



Terrestrial Biodiversity Compliance Statement for the proposed K4 Pollution Control Dam (PCD) Project

Marikana, North-West Province, South Africa

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CLIENT



Prepared by:

The Biodiversity Company

Cell: +27 81 319 1225

Fax: +27 86 527 1965

info@thebiodiversitycompany.com

www.thebiodiversitycompany.com



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|----------------------------|--|---|
| Report Name | Terrestrial Biodiversity Compliance Statement for the proposed K4 Pollution Control Dam (PCD) Project | |
| Submitted to/Client |  | |
| Report Writer | Carami Burger  | <p>Carami Burger has completed her Bachelor of Science Honours degree in Ecological Interactions and Ecosystem Resilience. Carami is Pr Sci Nat registered (121757) as an ecologist and has completed various studies as part of Basic Assessments and Environmental Impact Assessments.</p> |
| Report Reviewer | Sarah Newman  | <p>Sarah Newman is a terrestrial environmental consultant (Cand. Sci. Nat. 158474) with experience working in the fields of ecology, conservation and biodiversity. Sarah obtained her Master of Science degree in Entomology from the University of Pretoria in 2018.</p> |
| Report Reviewer | Andrew Husted  | <p>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.</p> |
| Declaration | <p>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.</p> | |

Table of Contents

| | | |
|--------|--|----|
| 1 | Introduction..... | 1 |
| 1.1 | Project Information | 1 |
| 1.1.1 | Project Area of Influence | 2 |
| 1.2 | Terms of Reference | 5 |
| 2 | Key Legislative Requirements..... | 6 |
| 2.1 | Report Legislative Framework | 6 |
| 3 | Definitions..... | 7 |
| 3.1 | Species of Conservation Concern | 7 |
| 3.2 | Protected Species | 8 |
| 4 | Methods..... | 8 |
| 4.1 | Geographic Information Systems (GIS) Mapping | 8 |
| 4.2 | Desktop Vegetation and Botanical Assessment | 9 |
| 4.3 | Floristic Fieldwork Survey and Analysis..... | 9 |
| 4.4 | Faunal Assessment..... | 10 |
| 4.4.1 | Desktop Assessment | 10 |
| 4.4.2 | Field Survey | 11 |
| 4.5 | Site Ecological Importance..... | 12 |
| 5 | Limitations and Assumptions | 14 |
| 6 | Receiving Environment | 15 |
| 6.1 | Desktop Spatial Assessment | 15 |
| 6.1.1 | Ecosystem Threat Status | 15 |
| 6.1.2 | Ecosystem Protection Level..... | 16 |
| 6.1.3 | Protected Areas..... | 17 |
| 6.1.4 | North West Biodiversity Spatial Plan..... | 18 |
| 6.1.5 | National Protected Area Expansion Strategy..... | 19 |
| 6.1.6 | Important Bird and Biodiversity Area..... | 20 |
| 6.1.7 | Hydrological Setting | 21 |
| 6.1.8 | National Freshwater Ecosystem Priority Area Status | 22 |
| 6.1.9 | Flora Assessment..... | 23 |
| 6.1.10 | Faunal Assessment..... | 25 |
| 6.2 | Field Survey | 28 |

| | | |
|-------|--|----|
| 6.2.1 | Terrestrial Fauna and Flora..... | 28 |
| 6.2.2 | Fauna Assessment..... | 31 |
| 6.2.3 | Habitat Survey and Site Ecological Importance..... | 33 |
| 7 | Biodiversity Risk Assessment | 36 |
| 7.1 | Present Impacts to Biodiversity | 36 |
| 7.2 | Loss of Irreplaceable Resources..... | 37 |
| 7.3 | Assessment of Impact Significance | 38 |
| 8 | Proposed Impact Management Plan..... | 44 |
| 9 | Conclusion..... | 50 |
| 9.1 | Specialist Recommendations..... | 50 |
| 10 | References | 51 |
| 11 | Appendix A Specialist Declarations | 55 |
| 12 | Appendix B Specialists CVs..... | 57 |

Tables

| | | |
|-----------|--|----|
| Table 2-1 | A list of key legislative requirements relevant to ecosystems and biodiversity in North West Province..... | 6 |
| Table 2-2 | Terrestrial Biodiversity Compliance Statement information requirements as per the relevant protocol, including the location of the information within this report..... | 7 |
| Table 4-1 | Summary of Conservation Importance criteria..... | 12 |
| Table 4-2 | Summary of Functional Integrity criteria | 12 |
| Table 4-3 | Matrix used to derive Biodiversity Importance from Functional Integrity and Conservation Importance..... | 13 |
| Table 4-4 | Summary of Receptor Resilience criteria..... | 13 |
| Table 4-5 | Matrix used to derive Site Ecological Importance from Receptor Resilience and Biodiversity Importance..... | 14 |
| Table 4-6 | Guidelines for interpreting Site Ecological Importance in the context of the proposed activities | 14 |
| Table 6-1 | Desktop spatial features examined..... | 15 |
| Table 6-2 | Plant Species of Conservation Concern potentially occurring in the PAOI..... | 25 |
| Table 6-3 | Threatened amphibian species that are expected to occur within the PAOI..... | 25 |
| Table 6-4 | Threatened reptile species that are expected to occur within the PAOI..... | 26 |
| Table 6-5 | Threatened mammal species that are expected to occur within the PAOI..... | 26 |
| Table 6-6 | Threatened avifauna species that are expected to occur within the PAOI..... | 27 |

| | | |
|-----------|---|----|
| Table 6-7 | Summary of avifauna species recorded within the PAOI | 31 |
| Table 6-8 | Summary of mammal species recorded within the PAOI..... | 32 |
| Table 6-9 | Site Ecological Importance assessment summary of the habitat types delineated within the PAOI | 33 |
| Table 7-1 | Impacts to biodiversity associated with the proposed construction phase | 39 |
| Table 7-2 | Impacts to biodiversity associated with the proposed operational phase | 42 |
| Table 8-1 | Mitigation measures from the terrestrial assessment; including requirements for timeframes, roles, and responsibilities | 45 |

Figures

| | | |
|-------------|---|----|
| Figure 1-1 | Map illustrating the regional overview of the PAOI..... | 3 |
| Figure 1-2 | Map illustrating the details of the PAOI | 4 |
| Figure 3-1 | Threatened species and Species of Conservation Concern (SANBI, 2016)..... | 8 |
| Figure 6-1 | Map illustrating the ecosystem threat status associated with the PAOI..... | 16 |
| Figure 6-2 | Map illustrating the ecosystem protection level associated with the PAOI | 17 |
| Figure 6-3 | Map illustrating the PAOI in relation to the nearest protected area - Magaliesberg Biosphere Reserve (Transition Area) | 18 |
| Figure 6-4 | Map illustrating the PAOI in relation to the North West Biodiversity Spatial Plan features . | 19 |
| Figure 6-5 | The PAOI in relation to the National Protected Area Expansion Strategy | 20 |
| Figure 6-6 | The PAOI in relation to the Magaliesberg IBA..... | 21 |
| Figure 6-7 | Map illustrating ecosystem threat status of rivers and wetland ecosystems in the PAOI ... | 22 |
| Figure 6-8 | The PAOI in relation to the National Freshwater Ecosystem Priority Areas. | 23 |
| Figure 6-9 | Map illustrating the vegetation type associated with the PAOI. | 24 |
| Figure 6-10 | Photo illustrating the Degraded Marikana Thornveld associated with the PAOI..... | 29 |
| Figure 6-11 | Photo illustrating the Degraded Marikana Thornveld associated with the PAOI..... | 29 |
| Figure 6-12 | Photo illustrating the Modified Habitat associated with the PAOI | 30 |
| Figure 6-13 | Avifauna species observed: A) <i>Quelea quelea</i> , B) <i>Plocepasser mahali</i> , C) <i>Corythaixoides concolor</i> , D) <i>Spermestes cucullatus</i> , E) <i>Pycnonotus tricolor</i> and F) <i>Bradornis mariquensis</i> . 32 | |
| Figure 6-14 | Photographs illustrating evidence of the mammal species recorded within the PAOI during the survey period: A) <i>Lepus saxatilis</i> | 33 |
| Figure 6-15 | Map illustrating the Site Ecological Importance of the PAOI | 35 |
| Figure 6-16 | Biodiversity Sensitivity of the PAOI according to the Screening Report | 36 |
| Figure 7-1 | Photograph illustrating current negative impacts associated with the PAOI: A) Mining Activities; B) Livestock grazing; C Powerline infrastructure; and D) Pipeline infrastructure. 37 | |

1 Introduction

The Biodiversity Company was commissioned by Alta van Dyk (AVD) Environmental to conduct a terrestrial biodiversity (fauna and flora) assessment for the proposed K4 PCD Project near Marikana, North West Province (Figure 1-1 and Figure 1-2). In order to assess the baseline ecological state of the project and to present a detailed description of the receiving environment, both a desktop assessment, as well as a field survey, were conducted during June 2023. 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 PAOI as 'Very High' sensitivity (National Environmental Screening Tool, 2023). Note that based on the observations made by the specialist, it is the opinion of the specialist that a Compliance Statement was sufficient for this assessment.

The purpose of the assessment is to provide relevant input into the environmental 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.

1.1 Project Information

Sibanye-Stillwater is the owner of the K4 Shaft that forms part of the Marikana Operations located near Marikana town, North-West Province. The Marikana Operations is divided into two entities consisting of Western Platinum (Pty) Ltd and Eastern Platinum (Pty) Ltd. The K4 Shaft falls under the Western Platinum (Pty) Ltd.

The shaft was placed under care and maintenance for a period of 6 years, but has been ramped up to be fully operational in the year 2024. The current waste rock dump on the property of the shaft has been established and initiated by the previous owner. Sibanye-Stillwater is planning to extend the Life of Mine (LOM) by approximately 30 years and the existing waste rock dump will be used to place the waste rock. The size of the waste rock dump will not exceed the approved footprint as authorised in the Western Platinum Limited – Environmental Management Programme.

Additional infrastructure that needs to be implemented include the construction of:

- A V-drain around the current waste rock dump. The V-drain is considered as catchment berms on either side of the waste rock dump and is located on a ridge;
- A Pollution Control Dam (PCD) that will be lined and completed with a recovery sump for the recycling of stormwater runoff for the mining operations;
- A pipeline from the K4 Shaft to the PCD; and
- An emergency spillway to manage the overflow.

Waste rock dump, berm and channels

The total final waste rock dump footprint area will be 203 830 m² and this footprint has already been authorised in the WPL EMPR:

- The berm will be 1353 m in length and 10,83 m wide.
- Catchment 203830 m² 10 years – phase 1 only.
- Berm length West 550 m, Berm Length East 600 m.
- Average width 10.83 m.

Pollution control dam

The PCD will have a capacity of 35 203 m³ and will have a maximum height of 3 m from the floor of the dam. The V-drain will discharge via 2 legs into the PCD. The trapezoidal channels will have a max flow of 6452 L/s from the East leg (a 1:100-year storm estimate flow is 2500 L/s/ leg).

Pipelines

The pipeline will be installed to transfer water from the PDC to the K4 Shaft for re-use. The pipeline will be 500 m in length with a total pump capacity of 60 m³/hour.

1.1.1 Project Area of Influence

A 100 m buffer was imposed on either side of the proposed project area, and this was delineated to provide an overall 85 ha Project Area of influence (PAOI) within which the field survey was conducted. The region is largely defined by mining activities, residential areas, grazing land and agricultural activities.

A map of the PAOI in relation to the local region is presented in Figure 1-1, and a detailed map of the PAOI and associated development footprint is presented in Figure 1-2.

