THE BIODIVERSITY AND WETLAND ASSESSMENTS FOR THE PROPOSED ADDITIONAL FOOTPRINT ASSSOCIATED WITH THE SANNASPOS SOLAR PV DEVELOPMENT

Sannaspos, Free State Province

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1 Introduction

The Biodiversity Company was appointed to undertake a terrestrial ecology and a wetland delineation and functional assessment for the establishment of a solar photovoltaic (PV) project, namely Sannaspos Saolar PV. The project is found 6.5 km south east from Sannaspos in the Free State (Figure 1-1).

ENGIE Sannaspos Solar Project (Pty) Ltd obtained an Environmental Authorisation for the proposed Sannaspos PV Plant Phase 1 and associated infrastructure, located on Portion 0 of Farm 1808 Besemkop and Portion 0 of Farm 2962 Lejwe, within the Mangaung Metropolitan Municipality, Free State Province in May 2013 (DFFE Reference No.: 14/12/16/3/3/2/360). The project has been selected as a Preferred Bidder project under Round 5 of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP).

The proposed facility will have a contracted capacity of 75MW (90MW installed capacity) and will include the following infrastructure:

- PV arrays and inverters;
- Cabling between project components, laid underground as far as possible;
- An on-site 132kV Independent Power Producer (IPP) substation to facilitate the grid connection;
- Internal access roads;
- Guard house;
- Laydown, Campsite and assembly area; and
- Office and Control centre.

A developmental footprint of 150 ha in extent is authorised for the facility and associated infrastructure. In order to implement the project, an additional 50ha is required. This additional area is located within the properties assessed for the project and immediately adjacent to the authorised facility.

The need for the additional footprint is due to the advancements in technology and spatial needs for the optimised operation of the facility. The developer is proposing to install bifacial PV modules, which enable energy generation from both sides of the PV modules, thereby improving the efficiency of the facility. This technology requires additional space between PV module rows, compared to traditional monofacial PV modules as originally considered for the project, to enable reflected solar irradiation (solar energy) to reach the underside of the bifacial modules. The purpose of the Environmental Impact Assessment is therefore to analyse the impacts of the portion of infrastructure on the additional footprint, namely:

- A total of 28 325 bifacial solar panels with a combined capacity of 15MW; and
- Internal Access roads.

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): “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria). The National Web based Environmental Screening Tool has characterised the terrestrial sensitivity of the solar plant as “Very High” and the aquatic sensitivity as “Low” sensitivity.

The purpose of the specialist studies is to provide relevant input into the EIA 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.

1.1 Background

The following specialist reports were reviewed and considered to supplement the project findings:

- Ecology report for the proposed Sannaspos 75MW Solar Energy Facility (Savannah, 2012); and
- Agricultural potential assessment for the proposed Sannaspos 75MW Solar Energy Facility (Viljoen & Associates, 2012).

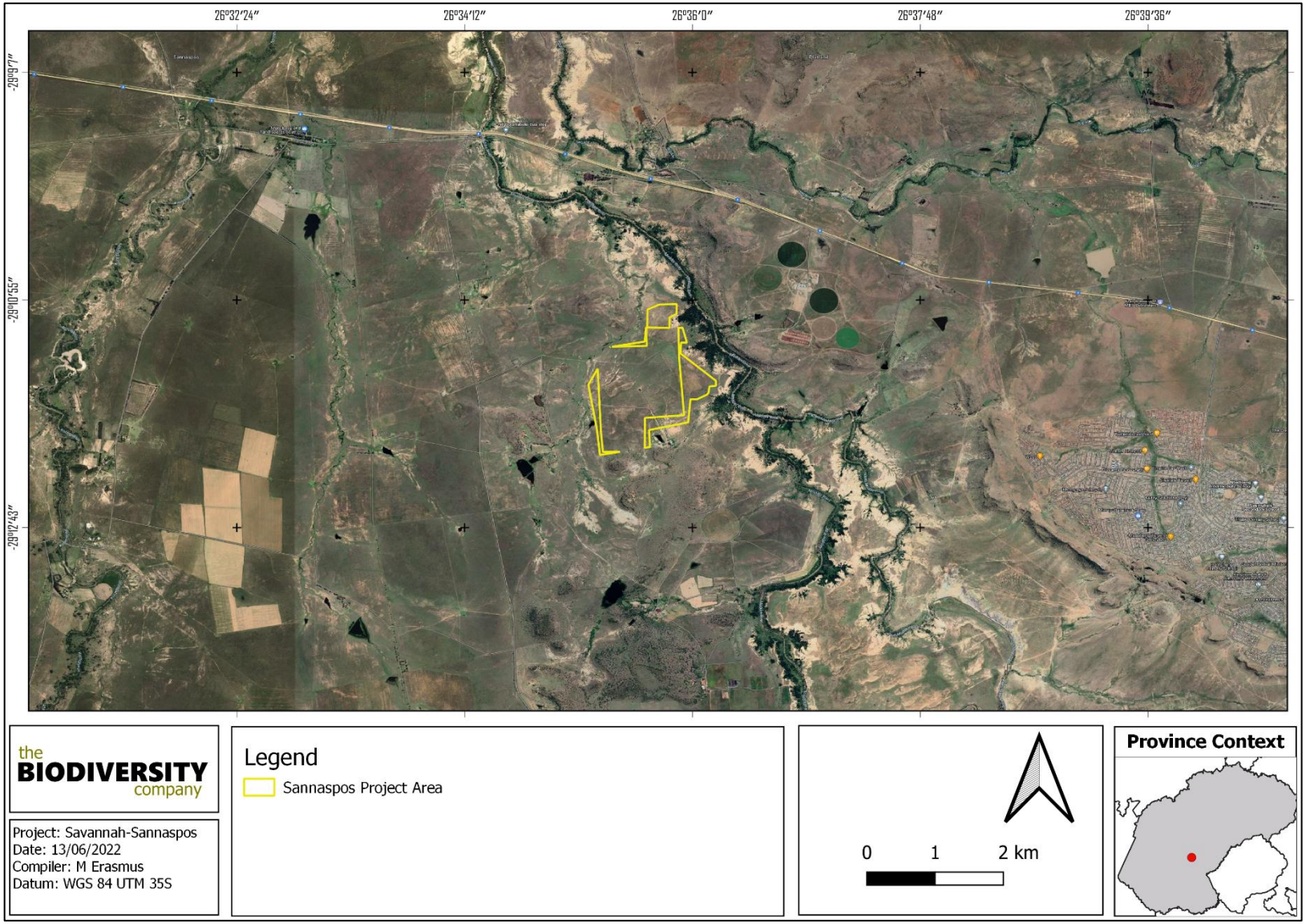


Figure 1-1 Proposed location of the project area in relation to the nearby towns.

1.2 Specialist Details

Report Name	**THE BIODIVERSITY AND WETLAND ASSESSMENTS FOR THE PROPOSED ADDITIONAL FOOTPRINT ASSSOCIATED WITH THE SANNASPOS SOLAR PV DEVELOPMENT**
Reference	**Sannaspos PV**
Submitted to	savannah environmental
Report Writer (Desktop)	**Lindi Steyn** 
	Dr Lindi Steyn has completed her PhD in Biodiversity and Conservation from the University of Johannesburg. Lindi is a terrestrial ecologist with a special interest in ornithology. She has completed numerous studies ranging from basic Assessments to Environmental Impact Assessments following IFC standards.
Report Writer (Desktop & Fauna and Flora)	**Martinus Erasmus** 
	Martinus Erasmus obtained his B-Tech degree in Nature Conservation in 2016 at the Tshwane University of Technology. Martinus has been conducting EIAs, basic assessments and assisting specialists in field during his studies since 2015. Martinus is Cand. Sci. Nat. registered (118630) is a specialist terrestrial ecologist and botanist which conducts floral surveys faunal surveys which include mammals, birds, amphibians and reptiles.
Reviewer and Wetland Report Writer	**Andrew Husted** 
	Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

2 Scope of Work

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

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

The aim of the wetland assessment was to provide information to guide the proposed project with respect to the current state of the associated wetlands in the project area. This was achieved through the following:

- The identification, deliniation and classiication of wetlands within the project area;
- The functional assessment of the identified wetlands;
- A risk assessment for the proposed development; and
- The prescription of mitigation measures and recommendations for identified risks.

3 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 3-1 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 3-1 A list of key legislative requirements relevant to biodiversity and conservation in the Free State Province

Region	Legislation / Guideline
International	Convention on Biological Diversity (CBD, 1993)
	The Convention on Wetlands (RAMSAR Convention, 1971)
	The United Nations Framework Convention on Climate Change (UNFCC,1994)
	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
	The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
National	Constitution of the Republic of South Africa (Act No. 108 of 1996)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004), Threatened or Protected Species Regulations

	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)
	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)
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
	The Environment Conservation Act (Act No. 73 of 1989)
	National Protected Areas Expansion Strategy (NPAES)
	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (101 of 1998)
	National Water Act (NWA) (Act No. 36 of 1998)
	National Spatial Biodiversity Assessment (NSBA)
	World Heritage Convention Act (Act No. 49 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations and, Alien and Invasive Species List 20142020, published under NEMBA
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)
	Sustainable Utilisation of Agricultural Resources (Draft Legislation).
	White Paper on Biodiversity
Provincial	Boputhatswana Nature Conservation Act 3 of 1973
	Free State Nature Conservation Ordinance 8 of 1969

3.1 National Environmental Management Act (NEMA, 1998)

The National Environmental Management Act (Act No. 107 of 1998 – NEMA) and the associated Regulations as amended in April 2017, states that prior to any development taking place within a wetland or riparian area, an environmental authorisation application process needs to be followed. This could follow either the Basic Assessment (BA) process or the Environmental Impact Assessment (EIA) process depending on the scale of the impact.

New regulations were gazetted (43110) on the 20 March 2020 which have replaced the requirements of Appendix 6 of the Environmental Impact Assessment Regulations. These regulations provide the criteria and minimum requirements for specialist's assessments in order to consider the impacts on aquatic biodiversity for activities which require Environmental Authorisation (EA).

3.2 National Water Act (NWA, 1998)

The Department of Human Settlements Water and Sanitation (DHSWS) is the custodian of South Africa's water resources and therefore assumes public trusteeship of water resources, which includes watercourses, surface water, estuaries, or aquifers. The National Water Act (Act No. 36 of 1998 – NWA) allows for the protection of water resources, which includes:

- The maintenance of the quality of the water resource to the extent that the water resources may be used in an ecologically sustainable way;
- The prevention of the degradation of the water resource; and

- The rehabilitation of the water resource.

A watercourse means;

- A river or spring;
- A natural channel in which water flows regularly or intermittently;
- A wetland, lake or dam into which, or from which, water flows; and
- Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

The NWA recognises that the entire ecosystem and not just the water itself, and any given water resource constitutes the resource and as such needs to be conserved. No activity may therefore take place within a watercourse unless it is authorised by the DHSWS. Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DHSWS in terms of Section 21 (c) and (i).

4 Methods

4.1 Project Area

The project area is 6.5 km southeast from Sannaspos and is found 1.3 km south of the N8 road. Presently, the project area is surrounded by the Modder River, agricultural fields and some open natural areas.

4.2 Desktop Assessment

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

4.2.1 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:

- *National Biodiversity Assessment 2018 (Skowno et al, 2019) (NBA)*- The purpose of the NBA is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA deals with all three components of biodiversity: genes, species and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are:
    - *Ecosystem Threat Status* – indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition.
    - *Ecosystem Protection Level* – indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems.
- Protected areas:

- *South Africa Protected Areas Database (SAPAD) (DEA, 2021)* – The (SAPAD) Database contains spatial data for the conservation of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. SAPAD is updated on a continuous basis and forms the basis for the Register of Protected Areas, which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.
- *National Protected Areas Expansion Strategy (NPAES) (SANBI, 2010)* – The NPAES provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and therefore, of high importance for biodiversity, climate resilience and freshwater protection.

- Free State Biodiversity Sector Plan
  - It is important to note that the Critical Biodiversity Areas (CBA) map accounts for terrestrial fauna and flora only. The inclusion of the aquatic component was limited to the Freshwater Ecosystem Priority Areas (FEPA) catchments (included in the cost layer and for the identification of Ecological Support Areas (ESAs)) and wetland clusters (included in the ESAs only).
  - A CBA is considered a significant and ecologically sensitive area and needs to be kept in a pristine or near-natural state to ensure the continued functioning of ecosystems (SANBI, 2017). A CBA represents the best choice for achieving biodiversity targets. ESAs are not essential for achieving targets, but they play a vital role in the continued functioning of ecosystems and often are essential for proper functioning of adjacent CBAs.
- Important Bird and Biodiversity Areas (IBAs) (BirdLife South Africa, 2015) – IBAs constitute a global network of over 13 500 sites, of which 112 sites are found in South Africa. IBAs are sites of global significance for bird conservation, identified through multi-stakeholder processes using globally standardised, quantitative and scientifically agreed criteria; and
- South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer *et al.,* 2018) – A SAIIAE was established during the NBA of 2018. It is a collection of data layers that represent the extent of river and inland wetland ecosystem types and pressures on these systems.

4.2.2 Desktop Flora Assessment

The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006) and SANBI (2019) was used to identify the vegetation type that would have occurred under natural or pre-anthropogenically altered conditions. Furthermore, the Plants of Southern Africa (POSA) database was accessed to compile a list of expected flora species within the project area (Figure 4-1). 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.

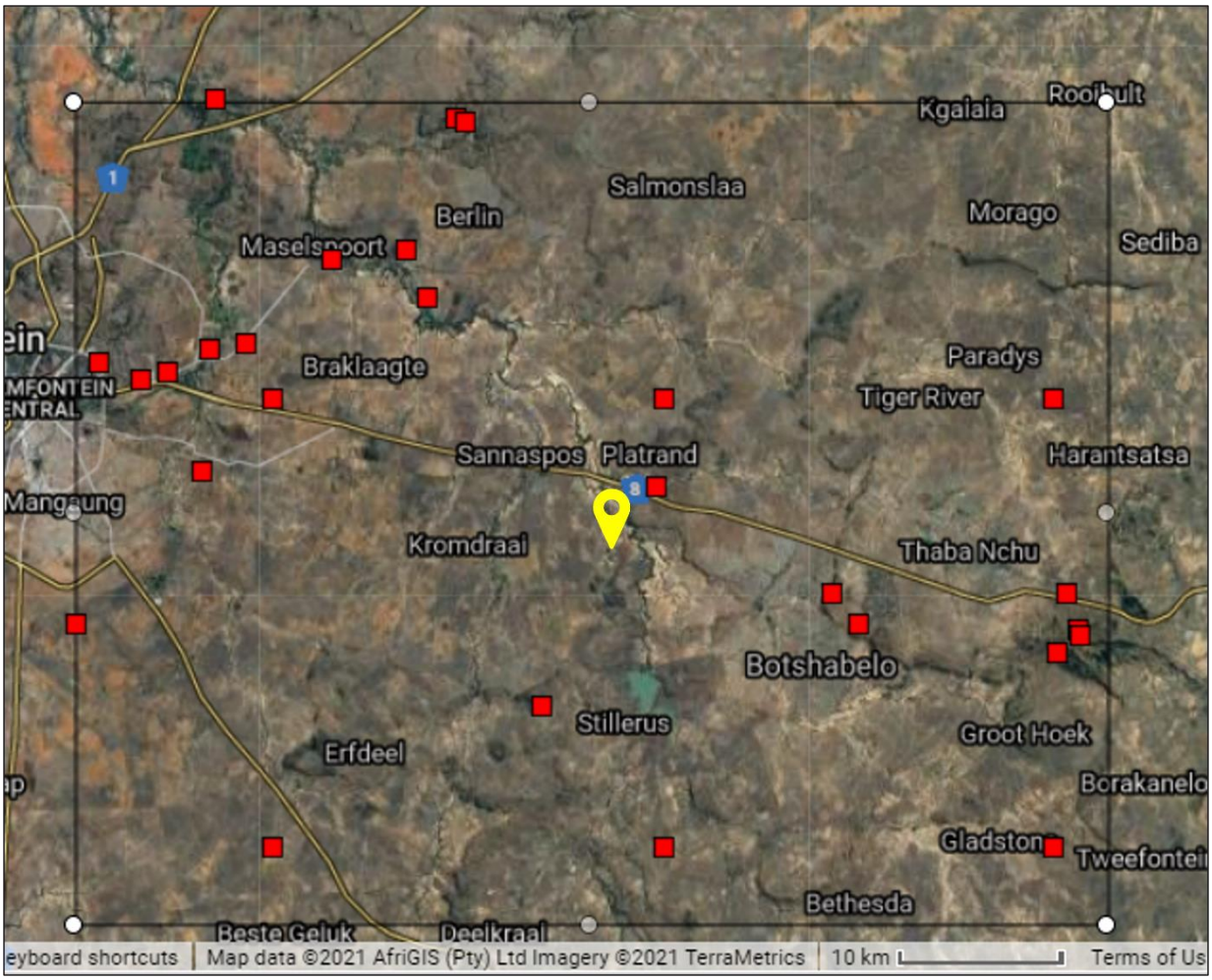


Figure 4-1 ***Map illustrating extent of area used to obtain the expected flora species list from the Plants of South Africa (POSA) database. Yellow icon indicates approximate location of the project area. The red squares are cluster markers of botanical records as per POSA data.***

4.2.3 Desktop Faunal Assessment

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

- Amphibian list, generated from the IUCN spatial dataset (2017) and AmphibianMap database (Fitzpatrick Institute of African Ornithology, 2021a), using the 2926 quarter degree square;
- Reptile list, generated from the IUCN spatial dataset (2017) and ReptileMap database (Fitzpatrick Institute of African Ornithology, 2021b), using the 2926 quarter degree square;
- Avifauna list, generated for the SABAP2 dataset by looking at pentads 2905_2635; 2910_2635; 2915_2635; and
- Mammal list from the IUCN spatial dataset (2017).

4.2.4 Desktop Wetland Assessment

The following spatial datasets were utilised:

- Aerial imagery (Google Earth Pro);
- Land Type Data (Land Type Survey Staff, 1972 - 2006);
- South African Inventory of Inland Aquatic Ecosystems (Van Deventer *et al*., 2019);

- The National Freshwater Ecosystem Priority Areas (Nel *et al*., 2011);
- Contour data (5m);
- NASA Shuttle Radar Topography Mission Global 1 arc second digital elevation data; and
- South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer *et al*., 2018).

4.3 Biodiversity Field Assessment

A single field survey was undertaken in November 2021, which is a wet-season survey, 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.

4.3.1 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 project area.

4.3.2 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
- Utilization of local knowledge.

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);
- Smithers' Mammals of Southern Africa (Apps, 2000);

- A Field Guide to the Tracks and Signs of Southern and East African Wildlife (Stuart and Stuart, 2000);
- Book of birds of South Africa, Lesotho and Swaziland (Taylor *et al.,* 2015); and
- Roberts – Birds of Southern Africa (Hockey *et al.,* 2005).

4.4 Terrestrial Site Ecological Importance

The different habitat types within the project area were delineated and identified based on observations during the field assessment, and available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern 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 4-1 and Table 4-2, respectively.

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

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

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

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

Medium	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts, with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.
Low	Small (> 1 ha but < 5 ha) area. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.
Very Low	Very small (< 1 ha) area. No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current negative ecological impacts.

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

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

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

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

Table 4-4 Summary of 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 4-5.

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

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

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

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

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

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

4.5 Wetland Assessment

4.5.1 Wetland Identification and Mapping

The wetland areas were delineated in accordance with the DWAF (2005) guidelines, a cross section is presented in Figure 4-2. The outer edges of the wetland areas were identified by considering the following four specific indicators:

- The Terrain Unit Indicator helps to identify those parts of the landscape where wetlands are more likely to occur;
- The Soil Form Indicator identifies the soil forms, as defined by the Soil Classification Working Group (1991), which are associated with prolonged and frequent saturation.
    - The soil forms (types of soil) found in the landscape were identified using the South African soil classification system namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification Working Group, 1991);
- The Soil Wetness Indicator identifies the morphological "signatures" developed in the soil profile as a result of prolonged and frequent saturation; and
- The Vegetation Indicator identifies hydrophilic vegetation associated with frequently saturated soils.

Vegetation is used as the primary wetland indicator. However, in practise the soil wetness indicator tends to be the most important, and the other three indicators are used in a confirmatory role.

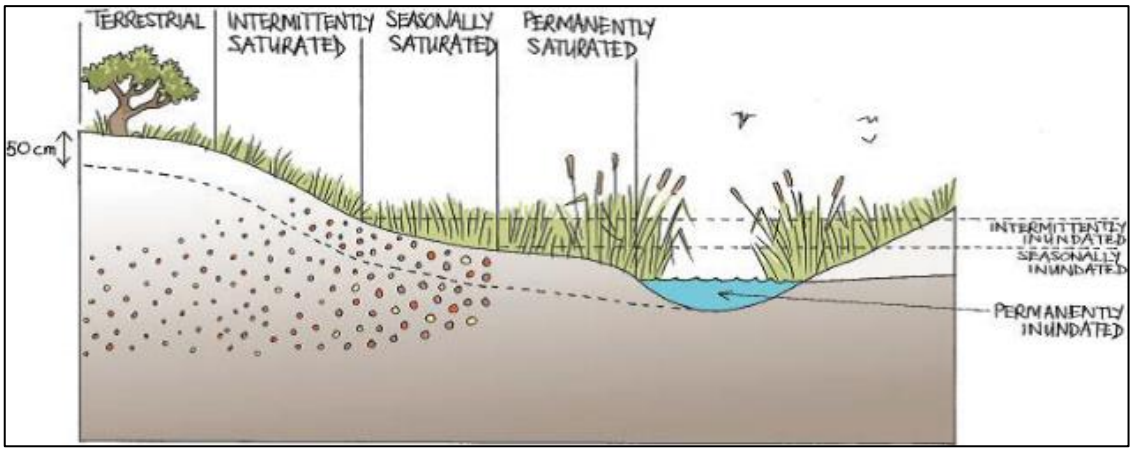


Figure 4-2 Cross section through a wetland, indicating how the soil wetness and vegetation indicators change (Ollis et al. 2013)

4.5.2 Delineation

The wetland indicators described above are used to determine the boundaries of the wetlands within the project area. These delineations are then illustrated by means of maps accompanied by descriptions.

4.5.3 Functional Assessment

Wetland Functionality refers to the ability of wetlands to provide healthy conditions for the wide variety of organisms found in wetlands as well as humans. Eco Services serve as the main factor contributing to wetland functionality.

The assessment of the ecosystem services supplied by the identified wetlands was conducted per the guidelines as described in WET-EcoServices (Kotze *et al*. 2008). An assessment was undertaken that examines and rates the following services according to their degree of importance and the degree to which the services are provided (Table 4-7).

Table 4-7 Classes for determining the likely extent to which a benefit is being supplied

Score	Rating of likely extent to which a benefit is being supplied
< 0.5	Low
0.6 - 1.2	Moderately Low
1.3 - 2.0	Intermediate
2.1 - 3.0	Moderately High
> 3.0	High

4.5.4 Present Ecological Status

The overall approach is to quantify the impacts of human activity or clearly visible impacts on wetland health, and then to convert the impact scores to a Present Ecological Status (PES) score. This takes the form of assessing the spatial extent of impact of individual activities/occurrences and then separately assessing the intensity of impact of each activity in the affected area. The extent and intensity are then combined to determine an overall magnitude of impact. The Present State categories are provided in Table 4-8.

Table 4-8 The Present Ecological Status categories (Macfarlane, et al., 2008)

Impact Category	Description	Impact Score Range	PES

None	Unmodified, natural	0 to 0.9	A
Small	Largely Natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1.0 to 1.9	B
Moderate	Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.	2.0 to 3.9	C
Large	Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.	4.0 to 5.9	D
Serious	Seriously Modified. The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable.	6.0 to 7.9	E
Critical	Critical Modification. The modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8.0 to 10	F

4.5.5 Importance and Sensitivity

The importance and sensitivity of water resources is determined in order establish resources that provide higher than average ecosystem services, biodiversity support functions or are particularly sensitive to impacts. The mean of the determinants is used to assign the Importance and Sensitivity (IS) category as listed in Table 4-9.

Table 4-9 Description of Importance and Sensitivity categories

IS Category	Range of Mean	Recommended Ecological Management Class
Very High	3.1 to 4.0	**A**
High	2.1 to 3.0	**B**
Moderate	1.1 to 2.0	**C**
Low Marginal	< 1.0	**D**

4.5.6 Ecological Classification and Description

The National Wetland Classification Systems (NWCS) developed by the South African National Biodiversity Institute (SANBI) will be considered for this study. This system comprises a hierarchical classification process of defining a wetland based on the principles of the hydrogeomorphic (HGM) approach at higher levels, and then also includes structural features at the lower levels of classification (Ollis *et al.,* 2013).

4.5.7 Buffer Requirements

The “Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries” (Macfarlane *et al.,* 2014) was used to determine the appropriate buffer zone for the proposed activity

4.5.8 Risk Assessment

The risk assessment was conducted in accordance with the DHSWS risk-based water use authorisation approach and delegation guidelines. The significance of the impact is calculated according to Table 4-10.

