APPENDIX E2: Terrestrial Compliance Statement

THE TERRESTRIAL BIODIVERSITY COMPLIANCE STATEMENT FOR THE PROPOSED PARYS SOLAR DEVELOPMENT

Parys, Free State Province

July 2022

CLIENT

Prepared by:

The Biodiversity Company

Cell: +27 81 319 1225

Fax: +27 86 527 1965

info@thebiodiversitycompany.com

www.thebiodiversitycompany.com

Report Name	**THE TERRESTRIAL BIODIVERSITY COMPLIANCE STATEMENT FOR THE PROPOSED PARYS SOLAR DEVELOPMENT**
Submitted to/Client	NEMAI CONSULTING
Report Writer (Desktop)	**Jan Jacobs** Jan Jacobs completed his BSc Honours degree in Biodiversity and Conservation Biology at the University of the Western Cape in 2016. He completed his Master of Applied Science degree in Nature Conservation at the Tshwane University of Technology in 2022.
Report Writer	**Carami Burger** Carami Burger has completed her Bachelor of Science Honours degree in Ecological Interactions and Ecosystem Resilience. Carami is an ecologist and has completed various studies as part of Basic Assessments and Environmental Impact Assessments.
Report Reviewer	**Andrew Husted** Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

Table of Contents

Tables

Figures

1 Introduction

The Biodiversity Company was commissioned by NEMAI Consulting to conduct a terrestrial ecology (fauna and flora) assessment and to compile a compliance statement for the proposed Parys Solar development, to take place 6 km south-east of the town of Parys, in the Free State Province. The proposed development will entail a 360MW Solar Photovoltaic (PV) Project with potential areas comprising of:

- Solar Area 1 – 164Ha;
- Solar Area 2 – 250Ha;
- Solar Area 3 – 220Ha; and
- Grid connection – approximately 5km.

In order to assess the baseline ecological state of the project area and to present a detailed description of the receiving environment, both a desktop assessment as well as a field survey were conducted during May 2022. Furthermore, the assessment and survey both involved the detection, identification and description of any locally relevant sensitive receptors, and the manner in which these sensitive receptors may be affected by the proposed development was also investigated.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations, 2014 (No. 326, 7 April 2017) of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998). The approach has taken cognisance of the recently published Government Notice 320 in terms of NEMA dated 20 March 2020 as well as the Government Notice 1150 in terms of NEMA dated 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation”. The National Web based Environmental Screening Tool has characterised the terrestrial biodiversity theme for the project area as ‘Very High’ sensitivity (National Environmental Screening Tool, 2022).

The purpose of the specialist studies is to provide relevant input into the overall assessment and application process. This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making as to the ecological viability of the project and the impacts that its implementation may have on the natural environment.

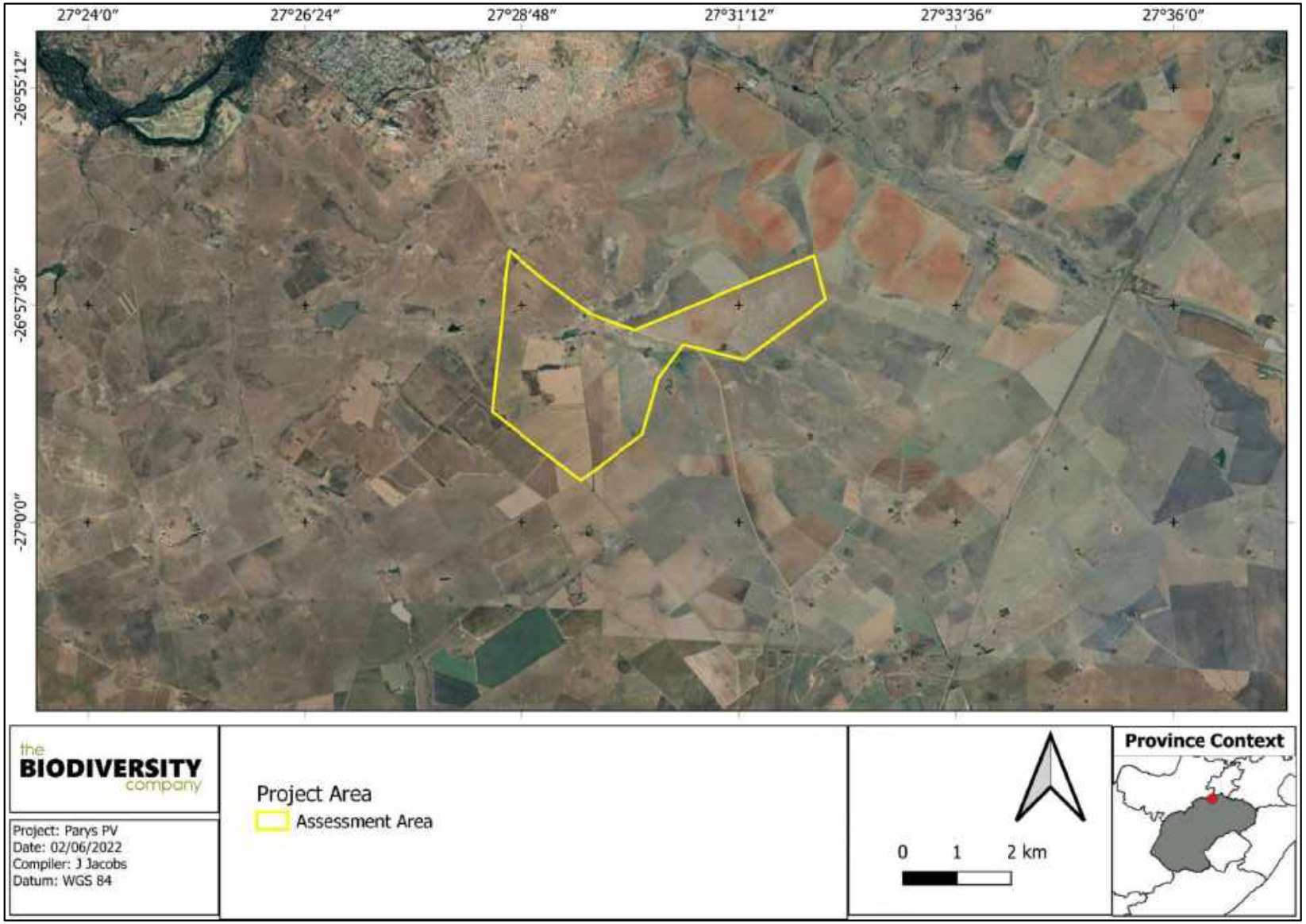


Figure 1-1 Project area

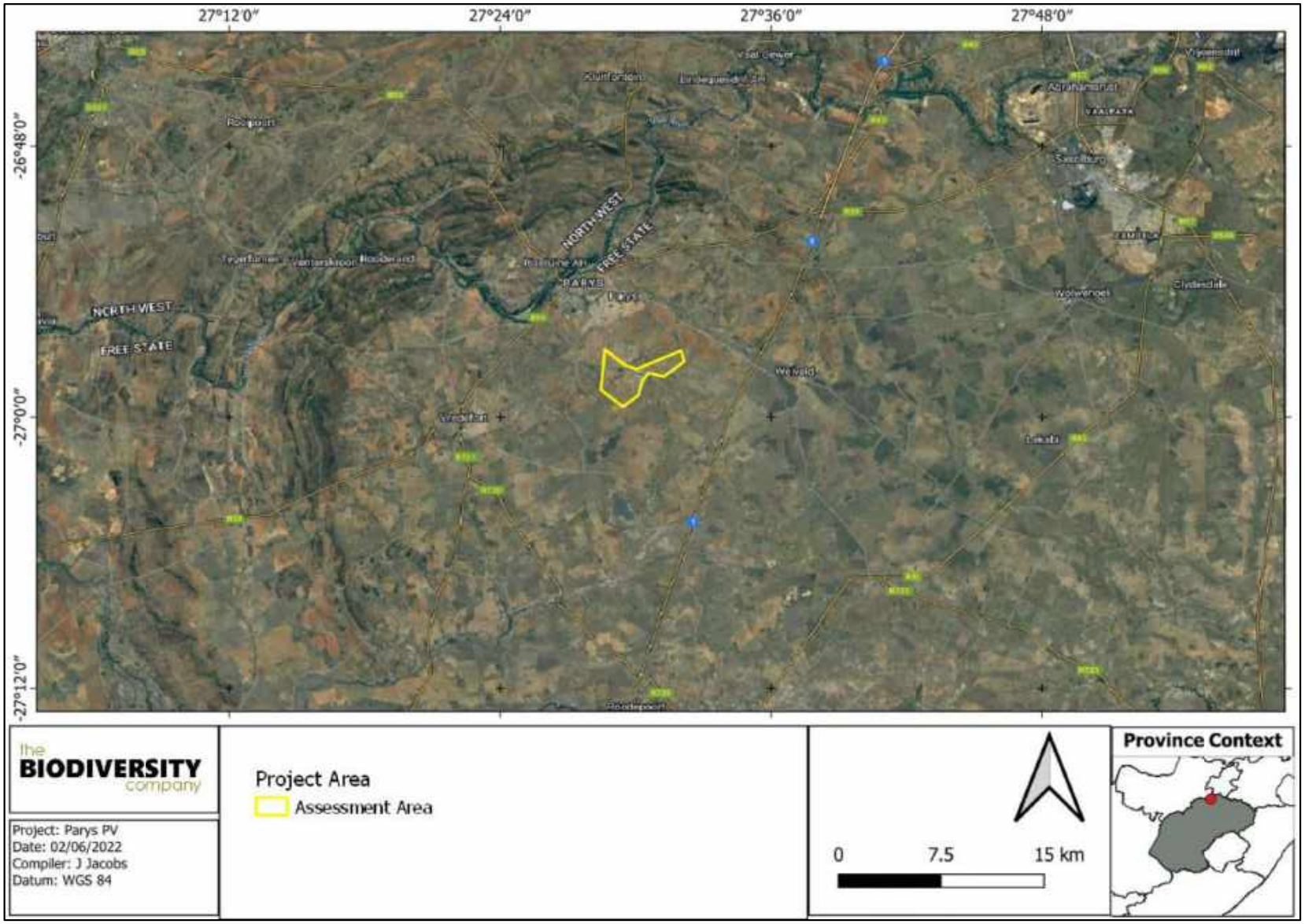


Figure 1-2 Regional overview of the project area

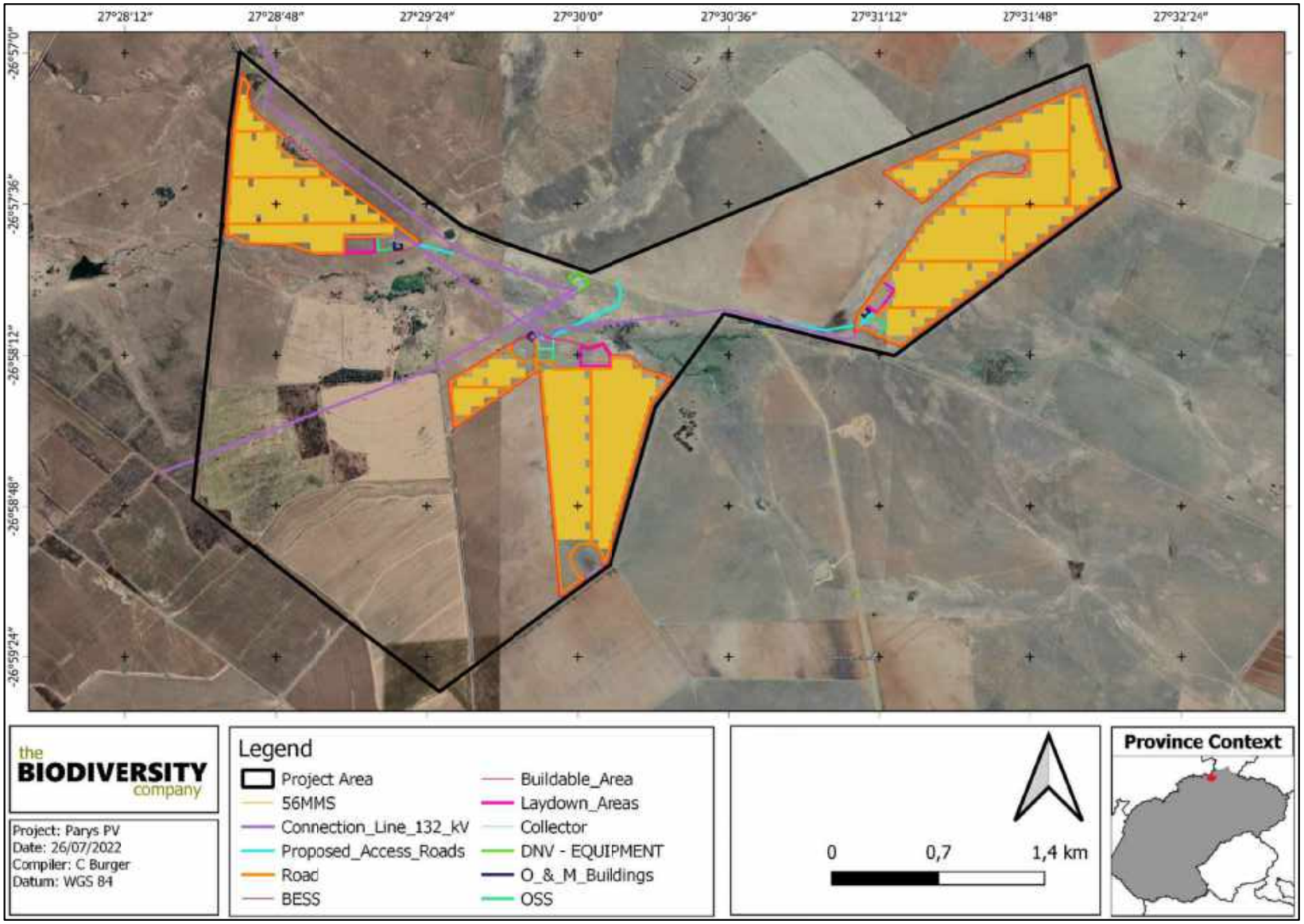


Figure 1-3 Map illustrating the proposed layout

2 Terms of Reference

The principal aim of the assessment was to adequately assess the current state of the terrestrial biodiversity in order to identify any significant and/or sensitive ecological receptors that may be impacted upon by the proposed activity. The following are the Terms of Reference that guide the project aim:

- Description of the baseline receiving environment specific to the field of expertise (including the general surrounding area as well as the site-specific environment);
- Identification and description of any sensitive receptors in terms of relevant specialist disciplines (i.e., terrestrial biodiversity) that occur in the project area, and the manner in which these sensitive receptors may be affected by the activity;
- Identification of 'significant' ecological, botanical and faunal features within the proposed project area;
- Identification of conservation significant habitats around the project area which might be impacted;
- Screening to identify any critical issues (potential fatal flaws) that may result in a rejection of the application;
- Provide a map to identify sensitive receptors in the project area, based on available maps and database information; and
- Presentation of recommend mitigation measures (outcomes to be included in the Management Plan) that should be used to mitigate or minimise impacts from the activity, either on terrestrial habitat or ecology directly.

