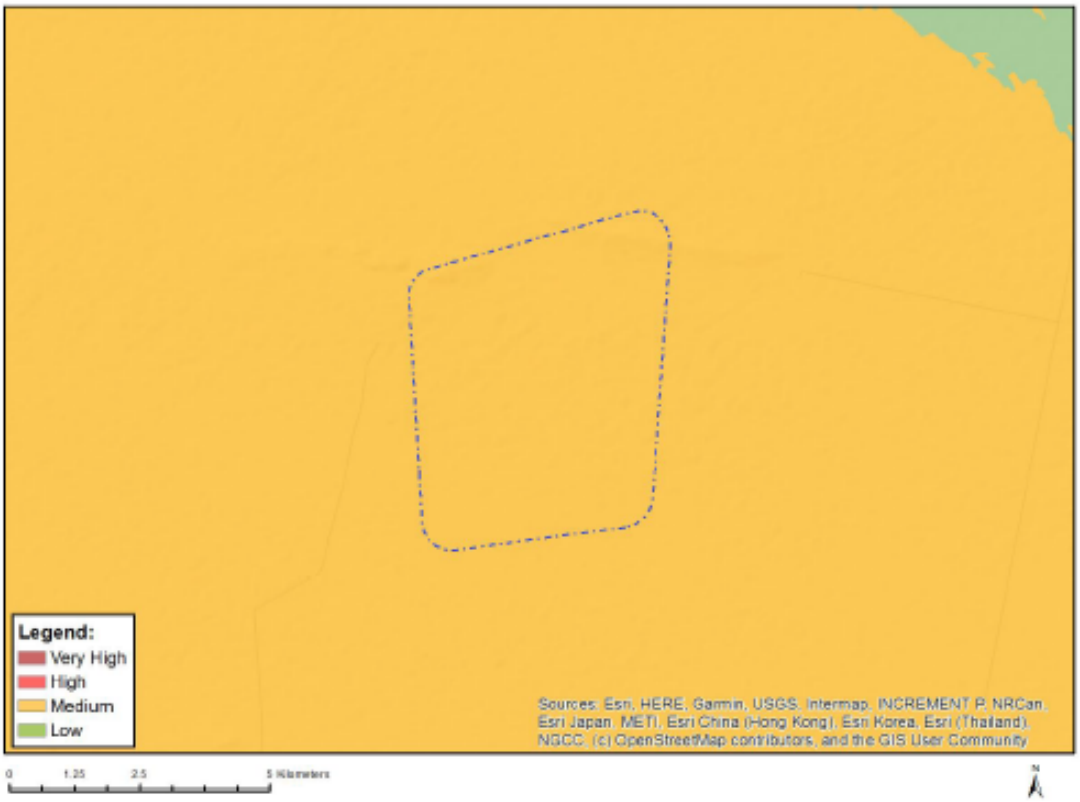
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
x			

Sensitivity Features:

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

Figure 3-9 Relative terrestrial biodiversity theme sensitivity for the project area

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.

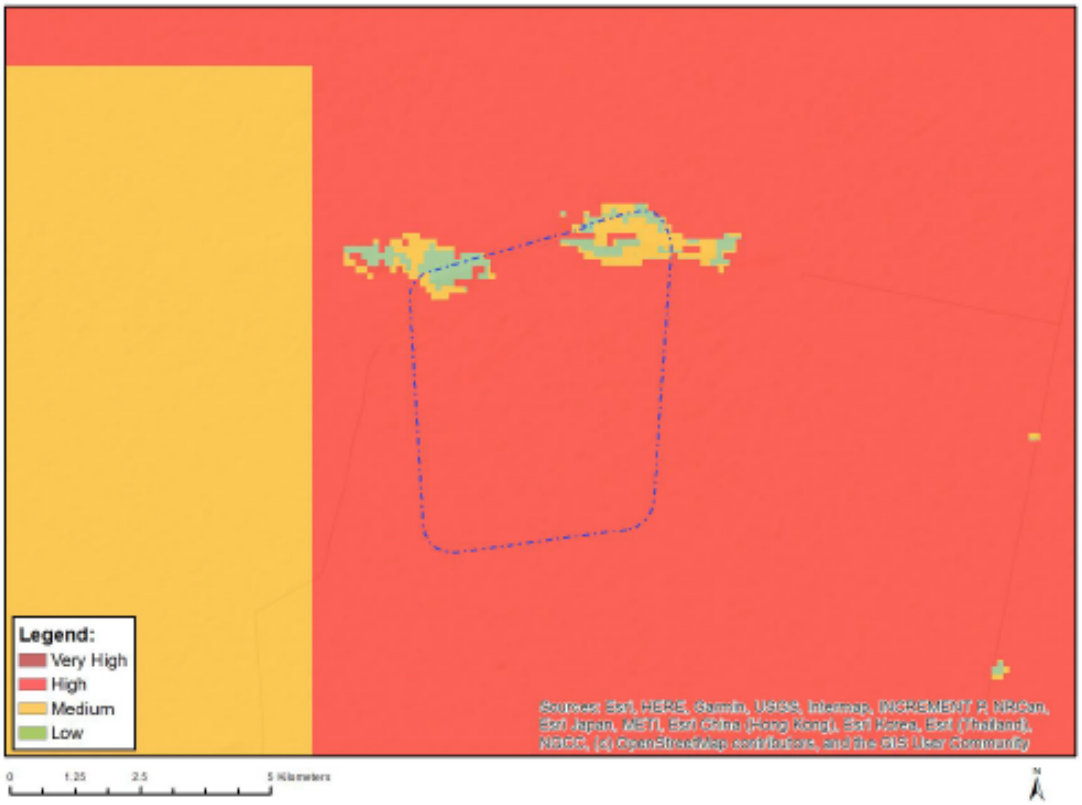
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Medium	Sensitive species 425
Medium	Sensitive species 119
Medium	Sensitive species 144

Figure 3-10 Relative plant species theme sensitivity for the project area

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-Calendulauda burra
Low	Subject to confirmation
Medium	Aves-Neotis ludwigii
Medium	Aves-Sagittarius serpentarius
Medium	Aves-Aquila verreauxii

Figure 3-11 Relative animal species theme sensitivity for the project area

3.2 Field Assessment

The following sections provide the results from the field survey for the proposed development that was undertaken.

3.2.1 Flora Assessment

This section is divided into two sections:

- Indigenous flora; and
- Invasive Alien Plants (IAPs).

3.2.1.1 Indigenous Flora

The vegetation assessment was conducted throughout the extent of the study area. A total of 27 tree, shrub and herbaceous plant species were recorded in the study area during the field assessment. Notably, this is not a complete list of indigenous flora recorded within the survey area, but only species that were able to be recorded within the survey within the time and accessibility constraints (Table 3-5). Some of the plant species recorded can be seen in Figure 3-12.

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

Table 3-5 Trees, shrub and herbaceous plant species recorded in the project area.

Family	*Scientific Name*	Conservation Status	Endemism
Acanthaceae	*Acanthopsis hoffmannseggiana*	DDT	-
Aizoaceae	*Aizoon africanum*	LC	-
Amaranthaceae	*Hermbstaedtia glauca*	LC	-
Asphodelaceae	*Aloidendron dichotomum*	VU	-
Asteraceae	*Kleinia longiflora*	LC	-
Asteraceae	*Pentzia pinnatisecta*	LC	-
Asteraceae	*Pentzia spinescens*	LC	-
Asteraceae	*Pteronia mucronata*	LC	-
Bignoniaceae	*Rhigozum brevispinosum*	LC	-
Bignoniaceae	*Rhigozum trichotomum*	LC	-
Brassicaceae	*Boscia foetida subsp. foetida*	LC	-
Crassulaceae	*Crassula sericea*	LC	-
Euphorbiaceae	*Euphorbia spinea*	LC	-
Fabaceae	*Parkinsonia africana*	LC	-
Geraniaceae	*Monsonia cf. crassicaulis*	LC	-
Loasaceae	*Kissenia capensis*	LC	-
Pedaliaceae	*Rogeria longiflora*	LC	-
Poaceae	*Aristida adscensionis*	LC	-
Poaceae	*Enneapogon scaber*	LC	-
Poaceae	*Schmidtia kalahariensis*	LC	-
Poaceae	*Schmidtia pappophoroides*	LC	-
Poaceae	*Stipagrostis ciliata*	LC	-

Poaceae	*Stipagrostis obtusa*	LC	-
Poaceae	*Tragus sp.*	-	-
Scrophulariaceae	*Aptosimum spinescens*	LC	-
Solanaceae	*Lycium cinereum*	LC	-
Zygophyllaceae	*Zygophyllum dregeanum*	LC	-

One of the flora species recorded within the PAOI during the field survey period is regarded as a SCC (Table 3-6).

Table 3-6 Summary of flora Species of Conservation Concern recorded within the Project Area of Influence (PAOI) during the field survey period

Scientific Name	Conservation Status and Criteria	Ecology and Threats
Aloidendron dichotomum	VU A3ce	"On north-facing rocky slopes (particularly dolomite) in the south of its range. Any slopes and sandy flats in the central and northern parts of range" (Foden, W. 2018) "Climate change models project a 36% decline in range in 100 years, assuming dispersal into newly suitable areas. Patterns of modelled declines have been supported by field and repeat photo studies. However, no colonization of newly suitable areas has yet happened. Without dispersal, the models predict a 73% decline in 100 years, qualifying the species as EN" (Foden, W. 2018)

Figure 3-12 Photographs illustrating some of the flora recorded within the assessment area: A) Hermbstaedtia glauca, B) Aptosimum spinescens, C) Acanthopsis hoffmannseggiana, D) Kleinia longiflora, E) Boscia foetida subsp. foetida and F) Parkinsonia africana.

3.2.1.2 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. 43726, 18 September 2020. The legislation calls for the removal and / or control of AIP 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.

No IAP species were recorded within the PAOI. These species are listed under the Alien and Invasive Species List 2020, Government Gazette No. GN1003 as Category 1b. These IAP species must be controlled by implementing an IAP Management Programme, in compliance of section 75 of the NEMBA, as stated above.

3.2.2 Faunal Assessment

Herpetofauna and mammal observations and recordings fall under this section. A separate avifaunal report was compiled for this project.

3.2.2.1 Amphibians and Reptiles

Four (4) species of reptile and no amphibian species were recorded within the study area during the survey period (Table 3-7, Figure 3-13). However, there is the possibility of more species being present,

as certain reptile species are secretive and require long-term surveys to ensure capture. None of the species recorded are regarded as threatened.

Table 3-7 Summary of herpetofauna species recorded within the study area.

Family	Scientific Name	Common Name	Conservation Status	
			Regional	Global
Agamidae	*Agama aculeata*	Ground Agama	LC	LC
Gekkonidae	*Chondrodactylus bibronii*	Bibron's Thick-toed Gecko	LC	LC
Lacertidae	*Pedioplanis inornata*	Plain Sand Lizard	LC	LC
Lacertidae	*Pedioplanis lineoocellata subsp. pulchella*	Spotted Sand Lizard	LC	LC
Psammophiidae	*Psammophis leightoni*	Cape Sand Snake	LC	LC
Scincidae	*Trachylepis occidentalis*	Western Three-striped Skink	LC	LC
Scincidae	*Trachylepis variegata*	Variegated Skink	LC	LC
Viperidae	*Bitis caudalis*	Horned Adder	LC	LC

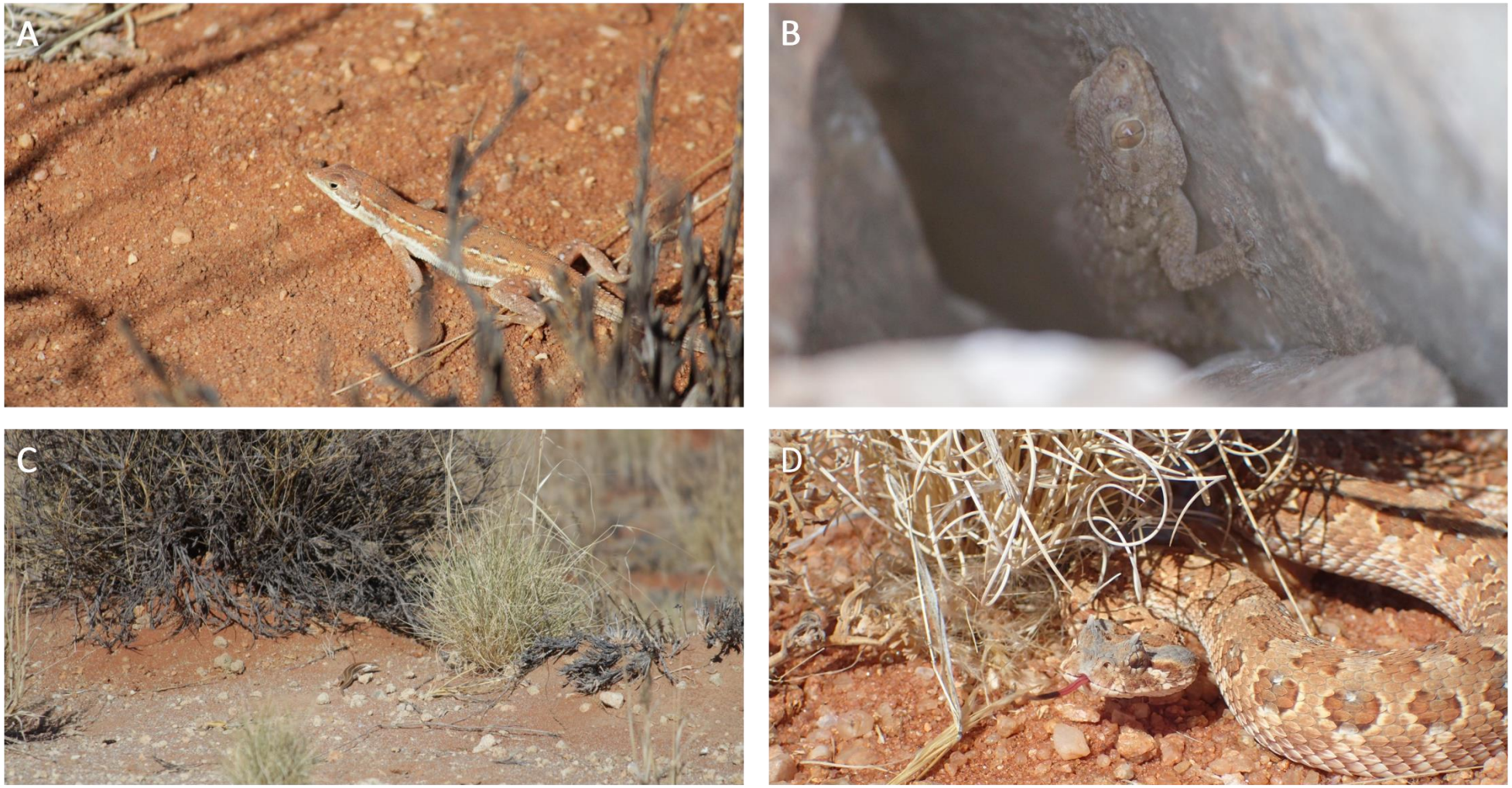


Figure 3-13 Photographs illustrating the reptile species recorded within the assessment area associated with the project area during the survey period: A) Pedioplanis lineoocellata subsp. pulchella, B) Chondrodactylus bibronii, C) Trachylepis occidentalis and, D) Bitis caudalis

3.2.2.2 Mammals

Thirteen (13) mammal species were observed during the survey of the study area (Table 3-8) based on either direct observation or the presence of visual tracks and signs (Figure 3-14).

The species *Orycteropus afer afer* (Southern Aardvark) is regarded as a keystone species within the Nama Karoo biome. The burrows they create are also utilised as shelter by an array of faunal species, which is pertinent in the thermally variable and semi-arid environment of the PAOI and surrounding landscape. In addition, they are ecosystem engineers as their foraging behaviour plays a role in vegetation dynamics. *Orycteropus afer afer* feed on the Formicidae species, *Messor capensis*, which is a major seed predator within the Karoo bioregion. During foraging by *O.afer afer*, the nests are damaged but usually not destroyed, and the seed stores are frequently distributed with the mound soils over a larger area. The seeds are usually buried within the mound soil and germinate during favourable conditions. A portion of the seeds may also be ingested by *O. afer afer* while feeding on the ants and these are distributed with the faeces. Consequently, the species inadvertently also plays a role in seed dispersal and germination.

Orycteropus afer afer (Southern Aardvark), *Pedetes capensis* (Southern Springhare) and *Geosciurus inauris* (South African Ground Squirrel) are ecosystem engineers within the region. The former species is also regarded as a keystone species within the Nama Karoo biome. The burrows they create are also utilised as shelter by an array of faunal species, which is pertinent in the climatically variable and semi-arid environment of the PAOI and surrounding landscape (Whittington-Jones, Bernard, & Parker, 2011)

Table 3-8 Summary of mammal species recorded within the study area .

Family	Scientific Name	Common Name	Conservation Status	
			Regional	Global
Bovidae	*Antidorcas marsupialis subsp. hofmeyri*	Kalahari Springbok	LC	LC
Bovidae	*Raphicerus campestris subsp. campestris*	Southern Steenbok	LC	LC
Canidae	*Lupulella mesomelas subsp. mesomelas*	Southern Black-backed Jackal	LC	LC
Canidae	*Otocyon megalotis subsp. megalotis*	Southern Bat-eared Fox	LC	LC
Herpestidae	*Herpestes pulverulentus*	Cape Grey Mongoose	LC	LC
Muridae	*Gerbillurus paeba*	Hairy-footed Gerbil	LC	LC
Orycteropodidae	*Orycteropus afer subsp. afer*	Southern Aardvark	LC	LC
Pedetidae	*Pedetes capensis*	Southern Springhare	LC	LC
Sciuridae	*Geosciurus inauris*	South African Ground Squirrel	LC	LC

Figure 3-14 Photographs illustrating the mammal species recorded within the study area during the survey period. A) Gerbillurus paeba (Hairy-footed Gerbil), B) Chlorocebus pygerythrus, C) Otocyon megalotis subsp. Megalotis (Southern Bat-eared Fox) and D) Antidorcas marsupialis subsp. Hofmeyri (Kalahari Springbok)

4 Site Sensitivity Verification

4.1 Site Ecological Importance (SEI)

Three (3) main terrestrial habitat types were delineated within the PAOI, including one set of Inselberg habitats (varying slopes) as a whole is discussed in Table 4-1, whereas a photo illustration can be seen in Figure 4-1.

