Terrestrial Biodiversity Scoping Report

Bonsmara Solar PV Facility (Kroonstad)

Date: 17/10/2022

Version: Draft Report

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Compiled for: **SiVest Environmental Division**

Date of report: **17/10/2022**

Final Report

Revisions

Report/Revision Version:	Date:	Approved by:
First Draft	03/10/2022	J Pote
Revisions/Comments	11/10/2022	M Guy
Final Draft	17/10/2022	J Pote
IAP Comments		
Final Report		

Table of Contents

List of Figures

List of Tables

1 Introduction & Background

1.1 Background

SiVest Environmental Division have been appointed to undertake the necessary environmental applications for a proposed Bonsmara Solar PV facility near Kroonstad, within the Free State province, on behalf of the applicant. Bonsmara Solar PV (RF) (Pty) Ltd. As part of this process, a terrestrial biodiversity assessment will be required. The purpose of this preliminary report is to undertake a high-level terrestrial biodiversity screening of the sites to assess risks to the proposed project in order to inform the Scoping Process.

1.2 Purpose of Report

The purpose of this report is to undertake and ecological and biodiversity scoping of the site to assesses the terrestrial biodiversity of the natural vegetation and to inform environmental requirements of the proposed project.

- This Scoping report has been compiled with reference to the reporting requirement for a **Terrestrial Biodiversity Assessment** as per the 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 NEMA (GNR 320), **as gazetted on 20 March 2020.** This report is undertaken as supporting information as part of a greater environmental application process and is compliant in terms of the requirements in the above regulations in terms of Terrestrial Biodiversity.
- This Scoping report also addresses the requirements in terms of the 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 NEMA, gazetted **on 30 October 2020**, relating to requirements relating specifically to the **Terrestrial Plant and Animal (species) themes.**

The principles that guide this process include protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources which are fundamental to sustainable development.

1.2.1 Report Structure

This report has been structured and written to provide background information relating to the various aspects relating to terrestrial biodiversity for scoping purposes. Specific observations and analyses of the project in relation to the various aspects are indicated in green text. Text boxes at the end of each section summarise the implications of the aspect under consideration in relation to the specific project. Summary information tables are provided, including a synopsis of applicable regional planning aspects (Table 1).

1.3 Project Description

1.3.1 Activity Location and Description

The proposed site is situated approximately 9 km south-east of Kroonstad, along the R 76 road in the direction of Steynsrus, in the Free State province. The site is situated within a commercial farming area (Refer to Figure 1) and is comprised of two farm portions, a north-western portion, Remainder of Farm Scheveningen 636 (~575 Ha) and a south-eastern portion, Portion 1 of Farm Scheveningen 636 (~429 Ha). The sites are within a predominantly commercial stock and game farming area, generally comprising dryland grazing in the surrounding area. The proposed activity will be to construct PV energy facilities, which will most likely feed into the national grid, being accessible in proximity to the site via Portion 0 of Farm Oslaagte No 2564.