Table 4-10 Significance ratings matrix

Rating	Class	Management Description
1 – 55	(L) Low Risk	Acceptable as is or consider requirement for mitigation. Impact to watercourses and resource quality small and easily mitigated. Wetlands may be excluded.
56 – 169	M) Moderate Risk	Risk and impact on watercourses are notably and require mitigation measures on a higher level, which costs more and require specialist input. Wetlands are excluded.
170 – 300	(H) High Risk	Always involves wetlands. Watercourse(s)impacts by the activity are such that they impose a long-term threat on a large scale and lowering of the Reserve.

4.6 Assumptions and Limitations

The following assumptions and limitations are applicable for this assessment:

- The assessment area was based on the initial area provided by the client
    - Alterations to the to the assessment area while in the field has affected the area surveyed in the larger additional areas not being covered during the field assessment, with negligible affect to confidence of the assessment (high).
- No avifauna components are included in this report, with the exception of species presence for the sensitivity classification for habitats;
- The area was only surveyed during a single site visit and therefore, this assessment does not consider temporal trends, with negligible affect to confidence of the assessment (high);
- 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;
- It is assumed that there will be no landscape enhancements to improve the efficacy of the bifacial panels;
- The direct project area was extensively ground truthed with only wetlands at an appreciable level of risk further assessed. The remainder of the 500 m regulated area has been delineated by means of desktop delineations; and
- The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by 5 m.

5 Results & Discussion

5.1 Desktop Assessment

5.1.1 Ecologically Important Landscape Features

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features are summarised in Table 5-1.

Table 5-1 Summary of relevance of the proposed project to ecologically important landscape features.

Desktop Information Considered	Relevant/Irrelevant	Section
Ecosystem Threat Status	Relevant – Overlaps with a Least Concern ecosystem	6.1.1.1
Ecosystem Protection Level	Relevant – Overlaps with a Poorly Protected Ecosystem	6.1.1.2
Protected Areas	Irrelevant – 6.2 km from the closest Protected Area (Rustfontein Nature Reserve)	-
Renewable Energy Development Zones	Irrelevant - The project area falls 66 km from the closest REDZ	-
National Protected Areas Expansion Strategy	Relevant – The project area overlaps with a NPAES	6.1.1.4
Important Bird and Biodiversity Areas	Irrelevant – Located 60 km from the Soetdoring Nature Reserve IBA	-
South African Inventory of Inland Aquatic Ecosystems	Relevant - The project area overlaps with a CR river.	6.1.1.6
National Freshwater Priority Area	Relevant – The project area overlaps with non FEPA wetlands and a non FEPA river.	6.1.1.7
Strategic Water Source Areas	Irrelevant- The project area is 86 km from the closest SWSA	-

South African Renewable Energy EIA Application (REEA)	Relevant – Overlaps with an application that has a status of "Amendment"	6.1.1.8

5.1.1.1 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 project overlaps with a LC ecosystem (Figure 5-1).

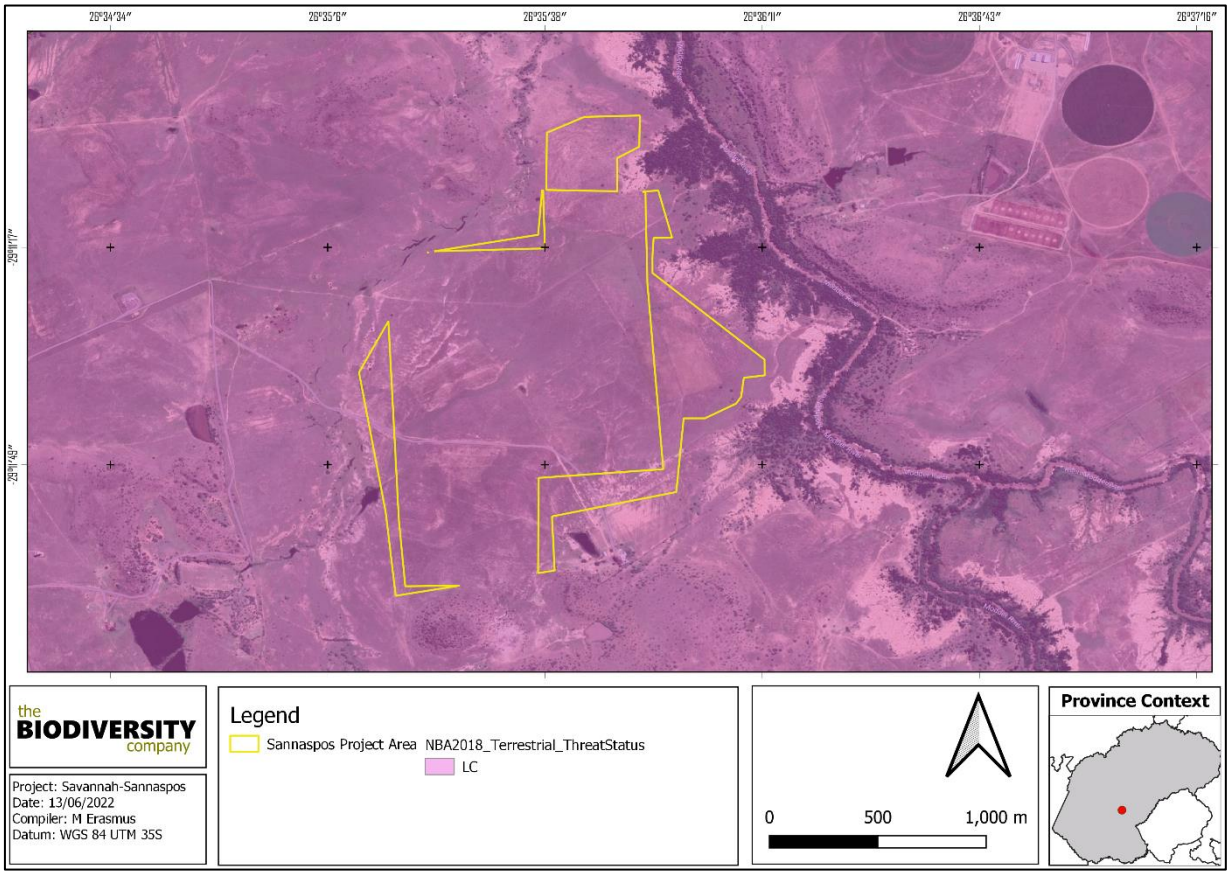


Figure 5-1 Map illustrating the ecosystem threat status associated with the project area.

5.1.1.2 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 proposed project overlaps with a PP ecosystem (Figure 5-2).

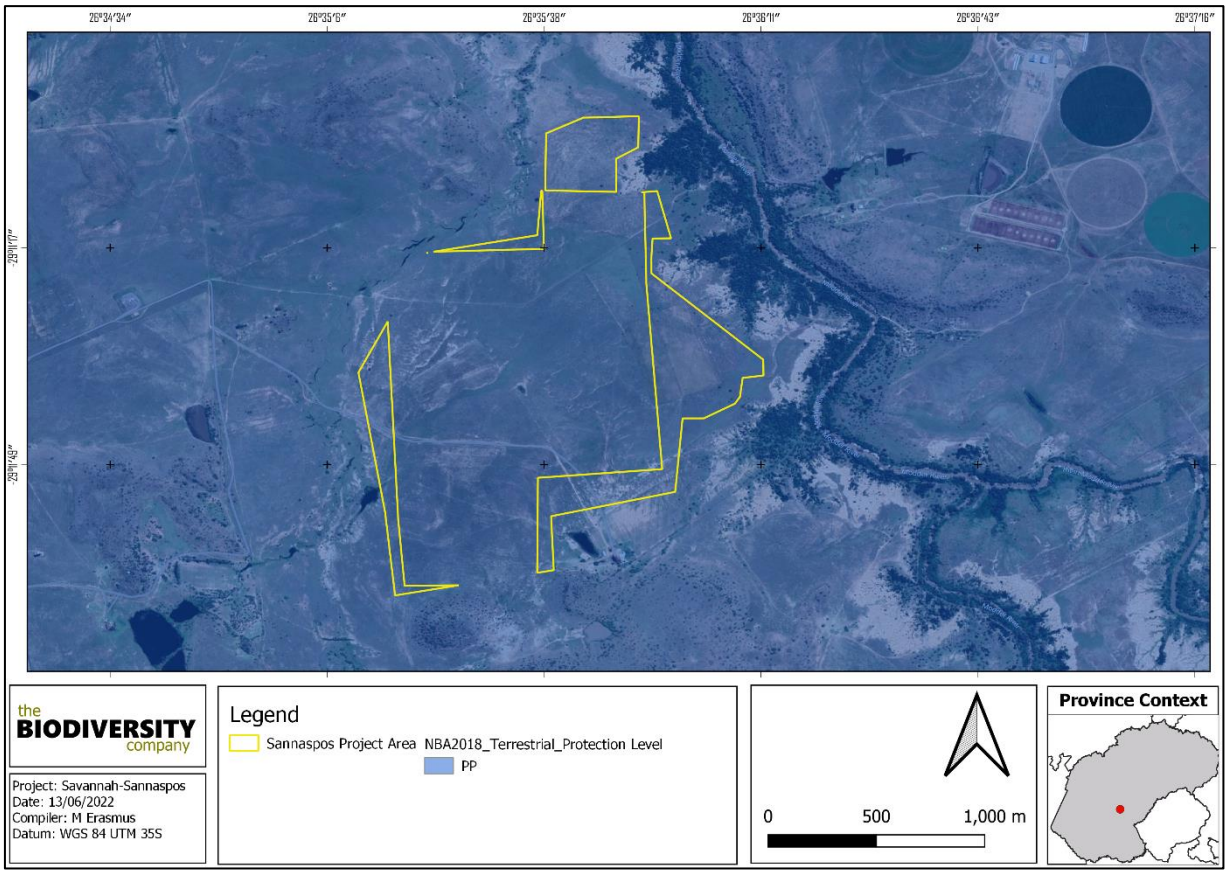


Figure 5-2 Map illustrating the ecosystem protection level associated with the project area

5.1.1.3 Critical Biodiversity Areas and Ecological Support Areas

It is important to note that the Critical Biodiversity Areas (CBA) map accounts for terrestrial fauna and flora only. The inclusion of the aquatic component was limited to the Freshwater Ecosystem Priority Areas (FEPA) catchments (included in the cost layer and for the identification of Ecological Support Areas (ESAs)) and wetland clusters (included in the ESAs only).

A CBA is considered a significant and ecologically sensitive area and needs to be kept in a pristine or near-natural state to ensure the continued functioning of ecosystems (SANBI, 2017). A CBA represents the best choice for achieving biodiversity targets. ESAs are not essential for achieving targets, but they play a vital role in the continued functioning of ecosystems and often are essential for proper functioning of adjacent CBAs.

Figure 5-3 shows the project area superimposed on the Terrestrial CBA map. The project area overlaps with an ESA1 and an ESA2 area.

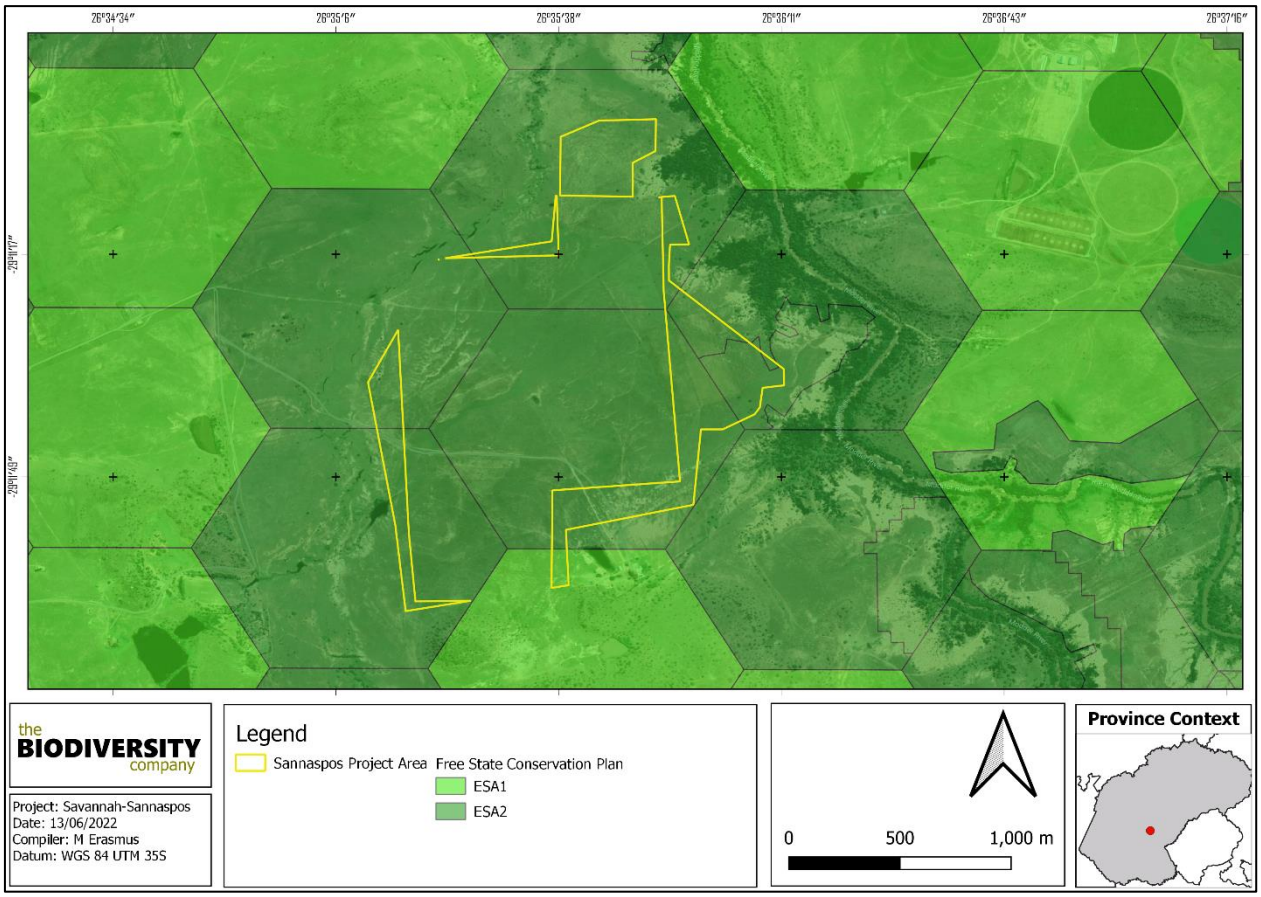


Figure 5-3 Map illustrating the locations of CBAs in the project area

5.1.1.4 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2010 (NPAES) were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for finescale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2010). The project area overlaps with a NPAES area as can be seen in Figure 5-4.

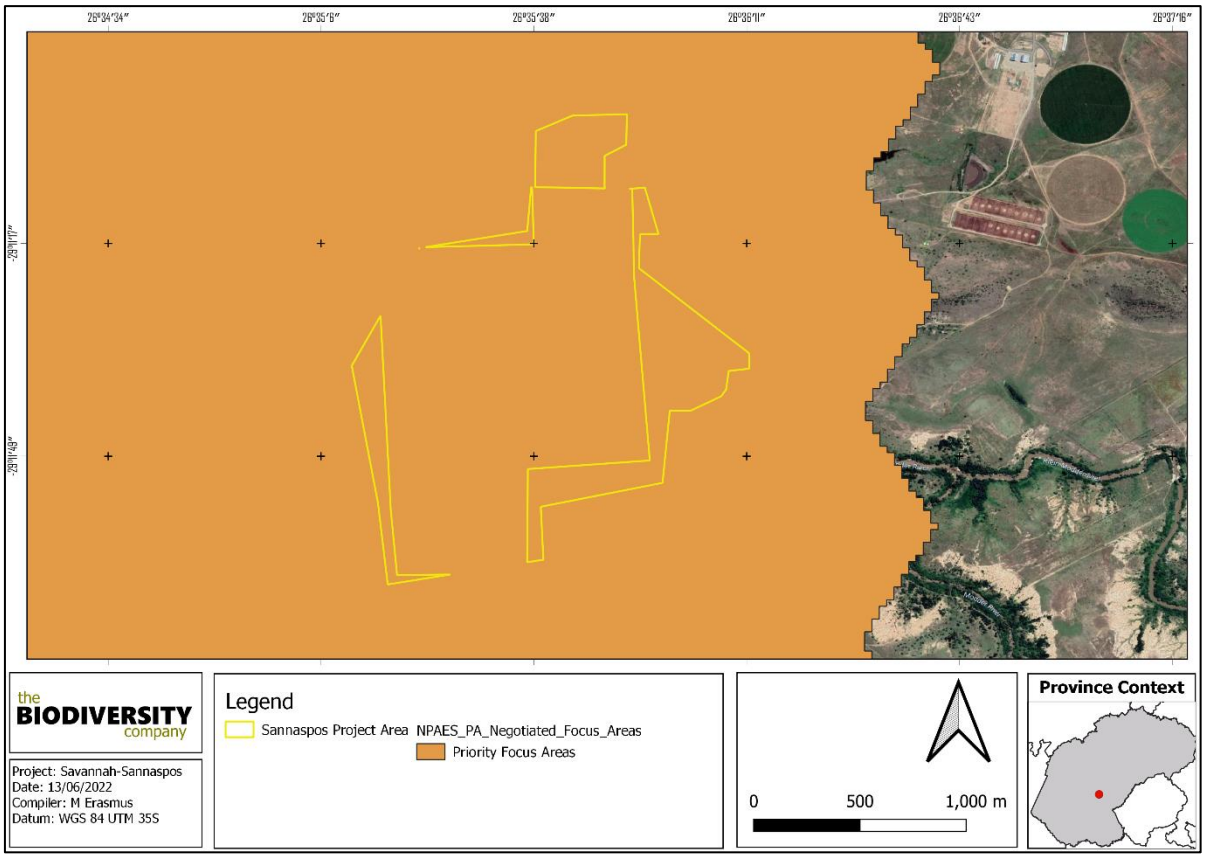


Figure 5-4 The project area in relation to the National Protected Area Expansion Strategy

5.1.1.5 Hydrological Setting

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.,* 2019; Skowno *et al.,* 2019). The project area does not overlap with a CR river, however it occurs within the 500 m regulated area of the Modder River (Figure 5-5).

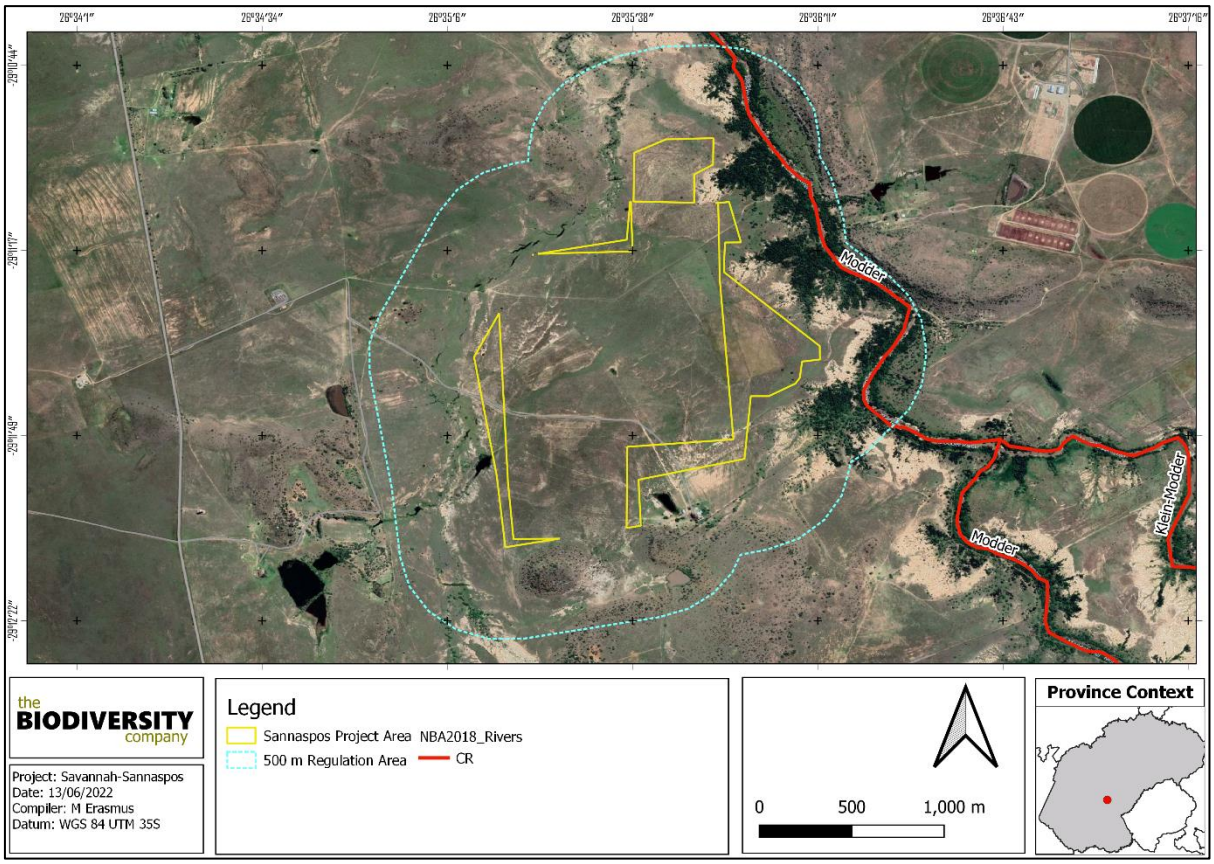


Figure 5-5 Map illustrating ecosystem threat status of rivers and protection level of wetland ecosystems in the project area

5.1.1.6 National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.,* 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al.,* 2011). Figure 5-6 shows the 500 m regulated area overlaps with non-FEPA wetlands and a non-FEPA river.

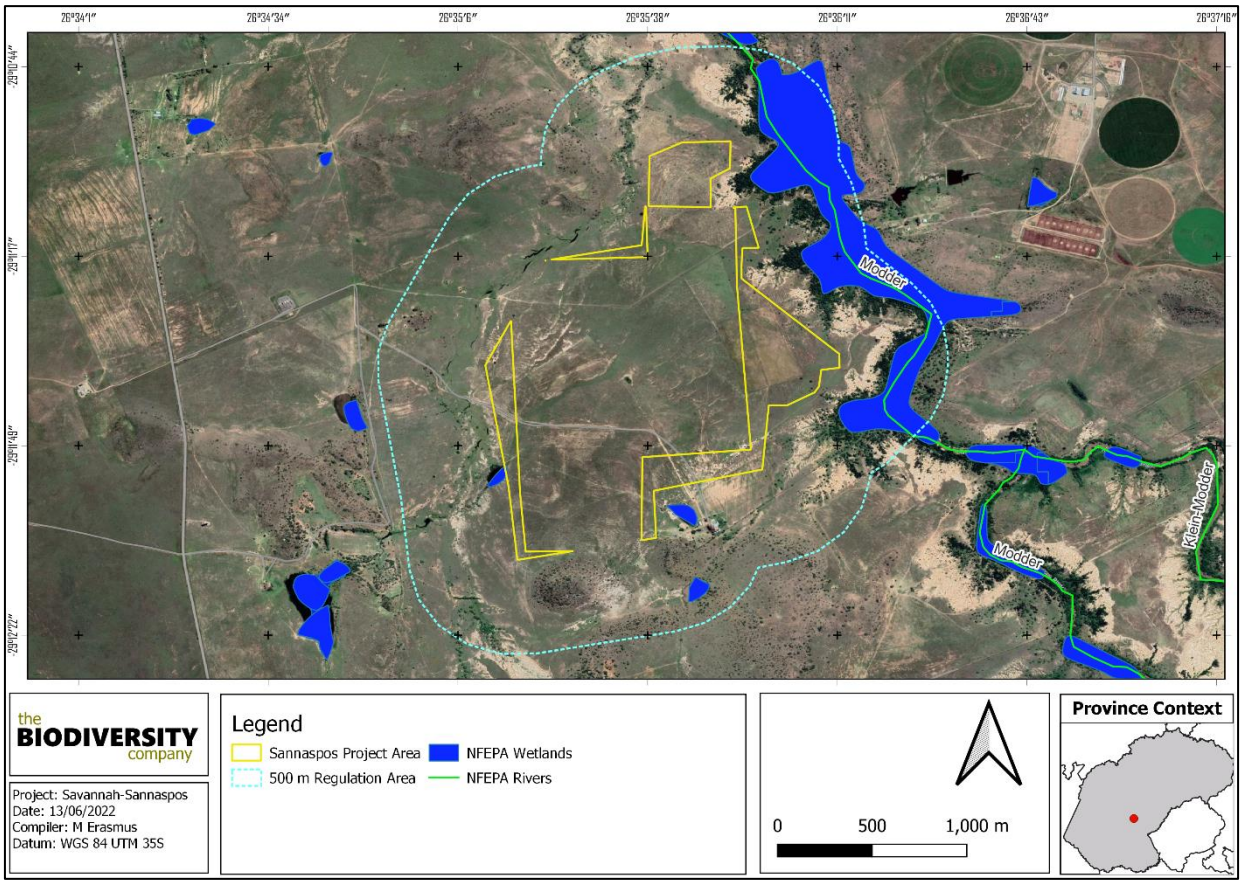


Figure 5-6 The project area in relation to the National Freshwater Ecosystem Priority Areas, River lines and Inland water areas

5.1.1.7 Inland Water Features

A review of river lines and water bodies for quarter degree squared (QDS) 2926 indicated the presence of a number of drainage lines, a river line and inland water areas (dams) within the project area and 500m regulatory area (Figure 5-7).