Based on the criteria provided in Section 2.3 of this report, all habitats within the assessment area of the proposed project were allocated a sensitivity category. The sensitivities of the habitat types delineated are illustrated in Figure 4-2,

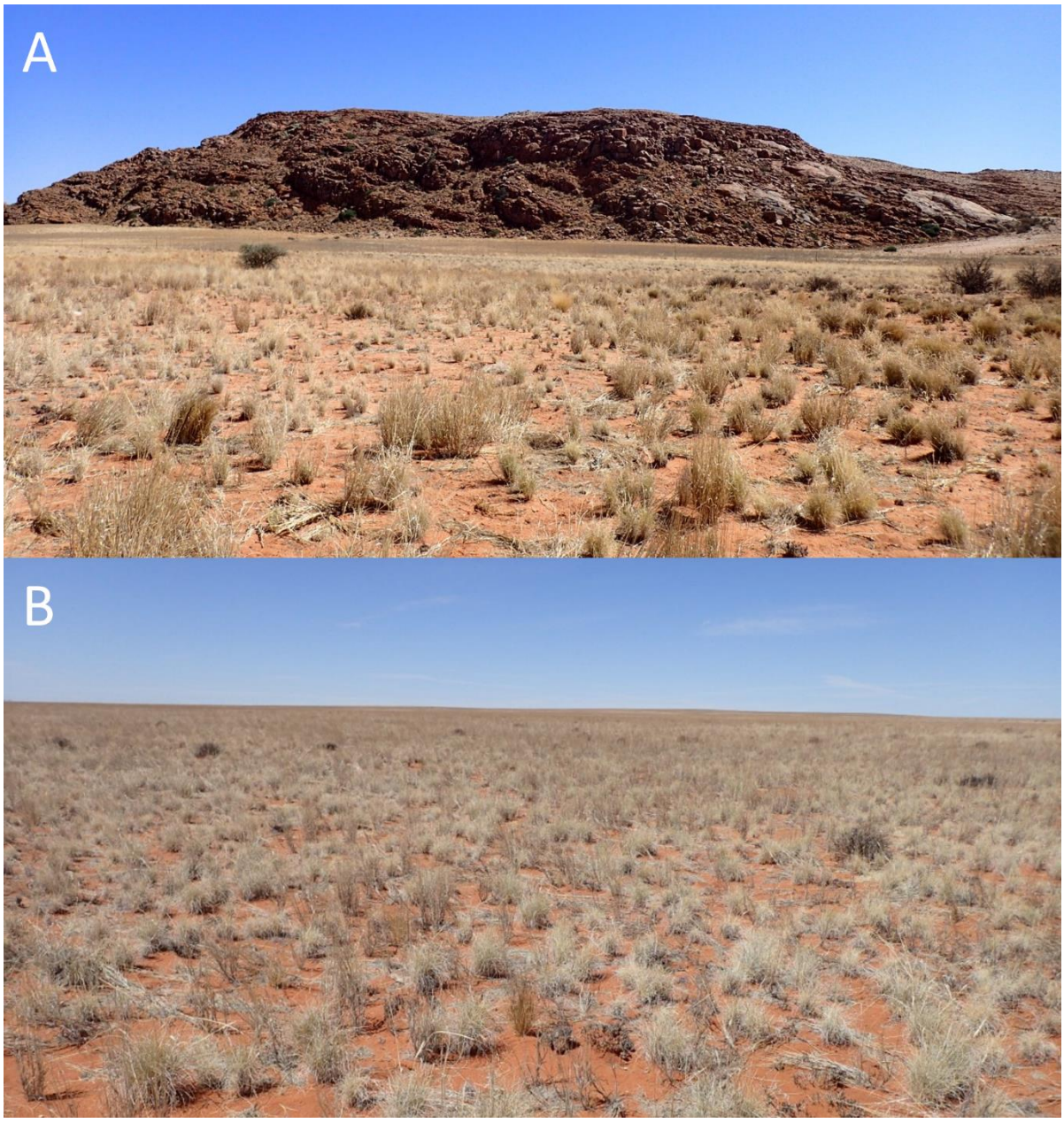


Figure 4-1 Photographs illustrating the habitat types delineated within the Project Area of Influence (PAOI): A) Gravel Grassland in the foreground with inselberg in the background, B) Sandy Grassland.

Table 4-1 Summary of habitat types delineated within field assessment area of project area.

Habitat Type	Description	Ecosystem Processes and Services	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
Inselberg Shrubland	Steep to moderately steep slopes with shallow soils. Distinct and unique habitat features within the relatively homogeneous Nama Karoo region.	Capture and filter precipitation and run-off. Provides unique habitat for numerous species. Provides greater heterogeneity in regional habitat and microclimate.	**High** Intact CBA 2	**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.	**High**	**Very Low** Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring.	**Very High** Avoidance mitigation – no destructive development activities should be considered. Applicable buffer may be added to the habitats.
Sandy Grassland	Terrain consists of a dune slope with deep red soils. Variable in the presence or absence of grass species and shrub density.	Provides grazing and foraging resources for indigenous fauna and livestock. Aids in the filtration of water permeating through the soil into the drainage lines. Important corridor for fauna dispersion within the landscape.	**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** 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.	**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. The nature of specific impacts to the topsoil is key in Karoo habitats. Mitigations such as retaining vegetation and topsoil layers is applicable, as well as avoiding certain areas and planning infrastructure layouts accordingly.

Habitat Type	Description	Ecosystem Processes and Services	Conservation Importance (CI)	Functional Integrity (FI)	Biodiversity Importance (BI)	Receptor Resilience (RR)	Site Ecological Importance (SEI) Guidelines for interpreting SEI in the context of the proposed development activities
Gravel Grassland	Terrain consists of a low to zero slope with gravely soils. Variable in the presence or absence of grass species and shrub density.	Provides grazing and foraging resources for indigenous fauna and livestock. Important corridor for fauna dispersion within the landscape.	**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**	**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**

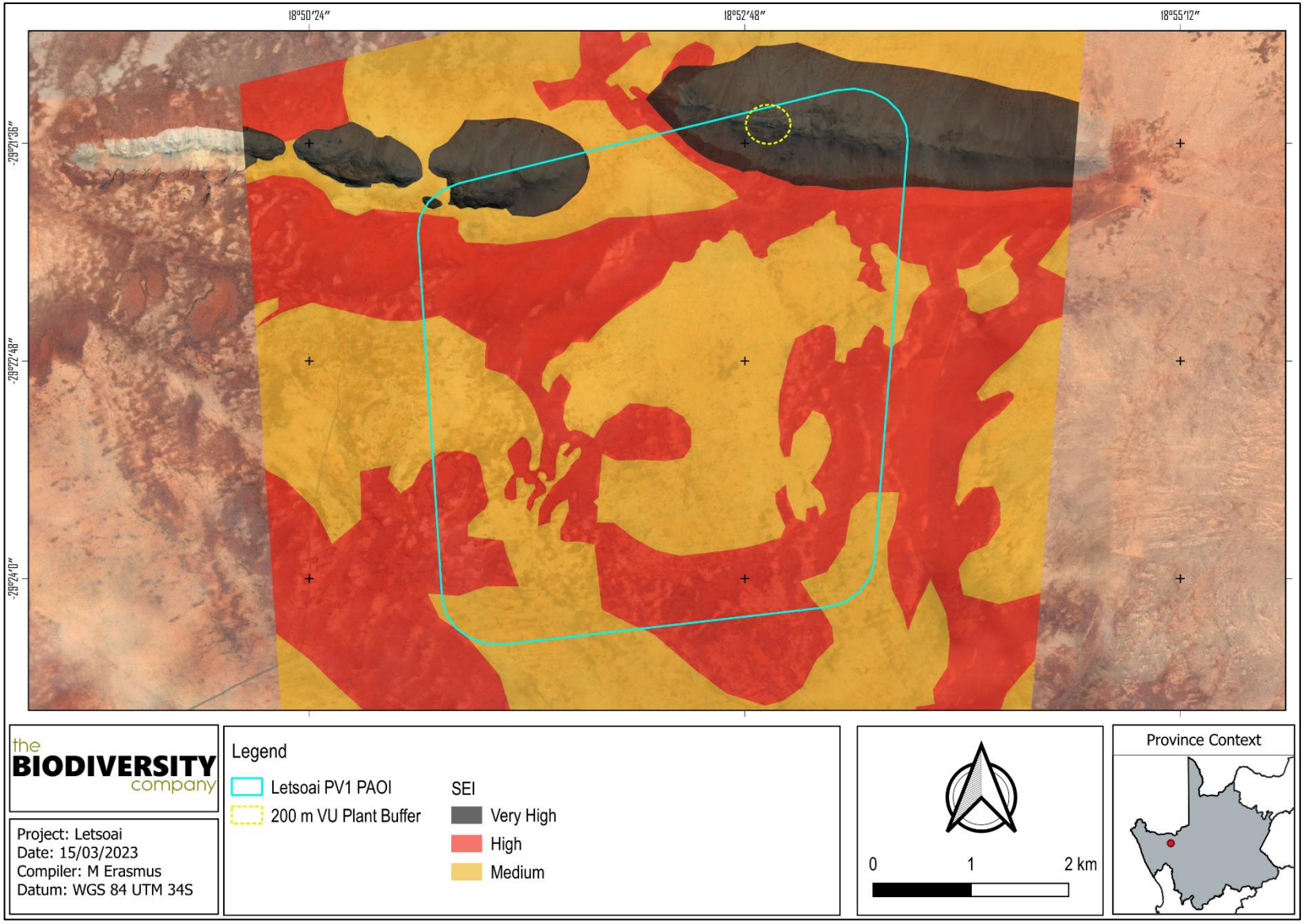


Figure 4-2 Sensitivity of the study area

4.2 Ecosystem Processes

The Northern Harvester Termite (Hodotermitidae) species (Figure 4-1, A) affect soil properties on a landscape scale and create diversity within the landscape. The termite burrows influence the hydrological characteristics and aid in the filtration of water permeating through the soil.

The Formicidae species *Messor striatifrons* (Figure 4-1, B) influences soil characteristics and plant growth via its tunnelling activity. The major physical change to the soils is the drier mound than inter-mound spaces, as although they permit greater water infiltration, they dry out faster due to less compaction and higher organic content. The chemical properties between mounds and inter-mound spaces also differ significantly, with mounds containing approximately 50% more phosphorous, potassium and nitrogen. This spatial discrepancy in soil physico-chemical properties therefore influences vegetation heterogeneity.

The inselberg habitat within the area captures and filters and directs precipitation and run-off, which is essential within most habitats, especially arid habitats. The role of inselbergs and how they contribute to the distribution of nutrients to surrounding more low laying areas is considered essential to maintain functioning ecosystems and landscapes. It is an important aspect to be considered in conservation, development or resource planning, as these habitats could serve as sources of nutrients as well as seeds (Burke, A, 2002)

Mounds are also not static, with new mounds being developed around replacement entrances after disturbance by rainfall or feeding *O. afer afer*, thereby affecting wide areas. As aforementioned, the foraging activity of *O. afer afer* inadvertently distributes the nest seed stores with mound soil and considering that the mound soil possesses elevated nutrient content, it is likely to provide an improved germination material.

Figure 4-1 A) Photograph illustrating individuals of Northern Harvester Termite within the PAOI and B) Messor capensis

5 Impact Risk Assessment

5.1 Biodiversity: Risk Assessment Method

The assessment of the significance of direct, indirect and cumulative impacts was undertaken using the method as developed by Savannah. The assessment of the impact considers the following, the:

- Nature of the impact, which shall include a description of what causes the effect, what will be affected, and how it will be affected;
- Extent of the impact, indicating whether the impact will be local or regional;
- Duration of the impact, very short-term duration (0-1 year), short-term duration (2-5 years), medium-term (5-15 years), long-term (> 15 years) or permanent;
- Probability of the impact, describing the likelihood of the impact actually occurring, indicated as improbable, probable, highly probable or definite;
- Severity/beneficial scale, indicating whether the impact will be very severe/beneficial (a permanent change which cannot be mitigated/permanent and significant benefit with no real alternative to achieving this benefit); severe/beneficial (long-term impact that could be mitigated/long-term benefit); moderately severe/beneficial (medium- to long-term impact that could be mitigated/ medium- to long-term benefit); slight; or have no effect;
- Significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low medium or high;
- Status, which will be described as either positive, negative or neutral;
- Degree to which the impact can be reversed;
- Degree to which the impact may cause irreplaceable loss of resources; and
- Degree to which the impact can be mitigated.

5.1.1 Present Impacts to Biodiversity

Considering the anthropogenic activities and influences within the landscape, limited negative impacts to biodiversity were observed within the study area. These include:

- Historical cattle grazing land-use and associated infrastructure;
- Roads and associated vehicle traffic and road kills; and
- Fences.

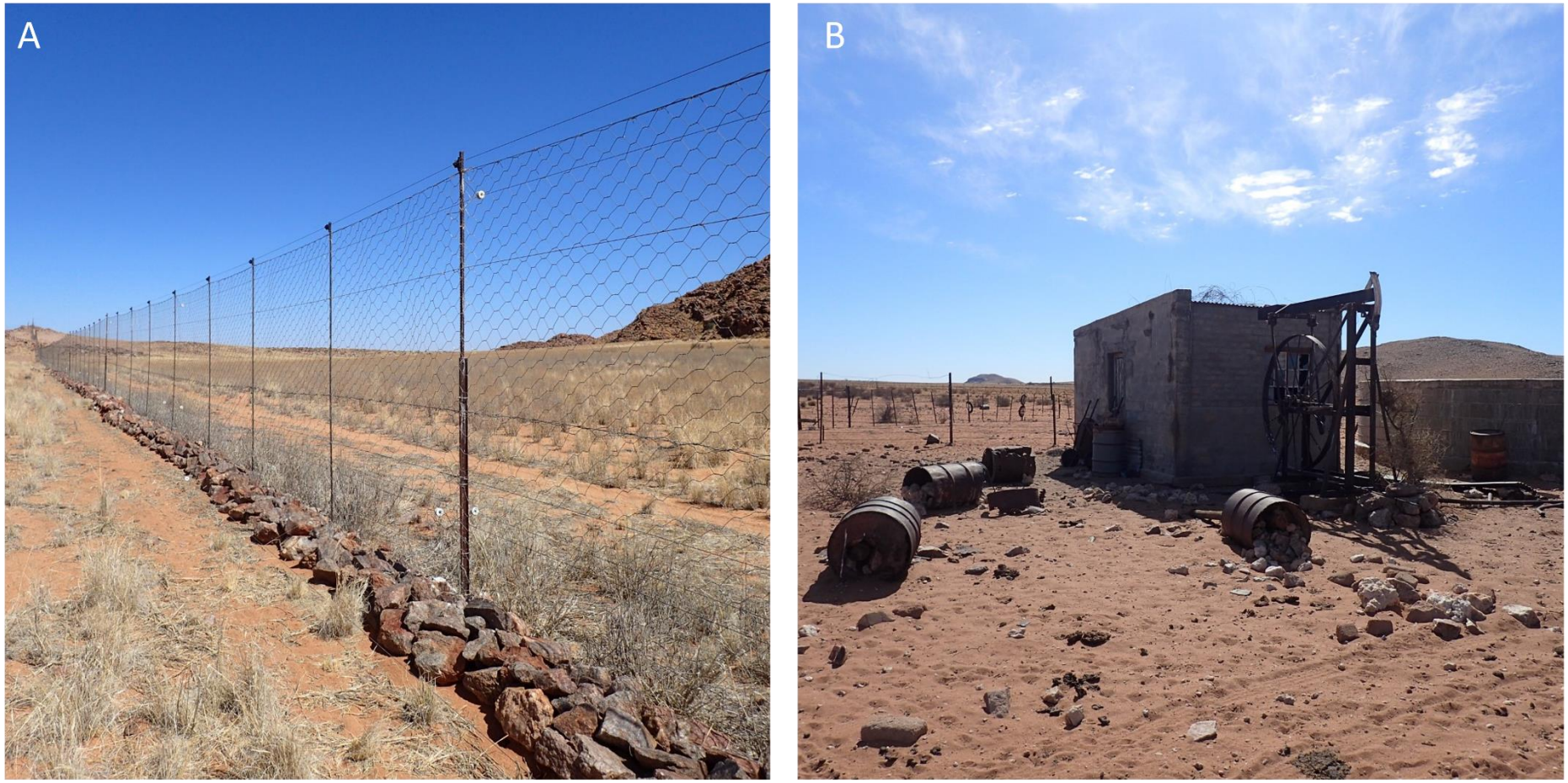


Figure 5-1 Photographs illustrating impacts to biodiversity A) Fencing and Roads, B) Surface infrastructure

5.1.2 Alternatives Considered

5.1.2.1 Development Alternatives

Figure 5-2 presents a map of the PV development area for both project facilities. Following the screening assessment, consideration of the total PV area was adapted to avoid the Very High SEI areas, and minimise (as much is feasible) the extent of the Sandy Grassland habitat. The layout in relation to the SEI can be seen in Figure 5-2. In addition, commitment was made towards the preservation of the remainder of the site, where no development is proposed. Overall, there is clear effort to achieve as much avoidance of the Sandy Grassland area for both development, as much is feasible.