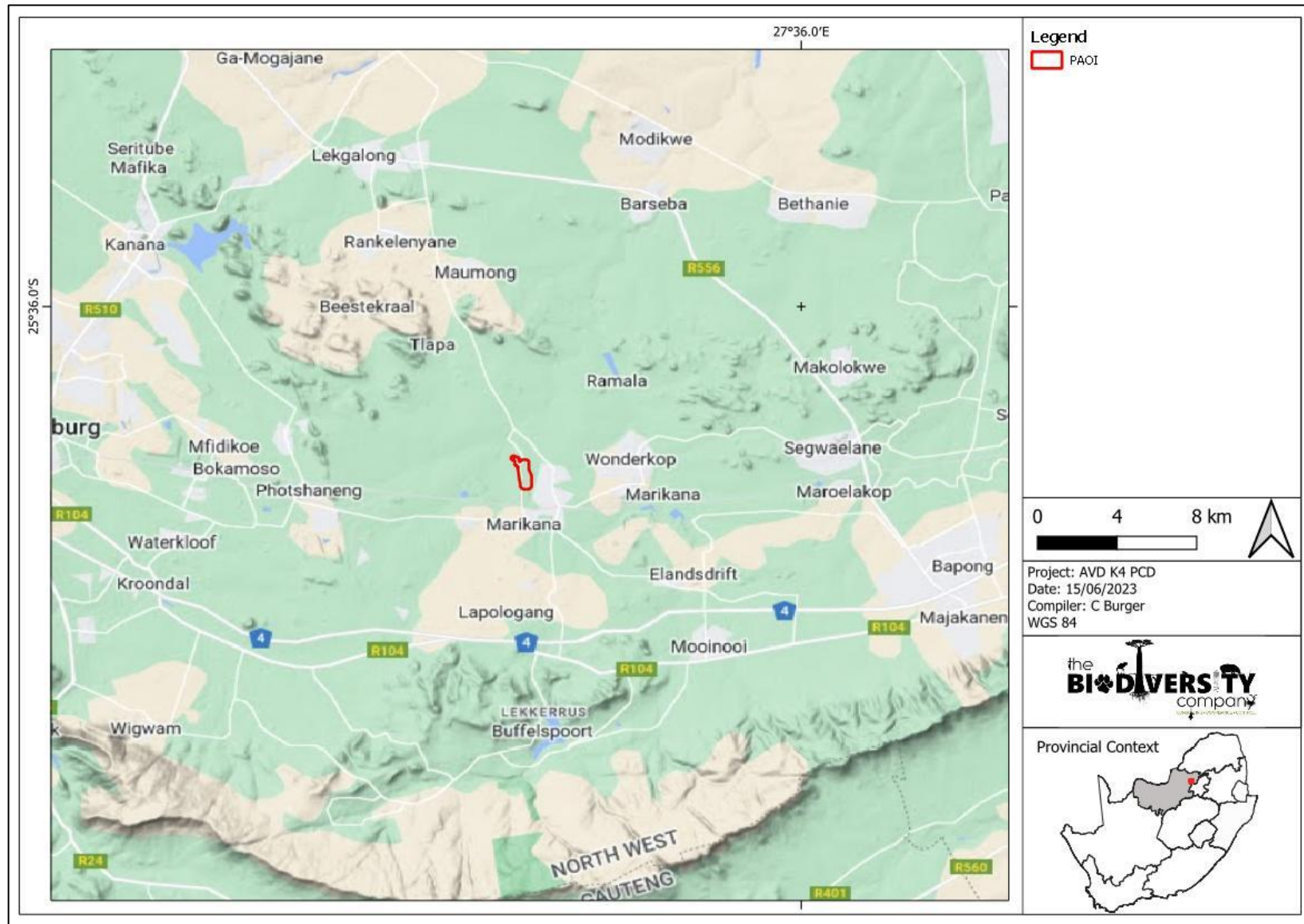


Figure 1-1 Map illustrating the regional overview of the PAOI

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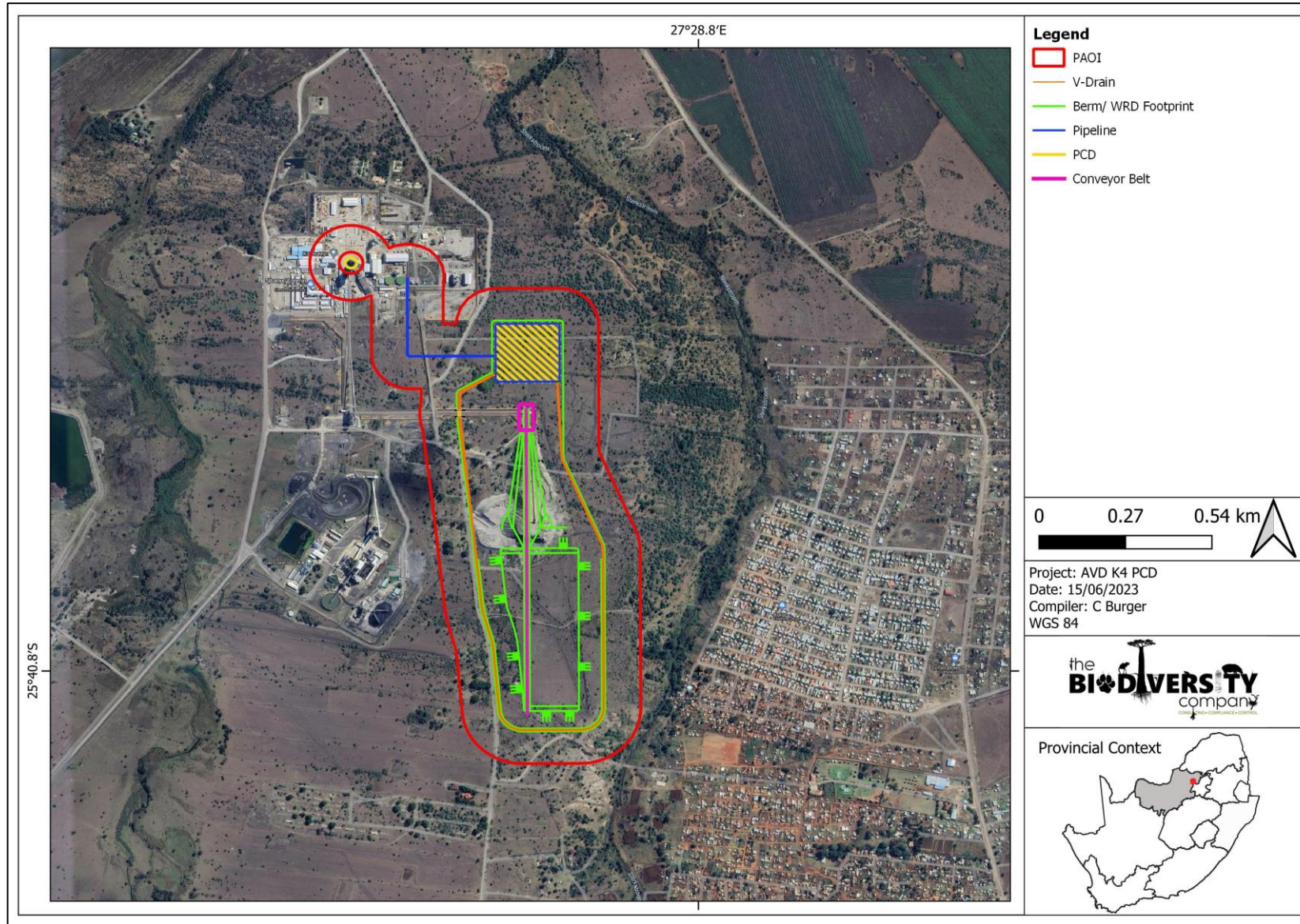


Figure 1-2 Map illustrating the details of the PAOI

1.2 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 PAOI, and the manner in which these sensitive receptors may be affected by the activity.
- Provide a map illustrating the location and extent of these sensitive receptors, if any, in the PAOI;
- Screening to identify any critical issues (potential fatal flaws) that may result in a rejection of the application; and
- Presentation of recommended 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.

2 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 2-1).

Table 2-1 A list of key legislative requirements relevant to ecosystems and biodiversity in North West Province

| Region | Legislation |
|---|---|
| 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 | North West Biodiversity Management Act (Act No. 4 of 2016) and the Biodiversity Management Amendment Bill, 2017 |
| | North West Biodiversity Sector Plan, 2015 |
| | North West Province Protected Area Expansion Implementation Strategy, 2011 |

2.1 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 (PAOI) is of a 'Medium' and 'Very 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 2-2 below.

Table 2-2 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 | 4 |
| Description of the assumptions and any uncertainties or gaps in knowledge or data | 5 |
| A baseline profile description of biodiversity and ecosystems of the site | 6 |
| Site sensitivity verification: Desktop Analysis using satellite imagery and available information | 6.1 |
| A statement on the duration, date and season of the site inspection | 6.2 |
| Site sensitivity verification: Onsite inspection, include a description of current land use and vegetation found on-site | 6.2 |
| Site sensitivity verification: Photographs/evidence of environmental sensitivity | 6.2 |
| Screening tool confirmation/dispute: The assessment must verify the "low" sensitivity of the site, in terms of plant, animal, and terrestrial biodiversity themes | 6.2.3 |
| Proposed impact management outcomes or monitoring requirements for inclusion in the EMPr | 7 & 0 |
| 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.

3 Definitions

3.1 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 3-1 below.

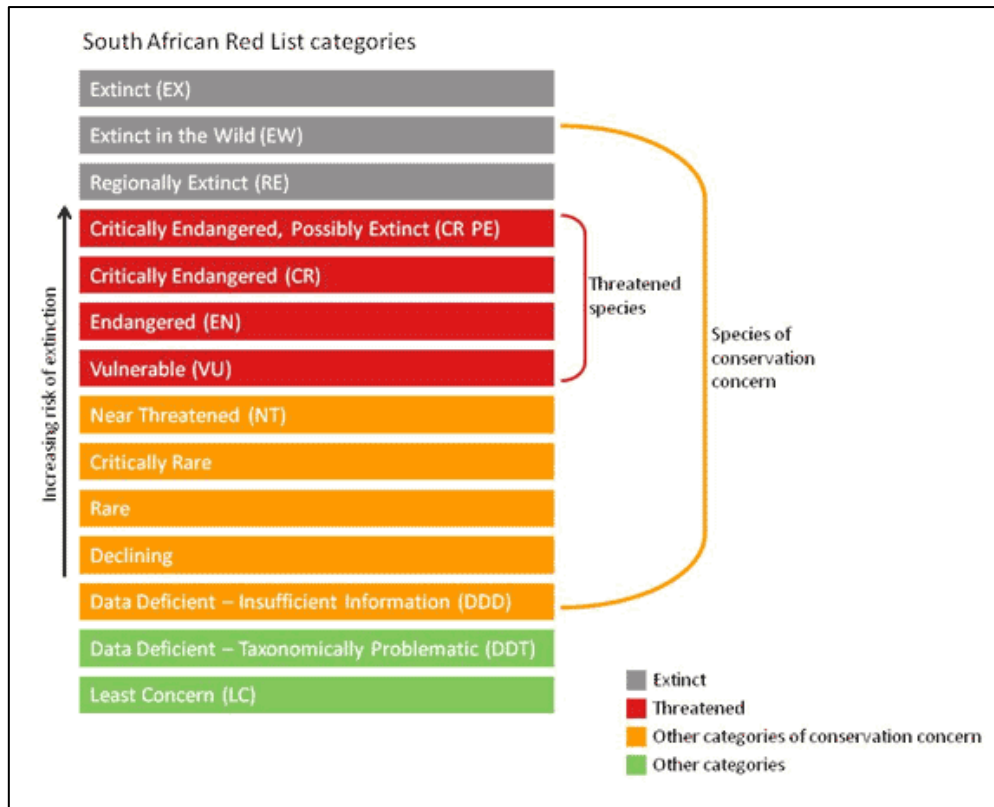


Figure 3-1 Threatened species and Species of Conservation Concern (SANBI, 2016)

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.

3.2 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). Relevant Provincial legislation include Schedule 2 of the North West Biodiversity Management Act, No. 4 of 2016.

4 Methods

4.1 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:

- The North West Biodiversity Sector Plan of 2015 (READ, 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, 2022 (DFFE, 2022a & DFFE-2, 2022b);
- National Protected Areas Expansion Strategy, 2018 (DEA, 2018);
- 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 methods applied are provided below. More detailed descriptions of survey methodologies are available upon request.

4.2 Desktop Vegetation and Botanical Assessment

The desktop vegetation and botanical assessment encompassed an assessment of all the vegetation units and habitat types within the PAOI. 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 PAOI. 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 (Schedule 2 of the North West Biodiversity Management Act, No. 4 of 2016);
- Nationally Protected plant species (The 2022 lists of Threatened or Protected Species (TOPS), published in terms of Section 56(1) of the NEM:BA No. 10 of 2004) and
- List of Protected Tree Species (DFFE 2, 2021).

4.3 Floristic Fieldwork Survey and Analysis

The dry season fieldwork (completed during June 2023) 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 PAOI.

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 desktop assessment. Emphasis was placed on any sensitive habitats overlapping with the proposed PAOI.

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 PAOI.

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).

4.4 Faunal Assessment

4.4.1 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 their likelihood of occurrence.

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

- Animal Demography Unit ((Fitzpatrick Institute of African Ornithology, 2023);
- Southern African Bird Atlas Project 2 (SABAP2, 2019);
- 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);
- Red Data Book of Birds (Birdlife South Africa, 2015);
- Atlas and Red Data Book of Frogs of South Africa (Minter *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).

South Africa's official site for Species Information and National Red Lists (SANBI, 2022) was used to provide the most current national Red-List status of fauna. The latest information regarding provincially, and nationally protected fauna was obtained from the following published legislative lists:

- Provincially Protected Wildlife Species (Schedule 2 of the North West Biodiversity Management Act, No. 4 of 2016); and
- Nationally Protected Wildlife species (The 2022 lists of Threatened or Protected Species (TOPS), published in terms of Section 56(1) of the NEM:BA, No. 10 of 2004).

4.4.2 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
- Utilisation of local knowledge.

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

- Roberts Bird Guide, Second Edition (Chittenden *et al.*, 2016);
- 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);
- Spiders of Southern Africa (Leroy & Leroy, 2003); and
- Tortoises, Terrapins, and Turtles of Africa (Branch, 2008).

4.5 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 4-1 and Table 4-2, respectively.

Table 4-1 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 4-2 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 | <p>Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem types.</p> <p>Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches.</p> <p>Mostly minor current negative ecological impacts with some major impacts and a few signs of minor past disturbance. Moderate rehabilitation potential.</p> |
| Low | <p>Small (> 1 ha but < 5 ha) area.</p> <p>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.</p> <p>Low rehabilitation potential.</p> <p>Several minor and major current negative ecological impacts.</p> |
| Very Low | <p>Very small (< 1 ha) area.</p> <p>No habitat connectivity except for flying species or flora with wind-dispersed seeds.</p> <p>Several major current negative ecological impacts.</p> |

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

Table 4-3 Matrix used to derive Biodiversity Importance 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 4-4

Table 4-4 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 4-5.

Table 4-5 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 4-6.

Table 4-6 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.

5 Limitations and Assumptions

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

- It is assumed that all information received from the client and landowner is accurate;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area (PAOI) was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;

- The area was only surveyed during a single site visit and therefore this assessment does not consider temporal trends (note: data collected is considered sufficient for a meaningful baseline);
- The fieldwork was conducted during the dry season which means that certain flora and fauna would not have been present or observable due to seasonal constraints;
- Whilst every effort was made to cover as much of the PAOI as possible, representative sampling is completed, and by its nature it is possible that some plant and animal species that are present within the PAOI were not recorded during the field investigations; and
- The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by up to 5 m.