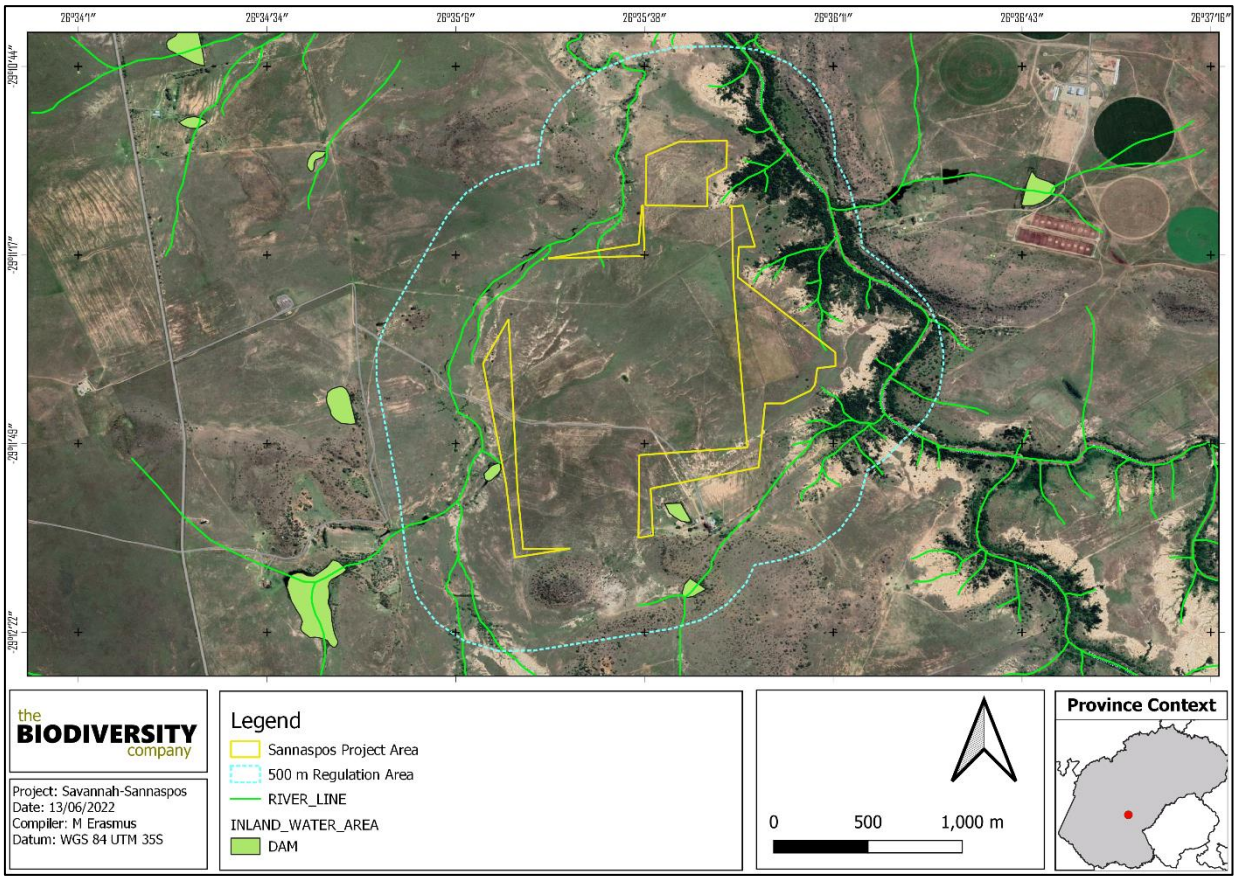


Figure 5-7 The inland water features associated with the project area

5.1.1.8 South African Renewable Energy EIA Application (REEA)

The South African Renewable Energy EIA Application Database (REEA) contains spatial data for renewable energy applications for environmental authorisation. It includes spatial and attribute information for both active (in process and with valid authorisations) and non-active (lapsed or replaced by amendments) applications. Data is captured and managed on a parcels level as well as aggregated to the project level. Only outer boundaries are provided in this release. The purpose of the spatial data is to produce and maintain a comprehensive spatial database on renewable energy EIA applications in the country. The database is suitable for a wide range of planning, assessment, analysis and display purposes. The project area is located adjacent to an authorised PV facility.

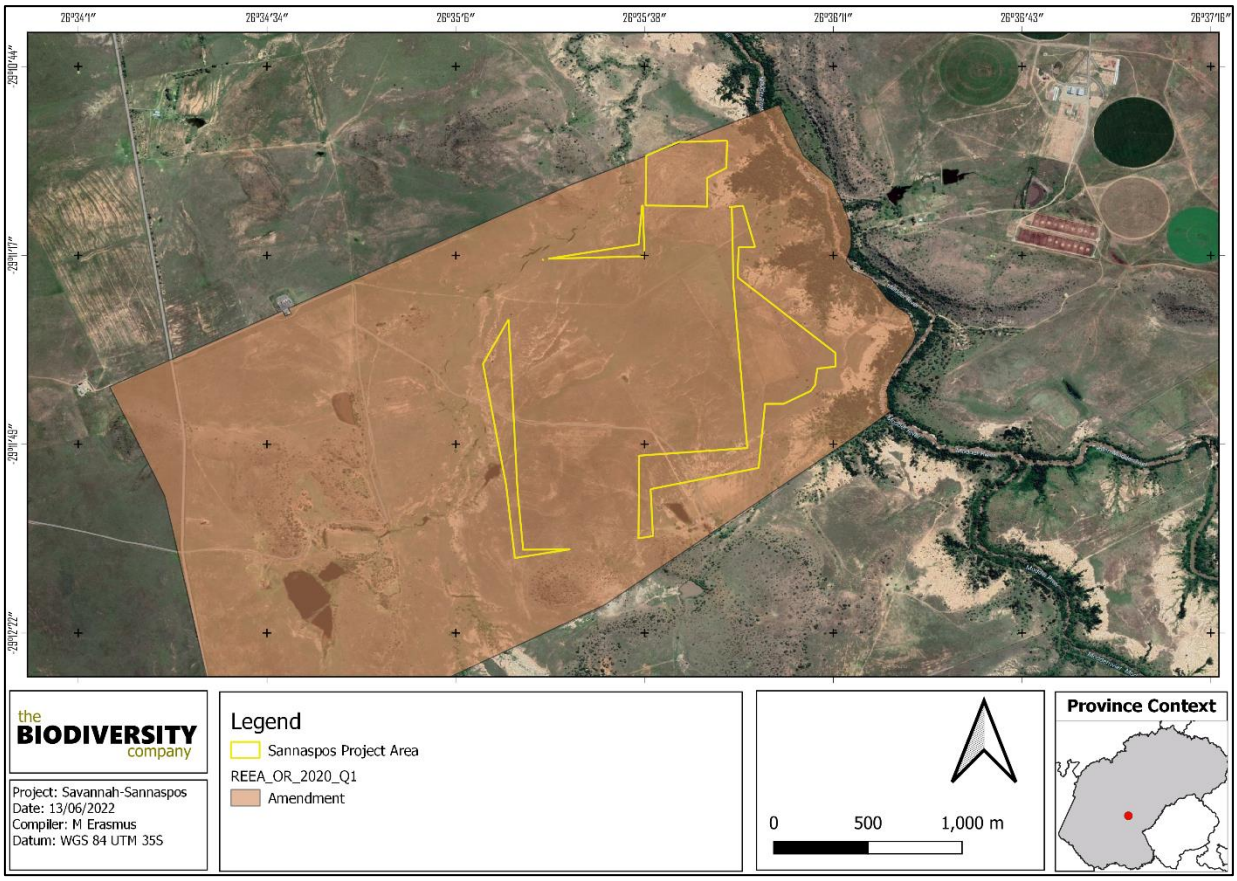


Figure 5-8 Map illustrating the project area in relation to the REEA.

5.1.2 Flora Assessment

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

5.1.2.1 Vegetation Type

The project area is situated within the Grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the grassland biome include:

a) Seasonal precipitation; and

b) The minimum temperatures in winter (Mucina & Rutherford, 2006).

The grassland biome is found chiefly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level.

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

On a fine-scale vegetation type, the project area overlaps with the Central Free State Grassland (Figure 5-9).

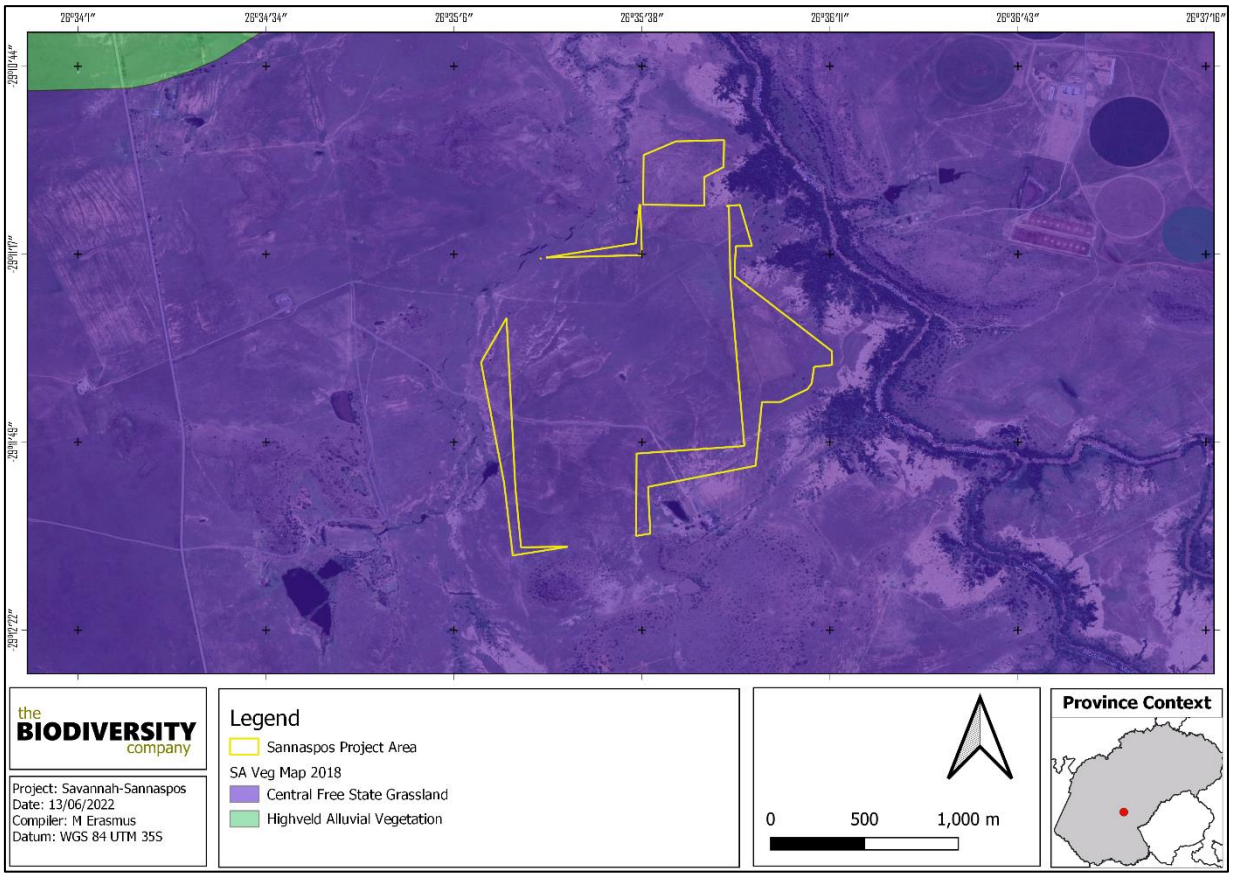


Figure 5-9 Map illustrating the vegetation type associated with the project area

5.1.2.1.1 Central Free State Grassland

Central Free State Grassland is undulating plains supporting short grassland, in natural condition dominated by *Themeda triandra* while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats.

Important taxa:

Important plant taxa are those species that have a high abundance, a frequent occurrence or are prominent in the landscape within a particular vegetation type (Mucina & Rutherford, 2006).

The following species are important in the **Central Free State Grassland** vegetation type (d= dominant species):

Graminoids: *Aristida adscensionis* (d), *A. congesta* (d), *Cynodon dactylon* (d), *Eragrostis chloromelas* (d), *E. curvula* (d), *E. plana* (d), *Panicum coloratum* (d), *Setaria sphacelata* (d), *Themeda triandra* (d), *Tragus koelerioides* (d), *Agrostis lachnantha*, *Andropogon appendiculatus*, *Aristida bipartita*, *A. canescens*, *Cymbopogon pospischilii*, *Cynodon transvaalensis*, *Digitaria argyrograpta*, *Elionurus muticus*, *Eragrostis lehmanniana*, *E. micrantha*, *E. obtusa*, *E. racemosa*, *E. trichophora*, *Heteropogon contortus*, *Microchloa caffra*, *Setaria incrassata*, *Sporobolus discosporus*.

Herbs: *Berkheya onopordifolia* var. *onopordifolia*, *Chamaesyce inaequilatera*, *Conyza pinnata*, *Crabbea acaulis*, *Geigeria aspera* var. *aspera*, *Hermannia depressa*, *Hibiscus pusillus*, *Pseudognaphalium luteo-album*, *Salvia stenophylla*, *Selago densiflora*, *Sonchus dregeanus*.

Geophytic Herbs: *Oxalis depressa*, *Raphionacme dyeri*.

Succulent Herb: *Tripteris aghillana* var. *integrifolia*.

Low Shrubs: *Felicia muricata* (d), *Anthospermum rigidum* subsp. *pumilum*, *Helichrysum dregeanum*, *Melolobium candicans*, *Pentzia globosa*.

Conservation Status of the Vegetation Type

The national conservation target is 24%. Only small portions enjoy statutory conservation (Willem Pretorius, Rustfontein and Koppies Dam Nature Reserves) as well as some protection in private nature reserves. The conservation status of this vegetation community was listed by Mucina and Rutherford (2006) as Vulnerable.

5.1.2.2 Expected Flora Species

The POSA database indicates that 408 species of indigenous plants are expected to occur within the project area. Appendix A provides the list of species and their respective conservation status and endemism. None of the species expected are species of conservation concern (SCC).

5.1.3 Faunal Assessment

5.1.3.1 Amphibians

Based on the IUCN Red List Spatial Data and AmphibianMap, 17 amphibian species are expected to occur within the area (Appendix B). None of the species are SCCs. One of the species are SCCs (Table 5-2).

Table 5-2 Threatened amphibian species that are expected to occur within the project area

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

The Giant Bull Frog (*Pyxicephalus adspersus*) is a species of conservation concern that may potentially occur in the project area. The Giant Bull Frog is listed as NT on a regional scale. It is a species of drier savannahs. It is fossorial for most of the year, remaining buried in cocoons. They emerge at the start of the rains, and breed in shallow, temporary waters in pools, pans and ditches (IUCN, 2017). This species may occur in this area, rated as moderate likelihood.

5.1.3.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 51 reptile species are expected to occur within the area (Appendix C). One (1) are regarded as threatened (Table 5-3).

Table 5-3 Threatened reptile species that are expected to occur within the project area

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Homoroselaps dorsalis	Striped Harlequin Snake	NT	LC	Low

Homoroselaps dorsalis (Striped Harlequin Snake) is partially fossorial and known to inhabit old termitaria in grassland habitat (IUCN, 2017). Most of its range is at moderately high altitudes, reaching 1,800 m in Mpumalanga and Swaziland, but it is also found at elevations as low as about 100 m in KwaZulu-Natal. The likelihood of occurrence was rated as low.

5.1.3.3 Mammals

The IUCN Red List Spatial Data lists 65 mammal species that could be expected to occur within the area (Appendix D). This list excludes large mammal species that are limited to protected areas. Eleven (11) of these expected species are regarded as threatened (Table 5-4), eight of these have a low likelihood of occurrence based on the lack of suitable habitat and food sources in the project area.

Table 5-4 Threatened mammal species that are expected to occur within the project area.

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Aonyx capensis	Cape Clawless Otter	NT	NT	Moderate
Atelerix frontalis	South Africa Hedgehog	NT	LC	Low
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT	Low
Felis nigripes	Black-footed Cat	VU	VU	Moderate
Hydrictis maculicollis	Spotted-necked Otter	VU	NT	Low
Leptailurus serval	Serval	NT	LC	Moderate
Mystromys albicaudatus	White-tailed Rat	VU	EN	Low
Panthera pardus	Leopard	VU	VU	Low
Parahyaena brunnea	Brown Hyaena	NT	NT	Low
Poecilogale albinucha	African Striped Weasel	NT	LC	Low
Redunca fulvorufula	Mountain Reedbuck	EN	LC	Low

Aonyx capensis (Cape Clawless Otter) is the most widely distributed otter species in Africa (IUCN, 2017). This species is predominantly aquatic, and it is seldom found far from water. Based on the presence of the Modder Rivier on the edge of the project area which provides suitable habitat the species were given a moderate likelihood of occurrence.

Felis nigripes (Black-footed cat) is endemic to the arid regions of southern Africa. This species is naturally rare, has cryptic colouring is small in size and is nocturnal. These factors have contributed to a lack of information on this species. Given that the highest densities of this species have been recorded in the more arid Karoo region of South Africa, the habitat in the project area can be considered to be sub-optimal for the species and the likelihood of occurrence is rated as moderate.

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

5.1.3.4 Avifauna

. The map below is a snippet from the report indicating the sensitive areas identified (Figure 5-10). A likely limitation regarding the 2014 assessment was that the faunal component was conducted purely from a desktop basis.

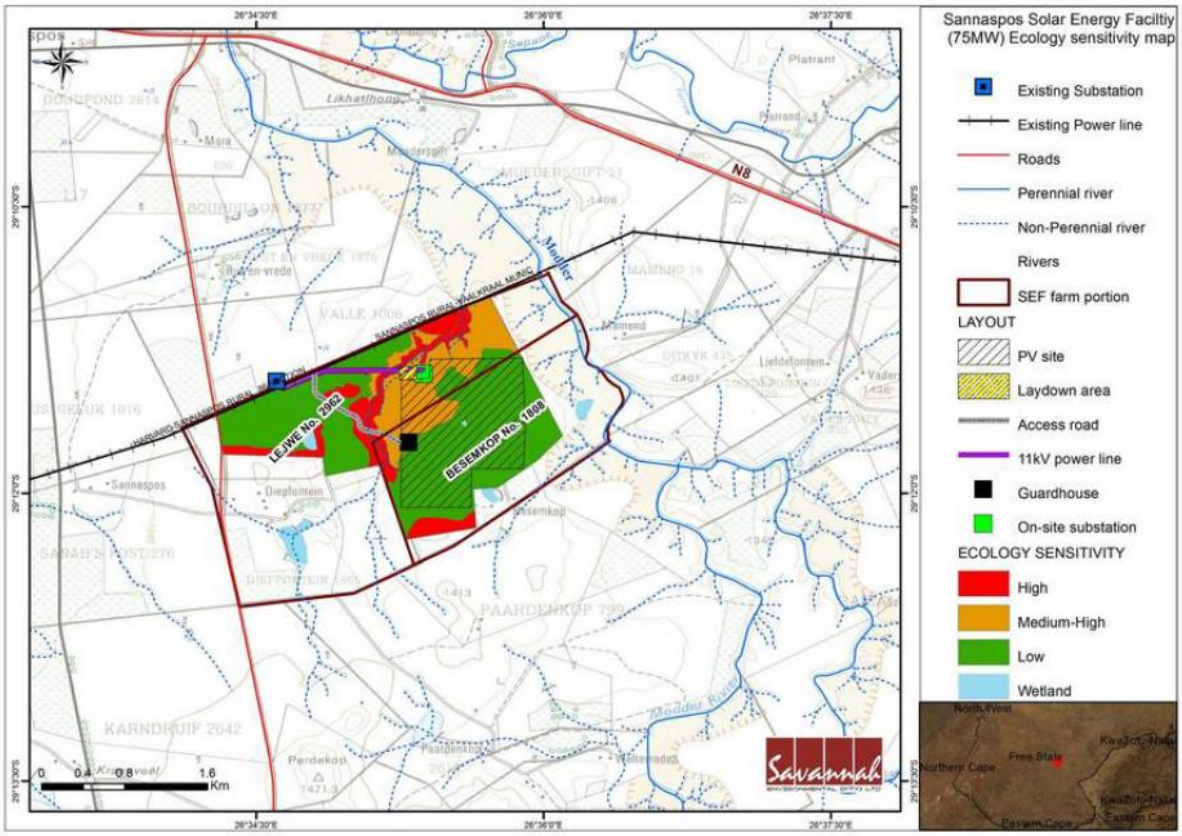


Figure 5-10 Map illustrating the vegetation type associated with the project area

5.2 Field Assessment

The following sections provide the results from the field survey for the proposed development that was undertaken on the 5th of November 2021.

5.2.1 Flora Assessment

This section is divided into two sections:

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

5.2.1.1 Indigenous Flora

The vegetation assessment was conducted throughout the extent of the project area covered. A total of 44 tree, shrub, herbaceous and graminoid plant species were recorded in the project area during the field assessment (Table 5-5). Plants listed as Category 1 alien or invasive species under the NEMBA appear in green text. Plants listed in Category 2 or as ‘not indigenous’ or ‘naturalised’ according to NEMBA, appear in blue text. Some of the plant species recorded can be seen in Figure 5-11.The list of plant species recorded to 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 however regarded as a sound representation of the local flora for the project area.

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

Family	*Scientific Name*	Common Name	Threat Status (SANBI, 2017)	SA Endemic	Alien Category
Amaryllidaceae	*Ammocharis coranica*	Karoo lily	LC-Sched 6 Protected	Not Endemic	
Amaryllidaceae	*Boophone disticha*	Poison Bulb	LC-Sched 6 Protected	Not Endemic	
Anacardiaceae	*Searsia lancea*	Karee	LC	Not Endemic	
Anacardiaceae	*Searsia burchellii*	Karoo Kuni-bush	LC	Not Endemic	
Anacardiaceae	*Searsia pyroides*	Common Wild Currant	LC	Not Endemic	
Apocynaceae	*Gomphocarpus fruticosus*	Narrow-leaved cotton bush	LC	Not Endemic	
Asparagaceae	*Asparagus laricinus*	Langbeenkatdoring	LC	Not Endemic	
Asteraceae	*Pentzia globosa*	Goedkaro	LC	Not Endemic	
Asteraceae	*Pentzia incana*	Skaapkaroo	LC	Not Endemic	
Asteraceae	Berkheya onopordifolia var. onopordifolia	Mohato	LC	Not Endemic	
Asteraceae	Berkheya pinnatifida subsp. pinnatifida	Isihlungu	LC	Not Endemic	
Asteraceae	*Geigeria filifolia*	Vermeerbos	LC	Not Endemic	
Asteraceae	*Nidorella anomala*	Mokoteli	LC	Not Endemic	
Asteraceae	*Flaveria bidentis*	Smelter's Bush			NEMBA Category 1b
Asteraceae	*Tagetes minuta*	Khaki Bush			Not indigenous; Naturalised
Asteraceae	*Felicia muricata subsp. muricata*	Taai-Astertjie	LC	Not Endemic	
Asteraceae	*Bidens pilosa*	Blackjack			Not indigenous; Naturalised
Cactaceae	*Opuntia humifusa*	Eastern Prickly Pear			NEMBA Category 1b
Campanulaceae	Wahlenbergia undulata	African Bluebell	LC	Not Endemic	
Cannabaceae	*Celtis africana*	Witstinkhoud	LC	Not Endemic	
Cyperaceae	*Schoenoplectus corymbosus*	Plume sedge			
Ebenaceae	*Diospyros lycioides*	Bluebush Star-apple	LC	Not Endemic	
Fabaceae	*Vachellia karroo*	Sweet Thorn	LC	Not Endemic	
Fabaceae	*Gleditsia triacanthos*	Honey Locust			NEMBA Category 1b

Hypoxidaceae	*Hypoxis argentea var. argentea*	Small Silver Star-flower	LC	Not Endemic	
Iridaceae	*Moraea pallida*	Geeltulp	LC	Not Endemic	
Malvaceae	*Hermannia depressa*	Rooiopslag	LC	Not Endemic	
Oleaceae	*Olea europaea subsp. africana*	Wild Olive	LC-Sched 6 Protected	Not Endemic	
Poaceae	*Aristida bipartata*	Rolling Three-awned Grass	LC	Not Endemic	
Poaceae	*Aristida congesta subsp. barbicollis*	Spreading Three-awn	LC	Not Endemic	
Poaceae	*Aristida congesta subsp. congesta*	Tassel Three-awned Grass	LC	Not Endemic	
Poaceae	*Cymbopogon caesius*	Broad-Leaved Turpentine Grass	LC	Not Endemic	
Poaceae	*Cynodon dactylon*	Couch Grass	LC	Not Endemic	
Poaceae	*Eragrostis chloromelas*	Blue Lovegrass	LC	Not Endemic	
Poaceae	*Eragrostis curvula*	Weeping Love Grass	LC	Not Endemic	
Poaceae	*Eragrostis gummiflua*	Gum grass	LC	Not Endemic	
Poaceae	*Heteropogon contortus*	Speargrass	LC	Not Endemic	
Poaceae	*Panicum coloratum*	Bamboeskweek	LC	Not Endemic	
Poaceae	*Themeda triandra*	Red Grass	LC	Not Endemic	
Polygalaceae	*Polygala hottentotta*	Small Purple Broom	LC	Not Endemic	
Scrophulariaceae	*Jamesbrittenia aurantiaca*	Cape Saffron	LC	Not Endemic	
SCROPHULARIACEAE	*Aptosimum procumbens*	Karoo Carpet Flower	LC	Not Endemic	
Solanaceae	*Lycium horridum*		LC	Not Endemic	
Solanaceae	*Solanum campylacanthum*	Bitter Apple	LC	Not Endemic	

Figure 5-11 ***Photographs illustrating some of the flora recorded within the assessment area. A) Boophone disticha (Protected, B) Ammocharis coranica (Protected) C) Hypoxis argentea var. argentea and D) Moraea pallida.***

5.2.1.2 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. 44182, 24th of February 2021. 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.