3 Key Legislative Requirements

The legislation, policies and guidelines listed below are applicable to the current project in terms of biodiversity and ecological support systems. The list provided, although extensive, is not exhaustive and other legislation, policies and guidelines may apply in addition to those listed below (Table 3-1).

Table 3-1 A list of key legislative requirements relevant to these studies in the Free State Province

Region	Legislation
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, 2013)
	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 2006)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24, No 42946 (January 2020)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24, No 43110 (March 2020)
	The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
	The National Environmental Management: Waste Act (Act No. 59 of 2008)
	The Environment Conservation Act (Act No. 73 of 1989) and associated EIA Regulations
	National Environmental Management Air Quality Act (Act No. 39 of 2004)
	National Protected Areas Expansion Strategy (NPAES, 2016)
	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 (Act No. 101 of 1998)
	World Heritage Convention Act (Act No. 49 of 1999)
	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations, 2014
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP 2015 - 2025)
	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)
	Threatened or Protected Species Regulations, 2007 (TOPS)
	National Water Act (Act No. 36 of 1998)
Provincial	Boputhatswana Nature Conservation Act 3 of 1973
	Free State Biodiversity Sector Plan (FSBSP) DESTEA, 2015)

3.1 Report Legislative Framework

In line with the protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity, as per Government Notice 320 published in terms of NEMA, dated 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" – section 3, subsection 1:

- An applicant intending to undertake an activity identified in the scope of the protocol, on a site identified on the screening tool as being of 'Very High' sensitivity for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment; however
- Where the information gathered from the site sensitivity verification differs from the designation of 'Very High' terrestrial biodiversity sensitivity on the screening tool and it is found to be of a 'Low' sensitivity, then a Terrestrial Biodiversity Compliance Statement must be submitted.

The information obtained from a site sensitivity verification, which involved both a desktop assessment as well as a field survey, confirmed that the site (project area) is mostly of a 'Low' sensitivity. Therefore, a Terrestrial Biodiversity Compliance Statement will be completed and submitted for this project.

As per sections 2 and 3 of the protocol discussed above, a Terrestrial Biodiversity Compliance Statement must contain the information as presented in Table 3-2 below.

Table 3-2 Terrestrial Biodiversity Compliance Statement information requirements as per the relevant protocol, including the location of the information within this report

Information to be Included (as per GN 320, 20 March 2020)	Report Section
Methodology used to undertake the site assessment and survey, and prepare the compliance statement, including relevant equipment and modelling used	5
Description of the assumptions and any uncertainties or gaps in knowledge or data	6
A baseline profile description of biodiversity and ecosystems of the site	7
Site sensitivity verification: Desktop Analysis using satellite imagery and available information	7.1
A statement on the duration, date and season of the site inspection	7.2
Site sensitivity verification: Onsite inspection, include a description of current land use and vegetation found on-site	7.2
Site sensitivity verification: Photographs/evidence of environmental sensitivity	7.2
Screening tool confirmation/dispute: The assessment must verify the "low" sensitivity of the site, in terms of plant, animal, and terrestrial biodiversity themes	7.2.2
Proposed impact management outcomes or monitoring requirements for inclusion in the EMPr	8
Indicate whether or not the proposed development will have any impact on the terrestrial environment, animals and/or plants	9
A signed statement of independence by the specialist	11
Specialist details, including a CV	12

A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

4 Definitions

4.1 Species of Conservation Concern

In accordance with the National Red List of South African Plants website, managed and maintained by the South African National Biodiversity Institute (SANBI), a Species of Conservation Concern (SCC) is species that has a high conservation importance in terms of preserving South Africa's rich biodiversity. This classification covers a range of red list categories as illustrated in Figure 4-1 below.

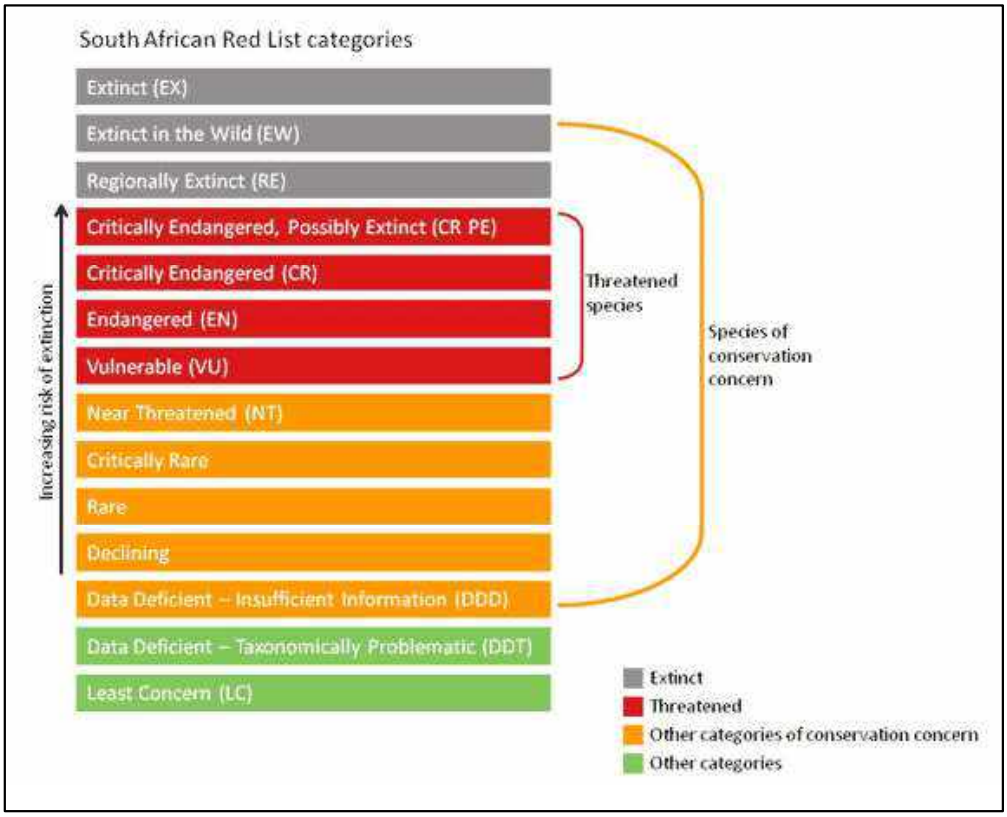


Figure 4-1 Threatened species and Species of Conservation Concern (SANBI, 2016)

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

4.2 Protected Species

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

5 Methods

5.1 Geographic Information Systems (GIS) Mapping

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

- Free State Biodiversity Sector Plan ((FSBSP) DESTEA, 2015);
- 2018 National Biodiversity Assessment (NBA, 2018) (Skowno *et al.,* 2019);
- Vegetation Map of South Africa, Lesotho and Swaziland (SANBI, 2018);
- SA Protected and Conservation Areas Databases, 2021 (DFFE, 2021 & DFFE-2, 2021);
- National Protected Areas Expansion Strategy, 2016 (DEA, 2016);
- Important Bird and Biodiversity Areas, 2015 (Marnewick *et al.,* 2015);
- South African Inventory of Inland Aquatic Ecosystems (SAIIAE), NBA 2018 Rivers and Wetlands (Awuah, 2018 & Van Deventer et al., 2018);
- National Freshwater Priority Areas, Rivers and Wetlands, 2011 (Nel, 2011); and
- Strategic Water Source Areas, 2021 (Lötter & Le Maitre, 2021).

Brief descriptions of the standardised methodologies applied are provided below. More detailed descriptions of survey methodologies are available upon request.

5.2 Desktop Vegetation and Botanical Assessment

The desktop vegetation and botanical assessment encompassed an assessment of all the vegetation units and habitat types within the project area. The focus was on an ecological assessment of pre-anthropogenic habitat types as well as the identification of any Red Data and protected species within the known distribution of the project area. The South African National Biodiversity Institute (SANBI) provides an electronic database system, namely the Botanical Database of Southern Africa (BODATSA-POSA, 2019), which was used to access distribution records on Southern African plants and generate an expected species list. This new database replaces the old Plants of Southern Africa database which provided distribution data of flora at the quarter degree square resolution. The Red List of South African Plants website (SANBI, 2016) was used to provide the most current account of the national conservation status of flora.

Additional information regarding ecosystems, vegetation types, protected flora and Species of Conservation Concern (SCC) was obtained from the following sources:

- The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2012);
- Red List of South African Plants (Raimondo *et al.,* 2009; SANBI, 2016);
- Provincially Protected Plant Species (Free State Nature Conservation Ordinance 8 of 1969); and

- List of Protected Tree Species (DFFE 2, 2021).

5.3 Floristic Fieldwork Survey and Analysis

The dry season fieldwork (completed during May 2022) 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 in order 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 protected plants and flora SCC were conducted through timed meanders within representative habitat units delineated during the scoping fieldwork. Emphasis was placed on any sensitive habitats overlapping with the proposed project area.

The timed random meander method is a highly efficient method for conducting floristic analysis, specifically in detecting protected plants and flora SCC and maximising floristic coverage. In addition, the method is time and cost effective and highly suited for compiling observed 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., roads, erosion etc.), and this included the subjective recording of dominant vegetation species and any sensitive features (e.g., wetlands, rock outcrops etc.). In addition, opportunistic observations were made while navigating through the project area.

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

- A field guide to Wild flowers (Pooley, 1998);
- Field Guide to the Wild Flowers of the Highveld (van Wyk & Malan, 1998);
- Orchids of South Africa (Johnson & Bytebier, 2015);
- Guide to the Aloes of South Africa (Van Wyk & Smith, 2014);
- Mesembs of the World (Smith *et al.,* 1998);
- Medicinal Plants of South Africa (Van Wyk *et al*., 2013);
- Freshwater Life: A field guide to the plants and animals of southern Africa (Griffiths & Day, 2016);
- Aquatic and Wetland Plants of Southern Africa (van Ginkel & Cilliers, 2020);
- Identification guide to southern African grasses. An identification manual with keys, descriptions and distributions (Fish *et al.,* 2015); and

- Field guide to trees of Southern Africa, Struik Publishers (Van Wyk & Van Wyk, 1997).

The field work methodology included the following survey techniques:

- Timed meanders;
- Sensitivity analysis based on structural and species diversity;
- Identification of protected floral species; and
- Identification of floral red-data or red-listed species (Species of Conservation Concern).

5.4 Faunal Assessment

5.4.1 Desktop Assessment

The faunal desktop assessment involved the following:

- Compilation of expected species lists;
- Identification of any red-data/red-listed species or Species of Conservation Concern potentially occurring in the area; and
- Emphasis was placed on the probability of occurrence of species of provincial, national, and international conservation importance.

Distribution and SCC data was obtained from the following information sources:

- Animal Demography Unit (ADU, 2020);
- South African Reptile Conservation Assessment (SARCA) (sarca.adu.org);
- Atlas and Red list of Reptiles of South Africa, Lesotho and Swaziland (Bates *et al.,* 2014);
- Atlas and Red Data Book of Frogs of South Africa (Mintner et al., 2004);
- South Africa's official site for Species Information and National Red Lists (SANBI, 2022);
- The 2016 Red List of Mammals of South Africa (EWT, 2016); and
- The International Union for Conservation of Nature's Red List of Threatened Species. Version 2021-3 (IUCN, 2021).

5.4.2 Field Survey

The field survey component of the assessment utilised a variety of sampling techniques including, but not limited to, the following:

- Visual observations (involving the use of binoculars and specialist camera equipment);
- Active hand-searches, used for species that shelter in or under particular micro-habitats (typically rocks, exfoliating rock outcrops, fallen trees, leaf litter, bark etc.);
- Identification of tracks and signs; and

- Utilization of local knowledge.

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

- A Guide to the Reptiles of Southern Africa (Alexander & Marais, 2007);
- Field guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
- A Complete Guide to the Frogs of Southern Africa (du Preez & Carruthers, 2009);
- The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005);
- Bats of Southern and Central Africa (Monadjem *et al.,* 2010);
- Spiders of Southern Africa (Leroy & Leroy, 2003); and
- Tortoises, Terrapins, and Turtles of Africa (Branch, 2008).

5.5 Site Ecological Importance

The different habitat types within the assessment area were delineated and identified based on observations during the field assessment as well as information from available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of Species of Conservation Concern (SCC) and their ecosystem processes.