6 Receiving Environment

6.1 Desktop Spatial Assessment

Table 6-1 below has been produced as a result of the spatial data collected and analysed (as provided by various sources such as the national and provincial environmental authorities and SANBI). It presents a summative breakdown of the ecological boundaries considered and the associated relevance that each has to the region or PAOI. Where a feature is regarded as relevant it is considered an ecologically important landscape feature and discussed further as part of the sub-sections that follow.

Table 6-1 Desktop spatial features examined

| Desktop Information Considered | Relevant/Irrelevant | Section |
|--|---|---------|
| Ecosystem Threat Status | Relevant – Overlaps with an Endangered Ecosystem. | 6.1.1 |
| Ecosystem Protection Level | Relevant – Overlaps with a Poorly Protected Ecosystem. | 6.1.2 |
| Protected Areas | Relevant – The Magaliesberg Biosphere Reserve (Transition Area) is located 2 km south of the PAOI. | 6.1.3 |
| North West Biodiversity Spatial Plan | Relevant – The PAOI overlaps with an CBA 2 and ESA2. | 6.1.4 |
| National Protected Areas Expansion Strategy | Relevant – The PAOI overlaps with a Priority Focus Area. | 6.1.5 |
| Important Bird and Biodiversity Areas | Irrelevant – Located 2 km from the nearest IBA (Magaliesberg). | 6.1.6 |
| South African Inventory of Inland Aquatic Ecosystems (SAIIAE) | Relevant – The PAOI's 500 m regulated area overlaps with a CR wetland and CR River. | 6.1.7 |
| National Freshwater Ecosystem Priority Areas | Relevant – The PAOI's 500 m regulated area overlap with several unclassified NFEPA Wetlands and a Phase 2 FEPA River. | 6.1.8 |
| Strategic Water Source Areas | Irrelevant – The PAOI does not overlap with a SWSA. | - |

6.1.1 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 PAOI overlaps with a EN ecosystem (Figure 6-1).

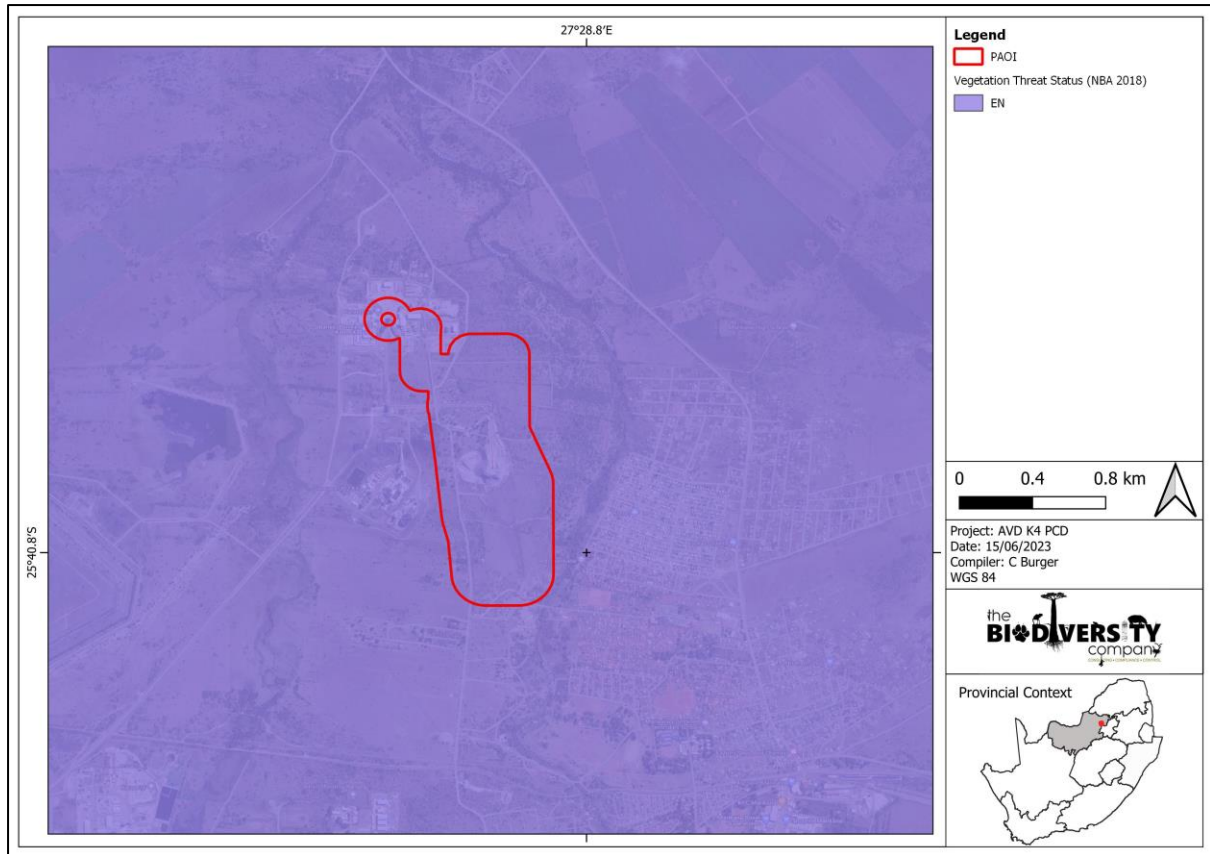


Figure 6-1 Map illustrating the ecosystem threat status associated with the PAOI

6.1.2 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 Poorly Protected ecosystem (Figure 6-2).

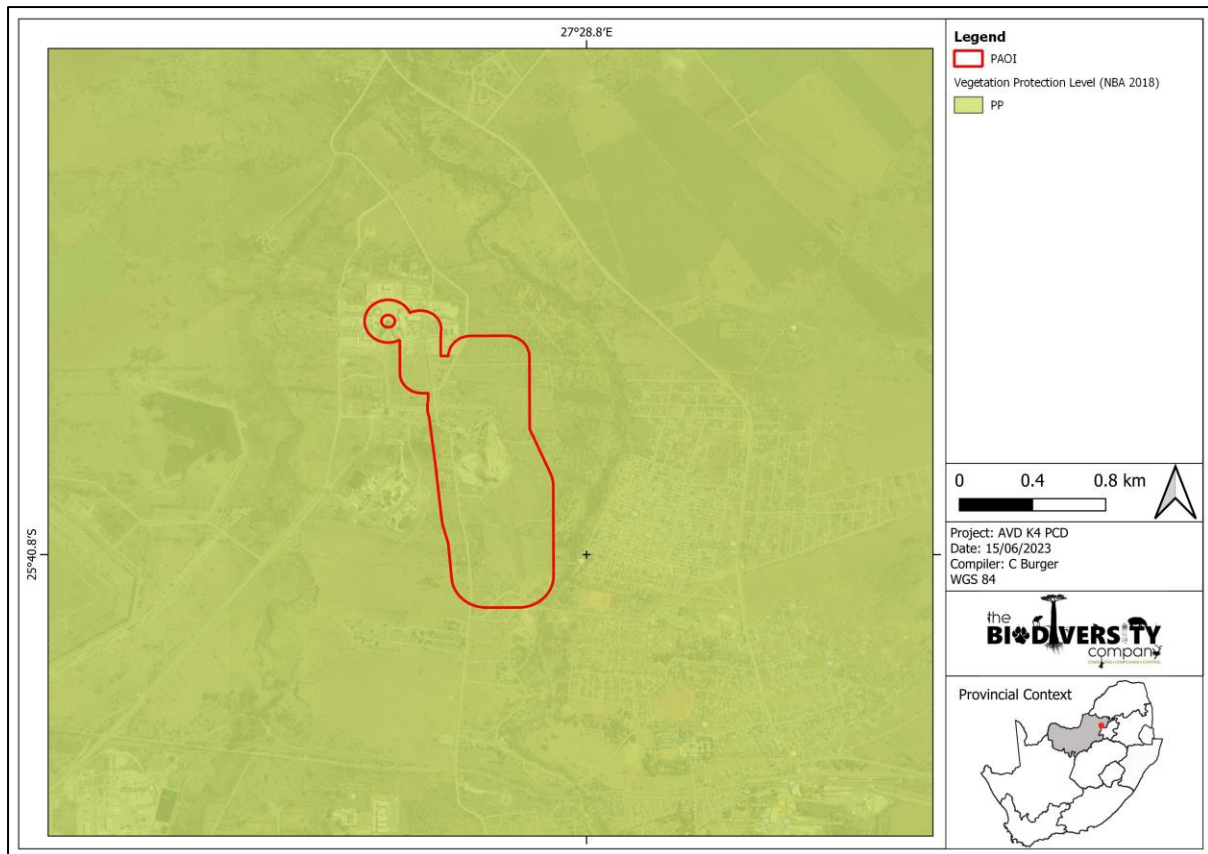


Figure 6-2 Map illustrating the ecosystem protection level associated with the PAOI

6.1.3 Protected Areas

According to the spatial data for SAPAD (2022) and SACAD (2022), the Magaliesberg Biosphere Reserve, Transition area, is located 2 km south of the PAOI and as such falls within the 5 km Protected Area Buffer Zone of a protected area (Figure 6-3).

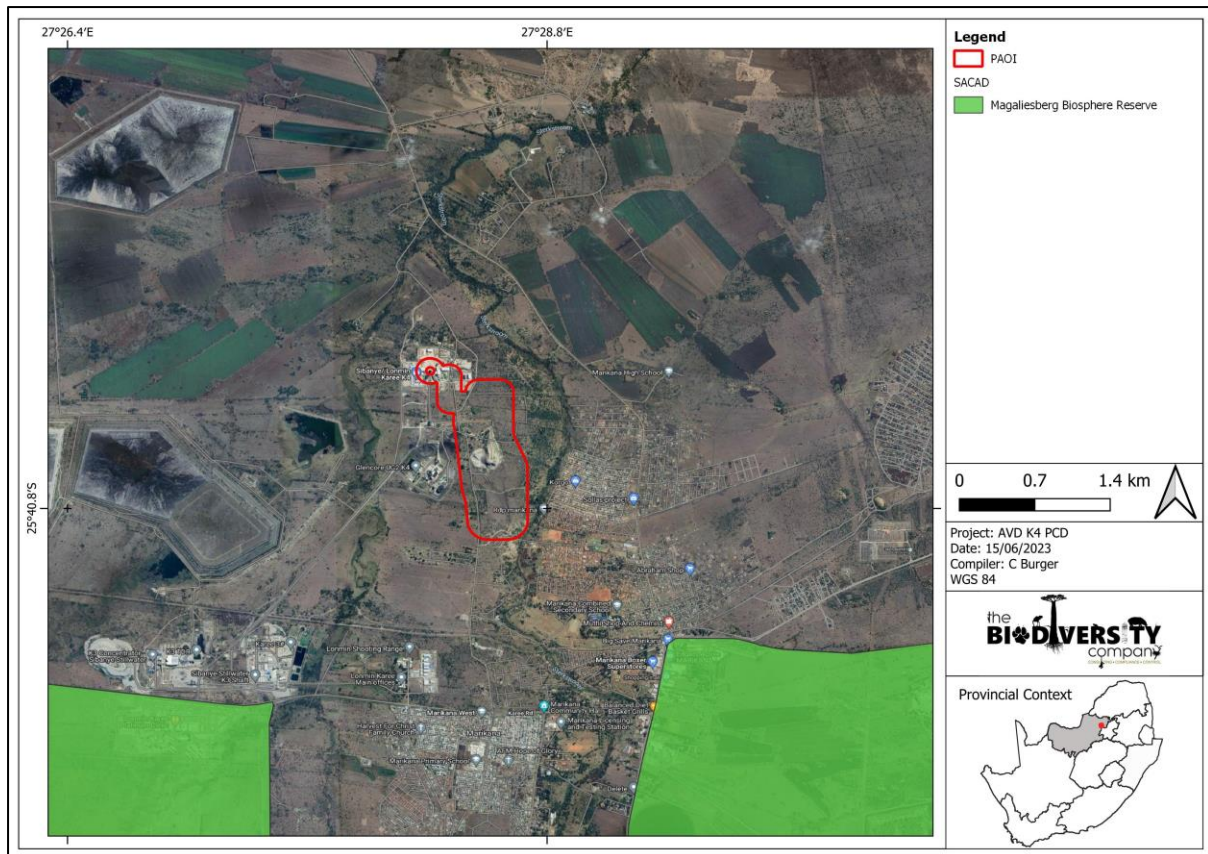


Figure 6-3 Map illustrating the PAOI in relation to the nearest protected area - Magaliesberg Biosphere Reserve (Transition Area)

6.1.4 North West Biodiversity Spatial Plan

According to the 2015 North West CBA and ESA map dataset the PAOI overlaps with CBA2 and ESA2 areas (Figure 6-4).

CBAs are areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and healthy functioning of important species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then provincial biodiversity targets cannot be met (SANBI, 2017).

ESAs are areas that are not essential for meeting biodiversity representation targets but play an important role in supporting the ecological functioning of ecosystems as well as adjacent Critical Biodiversity Areas, and/or in delivering ecosystem services that support socio-economic development (SANBI, 2017).