Three (3) IAP species were recorded within the project area. These species are listed under the Alien and Invasive Species List 2020, Government Gazette No. GN1003 as Category 1b. Category 1b species must be controlled by implementing an IAP Management Programme, in compliance of section 75 of the NEMBA, as stated above.

5.2.1.3 Protected plant species

Several individuals of three protected plant species that are protected by the Free State Nature Conservation Ordinance 8 of 1969 were observed in various parts of the project area, in close relation to wetlands/drainage areas. According to the list of protected species under Schedule, if any individuals of these plant species are to be disturbed, permits must be obtained from the Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs (FSDESTEA).

5.2.2 Faunal Assessment

Herpetofauna and mammal observations and recordings fall under this section.

5.2.2.1 Amphibians and Reptiles

No reptile or amphibian species were recorded in the project area during the survey. However, there is the possibility of more species being present, as certain reptile species are secretive and require long-term surveys to ensure capture. No amphibian species were recorded during the survey period, surveys relied on opportunistic sightings as opposed to intensive and appropriate sampling methods

5.2.2.2 Mammals

Seven (7) mammal species were observed during the survey of the project area (Table 5-6) based on either direct observation or the presence of visual tracks and signs (Figure 5-12). None of the species recorded are regarded as a SCC, 1 mammal species are protected provincially.

Table 5-6 Summary of mammal species recorded within the project area

Species	Common Name	Conservation Status		Free State Nature Conservation Ordinance 8 of 1969
		Regional (SANBI, 2016)	IUCN (2021)	
Cryptomys hottentotus	Common Mole-rat	LC	LC	
Cynictis penicillata	Yellow Mongoose	LC	LC	
Hystrix africaeaustralis	Cape Porcupine	LC	LC	
Lepus saxatilis	Scrub Hare	LC	LC	
Orycteropus afer	Aardvark	LC	LC	Schedule 1 Protected
Raphicerus campestris	Steenbok	LC	LC	
Xerus inauris	Cape Ground Squirrel	LC	LC	

Figure 5-12 Photograph illustrating some of the mammal species recorded in the project area. A) Scrub Hare (Lepus saxatilis) and B) Steenbok (Raphicerus campestris).

5.2.2.3 Avifauna

Twenty-nine (29) (22.6 % of expected) species were recorded in the project area during the survey based on either direct observation, vocalisations, or the presence of visual tracks & signs, (Table 5-7) (Figure 5-13). One (1) species rated as threatened, whereas 20 were listed as protected provincially.

Sagittarius serpentarius (Secretarybird) inhibits open landscapes such as grasslands, open plains, and lightly wooded savanna. It is also found in agricultural areas and sub-desert (BirdLife International, 2020). The species breeds typically nesting in a flat-topped Acacia (*Vachellia*) or other thorny tree,

where it constructs a flattened stick structure throughout the year. The species are susceptible to negative impacts from collisions with fence lines and electric cables (Whitecross *et al*. 2019) with 94 power-line fatalities have been recorded in 20 years by the Endangered Wildlife Trust (A. Botha *in litt*. 2020).

Table 5-7 A list of avifaunal species recorded for the project area

Species	Common Name	Conservation Status		Free State Nature Conservation Ordinance 8 of 1969
		Regional (SANBI, 2016)	IUCN (2021)	
Afrotis afraoides	Korhaan, Northern Black	Unlisted	LC	Schedule 1 Protected
Apus apus	Swift, Common	Unlisted	LC	Schedule 1 Protected
Bostrychia hagedash	Ibis, Hadeda	Unlisted	LC	
Bubulcus ibis	Egret, Cattle	Unlisted	LC	Schedule 1 Protected
Burhinus capensis	Thick-knee, Spotted	Unlisted	LC	Schedule 1 Protected
Columba livia	Dove, Rock	Unlisted	LC	
Corvus albus	Crow, Pied	Unlisted	LC	
Cursorius temminckii	Courser, Temminck's	Unlisted	LC	Schedule 1 Protected
Lanius collaris	Fiscal, Common (Southern)	Unlisted	LC	Schedule 1 Protected
Myrmecocichla formicivora	Chat, Anteating	Unlisted	LC	Schedule 1 Protected
Passer domesticus	Sparrow, House	Unlisted	LC	
Sagittarius serpentarius	Secretarybird	EN	EN	Schedule 1 Protected
Saxicola torquatus	Stonechat, African	Unlisted	LC	Schedule 1 Protected
Spilopelia senegalensis	Dove, Laughing	Unlisted	LC	
Streptopelia capicola	Turtle-dove, Cape	Unlisted	LC	
Sturnus vulgaris	Starling, Common	Unlisted	LC	
Vanellus armatus	Lapwing, Blacksmith	Unlisted	LC	Schedule 1 Protected
Vanellus coronatus	Lapwing, Crowned	Unlisted	LC	Schedule 1 Protected
Scopus umbretta	Hamerkop, Hamerkop	Unlisted	LC	Schedule 1 Protected
Cisticola juncidis	Cisticola, Zitting	Unlisted	LC	Schedule 1 Protected
Anas undulata	Duck, Yellow-billed	Unlisted	LC	Schedule 1 Protected
Lamprotornis nitens	Starling, Cape Glossy	Unlisted	LC	Schedule 1 Protected
Charadrius tricollaris	Plover, Three-banded	Unlisted	LC	Schedule 1 Protected
Plocepasser mahali	Sparrow-weaver, White-browed	Unlisted	LC	
Merops apiaster	Bee-eater, European	Unlisted	LC	Schedule 1 Protected
Alopochen aegyptiacus	Goose, Egyptian	Unlisted	LC	Schedule 1 Protected
Trachyphonus vaillantii	Barbet, Crested	Unlisted	LC	Schedule 1 Protected
Haliaeetus vocifer	Fish-eagle, African	Unlisted	LC	Schedule 1 Protected
Anas erythrorhyncha	Teal, Red-billed	Unlisted	LC	Schedule 1 Protected

Figure 5-13 ***Some of the avifaunal species recorded; A) Secretarybird (Sagittarius serpentarius) carcass (powerline collision), and B) Teal, Red-billed (Anas erythrorhyncha)***

5.3 Wetland Assessment

5.3.1 Wetland Classification and Extent

In total four (4) water resources were identified and delineated for the project (Figure 5-15). These comprised both natural and artificial systems, with the artificial systems comprising of impoundments and drainage features. Three (3) natural wetland hydrogeomorphic (HGM) units belonging to three HGM types (unchannelled valley bottom, depression and seepage) were identified within the 500 m regulated area surrounding the broader project area (Figure 5-15). The unchannelled valley bottom (HGM 1) is traversed by a portion of the project area and was determined to be the only system at an appreciable level of risk and was the focus for the functional assessment. No functional assessment was completed for the artificial systems. Photographs of the identified resources are presented in Figure 5-14.

The level 1-4 classification for the HGM unit as per the national wetland classification system (Ollis *et al.,* 2013) is presented in (Table 5-8). A map showing the extent of the wetlands is shown in Figure 5-15.

Table 5-8 Wetland classification as per SANBI guideline (Ollis et al. 2013)

Wetland System	Level 1	Level 2		Level 3	Level 4		
	System	DWS Ecoregion/s	NFEPA Wet Veg Group/s	Landscape Unit	4A (HGM)	4B	4C
HGM 1	Inland	Highveld	Dry Highveld Grassland Group 4	Valley Floor	Unchannelled valley bottom	N/A	N/A

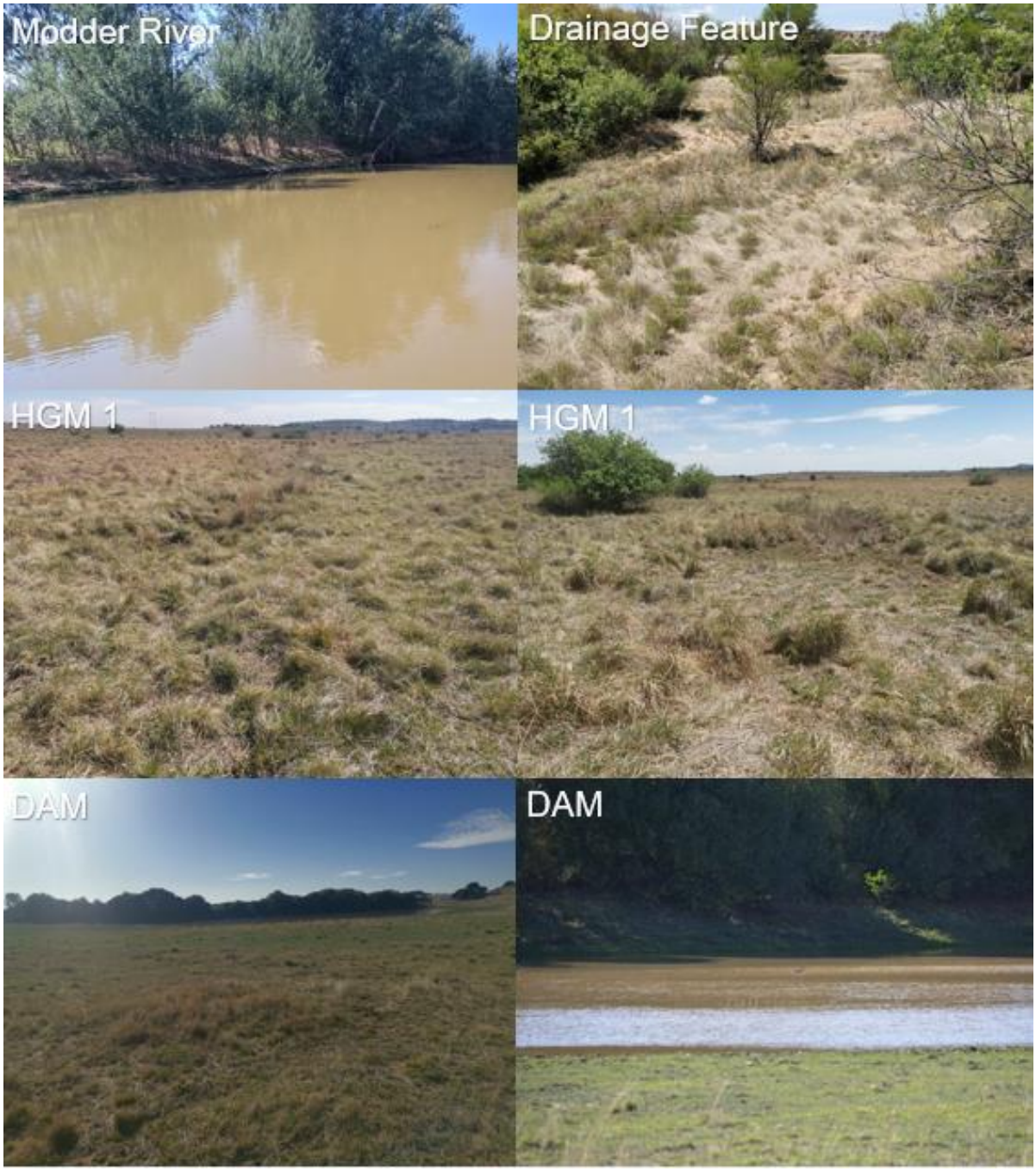


Figure 5-14 Photographs of the delineated resources

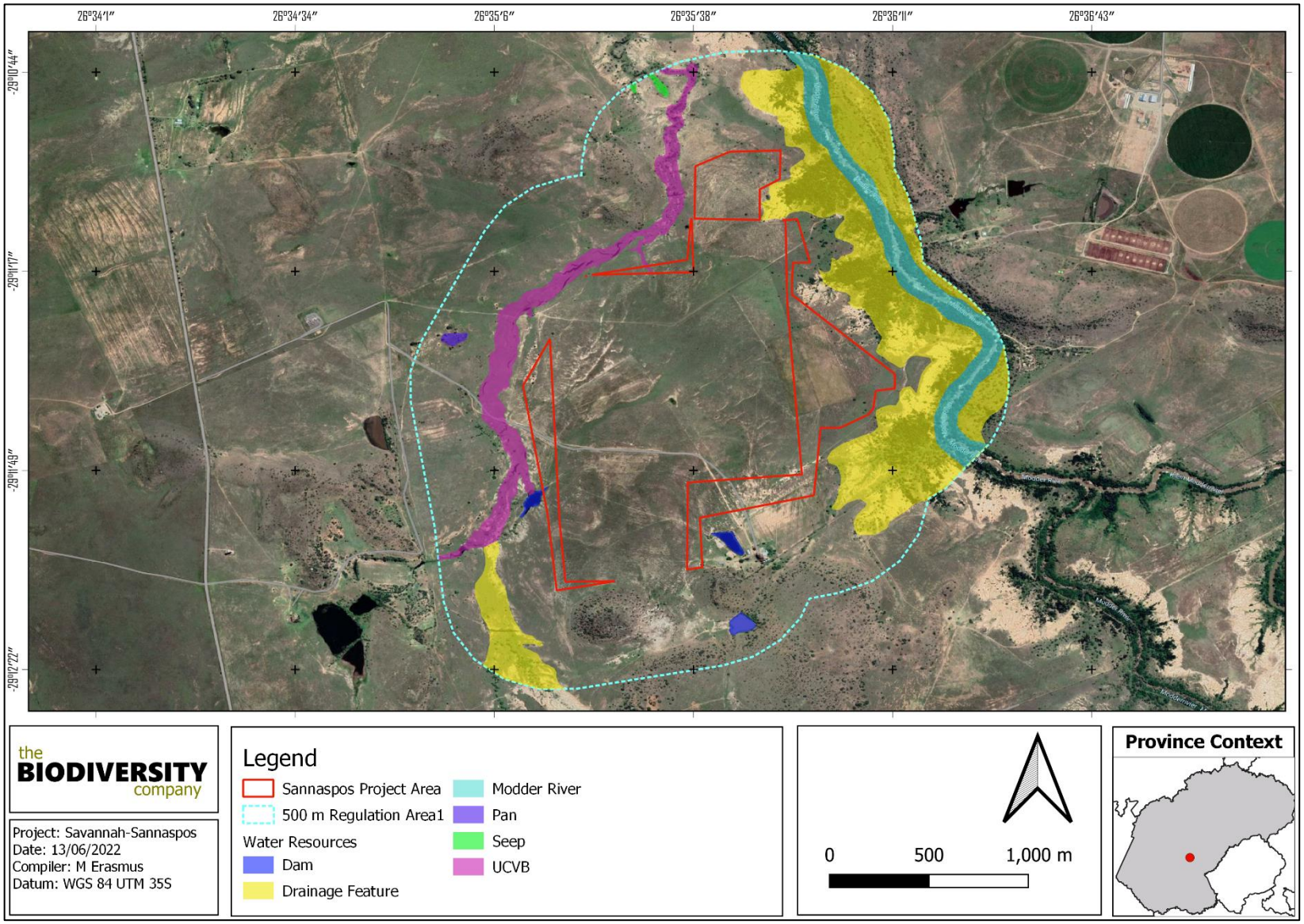


Figure 5-15 Wetlands delineated within the 500 m regulation area

5.3.2 Unit Setting

Unchanneled valley bottom wetlands are typically found on valley floors where the landscape does not allow high energy flows. Figure 5-16 presents a diagram of the relevant HGM units, showing the dominant movement of water into, through and out of the system.

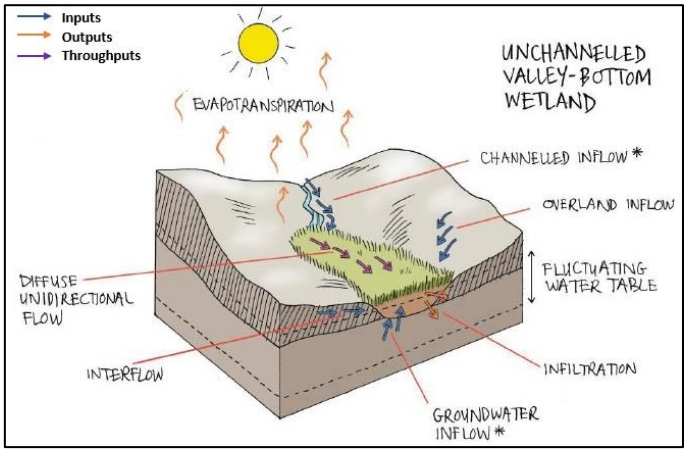


Figure 5-16 Amalgamated diagram of a typical unchanneled valley bottom, highlighting the dominant water inputs, throughputs and outputs, SANBI guidelines (Ollis et al. 2013)

5.3.3 General Functional Description

Unchanneled valley bottoms are characterised by sediment deposition, a gentle gradient with streamflow generally being spread diffusely across the wetland, ultimately ensuring prolonged saturation levels and high levels of organic matter. The assimilation of toxicants, nitrates and phosphates are usually high for unchanneled valley-bottom wetlands, especially in cases where the valley is fed by sub-surface interflow from slopes. The shallow depths of surface water within this system adds to the degradation of toxic contaminants by means of sunlight penetration.

It is however important to note that the descriptions of the above-mentioned functions are merely typical expectations. All wetland systems are unique and therefore, the ecosystem services rated high for these systems on site might differ slightly to those expectations.

5.3.4 Ecosystem Services

The ecosystem services provided by the wetland identified within the project area was assessed and rated using the WET-EcoServices method (Kotze *et al*. 2008) (Table 5-9). Overall, HGMs 1 scored Moderately Low in terms of ecosystem services. The most beneficial services are associated with regulating and supporting services such as flood attenuation and water quality enhancement. The majority of the direct benefits, with the exception of biodiversity maintenance all score low. The system is not considered important in terms of the direct provisioning of harvestable resources and cultivated foods for humans as the systems are not actively cultivated.

Table 5-9 Summary of the ecosystem services scores

Wetland Unit				HGM 1
Ecosystem Services Supplied by Wetlands	Indirect Benefits	Regulating and supporting benefits	Flood attenuation	1.8
			Streamflow regulation	1.3
		Water Quality enhancement benefits	Sediment trapping	1.3
			Phosphate assimilation	1.4
			Nitrate assimilation	1.6

				Toxicant assimilation	1.5
				Erosion control	1.3
			Carbon storage		1.3
	Direct Benefits	Biodiversity maintenance			0.5
		Provisioning benefits	Provisioning of water for human use		0.0
			Provisioning of harvestable resources		0.0
			Provisioning of cultivated foods		0.0
		Cultural benefits	Cultural heritage		0.0
			Tourism and recreation		0.0
			Education and research		0.0
Overall					**13.6**
Average					**0.9**

5.3.5 Wetland Health

The general features of the identified wetland unit were assessed in terms of impacts on the integrity of these systems using the WET-Health methodology. The integrity of the system was determined to be Largely Modified (class D). The PES for the assessed HGM unit is presented in the table below. Some notable aspects considered for the assessment include;

- Informal crossings of the watercourse;
- Vegetation clearing and overgrazing within the catchment, and system itself;
- Alien invasive vegetation;
- Series of impoundments within the catchment; and
- A high presence of drains and gullies.

Table 5-10 Summary of the scores for the HGM 1 PES

Component	PES Rating	Description
Hydrology	D	**Largely Modified:** Aspects which have altered the hydrology predominantly include: i) informal crossing infrastructure, ii) impoundments altering flow regimes and flooding, iii) trampling and overgrazing by livestock in the system, loss of roughness loss iv) excessive erosion and gully formation in the catchment
Geomorphology	D	**Largely Modified:** Development has caused changes to the embankments. Embankments are also eroded and have collapsed in some reaches. The system is characterised by pools of standing water, and infilled reaches. The uniformity of the systems has also been altered by the local agricultural practices.
Vegetation	C	**Moderately Modified:** The disturbances caused by local agricultural activities, including grazing by livestock have contributed to the encroachment of alien vegetation.
Overall	D	**Largely Modified. A large change in ecosystem processes and loss of natural habitat and biota has occurred.**

5.3.6 The Ecological Importance and Sensitivity

The Importance and Sensitivity ratings for the wetland HGM unit is provided below. Several factors were considered when establishing the IS of the wetland. Regional to national scale considerations included NFEPA river or wetland status, protected areas as well as Ramsar wetlands. Local considerations included habitat integrity and diversity, likelihood of supporting conservation important species and potential for hosting significant congregations of local or migratory species.

At a regional scale the NFEPA Wetveg database recognises unchanneled valley bottom wetlands within the Dry Highveld Grassland Group 4 as Critically Endangered and Not Protected (Nel *et al*., 2011). The following was also considered for the IS description for each AOI:

- Not located in in a Strategic Water Source Area;
- The Central Free State Grassland vegetation type is Vulnerable;
- The ecosystem is classified as Least Concern and Poorly Protected; and
- Only non-priority FEPA wetland within the regulation area.

Table 5-11 Ecological importance and sensitivity for the wetland unit

HGM Type	Wet Veg			NBA Wetlands		SWSA (Y/N)	Calculated IS
	Type	Ecosystem Threat Status	Ecosystem Protection Level	Wetland Condition	Ecosystem Threat Status 2018		
HGM 1	Dry Highveld Grassland Group 4	Critically Endangered	Not Protected	D	Least Concern	No	**Moderate**

5.3.7 Sensitivity and Buffer Analysis

The "*Buffer zone guidelines for wetlands, rivers and estuaries*" (Macfarlane *et al.,* 2014) was used to determine the appropriate wetland buffer zone for the proposed development.

Buffer zones have been used in land-use planning to protect natural resources and limit the impact of one land-use on another. A buffer zone has been prescribed for this project to serve as a "barrier" between the proposed development and the wetland systems.

The wetland buffer zone tool was used to calculate the appropriate buffer required for the proposes solar development. The model shows that the largest risk posed by the project during the construction phase is that of "increased sediment inputs and turbidity". During the operational phase the flow patterns being altered (increase flood peaks), increased sediment inputs and altered water quality are high risks. These risks are based on what could threaten the wetland and what buffer would be required at a desktop level. A buffer zone was suggested of 22 m (Table 5-12), this buffer is calculated assuming no mitigation measures are applied. However, to ensure the conservation of wetland areas it is recommended that a conservative approach be opted and a minimum buffer width of 30 m be implemented.

Table 5-12 Post-mitigation buffer requirement

	Required Buffer after mitigation measures have been applied
Solar PV	**22 m**

A sensitivity map (Figure 5-17) was produced to visually represent the sensitivity of the area. All identified natural wetland units and the Modder River were classified as having a High sensitivity, while the artificial systems and the associated 30 m buffer was assigned a Medium sensitivity. The remaining extent of the project area was assigned a Low sensitivity from a water resource perspective.

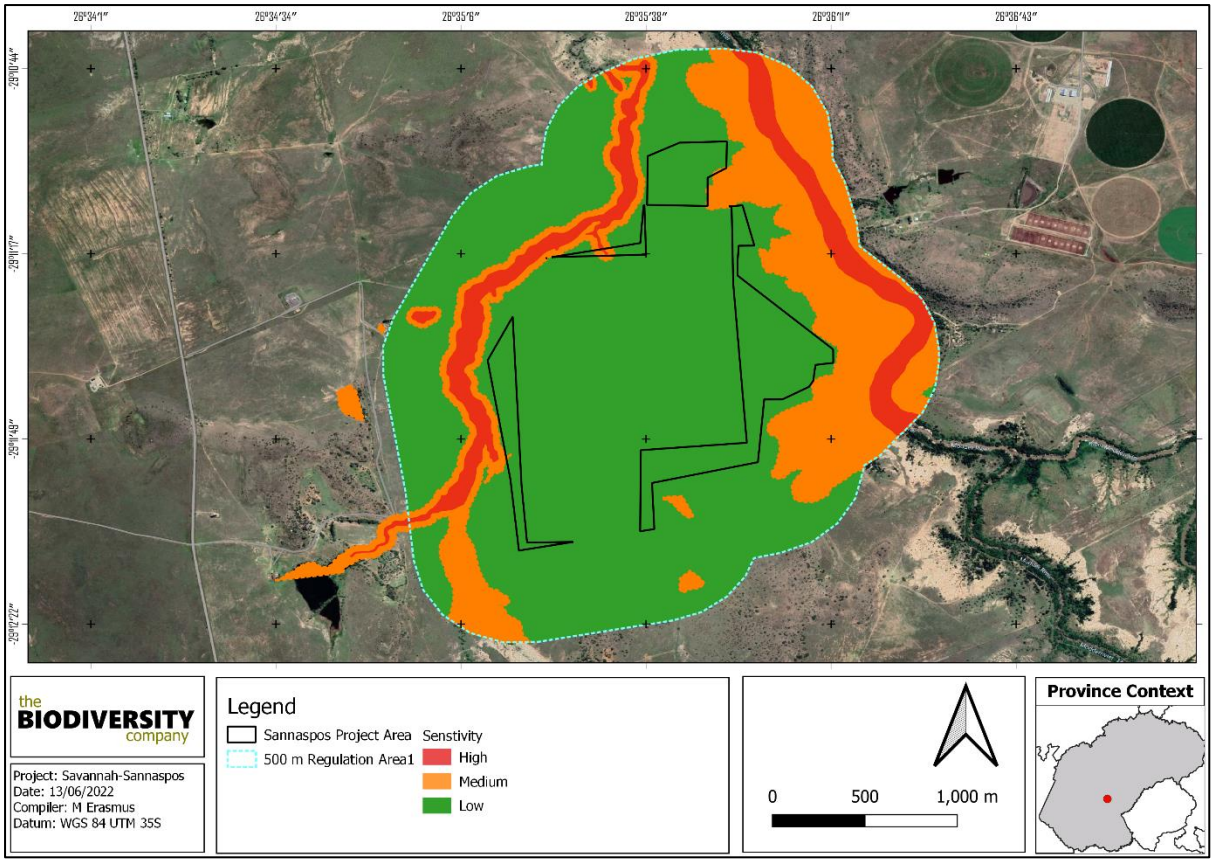


Figure 5-17 The associated wetland sensitivities for the project area

6 Habitat Assessment and Site Ecological Importance

6.1 Habitat Assessment

The main habitat types identified across the project area were initially identified largely based on aerial imagery. These main habitat types were refined based on the field coverage and data collected during the survey; the delineated habitats can be seen in Figure 6-1. Emphasis was placed on limiting timed meander searches along the proposed route within the natural habitats and therefore habitats with a higher potential of hosting SCC.