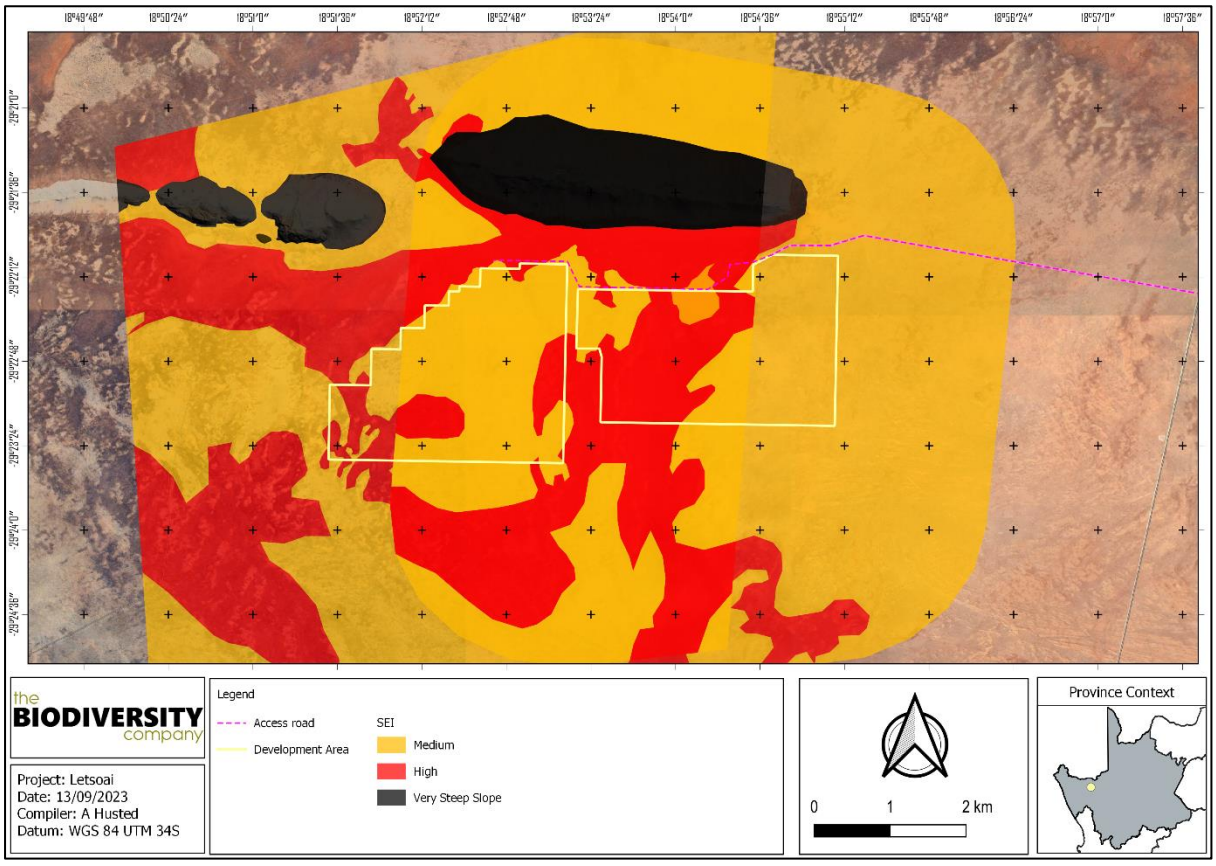


Figure 5-2 Map illustrating the revised development areas.

Considering the abovementioned, the following was avoided:

- All Very High SEI areas;
- Of the total 2407 ha PV area for both projects was considered, with 1812.5 ha of Sandy Grassland delineated;
- The (above) revised development areas overlay a total of 602.8 ha of Sandy Grassland;
- The revised layout will reduce the extent of Sandy Grassland lost by approximately 76%; and
- The maintenance of vegetation beneath the panels will achieve further avoidance and will achieve a further reduction on the extent (%) of Sandy Grassland lost.

5.1.2.2 Design Alternatives

The preparation of the substrate beneath solar arrays depends on the panel technology alternative that is implemented. The developer will retain vegetative ground cover with no clearing for the PV footprint,

most likely Monofacial panel technology instead of Bifacial panels which often removes vegetation and place white gravel underneath panels. The PV technology chosen will avoid total clearance for the PV footprint. It is proposed that vegetation clearance will only be conducted under the following circumstances:

- The excavation for and installation of subterranean equipment such as the earth mat; electrical cables and ducting from the solar PV module installation to the power stations (inverters, transformers & switchgear) and from the power stations to the substation; and required stormwater infrastructure;
- The casting of foundations and clearing of footprints for permanent buildings, laydown areas, power station plinths and the substation;
- The footprints of foundations or piles of the site fencing posts and solar mounting structures; and
- The footprints of internal- and access roads.

5.1.3 Identification of Additional Potential Impacts

The potential impacts during the construction and operation phases of the project are presented in Table 5-1.

Table 5-1 Potential impacts to biodiversity associated with the proposed activity

Main Impact	Project activities that can cause loss/impacts to habitat (especially with regard to the proposed infrastructure areas):	Secondary impacts anticipated
1. Destruction, fragmentation and degradation of habitats and ecosystems	Physical removal of vegetation, including protected species.	Displacement/loss of flora & fauna (including possible SCC)
	Access roads and servitudes	Increased potential for soil erosion
	Soil dust precipitation	Habitat fragmentation
	Dumping of waste products	Increased potential for establishment of alien & invasive vegetation
	Random events such as fire (cooking fires or cigarettes)	Erosion
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)
	Vehicles potentially spreading seed	Spreading of potentially dangerous diseases due to invasive and pest species
	Unsanitary conditions surrounding infrastructure promoting the establishment of alien and/or invasive rodents	Alteration of fauna assemblages due to habitat modification
	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 vegetation	Loss of habitat
		Loss of ecosystem services
	Roadkill due to vehicle collision	
	Pollution of water resources due to dust effects, chemical spills, etc.	Increase in rodent populations and associated disease risk
	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	Reduced dispersal/migration of fauna
		Loss of ecosystem services
	Compacted roads	Reduced plant seed dispersal
	Removal of vegetation	
Main Impact	**Project activities that can cause pollution in watercourses and the surrounding environment**	**Secondary impacts anticipated**
5. Environmental pollution due to water runoff, spills from vehicles and erosion	Chemical (organic/inorganic) spills	Pollution in watercourses and the surrounding environment
	Erosion	Faunal mortality (direct and indirectly)
		Groundwater pollution
		Loss of ecosystem services
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, vehicles)	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
	Vehicles	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	Loss of SCCs

5.1.4 Assessment of Impact Significance

The assessment of impact significance was undertaken in accordance with the method developed by Savannah. The various identified impacts are assessed below for the different phases of the development. The impacts assessed are considered for all alternatives as they are considered to have negligible impact significance differences.

5.1.4.1 Construction Phase

The following potential main impacts on the biodiversity (based on the framework above) were considered for the construction phase of the proposed development. This phase refers to the period during construction 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 the of habitats, ecosystems and vegetation community (Table 5-2),
- Introduction of alien and invasive species, especially plants (Table 5-3; and
- Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching) (Table 5-4).

Table 5-2 Impacts to biodiversity associated with the proposed construction phase.

Impact Nature: Loss of vegetation within development footprint

Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community		
	Without mitigation	**With mitigation**
Extent	Moderate (3)	Very low (1)
Duration	Permanent (5)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Probable (3)
Significance	**Medium (56)**	**Low (21)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Moderate
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, although this impact cannot be well mitigated as the loss of vegetation is unavoidable.	
Mitigation:		
• All 'Very High' SEI habitats (inselberg) and associated buffer zones (SCC plant) are to be avoided. • Avoid the disturbance or destruction of Sandy Grassland (High SEI areas) , as far as possible. Offset mitigation may be required for high impact activities within these areas. • 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; • Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas. o 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. o No non-environmentally friendly suppressants may be used as this could result in pollution of water sources. • Rehabilitate areas as soon as they are no longer impacted by construction o 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 • Indigenous vegetation to be maintained under the solar panels to ensure biodiversity is maintained and to prevent soil erosion (Beatty et al, 2017; Sinha et al, 2018). • Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities.		
Residual Impacts:		
The loss of currently intact vegetation is an unavoidable consequence of the project and cannot be entirely mitigated. The residual impact would however be low.		

Table 5-3 Impacts to biodiversity associated with the proposed construction phase.

Impact Nature: Introduction of alien and invasive species, especially plants		
Degradation and loss of surrounding natural vegetation, persecution of indigenous fauna species		
	Without mitigation	**With mitigation**
Extent	Moderate (3)	Low (2)
Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)

Impact Nature: Introduction of alien and invasive species, especially plants		
Degradation and loss of surrounding natural vegetation, persecution of indigenous fauna species		
Significance	**Medium (36)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
• 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 prescribing a monitoring plan and be updated as/when new data is collated; • Implementation of 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 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.		
Residual Impacts:		
Long-term broad scale. IAP infestation if not mitigated.		

Table 5-4 Impacts to biodiversity associated with the proposed construction phase.

Impact Nature: Displacement of faunal community due to habitat loss, direct mortalities and disturbance		
Construction activity will likely lead to direct mortality of fauna due to earthworks, vehicle collisions, accidental hazardous chemical spills and persecution. Disturbance due to dust and noise pollution and vibration may disrupt behaviour.		
	Without mitigation	**With mitigation**
Extent	Moderate (3)	Very low (1)
Duration	Moderate term (3)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (48)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes, to some extent. Noise and disturbance cannot be well mitigated, impacts on fauna due to human presence, such as vehicle collisions, poaching, and persecution can be mitigated.	
Mitigation:		
• 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. • 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. • Any fauna threatened by the construction activities should be removed safely by an appropriately qualified environmental officer or removal specialist.		

• All construction vehicles should adhere to a speed limit of maximum 40 km/h to avoid collisions. Appropriate speed control measures and signs must be erected. • Wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area • 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. Discussions The training must include. • 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 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 and subsequently inspected prior to backfilling • 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. • Considering that many of the mammal fauna recorded within the project area are nocturnal, no construction activity is to occur at night.
Residual Impacts:
It is probable that some individuals of susceptible species will be lost to construction-related activities despite mitigation. However, this is not likely to impact the viability of the local population of any fauna species.

5.1.4.2 Operation Phase

The operational phase of the impact of daily activities is anticipated to further spread the IAP, as well as the deterioration of the habitats due to the increase of dust and edge effect impacts. Dust reduces the ability of plants to photosynthesize and thus leads to degradation/retrogression of the veld. Moving maintenance vehicles don't only cause sensory disturbances to fauna, affecting their life cycles and movement, but will lead to direct mortalities due to collisions.

The following potential impacts were considered:

- Continued fragmentation and degradation of habitats and ecosystems (Table 5-5);
- Spread of alien and/or invasive species (Table 5-6);
- Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, noise, light, dust, vibration) (Table 5-7).

Table 5-5 Impacts to biodiversity associated with the proposed operational phase

Impact Nature: Continued fragmentation and degradation of habitats and ecosystems		
Disturbance created during the construction phase will leave the project area vulnerable to erosion and IAP encroachment.		
	Without Mitigation	With Mitigation
Extent	Low (2)	Low (2)
Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (48)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes, with proper management and avoidance, this impact can be mitigated to a low level.	

Impact Nature: Continued fragmentation and degradation of habitats and ecosystems
Disturbance created during the construction phase will leave the project area vulnerable to erosion and IAP encroachment.
Mitigation:
• All 'Very High' SEI habitats (inselberg) and associated buffer zones (SCC plant) are to be avoided. • Avoid the further disturbance or destruction of Sandy Grassland (High SEI areas) , as far as possible. • It should be made an offence for any staff to /take bring any plant species into/out of any portion of the PAOI. No plant species whether indigenous or exotic should be brought into/taken from the PAOI, to prevent the spread of exotic or invasive species or the illegal collection of plants. • A Rehabilitation Plan must be written for the development area and ensured that it be adhered to. • Access roads should have run-off control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. • All erosion observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. • There should be follow-up rehabilitation and re-vegetation of any remaining denuded areas with local indigenous perennial grass, shrubs and trees.
Residual Impacts
There is still the potential some potential for erosion and IAP encroachment even with the implementation of control measures but would have a low impact.

Table 5-6 Impacts to biodiversity associated with the proposed operational phase.

Impact Nature: Spread of alien and/or invasive species		
Degradation and loss of surrounding natural vegetation, persecution of indigenous fauna species		
	Without mitigation	**With mitigation**
Extent	Moderate (3)	Low (2)
Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (52)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		

• Implementation of an alien vegetation management plan.
  ○ Regular monitoring for IAP encroachment during the operation phase to ensure that no alien invasion problems have developed as result of the disturbance. This should be every 3 months during the first two years of the operation phase and every six months for the life of the project.
  ○ All IAP species must be removed/controlled using the appropriate techniques as indicated in the IAP management plan
• Compile and implement a Solid Waste Management Plan. 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.
• A pest control plan must be implemented; it is imperative that poisons not be used.		

Residual Impacts:		
Long term broad scale IAP infestation if not mitigated.		

Table 5-7 Impacts to biodiversity associated with the proposed operational phase

Impact Nature: Ongoing displacement and direct mortalities of faunal community (including potential SCC) due to disturbance (road collisions, noise, light, dust, vibration).		
The operation and maintenance of the proposed development may lead to mortality, disturbance or persecution of fauna in the vicinity of the development.		
	Without Mitigation	**With Mitigation**
Extent	Low (2)	Very low (1)
Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (48)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
• 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 wetlands. 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 • No vehicle traffic nor the use of vehicle lights should be permitted 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 • Latest technology solar panels with an anti-reflective coating must be used. This will also improve the light transmittance and therefore increases the overall efficiency. • If panels do not possess anti-reflective coatings, then non-polarising white tape can be used around and/or across panels to minimise reflection (Bennun *et al*, 2021). • All personnel and contractors must undergo Environmental Awareness Training and must include awareness about not harming or collecting species. • Any fauna threatened by the maintenance and operational activities should be removed to a safe location by an appropriate individual. • All vehicles accessing the site should adhere to a max 40 km/h max to avoid collisions. Appropriate signs must be erected. • If any excavations are to be dug these must not be left open for more than a few hours without ramps for trapped fauna to leave and must be filled at night.		
Residual Impacts		
Disturbance from maintenance activities will occur albeit at a low and infrequent level.		

5.1.4.3 Cumulative Impacts

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 pre-existing in an area or region, it is appropriate to consider the cumulative effects of development or disturbance activities. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a specific point in time may actually represent a significant change from the original state of the system. This section describes the potential cumulative impacts of the project on local fauna and flora specifically.

Cumulative impacts are assessed within the context of the extent of the proposed project area, other similar developments and activities in the area (existing and in-process), and general habitat loss and

transformation resulting from any other activities in the area. Localised cumulative impacts include those from operations that are close enough (within 30 km) to potentially cause additive effects on the local environment or any sensitive receptors (relevant operations include nearby large road networks, other solar PV facilities, and power infrastructure). Relevant impacts include the overall reduction of foraging and habitat where reproduction takes place, dust deposition, noise and vibration, disruption of functional corridors of habitat important for movement and migration, disruption of waterways, groundwater drawdown, increase risk of collisions; and groundwater and surface water quality depletion.

Long-term cumulative impacts associated with the site development activities can lead to the loss of endemic and threatened species, including natural habitat and vegetation types, and these impacts can even lead to the degradation of conserved areas such as the adjacent game parks and reserves. In order to spatially quantify the cumulative effects of the proposed development, the project in isolation is compared with the overall effects of surrounding development (including total transformation and transformation as a result of new and proposed developments of a similar type, i.e., solar).

The total area within the 30 km buffer around the PV development area amounts to 322061,46 ha, but when considering the transformation (1151.36 ha) that has taken place within this radius, 320910,10 ha of intact habitat remains according to the 2018 National Biodiversity Assessment. Therefore, the area within 30 km of the project has experienced approximately 0.36% loss in natural habitat. Considering this context, the PV development footprint for is 1243.5 ha (as provided) and similar projects exists (which includes the project area) in the 30 km region measuring a maximum of 94631.92 ha (as per the latest South African Renewable Energy EIA Application Database) which means that the total amount of remaining habitat lost as a result of the solar project amounts to 29.49% (PV developments as a percentage of the total remaining habitat). Table 5-8 outlines the calculation procedure for the spatial assessment of cumulative impacts.

Table 5-8 Loss of habitat within a 30 km radius of the project

	Total Habitat (ha)	Total Loss (ha)	Tot. Remaining Habitat (ha) (Remnants)	Total Historical Loss	PV Development Similar Projects including Project	Tot. Remaining Habitat (ha)	Cumulative Habitat Lost
Approximate Solar development cumulative effects (Spatial)	322061,46	1151.36	320910,10	**0.36%**	94631.92	226278.18	**29.49%**

The overall cumulative impact assessment is presented in Table 5-9 and Figure 5-3 and below. Note that this also accounts for the relative importance of the habitats within and adjacent to the development area, in the context of the value of the regional habitat. Approximately 0.36% of the habitat has already been lost, and as discussed above the proposed solar developments will result in a cumulative loss of approximately 29.49 % from the development in the area. The expected cumulative impact of PV development as a whole is expected to be of a 'Moderate-High' significance, however, the contribution of the project development footprint itself (1243.5 ha) is calculated at 1.31% of the total (PV Development Projects), with overall low significance when considering the contribution in isolation.