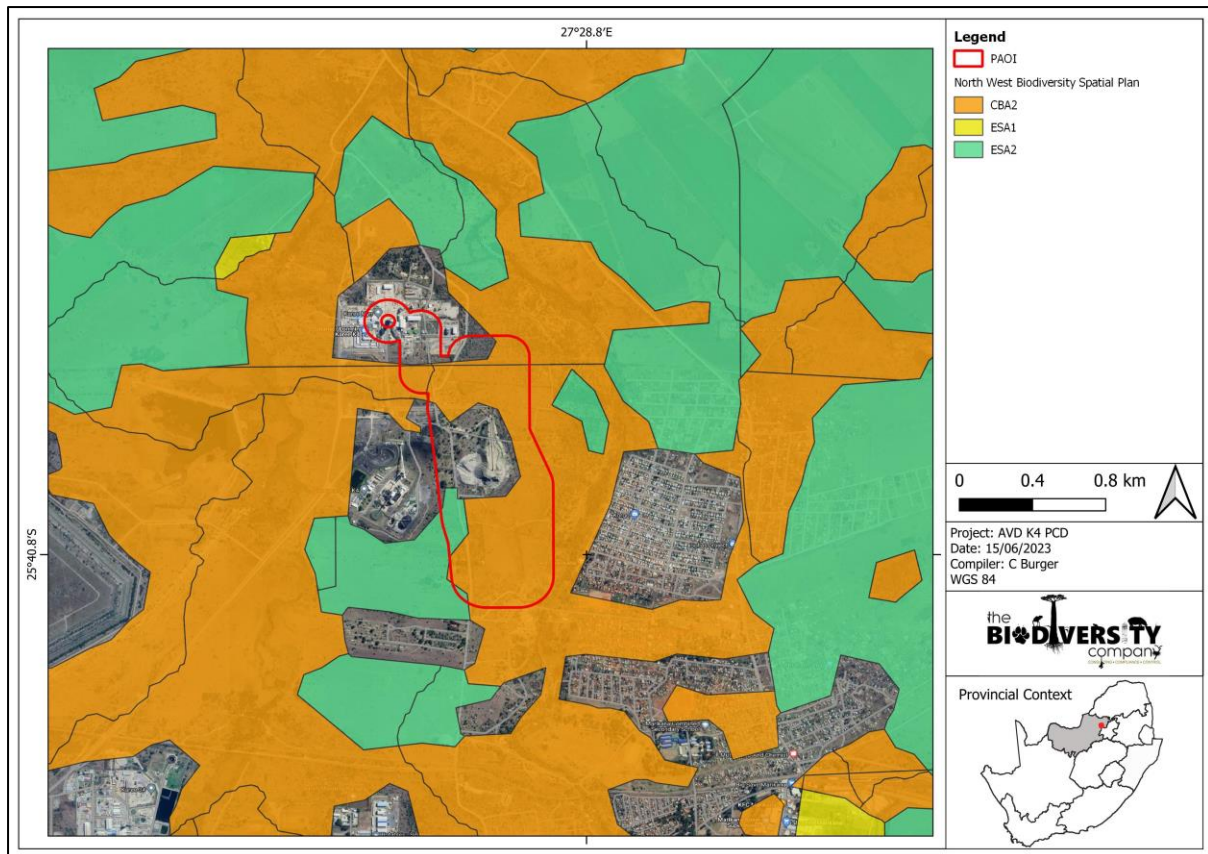


Figure 6-4 Map illustrating the PAOI in relation to the North West Biodiversity Spatial Plan features

6.1.5 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 fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2017). The PAOI overlaps with a Priority Focus Area (Figure 6-5).

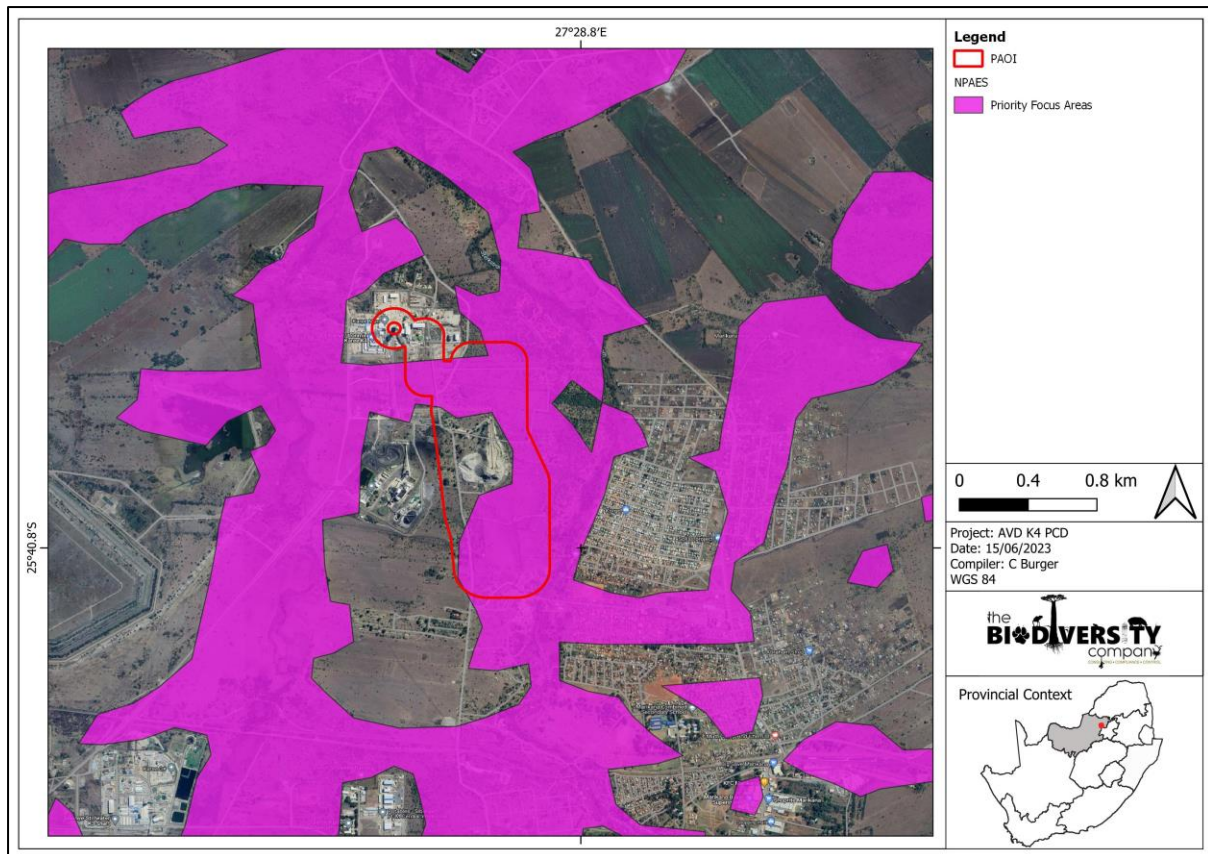


Figure 6-5 The PAOI in relation to the National Protected Area Expansion Strategy

6.1.6 Important Bird and Biodiversity Area

Important Bird & Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife, 2017). The PAOI is located 2 km from the nearest IBA (Magaliesberg) (Figure 6-6).

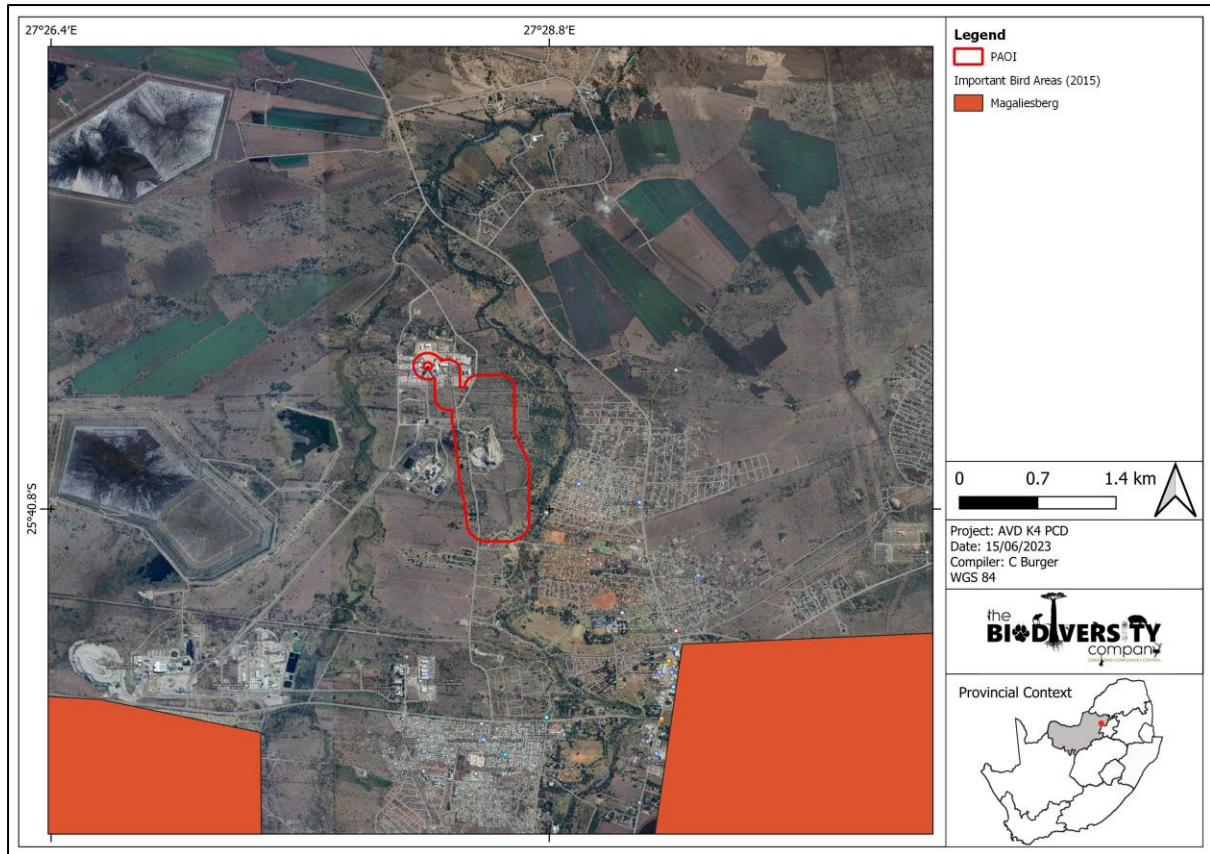


Figure 6-6 The PAOI in relation to the Magaliesberg IBA

6.1.7 Hydrological Setting

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as ‘threatened’ (Van Deventer *et al.*, 2019; Skowno *et al.*, 2019). The PAOI’s 500 m regulated area overlaps with a CR wetland and CR River (Figure 6-7).

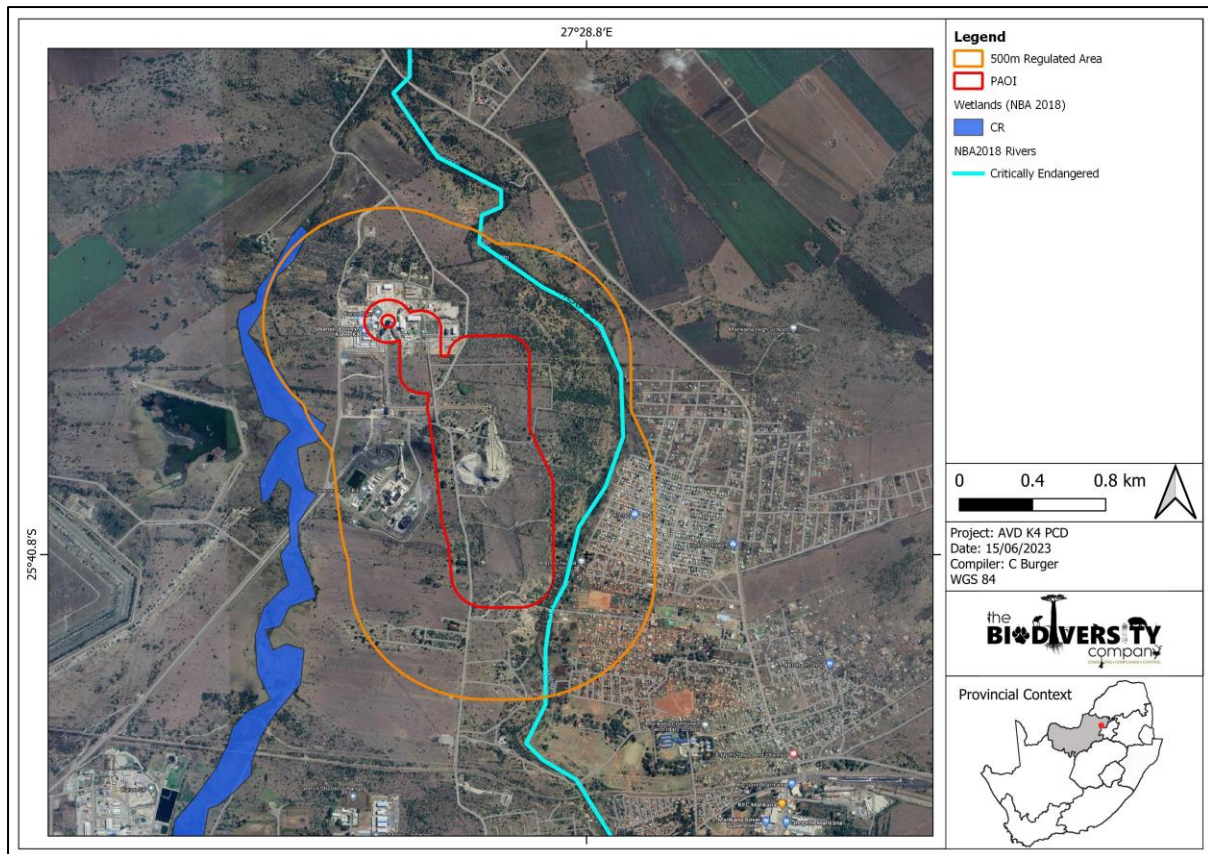


Figure 6-7 Map illustrating ecosystem threat status of rivers and wetland ecosystems in the PAOI

6.1.8 National Freshwater Ecosystem Priority Area Status

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

Figure 6-8 shows the PAOI’s 500 m regulated area overlap with several unclassified FEPA Wetlands and a Phase 2 FEPA River.