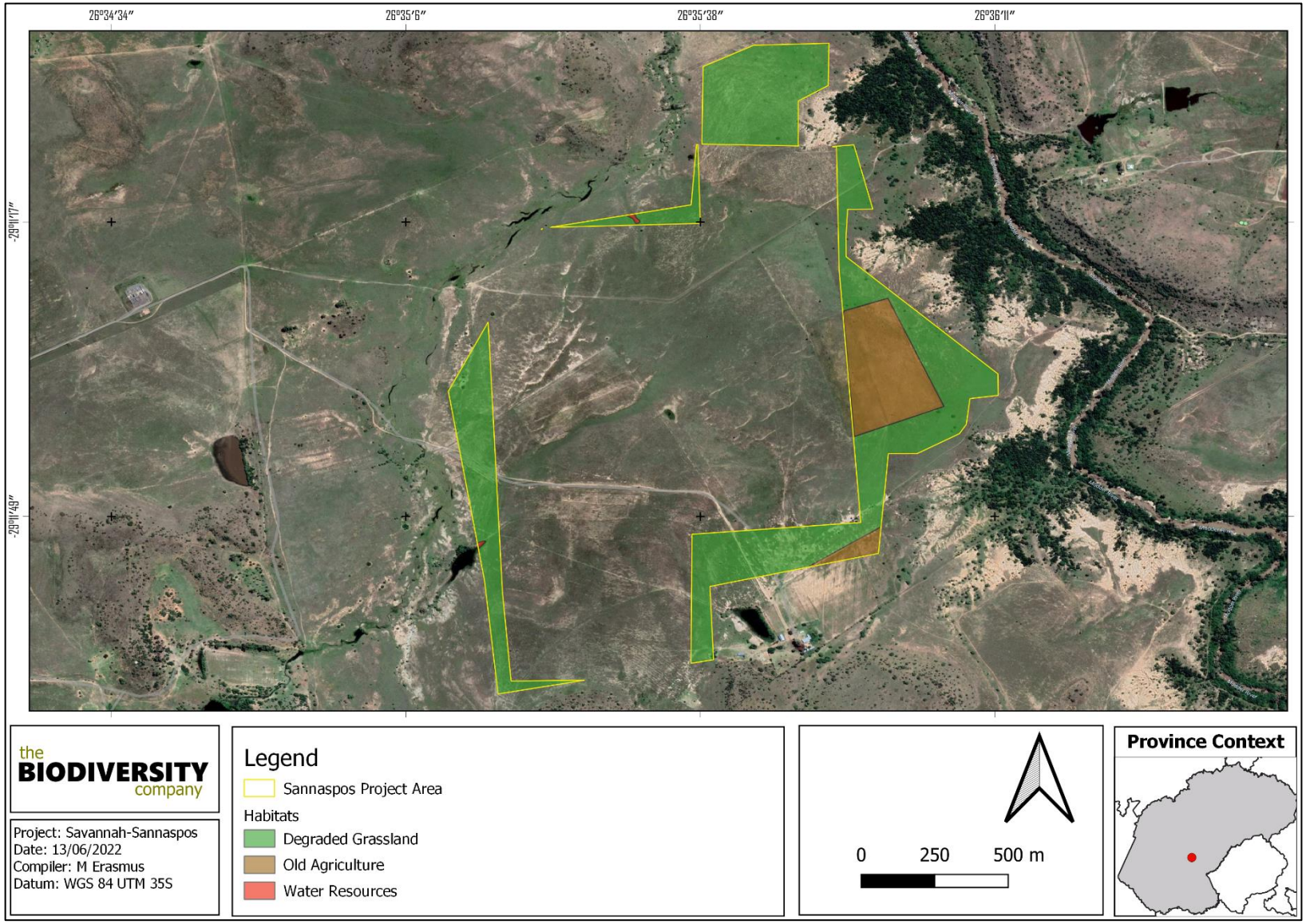


Figure 6-1 Habitats identified in the project area.

Central Free state Grassland (Degraded)

Dry Grassland habitat includes grassland areas that is connected to and plays a crucial role with the wetland habitats present. This habitat type is regarded as semi-natural grassland, but disturbed due to grazing by livestock and also human infringement in areas close to roads(Figure 6-2).

Generally, this habitat unit has functional ecological function attributed to flora and faunal communities found in this habitat. The current ecological condition of this habitat regarding the driving forces, are relatively due to the current land use. Portions of this grassland have been disturbed by the historic and current grazing pressure. The condition difference within this habitat depends on the extent of the disturbance in some areas being more severe, usually related to one being more overgrazed than the other.

Although the habitat unit is not entirely disturbed, ongoing and historic disturbances have resulted in the plant community no longer being fully representative of the reference vegetation. However, the habitat indicators that are known to show 'unhealthy' Dry Highveld Grassland such as grassland dominated by karroid shrubs, or the absence of endangered animal species.

The main ecological characteristics of these dry highveld grasslands include (SANBI, 2013):

- Climate; fundamentally different from any other grassland systems due to the significant difference in climate. This grassland experiences cold (frost) winters, but a defining difference is the low and highly variable summer rainfall that affects the grassland productivity, due to water being the main factor affecting growth, and not the duration or temperature of the season;
- Fire; plays a role in maintaining these grasslands, however not as important as grazing. Due to its slow growing nature, the grassland recovers slowly from fire events;
- Grazing, a slow growing sweetveld grassland being able to support animal production for most of the year, grazing is an important driver in these systems. and this is the most important ecosystem process that can be managed to maintain biodiversity and productivity in these ecosystems;
- Life-history strategies; due to the environmental conditions, driven primarily by adaptation to drought, the plants persist mainly through being long-lived, perennial plants replacing themselves through seeds or vegetative reproduction;
- Encroachment by invasive woody species; due to the factors limiting encroachment (fire, rainfall and frost) being variable in this grassland, if the biomass is reduced by grazing or decreased fire intensity, bush encroachment by trees such as *Vachellia karoo*, or woody karroid shrubs (such as *Pentzia* and *Felicia* species) can occur; and
- Geology; The underlying geology is an important determinant of the biodiversity patterners and processes. Especially dolerite sheets that correlates to high levels of plant species richness and endemism.

This habitat unit can thus be regarded as important, not only within the local landscape, but also regionally; it acts as a greenland, used for habitat, foraging area and movement corridors for fauna (including the EN Secretary Bird). The habitat sensitivity of the Dry Highveld Grassland is regarded as medium, mainly due to the role of this habitat to biodiversity.

Figure 6-2 Examples of degraded grassland habitat from the project area.

Figure 6-3 Examples of degraded grassland habitat from the project area.

Figure 6-4 Examples of disturbed grassland habitat from the project area.

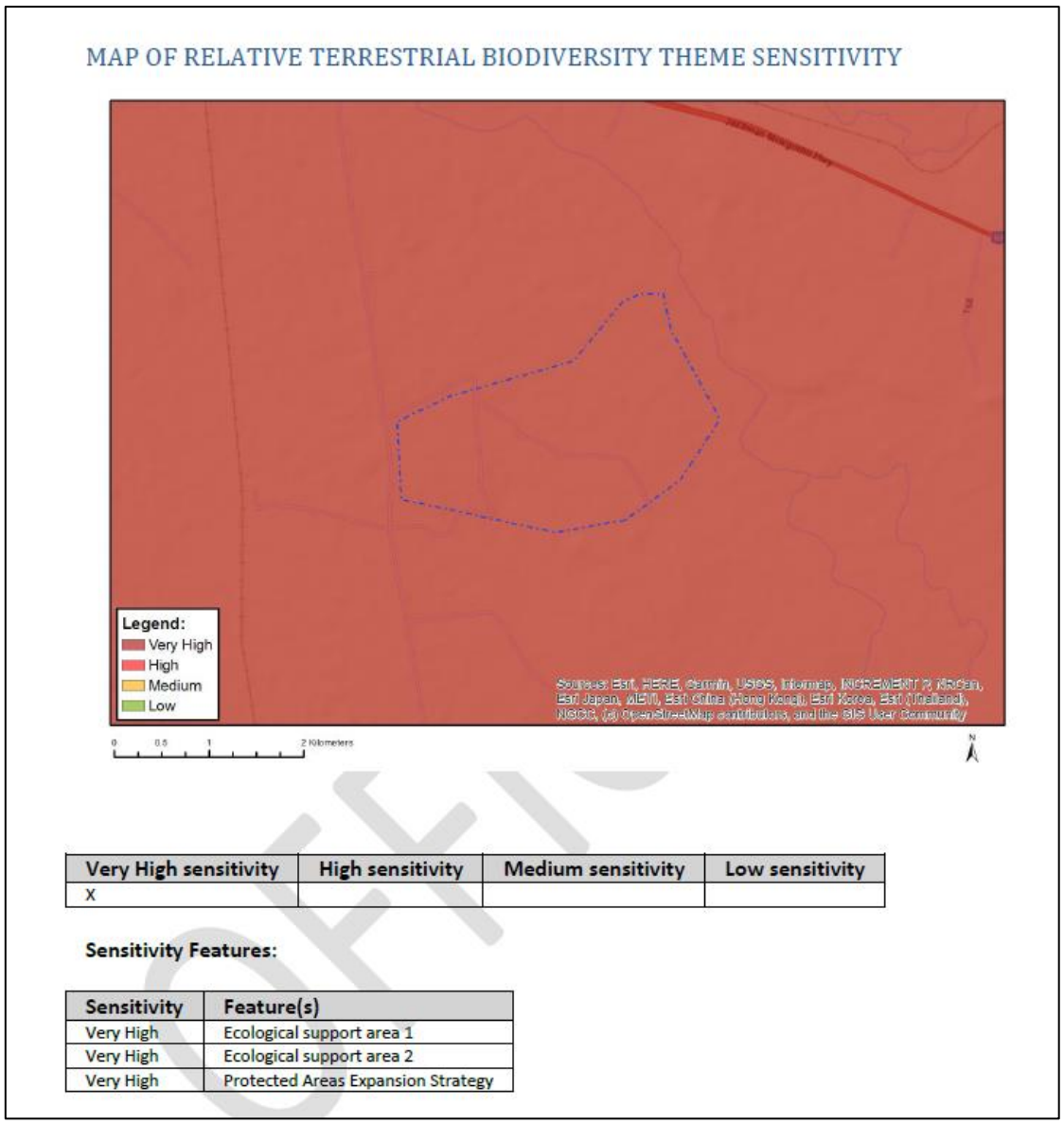
Wetlands

This habitat unit represents the wetland areas as well as watercourse areas with the grassland that it is connected to (Figure 6-5). The wetland assessment where these areas are identified can be seen in section 5.3. Even though somewhat disturbed, the ecological integrity, importance and functioning of these areas play a crucial role as a water resource system and an important habitat for various fauna and flora, including the SCC recorded. The preservation of this system is an important aspect to consider for the proposed development, even more so due to the high sensitivity of the area according to the various ecological datasets. This habitat needs to be protected and improved due to the role of this habitat as a water resource.

Figure 6-5 A typical example the wetland habitat from the project area.

6.2 Site Ecological Importance

The biodiversity theme sensitivity, as indicated in the screening report, was derived to be Very High, mainly due to the project area being with an ESA (Figure 6-6).



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

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

Figure 6-6 ***Terrestrial Biodiversity Theme Sensitivity, National Web based Environmental Screening Tool. The outside edges of the project area were used in the screening tool.***

The location and extent of these habitats are illustrated in Figure 6-1. Based on the criteria provided in Section 4.4 of this report, all habitats within the assessment area of the proposed project were allocated a sensitivity category(Table 6-1). The sensitivities of the habitat types delineated are illustrated in Figure 6-7. 'High Sensitivity' areas are due to the following and the guidelines can be seen in Table 6-2:

- Unique and low resilience habitats; and
- Water resources.

Table 6-1 ***SEI Summary of habitat types delineated within field assessment area of project area***

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Water Resource	High	Medium	Medium	Low	High
Degraded Grassland	Medium	Medium	Medium	Medium	Medium

Old Agriculture	Low	Low	Low	High	Low

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

Site Ecological Importance	Interpretation in relation to proposed development activities
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.

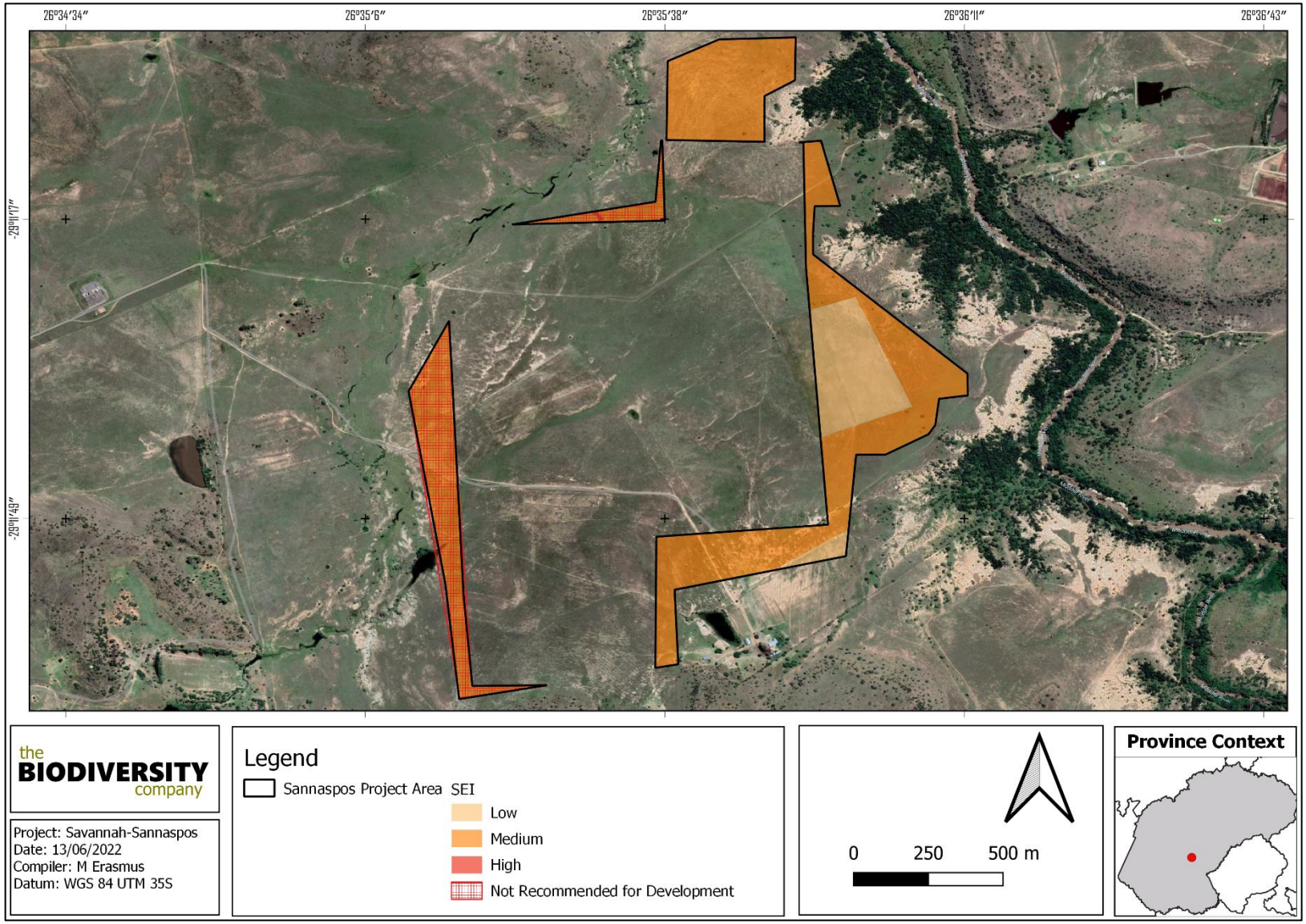


Figure 6-7 Sensitivity of the project area

7 Impact Risk Assessment

The section below and associated tables serve to indicate and summarise the significance of perceived impacts on the terrestrial ecology of the project area. Potential impacts were evaluated against the data captured during the desktop and field assessment to identify relevance to the project area. The relevant impacts associated with the proposed construction of the development were then subjected to a prescribed impact assessment methodology which were provided by Savannah Environmental and is available on request.

7.1 Biodiversity Risk Assessment

7.1.1 Present Impacts to Biodiversity

Considering the anthropogenic activities and influences within the landscape, several negative impacts to biodiversity were observed within the project area (Figure 7-1). These include:

- Historic land modification;
- Existing powerlines;
- Farm roads (and associated traffic and wildlife road mortalities);
- Grazing and trampling of natural vegetation by livestock in certain areas;
- Alien and/or Invasive Plants (AIP);
- Unregulated Fire and Erosion; and
- Fences and associated maintenance.

Figure 7-1 Some of the identified impacts within the project area; A) Livestock B)Farm Roads, C) Existing Powerlines and D) AIP.

7.1.2 Terrestrial Impact Assessment

Potential impacts were evaluated against the data captured during the desktop and field assessments to identify relevance to the project area. The relevant impacts associated with the proposed development were then subjected to a prescribed impact assessment methodology which were provided by Savannah Environmental and is available on request. No decommissioning phase was considered based on the nature of the development.

Anthropogenic activities drive habitat destruction causing displacement of fauna and flora and possibly direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area.

7.1.3 Alternatives considered.

No alternatives were provided for the development.

7.1.4 Loss of Irreplaceable Resources

- An ESA and NPAES will be lost; and
- SCCs will also be lost.

7.1.5 Anticipated Impacts

The impacts anticipated for the proposed activities are considered in order to predict and quantify these impacts and assess & evaluate the magnitude on the identified terrestrial biodiversity (Table 7-1).

Table 7-1 Anticipated impacts for the proposed activities on terrestrial biodiversity

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

7.1.6 Unplanned Events

The planned activities will have anticipated impacts as discussed; however, unplanned events may occur on any project and may have potential impacts which will need management.

Table 7-2 is a summary of the findings of an unplanned event assessment from a terrestrial ecology perspective. Note, not all potential unplanned events may be captured herein, and this must therefore be managed throughout all phases according to recorded events.

Table 7-2 Summary of unplanned events for terrestrial biodiversity

Unplanned Event	Potential Impact	Mitigation
Spills into the surrounding environment	Contamination of habitat as well as water resources associated with a spillage.	A spill response kit must be available at all times. The incident must be reported on and if necessary, a biodiversity specialist must investigate the extent of the impact and provide rehabilitation recommendations.
Fire	Uncontrolled/unmanaged fire that spreads to the surrounding natural grassland	Appropriate/Adequate fire management plan need to be implemented.
Erosion caused by water runoff from the surface	Erosion on the side of the road	Storm water management plan must be compiled and implemented.

7.1.7 Identification of Additional Potential Impacts

7.1.7.1 Assessment of Impact Significance

The assessment of impact significance considers pre-mitigation as well as implemented of post-mitigation scenarios. The mitigation actions required to lower the risk of the impact are provided in Section 7.1.9 of this report.

7.1.7.2 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 7-3),
- Introduction of alien species, especially plants (Table 7-4);
- Destruction of protected plant species (Table 7-5); and
- Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching) (Table 7-6).

Table 7-3 Impacts to biodiversity associated with the proposed construction phase.

Impact Nature: Loss of habitats, ecosystems and 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)	Long term (4)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
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:		
See Biodiversity Management Outcomes		
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 7-4 Impacts to biodiversity associated with the proposed construction phase.

Impact Nature: Introduction of alien species, especially plants		
Degradation and loss of surrounding natural vegetation		
	Without mitigation	**With mitigation**

Impact Nature: Introduction of alien species, especially plants		
Degradation and loss of surrounding natural vegetation		
Extent	High (4)	Low (2)
Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
See Biodiversity Management Outcomes		
Residual Impacts:		
Long-term broad scale. IAP infestation if not mitigated.		

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

Impact Nature: Destruction of protected plant species		
Construction activity will likely lead to direct loss of protected tree species		
	Without mitigation	**With mitigation**
Extent	Low (2)	Very low (1)
Duration	Permanent (5)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation:		
See Biodiversity Management Outcomes		
Residual Impacts:		
N/A		

Table 7-6 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	Short term (2)	Very short term (1)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Probable (3)
Significance	**Medium**	**Low**
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:		
See Biodiversity Management Outcomes		
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.		

7.1.7.3 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 and mining 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 7-7);
- Spread of alien and/or invasive species (Table 7-8);
- Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration) (Table 7-9).

Table 7-7 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	Permanent (5)	Very short term (1)
Magnitude	High (8)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
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:
See Biodiversity Management Outcomes
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 7-8 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		
	Without mitigation	**With mitigation**
Extent	High (4)	Low (2)
Duration	Long term (4)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	
Mitigation:		
See Biodiversity Management Outcomes		
Residual Impacts:		
Long term broad scale IAP infestation if not mitigated.		

Table 7-9 Impacts to biodiversity associated with the proposed operational phase

Impact Nature: Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration		
The operation and maintenance of the proposed development may lead to 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	High (8)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	**Medium**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Impact Nature: Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration
The operation and maintenance of the proposed development may lead to disturbance or persecution of fauna in the vicinity of the development.
Mitigation:
See Biodiversity Management Outcomes
Residual Impacts
Disturbance from maintenance activities will occur albeit at a low and infrequent level.

7.1.7.4 Cumulative Impacts

Cumulative impacts are assessed in context of the extent of the proposed project area; other developments in the area; and general habitat loss and transformation resulting from other activities in the area.

Table 7-10 Cumulative Impacts to biodiversity associated with the proposed project.

Impact Nature: Cumulative habitat loss within the region		
The development of the proposed infrastructure will contribute to cumulative habitat loss within ESAs 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	Low (2)	Moderate (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Highly probable (4)
Significance	**Medium**	**Medium**
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Low
Irreplaceable loss of resources?	No	No
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:		
• Ensure that a rehabilitation plan and IAP management plan be compiled for each development and are effectively implemented.		

7.1.8 Biodiversity Management Plan

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 7-11 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 ESA areas in the vicinity of the project area;
- As far as possible, reduce the negative fragmentation effects of the development and enable safe movement of faunal species;
- Prevent the direct and indirect loss and disturbance of faunal species and community (including occurring and potentially occurring species of conservation concern); and
- Follow the guidelines for interpreting Site Ecological Importance (SEI).