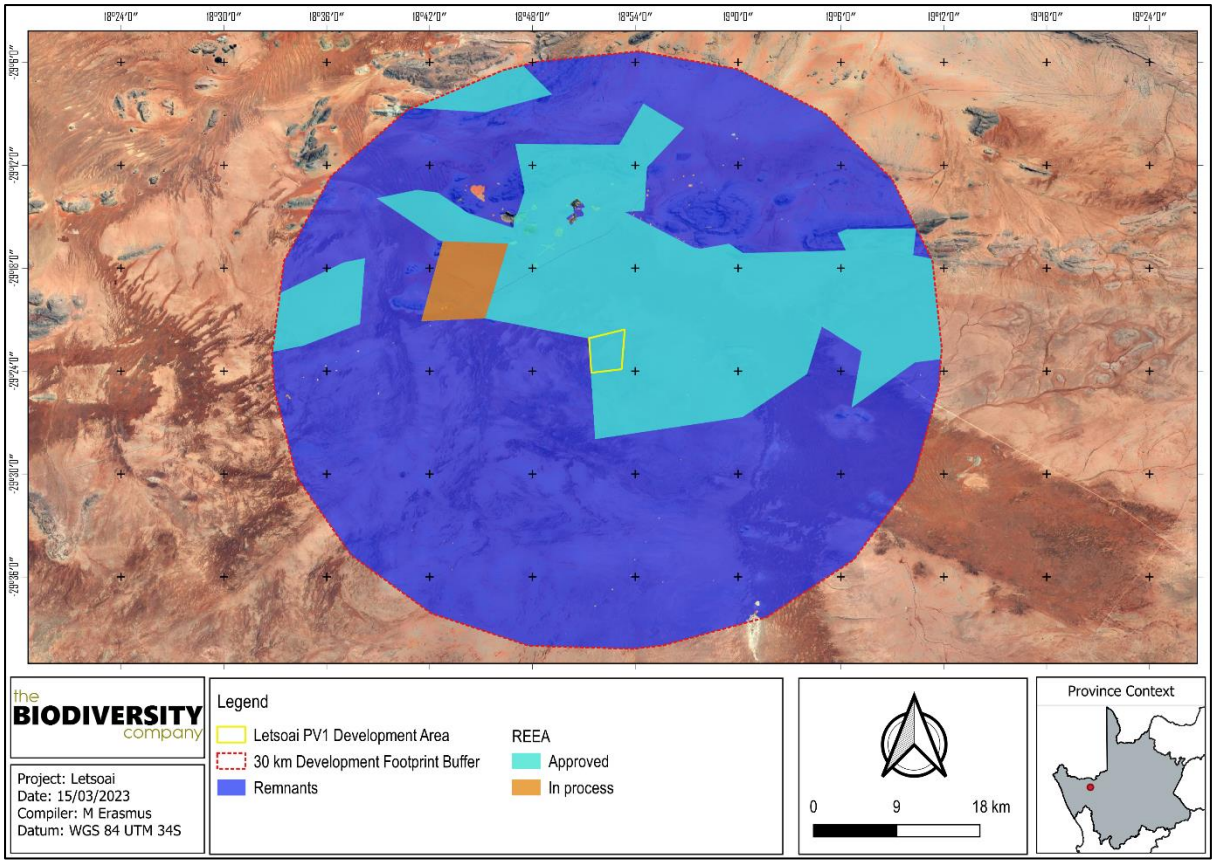


Figure 5-3 Map illustrating the additional renewable energy developments within the landscape overlaid onto the remnant vegetation types

Table 5-9 Cumulative impact assessment of the project

Impact Nature: Cumulative habitat loss within the region		
The development of the proposed infrastructure will contribute to cumulative habitat loss and thereby impact the ecological processes in the region.		
	Overall impact of the proposed development considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Very low (1)	High (4)
Duration	Moderate term (3)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Definite (5)
Significance	**Low**	**Moderately-High**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Low
Irreplaceable loss of resources?	No	Yes
Can impacts be mitigated	To some degree, but most of the impact results from the presence of the various facilities which cannot be well mitigated.	
Mitigation:		
• Over and above all provided mitigation measures; ensure that a rehabilitation plan and IAP management plan be compiled for each development and are effectively implemented.		

6 Management Outcomes

6.1 Biodiversity

The aim of the management outcomes is to present the mitigations in such a way that the can be incorporated into the Environmental Management Programme (EMPr), allowing for more successful implementation and auditing of the mitigations and monitoring guidelines. Table 6-1 presents the recommended mitigation measures and the respective timeframes, targets and performance indicators for the terrestrial study.

The focus of mitigation measures is to reduce the significance of potential impacts associated with the development and thereby to:

- Prevent the further loss and fragmentation of vegetation communities and the CBA areas in the vicinity of the project area;
- Prevent the direct and indirect loss and disturbance of faunal species and community (including potentially occurring species of conservation concern); and
- Follow the guidelines for interpreting Site Ecological Importance (SEI).

Table 6-1 Mitigation measures including requirements for timeframes, roles and responsibilities for this report

OBJECTIVE: Prevent the further loss and fragmentation of vegetation communities and the CBA areas in the vicinity of the project area;

Project component/s	**PV Footprint, laydown areas and road creation**
Potential Impact	**Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community**
Activity/risk source	**Land clearing, fire and dust.**
Mitigation: Target/Objective	**Avoidance / minimisation of the disturbance and degradation of vegetation and ecosystems**

Mitigation: Action/control	Responsibility	Timeframe
• All 'Very High' SEI habitats (inselberg) and associated buffer zones (SCC plant) are to be avoided. • Avoid the disturbance or destruction of Sandy Grassland (High SEI areas) , as far as possible. Offset mitigation may be required for high impact activities within these areas. • 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 • Where possible, existing access routes and walking paths must be made use of. • 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; • Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas. o 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. o No non-environmentally friendly suppressants may be used as this could result in pollution of water sources. • Rehabilitate areas as soon as they are no longer impacted by construction o 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	Project manager, Environmental Officer	Planning and Construction phase

• Indigenous vegetation to be maintained under the solar panels to ensure biodiversity is maintained and to prevent soil erosion (Beatty et al, 2017; Sinha et al, 2018). Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities.		
Performance Indicator	Clearing restricted to 'allowable' areas, dust generated, limited unplanned fires, rehabilitation.	
Monitoring	Daily during the construction phase	

OBJECTIVE: Prevent the further loss and fragmentation of vegetation communities and the CBA areas in the vicinity of the project area;

Project component/s	**Project Area**
Potential Impact	**Introduction of alien and invasive species, especially plants**
Activity/risk source	**Land clearing, fire and dust.**
Mitigation: Target/Objective	**Avoidance / minimisation of the disturbance and degradation of vegetation and ecosystems**

Mitigation: Action/control	Responsibility	Timeframe

• 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;
• Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas.
  o 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.
  o No non-environmentally friendly suppressants may be used as this could result in pollution of water sources.
• Rehabilitate areas as soon as they are no longer impacted by construction
  o 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
• Indigenous vegetation to be maintained under the solar panels to ensure biodiversity is maintained and to prevent soil erosion (Beatty et al, 2017; Sinha et al, 2018).
	Project manager, Environmental Officer	Planning and Construction phase

	Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities.		
Performance Indicator	Clearing restricted to 'allowable' areas, dust generated, limited unplanned fires, rehabilitation.		
Monitoring	Daily during the construction phase for all mitigation		

OBJECTIVE: Prevent the direct and indirect loss and disturbance of faunal species and community (including potential SCCs)

Project component/s	**PV Footprint, laydown areas and road creation**
Potential Impact	**Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching)**
Activity/risk source	**Land clearing, Fire and human presence as well as roads.**
Mitigation: Target/Objective	**Avoidance / minimisation of the disturbance and mortality of fauna**

Mitigation: Action/control	Responsibility	Timeframe
• 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. • 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. • Any fauna threatened by the construction activities should be removed safely by an appropriately qualified environmental officer or removal specialist. • All construction vehicles should adhere to a speed limit of maximum 40 km/h to avoid collisions. Appropriate speed control measures and signs must be erected. • Wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area • 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.	Project manager, Environmental Officer	Planning and Construction phase

• 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 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 and subsequently inspected prior to backfilling • 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. • Considering that many of the mammal fauna recorded within the project area are nocturnal, no construction activity is to occur at night.		
Performance Indicator	Amount of observable fauna mortalities, Sequence ,direction and timing of land clearing. Speed limits adhered to	
Monitoring	Daily during the construction phase for all mitigation	

OBJECTIVE: Prevent the further loss and fragmentation of vegetation communities and the CBA areas in the vicinity of the project area;

Project component/s	**Operational Area, PV as well as roads.**
Potential Impact	**Continued fragmentation and degradation of habitats and ecosystems**
Activity/risk source	**Dust, unregulated clearing, IAP plant proliferation and edge effects**
Mitigation: Target/Objective	**Avoidance / minimisation of the disturbance and degradation of vegetation and ecosystems**

Mitigation: Action/control	Responsibility	Timeframe
• All 'Very High' SEI habitats (inselberg) and associated buffer zones (SCC plant) are to be avoided. • Avoid the further disturbance or destruction of Sandy Grassland (High SEI areas) , as far as possible. • It should be made an offence for any staff to /take bring any plant species into/out of any portion of the PAOI. No plant species whether indigenous or exotic should be	Project manager, Environmental Officer	Operational phase

brought into/taken from the PAOI, to prevent the spread of exotic or invasive species or the illegal collection of plants. • A Rehabilitation Plan must be written for the development area and ensured that it be adhered to. • Access roads should have run-off control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. • All erosion observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. • There should be follow-up rehabilitation and re-vegetation of any remaining denuded areas with local indigenous perennial grass, shrubs and trees.		
Performance Indicator	Clearing restricted to 'allowable' areas, dust generated, limited unplanned fires, rehabilitation.	
Monitoring	Daily during the operational phase for all mitigation	

OBJECTIVE: Prevent the further loss and fragmentation of vegetation communities and the CBA areas in the vicinity of the project area;

Project component/s	**Project Area**
Potential Impact	**Spread of alien and/or invasive species**
Activity/risk source	**Cleared Areas, laydown areas, fire and dust.**
Mitigation: Target/Objective	**Avoidance / minimisation of the disturbance and degradation of vegetation and ecosystems**

Mitigation: Action/control	**Responsibility**	**Timeframe**
• Implementation of an alien vegetation management plan. o Regular monitoring for IAP encroachment during the operation phase to ensure that no alien invasion problems have developed as result of the disturbance. This should be every 3 months during the first two years of the operation phase and every six months for the life of the project. o All IAP species must be removed/controlled using the appropriate techniques as indicated in the IAP management plan o Compile and implement a Solid Waste Management Plan. 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.	Project manager, Environmental Officer	Operational phase
Performance Indicator	Clearing restricted to 'allowable' areas, dust generated, limited unplanned fires, rehabilitation.	
Monitoring	Daily during the construction phase for all mitigation	

OBJECTIVE: Prevent the direct and indirect loss and disturbance of faunal species and community (including potentially/occurring SCCs)

Project component/s	**Operations Area (PV Footprint, laydown areas and roads)**
Potential Impact	**Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, noise, light, dust, vibration)**
Activity/risk source	**Moving vehicles, Fire and human presence and activites**
Mitigation: Target/Objective	**Avoidance / minimisation of the disturbance and degradation of vegetation.**

Mitigation: Action/control	**Responsibility**	**Timeframe**
• 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 wetlands. 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 • Latest technology solar panels with an anti-reflective coating must be used. This will also improve the light transmittance and therefore increases the overall efficiency. • If panels do not possess anti-reflective coatings, then non-polarising white tape can be used around and/or across panels to minimise reflection (Bennun *et al*, 2021). • All personnel and contractors must undergo Environmental Awareness Training and must include awareness about not harming or collecting species. • Any fauna threatened by the maintenance and operational activities should be removed to a safe location by an appropriate individual. • All vehicles accessing the site should adhere to a max 40 km/h max to avoid collisions. Appropriate signs must be erected. • If any excavations are to be dug these must not be left open for more than a few hours without ramps for trapped fauna to leave and must be filled at night.	Project manager, Environmental Officer	Operational phase
Performance Indicator	Amount of observable fauna mortalities, Speed limits adhered to	
Monitoring	Daily during the construction phase for all mitigation	

7 Conclusion and Impact Statement

7.1 Conclusion

The PAOI has been altered, albeit limited, both currently and historically. Historically, grazing from livestock and mismanagement has led to (limited) deterioration of the area. Most areas can be regarded as important, not only within the local landscape, but also regionally; as they are used for habitat, foraging and movement corridors for fauna within a landscape fragmented by development. This is especially true regarding the water resource habitats. The habitat sensitivity of these habitats is regarded as High to Very High, and the following aspects support this classification:

- Functions as CBA 2 and ESA as per the Northern Cape Critical Biodiversity Areas spatial database;
- A priority focus area as per the NPAES; and
- Support various organisms and may play an important role in the ecosystem, if left to recover from the superficial impacts.

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

The habitat physiognomy within the PAOI is diverse and, based on the fauna components recorded within the PAOI and proximal landscape, the area provides important ecosystem services, particularly with regards to the maintenance of dynamic soil properties and pollination services. The SEI of the PAOI was determined to vary from ‘Medium’ to ‘Very High’, the extent of the area considered and its connectivity to natural areas within the landscape, and the low resilience of the habitat/vegetation type.

7.2 Impact Statement

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

- Habitat loss and fragmentation as well as degradation of surrounding habitat;
- Disturbance and displacement caused during the construction and maintenance phases; and
- Direct mortality during the construction phase.

The primary expected impacts of the proposed project will be the loss of habitat and emigration of fauna. Based on the outcomes of the SEI determination, there are areas within the PAOI that possess a ‘Very High’ SEI. This denotes that avoidance mitigation is the only appropriate option for these areas and no destructive development activities should be considered. There are areas within the PAOI that possess a ‘High’ SEI. This denotes that avoidance mitigation wherever possible must be implemented. This includes changes to project infrastructure design to limit the amount of habitat impacted. If avoidance is not possible, the potential to offset does exist.

Referring to the mitigation hierarchy, the project will achieve avoidance by means of revised and reduced spatial planning, suggested seasonal constraints for construction to prioritise the dry season period and also the ‘avoidance’ of vegetation clearing beneath the panels. The overall residual impacts are expected to be low, and this will be achieved though reduced durations for selected aspects, minimised footprint areas and supporting measures to reduce the expected impact intensities.

Note that based on the outcomes of this assessment the project developer has updated the project layout to avoid sensitive and no-go areas identified on the project site in line with prescribed specialist mitigation measures. Thus, mitigating potential negative impacts associated with the project site.

The main items are as follows:

- Onsite 132 kV substation, each site will have one;
- The 400 kV collector SS has move west to avoid a drainage feature;
- A 132 kV line will run between on-site SSs and the collector SS (route has not changed); and
- BESS on each site near respective SSs.

Considering that this area has been identified as being of significance for biodiversity maintenance and ecological processes (CBAs and ESAs), development may proceed but with caution and only with the implementation of mitigation measures. Considering the above-mentioned information, no fatal flaws are evident for the proposed project. It is the opinion of the specialists that the project may be favourably considered, on condition that all prescribed mitigation measures and supporting recommendations are implemented.