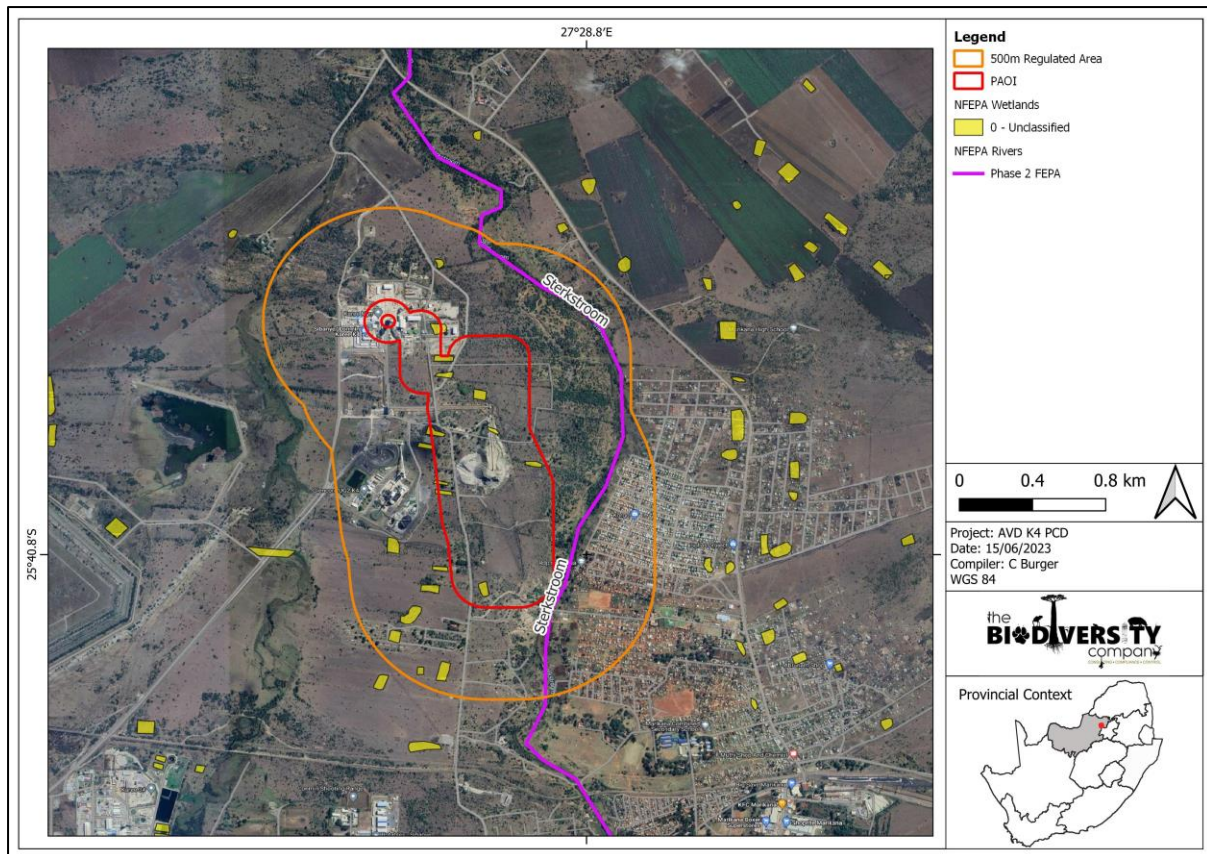


Figure 6-8 The PAOI in relation to the National Freshwater Ecosystem Priority Areas.

6.1.9 Flora Assessment

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

6.1.9.1 Vegetation Type

The project area is situated within the savanna biome. The savanna vegetation of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the savanna biome include:

- a) seasonal precipitation; and
- b) (sub) tropical thermal regime with no or usually low incidence of frost (Mucina & Rutherford, 2006).

Most savanna vegetation communities are characterised by a herbaceous layer dominated by grasses and a discontinuous to sometimes very open tree layer (Mucina & Rutherford, 2006).

The savanna biome is the largest biome in South Africa, extending throughout the east and north-eastern areas of the country. Savannas are characterised by a dominant grass layers, over-topped by a discontinuous, but distinct woody plant layer. At a structural level, Africa's savannas can be broadly categorised as either fine-leaved (microphyllous) savannas or broad-leaved savannas. Fine-leaved savannas typically occur on nutrient rich soils and are dominated by microphyllous woody plants of the Mimosaceae family and a generally dense herbaceous layer (Scholes & Walker, 1993).

On a fine-scale vegetation type, the PAOI overlaps with the Marikana Thornveld vegetation type (Figure 6-9).

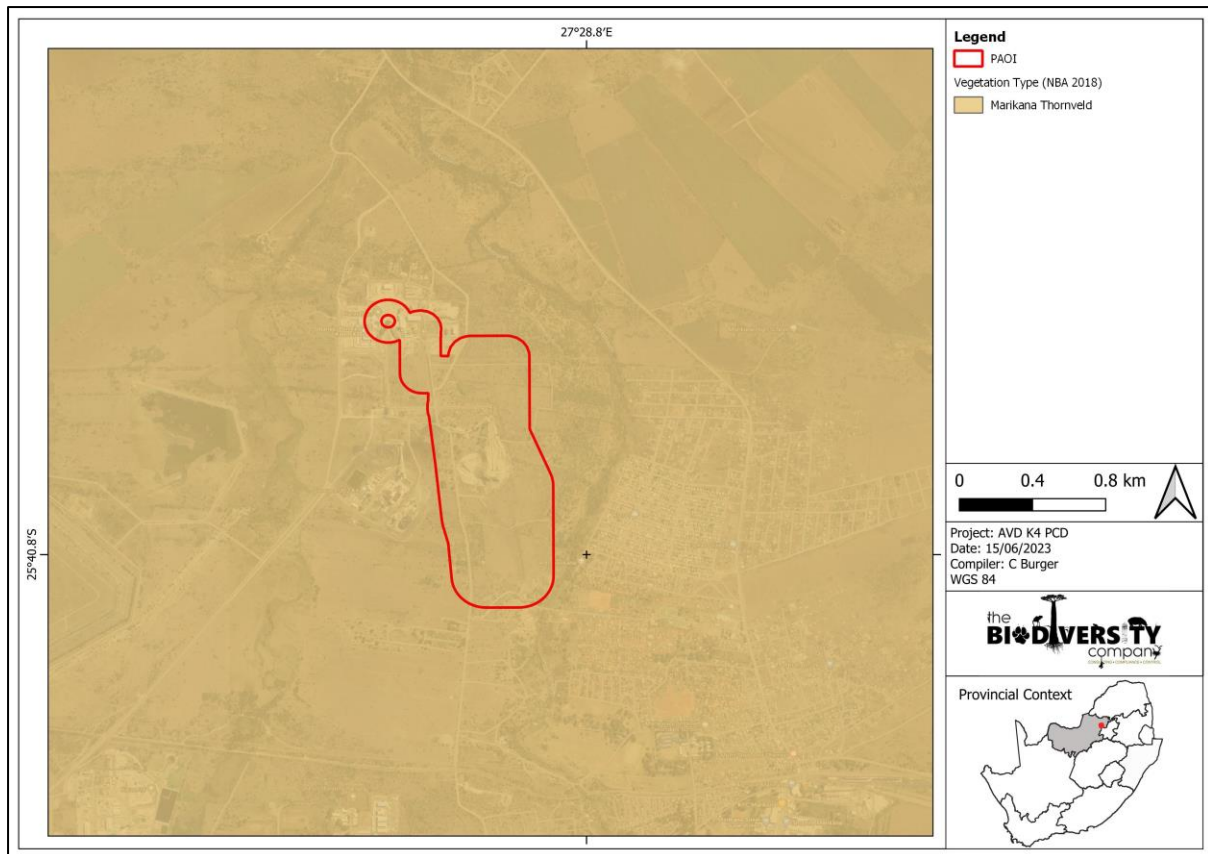


Figure 6-9 Map illustrating the vegetation type associated with the PAOI.

6.1.9.2 Marikana Thornveld (MT)

The MT consists of open *Vachellia karroo* woodland, occurring in valleys and slightly undulating plains, and some lowland hills. Shrubs are denser along drainage lines, on termitaria and rocky outcrops or in other habitats protected from fire (Mucina & Rutherford, 2006). Marikana Thornveld occurs on plains from the Rustenburg area in the west, through Marikana and Brits to the Pretoria area in the East (Mucina & Rutherford, 2006).

6.1.9.2.1 Important Plant Taxa

The following species are important in the **MT** vegetation type:

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

Tall Trees: *Senegalia burkei* (Mucina & Rutherford, 2006).

Small Trees: *Senegalia caffra*, *S. gerrardii*, *V. karroo*, *Combretum molle*, *Searsia lancea*, *Ziziphus mucronata*, *V. nilotica*, *V. tortilis* subsp. *heteracantha*, *Celtis africana*, *Dombeya rotundifolia*, *Pappea capensis*, *Peltophorum africanum*, *Terminalia sericea* (Mucina & Rutherford, 2006).

Tall Shrubs: *Euclea crispa* subsp. *crispa*, *Olea europaea* subsp. *africana*, *Searsia pyroides* var. *pyroides*, *Diospyros lycioides* subsp. *guerkei*, *Ehretia rigida* subsp. *rigida*, *Euclea undulata*, *Grewia flava*, *Pavetta gardeniifolia* (Mucina & Rutherford, 2006).

Low Shrubs: *Asparagus cooperi*, *Rhynchosia nitens*, *Indigofera zeyheri*, *Justicia flava*.

Woody Climbers: *Clematis brachiata*, *Helinus integrifolius* (Mucina & Rutherford, 2006).

Herbaceous Climbers: *Pentarrhinum insipidum*, *Cyphostemma cirrhosum*.

Graminoids: *Elionurus muticus*, *Eragrostis lehmanniana*, *Setaria sphacelata*, *Themeda triandra*, *Aristida scabrivalvis subsp. scabrivalvis*, *Fingerhuthia africana*, *Heteropogon contortus*, *Hyperthelia dissoluta*, *Melinis nerviglumis*, *Pogonarthria squarrosa*.

Herbs: *Hermannia depressa*, *Ipomoea obscura*, *Barleria macrostegia*, *Dianthus mooiensis subsp. mooiensis*, *Ipomoea oblongata*, *Vernonia oligocephala*.

Geophytic Herbs: *Ledebouria revoluta*, *Ornithogalum tenuifolium*, *Sansevieria aethiopica*

6.1.9.2.2 Conservation Status of the Vegetation Type

According to Mucina & Rutherford (2006), this vegetation type is classified as EN. The conservation target is 19 % but only approximately 1% of this vegetation community is statutorily conserved, in the Magaliesberg Nature Area for example but is more conserved in addition in other reserves, mainly in De Onderstepoort Nature Reserve (Mucina & Rutherford, 2006). Transformation of this vegetation type was estimated at 48% in 2006, mainly cultivated and urban or built-up areas.

6.1.9.3 Expected Flora Species

Based on the Plants of Southern Africa (BODATSA-POSA, 2019) database, over 351 plant species have the potential to occur within the PAOI and its surroundings. Of these species, one is listed as being an SCC. Table 6-2 below outlines the SCC species identified through the desktop assessment.

Table 6-2 Plant Species of Conservation Concern potentially occurring in the PAOI

| Family | Taxon | Author | National Red-List (SANBI, 2016a) | Ecology | Likelihood of Occurrence |
|--------------|---|---------|----------------------------------|---------------------|--------------------------|
| Crassulaceae | <i>Adromischus umbraticola subsp. umbraticola</i> | C.A.Sm. | NT | Indigenous; Endemic | Moderate |

6.1.10 Faunal Assessment

This section of the report details the lists of expected SCC fauna species that may occur within the PAOI, where the fauna species considered include mammals, reptiles, and amphibians. Where the likelihood of a particular species occurring within the PAOI is rated by the specialist as being either moderate or high, based on the known habitat and prey/forage preferences of a particular species (linked with the field survey data obtained), the relevant species is then further discussed below a given table.

6.1.10.1 Amphibians

Based on the IUCN Red List Spatial Data and AmphibianMap, 26 amphibian species are expected to occur within the area. One (1) is regarded as threatened (Table 6-3).

Table 6-3 Threatened amphibian species that are expected to occur within the PAOI

| Species | Common Name | Conservation Status | | Likelihood of occurrence |
|-------------------------------|----------------|---------------------|------|--------------------------|
| | | Regional (SANBI,) | IUCN | |
| <i>Pyxicephalus adspersus</i> | Giant Bullfrog | NT | LC | Low |

Giant Bull Frog (*Pyxicephalus adspersus*) is a species of conservation concern that will possibly occur in the PAOI, especially in the area with the wetlands. The Giant Bull Frog is listed as near threatened on a regional scale. It is a species of drier savannas where it is fossorial for most of the year, remaining buried in cocoons. They emerge at the start of the rains, and breed in shallow, temporary waters in

pools, pans and ditches (IUCN, 2017). Based on the lack of water sources in the PAOI, this species was given a low likelihood of occurrence.

6.1.10.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 80 reptile species are expected to occur within the area. Two (2) are regarded as threatened (Table 6-4).

Table 6-4 Threatened reptile species that are expected to occur within the PAOI

| Species | Common Name | Conservation Status | | Likelihood of Occurrence |
|------------------------------|-------------------------|---------------------|------|--------------------------|
| | | Regional (SANBI) | IUCN | |
| <i>Crocodylus niloticus</i> | Nile Crocodile | VU | VU | Low |
| <i>Homoroselaps dorsalis</i> | Striped Harlequin Snake | NT | LC | Moderate |

Crocodylus niloticus (Nile Crocodile) is listed as VU on a regional basis. The Nile crocodile is quite widespread throughout sub-Saharan Africa, in different types of aquatic environments such as lakes, rivers, and marshlands. Due to the lack of suitable water sources in the PAOI the likelihood of occurrence is rated as Low.