Table 7-11 Mitigation measures including requirements for timeframes, roles and responsibilities for the terrestrial study

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Vegetation and Habitats				
Areas rated as High sensitivity in proximity to the development areas, should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to this area from construction workers, machinery. The infrastructure should be realigned to prioritise development within low sensitivity areas. Mitigated development in medium sensitivity areas is permissible. High sensitivity areas are to be avoided.	Life of operation	Project manager, Environmental Officer	Development footprint	Ongoing
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further than that proposed for the project. Clearing of vegetation should be minimized and avoided where possible.	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation	Ongoing
Where possible, existing access routes and walking paths must be made use of.	Construction/Operational Phase	Environmental Officer & Design Engineer	Roads and paths used	Ongoing
All laydown, chemical toilets etc. should be restricted to low sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas.	Construction/Operational Phase	Environmental Officer & Design Engineer	Laydown areas	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Operational phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.	Operational and Decommissioning phase	Environmental Officer & Contractor	Woody material under powerline and in SS footprint	During Phase
A hydrocarbon spill management plan must be put in place, to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment may occur on site, unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.	Life of operation	Environmental Officer & Contractor	Spill events, Vehicles dripping.	Ongoing

Storm Water run-off & Discharge Water Quality monitoring	Life of operation	Environmental Officer & Design Engineer	Water Quality and presence of erosion	Ongoing
It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.	Life of operation	Project manager, Environmental Officer	Any instances	Ongoing
A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.	Life of operation	Environmental Officer & Contractor	Fire Management	During Phase
Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. Hi visibility flags must be placed near any protected plants in order to avoid any damage or destruction of the species. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. PV infrastructure, development areas and routes where protected plants cannot be avoided, these plants many being geophytes or small succulents should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again. All protected and red-data plants should be relocated, and as many other geophytic species as possible.	Life of operation	Project manager, Environmental Officer	Protected Plant species	Ongoing
Management outcome: Fauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments, • Signs must be put up to enforce this	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into these areas	Ongoing
Noise must be kept to an absolute minimum during the evenings and at night, to minimize all possible disturbances to amphibian species and nocturnal mammals	Construction/Operational Phase	Environmental Officer	Noise levels	Ongoing
No trapping, killing, or poisoning of any wildlife is to be allowed. • Signs must be put up to enforce this;	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (green/red) lights should be used wherever possible.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Light pollution and period of light.	Ongoing
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing

Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons.	Life of operation	Project manager, Environmental Officer & Design Engineer	Activities should take place during the day in the case.	Ongoing
Any excavations or holes must be conducted in a progressive manner. • Should the holes/excavations stay open overnight they must be covered temporarily, to ensure no small fauna species fall in.	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of trapped animals and open holes	Ongoing
A qualified environmental control officer must be on site when construction begins. The area must be walked though prior to construction, to ensure no faunal species remain in the habitat and get killed. Should animals not move out of the area on their own, relevant specialists must be contacted to advise on how the species can be relocated.	Construction Phase	Environmental Officer, Contractor	Presence of any floral or faunal species.	During phase
Heat generated from substation, if any, must be monitored to ensure it does not negatively affect the local fauna	Life of operation	Environmental Officer & Contractor	Heat generated by substations	Ongoing
All areas to be developed must be walked through prior to any activity to ensure no nests or fauna species are found in the area. Should any SCC not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.	Construction and Operational phase	Project manager, Environmental Officer	Presence of Nests and faunal species	Planning, Construction and Rehabilitation
Ensure that any cables and connections are insulated successfully to reduce electrocution risk.	Life of project	Environmental Officer & Contractor, Engineer	Presence of electrocuted fauna	Ongoing
Any exposed parts must be covered (insulated) to reduce electrocution risk.	Life of project	Environmental Officer & Contractor, Engineer	Presence of electrocuted fauna	Ongoing
Monitoring of all OHL route must be undertaken to detect bird carcasses, to enable the identification of any potential areas of high impact to be marked with bird flappers if not already done so. Monitoring should be undertaken at least once a month for the first year of operation.	Life of project	Environmental Officer & Contractor,	Monitoring of the OHL route	Ongoing
Management outcome: Alien Vegetation and fauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
Compilation of and implementation of an alien vegetation management plan.	Life of operation	Project manager, Environmental Officer & Contractor	Assess presence and encroachment of alien vegetation	Twice a year
The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas	Construction/Operational Phase	Project manager, Environmental Officer & Contractor	Footprint Area	Life of operation
Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site	Life of operation	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation
A pest control plan must be put in place and implemented; it is imperative that poisons not be used due to the likely presence of SCCs	Life of operation	Environmental Officer & Health and Safety Officer	Evidence or presence of pests	Life of operation
Management outcome: Dust				

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Dust-reducing mitigation measures must be put in place and strictly adhered to. This includes wetting of exposed soft soil surfaces. • No non environmentally friendly suppressants may be used, as this could result in pollution of water sources	Life of operation	Contractor	Dustfall	Dust monitoring program.
Management outcome: Waste management				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis 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; and • Maximum domestic waste storage period will be 10 days.	Construction Phase	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation
Toilets at the recommended Health and Safety standards must be provided. These should be emptied twice a day, to prevent staff from using the surrounding vegetation.	Construction Phase	Environmental Officer & Health and Safety Officer	Number of toilets per staff member. Waste levels	Daily
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. Under no circumstances may domestic waste be burned on site	Construction Phase	Environmental Officer & Health and Safety Officer	Availability of bins and the collection of the waste.	Ongoing
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 10 days.	Construction Phase	Environmental Officer, Contractor & Health and Safety Officer	Management of bins and collection of waste	Ongoing
Suitable temporary solid waste facilities are to be incorporated into the design to prevent unsanitary conditions. These are to be cleared weekly and waste collected by the local waste management department. The residents must be encouraged to recycle.	Operational Phase	Project manager	Management of bins and collection of waste	Ongoing
Management outcome: Environmental awareness training				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red /	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing

Orange List species, their identification, conservation status and importance; and biology, habitat requirements and management requirements in the EA and EMPr. The avoidance and protection of the wetland areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the "no-go" to be avoided.				
Management outcome: Erosion				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
Speed limits must be put in place to reduce erosion. • Reducing the dust generated by the listed activities above, especially the earthmoving machinery, through wetting the soil surface; putting up signs to enforce speed limit; and speed bumps built to force slow speeds; • Signs must be put up to enforce this.	Life of operation	Project manager, Environmental Officer	Water Runoff from road surfaces	Ongoing
Where possible, existing access routes and walking paths must be made use of.	Life of operation	Project manager, Environmental Officer	Routes used within the area	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation, to prevent erosion during flood events and strong winds.	Life of operation	Project manager, Environmental Officer	Re-establishment of indigenous vegetation	Progressively
A stormwater management plan must be compiled and implemented.	Life of operation	Project manager, Environmental Officer	Management plan	Before construction phase: Ongoing

7.2 Wetland Risk Assessment

A risk assessment was conducted in line with Section 21 (c) and (i) of the National Water Act, 1998, (Act 36 of 1998) to investigate the level of risk posed by proposed project, namely the installation of a solar (bifacial) PV facility. The risks posed by the proposed development to wetlands within the project areas are provided in Table 7-12 for scenarios with and without mitigation. Three levels of risk have been identified and determined for the overall risk assessment, these include low, medium and high risk. High risks are applicable based on the fact that a wetland will be directly impacted on by the proposed development. Medium risk refers to wetland areas that are either on the periphery of the infrastructure or at an indirect risk. Low risks are wetland systems beyond the 30 m buffer area that would be avoided, or wetland areas that could be avoided if feasible. The medium risks were the priority for the risk assessment, focussing on the expected potential for these indirect risks. The significance of all post-mitigation risks was determined to be low. Areas not recommended for development due to the proximity to HGM 1 are presented in Figure 7-2, but development in these area is permissible but all recommendations and mitigation measures remains applicable.

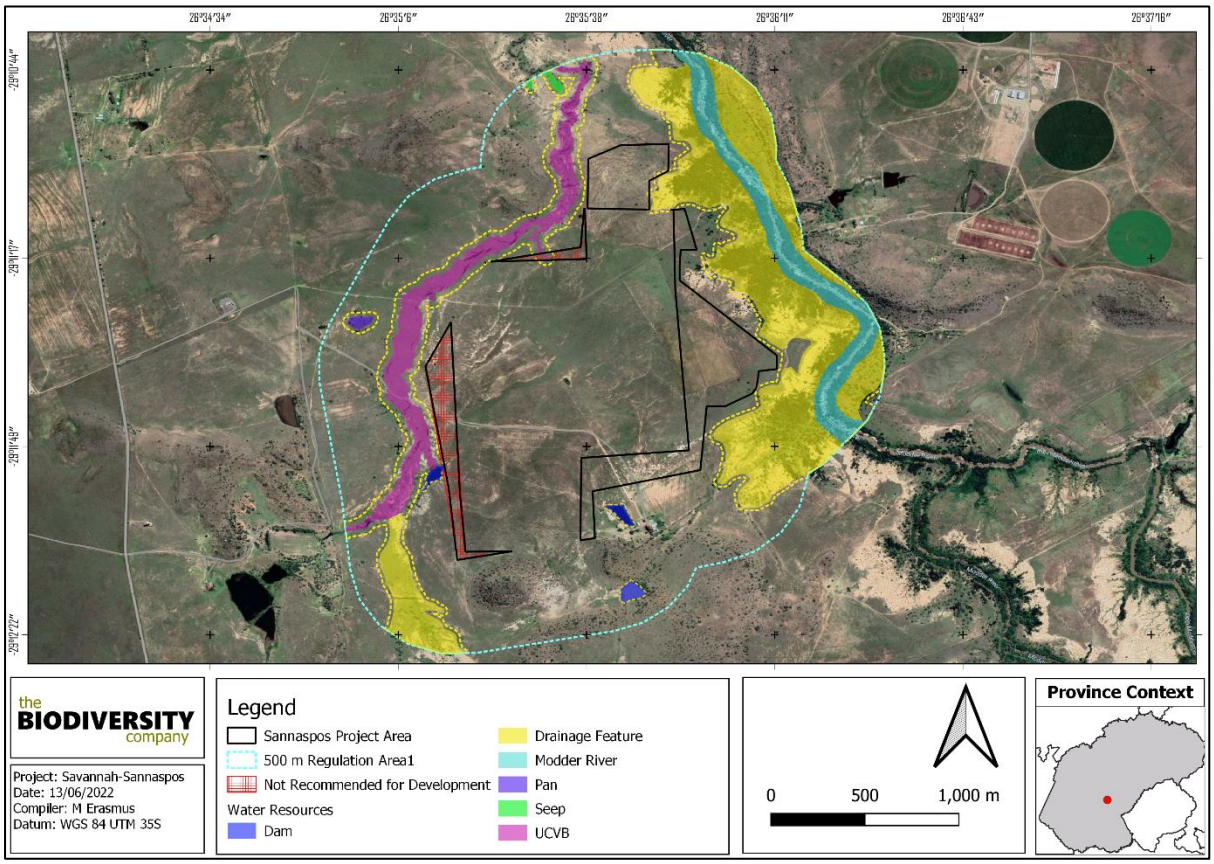


Figure 7-2 Recommended areas for PV development

Table 7-12 DWS Risk Impact Matrix for the proposed development (Andrew Husted Pr Sci Nat 400213/11)

Activity	Aspect	Impact	Severity															Control Measures
			Mitigation	Flow Regime	Water Quality	Habitat	Biota	Total	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	
Construction																			
Site clearing and preparation.	Wetland disturbance / loss.	Direct disturbance / degradation / loss to wetland soils or vegetation due to the construction of the solar facility.	Without	3	2	3	2	2.5	2	3	7.5	3	4	1	1	9	68	**M**	• Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area. • When clearing vegetation, allow for some vegetation cover as opposed to bare areas beneath the panels. • Minimize the disturbance footprint and the unnecessary clearing of vegetation outside of this area. • Use the wetland shapefiles to signpost the edge of the wetlands closest to site. Place the sign 20 m from the edge (this is the buffer zone). Label these areas as environmentally sensitive areas, keep out. • Educate staff and relevant contractors on the location and importance of the identified wetlands through toolbox talks and by including them in site inductions as well as the overall master plan. • All activities (including driving) must adhere to the 30 m buffer area. • Promptly remove / control all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed. • All alien vegetation along the transmission servitude should be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. By this Eskom is obliged to control. • Landscape and re-vegetate all denuded areas as soon as possible.
			With	2	1	2	1	1.5	2	3	6.5	3	3	1	1	8	52	**L**	

Activity	Aspect	Impact	Severity: Mitigation	Flow Regime	Water Quality	Habitat	Biota	Total	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Control Measures
	Water runoff from construction site.	Increased erosion and sedimentation.	Without	3	3	2	2	2.5	2	3	7.5	3	3	1	2	9	68	M	• Limit construction activities near (< 30 m) of wetlands and drainage features to winter (as much as possible) when rain is least likely to wash concrete and sand into the wetland. Activities in black turf soils can become messy • Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash. • No activities are permitted within the wetland and associated buffer area. • Landscape and re-vegetate all unnecessarily denuded areas as soon as possible.
			With	2	2	1	1	1.5	2	2	5.5	3	2	1	1	7	39	L	
		Potential contamination of wetlands with machine oils and construction materials.	Without	1	3	2	2	2	1	2	5	3	3	1	2	9	45	L	• Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility. • Appropriately stockpile topsoil cleared from the project area. • Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering the wetlands. • No activities are permitted within the wetland and associated buffer area.
			With	1	1	1	1	1	1	2	4	1	2	1	2	6	24	L	
Operation																			
Operation of the solar facility.	Hardened surfaces.	Potential for increased stormwater runoff leading to Increased erosion and sedimentation.	Without	2	2	2	2	2	3	2	7	3	3	1	2	9	63	M	• Design and Implement an effective stormwater management plan. • Allow for some vegetation cover as opposed to bare areas beneath the panels. • Promote water infiltration into the ground beneath the solar panels. • Release only clean water into the environment. • Stormwater leaving the site should not be concentrated in a single exit drain but spread across multiple drains around the site each fitted with energy dissipaters (e.g. slabs of concrete with
			With	1	1	1	1	1	2	2	5	1	2	1	1	5	25	L	

Activity	Aspect	Impact	Severity															Control Measures
			Mitigation	Flow Regime	Water Quality	Habitat	Biota	Total	Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	
																			rocks cemented in). • Re-vegetate denuded areas as soon as possible. • Regularly clear drains. • Minimise the extent of concreted / paved / gravel areas. • A covering of grass (regularly cut and maintained) below the solar panels is ideal for infiltration. If not feasible then gravel is preferable over concrete or paving. • Avoid excessively compacting the ground beneath the solar panels.
	Contamination.	Potential for increased contaminants entering the wetland systems.	Without	2	3	2	2	2.3	3	2	7.3	3	3	1	2	9	65	M	• Where possible minimise the use surfactants to clean solar panels and herbicides to control vegetation beneath the panels. If surfactants and herbicides must be used do so well prior to any significant predicted rainfall events.
			With	1	1	1	1	1	2	2	5	1	2	1	1	5	25	L	
Closure																			
Decommissioning of the solar facility.	Rehabilitation.	Potential loss or degradation of nearby wetlands through inappropriate closure.	Without	2	2	3	2	2.3	2	3	7.3	3	3	1	1	8	58	M	• Develop and implement a rehabilitation and closure plan. • Appropriately rehabilitate the project area by ripping, landscaping and re-vegetating with locally indigenous species.
			With	1	1	1	1	1	2	2	5	1	2	1	1	5	25	L	

8 Conclusion and Impact Statement

8.1 Conclusion

8.1.1 Terrestrial Ecology

The completion of a comprehensive desktop study, in conjunction with the results from the field survey, suggest there is a good confidence in the information provided. The survey ensured that there was a suitable groundtruth coverage of the assessment area and most habitats and ecosystems were assessed to obtain a general species (fauna and flora) overview and the major current impacts were observed. The conservation status is classified as Least Concern albeit the protection level is regarded as 'Not Protected and Poorly Protected' Ecosystem. Moreover, the proposed activity overlaps with an ESA1, ESA2 and NPAES.

The current layout, the project area overlaps within sensitive habitats and other areas of high biodiversity potential. Portions current layout as well as the expected access and service road of the development would be considered to have a significant and high negative impact as it would directly affect the habitat of threatened plant species and expected listed avifaunal species that use these ecosystems;

- The assessment area possesses a protected flora species. Moreover, protected fauna are ubiquitous within the assessment area and surrounding landscape was ubiquitous within the assessment area and surrounding landscape; and
- One threatened species of avifauna were observed to occur and utilise the habitats within the assessment area during the survey period. *Sagittarius serpentarius* (Secretarybird) possess high priority scores indicating that they are particularly susceptible to collisions with powerlines. Excessive noise will lead to displacement of the species and the vehicle traffic potentially will lead to direct mortality.

The developer is urged to alter the layout or design which represents a compromise between the needs of the development and the environmental concerns at the site, especially in regard to the high sensitivity areas.

Historically, overgrazing from livestock (Sheep, goats and cattle) and mismanagement has led to the deterioration these habits. However, the high sensitivity areas can be regarded as important, not only within the local landscape, but also regionally; as they are used for habitat, foraging, water resource and movement corridors for fauna within the landscape.

The habitat existence and importance of these habitats is regarded as crucial, due to the species recorded as well as the role of this intact unique habitat to biodiversity within a very fragmented disturbed local landscape, not to mention the sensitivity according to various ecological datasets.

The high and sensitivity terrestrial areas still:

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

The ecological integrity, importance and functioning of these 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.

Any development on the high sensitivity areas will lead the direct destruction and loss of portions of functional ESA, and also the floral and faunal species that are expected to utilise this habitat. Thus, if these areas are not maintained in a natural or near natural state, destroyed or fragmented, then meeting targets for biodiversity features will not be achieved. The mitigations, management and associated monitoring regarding these operational impacts will be the most important factor of this project and must be considered by the issuing authority.

8.1.2 Wetlands

In total four (4) water resources were identified and delineated for the project. These included both natural and artificial systems, with the artificial systems comprising of impoundments and drainage features. Three (3) natural wetland hydrogeomorphic (HGM) units belonging to three HGM types (unchannelled valley bottom, depression and seepage) were identified within the 500 m regulated area. The unchannelled valley bottom (HGM 1) is traversed by a portion of the project area and was determined to be the only system at an appreciable level of risk and was the focus for the functional assessment. No functional assessment was completed for the artificial systems.

Overall, HGM 1 scored Moderately Low in terms of the wetland ecosystem services. The wetland was considered relatively important for regulating and supporting benefits. The integrity (or health) for HGM 1 was rated as being in a Largely Modified state (class D). The unchanneled valley bottom wetland type is classified as Critically Endangered and the ecological importance and sensitivity is Moderate.

A 30 m buffer width was recommended for the project. All identified natural wetland units and the Modder River were classified as having a High sensitivity, while the artificial systems and the associated 30 m buffer was assigned a Medium sensitivity. The remaining extent of the project area was assigned a Low sensitivity from a water resource perspective.

A risk assessment was conducted in line with Section 21 (c) and (i) of the National Water Act, 1998, (Act 36 of 1998). High risks are applicable based on the fact that wetlands may be be directly impacted on by the proposed development. Medium risk refers to wetland areas that are either on the periphery of the infrastructure and at an indirect risk. Low risks are wetland systems beyond the project area that would be avoided, or wetland areas that could be avoided if feasible. Development in all the ‘segments’ of the project area is permissible, and the significance of all post-mitigation risks was determined to be low. All recommendations and mitigation measures are applicable to these areas, in order to achieve a low residual risk significance.

8.2 Impact Statement

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

- habitat loss and fragmentation;
- degradation of surrounding habitat;
- disturbance and displacement caused during the construction, operational and maintenance phases; and
- direct mortality during the construction phase.

Mitigation measures as described in this report can be implemented to reduce the significance of the risk but there is still a possibility of impacts. Considering that this area that has been identified as being of significance for biodiversity maintenance and ecological processes (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 all prescribed mitigation measures and supporting recommendations are implemented. In terms of Water Use

Authorisation, owing to the expected post-mitigation Low risks, a General Authorisation is permissible for the development.

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10 Appendix Items

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

Family	*Taxon*	Author	IUCN	Ecology
Achariaceae	*Kiggelaria africana*	L.	LC	Indigenous
Agavaceae	*Chlorophytum fasciculatum*	(Baker) Kativu	LC	Indigenous
Aizoaceae	*Delosperma sp.*	L.Bolus		
Aizoaceae	*Ruschia sp.*			
Aizoaceae	*Stoeberia utilis*	(L.Bolus) Van Jaarsv.		Indigenous
Aizoaceae	*Delosperma floribundum*	L.Bolus	LC	Indigenous; Endemic
Alliaceae	*Tulbaghia leucantha*	Baker	LC	Indigenous
Amaranthaceae	*Guilleminea densa*	(Humb. & Bonpl. ex Schult.) Moq.		Not indigenous; Naturalised; Invasive
Amaranthaceae	*Atriplex semibaccata*	R.Br.		Not indigenous; Naturalised; Invasive
Amaranthaceae	*Salsola kali*	L.		Not indigenous; Naturalised; Invasive
Amaryllidaceae	*Brunsvigia radulosa*	Herb.	LC	Indigenous
Amaryllidaceae	*Boophone disticha*	(L.f.) Herb.	LC	Indigenous
Amaryllidaceae	*Haemanthus humilis subsp. humilis*	Jacq.	LC	Indigenous; Endemic
Anacampserotaceae	*Anacampseros rufescens*	(Haw.) Sweet	LC	Indigenous
Anacardiaceae	*Searsia ciliata*	(Licht. ex Schult.) A.J.Mill.	LC	Indigenous
Anacardiaceae	*Searsia burchellii*	(Sond. ex Engl.) Moffett	LC	Indigenous
Anacardiaceae	*Searsia lancea*	(L.f.) F.A.Barkley	LC	Indigenous
Anacardiaceae	*Searsia erosa*	(Thunb.) Moffett	LC	Indigenous
Anacardiaceae	*Searsia pyroides var. gracilis*	(Burch.) Moffett	LC	Indigenous
Anacardiaceae	*Searsia bolusii*	(Sond. ex Engl.) Moffett	LC	Indigenous
Anacardiaceae	*Searsia dentata*	(Thunb.) F.A.Barkley	LC	Indigenous
Anacardiaceae	*Searsia pyroides var. pyroides*	(Burch.) Moffett	LC	Indigenous
Apiaceae	*Cyclospermum leptophyllum*	(Pers.) Sprague ex Britton & P.Wilson		Not indigenous; Naturalised
Apiaceae	*Heteromorpha arborescens var. abyssinica*	(Spreng.) Cham. & Schltdl.	LC	Indigenous
Apiaceae	*Notobubon laevigatum*	(Aiton) Magee	LC	Indigenous
Apiaceae	*Polemannia simplicior*	Hilliard & B.L.Burtt	LC	Indigenous
Apiaceae	*Bupleurum mundii*	Cham. & Schltdl.	LC	Indigenous
Apiaceae	*Berula thunbergii*	(DC.) H.Wolff	LC	Indigenous
Apocynaceae	*Asclepias sp.*			
Apocynaceae	*Cynanchum viminale subsp. viminale*	(L.) L.		Indigenous
Apocynaceae	*Pachycarpus rigidus*	E.Mey.	LC	Indigenous
Apocynaceae	*Cynanchum virens*	(E.Mey.) D.Dietr.	LC	Indigenous
Apocynaceae	*Brachystelma burchellii var. burchellii*	(Decne.) Peckover	LC	Indigenous
Apocynaceae	*Raphionacme dyeri*	Retief & Venter	LC	Indigenous

Apocynaceae	*Asclepias multicaulis*	(E.Mey.) Schltr.	LC	Indigenous
Apocynaceae	*Stenostelma corniculatum*	(E.Mey.) Bullock	LC	Indigenous
Apocynaceae	*Asclepias gibba var. gibba*	(E.Mey.) Schltr.	LC	Indigenous
Araceae	*Lemna gibba*	L.	LC	Indigenous
Araliaceae	*Cussonia paniculata subsp. sinuata*	Eckl. & Zeyh.	LC	Indigenous
Asparagaceae	*Asparagus laricinus*	Burch.	LC	Indigenous
Asparagaceae	*Asparagus striatus*	(L.f.) Thunb.	LC	Indigenous; Endemic
Asparagaceae	*Asparagus asparagoides*	(L.) W.Wight	LC	Indigenous
Asphodelaceae	*Trachyandra saltii var. saltii*	(Baker) Oberm.	LC	Indigenous
Asphodelaceae	*Trachyandra asperata var. macowanii*	Kunth	LC	Indigenous
Asphodelaceae	*Aristaloe aristata*	(Haw.) Boatwr. & J.C.Manning	LC	Indigenous
Asphodelaceae	*Aloe grandidentata*	Salm-Dyck	LC	Indigenous
Asphodelaceae	*Trachyandra asperata var. asperata*	Kunth	LC	Indigenous
Asphodelaceae	*Bulbine frutescens*	(L.) Willd.	LC	Indigenous
Asphodelaceae	*Kniphofia ritualis*	Codd	LC	Indigenous
Asphodelaceae	*Bulbine narcissifolia*	Salm-Dyck	LC	Indigenous
Aspleniaceae	*Asplenium aethiopicum*	(Burm.f.) Bech.	LC	Indigenous
Aspleniaceae	*Asplenium adiantum-nigrum var. adiantum-nigrum*	L.	LC	Indigenous
Aspleniaceae	*Asplenium trichomanes subsp. quadrivalens*	L.	LC	Indigenous
Asteraceae	*Oedera humilis*	(Less.) N.G.Bergh		Indigenous
Asteraceae	*Xanthium strumarium*	L.		Not indigenous; Naturalised; Invasive
Asteraceae	*Tagetes minuta*	L.		Not indigenous; Naturalised; Invasive
Asteraceae	*Cirsium vulgare*	(Savi) Ten.		Not indigenous; Naturalised; Invasive
Asteraceae	*Sonchus asper subsp. asper*	(L.) Hill		Not indigenous; Naturalised; Invasive
Asteraceae	*Artemisia afra*	Jacq. ex Willd.		Indigenous
Asteraceae	*Arctotis sp.*			
Asteraceae	*Seriphium plumosum*	L.		Indigenous
Asteraceae	*Felicia sp.*			
Asteraceae	*Symphyotrichum squamatum*	(Spreng.) G.L.Nesom		Not indigenous; Naturalised
Asteraceae	*Hilliardiella elaeagnoides*	(DC.) Swelank. & J.C.Manning		Indigenous
Asteraceae	*Hilliardiella capensis*	(Houtt.) H.Rob., Skvarla & V.A.Funk		Indigenous
Asteraceae	*Senecio sp.*			
Asteraceae	*Conyza podocephala*	DC.		Indigenous
Asteraceae	*Helichrysum odoratissimum var. odoratissimum*	(L.) Sweet		Indigenous
Asteraceae	*Gerbera piloselloides*	(L.) Cass.	LC	Indigenous
Asteraceae	*Nidorella anomala*	Steetz	LC	Indigenous
Asteraceae	*Garuleum pinnatifidum*	(Thunb.) DC.	LC	Indigenous; Endemic