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9 Appendix Items

9.1 Appendix A – Flora species expected to occur in the project area.

Family	Taxon	Genus	Species	Author	Conservation Status
Acanthaceae	*Barleria rigida*	*Barleria*	*rigida*	Willd. ex Nees	
Acanthaceae	*Justicia incana*	*Justicia*	*incana*	(Nees) T.Anderson	
Acanthaceae	*Justicia spartioides*	*Justicia*	*spartioides*	T.Anderson	
Acanthaceae	*Barleria rigida*	*Barleria*	*rigida*	Willd. ex Nees	
Acanthaceae	*Acanthopsis hoffmannseggiana*	*Acanthopsis*	*hoffmannseggiana*	(Nees) C.B.Clarke	DDT
Acanthaceae	*Blepharis mitrata*	*Blepharis*	*mitrata*	C.B.Clarke	LC
Acanthaceae	*Barleria rigida*	*Barleria*	*rigida*	Willd. ex Nees	LC
Acanthaceae	*Blepharis macra*	*Blepharis*	*macra*	(Nees) Vollesen	LC
Acanthaceae	*Petalidium setosum*	*Petalidium*	*setosum*	C.B.Clarke ex Schinz	LC
Acanthaceae	*Justicia thymifolia*	*Justicia*	*thymifolia*	(Nees) C.B.Clarke	LC
Aizoaceae	*Mesembryanthemum nucifer*	*Mesembryanthemum*	*nucifer*	(Ihlenf. & Bittrich) Klak	
Aizoaceae	*Mesembryanthemum tetragonum*	*Mesembryanthemum*	*tetragonum*	Thunb.	
Aizoaceae	*Mesembryanthemum coriarium*	*Mesembryanthemum*	*coriarium*	Burch. ex N.E.Br.	
Aizoaceae	*Mesembryanthemum arenosum*	*Mesembryanthemum*	*arenosum*	Schinz	
Aizoaceae	*Mesembryanthemum oculatum*	*Mesembryanthemum*	*oculatum*	N.E.Br.	
Aizoaceae	*Conophytum angelicae*	*Conophytum*	*angelicae*	(Dinter & Schwantes) N.E.Br.	
Aizoaceae	*Mesembryanthemum lignescens*	*Mesembryanthemum*	*lignescens*	(L.Bolus) Klak	
Aizoaceae	*Mesembryanthemum subnodosum*	*Mesembryanthemum*	*subnodosum*	A.Berger	
Aizoaceae	*Mesembryanthemum schenckii*	*Mesembryanthemum*	*schenckii*	Schinz	
Aizoaceae	*Mesembryanthemum articulatum*	*Mesembryanthemum*	*articulatum*	Thunb.	
Aizoaceae	*Mesembryanthemum noctiflorum*	*Mesembryanthemum*	*noctiflorum*	L.	
Aizoaceae	*Trianthema parvifolia*	*Trianthema*	*parvifolia*	E.Mey. ex Sond.	
Aizoaceae	*Galenia secunda*	*Galenia*	*secunda*	(L.f.) Sond.	LC
Aizoaceae	*Ruschia divaricata*	*Ruschia*	*divaricata*	L.Bolus	LC
Aizoaceae	*Galenia crystallina*	*Galenia*	*crystallina*	(Eckl. & Zeyh.) Fenzl ex Harv. & Sond.	LC
Aizoaceae	*Tetragonia arbuscula*	*Tetragonia*	*arbuscula*	Fenzl	LC
Aizoaceae	*Drosanthemum hispidum*	*Drosanthemum*	*hispidum*	(L.) Schwantes	LC
Aizoaceae	*Conophytum friedrichiae*	*Conophytum*	*friedrichiae*	(Dinter) Schwantes	LC
Aizoaceae	*Galenia sarcophylla*	*Galenia*	*sarcophylla*	Fenzl ex Sond.	LC
Aizoaceae	*Drosanthemum albens*	*Drosanthemum*	*albens*	L.Bolus	LC
Aizoaceae	*Mesembryanthemum nodiflorum*	*Mesembryanthemum*	*nodiflorum*	L.	LC
Aizoaceae	*Conophytum maughanii*	*Conophytum*	*maughanii*	N.E.Br.	LC
Aizoaceae	*Tetragonia reduplicata*	*Tetragonia*	*reduplicata*	Welw. ex Oliv.	LC

Aizoaceae	*Schwantesia ruedebuschii*	*Schwantesia*	*ruedebuschii*	Dinter	LC
Aizoaceae	*Trianthema parvifolia*	*Trianthema*	*parvifolia*	E.Mey. ex Sond.	LC
Aizoaceae	*Mesembryanthemum guerichianum*	*Mesembryanthemum*	*guerichianum*	Pax	LC
Aizoaceae	*Trichodiadema littlewoodii*	*Trichodiadema*	*littlewoodii*	L.Bolus	LC
Aizoaceae	*Hereroa hesperantha*	*Hereroa*	*hesperantha*	(Dinter & A.Berger) Dinter & Schwantes	LC
Aizoaceae	*Galenia fruticosa*	*Galenia*	*fruticosa*	(L.f.) Sond.	LC
Aizoaceae	*Trianthema parvifolia*	*Trianthema*	*parvifolia*	E.Mey. ex Sond.	LC
Aizoaceae	*Galenia papulosa*	*Galenia*	*papulosa*	(Eckl. & Zeyh.) Sond.	LC
Aizoaceae	*Mesembryanthemum crystallinum*	*Mesembryanthemum*	*crystallinum*	L.	LC
Aizoaceae	*Amphibolia rupis-arcuatae*	*Amphibolia*	*rupis-arcuatae*	(Dinter) H.E.K.Hartmann	LC
Aizoaceae	*Galenia squamulosa*	*Galenia*	*squamulosa*	(Eckl. & Zeyh.) Fenzl	LC
Aizoaceae	*Ruschia spinosa*	*Ruschia*	*spinosa*	(L.) Dehn	LC
Aizoaceae	*Galenia africana*	*Galenia*	*africana*	L.	LC
Aizoaceae	*Lapidaria margaretae*	*Lapidaria*	*margaretae*	(Schwantes) Dinter & Schwantes	LC
Aizoaceae	*Ebracteola fulleri*	*Ebracteola*	*fulleri*	(L.Bolus) Glen	LC
Aizoaceae	*Ruschia muricata*	*Ruschia*	*muricata*	L.Bolus	LC
Aizoaceae	*Drosanthemum luederitzii*	*Drosanthemum*	*luederitzii*	(Engl.) Schwantes	LC
Aizoaceae	*Mesembryanthemum amplectens*	*Mesembryanthemum*	*amplectens*	L.Bolus	
Aizoaceae	*Ruschia cradockensis*	*Ruschia*	*cradockensis*	(Kuntze) H.E.K.Hartmann & Stuber	
Aizoaceae	*Mesembryanthemum quartziticola*	*Mesembryanthemum*	*quartziticola*	Klak	
Aizoaceae	*Schlechteranthus stylosus*	*Schlechteranthus*	*stylosus*	(L.Bolus) R.F.Powell	
Aizoaceae	*Mesembryanthemum latipetalum*	*Mesembryanthemum*	*latipetalum*	(L.Bolus) Klak	
Aizoaceae	*Mesembryanthemum nitidum*	*Mesembryanthemum*	*nitidum*	Haw.	
Aizoaceae	*Drosanthemum godmaniae*	*Drosanthemum*	*godmaniae*	L.Bolus	DDT
Aizoaceae	*Trichodiadema obliquum*	*Trichodiadema*	*obliquum*	L.Bolus	DDT
Aizoaceae	*Drosanthemum breve*	*Drosanthemum*	*breve*	L.Bolus	DDT
Aizoaceae	*Trichodiadema setuliferum*	*Trichodiadema*	*setuliferum*	(N.E.Br.) Schwantes	LC
Aizoaceae	*Conophytum subfenestratum*	*Conophytum*	*subfenestratum*	Schwantes	LC
Aizoaceae	*Schwantesia triebneri*	*Schwantesia*	*triebneri*	L.Bolus	LC
Aizoaceae	*Conicosia elongata*	*Conicosia*	*elongata*	(Haw.) N.E.Br.	LC
Aizoaceae	*Galenia collina*	*Galenia*	*collina*	(Eckl. & Zeyh.) Walp.	LC
Aizoaceae	*Ruschia cradockensis*	*Ruschia*	*cradockensis*	(Kuntze) H.E.K.Hartmann & Stuber	LC
Aizoaceae	*Ruschia kenhardtensis*	*Ruschia*	*kenhardtensis*	L.Bolus	LC
Aizoaceae	*Drosanthemum schoenlandianum*	*Drosanthemum*	*schoenlandianum*	(Schltr.) L.Bolus	LC
Aizoaceae	*Conophytum calculus*	*Conophytum*	*calculus*	(A.Berger) N.E.Br.	LC
Aizoaceae	*Ruschia cradockensis*	*Ruschia*	*cradockensis*	(Kuntze) H.E.K.Hartmann & Stuber	LC
Aizoaceae	*Cephalophyllum staminodiosum*	*Cephalophyllum*	*staminodiosum*	L.Bolus	LC

Aizoaceae	*Hereroa pallens*	*Hereroa*	*pallens*	L.Bolus	LC
Aizoaceae	*Ruschia uncinata*	*Ruschia*	*uncinata*	(L.) Schwantes	LC
Aizoaceae	*Antimima nordenstamii*	*Antimima*	*nordenstamii*	(L.Bolus) H.E.K.Hartmann	LC
Aizoaceae	*Ruschia centrocapsula*	*Ruschia*	*centrocapsula*	H.E.K.Hartmann & Stuber	LC
Aizoaceae	*Schwantesia marlothii*	*Schwantesia*	*marlothii*	L.Bolus	LC
Aizoaceae	*Malephora lutea*	*Malephora*	*lutea*	(Haw.) Schwantes	LC
Aizoaceae	*Drosanthemum subcompressum*	*Drosanthemum*	*subcompressum*	(Haw.) Schwantes	LC
Aizoaceae	*Conophytum fulleri*	*Conophytum*	*fulleri*	L.Bolus	LC
Aizoaceae	*Schwantesia pillansii*	*Schwantesia*	*pillansii*	L.Bolus	LC
Aizoaceae	*Ihlenfeldtia vanzylii*	*Ihlenfeldtia*	*vanzylii*	(L.Bolus) H.E.K.Hartmann	LC
Aizoaceae	*Tetragonia acanthocarpa*	*Tetragonia*	*acanthocarpa*	Adamson	LC
Aizoaceae	*Leipoldtia schultzei*	*Leipoldtia*	*schultzei*	(Schltr. & Diels) Friedrich	LC
Aizoaceae	*Ihlenfeldtia excavata*	*Ihlenfeldtia*	*excavata*	(L.Bolus) H.E.K.Hartmann	LC
Aizoaceae	*Cheiridopsis schlechteri*	*Cheiridopsis*	*schlechteri*	Tischer	LC
Aizoaceae	*Conophytum marginatum*	*Conophytum*	*marginatum*	Lavis	LC
Aizoaceae	*Cephalophyllum fulleri*	*Cephalophyllum*	*fulleri*	L.Bolus	LC
Aizoaceae	*Ruschia robusta*	*Ruschia*	*robusta*	L.Bolus	LC
Aizoaceae	*Antimima vanzylii*	*Antimima*	*vanzylii*	(L.Bolus) H.E.K.Hartmann	LC
Aizoaceae	*Drosanthemum intermedium*	*Drosanthemum*	*intermedium*	(L.Bolus) L.Bolus	LC
Aizoaceae	*Dinteranthus puberulus*	*Dinteranthus*	*puberulus*	N.E.Br.	LC
Aizoaceae	*Stomatium fulleri*	*Stomatium*	*fulleri*	L.Bolus	LC
Aizoaceae	*Drosanthemum karrooense*	*Drosanthemum*	*karrooense*	L.Bolus	LC
Aizoaceae	*Conophytum limpidum*	*Conophytum*	*limpidum*	S.A.Hammer	NT
Aizoaceae	*Conophytum achabense*	*Conophytum*	*achabense*	S.A.Hammer	VU
Aizoaceae	*Lithops olivacea*	*Lithops*	*olivacea*	L.Bolus	VU
Amaranthaceae	*Sericocoma avolans*	*Sericocoma*	*avolans*	Fenzl	LC
Amaranthaceae	*Hermbstaedtia glauca*	*Hermbstaedtia*	*glauca*	(J.C.Wendl.) Rchb. ex Steud.	LC
Amaranthaceae	*Salsola columnaris*	*Salsola*	*columnaris*	Botsch.	LC
Amaranthaceae	*Salsola barbata*	*Salsola*	*barbata*	Aellen	LC
Amaranthaceae	*Sericocoma pungens*	*Sericocoma*	*pungens*	Fenzl	LC
Amaranthaceae	*Salsola rabieana*	*Salsola*	*rabieana*	I.Verd.	LC
Amaranthaceae	*Salsola esterhuyseniae*	*Salsola*	*esterhuyseniae*	Botsch.	LC
Amaranthaceae	*Salsola kalaharica*	*Salsola*	*kalaharica*	Botsch.	LC
Amaranthaceae	*Salsola kali*	*Salsola*	*kali*	L.	
Amaranthaceae	*Chenopodiastrum murale*	*Chenopodiastrum*	*murale*	(L.) S.Fuentes, Uotila & Borsch	
Amaryllidaceae	*Hessea speciosa*	*Hessea*	*speciosa*	Snijman	LC
Amaryllidaceae	*Brunsvigia namaquana*	*Brunsvigia*	*namaquana*	D.Mull.-Doblies & U.Mull.-Doblies	LC

Amaryllidaceae	*Brunsvigia bosmaniae*	*Brunsvigia*	*bosmaniae*	F.M.Leight.	LC
Amaryllidaceae	*Hessea stenosiphon*	*Hessea*	*stenosiphon*	(Snijman) D.Mull.-Doblies & U.Mull.-Doblies	LC
Amaryllidaceae	*Brunsvigia comptonii*	*Brunsvigia*	*comptonii*	W.F.Barker	LC
Amaryllidaceae	*Strumaria massoniella*	*Strumaria*	*massoniella*	(D.Mull.-Doblies & U.Mull.-Doblies) Snijman	VU
Anacampserotaceae	*Anacampseros filamentosa*	*Anacampseros*	*filamentosa*	(Haw.) Sims	
Anacampserotaceae	*Anacampseros papyracea*	*Anacampseros*	*papyracea*	E.Mey. ex Fenzl	LC
Anacampserotaceae	*Anacampseros albissima*	*Anacampseros*	*albissima*	Marloth	LC
Anacampserotaceae	*Anacampseros baeseckei*	*Anacampseros*	*baeseckei*	Dinter ex Poelln.	LC
Anacampserotaceae	*Anacampseros papyracea*	*Anacampseros*	*papyracea*	E.Mey. ex Fenzl	LC
Anacampserotaceae	*Anacampseros quinaria*	*Anacampseros*	*quinaria*	E.Mey. ex Fenzl	LC
Anacampserotaceae	*Anacampseros recurvata*	*Anacampseros*	*recurvata*	Schonland	DDD
Anacampserotaceae	*Anacampseros recurvata*	*Anacampseros*	*recurvata*	Schonland	LC
Anacardiaceae	*Ozoroa dispar*	*Ozoroa*	*dispar*	(C.Presl) R.Fern. & A.Fern.	LC
Anacardiaceae	*Searsia undulata*	*Searsia*	*undulata*	(Jacq.) T.S.Yi, A.J.Mill. & J.Wen	LC
Anacardiaceae	*Searsia populifolia*	*Searsia*	*populifolia*	(E.Mey. ex Sond.) Moffett	LC
Anacardiaceae	*Searsia burchellii*	*Searsia*	*burchellii*	(Sond. ex Engl.) Moffett	LC
Apocynaceae	*Fockea comaru*	*Fockea*	*comaru*	(E.Mey.) N.E.Br.	LC
Apocynaceae	*Larryleachia picta*	*Larryleachia*	*picta*	(N.E.Br.) Plowes	LC
Apocynaceae	*Huernia barbata*	*Huernia*	*barbata*	(Masson) Haw.	LC
Apocynaceae	*Cryptolepis decidua*	*Cryptolepis*	*decidua*	(Planch. ex Benth.) N.E.Br.	LC
Apocynaceae	*Gomphocarpus filiformis*	*Gomphocarpus*	*filiformis*	(E.Mey.) D.Dietr.	LC
Apocynaceae	*Stapelia similis*	*Stapelia*	*similis*	N.E.Br.	LC
Apocynaceae	*Tridentea pachyrrhiza*	*Tridentea*	*pachyrrhiza*	(Dinter) L.C.Leach	LC
Apocynaceae	*Pachypodium namaquanum*	*Pachypodium*	*namaquanum*	(Wyley ex Harv.) Welw.	LC
Apocynaceae	*Hoodia alstonii*	*Hoodia*	*alstonii*	(N.E.Br.) Plowes	LC
Apocynaceae	*Microloma incanum*	*Microloma*	*incanum*	Decne.	LC
Apocynaceae	*Microloma sagittatum*	*Microloma*	*sagittatum*	(L.) R.Br.	LC
Apocynaceae	*Huernia barbata*	*Huernia*	*barbata*	(Masson) Haw.	LC
Asparagaceae	*Asparagus suaveolens*	*Asparagus*	*suaveolens*	Burch.	LC
Asparagaceae	*Asparagus exuvialis*	*Asparagus*	*exuvialis*	Burch.	NE
Asphodelaceae	*Haworthiopsis tessellata*	*Haworthiopsis*	*tessellata*	(Haw.) G.D.Rowley	
Asphodelaceae	*Bulbine ophiophylla*	*Bulbine*	*ophiophylla*	G.Will.	EN
Asphodelaceae	*Aloe gariepensis*	*Aloe*	*gariepensis*	Pillans	LC
Asphodelaceae	*Aloe microstigma*	*Aloe*	*microstigma*	Salm-Dyck	LC
Asphodelaceae	*Trachyandra laxa*	*Trachyandra*	*laxa*	(N.E.Br.) Oberm.	LC
Asphodelaceae	*Trachyandra jacquiniana*	*Trachyandra*	*jacquiniana*	(Schult. & Schult.f.) Oberm.	LC