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

6.1.10.3 Mammals

The IUCN Red List Spatial Data lists 93 mammal species that could be expected to occur within the area. This list excludes large mammal species that are normally restricted to protected areas. The screening tool report lists one medium sensitivity species to be expected within the PAOI. Sixteen (16) of these expected species are regarded as threatened (Table 6-5), thirteen of these have a low likelihood of occurrence based on the lack of suitable habitat and food sources in the PAOI.

Table 6-5 Threatened mammal species that are expected to occur within the PAOI.

| Species | Common Name | Conservation Status | | Likelihood of occurrence | Screening Tool Sensitivity |
|--------------------------------|---------------------------------|---------------------|------|--------------------------|----------------------------|
| | | Regional (SANBI) | IUCN | | |
| <i>Aonyx capensis</i> | Cape Clawless Otter | NT | NT | Low | |
| <i>Atelerix frontalis</i> | South Africa Hedgehog | NT | LC | Moderate | |
| <i>Cloeotis percivali</i> | Short-eared Trident Bat | EN | LC | Moderate | |
| <i>Crocidura maquassiensis</i> | Makwassie musk shrew | VU | LC | Low | |
| <i>Crocidura mariquensis</i> | Swamp Musk Shrew | NT | LC | Low | |
| <i>Eidolon helvum</i> | African Straw-colored Fruit Bat | LC | NT | Low | |
| <i>Felis nigripes</i> | Black-footed Cat | VU | VU | Low | |
| <i>Hydrictis maculicollis</i> | Spotted-necked Otter | VU | NT | Low | |
| <i>Leptailurus serval</i> | Serval | NT | LC | Moderate | |
| <i>Mystromys albicaudatus</i> | White-tailed Rat | VU | EN | Low | |
| <i>Ourebia ourebi</i> | Oribi | EN | LC | Low | |
| <i>Panthera pardus</i> | Leopard | VU | VU | Low | |
| <i>Parahyaena brunnea</i> | Brown Hyaena | NT | NT | Low | |

| | | | | | |
|------------------------------|------------------------|----|----|-----|--|
| <i>Pelea capreolus</i> | Grey Rhebok | NT | NT | Low | |
| <i>Poecilogale albinucha</i> | African Striped Weasel | NT | LC | Low | |
| <i>Redunca fulvorufula</i> | Mountain Reedbuck | EN | EN | Low | |

Atelerix frontalis (South African Hedgehog) has a tolerance to a degree for habitat modification and occurs in a wide variety of semi-arid and sub-temperate habitats (IUCN, 2017). Based on the Red List of Mammals of South Africa, Lesotho and Swaziland (2016), *A. frontalis* populations are decreasing due to the threats of electrocution, veld fires, road collisions, predation from domestic pets and illegal harvesting. Suitable habitat might occur in the PAOI therefore the species has a moderate likelihood of occurrence.

Cloetis percivali (Short-eared Trident Bat) occurs in savanna areas where there is sufficient cover in the form of caves and mine tunnels for day roosting (IUCN, 2017). It feeds exclusively on moths and appears to be very sensitive to disturbance. Suitable habitat and roosting area may be found around the PAOI and therefore the likelihood of finding this species is rated as moderate.

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

6.1.10.4 Avifauna

The SABAP2 Data lists 346 avifauna species that could be expected to occur within the area. Fifteen (15) of these expected species are regarded as threatened (Table 6-6). Twelve of the species have a low likelihood of occurrence due to lack of suitable habitat and food sources in the PAOI. The likelihood of occurrence is also related to the disturbed nature of the PAOI. Some of the larger birds might fly over but it is unlikely that they would be residents on site.

Table 6-6 Threatened avifauna species that are expected to occur within the PAOI

| Species | Common Name | Conservation Status | | Likelihood of occurrence | Screening Tool Sensitivity |
|------------------------------|---------------------------|------------------------|-------------|--------------------------|----------------------------|
| | | Regional (SANBI, 2016) | IUCN (2021) | | |
| <i>Alcedo semitorquata</i> | Kingfisher, Half-collared | NT | LC | Low | |
| <i>Aquila rapax</i> | Eagle, Tawny | EN | VU | Low | |
| <i>Aquila verreauxii</i> | Eagle, Verreaux's | VU | LC | Low | |
| <i>Calidris ferruginea</i> | Sandpiper, Curlew | LC | NT | Low | |
| <i>Ciconia abdimii</i> | Stork, Abdim's | NT | LC | Low | |
| <i>Coracias garrulus</i> | Roller, European | NT | LC | Moderate | |
| <i>Falco biarmicus</i> | Falcon, Lanner | VU | LC | High | |
| <i>Falco vespertinus</i> | Falcon, Red-footed | NT | NT | Moderate | |
| <i>Gyps coprotheres</i> | Vulture, Cape | EN | EN | Low | |
| <i>Oxyura maccoa</i> | Duck, Maccoa | NT | VU | Low | |
| <i>Phoeniconaias minor</i> | Flamingo, Lesser | NT | NT | Low | |
| <i>Polemaetus bellicosus</i> | Eagle, Martial | EN | EN | Low | |

| | | | | | |
|---------------------------------|-----------------------------|----|----|-----|--------|
| <i>Pterocles gutturalis</i> | Sandgrouse, Yellow-throated | NT | LC | Low | |
| <i>Rostratula benghalensis</i> | Painted-snipe, Greater | NT | LC | Low | |
| <i>Sagittarius serpentarius</i> | Secretarybird | VU | EN | Low | Medium |

Coracias garrulous (European Roller) is a winter migrant from most of South-central Europe and Asia occurring throughout sub-Saharan Africa (IUCN, 2017). The European Roller has a preference for bushy plains and dry savannah areas (IUCN, 2017). There is a moderate chance of this species occurring in the PAOI as they prefer to forage in open areas.

Falco biarmicus (Lanner Falcon) is native to South Africa and inhabits a wide variety of habitats, from lowland deserts to forested mountains (IUCN, 2017). They may occur in groups up to 20 individuals but have also been observed solitary. Their diet is mainly composed of small birds such as pigeons and francolins. The likelihood of incidental records of this species in the PAOI is rated as high due to the presence of many bird species on which Lanner Falcons may predate.

Falco vespertinus (Red-footed Falcon) is known to breed from eastern Europe and northern Asia to north-western China, heading south in the non-breeding season to southern Angola and southern Africa. Within southern Africa it is locally uncommon to common in Botswana, northern Namibia, central Zimbabwe and the area in and around Gauteng, South Africa (Hockey *et al.*, 2005). The habitat it generally prefers is open habitats with scattered trees, such as open grassy woodland, wetlands, forest fringes and croplands. Some of these habitats are present in the PAOI and thus the likelihood of occurrence is rated as moderate.

6.2 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 PAOI. These observations pertain to the current state of the area as of June 2023.

6.2.1 Terrestrial Fauna and Flora

During the terrestrial survey the floral and faunal communities within the PAOI 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.

6.2.1.1 Vegetation and Habitat Units

During the field assessment two habitat units were identified and included Degraded Marikana Thornveld and Modified habitat. No flora SCC were observed or are expected to occur due to a lack of suitable habitat.

Degraded Marikana Thornveld

This habitat type is regarded as semi-natural thornveld, but disturbed due to the presence of roads, mismanagement (overgrazing) and also human infringement, as it is located directly adjacent to active mining operations (Figure 6-10 and Figure 6-11). This habitat represents open woodland dominated by thorny trees and bushes, such as *Vachellia karroo* and *Vachellia tortilis*, with rocky boulders in certain areas. The current ecological condition of this habitat regarding the main driving forces has been altered to some extent, which is evident in the low diversity of flora and fauna species recorded across the habitat unit. Current human infringement still occurs throughout, especially in areas close to active mining operations.

The condition difference within this habitat depends on the extent of the disturbance, being more severe in some areas, 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.



Figure 6-10 Photo illustrating the Degraded Marikana Thornveld associated with the PAOI



Figure 6-11 Photo illustrating the Degraded Marikana Thornveld associated with the PAOI

Modified Habitat

This habitat unit represents all areas of roads as well as mining areas associated with the PAOI (Figure 6-12). The modified areas have little to no remaining natural vegetation due to land transformation by various mining activities and roads. These habitats exist in a constant disturbed state as it cannot recover to a more natural state unless through human intervention.



Figure 6-12 Photo illustrating the Modified Habitat associated with the PAOI

6.2.2 Fauna Assessment

Avifauna, herpetofauna and mammal observations and recordings fall under this section.

6.2.2.1 Avifauna

Twenty-four avifauna species were recorded within the PAOI (Table 6-7) (Figure 6-13). No SCC were observed, however, based on portions of suitable habitat within the PAOI some SCC might occur.

Table 6-7 Summary of avifauna species recorded within the PAOI

| Species | Common Name | Conservation Status | |
|--------------------------------|-----------------------------|---------------------|----------|
| | | Regional (SANBI) | IUCN |
| <i>Bradornis mariquensis</i> | Flycatcher, Marico | Unlisted | LC |
| <i>Bubulcus ibis</i> | Western Cattle Egret | Unlisted | LC |
| <i>Cinnyris talatala</i> | White-bellied Sunbird | Unlisted | LC |
| <i>Corythaoides concolor</i> | Go-away-bird, Grey | Unlisted | LC |
| <i>Cossypha caffra</i> | Robin-chat, Cape | Unlisted | LC |
| <i>Cossypha humeralis</i> | Robin-chat, White-throated | Unlisted | LC |
| <i>Crithagra flaviventris</i> | Canary, Yellow | Unlisted | LC |
| <i>Dicrurus adsimilis</i> | Drongo, Fork-tailed | Unlisted | LC |
| <i>Estrilda erythronotos</i> | Waxbill, Black-faced | Unlisted | LC |
| <i>Laniarius atrococcineus</i> | Shrike, Crimson-breasted | Unlisted | LC |
| <i>Merops bullockoides</i> | White-fronted Bee-eater | Unlisted | LC |
| <i>Plocepasser mahali</i> | White-browed Sparrow-Weaver | Unlisted | LC |
| <i>Ploceus velatus</i> | Southern Masked Weaver | Unlisted | LC |
| <i>Prinia flavicans</i> | Black-chested Prinia | Unlisted | LC |
| <i>Prinia subflava</i> | Tawny-flanked Prinia | Unlisted | LC |
| <i>Pycnonotus tricolor</i> | Dark-capped Bulbul | Unlisted | Unlisted |
| <i>Quelea quelea</i> | Red-billed Quelea | Unlisted | LC |
| <i>Spermestes cucullatus</i> | Mannikin, Bronze | Unlisted | Unlisted |
| <i>Spilopelia senegalensis</i> | Laughing Dove | Unlisted | LC |
| <i>Sylvietta rufescens</i> | Long-billed crombec | Unlisted | LC |
| <i>Trachyphonus vaillantii</i> | Barbet, Crested | Unlisted | LC |
| <i>Uraeginthus angolensis</i> | Blue Waxbill | Unlisted | LC |
| <i>Vanellus armatus</i> | Lapwing, Blacksmith | Unlisted | LC |
| <i>Vanellus coronatus</i> | Crowned Lapwing | Unlisted | LC |

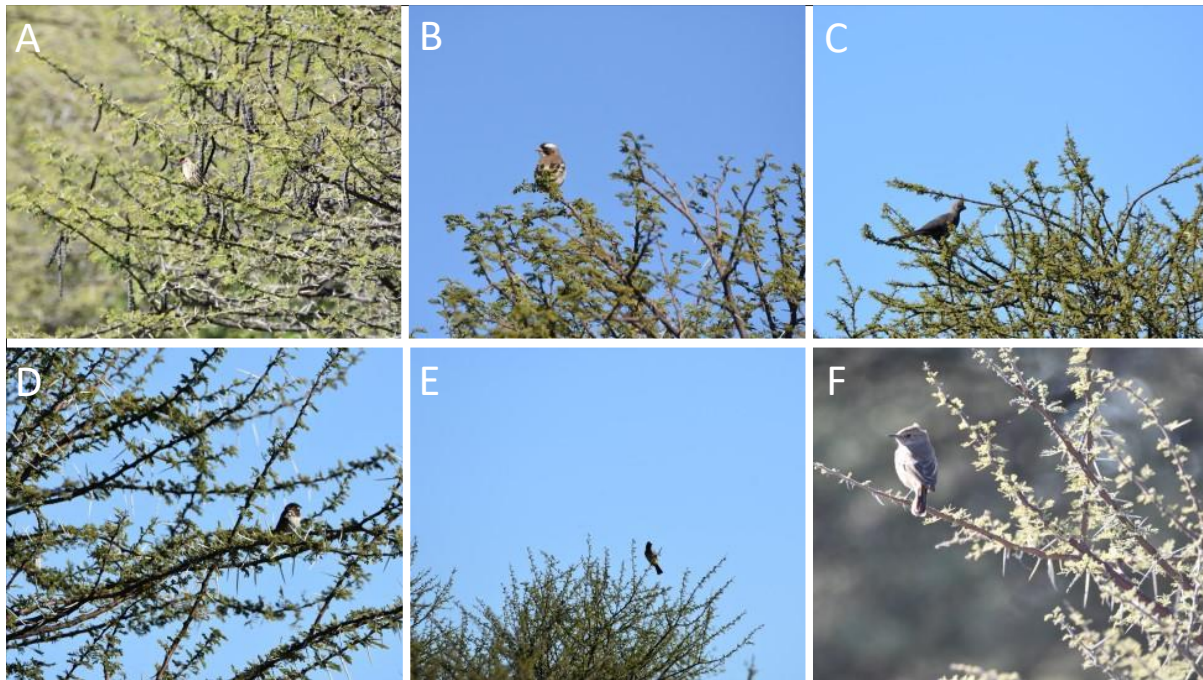


Figure 6-13 Avifauna species observed: A) *Quelea quelea*, B) *Plocepasser mahali*, C) *Corythaixoides concolor*, D) *Spermestes cucullatus*, E) *Pycnonotus tricolor* and F) *Bradornis mariquensis*.