Asteraceae	*Berkheya onopordifolia var. onopordifolia*	(DC.) O.Hoffm. ex Burtt Davy	LC	Indigenous
Asteraceae	*Denekia capensis*	Thunb.	LC	Indigenous
Asteraceae	*Eriocephalus tenuifolius*	DC.	LC	Indigenous
Asteraceae	*Helichrysum nudifolium var. pilosellum*	(L.) Less.	LC	Indigenous
Asteraceae	*Gazania krebsiana subsp. serrulata*	Less.	LC	Indigenous
Asteraceae	*Berkheya pinnatifida subsp. pinnatifida*	(Thunb.) Thell.	LC	Indigenous; Endemic
Asteraceae	*Helichrysum rugulosum*	Less.	LC	Indigenous
Asteraceae	*Pegolettia retrofracta*	(Thunb.) Kies	LC	Indigenous
Asteraceae	*Senecio hieracioides*	DC.	LC	Indigenous
Asteraceae	*Felicia muricata subsp. muricata*	(Thunb.) Nees	LC	Indigenous
Asteraceae	*Osteospermum moniliferum subsp. canescens*	L.	LC	Indigenous
Asteraceae	*Felicia petiolata*	(Harv.) N.E.Br.	LC	Indigenous
Asteraceae	*Helichrysum nudifolium var. nudifolium*	(L.) Less.	LC	Indigenous
Asteraceae	*Helichrysum dregeanum*	Sond. & Harv.	LC	Indigenous
Asteraceae	*Senecio polyodon var. polyodon*	DC.	LC	Indigenous
Asteraceae	*Senecio laevigatus var. integrifolius*	Thunb.	LC	Indigenous; Endemic
Asteraceae	*Berkheya discolor*	(DC.) O.Hoffm. & Muschl.	LC	Indigenous
Asteraceae	*Sonchus dregeanus*	DC.	LC	Indigenous
Asteraceae	*Senecio achilleifolius*	DC.	LC	Indigenous
Asteraceae	*Tolpis capensis*	(L.) Sch.Bip.	LC	Indigenous
Asteraceae	*Chrysocoma ciliata*	L.	LC	Indigenous
Asteraceae	*Hertia pallens*	(DC.) Kuntze	LC	Indigenous
Asteraceae	*Pentzia globosa*	Less.	LC	Indigenous
Asteraceae	*Helichrysum melanacme*	DC.	LC	Indigenous
Asteraceae	*Helichrysum argyrosphaerum*	DC.	LC	Indigenous
Asteraceae	*Eriocephalus eximius*	DC.	LC	Indigenous
Asteraceae	*Helichrysum zeyheri*	Less.	LC	Indigenous
Asteraceae	*Cineraria erodioides var. erodioides*	DC.	LC	Indigenous
Asteraceae	*Troglophyton capillaceum subsp. diffusum*	(Thunb.) Hilliard & B.L.Burtt	LC	Indigenous
Asteraceae	*Pseudognaphalium luteoalbum*	(L.) Hilliard & B.L.Burtt	LC	Not indigenous; Cryptogenic
Asteraceae	*Gnaphalium filagopsis*	Hilliard & B.L.Burtt	LC	Indigenous
Asteraceae	*Nolletia ciliaris*	(DC.) Steetz	LC	Indigenous
Asteraceae	*Helichrysum chionosphaerum*	DC.	LC	Indigenous
Asteraceae	*Geigeria filifolia*	Mattf.	LC	Indigenous
Asteraceae	*Schistostephium crataegifolium*	(DC.) Fenzl ex Harv.	LC	Indigenous
Asteraceae	*Pentzia cooperi*	Harv.	LC	Indigenous
Asteraceae	*Senecio cordifolius*	L.f.	LC	Indigenous; Endemic
Asteraceae	*Tarchonanthus minor*	Less.	LC	Indigenous

Asteraceae	*Senecio isatideus*	DC.	LC	Indigenous
Asteraceae	*Helichrysum aureum var. monocephalum*	(Houtt.) Merr.	NE	Indigenous
Asteraceae	*Osteospermum scariosum var. scariosum*	DC.	NE	Indigenous
Bignoniaceae	*Rhigozum obovatum*	Burch.	LC	Indigenous
Blechnaceae	*Blechnum australe subsp. australe*	L.	LC	Indigenous
Boraginaceae	*Anchusa riparia*	A.DC.	LC	Indigenous
Boraginaceae	*Ehretia rigida subsp. nervifolia*	(Thunb.) Druce	LC	Indigenous
Boraginaceae	*Cynoglossum lanceolatum*	Forssk.	LC	Indigenous
Boraginaceae	*Cynoglossum hispidum*	Thunb.	LC	Indigenous
Brassicaceae	*Erucastrum austroafricanum*	Al-Shehbaz & Warwick	LC	Indigenous
Brassicaceae	*Lepidium africanum subsp. divaricatum*	(Burm.f.) DC.	LC	Indigenous
Brassicaceae	*Sisymbrium capense*	Thunb.	LC	Indigenous
Brassicaceae	*Heliophila suavissima*	Burch. ex DC.	LC	Indigenous
Campanulaceae	*Wahlenbergia denticulata var. transvaalensis*	(Burch.) A.DC.	LC	Indigenous; Endemic
Campanulaceae	*Wahlenbergia albens*	(Spreng. ex A.DC.) Lammers	LC	Indigenous
Campanulaceae	*Wahlenbergia undulata*	(L.f.) A.DC.	LC	Indigenous
Campanulaceae	*Craterocapsa tarsodes*	Hilliard & B.L.Burtt	LC	Indigenous
Caryophyllaceae	*Silene burchellii subsp. pilosellifolia*	Otth ex DC.		Indigenous
Caryophyllaceae	*Dianthus micropetalus*	Ser.	LC	Indigenous
Commelinaceae	*Commelina africana var. lancispatha*	L.	LC	Indigenous
Commelinaceae	*Commelina africana var. krebsiana*	L.	LC	Indigenous
Convolvulaceae	*Convolvulus arvensis*	L.		Not indigenous; Naturalised; Invasive
Convolvulaceae	*Convolvulus boedeckerianus*	Peter	LC	Indigenous; Endemic
Convolvulaceae	*Ipomoea oenotheroides*	(L.f.) Raf. ex Hallier f.	LC	Indigenous
Convolvulaceae	*Convolvulus thunbergii*	Roem. & Schult.	LC	Indigenous
Convolvulaceae	*Convolvulus sagittatus*	Thunb.	LC	Indigenous
Convolvulaceae	*Ipomoea oblongata*	E.Mey. ex Choisy	LC	Indigenous
Crassulaceae	*Crassula sp.*			
Crassulaceae	*Crassula vaillantii*	(Willd.) Roth		Not indigenous; Naturalised
Crassulaceae	*Crassula natans var. natans*	Thunb.	LC	Indigenous
Crassulaceae	*Kalanchoe thyrsiflora*	Harv.	LC	Indigenous
Crassulaceae	*Cotyledon orbiculata var. oblonga*	L.	LC	Indigenous
Crassulaceae	*Crassula capitella subsp. capitella*	Thunb.	LC	Indigenous; Endemic
Crassulaceae	*Crassula dependens*	Bolus	LC	Indigenous
Crassulaceae	*Crassula nudicaulis var. nudicaulis*	L.	LC	Indigenous
Crassulaceae	*Cotyledon orbiculata var. dactylopsis*	L.	LC	Indigenous; Endemic

Cucurbitaceae	*Cucumis myriocarpus subsp. myriocarpus*	Naudin	LC	Indigenous
Cyperaceae	*Carex ludwigii*	(Hochst.) Luceno & Martin-Bravo		Indigenous
Cyperaceae	*Fuirena coerulescens*	Steud.	LC	Indigenous
Cyperaceae	*Eleocharis dregeana*	Steud.	LC	Indigenous
Cyperaceae	*Schoenoplectus muricinux*	(C.B.Clarke) J.Raynal	LC	Indigenous
Cyperaceae	*Cyperus congestus*	Vahl	LC	Indigenous
Cyperaceae	*Schoenoplectus decipiens*	(Nees) J.Raynal	LC	Indigenous
Cyperaceae	*Cyperus difformis*	L.	LC	Indigenous
Cyperaceae	*Abildgaardia ovata*	(Burm.f.) Kral	LC	Indigenous
Cyperaceae	*Cyperus esculentus var. esculentus*	L.	LC	Indigenous
Cyperaceae	*Cyperus parvinux*	C.B.Clarke	LC	Indigenous
Cyperaceae	*Kyllinga alata*	Nees	LC	Indigenous
Cyperaceae	*Cyperus obtusiflorus var. flavissimus*	Vahl	LC	Indigenous
Cyperaceae	*Cyperus marginatus*	Thunb.	LC	Indigenous
Cyperaceae	*Ficinia cinnamomea*	C.B.Clarke	LC	Indigenous
Cyperaceae	*Ficinia gracilis*	Schrad.	LC	Indigenous
Cyperaceae	*Cyperus longus var. tenuiflorus*	L.	NE	Indigenous
Dipsacaceae	*Scabiosa columbaria*	L.	LC	Indigenous
Dryopteridaceae	*Polystichum monticola*	N.C.Anthony & Schelpe	LC	Indigenous
Ebenaceae	*Diospyros austroafricana*	De Winter		Indigenous
Ebenaceae	*Diospyros lycioides subsp. lycioides*	Desf.	LC	Indigenous
Ebenaceae	*Diospyros austroafricana var. rubriflora*	De Winter	LC	Indigenous
Ebenaceae	*Diospyros austroafricana var. microphylla*	De Winter	LC	Indigenous
Ericaceae	*Erica maesta var. maesta*	Bolus	LC	Indigenous
Euphorbiaceae	*Euphorbia rhombifolia*	Boiss.	LC	Indigenous
Euphorbiaceae	*Euphorbia pulvinata*	Marloth	LC	Indigenous
Euphorbiaceae	*Acalypha segetalis*	Mull.Arg.	LC	Indigenous
Euphorbiaceae	*Euphorbia clavarioides*	Boiss.	LC	Indigenous
Fabaceae	*Rhynchosia adenodes*	Eckl. & Zeyh.	LC	Indigenous
Fabaceae	*Dichilus strictus*	E.Mey.	LC	Indigenous
Fabaceae	*Melolobium candicans*	(E.Mey.) Eckl. & Zeyh.	LC	Indigenous
Fabaceae	*Indigofera alternans var. alternans*	DC.	LC	Indigenous
Fabaceae	*Argyrolobium molle*	Eckl. & Zeyh.	LC	Indigenous; Endemic
Fabaceae	*Argyrolobium humile*	E.Phillips	LC	Indigenous; Endemic
Fabaceae	*Indigofera cryptantha var. cryptantha*	Benth. ex Harv.	LC	Indigenous
Fabaceae	*Elephantorrhiza elephantina*	(Burch.) Skeels	LC	Indigenous
Fabaceae	*Lotononis laxa*	Eckl. & Zeyh.	LC	Indigenous
Fabaceae	*Crotalaria distans subsp. distans*	Benth.	LC	Indigenous
Fabaceae	*Rhynchosia hirsuta*	Eckl. & Zeyh.	LC	Indigenous

Fabaceae	*Lessertia frutescens subsp. microphylla*	(L.) Goldblatt & J.C.Manning	LC	Indigenous
Fabaceae	*Tephrosia capensis var. angustifolia*	(Jacq.) Pers.	LC	Indigenous; Endemic
Fabaceae	*Melolobium microphyllum*	(L.f.) Eckl. & Zeyh.	LC	Indigenous
Fabaceae	*Lessertia affinis*	Burtt Davy	LC	Indigenous; Endemic
Fabaceae	*Lessertia frutescens subsp. frutescens*	(L.) Goldblatt & J.C.Manning	LC	Indigenous
Fabaceae	*Cullen tomentosum*	(Thunb.) J.W.Grimes	LC	Indigenous
Fabaceae	*Rhynchosia totta var. totta*	(Thunb.) DC.	LC	Indigenous
Fabaceae	*Lessertia depressa*	Harv.	LC	Indigenous
Fabaceae	*Indigofera nigromontana*	Eckl. & Zeyh.	LC	Indigenous
Fabaceae	*Indigastrum fastigiatum*	(E.Mey.) Schrire	LC	Indigenous
Fabaceae	*Lotononis sericophylla*	Benth.	LC	Indigenous
Fabaceae	*Erythrina zeyheri*	Harv.	LC	Indigenous
Fabaceae	*Melolobium canescens*	Benth.	LC	Indigenous
Fabaceae	*Lessertia pauciflora var. pauciflora*	Harv.	LC	Indigenous
Fabaceae	*Melolobium obcordatum*	Harv.	LC	Indigenous
Fabaceae	*Medicago laciniata var. laciniata*	(L.) Mill.	NE	Not indigenous; Naturalised
Fabaceae	*Trifolium africanum var. africanum*	Ser.	NE	Indigenous
Fabaceae	*Lotononis divaricata*	(Eckl. & Zeyh.) Benth.	NE	Indigenous
Fabaceae	*Gleditsia triacanthos*	L.	NE	Not indigenous; Naturalised; Invasive
Fabaceae	*Rhynchosia minima var. prostrata*	(L.) DC.	NE	Indigenous
Fabaceae	*Lessertia perennans var. perennans*	(Jacq.) DC.	NE	Indigenous
Gentianaceae	*Sebaea filiformis*	Schinz	LC	Indigenous
Gentianaceae	*Sebaea leiostyla*	Gilg	LC	Indigenous
Gentianaceae	*Sebaea bojeri*	Griseb.	LC	Indigenous
Gentianaceae	*Sebaea compacta*	A.W.Hill	LC	Indigenous; Endemic
Geraniaceae	*Pelargonium dolomiticum*	R.Knuth	LC	Indigenous
Geraniaceae	*Geranium robustum*	Kuntze	LC	Indigenous
Geraniaceae	*Pelargonium sidoides*	DC.	LC	Indigenous
Geraniaceae	*Pelargonium abrotanifolium*	(L.f.) Jacq.	LC	Indigenous; Endemic
Gunneraceae	*Gunnera perpensa*	L.	LC	Indigenous
Hyacinthaceae	*Drimia elata*	Jacq. ex Willd.	DD	Indigenous
Hyacinthaceae	*Massonia jasminiflora*	Burch. ex Baker	LC	Indigenous
Hyacinthaceae	*Ledebouria luteola*	Jessop	LC	Indigenous
Hyacinthaceae	*Schizocarphus nervosus*	(Burch.) Van der Merwe	LC	Indigenous
Hyacinthaceae	*Albuca virens subsp. arida*	(Ker Gawl.) J.C.Manning & Goldblatt	LC	Indigenous
Hydrocharitaceae	*Lagarosiphon muscoides*	Harv.	LC	Indigenous
Hypericaceae	*Hypericum wilmsii*	R.Keller	LC	Indigenous
Hypodontiaceae	*Hypodontium dregei*	(Hornsch.) Mull.Hal.		Indigenous

Hypoxidaceae	*Hypoxis angustifolia var. angustifolia*	Lam.	LC	Indigenous
Hypoxidaceae	*Hypoxis argentea var. argentea*	Harv. ex Baker	LC	Indigenous
Hypoxidaceae	*Hypoxis rigidula var. rigidula*	Baker	LC	Indigenous
Hypoxidaceae	*Hypoxis argentea var. sericea*	Harv. ex Baker	LC	Indigenous
Hypoxidaceae	*Hypoxis hemerocallidea*	Fisch., C.A.Mey. & Ave-Lall.	LC	Indigenous
Iridaceae	*Dierama sp.*			
Iridaceae	*Crocosmia aurea subsp. aurea*	(Pappe ex Hook.) Planch.	LC	Indigenous
Iridaceae	*Gladiolus permeabilis subsp. edulis*	D.Delaroche	LC	Indigenous
Iridaceae	*Dierama robustum*	N.E.Br.	LC	Indigenous
Iridaceae	*Moraea simulans*	Baker	LC	Indigenous
Iridaceae	*Aristea abyssinica*	Pax	LC	Indigenous
Juncaceae	*Juncus exsertus*	Buchenau	LC	Indigenous
Juncaceae	*Juncus punctorius*	L.f.	LC	Indigenous
Juncaceae	*Juncus inflexus*	L.	LC	Indigenous
Juncaceae	*Juncus oxycarpus*	E.Mey. ex Kunth	LC	Indigenous
Juncaceae	*Juncus rigidus*	Desf.	LC	Indigenous
Lamiaceae	*Salvia repens var. repens*	Burch. ex Benth.	LC	Indigenous
Lamiaceae	*Salvia verbenaca*	L.	LC	Not indigenous; Naturalised; Invasive
Lamiaceae	*Ajuga ophrydis*	Burch. ex Benth.	LC	Indigenous
Lamiaceae	*Stachys hyssopoides*	Burch. ex Benth.	LC	Indigenous
Lamiaceae	*Acrotome inflata*	Benth.	LC	Indigenous
Lamiaceae	*Teucrium trifidum*	Retz.	LC	Indigenous
Lamiaceae	*Stachys aethiopica*	L.	LC	Indigenous
Linaceae	*Linum thunbergii*	Eckl. & Zeyh.	LC	Indigenous
Lobeliaceae	*Lobelia erinus*	L.	LC	Indigenous
Lobeliaceae	*Cyphia triphylla*	E.Phillips	LC	Indigenous
Malvaceae	*Malva pusilla*	Sm.		Not indigenous; Naturalised
Malvaceae	*Sphaeralcea bonariensis*	(Cav.) Griseb.		Not indigenous; Naturalised
Malvaceae	*Malva verticillata var. verticillata*	L.		Not indigenous; Naturalised
Malvaceae	*Grewia occidentalis*	L.		Indigenous
Malvaceae	*Hermannia sp.*			
Malvaceae	*Sida dregei*	Burtt Davy	LC	Indigenous
Malvaceae	*Hermannia cordata*	(E.Mey. ex E.Phillips) De Winter	LC	Indigenous; Endemic
Malvaceae	*Hibiscus pusillus*	Thunb.	LC	Indigenous
Malvaceae	*Hibiscus aethiopicus var. ovatus*	L.	LC	Indigenous
Malvaceae	*Anisodontea julii subsp. julii*	(Burch. ex DC.) D.M.Bates	LC	Indigenous
Malvaceae	*Grewia occidentalis var. occidentalis*	L.	LC	Indigenous
Malvaceae	*Pavonia burchellii*	(DC.) R.A.Dyer	LC	Indigenous
Malvaceae	*Hermannia depressa*	N.E.Br.	LC	Indigenous

Malvaceae	*Hermannia geniculata*	Eckl. & Zeyh.	LC	Indigenous
Malvaceae	*Hermannia oblongifolia*	(Harv.) Hochr.	LC	Indigenous; Endemic
Molluginaceae	*Pharnaceum detonsum*	Fenzl	LC	Indigenous
Molluginaceae	*Psammotropha mucronata var. mucronata*	(Thunb.) Fenzl	LC	Indigenous
Oleaceae	*Olea europaea subsp. cuspidata*	L.		Indigenous
Oleaceae	*Menodora africana*	Hook.	LC	Indigenous
Onagraceae	*Oenothera rosea*	L'Her. ex Aiton		Not indigenous; Naturalised; Invasive
Onagraceae	*Epilobium capense*	Buchinger ex Hochst.	LC	Indigenous
Orobanchaceae	*Harveya pauciflora*	(Benth.) Hiern	LC	Indigenous
Orobanchaceae	*Striga elegans*	Benth.	LC	Indigenous
Orobanchaceae	*Striga bilabiata subsp. bilabiata*	(Thunb.) Kuntze	LC	Indigenous
Oxalidaceae	*Oxalis sp.*			
Oxalidaceae	*Oxalis smithiana*	Eckl. & Zeyh.	LC	Indigenous
Oxalidaceae	*Oxalis depressa*	Eckl. & Zeyh.	LC	Indigenous
Peraceae	*Clutia pulchella var. pulchella*	L.	LC	Indigenous
Phyllanthaceae	*Phyllanthus parvulus var. parvulus*	Sond.	LC	Indigenous
Plantaginaceae	*Veronica anagallis-aquatica*	L.	LC	Indigenous
Poaceae	*Bromus sp.*			
Poaceae	*Trisetopsis imberbis*	(Nees) Roser, A.Wolk & Veldkamp		Indigenous
Poaceae	*Setaria sp.*			
Poaceae	*Aristida adscensionis*	L.	LC	Indigenous
Poaceae	*Eragrostis nindensis*	Ficalho & Hiern	LC	Indigenous
Poaceae	*Triraphis andropogonoides*	(Steud.) E.Phillips	LC	Indigenous
Poaceae	*Festuca scabra*	Vahl	LC	Indigenous
Poaceae	*Eustachys paspaloides*	(Vahl) Lanza & Mattei	LC	Indigenous
Poaceae	*Setaria incrassata*	(Hochst.) Hack.	LC	Indigenous
Poaceae	*Oropetium capense*	Stapf	LC	Indigenous
Poaceae	*Digitaria argyrograpta*	(Nees) Stapf	LC	Indigenous
Poaceae	*Enneapogon scoparius*	Stapf	LC	Indigenous
Poaceae	*Andropogon schirensis*	Hochst. ex A.Rich.	LC	Indigenous
Poaceae	*Panicum maximum*	Jacq.	LC	Indigenous
Poaceae	*Hyparrhenia hirta*	(L.) Stapf	LC	Indigenous
Poaceae	*Eragrostis capensis*	(Thunb.) Trin.	LC	Indigenous
Poaceae	*Eragrostis racemosa*	(Thunb.) Steud.	LC	Indigenous
Poaceae	*Eragrostis stapfii*	De Winter	LC	Indigenous
Poaceae	*Hordeum capense*	Thunb.	LC	Indigenous
Poaceae	*Melica decumbens*	Thunb.	LC	Indigenous
Poaceae	*Koeleria capensis*	(Steud.) Nees	LC	Indigenous

Poaceae	*Stipagrostis zeyheri subsp. sericans*	(Nees) De Winter	LC	Indigenous
Poaceae	*Cynodon dactylon*	(L.) Pers.	LC	Indigenous
Poaceae	*Microchloa kunthii*	Desv.	LC	Indigenous
Poaceae	*Tragus koelerioides*	Asch.	LC	Indigenous
Poaceae	*Aristida congesta subsp. congesta*	Roem. & Schult.	LC	Indigenous
Poaceae	*Setaria verticillata*	(L.) P.Beauv.	LC	Indigenous
Poaceae	*Melica racemosa*	Thunb.	LC	Indigenous
Poaceae	*Eragrostis curvula*	(Schrad.) Nees	LC	Indigenous
Poaceae	*Cymbopogon dieterlenii*	Stapf ex E.Phillips	LC	Indigenous
Poaceae	*Digitaria tricholaenoides*	Stapf	LC	Indigenous
Poaceae	*Melinis repens subsp. repens*	(Willd.) Zizka	LC	Indigenous
Poaceae	*Eragrostis planiculmis*	Nees	LC	Indigenous
Poaceae	*Microchloa caffra*	Nees	LC	Indigenous
Poaceae	*Sporobolus fimbriatus*	(Trin.) Nees	LC	Indigenous
Poaceae	*Eragrostis gummiflua*	Nees	LC	Indigenous
Poaceae	*Tetrachne dregei*	Nees	LC	Indigenous
Poaceae	*Setaria sphacelata var. torta*	(Schumach.) Stapf & C.E.Hubb. ex M.B.Moss	LC	Indigenous
Poaceae	*Urochloa panicoides*	P.Beauv.	LC	Indigenous
Poaceae	*Setaria sphacelata var. sphacelata*	(Schumach.) Stapf & C.E.Hubb. ex M.B.Moss	LC	Indigenous
Poaceae	*Andropogon appendiculatus*	Nees	LC	Indigenous
Poaceae	*Sporobolus discosporus*	Nees	LC	Indigenous
Poaceae	*Panicum coloratum*	L.	LC	Indigenous
Poaceae	*Heteropogon contortus*	(L.) Roem. & Schult.	LC	Indigenous
Poaceae	*Aristida bipartita*	(Nees) Trin. & Rupr.	LC	Indigenous
Poaceae	*Aristida canescens subsp. canescens*	Henrard	LC	Indigenous
Poaceae	*Elionurus muticus*	(Spreng.) Kunth	LC	Indigenous
Poaceae	*Eragrostis micrantha*	Hack.	LC	Indigenous
Poaceae	*Phragmites australis*	(Cav.) Steud.	LC	Indigenous
Poaceae	*Eragrostis plana*	Nees	LC	Indigenous
Poaceae	*Chloris virgata*	Sw.	LC	Indigenous
Poaceae	*Eragrostis obtusa*	Munro ex Ficalho & Hiern	LC	Indigenous
Poaceae	*Eragrostis echinochloidea*	Stapf	LC	Indigenous
Poaceae	*Hyparrhenia dregeana*	(Nees) Stapf ex Stent	LC	Indigenous
Poaceae	*Digitaria eriantha*	Steud.	LC	Indigenous
Poaceae	*Eragrostis cilianensis*	(All.) Vignolo ex Janch.	LC	Indigenous
Poaceae	*Eragrostis trichophora*	Coss. & Durieu	LC	Indigenous
Poaceae	*Agrostis lachnantha var. lachnantha*	Nees	LC	Indigenous
Poaceae	*Setaria nigrirostris*	(Nees) T.Durand & Schinz	LC	Indigenous
Poaceae	*Digitaria sanguinalis*	(L.) Scop.	NE	Not indigenous; Naturalised