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).

BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor. The criteria for the CI and FI ratings are provided in Table 5-1 and Table 5-2, respectively.

Table 5-1 Summary of Conservation Importance criteria

Conservation Importance	Fulfilling Criteria
Very High	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species that have a global 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 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 5-2 Summary of Functional Integrity 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 5-3.

Table 5-3 Matrix used to derive Biodiversity Importance from Functional Integrity and Conservation Importance

Biodiversity Importance		Conservation Importance				
		Very high	**High**	**Medium**	**Low**	**Very low**
Functional Integrity	**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 5-4.

Table 5-4 Summary of Receptor Resilience 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 remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of 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 remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of 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 remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of 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 remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of 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 remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

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

Table 5-5 Matrix used to derive Site Ecological Importance from Receptor Resilience and Biodiversity Importance

Site Ecological Importance		**Biodiversity Importance**				
		Very high	**High**	**Medium**	**Low**	**Very low**
Receptor Resilience	**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 activities is provided in Table 5-6.

Table 5-6 Guidelines for interpreting Site Ecological Importance in the context of the proposed activities

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

The SEI evaluated for each taxon can be combined into a single multi-taxon evaluation of SEI for the assessment area. Either a combination of the maximum SEI for each receptor should

be applied, or the SEI may be evaluated only once per receptor but for all necessary taxa simultaneously. For the latter, justification of the SEI for each receptor is based on the criteria that conforms to the highest CI and FI, and the lowest RR across all taxa.

6 Limitations and Assumptions

The following limitations and assumptions should be noted for the assessment:

- The assessment area was based on the area provided by the client and any alterations to the route and/or missing GIS information pertaining to the assessment area would have affected the area surveyed;
- The area was only surveyed during a single site visit and therefore, this assessment does not consider temporal trends, however sufficient to derive meaningful baseline;
    - Only a single season survey was conducted for the respective studies, this would constitute a dry season survey. However, owing to the very low to low sensitivity of the terrestrial habitats this is not considered to be a notable limitation, with limit benefit being achieved from a wet season survey in comparison;
    - Flora identification is limited due to the lack of aboveground plant parts used to determine species, especially in regard to bulbous plants, the vegetation was dry, and most plants had already lost the green flush;
- A separate avifauna assessment has been compiled;
- The layout of the proposed project was provided after completion of the report and the mitigation measures was updated accordingly;
- 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.

7 Receiving Environment

7.1 Desktop Spatial Assessment

7.1.1 Ecologically Important Landscape Features

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features are summarised in Table 7-1.

Table 7-1 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 Vulnerable Ecosystem	7.1.1.1
Ecosystem Protection Level	Relevant – Overlaps with a Not Protected Ecosystem	7.1.1.2
Protected Areas	Irrelevant – Lies more than 5 km from the nearest protected area.	7.1.1.3
Renewable Energy Development Zones	Irrelevant – Does not overlap with any REDZs.	-
Powerline Corridor	Irrelevant – Does not overlap with any corridors.	-

National Protected Areas Expansion Strategy	Irrelevant – The project area does not overlap with a NPAES Priority Focus Area.	7.1.1.5
Critical Biodiversity Area	Relevant – The project area overlaps with a CBA2, a degraded area and an ONA area.	7.1.1.4
Important Bird and Biodiversity Areas	Irrelevant – Located 77 km from the nearest IBA.	-

7.1.1.1 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 area overlaps with a VU ecosystem (Figure 7-1).

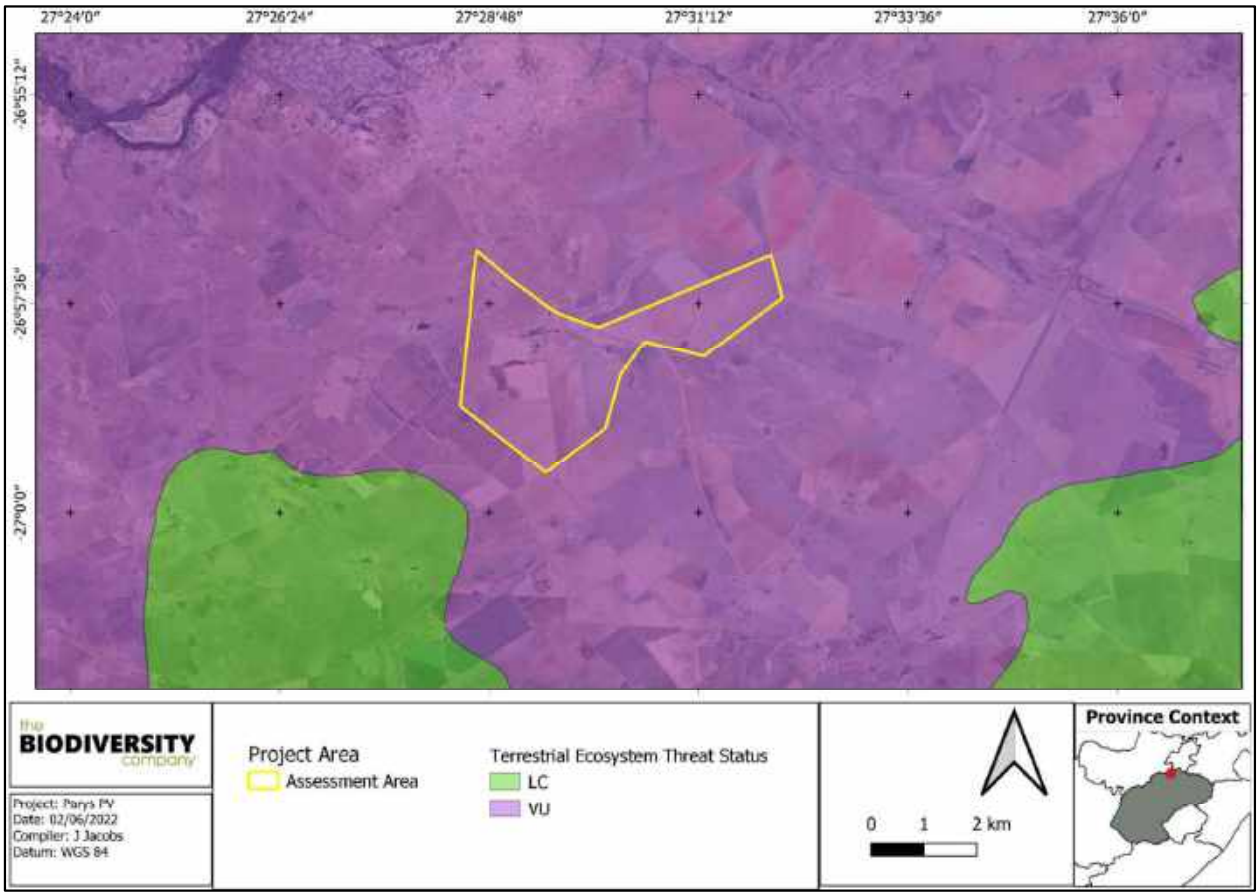


Figure 7-1 Map illustrating the ecosystem threat status associated with the project area.

7.1.1.2 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 Not Protected ecosystem (Figure 7-2**Error! Reference source not found.**).

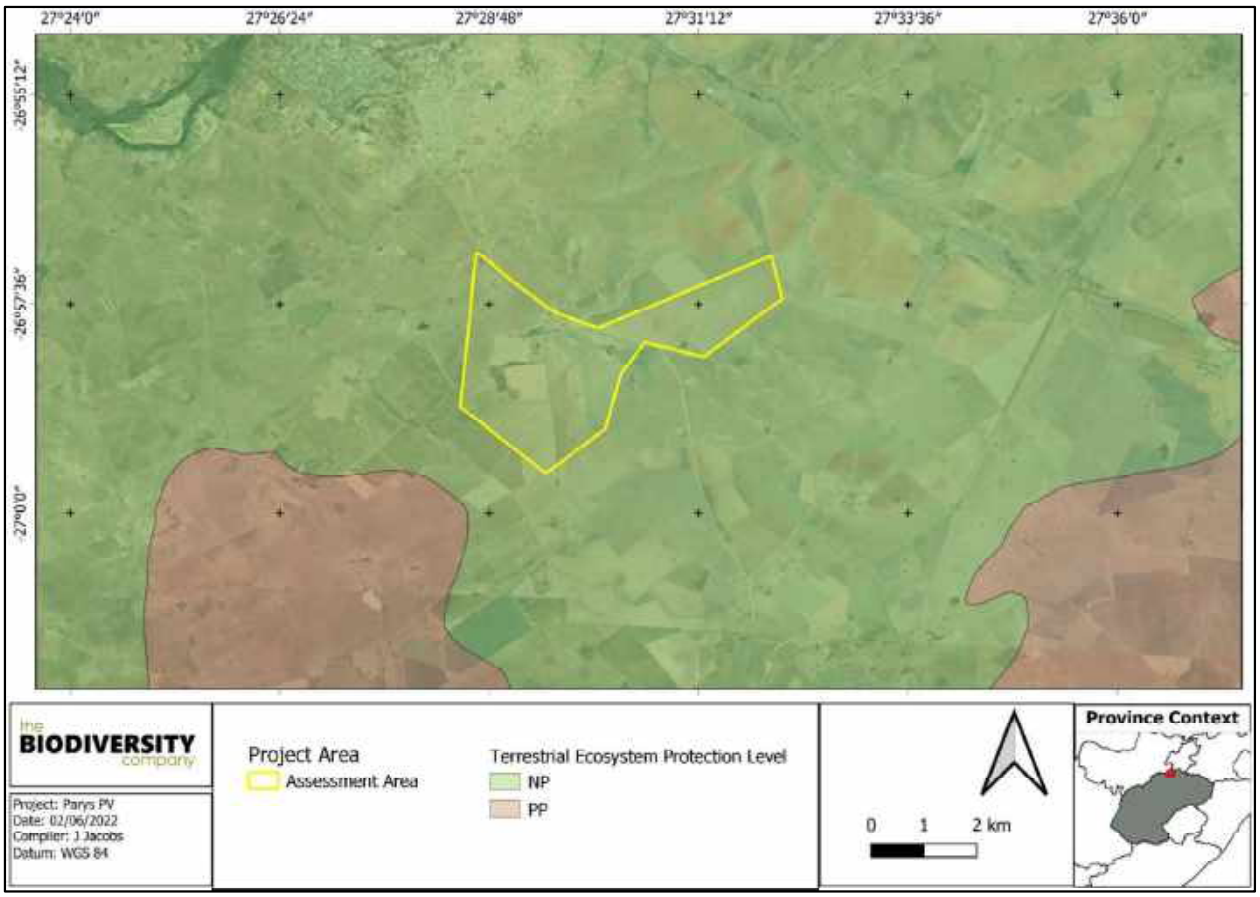


Figure 7-2 Map illustrating the ecosystem protection level associated with the project area

7.1.1.3 Protected Areas

According to the spatial data for SAPAD (2021) and SACAD (2021), the project area does not overlap with any protected areas or conservation areas (Figure 7-3). The project area also does not occur within the 5 km Protected Area Buffer Zone of any protected areas.

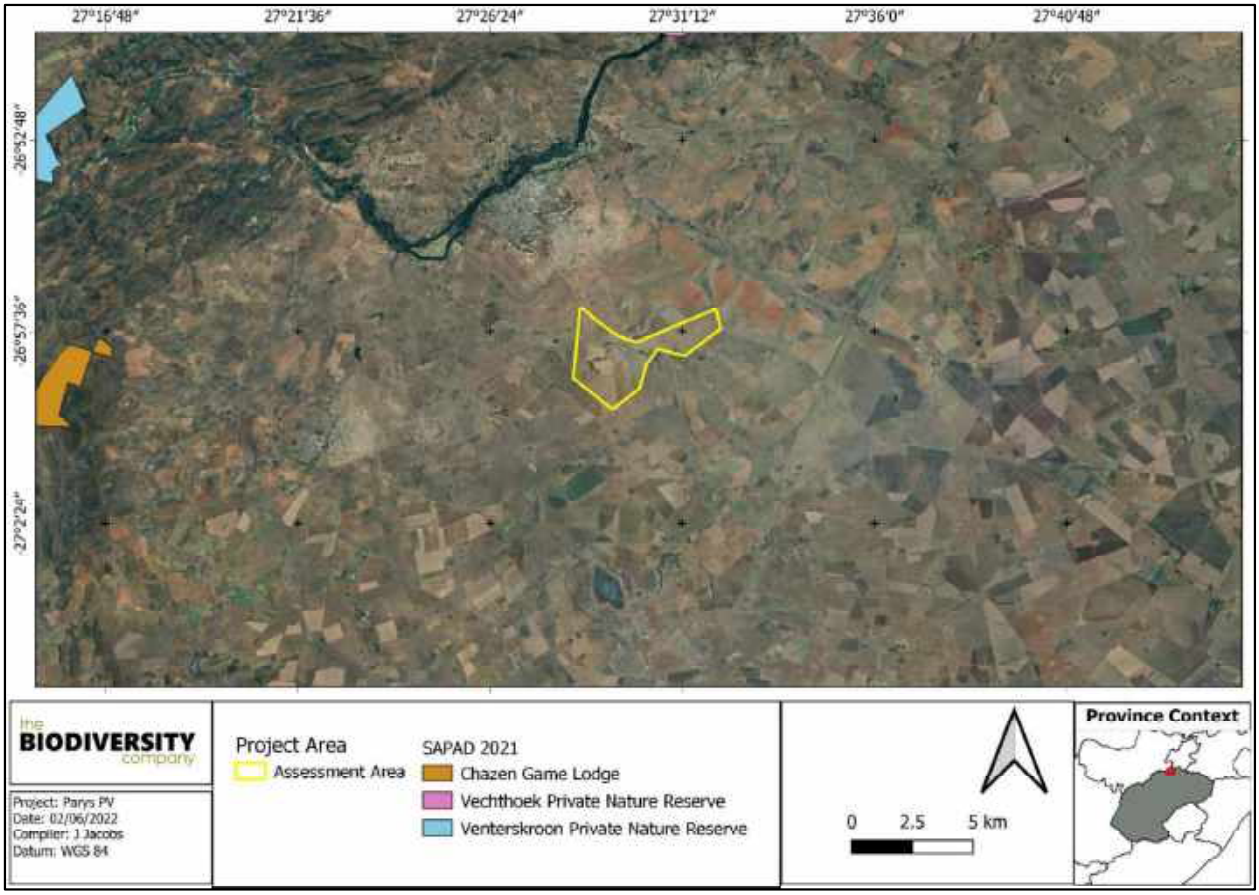


Figure 7-3 Map illustrating the project area in relation to the nearest protected areas

7.1.1.4 Critical Biodiversity Areas and Ecological Support Areas

The key output of a systematic biodiversity plan is a map of biodiversity priority areas. The CBA map delineates Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Other Natural Areas (ONAs), Protected Areas (PAs), and areas that have been irreversibly modified from their natural state.