6.2.2.2 Amphibians and Reptiles

No species of reptile or amphibians were recorded within the PAOI during the survey period. However, there is the possibility of at least several reptile species being present, as certain reptile species are secretive and longer-term surveys are required in order to ensure adequate sampling.

6.2.2.3 Mammals

One (1) mammal species was observed in total based on either direct observation or the presence of visual tracks and signs (Table 6-8) (Figure 6-14). No SCC were observed nor are expected.

Table 6-8 Summary of mammal species recorded within the PAOI

| Species | Common Name | Conservation Status | |
|------------------------|-------------|------------------------|-------------|
| | | Regional (SANBI, 2016) | IUCN (2022) |
| <i>Lepus saxatilis</i> | Scrub Hare | LC | LC |



Figure 6-14 Photographs illustrating evidence of the mammal species recorded within the PAOI during the survey period: A) *Lepus saxatilis*.

6.2.3 Habitat Survey and Site Ecological Importance

The main habitat types identified across the PAOI were initially identified and pre-delineated largely based on aerial imagery from 2022. These habitat types were then refined based on the field coverage and data collected during the survey.

Based on the criteria provided in section 4.5 of this report, the delineated habitat type has been allocated a sensitivity category, or SEI, and this breakdown is presented in Table 6-9 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 PAOI are mapped in Figure 6-15.

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 6-9 Site Ecological Importance assessment summary of the habitat types delineated within the PAOI

| Habitat | Conservation Importance | Functional Integrity | Biodiversity Importance | Receptor Resilience | Site Ecological Importance |
|------------------------------------|---|---|-------------------------|--|----------------------------|
| Degraded Marikana Thornveld | <u>Medium</u> > 50% of receptor contains natural habitat | <u>Medium</u> Only narrow corridors of good habitat connectivity | Medium | <u>Medium</u> Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality | Medium |
| Modified | <u>Very Low</u> No natural habitat remaining. | <u>Very Low</u> Several major current negative ecological impacts. | Very Low | <u>Very High</u> Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species | Very Low |

| Habitat | Conservation Importance | Functional Integrity | Biodiversity Importance | Receptor Resilience | Site Ecological Importance |
|---------|-------------------------|----------------------|-------------------------|-------------------------------|----------------------------|
| | | | | composition and functionality | |

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.
- Medium: Minimisation and restoration mitigation – Development activities of medium impact acceptable followed by appropriate restoration activities.

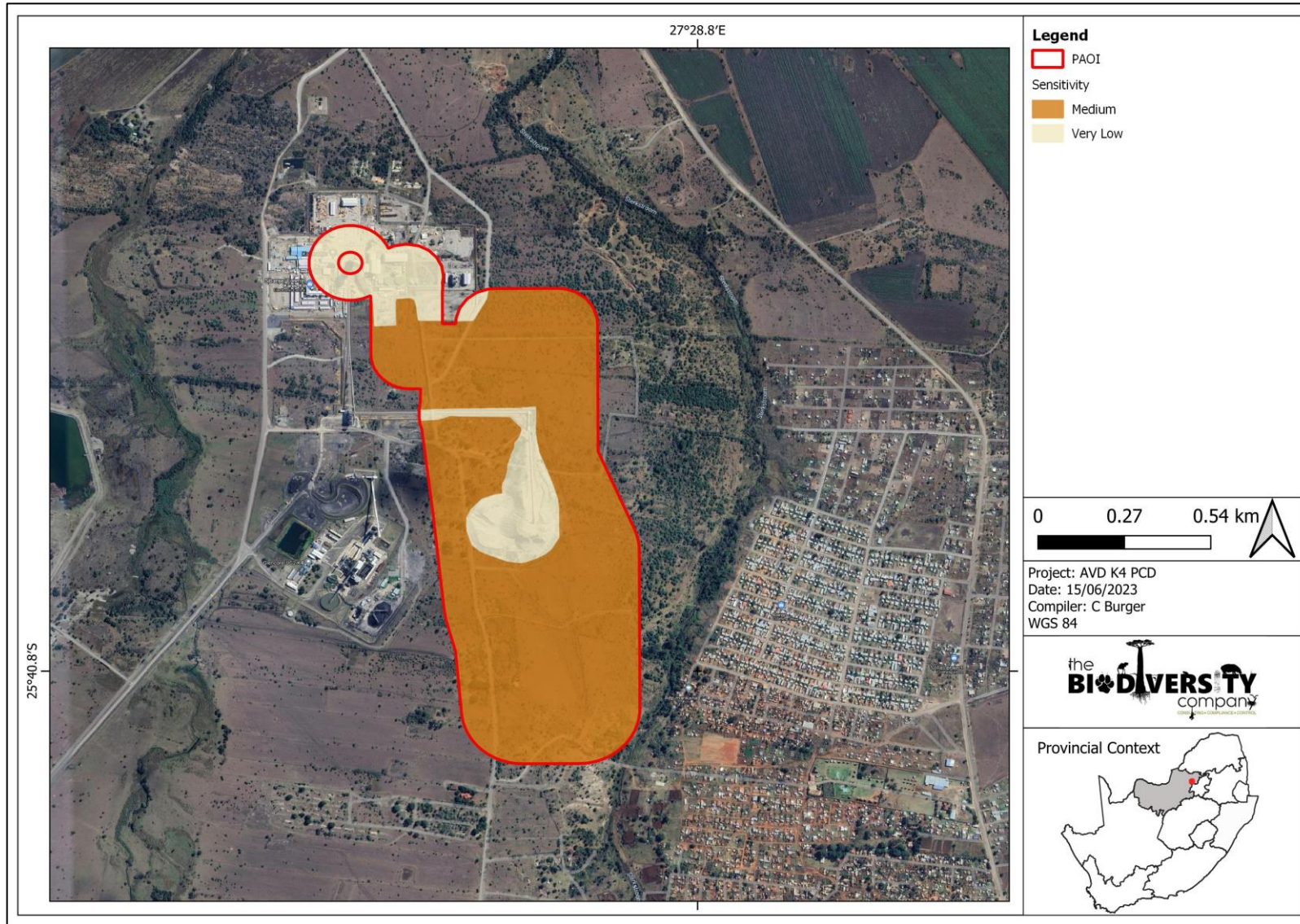


Figure 6-15 Map illustrating the Site Ecological Importance of the PAOI

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 6-16), mainly due to the fact that the PAOI lies within an CBA2, ESA2, Protected Areas Expansion Strategy Area and Endangered Ecosystem.



Figure 6-16 Biodiversity Sensitivity of the PAOI 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 PAOI has largely been impacted upon by current and historic anthropogenic activities and as such is assigned a sensitivity rating of 'Medium' and 'Very Low'.

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, the animal species theme should retain its "medium" sensitivity, based on the likely presence of certain SCC/protected species, and the plant species theme should retain a "Low" sensitivity due to the absence of certain SCC species.

7 Biodiversity Risk Assessment

The significance of the identified impacts will be determined using an accepted methodology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998 as provided by AVD Environmental. As with all impact methodologies, the impact is defined in a semi-quantitative way.

7.1 Present Impacts to Biodiversity

Considering the fact that anthropogenic activities have historically taken place throughout most of the region, and continue to do so, several significantly negative impacts to biodiversity were observed within and adjacent to the PAOI (Figure 7-1). These include:

- Mining activities;
- Historic land modification largely in the form of road and powerline infrastructure, and the associated land clearing and edge effects;
- Livestock grazing;
- Minor and major gravel roads (and associated vehicle traffic and the possibility of wildlife road mortalities);
- Pipeline infrastructure;
- Invasive Alien Plant infestations; and
- Fences and the associated infrastructure.

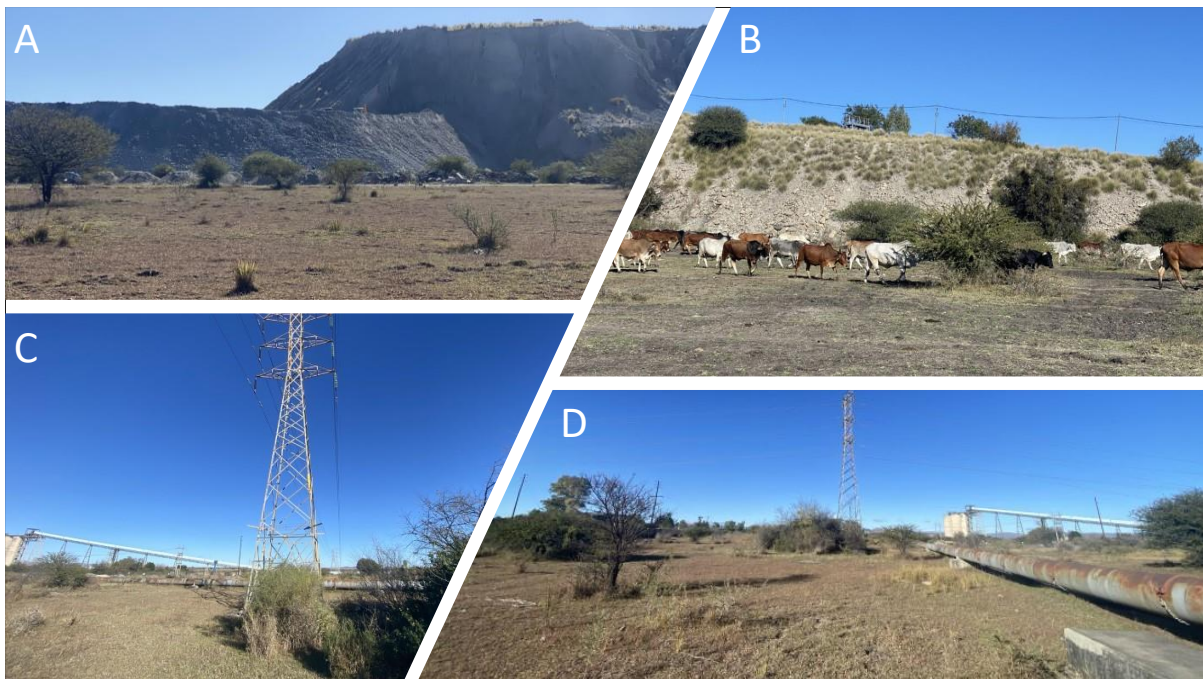


Figure 7-1 Photograph illustrating current negative impacts associated with the PAOI: A) Mining Activities; B) Livestock grazing; C) Powerline infrastructure; and D) Pipeline infrastructure.

7.2 Loss of Irreplaceable Resources

The proposed activities are likely to be of a medium impact and will result in the loss of the following important ecological resources:

- Degraded Critical Biodiversity Areas;
- Degraded Ecological Support Area; and
- Indigenous vegetation.

The majority of the PAOI comprised of Degraded Marikana Thornveld, which has been impacted upon by anthropogenic related activities and retains a medium level of functionality. As such the recommendations put forward by the specialist at the end of this report must be implemented and mitigations must be put in place and implemented to prevent the total destruction and loss of all local natural resources.

7.3 Assessment of Impact Significance

The assessment of impact significance was undertaken in accordance with the method developed by AVD Environmental. The identified impacts are assessed below for the different phases of the development.

7.3.1.1 Construction Phase

The following potential main impacts on the flora and fauna community (based on the framework above) were considered for the construction phase of the proposed development. This phase refers to the period during construction when the proposed features are constructed; and is considered to have the largest direct impact on flora and fauna. The following potential impacts to terrestrial biodiversity were considered (Table 7-1):

- Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community; and
- Introduction of alien and invasive species, especially plants;
- Displacement of the indigenous faunal community (including possible SCC) due to habitat loss, direct mortalities, and disturbance (road collisions, noise, dust, light, vibration, and poaching).

Table 7-1 Impacts to biodiversity associated with the proposed construction phase

| ACTIVITY | POTENTIAL ENVIRONMENTAL IMPACT | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION | | | | | | | | Cumulative | Status | RECOMMENDED MITIGATION MEASURES/ REMARKS | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION | | | | | | | |
|---|--|--|----------|--------|------------------|---------------|-------------|-------|--------------|------------|----------|---|---|----------|--------|------------------|---------------|-------------|-------|--------------|
| | | Magnitude | Duration | Extent | Irreplaceability | Reversibility | Probability | TOTAL | Significance | | | | Magnitude | Duration | Extent | Irreplaceability | Reversibility | Probability | TOTAL | Significance |
| Vegetation, Habitats and Fauna | | | | | | | | | | | | | | | | | | | | |
| Clearance of Vegetation | Destruction, further loss and fragmentation of the habitats, ecosystems and vegetation community | 2 | 3 | 2 | 2 | 2 | 3 | 33 | Low | Low | Negative | Demarcate work areas during the construction phase to avoid affecting outside areas. Compile and implement a rehabilitation plan from the onset of the project. | 2 | 3 | 1 | 1 | 1 | 2 | 16 | Low |
| Clearance of Vegetation and movement of construction vehicles | Introduction of alien and invasive species, especially plants | 2 | 4 | 2 | 2 | 3 | 3 | 39 | Low | Low | Negative | Compile and implement an alien vegetation management plan from the onset of construction. The plan must identify areas for action (if any) and prescribe the necessary removal methods and frequencies to be applied. | 2 | 3 | 1 | 1 | 2 | 2 | 18 | Low |

| ACTIVITY | POTENTIAL ENVIRONMENTAL IMPACT | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION | | | | | | | | Cumulative | Status | RECOMMENDED MITIGATION MEASURES/ REMARKS | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION | | | | | | | |
|---|---|--|----------|--------|------------------|---------------|-------------|-------|--------------|------------|----------|---|---|----------|--------|------------------|---------------|-------------|-------|--------------|
| | | Magnitude | Duration | Extent | Irreplaceability | Reversibility | Probability | TOTAL | Significance | | | | Magnitude | Duration | Extent | Irreplaceability | Reversibility | Probability | TOTAL | Significance |
| Clearance of vegetation and movement of construction vehicles | Displacement of the indigenous faunal community (including possible SCC) due to habitat loss, direct mortalities, and disturbance (road collisions, noise, dust, light, vibration, and poaching). | 4 | 3 | 2 | 2 | 2 | 3 | 39 | Low | Low | Negative | Clearing and/or disturbance activities must be conducted in a progressive linear manner, from the north to the south of the PAOI and over several days, so as to provide an easy escape route for all small mammals and herpetofauna. | 2 | 3 | 1 | 1 | 1 | 2 | 16 | Low |

7.3.1.2 Operation Phase

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

The following potential impacts were considered (Table 7-2):

- Continued fragmentation and degradation of habitats and ecosystems;
- Spread of alien and/or invasive species; and
- Ongoing displacement and direct mortalities of the faunal community (including possible SCC) due to continued disturbance (road collisions, noise, light, dust, vibration, poaching, erosion, etc.).