Poaceae	*Paspalum dilatatum*	Poir.	NE	Not indigenous; Naturalised; Invasive
Poaceae	*Eragrostis tef*	(Zuccagni) Trotter	NE	Not indigenous; Naturalised
Poaceae	*Bromus catharticus*	Vahl	NE	Not indigenous; Naturalised; Invasive
Polygalaceae	*Polygala hottentotta*	C.Presl	LC	Indigenous
Polygalaceae	*Polygala gymnoclada*	MacOwan	LC	Indigenous
Polygalaceae	*Polygala gracilenta*	Burtt Davy	LC	Indigenous
Polygalaceae	*Polygala ephedroides*	Burch.	LC	Indigenous
Polygonaceae	*Fallopia convolvulus*	(L.) Holub		Not indigenous; Naturalised
Polygonaceae	*Persicaria hystricula*	(J.Schust.) Sojak	LC	Indigenous
Polygonaceae	*Rumex lanceolatus*	Thunb.	LC	Indigenous
Polypodiaceae	*Pleopeltis macrocarpa*	(Bory ex Willd.) Kaulf.	LC	Indigenous
Pottiaceae	*Pseudocrossidium crinitum*	(Schultz) R.H.Zander		Indigenous
Pteridaceae	*Pteris cretica*	L.	LC	Indigenous
Pteridaceae	*Cheilanthes quadripinnata*	(Forssk.) Kuhn	LC	Indigenous
Ranunculaceae	*Ranunculus trichophyllus*	Chaix	LC	Indigenous
Ranunculaceae	*Ranunculus multifidus*	Forssk.	LC	Indigenous
Ranunculaceae	*Thalictrum minus*	L.	LC	Indigenous
Rhamnaceae	*Rhamnus prinoides*	L'Her.	LC	Indigenous
Rhamnaceae	*Ziziphus mucronata subsp. mucronata*	Willd.	LC	Indigenous
Rosaceae	*Rubus ludwigii subsp. ludwigii*	Eckl. & Zeyh.	LC	Indigenous
Rosaceae	*Cliffortia serpyllifolia*	Cham. & Schltdl.	LC	Indigenous
Rosaceae	*Leucosidea sericea*	Eckl. & Zeyh.	LC	Indigenous
Rosaceae	*Rubus rigidus*	Sm.	LC	Indigenous
Rosaceae	*Alchemilla elongata var. elongata*	Eckl. & Zeyh.	NE	Indigenous
Rubiaceae	*Anthospermum rigidum subsp. rigidum*	Eckl. & Zeyh.	LC	Indigenous
Rubiaceae	*Galium capense subsp. capense*	Thunb.	LC	Indigenous
Rubiaceae	*Galium thunbergianum var. thunbergianum*	Eckl. & Zeyh.	LC	Indigenous
Rubiaceae	*Rubia cordifolia subsp. conotricha*	L.	LC	Indigenous
Rubiaceae	*Anthospermum herbaceum*	L.f.	LC	Indigenous
Rubiaceae	*Galium capense subsp. garipense*	Thunb.	NE	Indigenous
Salviniaceae	*Azolla filiculoides*	Lam.	NE	Not indigenous; Naturalised; Invasive
Santalaceae	*Thesium lobelioides*	A.DC.	LC	Indigenous; Endemic
Santalaceae	*Osyris lanceolata*	Hochst. & Steud.	LC	Indigenous
Santalaceae	*Viscum rotundifolium*	L.f.	LC	Indigenous
Scrophulariaceae	*Nemesia sp.*			
Scrophulariaceae	*Jamesbrittenia sp.*			
Scrophulariaceae	*Diascia capsularis*	Benth.	LC	Indigenous

Scrophulariaceae	*Chaenostoma patrioticum*	(Hiern) Kornhall	LC	Indigenous
Scrophulariaceae	*Jamesbrittenia atropurpurea subsp. atropurpurea*	(Benth.) Hilliard	LC	Indigenous
Scrophulariaceae	*Buddleja saligna*	Willd.	LC	Indigenous
Scrophulariaceae	*Zaluzianskya schmitziae*	Hilliard & B.L.Burtt	LC	Indigenous
Scrophulariaceae	*Jamesbrittenia stricta*	(Benth.) Hilliard	LC	Indigenous
Scrophulariaceae	*Hebenstretia dura*	Choisy	LC	Indigenous
Scrophulariaceae	*Gomphostigma virgatum*	(L.f.) Baill.	LC	Indigenous
Scrophulariaceae	*Selago saxatilis*	E.Mey.	LC	Indigenous
Scrophulariaceae	*Jamesbrittenia filicaulis*	(Benth.) Hilliard	LC	Indigenous
Scrophulariaceae	*Chaenostoma halimifolium*	Benth.	LC	Indigenous
Scrophulariaceae	*Selago albida*	Choisy	LC	Indigenous
Scrophulariaceae	*Buddleja salviifolia*	(L.) Lam.	LC	Indigenous
Scrophulariaceae	*Nemesia rupicola*	Hilliard	LC	Indigenous
Scrophulariaceae	*Limosella inflata*	Hilliard & B.L.Burtt	LC	Indigenous
Selaginellaceae	*Selaginella dregei*	(C.Presl) Hieron.	LC	Indigenous
Solanaceae	*Solanum elaeagnifolium*	Cav.		Not indigenous; Naturalised; Invasive
Solanaceae	*Solanum nigrum*	L.		Not indigenous; Naturalised
Solanaceae	*Solanum pseudocapsicum*	L.		Not indigenous; Naturalised; Invasive
Solanaceae	*Solanum lichtensteinii*	Willd.	LC	Indigenous
Solanaceae	*Lycium hirsutum*	Dunal	LC	Indigenous
Solanaceae	*Solanum retroflexum*	Dunal	LC	Indigenous
Solanaceae	*Lycium cinereum*	Thunb.	LC	Indigenous
Stilbaceae	*Halleria lucida*	L.	LC	Indigenous
Thymelaeaceae	*Lasiosiphon kraussianus var. kraussianus*	(Meisn.) Meisn.		Indigenous
Thymelaeaceae	*Gnidia wikstroemiana*	Meisn.	LC	Indigenous; Endemic
Thymelaeaceae	*Lasiosiphon polycephalus*	(E.Mey. ex Meisn.) H.Pearson	LC	Indigenous
Thymelaeaceae	*Lasiosiphon capitatus*	(L.f.) Burtt Davy	LC	Indigenous
Thymelaeaceae	*Gnidia gymnostachya*	(C.A.Mey.) Gilg	LC	Indigenous
Thymelaeaceae	*Passerina montana*	Thoday	LC	Indigenous
Vahliaceae	*Vahlia sp.*			
Verbenaceae	*Verbena bonariensis*	L.		Not indigenous; Naturalised; Invasive
Verbenaceae	*Lantana rugosa*	Thunb.	LC	Indigenous
Vitaceae	*Rhoicissus tridentata subsp. cuneifolia*	(L.f.) Wild & R.B.Drumm.	NE	Indigenous

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Amietia delalandii	Delalande's River Frog	LC	Unlisted
Amietia fuscigula	Common River Frog	LC	LC
Cacosternum boettgeri	Common Caco	LC	LC
Kassina senegalensis	Bubbling Kassina	LC	LC
Phrynobatrachus natalensis	Snoring Puddle Frog	LC	LC
Poyntonophrynus vertebralis	Southern Pygmy Toad	LC	LC
Pyxicephalus adspersus	Giant Bullfrog	NT	LC
Sclerophrys capensis	Raucous Toad	LC	LC
Sclerophrys gutturalis	Guttural Toad	LC	LC
Sclerophrys poweri	Power's Toad	LC	LC
Semnodactylus wealii	Rattling Frog	LC	LC
Strongylopus grayii	Clicking Stream Frog	LC	LC
Tomopterna cryptotis	Tremelo Sand Frog	LC	LC
Tomopterna tandyi	Tandy's Sand Frog	LC	LC
Vandijkophrynus gariepensis	Karoo toad	LC	LC
Vandijkophrynus gariepensis gariepensis	Karoo Toad	Not listed	Not listed
Xenopus laevis	Common Platanna	LC	LC

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Acontias gracilicauda	Thin-tailed Legless Skink	LC	LC
Afroedura nivaria	Drankensberg Flat Gecko	LC	LC
Agama aculeata distanti	Eastern Ground Agama	LC	LC
Agama atra	Southern Rock Agama	LC	LC
Aparallactus capensis	Black-headed Centipede-eater	LC	LC
Atractaspis bibronii	Bibron's Stiletto Snake	LC	Unlisted
Bitis arietans arietans	Puff Adder	LC	Unlisted
Boaedon capensis	Brown House Snake	LC	LC
Chamaeleo dilepis	Common Flap-neck Chameleon	LC	LC
Chondrodactylus bibronii	Bibron's Gecko	LC	Unlisted
Crotaphopeltis hotamboeia	Red-lipped Snake	LC	Unlisted
Dasypeltis scabra	Rhombic Egg-eater	LC	LC
Duberria lutrix	Common Slug-eater	LC	LC
Elapsoidea sundevallii	Sundevall's Garter Snake	LC	Unlisted
Gerrhosaurus flavigularis	Yellow-throated Plated Lizard	LC	Unlisted
Hemachatus haemachatus	Rinkhals	LC	LC
Homopus femoralis	Greater Dwarf Tortoise	LC	LC
Homoroselaps dorsalis	Striped Harlequin Snake	NT	LC
Karusasaurus polyzonus	Southern Karusa Lizard	LC	LC
Lamprophis aurora	Aurora House Snake	LC	LC
Lamprophis guttatus	Spotted Rock Snake	LC	LC
Leptotyphlops scutifrons	Peters' Thread Snake	LC	Unlisted
Lycodonomorphus rufulus	Brown Water Snake	LC	Unlisted
Lycophidion capense capense	Cape Wolf Snake	LC	Unlisted
Lygodactylus capensis	Cape dwarf gecko	LC	LC
Monopeltis capensis	Cape Worm Lizard	LC	LC
Naja nivea	Cape Cobra	LC	Unlisted
Nucras holubi	Holub's Sandveld Lizard	LC	Unlisted
Pachydactylus capensis	Cape Gecko	LC	Unlisted
Pachydactylus mariquensis	Common Banded Gecko	LC	LC
Panaspis wahlbergii	Wahlberg's Snake-eyed Skink	LC	Unlisted
Pedioplanis lineoocellata lineoocellata	Spotted Sand Lizard	LC	Unlisted
Pelomedusa galeata	South African Marsh Terrapin	Not evaluated	Unlisted
Prosymna sundevallii	Sundevall's Shovel-snout	LC	LC
Psammobates oculifer	Serrated Tent Tortoise	LC	Unlisted
Psammophis crucifer	Cross-marked Grass Snake	LC	LC

Psammophis notostictus	Karoo Sand Snake	LC	Unlisted
Psammophis trinasalis	Fork-marked Sand Snake	LC	Unlisted
Psammophylax rhombeatus	Spotted Grass Snake	LC	Unlisted
Psammophylax tritaeniatus	Striped Grass Snake	LC	LC
Pseudaspis cana	Mole Snake	LC	Unlisted
Pseudocordylus melanotus melanotus	Common Crag Lizard	LC	LC
Rhinotyphlops lalandei	Delalande's Beaked Blind Snake	LC	Unlisted
Stigmochelys pardalis	Leopard Tortoise	LC	LC
Trachylepis capensis	Cape Skink	LC	Unlisted
Trachylepis punctatissima	Speckled Rock Skink	LC	LC
Trachylepis punctulata	Speckled Sand Skink	LC	Unlisted
Trachylepis varia	Variable Skink	LC	LC
Varanus albigularis albigularis	Southern Rock Monitor	LC	Unlisted
Varanus niloticus	Water Monitor	LC	Unlisted
Xenocalamus bicolor bicolor	Bicoloured Quill-snouted Snake	LC	Unlisted

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

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Aethomys ineptus	Tete Veld Rat	LC	LC
Aethomys namaquensis	Namaqua rock rat	LC	LC
Aonyx capensis	Cape Clawless Otter	NT	NT
Atelerix frontalis	South Africa Hedgehog	NT	LC
Atilax paludinosus	Water Mongoose	LC	LC
Canis mesomelas	Black-backed Jackal	LC	LC
Caracal caracal	Caracal	LC	LC
Crocidura cyanea	Reddish-grey Musk Shrew	LC	LC
Crocidura fuscomurina	Tiny Musk Shrew	LC	LC
Cryptomys hottentotus	Common Mole-rat	LC	LC
Cynictis penicillata	Yellow Mongoose	LC	LC
Desmodillus auricularis	Short-tailed Gerbil	LC	LC
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT
Elephantulus myurus	Eastern Rock Sengi	LC	LC
Eptesicus hottentotus	Long-tailed Serotine Bat	LC	LC
Felis nigripes	Black-footed Cat	VU	VU
Felis silvestris	African Wildcat	LC	LC
Genetta genetta	Small-spotted Genet	LC	LC
Gerbilliscus brantsii	Highveld Gerbil	LC	LC
Gerbilliscus leucogaster	Bushveld Gerbil	LC	LC
Herpestes pulverulentus	Cape Grey Mongoose	LC	LC
Herpestes sanguineus	Slender Mongoose	LC	LC
Hydrictis maculicollis	Spotted-necked Otter	VU	NT
Hystrix africaeaustralis	Cape Porcupine	LC	LC
Ichneumia albicauda	White-tailed Mongoose	LC	LC
Ictonyx striatus	Striped Polecat	LC	LC
Leptailurus serval	Serval	NT	LC
Lepus capensis	Cape Hare	LC	LC
Lepus saxatilis	Scrub Hare	LC	LC
Lepus victoriae	African Savanna Hare	LC	LC
Malacothrix typica	Gerbil Mouse	LC	LC
Mastomys coucha	Multimammate Mouse	LC	LC
Mellivora capensis	Honey Badger	LC	LC
Mus musculus	House Mouse	Unlisted	LC
Mus orangiae	Free State Pygmy Mouse	NE	Unlisted
Myotis welwitschii	Welwitsch's Hairy Bat	LC	LC

Mystromys albicaudatus	White-tailed Rat	VU	EN
Neoromicia capensis	Cape Serotine Bat	LC	LC
Neoromicia zuluensis	Aloe Bat	LC	LC
Orycteropus afer	Aardvark	LC	LC
Otocyon megalotis	Bat-eared Fox	LC	LC
Otomys irroratus	Vlei Rat (Fynbos type)	LC	LC
Otomys saundersiae	Saunder's vlei rat	LC	LC
Panthera pardus	Leopard	VU	VU
Papio ursinus	Chacma Baboon	LC	LC
Parahyaena brunnea	Brown Hyaena	NT	NT
Pedetes capensis	Springhare	LC	LC
Phacochoerus africanus	Common Warthog	LC	LC
Poecilogale albinucha	African Striped Weasel	NT	LC
Procavia capensis	Rock Hyrax	LC	LC
Pronolagus rupestris	Smith's Red Rock Hare	LC	LC
Pronolagus saundersiae	Natal Red Rock Rabbit	LC	LC
Proteles cristata	Aardwolf	LC	LC
Raphicerus campestris	Steenbok	LC	LC
Rattus rattus	House Rat	Exotic (Not listed)	LC
Redunca fulvorufula	Mountain Reedbuck	EN	LC
Rhabdomys pumilio	Xeric Four-striped Mouse	LC	LC
Rhinolophus clivosus	Geoffroy's Horseshoe Bat	LC	LC
Rhinolophus darlingi	Darling's Horseshoe Bat	LC	LC
Scotophilus dinganii	Yellow House Bat	LC	LC
Suncus varilla	Lesser Dwarf Shrew	LC	LC
Suricata suricatta	Suricate	LC	LC
Tadarida aegyptiaca	Egyptian Free-tailed Bat	LC	LC
Vulpes chama	Cape Fox	LC	LC
Xerus inauris	Cape Ground Squirrel	LC	LC

10.5 Appendix E -Avifauna Species expected to occur within the project area

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Acrocephalus baeticatus	Reed-warbler, African	Unlisted	Unlisted
Acrocephalus gracilirostris	Swamp-warbler, Lesser	Unlisted	LC
Actitis hypoleucos	Sandpiper, Common	Unlisted	LC
Afrotis afraoides	Korhaan, Northern Black	Unlisted	LC
Alopochen aegyptiaca	Goose, Egyptian	LC	LC
Amadina erythrocephala	Finch, Red-headed	Unlisted	LC
Anas erythrorhyncha	Teal, Red-billed	Unlisted	LC
Anas sparsa	Duck, African Black	Unlisted	LC
Anas undulata	Duck, Yellow-billed	Unlisted	LC
Anhinga rufa	Darter, African	Unlisted	LC
Anthus cinnamomeus	Pipit, African	Unlisted	LC
Anthus nicholsoni	Nicholson's pipit	Unlisted	Unlisted
Apus affinis	Swift, Little	Unlisted	LC
Apus caffer	Swift, White-rumped	Unlisted	LC
Ardea alba	Egret, Great	Unlisted	LC
Ardea cinerea	Heron, Grey	Unlisted	LC
Ardea melanocephala	Heron, Black-headed	Unlisted	LC
Bostrychia hagedash	Ibis, Hadeda	Unlisted	LC
Bubulcus ibis	Egret, Cattle	Unlisted	LC
Burhinus capensis	Thick-knee, Spotted	Unlisted	LC
Buteo buteo	Buzzard, Common (Steppe)	Unlisted	LC
Calandrella cinerea	Lark, Red-capped	Unlisted	LC
Calidris pugnax	Ruff	Unlisted	LC
Cecropis cucullata	Swallow, Greater Striped	Unlisted	LC
Cecropis semirufa	Swallow, Red-breasted	Unlisted	LC
Cercotrichas coryphoeus	Scrub-robin, Karoo	Unlisted	LC
Cercotrichas paena	Scrub-robin, Kalahari	Unlisted	LC
Charadrius pecuarius	Plover, Kittlitz's	Unlisted	LC
Charadrius tricollaris	Plover, Three-banded	Unlisted	LC
Chersomanes albofasciata	Lark, Spike-heeled	Unlisted	LC
Chrysococcyx caprius	Cuckoo, Diderick	Unlisted	LC
Cinnyris talatala	Sunbird, White-bellied	Unlisted	LC
Cisticola aridulus	Cisticola, Desert	Unlisted	LC
Cisticola fulvicapilla	Neddicky, Neddicky	Unlisted	LC
Cisticola juncidis	Cisticola, Zitting	Unlisted	LC
Cisticola textrix	Cisticola, Cloud	Unlisted	LC

Cisticola tinniens	Cisticola, Levaillant's	Unlisted	LC
Colius colius	Mousebird, White-backed	Unlisted	LC
Colius striatus	Mousebird, Speckled	Unlisted	LC
Columba guinea	Pigeon, Speckled	Unlisted	LC
Corvus albus	Crow, Pied	Unlisted	LC
Cossypha caffra	Robin-chat, Cape	Unlisted	LC
Coturnix coturnix	Quail, Common	Unlisted	LC
Creatophora cinerea	Starling, Wattled	Unlisted	LC
Crithagra atrogularis	Canary, Black-throated	Unlisted	LC
Crithagra flaviventris	Canary, Yellow	Unlisted	LC
Curruca subcoerulea	Tit-babbler, Chestnut-vented	Unlisted	Unlisted
Dendrocygna viduata	Duck, White-faced Whistling	Unlisted	LC
Egretta garzetta	Egret, Little	Unlisted	LC
Elanus caeruleus	Kite, Black-shouldered	Unlisted	LC
Emberiza capensis	Bunting, Cape	Unlisted	LC
Emberiza tahapisi	Bunting, Cinnamon-breasted	Unlisted	LC
Eremopterix leucotis	Sparrowlark, Chestnut-backed	Unlisted	LC
Estrilda astrild	Waxbill, Common	Unlisted	LC
Euplectes afer	Bishop, Yellow-crowned	Unlisted	LC
Euplectes orix	Bishop, Southern Red	Unlisted	LC
Euplectes progne	Widowbird, Long-tailed	Unlisted	LC
Falco naumanni	Kestrel, Lesser	Unlisted	LC
Falco rupicoloides	Kestrel, Greater	Unlisted	LC
Falco rupicolus	Kestrel, Rock	Unlisted	LC
Fulica cristata	Coot, Red-knobbed	Unlisted	LC
Gallinula chloropus	Moorhen, Common	Unlisted	LC
Haliaeetus vocifer	Fish-eagle, African	Unlisted	LC
Himantopus himantopus	Stilt, Black-winged	Unlisted	LC
Hirundo albigularis	Swallow, White-throated	Unlisted	LC
Hirundo rustica	Swallow, Barn	Unlisted	LC
Indicator indicator	Honeyguide, Greater	Unlisted	LC
Jynx ruficollis	Wryneck, Red-throated	Unlisted	LC
Lamprotornis bicolor	Starling, Pied	Unlisted	LC
Lamprotornis nitens	Starling, Cape Glossy	Unlisted	LC
Lanius collaris	Fiscal, Common (Southern)	Unlisted	LC
Macronyx capensis	Longclaw, Cape	Unlisted	LC
Melaenornis silens	Flycatcher, Fiscal	Unlisted	LC
Melaniparus cinerascens	Tit, Ashy	Unlisted	LC
Melierax canorus	Goshawk, Southern Pale Chanting	Unlisted	LC

Merops apiaster	Bee-eater, European	Unlisted	LC
Merops bullockoides	Bee-eater, White-fronted	Unlisted	LC
Microcarbo africanus	Cormorant, Reed	Unlisted	LC
Mirafra africana	Lark, Rufous-naped	Unlisted	LC
Mirafra fasciolata	Lark, Eastern Clapper	Unlisted	LC
Motacilla capensis	Wagtail, Cape	Unlisted	LC
Myrmecocichla formicivora	Chat, Anteating	Unlisted	LC
Numida meleagris	Guineafowl, Helmeted	Unlisted	LC
Oena capensis	Dove, Namaqua	Unlisted	LC
Oenanthe familiaris	Chat, Familiar	Unlisted	LC
Ortygospiza atricollis	Quailfinch, African	Unlisted	LC
Passer diffusus	Sparrow, Southern Grey-headed	Unlisted	LC
Passer domesticus	Sparrow, House	Unlisted	LC
Passer melanurus	Sparrow, Cape	Unlisted	LC
Petrochelidon spilodera	Cliff-swallow, South African	Unlisted	LC
Phoeniculus purpureus	Wood-hoopoe, Green	Unlisted	LC
Phylloscopus trochilus	Warbler, Willow	Unlisted	LC
Platalea alba	Spoonbill, African	Unlisted	LC
Plectropterus gambensis	Goose, Spur-winged	Unlisted	LC
Plegadis falcinellus	Ibis, Glossy	Unlisted	LC
Plocepasser mahali	Sparrow-weaver, White-browed	Unlisted	LC
Ploceus velatus	Masked-weaver, Southern	Unlisted	LC
Prinia flavicans	Prinia, Black-chested	Unlisted	LC
Pternistis swainsonii	Spurfowl, Swainson's	Unlisted	LC
Ptyonoprogne fuligula	Martin, Rock	LC	LC
Pycnonotus nigricans	Bulbul, African Red-eyed	Unlisted	LC
Quelea quelea	Quelea, Red-billed	Unlisted	LC
Rhinopomastus cyanomelas	Scimitarbill, Common	Unlisted	LC
Rhinoptilus africanus	Courser, Double-banded	Unlisted	LC
Riparia cincta	Martin, Banded	Unlisted	LC
Riparia paludicola	Martin, Brown-throated	Unlisted	LC
Saxicola torquatus	Stonechat, African	Unlisted	LC
Scleroptila gutturalis	Francolin, Orange River	Unlisted	LC
Spatula smithii	Shoveler, Cape	LC	LC
Spilopelia senegalensis	Dove, Laughing	Unlisted	LC
Spizocorys conirostris	Lark, Pink-billed	Unlisted	LC
Stenostira scita	Flycatcher, Fairy	Unlisted	LC
Streptopelia capicola	Turtle-dove, Cape	Unlisted	LC
Streptopelia semitorquata	Dove, Red-eyed	Unlisted	LC

Tachybaptus ruficollis	Grebe, Little	Unlisted	LC
Telophorus zeylonus	Bokmakierie, Bokmakierie	Unlisted	LC
Threskiornis aethiopicus	Ibis, African Sacred	Unlisted	LC
Trachyphonus vaillantii	Barbet, Crested	Unlisted	LC
Tricholaema leucomelas	Barbet, Acacia Pied	Unlisted	LC
Turdus smithi	Thrush, Karoo	Unlisted	LC
Tyto alba	Owl, Barn	Unlisted	LC
Upupa africana	Hoopoe, African	Unlisted	LC
Urocolius indicus	Mousebird, Red-faced	Unlisted	LC
Vanellus armatus	Lapwing, Blacksmith	Unlisted	LC
Vanellus coronatus	Lapwing, Crowned	Unlisted	LC
Vidua macroura	Whydah, Pin-tailed	Unlisted	LC
Zosterops pallidus	White-eye, Orange River	Unlisted	LC
Zosterops virens	White-eye, Cape	Unlisted	LC