Asphodelaceae	*Bulbine striata*	*Bulbine*	*striata*	Baijnath & Van Jaarsv.	LC
Aspleniaceae	*Asplenium cordatum*	*Asplenium*	*cordatum*	(Thunb.) Sw.	LC
Asteraceae	*Helichrysum pumilio*	*Helichrysum*	*pumilio*	(O.Hoffm.) Hilliard & B.L.Burtt	
Asteraceae	*Dimorphotheca pinnata*	*Dimorphotheca*	*pinnata*	(Thunb.) Harv.	
Asteraceae	*Felicia clavipilosa*	*Felicia*	*clavipilosa*	Grau	
Asteraceae	*Curio pinguifolius*	*Curio*	*pinguifolius*	(DC.) P.V.Heath	DDT
Asteraceae	*Orbivestus cinerascens*	*Orbivestus*	*cinerascens*	(Sch.Bip.) H.Rob.	LC
Asteraceae	*Osteospermum sinuatum*	*Osteospermum*	*sinuatum*	(DC.) Norl.	LC
Asteraceae	*Senecio niveus*	*Senecio*	*niveus*	(Thunb.) Willd.	LC
Asteraceae	*Chrysocoma microphylla*	*Chrysocoma*	*microphylla*	Thunb.	LC
Asteraceae	*Berkheya annectens*	*Berkheya*	*annectens*	Harv.	LC
Asteraceae	*Hirpicium echinus*	*Hirpicium*	*echinus*	Less.	LC
Asteraceae	*Senecio bulbinifolius*	*Senecio*	*bulbinifolius*	DC.	LC
Asteraceae	*Ursinia nana*	*Ursinia*	*nana*	DC.	LC
Asteraceae	*Helichrysum argyrosphaerum*	*Helichrysum*	*argyrosphaerum*	DC.	LC
Asteraceae	*Berkheya canescens*	*Berkheya*	*canescens*	DC.	LC
Asteraceae	*Lopholaena cneorifolia*	*Lopholaena*	*cneorifolia*	(DC.) S.Moore	LC
Asteraceae	*Didelta carnosa*	*Didelta*	*carnosa*	(L.f.) Aiton	LC
Asteraceae	*Osteospermum muricatum*	*Osteospermum*	*muricatum*	E.Mey. ex DC.	LC
Asteraceae	*Pteronia glabrata*	*Pteronia*	*glabrata*	L.f.	LC
Asteraceae	*Arctotis venusta*	*Arctotis*	*venusta*	Norl.	LC
Asteraceae	*Pentatrichia petrosa*	*Pentatrichia*	*petrosa*	Klatt	LC
Asteraceae	*Dicoma capensis*	*Dicoma*	*capensis*	Less.	LC
Asteraceae	*Geigeria pectidea*	*Geigeria*	*pectidea*	(DC.) Harv.	LC
Asteraceae	*Berkheya chamaepeuce*	*Berkheya*	*chamaepeuce*	(S.Moore) Roessler	LC
Asteraceae	*Pteronia leucoclada*	*Pteronia*	*leucoclada*	Turcz.	LC
Asteraceae	*Foveolina dichotoma*	*Foveolina*	*dichotoma*	(DC.) Kallersjo	LC
Asteraceae	*Dimorphotheca sinuata*	*Dimorphotheca*	*sinuata*	DC.	LC
Asteraceae	*Pteronia unguiculata*	*Pteronia*	*unguiculata*	S.Moore	LC
Asteraceae	*Helichrysum gariepinum*	*Helichrysum*	*gariepinum*	DC.	LC
Asteraceae	*Cineraria canescens*	*Cineraria*	*canescens*	J.C.Wendl. ex Link	LC
Asteraceae	*Pentzia argentea*	*Pentzia*	*argentea*	Hutch.	LC
Asteraceae	*Felicia hirsuta*	*Felicia*	*hirsuta*	DC.	LC
Asteraceae	*Pteronia mucronata*	*Pteronia*	*mucronata*	DC.	LC
Asteraceae	*Euryops dregeanus*	*Euryops*	*dregeanus*	Sch.Bip.	LC
Asteraceae	*Amphiglossa triflora*	*Amphiglossa*	*triflora*	DC.	LC
Asteraceae	*Pentzia lanata*	*Pentzia*	*lanata*	Hutch.	LC
Asteraceae	*Pentzia globosa*	*Pentzia*	*globosa*	Less.	LC
Asteraceae	*Gazania lichtensteinii*	*Gazania*	*lichtensteinii*	Less.	LC

Asteraceae	*Pteronia ciliata*	*Pteronia*	*ciliata*	Thunb.	LC
Asteraceae	*Othonna cyclophylla*	*Othonna*	*cyclophylla*	Merxm.	LC
Asteraceae	*Geigeria vigintisquamea*	*Geigeria*	*vigintisquamea*	O.Hoffm.	LC
Asteraceae	*Felicia namaquana*	*Felicia*	*namaquana*	(Harv.) Merxm.	LC
Asteraceae	*Doellia cafra*	*Doellia*	*cafra*	(DC.) Anderb.	LC
Asteraceae	*Osteospermum armatum*	*Osteospermum*	*armatum*	Norl.	LC
Asteraceae	*Pteronia scariosa*	*Pteronia*	*scariosa*	L.f.	LC
Asteraceae	*Dimorphotheca polyptera*	*Dimorphotheca*	*polyptera*	DC.	LC
Asteraceae	*Berkheya spinosissima*	*Berkheya*	*spinosissima*	(Thunb.) Willd.	LC
Asteraceae	*Osteospermum karrooicum*	*Osteospermum*	*karrooicum*	(Bolus) Norl.	LC
Asteraceae	*Pteronia lucilioides*	*Pteronia*	*lucilioides*	DC.	LC
Asteraceae	*Gorteria corymbosa*	*Gorteria*	*corymbosa*	DC.	LC
Asteraceae	*Senecio piptocoma*	*Senecio*	*piptocoma*	O.Hoffm.	LC
Asteraceae	*Crassothonna sedifolia*	*Crassothonna*	*sedifolia*	(DC.) B.Nord.	LC
Asteraceae	*Kleinia cephalophora*	*Kleinia*	*cephalophora*	Compton	LC
Asteraceae	*Eriocephalus ambiguus*	*Eriocephalus*	*ambiguus*	(DC.) M.A.N.Mull.	LC
Asteraceae	*Ifloga molluginoides*	*Ifloga*	*molluginoides*	(DC.) Hilliard	LC
Asteraceae	*Athanasia minuta*	*Athanasia*	*minuta*	(L.f.) Kallersjo	LC
Asteraceae	*Arctotis leiocarpa*	*Arctotis*	*leiocarpa*	Harv.	LC
Asteraceae	*Nidorella resedifolia*	*Nidorella*	*resedifolia*	DC.	LC
Asteraceae	*Helichrysum herniarioides*	*Helichrysum*	*herniarioides*	DC.	LC
Asteraceae	*Leysera tenella*	*Leysera*	*tenella*	DC.	LC
Asteraceae	*Othonna furcata*	*Othonna*	*furcata*	(Lindl.) Druce	LC
Asteraceae	*Oncosiphon pilulifer*	*Oncosiphon*	*pilulifer*	(L.f.) Kallersjo	LC
Asteraceae	*Helichrysum micropoides*	*Helichrysum*	*micropoides*	DC.	LC
Asteraceae	*Amphiglossa tomentosa*	*Amphiglossa*	*tomentosa*	(Thunb.) Harv.	LC
Asteraceae	*Senecio eenii*	*Senecio*	*eenii*	(S.Moore) Merxm.	LC
Asteraceae	*Osteospermum microcarpum*	*Osteospermum*	*microcarpum*	(Harv.) Norl.	LC
Asteraceae	*Kleinia longiflora*	*Kleinia*	*longiflora*	DC.	LC
Asteraceae	*Ursinia speciosa*	*Ursinia*	*speciosa*	DC.	LC
Asteraceae	*Helichrysum zeyheri*	*Helichrysum*	*zeyheri*	Less.	LC
Asteraceae	*Pteronia glauca*	*Pteronia*	*glauca*	Thunb.	LC
Asteraceae	*Amellus tridactylus*	*Amellus*	*tridactylus*	DC.	LC
Asteraceae	*Helichrysum tomentosulum*	*Helichrysum*	*tomentosulum*	(Klatt) Merxm.	LC
Asteraceae	*Senecio sisymbriifolius*	*Senecio*	*sisymbriifolius*	DC.	LC
Asteraceae	*Eriocephalus scariosus*	*Eriocephalus*	*scariosus*	DC.	LC
Asteraceae	*Felicia muricata*	*Felicia*	*muricata*	(Thunb.) Nees	LC
Asteraceae	*Felicia clavipilosa*	*Felicia*	*clavipilosa*	Grau	LC
Asteraceae	*Euryops subcarnosus*	*Euryops*	*subcarnosus*	DC.	LC

Asteraceae	*Pegolettia retrofracta*	*Pegolettia*	*retrofracta*	(Thunb.) Kies	LC
Asteraceae	*Gorteria integrifolia*	*Gorteria*	*integrifolia*	Thunb.	
Asteraceae	*Gorteria alienata*	*Gorteria*	*alienata*	(Thunb.) Stangb. & Anderb.	
Asteraceae	*Helichrysum pulchellum*	*Helichrysum*	*pulchellum*	DC.	LC
Asteraceae	*Gymnodiscus linearifolia*	*Gymnodiscus*	*linearifolia*	DC.	LC
Asteraceae	*Gazania jurineifolia*	*Gazania*	*jurineifolia*	DC.	LC
Asteraceae	*Eriocephalus microphyllus*	*Eriocephalus*	*microphyllus*	DC.	LC
Asteraceae	*Helichrysum pumilio*	*Helichrysum*	*pumilio*	(O.Hoffm.) Hilliard & B.L.Burtt	LC
Asteraceae	*Othonna daucifolia*	*Othonna*	*daucifolia*	J.C.Manning & Goldblatt	LC
Asteraceae	*Arctotis dimorphocarpa*	*Arctotis*	*dimorphocarpa*	R.J.Mckenzie	LC
Asteraceae	*Eriocephalus africanus*	*Eriocephalus*	*africanus*	L.	LC
Asteraceae	*Ursinia cakilefolia*	*Ursinia*	*cakilefolia*	DC.	LC
Asteraceae	*Eriocephalus spinescens*	*Eriocephalus*	*spinescens*	Burch.	LC
Asteraceae	*Chrysocoma longifolia*	*Chrysocoma*	*longifolia*	DC.	LC
Asteraceae	*Arctotis hirsuta*	*Arctotis*	*hirsuta*	(Harv.) Beauverd	LC
Asteraceae	*Othonna quercifolia*	*Othonna*	*quercifolia*	DC.	LC
Asteraceae	*Chrysocoma sparsifolia*	*Chrysocoma*	*sparsifolia*	Hutch.	LC
Asteraceae	*Othonna arbuscula*	*Othonna*	*arbuscula*	(Thunb.) Sch.Bip.	LC
Asteraceae	*Euryops multifidus*	*Euryops*	*multifidus*	(Thunb.) DC.	LC
Asteraceae	*Helichrysum marmarolepis*	*Helichrysum*	*marmarolepis*	S.Moore	NT
Aytoniaceae	*Plagiochasma rupestre*	*Plagiochasma*	*rupestre*	(J.R.Forst. & G.Forst.) Steph.	
Bartramiaceae	*Philonotis dregeana*	*Philonotis*	*dregeana*	(Mull.Hal.) A.Jaeger	
Bignoniaceae	*Rhigozum trichotomum*	*Rhigozum*	*trichotomum*	Burch.	LC
Boraginaceae	*Codon royenii*	*Codon*	*royenii*	L.	LC
Boraginaceae	*Heliotropium tubulosum*	*Heliotropium*	*tubulosum*	E.Mey. ex A.DC.	LC
Boraginaceae	*Wellstedia dinteri*	*Wellstedia*	*dinteri*	Pilg.	LC
Boraginaceae	*Trichodesma africanum*	*Trichodesma*	*africanum*	(L.) Lehm.	LC
Boraginaceae	*Heliotropium ciliatum*	*Heliotropium*	*ciliatum*	Kaplan	LC
Brassicaceae	*Lepidium englerianum*	*Lepidium*	*englerianum*	(Muschl.) Al-Shehbaz	
Brassicaceae	*Heliophila deserticola*	*Heliophila*	*deserticola*	Schltr.	LC
Brassicaceae	*Heliophila trifurca*	*Heliophila*	*trifurca*	Burch. ex DC.	LC
Brassicaceae	*Heliophila lactea*	*Heliophila*	*lactea*	Schltr.	LC
Brassicaceae	*Lepidium trifurcum*	*Lepidium*	*trifurcum*	Sond.	LC
Brassicaceae	*Heliophila deserticola*	*Heliophila*	*deserticola*	Schltr.	LC
Brassicaceae	*Heliophila carnosa*	*Heliophila*	*carnosa*	(Thunb.) Steud.	LC
Brassicaceae	*Heliophila minima*	*Heliophila*	*minima*	(Stephens) Marais	LC
Bryaceae	*Bryum argenteum*	*Bryum*	*argenteum*	Hedw.	
Burseraceae	*Commiphora gracilifrondosa*	*Commiphora*	*gracilifrondosa*	Dinter ex J.J.A.van der Walt	LC
Campanulaceae	*Wahlenbergia prostrata*	*Wahlenbergia*	*prostrata*	A.DC.	LC

Campanulaceae	*Wahlenbergia campanuloides*	*Wahlenbergia*	*campanuloides*	(Delile) Vatke	LC
Campanulaceae	*Wahlenbergia annularis*	*Wahlenbergia*	*annularis*	A.DC.	LC
Campanulaceae	*Wahlenbergia meyeri*	*Wahlenbergia*	*meyeri*	A.DC.	LC
Capparaceae	*Boscia foetida*	*Boscia*	*foetida*	Schinz	
Capparaceae	*Boscia foetida*	*Boscia*	*foetida*	Schinz	LC
Capparaceae	*Boscia albitrunca*	*Boscia*	*albitrunca*	(Burch.) Gilg & Gilg-Ben.	LC
Caryophyllaceae	*Dianthus namaensis*	*Dianthus*	*namaensis*	Schinz	
Caryophyllaceae	*Dianthus micropetalus*	*Dianthus*	*micropetalus*	Ser.	LC
Caryophyllaceae	*Dianthus namaensis*	*Dianthus*	*namaensis*	Schinz	LC
Celastraceae	*Gymnosporia heterophylla*	*Gymnosporia*	*heterophylla*	(Eckl. & Zeyh.) Loes.	LC
Cleomaceae	*Cleome oxyphylla*	*Cleome*	*oxyphylla*	Burch.	LC
Cleomaceae	*Cleome foliosa*	*Cleome*	*foliosa*	Hook.f.	LC
Cleomaceae	*Cleome paxii*	*Cleome*	*paxii*	(Schinz) Gilg & Gilg-Ben.	LC
Colchicaceae	*Ornithoglossum dinteri*	*Ornithoglossum*	*dinteri*	K.Krause	LC
Colchicaceae	*Ornithoglossum vulgare*	*Ornithoglossum*	*vulgare*	B.Nord.	LC
Crassulaceae	*Tylecodon reticulatus*	*Tylecodon*	*reticulatus*	(L.f.) Toelken	
Crassulaceae	*Crassula garibina*	*Crassula*	*garibina*	Marloth & Schonland	
Crassulaceae	*Cotyledon orbiculata*	*Cotyledon*	*orbiculata*	L.	LC
Crassulaceae	*Tylecodon rubrovenosus*	*Tylecodon*	*rubrovenosus*	(Dinter) Toelken	LC
Crassulaceae	*Crassula tenuipedicellata*	*Crassula*	*tenuipedicellata*	Schonland & Baker f.	LC
Crassulaceae	*Crassula garibina*	*Crassula*	*garibina*	Marloth & Schonland	LC
Crassulaceae	*Crassula tabularis*	*Crassula*	*tabularis*	Dinter	LC
Crassulaceae	*Crassula elegans*	*Crassula*	*elegans*	Schonland & Baker f.	LC
Crassulaceae	*Crassula campestris*	*Crassula*	*campestris*	(Eckl. & Zeyh.) Endl. ex Walp.	LC
Crassulaceae	*Crassula corallina*	*Crassula*	*corallina*	Thunb.	LC
Crassulaceae	*Crassula tomentosa*	*Crassula*	*tomentosa*	Thunb.	LC
Crassulaceae	*Crassula exilis*	*Crassula*	*exilis*	Harv.	LC
Crassulaceae	*Crassula brevifolia*	*Crassula*	*brevifolia*	Harv.	LC
Crassulaceae	*Crassula subaphylla*	*Crassula*	*subaphylla*	(Eckl. & Zeyh.) Harv.	LC
Crassulaceae	*Crassula deltoidea*	*Crassula*	*deltoidea*	Thunb.	LC
Crassulaceae	*Tylecodon reticulatus*	*Tylecodon*	*reticulatus*	(L.f.) Toelken	LC
Crassulaceae	*Crassula cotyledonis*	*Crassula*	*cotyledonis*	Thunb.	LC
Crassulaceae	*Tylecodon reticulatus*	*Tylecodon*	*reticulatus*	(L.f.) Toelken	LC
Crassulaceae	*Crassula grisea*	*Crassula*	*grisea*	Schonland	LC
Crassulaceae	*Crassula macowaniana*	*Crassula*	*macowaniana*	Schonland & Baker f.	LC
Crassulaceae	*Crassula columnaris*	*Crassula*	*columnaris*	Thunb.	LC
Crassulaceae	*Crassula muscosa*	*Crassula*	*muscosa*	L.	NE
Crassulaceae	*Crassula sericea*	*Crassula*	*sericea*	Schonland	NE