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. CBAs are areas of high biodiversity value and need to be kept in a natural state, with no further loss of habitat or species. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI-BGIS, 2017).

Ecological Support Areas (ESAs) are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic (SANBI-BGIS, 2017).

Other Natural Areas (ONAs) consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs. A biodiversity sector plan or bioregional plan must not specify the desired state/management objectives for ONAs or provide land-use guidelines for ONAs (SANBI-BGIS, 2017).

Figure 7-4 shows the project area superimposed on the Terrestrial CBA map. The project area overlaps with a CBA2, a Degraded area as well as an ONA.

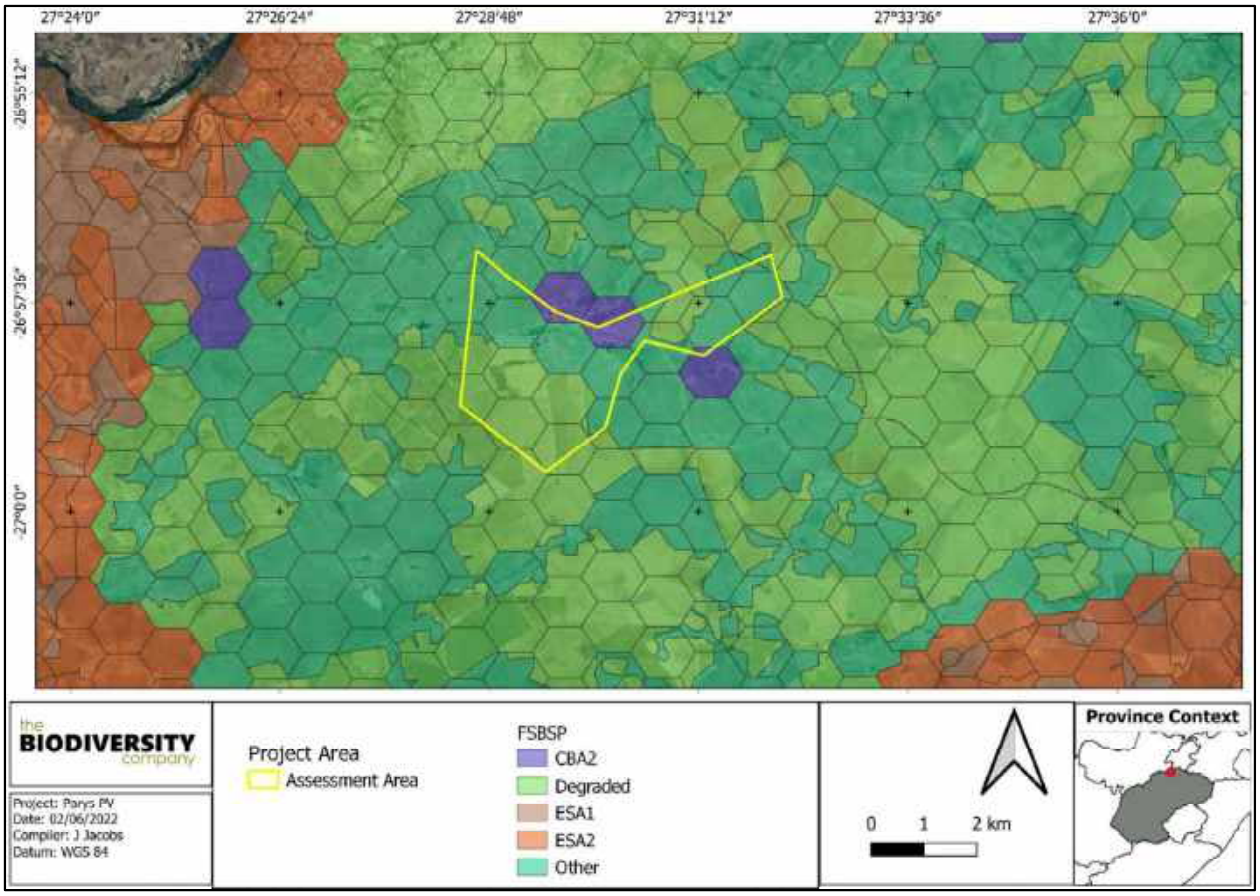


Figure 7-4 Map illustrating the locations of CBAs in the project area and previous option (blue)

7.1.1.5 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2017 (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, 2017). The project area does not overlap with any Priority Focus Areas, as per the NPAES (Figure 7-5).

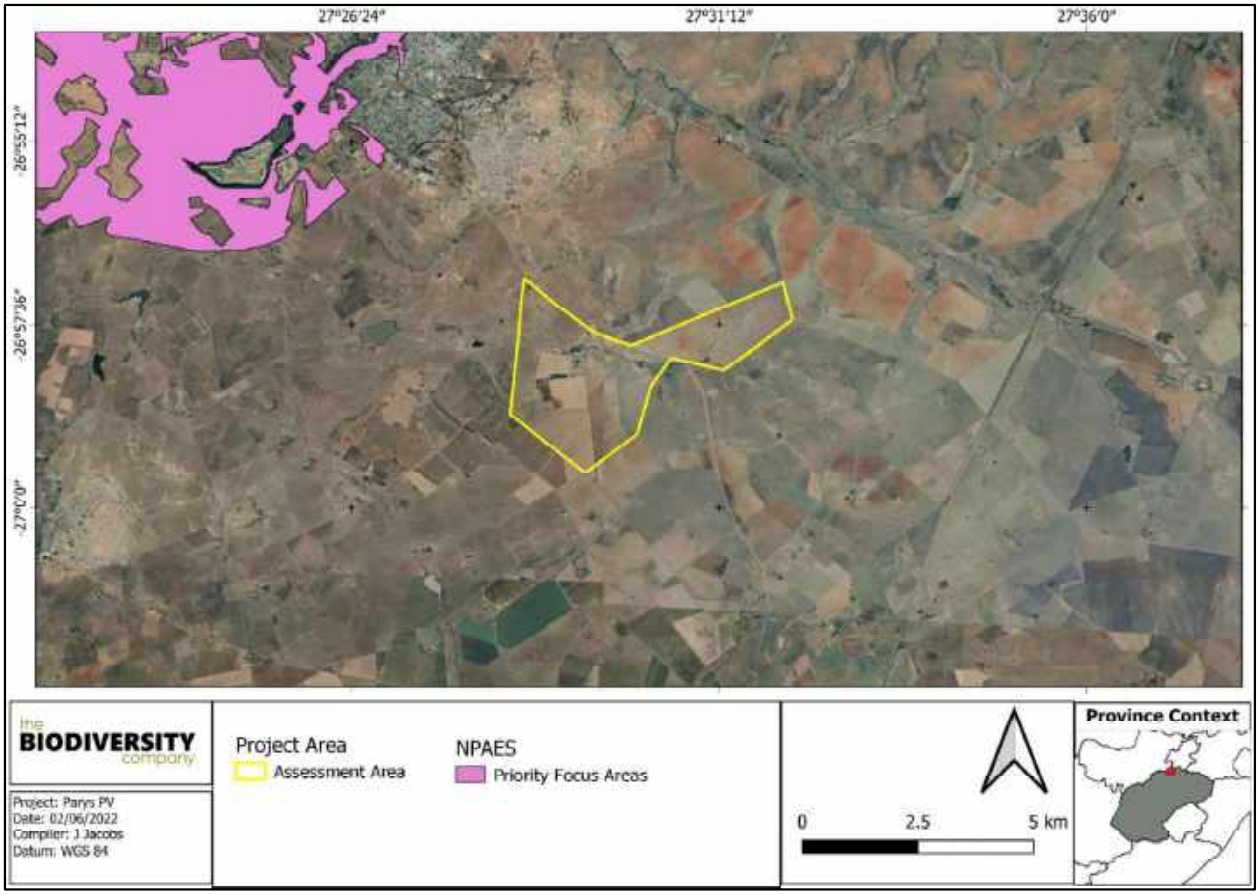


Figure 7-5 The project area in relation to the National Protected Area Expansion Strategy

7.1.2 Flora Assessment

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

7.1.2.1 Vegetation Type

The project area is situated within the Grassland biome.

Grassland biome

In South Africa, the Grassland Biome occurs mainly on the high central plateau (Highveld), the inland areas of the eastern seaboard, the mountainous areas of KwaZulu-Natal (KZN) and the central parts of the Eastern Cape (Mucina & Rutherford, 2006). However, grasslands can also be found below the Drakensberg, both in KZN and the Eastern Cape, with floristic links to the high-altitude Drakensberg grassland (Mucina & Rutherford, 2006). The topography is mainly flat to rolling, but also includes mountainous regions and the Escarpment (Mucina & Rutherford, 2006). Altitude is mostly from about 300 to 400 m.a.s.l., but reaches up to 3 482 m on Thabana Ntlenyana, the highest mountain in southern Africa (Mucina & Rutherford, 2006).

In terms of climate, the temperate grasslands of the Highveld in South Africa have cold and dry conditions, with rainfall during the summer (which can sometimes be a strong summer

rainfall) and winter drought (Mucina & Rutherford, 2006). Frost is common and there is a high risk of lightning-induced fires (Mucina & Rutherford, 2006).

In terms of vegetation structural composition, grasslands are characteristically dominated by grasses of the Poaceae Family (Mucina & Rutherford, 2006). On the Lesotho Plateau and highest peaks of the Drakensberg, grassland plants xeromorphic characteristics due to the severity of the climate in these places (Mucina & Rutherford, 2006).

On a fine-scale vegetation type, the project area overlaps with the Vredefort Dome Granite Grassland (Figure 7-6**Error! Reference source not found.**).

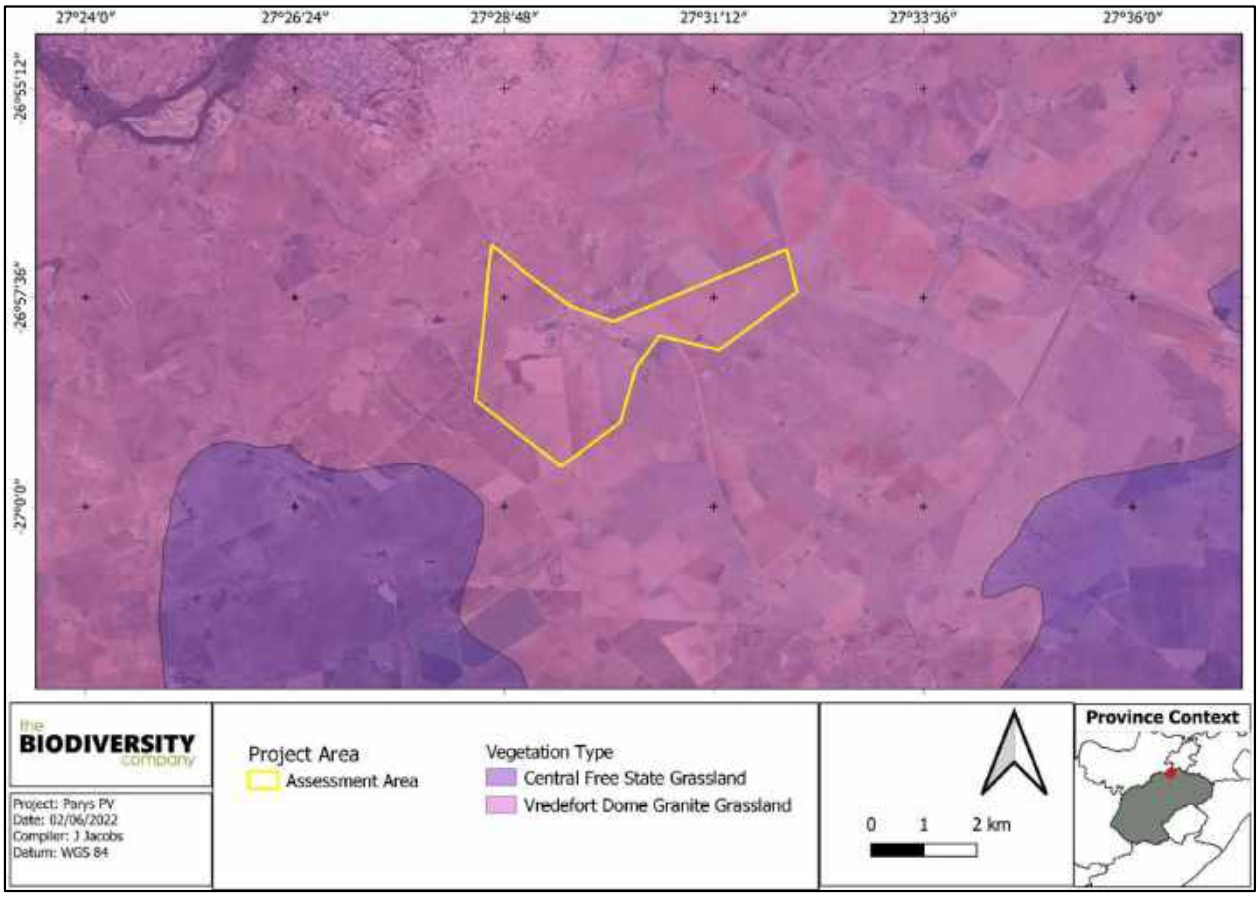


Figure 7-6 Map illustrating the vegetation type associated with the project area.