Table 7-2 Impacts to biodiversity associated with the proposed operational phase

| ACTIVITY | POTENTIAL ENVIRONMENTAL IMPACT | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION | | | | | | | | Cumulative | Status | RECOMMENDED MITIGATION MEASURES/ REMARKS | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION | | | | | | | |
|---|--|--|----------|--------|------------------|---------------|-------------|-------|--------------|------------|----------|--|---|----------|--------|------------------|---------------|-------------|-------|--------------|
| | | Magnitude | Duration | Extent | Irreplaceability | Reversibility | Probability | TOTAL | Significance | | | | Magnitude | Duration | Extent | Irreplaceability | Reversibility | Probability | TOTAL | Significance |
| Vegetation, Habitats and Fauna | | | | | | | | | | | | | | | | | | | | |
| Operational activities associated with retreatment | Continued fragmentation and degradation of habitats and ecosystems | 4 | 3 | 2 | 2 | 2 | 3 | 39 | Low | Low | Negative | Avoid the further disturbance or destruction of areas outside of the development footprint. Rehabilitate areas as soon as they are no longer impacted by construction. The rehabilitated areas must be revegetated with indigenous vegetation. | 2 | 2 | 1 | 1 | 1 | 2 | 14 | Low |
| Moving maintenance vehicles | Spread of alien and/or invasive species | 2 | 3 | 2 | 2 | 2 | 3 | 33 | Low | Low | Negative | Implementation of an alien vegetation management plan. Regular monitoring for AIP encroachment during the operation phase to ensure that no alien invasion problems have developed as result of the disturbance. | 2 | 2 | 1 | 1 | 1 | 2 | 14 | Low |

| ACTIVITY | POTENTIAL ENVIRONMENTAL IMPACT | ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION | | | | | | | Cumulative | Status | RECOMMENDED MITIGATION MEASURES/REMARKS | ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION | | | | | | | |
|--|--|--|----------|--------|------------------|---------------|-------------|-------|------------|--------|--|---|-----------|----------|--------|------------------|---------------|-------------|-------|
| | | Magnitude | Duration | Extent | Irreplaceability | Reversibility | Probability | TOTAL | | | | Significance | Magnitude | Duration | Extent | Irreplaceability | Reversibility | Probability | TOTAL |
| Operational activities and moving maintenance vehicles | Ongoing displacement and direct mortalities of the faunal community (including possible SCC) due to continued disturbance (road collisions, noise, light, dust, vibration, poaching, erosion, etc.). | 4 | 3 | 2 | 2 | 2 | 3 | 39 | Low | Low | Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (yellow) lights should be used wherever possible. | 2 | 3 | 1 | 1 | 1 | 2 | 16 | Low |

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 adjacent natural areas in the vicinity of the PAOI;
- 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).

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 |
| 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 |
| Areas of 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 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 as far as possible. Any materials may not be stored for extended periods of time and must be removed from the PAOI 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 PAOI. No plant species whether indigenous or exotic should be brought into/taken from the PAOI, to prevent the spread of exotic or invasive species or the illegal collection of plants.(Apart from rehabilitation activities). | Life of operation | Project manager, Environmental Officer | Any instances | Ongoing |
| Leaking equipment and vehicles must be repaired immediately or be removed from PAOI 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. | | | | |
| <ul style="list-style-type: none"> • 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. | Life of operation | Environmental Officer & Contractor | Spill events, Vehicles dripping | Ongoing |

- 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.

| Consult a fire expert and compile and implement a fire management plan to minimise the risk of veld fires around the PAOI. | Life of operation | Environmental Officer & Contractor | Fire Management | During Phase |
|--|--------------------------------------|--|--|--------------|
| 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 through 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 |
| Clearing and/or disturbance activities must be conducted in a progressive linear manner, from the north to the south of the PAOI and over several days, so as to provide an easy escape route for all small mammals and herpetofauna. | Construction Phase | Environmental Officer & Contractor | Progressive land clearing operations and the movement of fauna | Ongoing |
| 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 minimised 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 minimise 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 kill 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 minimise 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. | Life of operation | Environmental Officer | Presence and condition of signs | Ongoing |
| Wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area. | Planning and construction | Environmental Officer & Contractor, Engineer | Fauna movement corridor | Ongoing |
| During operation, fences should be checked regularly (once a day) to free fauna that may become trapped and to repair any holes dug under the fence. | Life of operation | Environmental Officer | Presence of fauna | Ongoing |
| Only use environmentally friendly dust suppressant products. | Construction and operation | Environmental Officer & Contractor, Engineer | Presence of chemicals in and around the PAOI | Ongoing |

Management outcome: Alien Vegetation and Fauna

| Impact Management Actions | Implementation | | Monitoring | |
|--|--------------------------------|---|--|----------------------|
| | Phase | Responsible Party | Aspect | Frequency |
| Compilation of and implementation of an alien vegetation management plan. This is 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 PAOI. | 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 |
| 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. A location specific waste management plan must be put in place to limit the presence of rodents and pests and waste must not be allowed to enter surrounding areas. | Life of operation | Environmental Officer & Health and Safety Officer | Presence of waste | Life of operation |
| A pest control plan must be put in place and implemented; it is imperative that poisons not be used to control pests. | Life of operation | Environmental Officer & Health and Safety Officer | Evidence or presence of pests | Life of operation |

Management outcome: Dust

| Impact Management Actions | Implementation | | Monitoring | |
|--|--|-------------------|------------|---|
| | Phase | Responsible Party | Aspect | Frequency |
| Dust-reducing mitigation measures must be put in place and 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 | Construction Phase and Life of operation | Contractor | Dustfall | Ongoing, as per a dust monitoring program |

limits must be put in place to reduce erosion, and speed bumps should also be constructed.

Management outcome: Waste Management

| Impact Management Actions | Implementation | | Monitoring | |
|---|---|---|--|-------------------|
| | Phase | Responsible Party | Aspect | Frequency |
| <p>Waste management must be a priority and all waste must be collected and stored effectively and responsibly according to a site-specific waste management plan. Dangerous waste such as metal wires and glass must only be stored in fully sealed and secure containers, before being moved off site as soon as possible. Any litter, spills, fuels, chemical and human waste in and around the PAOI must be removed and disposed of timeously and responsibly. 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. Portable toilets must be provided in the ratio provided in the Health and Safety Act. Portable toilets must be regularly pumped dry to ensure that the system does not degrade over time and spill into the surrounding area. 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. Where a registered disposal facility is not available close to the PAOI, 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.</p> | Life of operation | Environmental Officer & Health and Safety Officer | Waste removal | Life of operation |
| | Construction/Closure Phase | Environmental Officer & Health and Safety Officer | Presence of Waste | Daily |
| | Life of operation | Contractor, Environmental Officer & Health and Safety Officer | Presence of Waste and Dumping | Daily, Ongoing |
| | Construction Phase | Environmental Officer & Health and Safety Officer | Number of toilets per staff member. Waste levels | Daily |
| | Life of operation | Environmental Officer & Health and Safety Officer, Contractor | Availability of bins and the collection of waste | Ongoing |
| 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 |
| <p>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 PAOI to inform contractors and site staff of the presence of sensitive habitat features, and management requirements in line with the Environmental Authorisation and within the EMPr.</p> | Life of operation | Environmental Officer, Health and Safety Officer | Compliance to the training | Ongoing |

Management outcome: Erosion

| Impact Management Actions | Implementation | | Monitoring | |
|---------------------------|----------------|-------------------|------------|-----------|
| | Phase | Responsible Party | Aspect | Frequency |

| | | | | |
|---|-------------------|--|---|---------------------------------------|
| Speed limits must be put in place to reduce erosion. Soil surfaces must be wetted as necessary to reduce the dust generated by the project activities. Speed bumps and signs must be erected to enforce slow speeds. | Life of operation | Project manager, Environmental Officer | Water Runoff from road surfaces | Ongoing |
| Only existing access routes and walking paths may be made use of. | Life of operation | Project manager, Environmental Officer | Routes used within the area | Ongoing |
| Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events etc. | Life of operation | Project manager, Environmental Officer | Re-establishment of indigenous vegetation | Progressively |
| A stormwater management plan must be compiled and implemented. | Life of operation | Project manager, Environmental Officer | Management plan | Before construction phase: Ongoing |

9 Conclusion

The PAOI has been historically altered. The present land use has had a direct impact on both the fauna and the flora in the area, which is evident in and across the habitats. Historical land clearing and adjacent mining activities have led to the deterioration of most of the area, resulting in a disturbed habitat that has not recovered fully.

No significant impacts from a terrestrial ecology perspective are expected, subject to the implementation of the recommended mitigation measures, since the majority of the areas have been found to be degraded or modified. No faunal component of significance was observed, which further reduced the impact significance of the development on terrestrial biodiversity.

However, it is important to note that the Degraded Thornveld Habitat is regarded as having a Medium ecological theme sensitivity as these areas serve as an important greenfields area that supports indigenous flora and fauna.

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 PAOI is instead assigned an overall sensitivity of 'Medium' and 'Very Low'.

9.1 Specialist Recommendations

The portion of land within the PAOI that is classified as having a sensitivity rating of 'Very Low', namely the modified habitat 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 (Degraded Marikana Bushveld). As such it is imperative that the mitigation measures mentioned in this report be implemented and adhered to.

Considering the above-mentioned information, no fatal flaws are evident for the proposed project. It is the opinion of the specialists that the project may be favourably considered on condition that all prescribed mitigation measures and supporting recommendations are implemented.

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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.

CB

Carami Burger

Ecologist

The Biodiversity Company

June 2023

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

June 2023

12 Appendix B Specialists CVs

Carami Burger

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

(Pr 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

Zambia

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient

Qualifications

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

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

The Biodiversity Company (May 2022 - Present)

Ecologist.

EP3 Environmental (June 2019 - April 2022)

Senior Consultant and Ecologist

Scientific Aquatic Services (SAS) (November 2018 - June 2019)

Internship

ACADEMIC QUALIFICATIONS

North-West University of Potchefstroom (2017): 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.

North-West University of Potchefstroom (2013): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Botany and Zoology.

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 & Serbia.

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

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

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, Freshwater Ecology, Terrestrial Ecology and also Ecosystem Services.

Areas of Interest

Sustainability and Conservation.

Instream Flow and Ecological Water Requirements.

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
- Rehabilitation Plans and Monitoring
- Fish population structure assessments
- The use of macroinvertebrates to determine water quality
- Aquatic Ecological Assessments
- Aquaculture

Country Experience

Botswana, Cameroon
Democratic Republic of Congo
Ghana, Ivory Coast, Lesotho
Liberia, Mali, Mozambique
Nigeria, Republic of Armenia,
Senegal, Serbia, Sierra Leone, South Africa
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: Mondri 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

OVERVIEW

An overview of the specialist technical expertise include the following:

- Aquatic ecological state and functional assessments of rivers and dams.
- Instream Flow Requirement or Ecological Water Requirement using PROBFLO studies for river systems.
- Ecological wetland assessment studies, including the integrity (health) and functioning of the wetland systems.
- Wetland offset strategy designs.
- Wetland rehabilitation plans.
- Monitoring plans for rivers and other wetland systems.
- Toxicity and metal analysis of water, sediment and biota.
- Bioaccumulation assessment of fish communities.
- Fish telemetry assessment that included the translocation of fish as well as the monitoring of fish in order to determine the suitability of the hosting system.
- Faunal surveys which includes mammals, birds, amphibians and reptiles.
- The design, compilation and implementation of Biodiversity and Land Management Plans and strategies.

TRAINING

Some of the more pertinent training undergone includes the following:

- Wetland and Riparian Delineation Course for Consultants (Certificate of Competence) – DWAF 2008
- The threats and impacts posed on wetlands by infrastructure and development: Mitigation and rehabilitation thereof – Gauteng Wetland Forum 2010
- Ecological State Assessment of Lentic Systems using Fish Population Dynamics – University of Johannesburg/Rivers of Life 2010
- Soil Classification and Wetland Delineation – Terra Soil Science 2010
- Wetland Rehabilitation Methods and Techniques - Gauteng Wetland Forum 2011
- Application of the Fish Response Assessment Index (FRAI) and Macroinvertebrate Response Assessment Index (MIRAI) for the River Health Programme 2011
- Tools for a Wetland Assessment (Certificate of Competence) – Rhodes University 2011
- PROBFLO for conducting Ecological Flow Assessments – 2018/19

EMPLOYMENT EXPERIENCE

The Biodiversity Company (January 2015 – Present)

Director / Ecologist.

Digby Wells Environmental (August 2008 – December 2014)

Freshwater & Terrestrial Ecologist

PREVIOUS EMPLOYMENT: Econ@UJ (University of Johannesburg)

Freshwater Ecologist

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

Desai M., Husted A., Fry C., Downs C.T., & O'Brien G.C. 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

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