Crassulaceae	*Crassula sericea*	*Crassula*	*sericea*	Schonland	NE
Crassulaceae	*Tylecodon sulphureus*	*Tylecodon*	*sulphureus*	(Toelken) Toelken	
Crassulaceae	*Adromischus diabolicus*	*Adromischus*	*diabolicus*	Toelken	DDT
Crassulaceae	*Adromischus nanus*	*Adromischus*	*nanus*	(N.E.Br.) Poelln.	LC
Crassulaceae	*Crassula exilis*	*Crassula*	*exilis*	Harv.	LC
Crassulaceae	*Tylecodon sulphureus*	*Tylecodon*	*sulphureus*	(Toelken) Toelken	LC
Crassulaceae	*Crassula decumbens*	*Crassula*	*decumbens*	Thunb.	NT
Cucurbitaceae	*Cucumis rigidus*	*Cucumis*	*rigidus*	E.Mey. ex Sond.	LC
Cucurbitaceae	*Corallocarpus dissectus*	*Corallocarpus*	*dissectus*	Cogn.	LC
Cucurbitaceae	*Cucumis africanus*	*Cucumis*	*africanus*	L.f.	LC
Cucurbitaceae	*Coccinia rehmannii*	*Coccinia*	*rehmannii*	Cogn.	LC
Cucurbitaceae	*Trochomeria debilis*	*Trochomeria*	*debilis*	(Sond.) Hook.f.	LC
Cyperaceae	*Isolepis hemiuncialis*	*Isolepis*	*hemiuncialis*	(C.B.Clarke) J.Raynal	LC
Cyperaceae	*Cyperus indecorus*	*Cyperus*	*indecorus*	Kunth	NE
Didiereaceae	*Portulacaria fruticulosa*	*Portulacaria*	*fruticulosa*	(H.Pearson & Stephens) Bruyns & Klak	LC
Didiereaceae	*Portulacaria namaquensis*	*Portulacaria*	*namaquensis*	Sond.	LC
Ebenaceae	*Diospyros ramulosa*	*Diospyros*	*ramulosa*	(E.Mey. ex A.DC.) De Winter	LC
Ebenaceae	*Diospyros acocksii*	*Diospyros*	*acocksii*	(De Winter) De Winter	LC
Ebenaceae	*Euclea pseudebenus*	*Euclea*	*pseudebenus*	E.Mey. ex A.DC.	LC
Ebenaceae	*Euclea undulata*	*Euclea*	*undulata*	Thunb.	LC
Euphorbiaceae	*Euphorbia gariepina*	*Euphorbia*	*gariepina*	Boiss.	
Euphorbiaceae	*Euphorbia gregaria*	*Euphorbia*	*gregaria*	Marloth	LC
Euphorbiaceae	*Jatropha orangeana*	*Jatropha*	*orangeana*	Dinter ex P.G.Mey.	LC
Euphorbiaceae	*Euphorbia ephedroides*	*Euphorbia*	*ephedroides*	E.Mey. ex Boiss.	LC
Euphorbiaceae	*Euphorbia spinea*	*Euphorbia*	*spinea*	N.E.Br.	LC
Euphorbiaceae	*Euphorbia mauritanica*	*Euphorbia*	*mauritanica*	L.	LC
Euphorbiaceae	*Euphorbia dregeana*	*Euphorbia*	*dregeana*	E.Mey. ex Boiss.	LC
Euphorbiaceae	*Euphorbia gariepina*	*Euphorbia*	*gariepina*	Boiss.	LC
Fabaceae	*Indigofera heterotricha*	*Indigofera*	*heterotricha*	DC.	
Fabaceae	*Indigastrum niveum*	*Indigastrum*	*niveum*	(Willd. ex Spreng.) Schrire & Callm.	
Fabaceae	*Calobota angustifolia*	*Calobota*	*angustifolia*	(E.Mey.) Boatwr. & B.-E.van Wyk	LC
Fabaceae	*Indigofera pungens*	*Indigofera*	*pungens*	E.Mey.	LC
Fabaceae	*Crotalaria meyeriana*	*Crotalaria*	*meyeriana*	Steud.	LC
Fabaceae	*Melolobium candicans*	*Melolobium*	*candicans*	(E.Mey.) Eckl. & Zeyh.	LC
Fabaceae	*Leobordea platycarpa*	*Leobordea*	*platycarpa*	(Viv.) B.-E.van Wyk & Boatwr.	LC
Fabaceae	*Melolobium canescens*	*Melolobium*	*canescens*	Benth.	LC
Fabaceae	*Tephrosia dregeana*	*Tephrosia*	*dregeana*	E.Mey.	LC
Fabaceae	*Rhynchosia totta*	*Rhynchosia*	*totta*	(Thunb.) DC.	LC

Fabaceae	*Melolobium microphyllum*	*Melolobium*	*microphyllum*	(L.f.) Eckl. & Zeyh.	LC
Fabaceae	*Lotononis rabenaviana*	*Lotononis*	*rabenaviana*	Dinter & Harms	LC
Fabaceae	*Vachellia erioloba*	*Vachellia*	*erioloba*	(E.Mey.) P.J.H.Hurter	LC
Fabaceae	*Indigofera heterotricha*	*Indigofera*	*heterotricha*	DC.	LC
Fabaceae	*Tephrosia limpopoensis*	*Tephrosia*	*limpopoensis*	J.B.Gillett	LC
Fabaceae	*Crotalaria virgultalis*	*Crotalaria*	*virgultalis*	Burch. ex DC.	LC
Fabaceae	*Lotononis falcata*	*Lotononis*	*falcata*	(E.Mey.) Benth.	LC
Fabaceae	*Adenolobus garipensis*	*Adenolobus*	*garipensis*	(E.Mey.) Torre & Hillc.	LC
Fabaceae	*Indigofera evansiana*	*Indigofera*	*evansiana*	Burtt Davy	LC
Fabaceae	*Lessertia depressa*	*Lessertia*	*depressa*	Harv.	LC
Fabaceae	*Indigofera sordida*	*Indigofera*	*sordida*	Benth. ex Harv.	LC
Fabaceae	*Parkinsonia africana*	*Parkinsonia*	*africana*	Sond.	LC
Fabaceae	*Indigastrum argyroides*	*Indigastrum*	*argyroides*	(E.Mey.) Schrire	LC
Fabaceae	*Pomaria lactea*	*Pomaria*	*lactea*	(Schinz) B.B.Simpson & G.P.Lewis	LC
Fabaceae	*Requienia sphaerosperma*	*Requienia*	*sphaerosperma*	DC.	LC
Fabaceae	*Lotononis parviflora*	*Lotononis*	*parviflora*	(P.J.Bergius) D.Dietr.	LC
Fabaceae	*Crotalaria pearsonii*	*Crotalaria*	*pearsonii*	Baker f.	VU
Fabaceae	*Prosopis glandulosa*	*Prosopis*	*glandulosa*	Torr.	NE
Fabaceae	*Prosopis velutina*	*Prosopis*	*velutina*	Wooton	NE
Funariaceae	*Goniomitrium africanum*	*Goniomitrium*	*africanum*	(Mull.Hal.) Broth.	
Funariaceae	*Funaria clavata*	*Funaria*	*clavata*	(Mitt.) Magill	
Geraniaceae	*Pelargonium spinosum*	*Pelargonium*	*spinosum*	Willd.	LC
Geraniaceae	*Monsonia parvifolia*	*Monsonia*	*parvifolia*	Schinz	LC
Geraniaceae	*Pelargonium xerophyton*	*Pelargonium*	*xerophyton*	Schltr. ex R.Knuth	LC
Geraniaceae	*Pelargonium carnosum*	*Pelargonium*	*carnosum*	(L.) L'Her.	LC
Geraniaceae	*Pelargonium crithmifolium*	*Pelargonium*	*crithmifolium*	Sm.	LC
Geraniaceae	*Monsonia glauca*	*Monsonia*	*glauca*	R.Knuth	LC
Geraniaceae	*Monsonia crassicaulis*	*Monsonia*	*crassicaulis*	(Rehm) F.Albers	LC
Geraniaceae	*Monsonia ciliata*	*Monsonia*	*ciliata*	(Moffett) F.Albers	LC
Gigaspermaceae	*Chamaebryum pottioides*	*Chamaebryum*	*pottioides*	Ther. & Dixon	
Gisekiaceae	*Gisekia africana*	*Gisekia*	*africana*	(Lour.) Kuntze	LC
Hyacinthaceae	*Lachenalia giessii*	*Lachenalia*	*giessii*	W.F.Barker	
Hyacinthaceae	*Drimia toxicaria*	*Drimia*	*toxicaria*	(C.Archer & R.H.Archer) J.C.Manning & Goldblatt	
Hyacinthaceae	*Albuca namaquensis*	*Albuca*	*namaquensis*	Baker	LC
Hyacinthaceae	*Massonia bifolia*	*Massonia*	*bifolia*	(Jacq.) J.C.Manning & Goldblatt	LC
Hyacinthaceae	*Dipcadi gracillimum*	*Dipcadi*	*gracillimum*	Baker	LC
Hyacinthaceae	*Albuca glandulifera*	*Albuca*	*glandulifera*	J.C.Manning & Goldblatt	LC
Hyacinthaceae	*Ledebouria undulata*	*Ledebouria*	*undulata*	(Jacq.) Jessop ex Willd.	LC
Hyacinthaceae	*Ornithogalum pruinosum*	*Ornithogalum*	*pruinosum*	F.M.Leight.	LC

Hyacinthaceae	*Bowiea volubilis*	*Bowiea*	*volubilis*	Harv. ex Hook.f.	LC
Hyacinthaceae	*Drimia intricata*	*Drimia*	*intricata*	(Baker) J.C.Manning & Goldblatt	LC
Hyacinthaceae	*Ornithogalum nanodes*	*Ornithogalum*	*nanodes*	F.M.Leight.	LC
Hyacinthaceae	*Albuca setosa*	*Albuca*	*setosa*	Jacq.	LC
Hyacinthaceae	*Lachenalia polypodantha*	*Lachenalia*	*polypodantha*	Schltr. ex W.F.Barker	
Hyacinthaceae	*Ornithogalum bicornutum*	*Ornithogalum*	*bicornutum*	F.M.Leight.	LC
Hyacinthaceae	*Ornithogalum dubium*	*Ornithogalum*	*dubium*	Houtt.	LC
Hyacinthaceae	*Lachenalia xerophila*	*Lachenalia*	*xerophila*	Schltr. ex G.D.Duncan	LC
Hyacinthaceae	*Daubenya namaquensis*	*Daubenya*	*namaquensis*	(Schltr.) J.C.Manning & Goldblatt	LC
Hyacinthaceae	*Albuca spiralis*	*Albuca*	*spiralis*	L.f.	LC
Hyacinthaceae	*Lachenalia undulata*	*Lachenalia*	*undulata*	Masson ex Baker	LC
Hydnoraceae	*Hydnora africana*	*Hydnora*	*africana*	Thunb.	LC
Hypoxidaceae	*Pauridia scullyi*	*Pauridia*	*scullyi*	(Baker) Snijman & Kocyan	LC
Iridaceae	*Lapeirousia plicata*	*Lapeirousia*	*plicata*	(Jacq.) Diels	
Iridaceae	*Lapeirousia littoralis*	*Lapeirousia*	*littoralis*	Baker	
Iridaceae	*Gladiolus saccatus*	*Gladiolus*	*saccatus*	(Klatt) Goldblatt & M.P.de Vos	LC
Iridaceae	*Gladiolus orchidiflorus*	*Gladiolus*	*orchidiflorus*	Andrews	LC
Iridaceae	*Lapeirousia littoralis*	*Lapeirousia*	*littoralis*	Baker	LC
Iridaceae	*Hesperantha rupicola*	*Hesperantha*	*rupicola*	Goldblatt	LC
Iridaceae	*Ferraria variabilis*	*Ferraria*	*variabilis*	Goldblatt & J.C.Manning	LC
Iridaceae	*Tritonia karooica*	*Tritonia*	*karooica*	M.P.de Vos	LC
Kewaceae	*Kewa salsoloides*	*Kewa*	*salsoloides*	(Burch.) Christenh.	LC
Lamiaceae	*Acrotome pallescens*	*Acrotome*	*pallescens*	Benth.	LC
Lamiaceae	*Salvia garipensis*	*Salvia*	*garipensis*	E.Mey. ex Benth.	LC
Lamiaceae	*Stachys linearis*	*Stachys*	*linearis*	Burch. ex Benth.	LC
Lamiaceae	*Stachys rugosa*	*Stachys*	*rugosa*	Aiton	LC
Lamiaceae	*Stachys flavescens*	*Stachys*	*flavescens*	Benth.	LC
Limeaceae	*Limeum africanum*	*Limeum*	*africanum*	L.	
Limeaceae	*Limeum myosotis*	*Limeum*	*myosotis*	H.Walter	LC
Limeaceae	*Limeum aethiopicum*	*Limeum*	*aethiopicum*	Burm.f.	LC
Limeaceae	*Limeum arenicolum*	*Limeum*	*arenicolum*	G.Schellenb.	LC
Limeaceae	*Limeum aethiopicum*	*Limeum*	*aethiopicum*	Burm.f.	NE
Loasaceae	*Kissenia capensis*	*Kissenia*	*capensis*	Endl.	LC
Lophiocarpaceae	*Lophiocarpus polystachyus*	*Lophiocarpus*	*polystachyus*	Turcz.	LC
Malvaceae	*Hermannia stricta*	*Hermannia*	*stricta*	(E.Mey. ex Turcz.) Harv.	LC
Malvaceae	*Hermannia bicolor*	*Hermannia*	*bicolor*	Engl. & Dinter	LC
Malvaceae	*Hermannia minutiflora*	*Hermannia*	*minutiflora*	Engl.	LC
Malvaceae	*Hermannia spinosa*	*Hermannia*	*spinosa*	E.Mey. ex Harv.	LC
Malvaceae	*Hermannia cernua*	*Hermannia*	*cernua*	Thunb.	LC
Malvaceae	*Hermannia burchellii*	*Hermannia*	*burchellii*	(Sweet) I.Verd.	LC

Malvaceae	*Hermannia tomentosa*	*Hermannia*	*tomentosa*	(Turcz.) Schinz ex Engl.	LC
Malvaceae	*Hermannia disermifolia*	*Hermannia*	*disermifolia*	Jacq.	LC
Malvaceae	*Hermannia affinis*	*Hermannia*	*affinis*	K.Schum.	LC
Malvaceae	*Hermannia paucifolia*	*Hermannia*	*paucifolia*	Turcz.	LC
Malvaceae	*Radyera urens*	*Radyera*	*urens*	(L.f.) Bullock	LC
Malvaceae	*Hibiscus elliottiae*	*Hibiscus*	*elliottiae*	Harv.	LC
Malvaceae	*Abutilon pycnodon*	*Abutilon*	*pycnodon*	Hochr.	LC
Malvaceae	*Hermannia gariepina*	*Hermannia*	*gariepina*	Eckl. & Zeyh.	LC
Malvaceae	*Hermannia confusa*	*Hermannia*	*confusa*	T.M.Salter	LC
Menispermaceae	*Antizoma miersiana*	*Antizoma*	*miersiana*	Harv.	LC
Molluginaceae	*Pharnaceum croceum*	*Pharnaceum*	*croceum*	E.Mey. ex Fenzl	LC
Molluginaceae	*Suessenguthiella scleranthoides*	*Suessenguthiella*	*scleranthoides*	(Sond.) Friedrich	LC
Molluginaceae	*Adenogramma glomerata*	*Adenogramma*	*glomerata*	(L.f.) Druce	LC
Molluginaceae	*Pharnaceum viride*	*Pharnaceum*	*viride*	Adamson	LC
Montiniaceae	*Montinia caryophyllacea*	*Montinia*	*caryophyllacea*	Thunb.	LC
Moraceae	*Ficus cordata*	*Ficus*	*cordata*	Thunb.	
Moraceae	*Ficus cordata*	*Ficus*	*cordata*	Thunb.	LC
Moraceae	*Ficus ilicina*	*Ficus*	*ilicina*	(Sond.) Miq.	LC
Neuradaceae	*Grielum sinuatum*	*Grielum*	*sinuatum*	Licht. ex Burch.	LC
Neuradaceae	*Grielum humifusum*	*Grielum*	*humifusum*	Thunb.	LC
Oleaceae	*Menodora juncea*	*Menodora*	*juncea*	Harv.	LC
Orobanchaceae	*Hyobanche rubra*	*Hyobanche*	*rubra*	N.E.Br.	LC
Oxalidaceae	*Oxalis annae*	*Oxalis*	*annae*	F.Bolus	LC
Passifloraceae	*Adenia repanda*	*Adenia*	*repanda*	(Burch.) Engl.	LC
Plumbaginaceae	*Dyerophytum africanum*	*Dyerophytum*	*africanum*	(Lam.) Kuntze	LC
Poaceae	*Eragrostis rotifer*	*Eragrostis*	*rotifer*	Rendle	LC
Poaceae	*Stipagrostis hochstetteriana*	*Stipagrostis*	*hochstetteriana*	(Beck ex Hack.) De Winter	LC
Poaceae	*Schmidtia kalahariensis*	*Schmidtia*	*kalahariensis*	Stent	LC
Poaceae	*Aristida adscensionis*	*Aristida*	*adscensionis*	L.	LC
Poaceae	*Cladoraphis spinosa*	*Cladoraphis*	*spinosa*	(L.f.) S.M.Phillips	LC
Poaceae	*Tricholaena monachne*	*Tricholaena*	*monachne*	(Trin.) Stapf & C.E.Hubb.	LC
Poaceae	*Cenchrus ciliaris*	*Cenchrus*	*ciliaris*	L.	LC
Poaceae	*Stipagrostis hochstetteriana*	*Stipagrostis*	*hochstetteriana*	(Beck ex Hack.) De Winter	LC
Poaceae	*Eragrostis nindensis*	*Eragrostis*	*nindensis*	Ficalho & Hiern	LC
Poaceae	*Ehrharta pusilla*	*Ehrharta*	*pusilla*	Nees ex Trin.	LC
Poaceae	*Danthoniopsis ramosa*	*Danthoniopsis*	*ramosa*	(Stapf) Clayton	LC
Poaceae	*Eragrostis lehmanniana*	*Eragrostis*	*lehmanniana*	Nees	LC
Poaceae	*Triraphis ramosissima*	*Triraphis*	*ramosissima*	Hack.	LC