7.1.2.1.1 Vredefort Dome Granite Grassland

The Vredefort Dome Granite Grassland is characterised by slightly undulating plains with mainly covered with short, *Themeda triandra*-dominated grassland, although mostly grazed and often degraded (Mucina & Rutherford, 2006). Large granite boulders are conspicuous within this vegetation type, creaing microhabitats for a variety of plant species (Mucina & Rutherford, 2006). It occurs the Free State and North-West Provinces, specifically within the central portion of the Vredefort Dome around Parys and Vredefort, hence the name (Mucina & Rutherford, 2006). Altitudes range from 1 340 to 1 520 m (Mucina & Rutherford, 2006).

Important Taxa (d = dominant)

Graminoids: *Aristida congesta* (d), *Chloris virgata* (d), *Cynodon dactylon* (d), *Digitaria eriantha* (d), *Elionurus muticus* (d), *Eragrostis biflora* (d), *E. lehmanniana* (d), *E. trichophora* (d), *Setaria*

sphacelata (d), *Themeda triandra* (d), *Tragus berteronianus* (d), *Aristida diffusa*, *Brachiaria serrata*, *Cymbopogon pospischilii*, *Eragrostis chloromelas*, *E. gummiflua*, *E. racemosa*, *E. superba*, *Heteropogon contortus*, *Hyparrhenia hirta*, *Trichoneura grandiglumis*, *Triraphis andropogonoides*.

Herbs: *Barleria macrostegia*, *Berkheya setifera*, *Chamaesyce inaequilatera*, *Crabbea acaulis*, *Helichrysum rugulosum*, *Hermannia depressa*, *Ipomoea oblongata*, *I. obscura*, *Lepidium capense*, *Lotononis listii*, *Selago densiflora*, *Vernonia oligocephala*.

Herbaceous Climber: *Rhynchosia totta*.

Low Shrubs: *Felicia muricata* (d), *Anthospermum rigidum* subsp. *pumilum*, *Deverra burchellii*, *Polygala hottentotta*.

Conservation Status

This vegetation type is classified as EN, with a conservation target of 24% (Mucina & Rutherford, 2006).

7.1.2.2 Expected Flora Species

The POSA database indicates that 328 species of indigenous plants are expected to occur within the project area, including one SCC (Table 7-2).

Table 7-2 Threatened flora species that may occur within the project area

Family	Taxon	Author	IUCN	Ecology
Asphodelaceae	*Kniphofia typhoides*	Codd	NT	Indigenous; Endemic

7.1.3 Faunal Assessment

7.1.3.1 Amphibians

Based on the IUCN Red List Spatial Data and AmphibianMap, 19 amphibian species are expected to occur within the area. None are regarded as threatened.

7.1.3.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 44 reptile species are expected to occur within the area. None are regarded as threatened.

7.1.3.3 Mammals

The IUCN Red List Spatial Data lists 66 mammal species that could be expected to occur within the area. This list excludes large mammal species that are limited to protected areas. Twelve of these expected species are regarded as threatened (Table 7-3) seven of these have a low likelihood of occurrence based on the lack of suitable habitat and the level of disturbance nearby to the project area.

Table 7-3 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 African Hedgehog	NT	LC	Moderate

Crocidura maquassiensis	Makwassie Musk Shrew	VU	LC	Low
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT	Low
Felis nigripes	Black-footed Cat	VU	VU	Low
Hydrictis maculicollis	Spotted-necked Otter	VU	NT	Moderate
Leptailurus serval	Serval	NT	LC	Moderate
Mystromys albicaudatus	White-tailed Rat	VU	EN	Moderate
Panthera pardus	Leopard	VU	VU	Low
Parahyaena brunnea	Brown Hyaena	NT	NT	Low
Poecilogale albinucha	African Striped Weasel	NT	LC	Low
Rhinolophus clivosus	Geoffroy's Horseshoe Bat	NT	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 a nearby wetland area and seasonal stream, the likelihood of occurrence of this species occurring in the project area is considered to be moderate.

Atelerix frontalis (South African Hedgehog) has a tolerance of a degree of habitat modification and occurs in a wide variety of semi-arid and sub-temperate habitats (IUCN, 2017). Based on the Red List of Mammals of South Africa, Lesotho and Swaziland (2016), *A. frontalis* populations are decreasing due to the threats of electrocution, veld fires, road collisions, predation from domestic pets and illegal harvesting. Although the species is cryptic and therefore not often seen, there is suitable habitat in the project area and therefore the likelihood of occurrence is rated as moderate.

Hydrictis maculicollis (Spotted-necked Otter) inhabits freshwater habitats where water is un-silted, unpolluted, and rich in small to medium sized fishes (IUCN, 2017). Suitable habitat may be available across the project area and therefore the likelihood of occurrence is 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. Grasslands are present in the project area and as such the likelihood of occurrence is rated as moderate.

Mystromys albicaudatus (White-tailed Rat) is listed as Vulnerable (VU) on a regional basis and Endangered (EN) on a global scale. It is relatively widespread across South Africa and Lesotho; the species is known to occur in shrubland and grassland areas. A major requirement of the species is black loam soils with good vegetation cover. Although the vegetation type is suitable, no black loam seems to be present on site, therefore the likelihood of occurrence of this species is rated as moderate.

7.2 Field Survey

This section details the observations recorded during an on-site field survey conducted to ground truth the floral, faunal, and habitat features of the project area. These observations pertain to the current state of the area as of May 2022.

7.2.1 Terrestrial Fauna and Flora

During the terrestrial survey the floral and faunal communities within the project area were assessed and photographs were captured, some of which are provided in this section of the report. For ease of reading, the observations and discussions pertaining to the floral and the faunal species recorded are separated below.

7.2.1.1 Flora and Vegetation

During the field assessment five habitat units have been identified and included transformed areas, degraded grassland, secondary grassland, a ridge/rocky outcrop and wetland habitat.

Transformed Habitat

The transformed areas can be found along the central, southern and north eastern portions of the project area. The majority of the transformed habitat comprised of agricultural fields utilised for crop production of *Zea Mays* (corn) (Figure 7-7). Smaller areas were associated with residential and agricultural buildings as wells as an electrical substation. The transformed areas have little to no remaining natural vegetation due to land transformation by various agricultural activities. These habitats exist in a constant disturbed state as it cannot recover to a more natural state unless through human intervention. No protected or SCC flora species were observed in this habitat unit and is not expected to occur due to the modified nature of the majority of the area.

Degraded Grassland Habitat

The degraded grassland habitat can be found along two sections of the project area located in the central and western portion. This habitat is regarded as areas that have been impacted on more by historic mismanagement and land use. Historical vegetation clearing to make way for agricultural practices has led to alterations of the natural grassland habitat and current utilisation of the area for grazing as well as ongoing human infringement, especially in areas close to residential and agricultural buildings, are still impacting on this habitat unit. Vegetation associated with this habitat included species such as *Chloris Gayana* which is commonly associated with planted pastures and has spread from adjacent areas to this habitat. Additional species found included grass species such as *Aristida congesta, Cynodon dactylon, Eragrostis chloromelas, Hyparrhenia hirta* and alien and invasive species such as *Tagetes minuta, Verbena bonariensis, Gomphocarpus physocarpus* and *Erigeron bonariensis.*

These habitats aren't entirely transformed but in a constant disturbed state, as they can't recover to a more natural state due to ongoing disturbances and impacts as a result of grazing and anthropogenic related activities. No protected or SCC flora species were observed in this habitat unit and is not expected to occur due to the modified nature of the majority of the area.

Secondary Grassland Habitat

The secondary grassland habitat is located in the north and north eastern section of the project area (Figure 7-8). This habitat is associated with grassland habitat that has been exposed to

modifications due to land use and mismanagement but differs from the degraded grassland in the extent of disturbance that has taken place, with the degraded grassland being exposed to more severe disturbance. Dominant species within this habitat unit included *Themeda triandra, Aristida congesta, Hyparrhenia hirta, Eragrostis chloromelas, Agave americana, Verbena bonariensis* and *Tagetes minuta.*

Based on the current ecological condition of this habitat the driving forces are inconsistent due to the current land uses. 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 and exposed to current anthropogenic activities than the other. As a result of the ongoing and historic disturbances the plant community is no longer considered as being fully representative of the reference vegetation. During the assessment two species of the genus *Hypoxis* (*H. hemerocallidea* and *H. rigidula*), one species of the genus *Aloe (Aloe greatheadii),* one species of the genus *Boophone (Boophone disticha)* and one species of the genus *Helichrysum* (*Helichrysum nudifolium*) listed as protected under Schedule 6 of the Free State Nature Conservation Ordinance 8 of 1969 were recorded within the secondary grassland (Figure 7-10).

Rocky outcrop/ridge Habitat

A single rocky outcrop has been identified within the north western corner of the project area (Figure 7-9). This feature represents portions of more in-tact natural habitat and supported a diversity of locally indigenous trees and shrubs such as *Ziziphus mucronata*, *Celtis africana*, and *Searsia lancea*. The area did, however, also include alien and invasive species such as *Opuntia ficus-indica, Tagetes minuta and Solanum linnaeanum.*

Wetland Habitat

Wetland habitat was found predominantly traversing the central portion of the project area and then in smaller scattered areas (Figure 7-11). These areas provided habitat to various hydrophytic plant species such as *Cyperus fastigiatus, Paspalum cf. scrobiculatum, Cyperus longus, Cyperus congestus, Juncus effuses, Schoenoplectus brachyceras* and *Crinum bulbispermum*. Some of the wetland systems along the project area were dominated by the alien and invasive species *Populus alba*, which is listed as category 1b invasive species as per the latest NEMBA legislation. During the assessment *Ammocharis coranica* listed as protected under Schedule 6 of the Free State Nature Conservation Ordinance 8 of 1969 were recorded within the wetland habitat.

These habitats were assessed in the TBC Wetland Baseline and Impact Assessment (2022). 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.

Figure 7-7 A large portion of the project area comprised of transformed agricultural fields

Figure 7-8 Secondary Grassland Habitat

Figure 7-9 A single small-medium rocky habitat feature was found in the western corner of the project area and supported indigenous flora

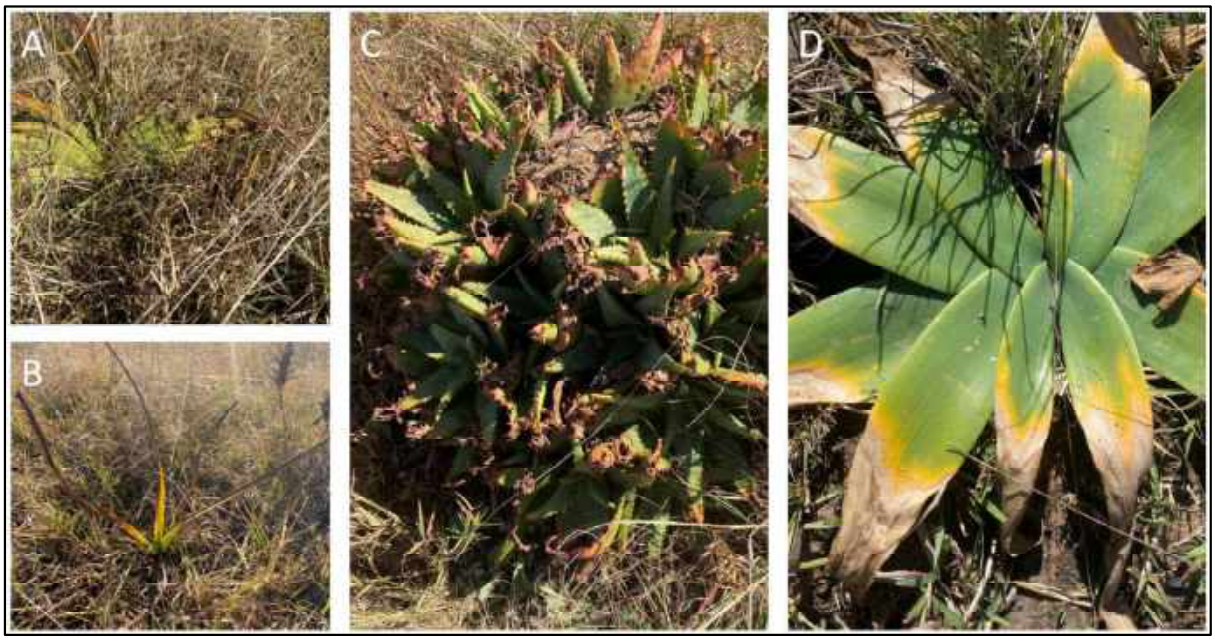


Figure 7-10 Protected floral species A) Hypoxis hemerocallidea, B) H. rigidula, C) Aloe greatheadii, and D) Ammocharis coranica were observed within the secondary grassland and wetland habitat

Figure 7-11 A large wetland traverse the central portion of the project area

Figure 7-12 Populus alba was found to completely invade a portion of the wetland that traverses the project area

Figure 7-13 The category 1b invasive Opuntia ficus-indica was found along the rocky area

7.2.1.2 Fauna

Mammal activity was considered to be moderate as only common mammal species such as *Cynictis penicillate* (Yellow Mongoose), *Raphicerus campestris* (Steenbok), *Suricata suricatta* (Suricate) and *Xerus inauris* (Cape Ground Squirrel) were observed throughout the project area (Figure 7-14). Eastern rock elephant shrew (*Elephantulus myurus*) was found in the ridge area (Figure 7-15). No species of reptile or amphibians were recorded within the project area during the survey period. However, there is the possibility of at least several species being present, as certain reptile and amphibian species are secretive and longer-term surveys are required in order to ensure adequate sampling.