Poaceae	*Digitaria eriantha*	*Digitaria*	*eriantha*	Steud.	LC
Poaceae	*Enneapogon cenchroides*	*Enneapogon*	*cenchroides*	(Licht. ex Roem. & Schult.) C.E.Hubb.	LC
Poaceae	*Stipagrostis uniplumis*	*Stipagrostis*	*uniplumis*	(Licht.) De Winter	LC
Poaceae	*Enneapogon desvauxii*	*Enneapogon*	*desvauxii*	P.Beauv.	LC
Poaceae	*Stipagrostis anomala*	*Stipagrostis*	*anomala*	De Winter	LC
Poaceae	*Ehrharta calycina*	*Ehrharta*	*calycina*	Sm.	LC
Poaceae	*Stipagrostis ciliata*	*Stipagrostis*	*ciliata*	(Desf.) De Winter	LC
Poaceae	*Aristida engleri*	*Aristida*	*engleri*	Mez	LC
Poaceae	*Schmidtia pappophoroides*	*Schmidtia*	*pappophoroides*	Steud.	LC
Poaceae	*Aristida congesta*	*Aristida*	*congesta*	Roem. & Schult.	LC
Poaceae	*Tricholaena capensis*	*Tricholaena*	*capensis*	(Licht. ex Roem. & Schult.) Nees	LC
Poaceae	*Brachiaria glomerata*	*Brachiaria*	*glomerata*	(Hack.) A.Camus	LC
Poaceae	*Leucophrys mesocoma*	*Leucophrys*	*mesocoma*	(Nees) Rendle	LC
Poaceae	*Stipagrostis obtusa*	*Stipagrostis*	*obtusa*	(Delile) Nees	LC
Poaceae	*Stipagrostis brevifolia*	*Stipagrostis*	*brevifolia*	(Nees) De Winter	LC
Poaceae	*Schismus barbatus*	*Schismus*	*barbatus*	(Loefl. ex L.) Thell.	LC
Poaceae	*Enneapogon scaber*	*Enneapogon*	*scaber*	Lehm.	LC
Poaceae	*Tragus berteronianus*	*Tragus*	*berteronianus*	Schult.	LC
Poaceae	*Stipagrostis amabilis*	*Stipagrostis*	*amabilis*	(Schweick.) De Winter	LC
Poaceae	*Fingerhuthia africana*	*Fingerhuthia*	*africana*	Lehm.	LC
Poaceae	*Panicum arbusculum*	*Panicum*	*arbusculum*	Mez	LC
Poaceae	*Polypogon monspeliensis*	*Polypogon*	*monspeliensis*	(L.) Desf.	NE
Polygalaceae	*Polygala leptophylla*	*Polygala*	*leptophylla*	Burch.	
Polygalaceae	*Polygala leptophylla*	*Polygala*	*leptophylla*	Burch.	LC
Polygalaceae	*Polygala seminuda*	*Polygala*	*seminuda*	Harv.	LC
Portulacaceae	*Portulaca kermesina*	*Portulaca*	*kermesina*	N.E.Br.	LC
Portulacaceae	*Portulaca pilosa*	*Portulaca*	*pilosa*	L.	LC
Pottiaceae	*Syntrichia ammonsiana*	*Syntrichia*	*ammonsiana*	(H.A.Crum & L.E.Anderson) Ochyra	
Pottiaceae	*Pseudocrossidium crinitum*	*Pseudocrossidium*	*crinitum*	(Schultz) R.H.Zander	
Pottiaceae	*Tortula atrovirens*	*Tortula*	*atrovirens*	(Sm.) Lindb.	
Pottiaceae	*Trichostomum brachydontium*	*Trichostomum*	*brachydontium*	Bruch	
Pteridaceae	*Cheilanthes deltoidea*	*Cheilanthes*	*deltoidea*	Kunze	LC
Ptychomitriaceae	*Ptychomitriopsis aloinoides*	*Ptychomitriopsis*	*aloinoides*	Magill	
Rubiaceae	*Plocama crocyllis*	*Plocama*	*crocyllis*	(Sond.) M.Backlund & Thulin	LC
Rubiaceae	*Kohautia caespitosa*	*Kohautia*	*caespitosa*	Schnizl.	LC
Rubiaceae	*Anthospermum spathulatum*	*Anthospermum*	*spathulatum*	Spreng.	LC
Ruscaceae	*Eriospermum bakerianum*	*Eriospermum*	*bakerianum*	Schinz	LC
Ruscaceae	*Eriospermum pusillum*	*Eriospermum*	*pusillum*	P.L.Perry	LC

Salvadoraceae	*Azima tetracantha*	*Azima*	*tetracantha*	Lam.	LC
Santalaceae	*Lacomucinaea lineata*	*Lacomucinaea*	*lineata*	(L.f.) Nickrent & M.A.Garcia	
Santalaceae	*Viscum rotundifolium*	*Viscum*	*rotundifolium*	L.f.	LC
Sapindaceae	*Pappea capensis*	*Pappea*	*capensis*	Eckl. & Zeyh.	LC
Scrophulariaceae	*Peliostomum junceum*	*Peliostomum*	*junceum*	(Hiern) Kolberg & Van Slageren	
Scrophulariaceae	*Aptosimum spinescens*	*Aptosimum*	*spinescens*	(Thunb.) Emil Weber	LC
Scrophulariaceae	*Aptosimum albomarginatum*	*Aptosimum*	*albomarginatum*	Marloth & Engl.	LC
Scrophulariaceae	*Aptosimum tragacanthoides*	*Aptosimum*	*tragacanthoides*	E.Mey. ex Benth.	LC
Scrophulariaceae	*Peliostomum leucorrhizum*	*Peliostomum*	*leucorrhizum*	E.Mey. ex Benth.	LC
Scrophulariaceae	*Aptosimum indivisum*	*Aptosimum*	*indivisum*	Burch. ex Benth.	LC
Scrophulariaceae	*Zaluzianskya diandra*	*Zaluzianskya*	*diandra*	Diels	LC
Scrophulariaceae	*Jamesbrittenia aridicola*	*Jamesbrittenia*	*aridicola*	Hilliard	LC
Scrophulariaceae	*Hebenstretia parviflora*	*Hebenstretia*	*parviflora*	E.Mey.	LC
Scrophulariaceae	*Lyperia tristis*	*Lyperia*	*tristis*	(L.f.) Benth.	LC
Scrophulariaceae	*Jamesbrittenia ramosissima*	*Jamesbrittenia*	*ramosissima*	(Hiern) Hilliard	LC
Scrophulariaceae	*Jamesbrittenia integerrima*	*Jamesbrittenia*	*integerrima*	(Benth.) Hilliard	LC
Scrophulariaceae	*Antherothamnus pearsonii*	*Antherothamnus*	*pearsonii*	N.E.Br.	LC
Scrophulariaceae	*Nemesia anisocarpa*	*Nemesia*	*anisocarpa*	E.Mey. ex Benth.	LC
Scrophulariaceae	*Manulea gariepina*	*Manulea*	*gariepina*	Benth.	LC
Scrophulariaceae	*Jamesbrittenia maxii*	*Jamesbrittenia*	*maxii*	(Hiern) Hilliard	LC
Scrophulariaceae	*Selago divaricata*	*Selago*	*divaricata*	L.f.	LC
Scrophulariaceae	*Aptosimum procumbens*	*Aptosimum*	*procumbens*	(Lehm.) Steud.	LC
Scrophulariaceae	*Microdon capitatus*	*Microdon*	*capitatus*	(P.J.Bergius) Levyns	EN
Scrophulariaceae	*Nemesia cheiranthus*	*Nemesia*	*cheiranthus*	E.Mey. ex Benth.	LC
Scrophulariaceae	*Manulea nervosa*	*Manulea*	*nervosa*	E.Mey. ex Benth.	LC
Scrophulariaceae	*Zaluzianskya affinis*	*Zaluzianskya*	*affinis*	Hilliard	LC
Scrophulariaceae	*Zaluzianskya sanorum*	*Zaluzianskya*	*sanorum*	Hilliard	LC
Scrophulariaceae	*Nemesia maxii*	*Nemesia*	*maxii*	Hiern	LC
Solanaceae	*Solanum tomentosum*	*Solanum*	*tomentosum*	L.	
Solanaceae	*Solanum humile*	*Solanum*	*humile*	Lam.	
Solanaceae	*Lycium horridum*	*Lycium*	*horridum*	Thunb.	LC
Solanaceae	*Solanum capense*	*Solanum*	*capense*	L.	LC
Solanaceae	*Solanum burchellii*	*Solanum*	*burchellii*	Dunal	LC
Urticaceae	*Forsskaolea candida*	*Forsskaolea*	*candida*	L.f.	LC
Verbenaceae	*Chascanum garipense*	*Chascanum*	*garipense*	E.Mey.	LC

Zygophyllaceae	*Tetraena simplex*	*Tetraena*	*simplex*	(L.) Beier & Thulin	
Zygophyllaceae	*Tetraena retrofracta*	*Tetraena*	*retrofracta*	(Thunb.) Beier & Thulin	
Zygophyllaceae	*Zygophyllum dregeanum*	*Zygophyllum*	*dregeanum*	Sond.	LC
Zygophyllaceae	*Augea capensis*	*Augea*	*capensis*	Thunb.	LC
Zygophyllaceae	*Sisyndite spartea*	*Sisyndite*	*spartea*	E.Mey. ex Sond.	LC
Zygophyllaceae	*Tribulus terrestris*	*Tribulus*	*terrestris*	L.	LC
Zygophyllaceae	*Tribulus pterophorus*	*Tribulus*	*pterophorus*	C.Presl	LC
Zygophyllaceae	*Tribulus zeyheri*	*Tribulus*	*zeyheri*	Sond.	LC

9.2 Appendix B – Amphibian species expected to occur in the project area

FAMILY	TAXON	Conservation Status	
		Local	Global
Pyxicephalidae	*Amietia fuscigula*	LC	Unlisted
Pyxicephalidae	*Cacosternum namaquense*	LC	LC
Microhylidae	*Phrynomantis annectens*	LC	LC
Pyxicephalidae	*Strongylopus grayii*	LC	LC
Pyxicephalidae	*Tomopterna delalandii*	LC	LC
Bufonidae	*Vandijkophrynus gariepensis gariepensis*	Not listed	Not listed
Bufonidae	*Vandijkophrynus robinsoni*	LC	LC
Pipidae	*Xenopus laevis*	LC	LC

9.3 Appendix C – Reptile species expected to occur in the project area

FAMILY	TAXON	Conservation Status	
		Local	Global
Scincidae	*Acontias lineatus*	LC	LC
Scincidae	*Acontias namaquensis*	LC	LC
Scincidae	*Acontias tristis*	LC	LC
Agamidae	*Agama aculeata aculeata*	LC	Unlisted
Agamidae	*Agama atra*	LC	LC
Agamidae	*Agama hispida*	LC	LC
Agamidae	*Agama knobeli*	LC	LC
Elapidae	*Aspidelaps lubricus lubricus*	LC	Unlisted
Viperidae	*Bitis arietans arietans*	LC	Unlisted
Lamprophiidae	*Boaedon capensis*	LC	LC
Lamprophiidae	*Boaedon mentalis*	LC	Unlisted
Chamaeleonidae	*Chamaeleo namaquensis*	LC	LC
Testudinidae	*Chersina angulata*	LC	LC
Testudinidae	*Chersobius signatus*	EN	EN
Gekkonidae	*Chondrodactylus angulifer*	LC	LC
Gekkonidae	*Chondrodactylus bibronii*	LC	Unlisted
Gekkonidae	*Chondrodactylus laevigatus*	Unlisted	LC
Gerrhosauridae	*Cordylosaurus subtessellatus*	LC	LC
Colubridae	*Dasypeltis scabra*	LC	LC
Colubridae	*Dipsina multimaculata*	LC	Unlisted
Gekkonidae	*Goggia lineata*	LC	LC
Gekkonidae	*Goggia rupicola*	LC	LC
Cordylidae	*Karusasaurus polyzonus*	LC	LC
Lamprophiidae	*Lamprophis fiskii*	Unlisted	LC
Lamprophiidae	*Lamprophis guttatus*	LC	LC
Lacertidae	*Meroles knoxii*	LC	LC
Lacertidae	*Meroles suborbitalis*	LC	Unlisted
Elapidae	*Naja nigricincta woodi*	LC	Unlisted
Elapidae	*Naja nivea*	LC	Unlisted
Cordylidae	*Namazonurus peersi*	LC	LC
Lacertidae	*Nucras tessellata*	LC	Unlisted
Gekkonidae	*Pachydactylus atorquatus*	Unlisted	LC
Gekkonidae	*Pachydactylus capensis*	LC	Unlisted
Gekkonidae	*Pachydactylus latirostris*	LC	Unlisted
Gekkonidae	*Pachydactylus montanus*	LC	LC
Gekkonidae	*Pachydactylus namaquensis*	LC	LC
Gekkonidae	*Pachydactylus rugosus*	LC	Unlisted

Gekkonidae	*Pachydactylus weberi*	LC	LC
Lacertidae	*Pedioplanis inornata*	LC	Unlisted
Lacertidae	*Pedioplanis lineoocellata lineoocellata*	LC	Unlisted
Lacertidae	*Pedioplanis lineoocellata pulchella*	LC	LC
Lacertidae	*Pedioplanis namaquensis*	LC	Unlisted
Colubridae	*Philothamnus semivariegatus*	LC	Unlisted
Cordylidae	*Platysaurus capensis*	LC	LC
Lamprophiidae	*Prosymna bivittata*	LC	Unlisted
Lamprophiidae	*Prosymna frontalis*	LC	Unlisted
Testudinidae	*Psammobates tentorius verroxii*	NT	LC
Lamprophiidae	*Psammophis leightoni*	LC	LC
Lamprophiidae	*Psammophis notostictus*	LC	Unlisted
Lamprophiidae	*Pseudaspis cana*	LC	Unlisted
Gekkonidae	*Ptenopus garrulus maculatus*	LC	Unlisted
Typhlopidae	*Rhinotyphlops lalandei*	LC	Unlisted
Typhlopidae	*Rhinotyphlops schinzi*	LC	Unlisted
Colubridae	*Telescopus beetzi*	LC	LC
Colubridae	*Telescopus semiannulatus polystictus*	LC	Unlisted
Scincidae	*Trachylepis occidentalis*	LC	Unlisted
Scincidae	*Trachylepis sulcata*	LC	Unlisted
Scincidae	*Trachylepis sulcata sulcata*	LC	Unlisted
Scincidae	*Trachylepis variegata*	LC	Unlisted

9.4 Appendix D – Mammal species expected to occur within the project area

FAMILY	TAXON	Conservation Status	
		Local	Global
Muridae	*Aethomys namaquensis*	LC	LC
Bovidae	*Antidorcas marsupialis*	LC	LC
Canidae	*Canis mesomelas*	LC	LC
Felidae	*Caracal caracal*	LC	LC
Chrysochloridae	*Chrysochloris (Chrysochloris) asiatica*	LC	LC
Chrysochloridae	*Chrysochloris sp.*	LC	LC
Vespertilionidae	*Cistugo seabrae*	LC	NT
Soricidae	*Crocidura cyanea*	LC	LC
Bathyergidae	*Cryptomys hottentotus*	LC	LC
Herpestidae	*Cynictis penicillata*	LC	LC
Muridae	*Desmodillus auricularis*	LC	LC
Pteropodidae	*Eidolon helvum*	LC	NT
Macroscelididae	*Elephantulus edwardii*	LC	LC
Macroscelididae	*Elephantulus rupestris*	LC	LC
Vespertilionidae	*Eptesicus hottentotus*	LC	LC
Felidae	*Felis nigripes*	VU	VU
Felidae	*Felis silvestris*	LC	LC
Viverridae	*Genetta genetta*	LC	LC
Muridae	*Gerbilliscus brantsii*	LC	LC
Muridae	*Gerbilliscus paeba*	LC	LC
Muridae	*Gerbillurus paeba*	LC	Unlisted
Muridae	*Gerbillurus vallinus*	LC	Unlisted
Gliridae	*Graphiurus (Graphiurus) ocularis*	LC	LC
Gliridae	*Graphiurus rupicola*	NT	LC
Herpestidae	*Herpestes pulverulentus*	LC	LC
Hystricidae	*Hystrix africaeaustralis*	LC	LC
Mustelidae	*Ictonyx striatus*	LC	LC
Leporidae	*Lepus capensis*	LC	LC
Leporidae	*Lepus saxatilis*	LC	LC
Macroscelididae	*Macroscelides proboscideus*	LC	LC
Nesomyidae	*Malacothrix typica*	LC	LC
Mustelidae	*Mellivora capensis*	LC	LC
Muridae	*Mus (Nannomys) minutoides*	LC	LC
Muridae	*Mus musculus*	Unlisted	LC
Muridae	*Mus musculus musculus*	Unlisted	LC
Soricidae	*Myosorex varius*	LC	LC
Vespertilionidae	*Neoromicia capensis*	LC	LC

Nycteridae	*Nycteris thebaica*	LC	LC
Bovidae	*Oreotragus oreotragus*	LC	LC
Orycteropodidae	*Orycteropus afer*	LC	LC
Canidae	*Otocyon megalotis*	LC	LC
Muridae	*Otomys unisulcatus*	LC	LC
Felidae	*Panthera pardus*	VU	VU
Cercopithecidae	*Papio ursinus*	LC	LC
Muridae	*Parotomys brantsii*	LC	LC
Muridae	*Parotomys littledalei*	NT	LC
Pedetidae	*Pedetes capensis*	LC	LC
Petromuridae	*Petromus typicus*	LC	LC
Nesomyidae	*Petromyscus barbouri*	LC	LC
Nesomyidae	*Petromyscus collinus*	LC	LC
Nesomyidae	*Petromyscus monticularis*	LC	LC
Procaviidae	*Procavia capensis*	LC	LC
Procaviidae	*Procavia capensis capensis*	LC	LC
Leporidae	*Pronolagus crassicaudatus*	LC	LC
Leporidae	*Pronolagus rupestris*	LC	LC
Hyaenidae	*Proteles cristata*	LC	LC
Muridae	*Rhabdomys pumilio*	LC	LC
Rhinolophidae	*Rhinolophus capensis*	LC	LC
Rhinolophidae	*Rhinolophus clivosus*	LC	LC
Rhinolophidae	*Rhinolophus damarensis*	LC	LC
Rhinolophidae	*Rhinolophus darlingi*	LC	LC
Molossidae	*Sauromys petrophilus*	LC	LC
Soricidae	*Suncus varilla*	LC	LC
Herpestidae	*Suricata suricatta*	LC	LC
Bovidae	*Sylvicapra grimmia*	LC	LC
Molossidae	*Tadarida aegyptiaca*	LC	LC
Muridae	*Thallomys paedulcus*	LC	LC
Muridae	*Thallomys shortridgei*	DD	DD
Canidae	*Vulpes chama*	LC	LC
Sciuridae	*Xerus inauris*	LC	LC