Due to the limited in-tact and suitable habitat found within the project area it is unlikely that any mammal or herpetofauna SCC will occur nearby.

Figure 7-14 Xerus inauris (Cape Ground Squirrel) were observed throughout the project

Figure 7-15 Eastern rock elephant shrew (Elephantulus myurus) found in the ridge area

Figure 7-16 The Raphicerus campestris (Steenbok) was observed grazing along the secondary grassland

7.2.2 Habitat Survey and Site Ecological Importance

The main habitat types identified across the project area were initially identified and pre-delineated largely based on aerial imagery from late 2021. These habitat types were then refined based on the field coverage and data collected during the survey. Five habitat units are delineated for the project area: transformed, degraded grassland, secondary grassland, rocky outcrop and wetland.

The transformed habitat represents the largest portion of habitat across the project area. The transformed areas have little to no remaining natural vegetation due to land transformation by various agricultural activities. Impacts recorded across this habitat include the transformation of the entire habitat in preceding years to accommodate agricultural practises, residential buildings as well as infrastructural development such as the electrical substation and associated powerlines.

Degraded grassland habitat as well as secondary grassland habitat were identified along the project area. Both these habitats have been impacted upon by historic mismanagement and land use activities, most notably to accommodate various agricultural practises such as planted pastures and grazing. The difference between the secondary grassland habitat and the disturbed thornveld is the extent of the disturbance in the degraded grassland being more severe.

A single rocky outcrop/ ridge area was identified along the western corner of the project area and represent a healthy node of mixed indigenous vegetation and useful microhabitat for reptile and mammal species. There were only minimal signs of disturbance and the local trees and shrubs had mostly reached a healthy maturity. It is however noted that portions of the rocky outcrop have become invaded by alien and invasive vegetation such as *Tagetes minuta*, and *Opuntia ficus-indica*.

Various wetland systems were identified across the project area, with the largest system traversing the central portion of the project area. The wetland habitat unit is one of the more sensitive portions of the project area due to the unique, habitat specific flora and fauna found within the section. It is however noted that some of the wetland systems are under significant pressure from the invasive *Populus alba.*

Based on the criteria provided in section 5.5 of this report, the five delineated habitat types have each been allocated a sensitivity category, or SEI, and this breakdown is presented in Table 7-4 below. In order to identify and spatially present sensitive features in terms of the relevant specialist discipline, the sensitivities of each of the habitat types delineated within the project area are mapped in Figure 7-17.

It is important to note that this map does not replace any local, provincial, or national government legislation relating to these areas or the land use capabilities or sensitivities of these environments.

Table 7-4 Site Ecological Importance assessment summary of the habitat types delineated within the project area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Transformed	Very Low	Low	Very Low	High	Very Low

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Degraded Grassland	Medium	Low	Low	High	Very Low
Secondary Grassland	Medium	Low	Low	Medium	Low
Rocky Area/Ridge	Medium	High	Medium	Medium	Medium
Wetland	Medium	High	Medium	Medium	Medium

Consider the following guidelines when interpreting SEI in the context of any proposed development or disturbance activities:

- Very Low: Minimisation mitigation - Development activities of medium to high impact acceptable and restoration activities may not be required.
- Low: Minimisation and restoration mitigation - Development activities of medium to high impact acceptable followed by appropriate restoration activities.
- Medium: Minimisation and restoration mitigation - Development activities of medium impact acceptable followed by appropriate restoration activities.

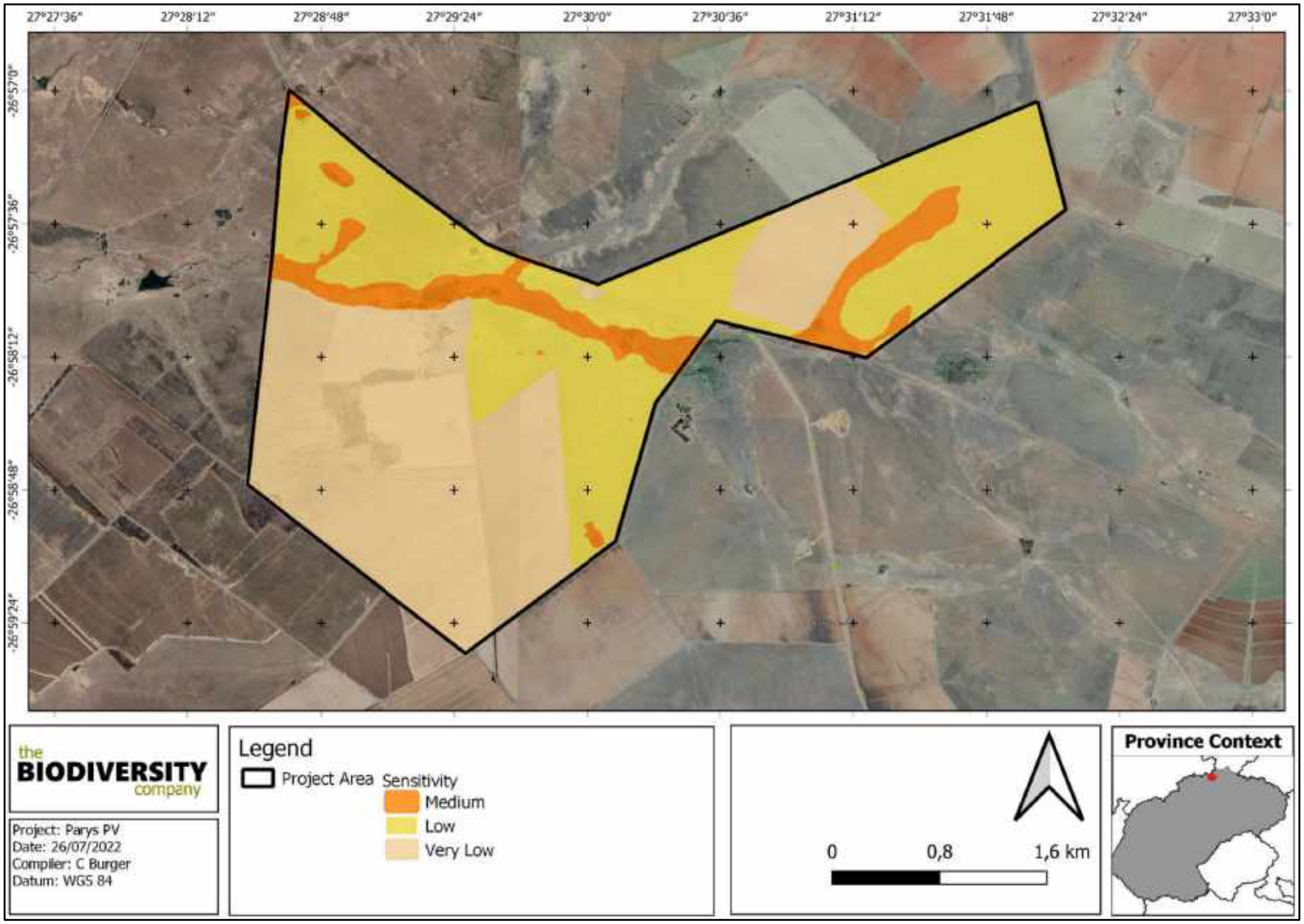
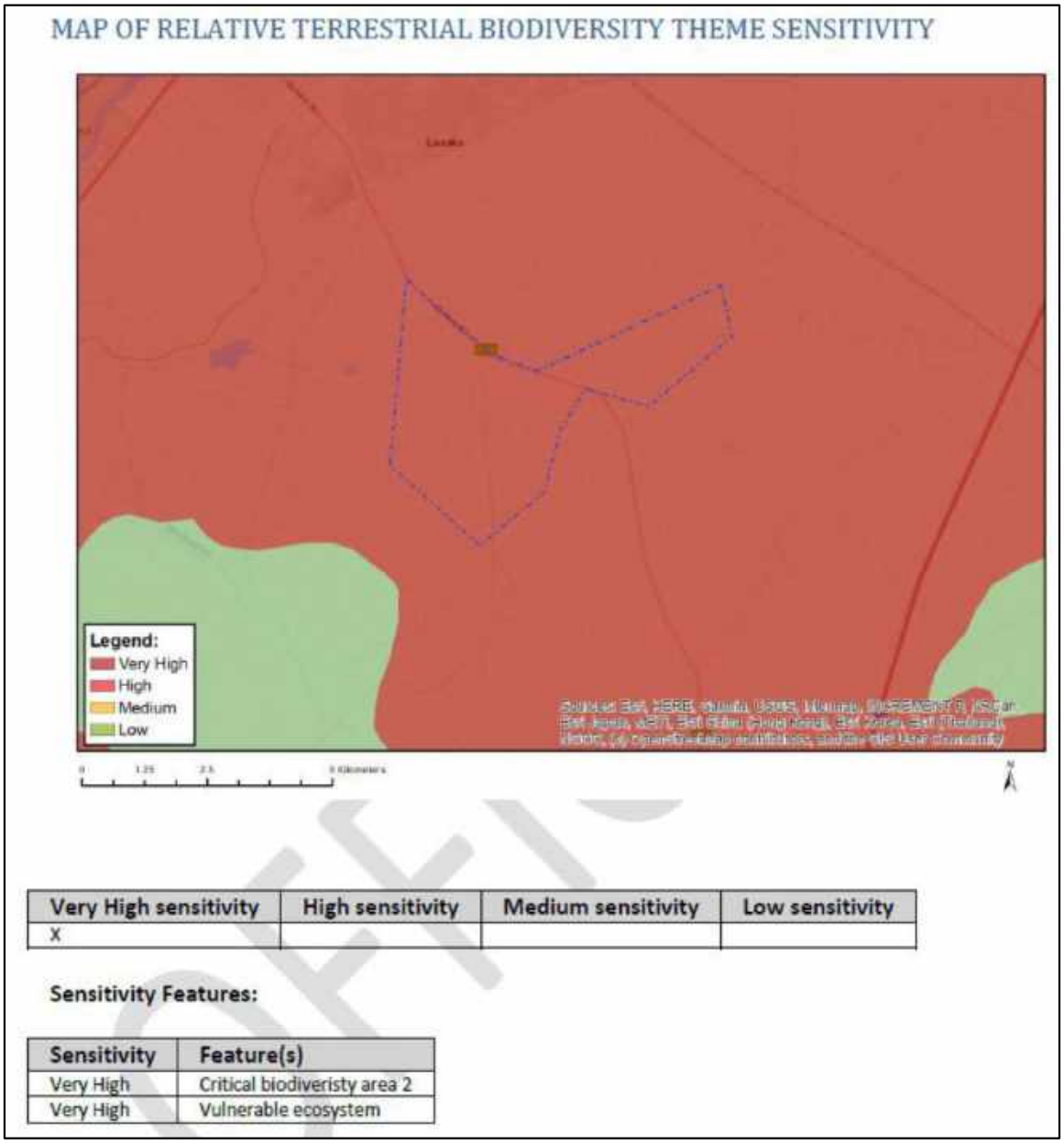


Figure 7-17 Biodiversity SEI delineation relevant to the project area

The terrestrial biodiversity theme sensitivity as indicated in the screening report (compiled by the National Web based Environmental Screening Tool) was derived to be 'Very High' (Figure 7-18), mainly due to the fact that a small area is classified as CBA and the fact that it lies within a VU ecosystem.



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	Critical biodiveristy area 2
Very High	Vulnerable ecosystem

Figure 7-18 Biodiversity Sensitivity of the project area according to the Screening Report

The completion of the terrestrial desktop and field studies disputes the 'Very High' sensitivity presented by the screening report. As discussed above, the project area is largely degraded and as such is assigned a sensitivity rating of 'Very Low' to 'Low' (with minor exceptions).

The screening report classified the animal species theme sensitivity as being of a 'Medium' sensitivity and the plant species theme as 'Low' sensitivity. Following the findings of the field survey, both the animal and plant species themes may be classified as having 'Low' sensitivities. This is due to the fact that there is very little suitable habitat available to support the occurrence of any SCC within the project area.

8 Proposed Impact Management Plan

The aim of the management outcomes is to present mitigation actions in such a way that they can be incorporated into the Environmental Management Programme (EMPr) for the project, which should in turn allow for a more successful implementation and auditing of the mitigations and monitoring guidelines. Table 8-1 presents the recommended mitigation measures and the respective timeframes, targets, and performance indicators relative to the terrestrial study.

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

- Prevent the further loss and fragmentation of vegetation communities within the CBA areas in the vicinity of the project area;
- Reduce the negative fragmentation effects of the development and enable the safe movement of faunal species; and
- Prevent the direct and indirect loss and disturbance of floral and faunal species and communities (including any potential Species of Conservation Concern).

Special attention must be paid to the ‘Vegetation and Habitats’ and ‘Fauna’ sections below as these sections provide recommended and important mitigation measures pertaining to the sensitive ridge and wetland areas, in addition to any SCC that may occur within the project area.

Table 8-1 Mitigation measures from the terrestrial assessment; including requirements for timeframes, roles, and responsibilities

Management outcome: Vegetation and Habitats				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
All planned activities should be realigned to prioritise development within the 'Very Low' to 'Low' sensitivity areas. Medium impact activities followed by appropriate restoration are allowed within the 'medium' sensitive rocky area. It is recommended that areas to be developed/disturbed be specifically demarcated so that during the construction/activity phase, only the demarcated areas be impacted upon.	Planning Phase, Construction Phase	Project manager, Environmental Officer	Construction footprint	During phase
The wetland systems are considered to be of medium sensitivity from a terrestrial perspective. However, all requirements and recommendations as per the TBC Wetland Assessment (2022) must be adhered to. This includes the recommendation that any development within the wetlands would require strong motivation, would constitute a Very High residual impact rating and would warrant a full water use licence application and the development and implementation of a comprehensive wetland offset strategy.	Planning Phase, Pre-Construction, Construction Phase	Project manager, Environmental Officer & Contractor	Sensitive areas	Ongoing
It is recommended that the proposed powerlines to cross a wetland area have a longer span width which enables it to avoid the wetland area and/or be realigned to follow existing access roads which will minimise the impacts on wetland systems. Additionally, it is recommended that access routes be realigned to follow existing routes as far as possible and avoid wetland areas as far as possible.	Planning Phase, Pre-Construction, Construction Phase	Project manager, Environmental Officer & Contractor	Construction footprint	Ongoing
Areas of dense and healthy indigenous vegetation, even secondary communities outside of the direct project footprint, should not be fragmented or disturbed further.	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation	Ongoing
All vehicles and personnel must make use of the existing roads and walking paths, especially construction/operational vehicles.	Construction/Operational Phase	Environmental Officer & Design Engineer	Roads and paths used	During phase
All laydown, chemical toilets etc. should be restricted to 'Very 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.	Construction/Operational Phase	Environmental Officer & Design Engineer	Laydown areas and material storage & placement	During phase

Areas that are denuded during construction that are not within the proposed footprint area need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds and to support the adjacent habitat. This will also reduce the likelihood of encroachment by alien invasive plant species.	Closure Phase/Rehabilitation phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
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
Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair.	Life of operation	Environmental Officer & Contractor	Leaks and spills	Ongoing
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 is to take place on site unless necessary.** • **All contaminated soil shall be treated in situ or removed and be placed in containers.** • **It is important to appropriately contain any diesel storage tanks and/or 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
Consult a fire expert and compile and implement a fire management plan to minimise the risk of veld fires around the project site.	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. Infrastructure, development areas and routes where protected plants cannot be avoided, these plants	Life of operation	Project manager, Environmental Officer	Protected Tree/Plant species	Ongoing

should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again.				
Management outcome: Fauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to enforce this. These actions are illegal in terms of provincial environmental legislation.	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
A qualified environmental control officer must be on site when clearing begins. The area must be walked though by a qualified ecologist prior to construction to ensure that 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.	Pre-Construction, Construction Phase	Environmental Officer, Contractor	Presence of any floral or faunal species	During phase
Any holes/deep excavations must be dug in a progressive manner in order to allow burrowing animals time to move off and to prevent trapping. Should the holes remain open overnight they must be covered temporarily to ensure no fauna species fall in.	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of trapped animals and open holes	Ongoing
The proposed area to be developed must be disturbed by walking the area, prior to clearing of the area. This will allow fauna to move off from the area.	Life of Operation	Environmental Officer, Contractor, and estate manager	Fauna	Construction phase
The areas to be developed (or activity areas) must be specifically demarcated to prevent the movement of staff or equipment/vehicles into the surrounding environments. Signs must be put up to enforce this.	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into surrounding areas	During phase
The duration of the construction should be minimized to as short a term as possible, to reduce the period of disturbance on fauna.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Construction timeframe	During phase
Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (yellow) lights should be used wherever possible.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Light pollution and period of light	During phase

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 be enforced to ensure that road killings and erosion is limited. Speed bumps should be built to force slow speeds.	Construction Phase	Health and Safety Officer	Compliance to the training	During phase
Noise must be kept to a minimum during the evenings/ at night to minimize all possible disturbances to amphibian species and nocturnal mammals.	Construction/Operational Phase	Environmental Officer	Noise levels	Ongoing
Signs must be put up in order to show the importance and sensitivity of surrounding areas and their functions. This especially pertains to the ridge and wetland areas.	Life of operation	Environmental Officer	Presence and condition of signs	Ongoing
Only use environmentally friendly dust suppressant products.	Construction and operation	Environmental Officer & Contractor, Engineer	Presence of chemicals in and around the project area	Ongoing
Management outcome: Alien Vegetation and Fauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
The implementation of an Alien Invasive Plant management plan is very important, especially because of the invasive species identified on site which, if left unchecked, will continue to grow and spread prolifically leading to further and more significant deterioration to the health of the natural environment within the project area.	Life of operation	Project manager, Environmental Officer & Contractor	Assess and control presence and encroachment of alien vegetation	Quarterly monitoring
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	During phase
Management outcome: Dust				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency

Dust-reducing mitigation measures must be put in place and must be strictly adhered to, particularly for all dirt roads and any earth dumps. This includes the wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated. Only environmentally friendly suppressants may be used to avoid the pollution of water sources. Speed limits must be put in place to reduce erosion, and speed bumps should also be constructed.	Construction Phase and Life of operation	Contractor	Dustfall	Ongoing, as per a dust monitoring program
Develop and implement a dust monitoring programme for the construction phase of the project.	Construction Phase	Environmental Officer	Dust monitoring	Construction phase
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 must be emptied and secured;** • **Temporary storage of domestic waste shall be in covered waste skips; and** • **Maximum domestic waste storage period must be 10 days.**	Life of operation	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation
Any litter, spills, fuels, chemical and human waste in and around the project area must be removed and disposed of timeously and responsibly.	Construction/Closure Phase	Environmental Officer & Health and Safety Officer	Presence of Waste	Daily
It must be made an offence to litter or dump any material outside of specially demarcated and managed zones. Signs and protocols must be established to explain and enforce this.	Life of operation	Contractor, Environmental Officer & Health and Safety Officer	Presence of Waste and Dumping	Daily, Ongoing
A minimum of one toilet must be provided per 10 persons. Portable toilets must be regularly pumped dry to ensure that the system does not degrade over time and spill into the surrounding area.	Life of operation	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.	Life of operation	Environmental Officer & Health and Safety Officer, Contractor	Availability of bins and the collection of waste	Ongoing

Where a registered disposal facility is not available close to the project area, the Contractor/property owner shall provide a method statement with regards to waste management. Under no circumstances may domestic waste be burned on site. Waste may never be stored in an open pit where it is susceptible to the elements such as wind and rain.	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Collection/handling of waste	Ongoing
Management outcome: Environmental Awareness Training				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
All personnel are to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on all sensitive environmental receptors within the project area to inform contractors and site staff of the presence of sensitive habitat features such as ridges and wetlands, and management requirements in line with the Environmental Authorisation and within the EMPr.	Life of operation	Environmental Officer, Health and Safety Officer	Compliance to the training	Ongoing
Contractors and employees must all undergo a strict environmental induction and be made aware of the sensitive habitats within the project area.	Life of operation	Environmental Officer, Health and Safety Officer	Compliance to the training	Ongoing

9 Conclusion

The majority of the project area has historically been modified to accommodate agricultural practices and as such remain in a transformed state. The project area does, however, contain unique habitat features such as the wetland systems that traverse the central portion of the project area as well as the rocky area/ridge. Thus, it is very important that the management outcomes presented above be adhered to, in order to mitigate the negative expected environmental impacts that will stem from the development activities. These include:

- The loss and fragmentation of vegetation communities;
- The safe movement of faunal species; and
- The direct and indirect loss and disturbance of floral and faunal species and communities.

Completion of the terrestrial biodiversity assessment led to a disputing of the 'Very High' classification for the terrestrial biodiversity theme sensitivity as allocated by the National Environmental Screening Tool. The majority of the project area has instead been assigned a 'Very Low' to 'Low' sensitivity, because of the high levels of environmental disturbance that have taken place and the fact that no SCC were observed - or are very likely to occur. It is noted that two areas have been assigned higher sensitivities, with both the wetland and ridge habitat allocated a 'Medium' sensitivity. The ridge and wetland areas remain in a moderately natural condition as it has been predominantly excluded from direct historic anthropogenic activities and as such still provides habitat to support indigenous vegetation and common faunal species.

9.1 Specialist Recommendations

The portion of land within the project area that is classified as having a sensitivity rating of 'Very Low', namely the transformed and degraded grassland habitat, and of "Low", namely the secondary grassland, is likely to face minimal further impacts from any development activities, and as such the proposed activities may proceed within these areas.

As per the SEI guidelines, only development activities of medium impact followed by appropriate restoration activities will be acceptable within the areas designated as medium sensitivity (Ridge area). Additionally, it is recommended that the requirements and recommendations mentioned in TBC Wetland Assessment (2022) be adhered to. This includes the recommendation that any development within the wetlands would require strong motivation, would constitute a Very High residual impact rating and would warrant a full water use licence application and the development and implementation of a comprehensive wetland offset strategy. Should the development adhere to the mitigation measures mentioned in Table 8-1 above, then there are no fatal flaws for this project and the proposed activities may commence.

As mentioned, the development footprint occurs within the 500 m regulation area for a wetland and as such development must follow the guidelines stipulated in the project wetland assessment.

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11 Appendix A: Specialist Declarations

DECLARATION

I, Carami Burger, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations, and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan, or document to be prepared by myself for submission to the competent authority.
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Carami Burger

Ecologist

The Biodiversity Company

July 2022

DECLARATION

I, Andrew Husted, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.

Andrew Husted

Ecologist

The Biodiversity Company

July 2022

12 Appendix F Specialists CVs

Carami Burger

B.Sc. Honours – Ecological Interactions and Ecosystem Resilience (Cum Laude)

(*Cand Sci Nat*)

Cell: +27 83 630 9077

Email: Carami@thebiodiversitycompany.com

Identity Number: 9606250185084

Date of birth: 25 June 1996

Profile Summary

Working experience in South Africa and Mozambique.

Specialist experience with infrastructure development, road development, renewable energy, mining and prospecting.

Specialist expertise include terrestrial ecology, wetland resources, rehabilitation and management plans, environmental compliance and monitoring.

Areas of Interest

Renewable Energy & Bulk Services Infrastructure Development, Mining, Farming, Sustainability and Conservation.

Key Experience

- Environmental Impact Assessments (EIA)
- Basic Assessments
- Terrestrial Ecological Assessments
- Wetland Delineation and Ecological Assessments
- Environmental Management Programmes (EMPr)
- Rehabilitation Plans
- Invasive Species Plans
- Search and Rescue Plans
- Environmental Compliance Audits
- Water Use License Applications
- Dust Fallout Monitoring
- Water Quality Monitoring

Countries worked in

South Africa

Mozambique

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient

Qualifications

- BSc Hons Ecological Interactions and Ecosystem Resilience.
- BSc Botany and Zoology.
- Cand Sci Nat (121757)

SELECTED PROJECT EXPERIENCE

Project Name: The Central Térmica de Temane (CTT) Project - Management Plans

Client: TSK

Personal position / role on project: Author

Location: Inhambane Province, Mozambique

Main project features: Compile a Plant Search and Rescue Plan, Site Clearance Plan, Invasive Alien Species Plan and a Rehabilitation Plan for the Central Térmica de Temane (CTT) project

Project Name: The Central Térmica de Temane (CTT) Project - Flora and Fauna Survey and Report

Client: TSK

Personal position / role on project: Terrestrial Specialist

Location: Inhambane Province, Mozambique

Main project features: Conduct a Flora and Fauna survey and report during the dry and wet season for the Central Térmica de Temane (CTT) project, located in the vicinity of the town of Inhassoro, Inhambane Province, Mozambique

Project Name: Sikhwetha Lodge - Ridge and Terrestrial Ecological Assessment

Client: Neels Bezuidenhout Architects

Personal position / role on project: Terrestrial Specialist

Location: Roodeplaat, Gauteng

Main project features: Conduct a Ridge And Terrestrial Ecological Assessment as part of the Environmental Authorisation process for the proposed Sikhwetha Lodge located on Portion 2 of the Farm Doornfontein 291 JR.

Project Name: Rama City Bulk Service Infrastructure Development - Watercourse Delineation and Assessment

Client: RCDC

Personal position / role on project: Wetland Ecologist

Location: Ga-Rankuwa Gauteng

Main project features: Conduct a Watercourse Delineation and Assessment for the Rama City Bulk Service Infrastructure Development.

Project Name: Katoloso Minerals Prospecting Right – Terrestrial and Wetland Ecological Opinion

Client: Katoloso Minerals

Personal position / role on project: Terrestrial/ Wetland Ecologist

Location: Ventersdorp North West

Main project features: To conduct a terrestrial and wetland ecological opinion for the proposed Prospecting Right.

Project Name: Wetland Assessment as part of the Environmental Authorisation process for the proposed construction of residential units on Portion 9 of the farm Olievenhoutbosch 389-JR, Gauteng Province.

Personal position / role on project: Avifaunal specialist

Location: Olievenhoutbosch, Gauteng Province.

Main project features: To conduct a wetland assessment for the proposed construction of residential units.

Project Name: Copperton Wind Farm Project - Rehabilitation Method Statement

Personal position / role on project: Terrestrial Ecologist

Location: Copperton Northern Cape Province.

Main project features: To compile a rehabilitation method statement for the Copperton Wind Farm Project located on the farm Nelspoortjie (Farm No. 103 Portion 4 (a portion of portion 2) and 7 (a portion of portion 5) near Copperton in the Northern Cape Province.

Project Name: Wonderfontein Road Diversion - Terrestrial Ecological Scan

Personal position / role on project: Terrestrial Ecologist.

Location: Belfast, Mpumalanga Province

Main project features: To conduct a terrestrial ecological scan as part of the Environmental Authorisation Process for the Proposed Wonderfontein Road Diversion Near Wonderfontein Colliery.

Project Name: Terrestrial Ecological Report for the proposed construction of a crematorium on a portion of the remaining extent of the Farm Vulcania 279 IR, Gauteng Province

Personal position / role on project: Terrestrial Ecologist

Location: Springs, Gauteng

Main project features: Conduct a detailed terrestrial ecology basic assessment for the proposed construction of a crematorium.

Project Name: Wetland study as part of the Environmental Authorisation process for the proposed construction of a crematorium on a portion of the remaining extent of the Farm Vulcania 279 IR, Gauteng Province.

Personal position / role on project: Wetland Ecologist

Location: Springs, Gauteng

Main project features: To conduct a wetland delineation and ecological assessment for the proposed construction of a crematorium.

OVERVIEW

An overview of the specialist technical expertise includes the following:

- Terrestrial Ecological Assessments.
- Faunal surveys which include mammals, birds, amphibians and reptiles.
- Wetland Ecological Assessment.
- Management plan compilation (Plant Search and Rescue, Rehabilitation, Site Clearance, Alien Invasive Species Plans).
- Compliance audits.
- Water Use Licenses.
- Water Quality and Dust Fall Monitoring.

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (May 2022 - Present)

Terrestrial Ecological Assessments, Wetland Ecological Assessment and management Plans.

EMPLOYMENT: EP3 Environmental - Senior Consultant and Ecologist (June 2019 - April 2022)

Responsibilities:

- Specialist studies
- Environmental Procedures
- Basic Assessment Reports
- Environmental Impact Assessment Reports
- Water Use License Applications
- Environmental Management Programmes
- Environmental Control Officer Audits and Reports
- Surface Water Quality Monitoring Reports

- Groundwater Quality Monitoring Reports
- Dust Fallout Monitoring Reports

EMPLOYMENT: Scientific Aquatic Services (SAS)- Internship (November 2018 - June 2019)

Responsibilities:

- Specialist studies
- Background Information, Mapping (ArcGIS) and Desktop Studies

ACADEMIC QUALIFICATIONS

North-West University of Potchefstroom (2017): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Botany and Zoology.

North-West University of Potchefstroom (2013): BACCALAUREUS SCIENTIAE HONORIBUS (Hons) – Ecological Interactions and Ecosystem Resilience (Cum Laude)

Title: Mini-Dissertation on ecological information in Environmental Impact Assessments (EIA) at Mooi River Mall.

Andrew Husted

M.Sc Aquatic Health (*Pr Sci Nat*)

Cell: +27 81 319 1225
Email: andrew@thebiodiversitycompany.com
Identity Number: 7904195054081
Date of birth: 19 April 1979

Profile Summary

Working experience throughout South Africa, West and Central Africa and also Armenia.

Specialist experience with on-shore drilling, mining, engineering, hydropower and renewable energy.

Experience with project management of national and international multi-disciplinary projects. Including managing and compiling ESHIAs and EMPs

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

Specialist expertise include Instream Flow and Ecological Water Requirements, aquatic ecology and wetlands resources.

Areas of Interest

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

Publication of scientific journals and articles.

Key Experience

- Familiar with World Bank, Equator Principles and the International Finance Corporation requirements
- Environmental, Social and Health Impact Assessments (ESHIA)
- Environmental Management Programmes (EMP)
- Ecological Water Requirement determination experience
- Wetland delineations and ecological assessments
- Terrestrial Ecological Assessments
- Aquatic Ecological Assessments
- Rehabilitation Plans and Monitoring
- Aquaculture

Country Experience

Botswana, Cameroon

Democratic Republic of Congo

Ghana, Ivory Coast, Lesotho

Liberia, Mali, Mozambique

Nigeria, Republic of Armenia, Senegal

Sierra Leone, South Africa

Swaziland, Tanzania

Nationality

South African

Languages

English – Proficient

Afrikaans – Conversational

German - Basic

Qualifications

- MSc (University of Johannesburg) – Aquatic Health.
- BSc Honours (Rand Afrikaans University) – Aquatic Health
- BSc Natural Science
- Pr Sci Nat (400213/11)
- Certificate of Competence: Mondi Wetland Assessments
- Certificate of Competence: Wetland WET-Management
- SASS 5 (Expired) – Department of Water Affairs and Forestry for the River Health Programme
- EcoStatus application for rivers and streams

SELECTED PROJECT EXPERIENCE

Project Name: The Environmental and Social Impact Assessment (ESIA) the proposed Nondvo Dam

Client: WSP

Personal position / role on project: Project Manager.

Location: Swaziland

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the proposed dam. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: The environmental flow assessment for the Mara River system

Client: IHE Delft Institute for Water Education

Personal position / role on project: Project Manager / Freshwater Ecologist

Location: Tanzania

Main project features: To conduct a dual season campaign to the Lower Mara River Basin in Tanzania to collect hydrological and ecological information as part of an environmental flow assessment on the Tanzanian side of the Mara River in collaboration with GIZ and NBI-NELSAP.

Project Name: The Environmental and Social Impact Assessment (ESIA) the proposed solar photovoltaic facility and transmission in Cuamba

Client: WSP

Personal position / role on project: Project Manager.

Location: Mozambique

Main project features: To conduct a single season terrestrial and aquatic ecological baseline and impact assessment for the proposed dam. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline assessment for the proposed Siguiri Gold Mine Project, in Kankan Province, Guinea.

Client: SRK Consulting.

Personal position / role on project: Project Manager.

Location: Siguiri, Guinea, West-Africa (2018).

Main project features: To conduct a dual season ecological baseline assessment for the expected impact footprint area. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline and impact assessment for the proposed Lesotho Bulk Water Supply Scheme, Lesotho.

Client: WSP.

Personal position / role on project: Wetland & Aquatic Ecologist, PROBFLO and Project Manager.

Location: Mohale's Hoek, Lesotho (2018).

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the pipeline route and proposed weir. The study was required to meet national and IFC requirements, including a Critical Habitat assessment. The study also contributed to prescribing Instream Flow Requirements using PROBFLO for the system.

Project Name: A biodiversity baseline and impact assessment for the proposed Pavua Hydropower Project, in Sofala Province, Central Mozambique.

Client: Mott MacDonald.

Personal position / role on project: Project Manager.

Location: Sofala Province, Mozambique (2017).

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the expected impact footprint area, including Gorongosa National. The study was required to meet national and IFC requirements, including a Critical Habitat assessment. The study also contributed to prescribing Instream Flow Requirements for the system.

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (January 2015 – Present)

I founded The Biodiversity Company in 2015, now consisting of experienced ecologists who provide technical expertise and policy advice to numerous sectors, such as mining, agriculture, construction and natural resources. The team at The Biodiversity Company have conducted stand-alone specialist studies, and provided overall guidance of studies with a pragmatic approach for the management of biodiversity that takes into account all the relevant stakeholders, most importantly the environment that is potentially affected. We manage risks to the environment to reduce impacts with practical, relevant and measurable methods.

EMPLOYMENT: Digby Wells Environmental (October 2013 – December 2014)

Digby Wells assigned me to the role of Country Manager for the united Kingdom. This was a new endeavour for the company as the company's global footprint continues to increase. The primary responsibilities for the role included the following:

- **Client liaison** to be able to interact more efficiently and personally with current mining clients, mining industry service providers, legal firms and banking institutions in order to introduce Digby Wells as a services provider with the aim of securing work.
- **Project management** for international projects which may require a presence in the united Kingdom, this was dependent on the location and needs of the client. These projects would mostly be based on the Equator Principles (EP) and International Finance Corporation (IFC) Performance Standards.
- **Technical input** to provide specialist technical expertise for projects, this included fauna, aquatic ecology, wetlands and rehabilitation. Continued with the design and implementation of Biodiversity and Land Management Plans to assist clients with managing the natural resources. Responsibilities also included the mentorship and management (including reviewing and guiding) other expertise such as flora, fauna and pedology.

EMPLOYMENT: Digby Wells Environmental (March 2012 – September 2013)

Manager of a multi-disciplinary department of scientists providing specialist services in support of national and international requirements as well as best practice guidelines, primarily focussing on the mining sector. In addition to managing the department, I was also expected to contribute specialist services, most notably focusing on water resources. Further responsibilities also included the management of numerous projects on a national or international scale. A general overview of the required responsibilities are as follows:

- **Project management** for single as well as multi-disciplinary studies on a national and international scale. This included legislation and commitments for the respective country being operated in, as well as included the World Bank (WB), EP and IFC requirements.
- **Individual and/or team management** in order to provide mentoring and supportive structures for development and growth in support of the company's strategic objectives.
- **Scientific report writing** to ensure that the relevant standards and requirements have been attained, namely local country legislation, as well as WB, EP and IFC requirements.
- **Report reviewing** in order to ensure compliance and consideration of relevant legislation and guidelines and also quality control.
- **Specialist management** to facilitate the collaboration and integration of specialist skills for the respective projects. This also included the development of Biodiversity and Land Management Plan for clients.
- **Client Resource Manager** for numerous clients in order to establish as well as maintain working relationships.

An overview of the tenure working with the company is provided below**:**

- **October 2013 – December 2014: London Operations Manager –** Deployed to establish a presence for the company (remote office) in the united Kingdom by means of generating project work to support the employment of staff and operation of a business structure.
- **March 2012 – September 2013: Biophysical Department Manager –** Responsible for the development and growth of the department to consist of four specialist units. This included the development of a new specialist unit, namely Rehabilitation.
- **January 2011 - February 2012: Ecological unit Manager** – In addition to implementing aquatic and wetland specialist services, the role required the overall management of additional specialist services which included fauna & flora.
- **June 2010 - December 2010: Aquatic Services Manager –** This required the marketing and implementation of specialist programmes for the client base such as biomonitoring and wetland off-set strategies. In addition to this, this also included expanding on the existing skill set to include services such as toxicity, bioaccumulation and ecological flow assessments.
- **August 2008: Aquatic ecologist –** Employed as a specialist to establish the aquatic services within the company. In addition to this, wetland specialist services were added to the existing portfolio.

PREVIOUS EMPLOYMENT: Econ@UJ (University of Johannesburg)

- June 2007 – July 2008: Junior aquatic ecologist
  - Researcher
  - Technical assistant for fieldwork
  - Reporting writing
  - Project management

ADDITIONAL EXPERIENCE

Compliance audits	Conducting site investigations in order to determine the level of compliance attained, ensuring that the client maintains an

	appropriate measure of compliance with environmental regulations by means of a legislative approach
Control officer	Acting as an independent Environmental Control Officer (ECO), acting as a quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts
Screening studies	Project investigations in order to determine the level of complexity for the environmental and social studies required for a project. This is a form of risk assessment to guide the advancement of the project.
Public consultation	The provision of specialist input in order to communicate project findings as well as assist with providing feedback if and when required.
Water use licenses	Consultation with the relevant authorities in order to establish the project requirements, as well as provide specialist (aquatics/wetland) input for the application in order to achieve authorisation.
Closure	Primarily the review of closure projects, with emphasis on the closure cost calculations. Support was also provided by assisting with the measurements of structures during fieldwork.
Visual	The review of visual studies as well as the collation of field data to be considered for the visual interpretation for the project.

ACADEMIC QUALIFICATIONS

University of Johannesburg, Johannesburg, South Africa (2009): MAGISTER SCIENTIAE (MSc) - Aquatic Health:

Title: *Aspects of the biology of the Bushveld Smallscale Yellowfish (Labeobarbus polylepis): Feeding biology and metal bioaccumulation in five populations.*

Rand Afrikaans University (RAU), Johannesburg, South Africa (2004): BACCALAUREUS SCIENTIAE CUM HONORIBUS (Hons) – Zoology

Rand Afrikaans University (RAU), Johannesburg, South Africa (2001 - 2004): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Zoology and Botany.

PUBLICATIONS

Mahomed D, Husted A, Fry C, Downsa CT and O'Brien GC. 2019. Spatial shifts and habitat partitioning of ichthyofauna within the middle-lower region of the Pungwe Basin, Mozambique, Journal of Freshwater Ecology, 34:1, 685-702, DOI: 10.1080/02705060.2019.1673221

Tate RB and Husted, A. 2015. Aquatic Biomonitoring in the upper reaches of the Boesmanspruit, Carolina, Mpumalanga, South Africa. African Journal of Aquatic Science.

Tate RB and Husted A. 2013. Bioaccumulation of metals in *Tilapia zillii* (Gervai, 1848) from an impoundment on the Badeni River, Cote D'Iviore. African Journal of Aquatic Science.

O'Brien GC, Bulfin JB, Husted A. and Smit NJ. 2012. Comparative behavioural assessment of an established and new Tigerfish (*Hydrocynus vittatus*) population in two manmade lakes in the Limpopo catchment, Southern

Africa. African Journal of Aquatic Science.

Tomschi, H, Husted, A, O'Brien, GC, Cloete, Y, Van Dyk C, Pieterse GM, Wepener V, Nel A and Reisinger U. 2009. Environmental study to establish the baseline biological and physical conditions of the Letsibogo Dam near Selebi Phikwe, Botswana. EC Multiple Framework Contract Beneficiaries.8 ACP BT 13 – Mining Sector (EDMS). Specific Contract N° 2008/166788. Beneficiary Country: Botswana. By: HPC HARRESS PICKEL CONSULT AG

Husted A. 2009. Aspects of the biology of the Bushveld Smallscale Yellowfish (*Labeobarbus polylepis*): Feeding biology and metal bioaccumulation in five populations. The University of Johannesburg (Thesis).