Layout - Topographic Locality Map

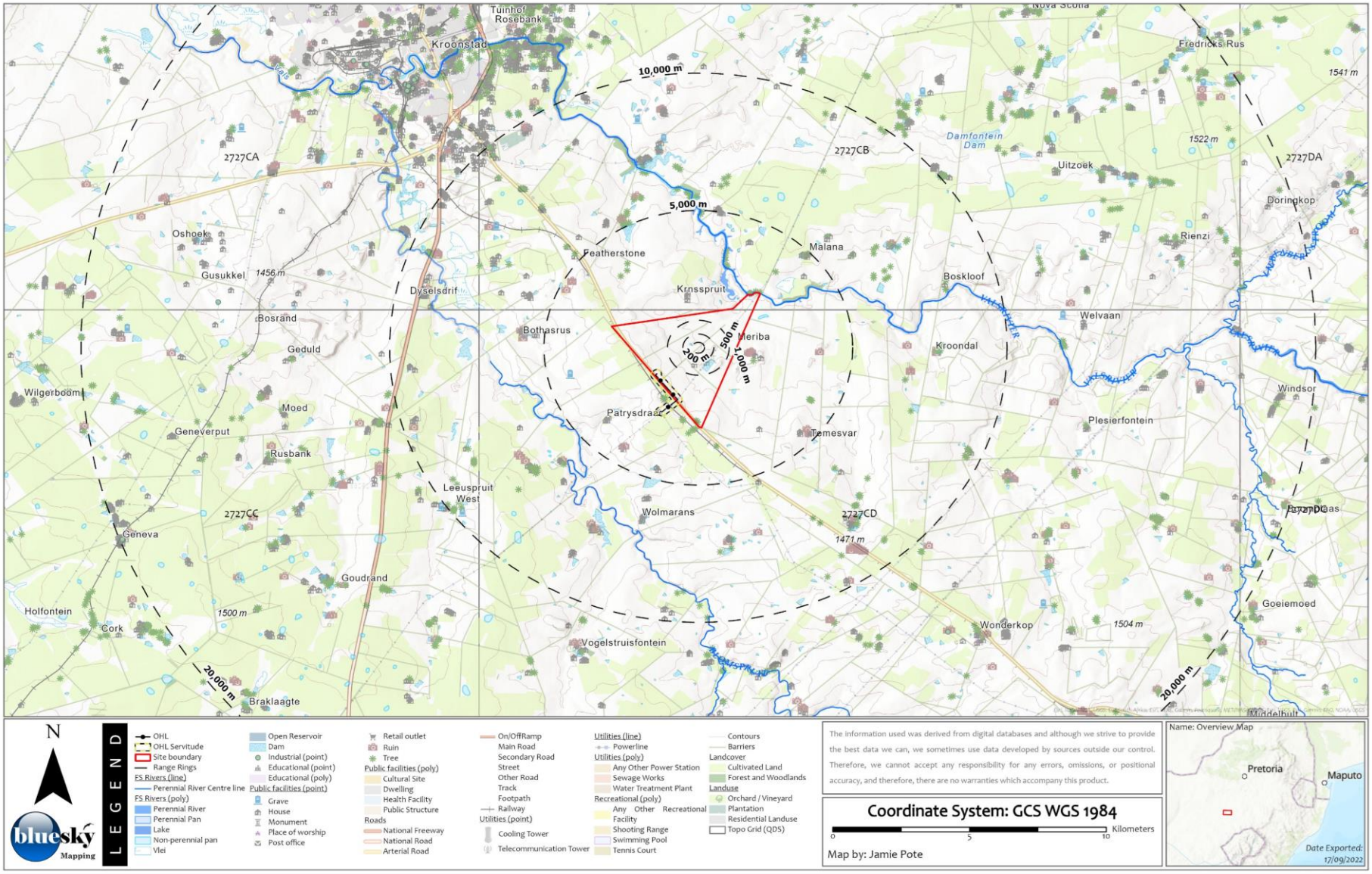

Figure 1: Site location comprised of commercial farmland with predominantly natural vegetation but with cultivated lands in the surrounding area.

1.3.2 Aspects of the project that could potentially have Biodiversity related Impacts

The proposed project will require clearing of natural vegetation for the construction of the PV facility as well as infrastructure including access roads and grid connections (substation, BESS and powerlines) as well as any construction areas and laydown areas.

1.3.3 Site visit

A site visit was undertaken on 29th & 30th September 2022, the findings of which will inform the Scoping Report and Site Verification.

1.3.4 Assumptions, Uncertainties and Gaps in Knowledge

The findings and recommendations of this report may be susceptible to the following uncertainties and limitation:

- This scoping report is primarily desktop based and relies on most recent available information including literature, online and other databases and aerial photography, supplemented by initial site observations. These site observations will be further analysed during compilation of the full terrestrial biodiversity assessment reporting.

2 Legislation Framework

In terms of NEMA EIA Regulations (07 April 2014, as amended), the following specific listing notices have bearing on the proposed activity and terrestrial biodiversity[1]:

Listing Notice 1 (GNR):

1. The development of facilities or infrastructure for the generation of electricity from a renewable resource where—
(i) the electricity output is more than 10 megawatts but less than 20 megawatts; or
(ii) the output is 10 megawatts or less, but the total extent of the facility covers an area in excess of 1 hectare.

Activity 1 could apply relating to facilities or infrastructure for the generation of electricity more than 10 megawatts but less than 20 megawatts from a renewable resource but is not related to terrestrial biodiversity unless additional activities are triggered, as below.

12. The development of:
(ii) infrastructure or structures with a physical footprint of 100 square metres or more.
where such development occurs—
(a) within a watercourse.
~~(b) in front of a development setback; or~~
(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse: —

Watercourses are present on site and the listed activity would be triggered if such an activity was to take place above the legislated thresholds.

1 *The listed activities itemized are only those with Biodiversity relevance to this report and is not a complete list of potential triggers.*

19. The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 10 cubic metres from a watercourse.

Watercourses are present on site and the listed activity would be triggered if such an activity was to take place above legislated thresholds.

27. The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—
~~(i) the undertaking of a linear activity; or~~
~~(ii) maintenance purposes undertaken in accordance with a maintenance management plan.~~

Indigenous vegetation is present on site and the listed activity will be triggered, as it is likely clearing will exceed 1 Ha.

Listing Notice 2 (GNR):

15. The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for—
~~(i) the undertaking of a linear activity; or~~
~~(ii) maintenance purposes undertaken in accordance with a maintenance management plan.~~

The PV footprint will likely require the clearing of greater than 20 Ha of indigenous vegetation, hence this activity would likely be triggered, requiring a full Scoping and EIA process.

Listing Notice 3 (GNR):

4. The development of a road wider than 4 metres with a reserve less than 13,5 metres
b. Free State
i. Outside urban areas:
~~(aa) A protected area identified in terms of NEMPAA, excluding disturbed areas;~~
(bb) National Protected Area Expansion Strategy Focus areas;
~~(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;~~
~~(dd) Sites or areas identified in terms of an international convention;~~
~~(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;~~
~~(ff) Core areas in biosphere reserves; or~~
(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas; or
~~ii. Inside urban areas:~~
~~(aa) Areas zoned for use as public open space;~~
~~(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose; or~~
~~(cc) Areas within urban protected areas.~~

The listed activity will be triggered if access roads exceed the threshold (wider than 4 m) and occurs within designated Critical Biodiversity Areas or within 5 km of a nature reserve. The site is within an ESA and not a CBA but is within 5 km of a nature reserve, hence the activity will be triggered if road widths exceed 4 m.

12. The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.

b. Free State

~~i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;~~

~~ii. Within critical biodiversity areas identified in bioregional plans;~~

~~iii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or~~

iv. Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.

The listed activity would be triggered if clearing of indigenous vegetation (natural areas) exceeds 300 m² and occurs within 100 m of a watercourse or wetland or within designated Critical Biodiversity Areas. The site is *within an ESA and not a CBA but may result in the clearance of greater than 300 m² of natural vegetation within 100 m of watercourses, which are present across the site, as a minimum in order to construct access roads.*

14. The development of -

(ii) infrastructure or structures with a physical footprint of 10 square metres or more, where such development occurs -

(a) within a watercourse.

(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.

b. Free State

i. Outside urban areas:

~~(aa) A protected area identified in terms of NEMPAA, excluding conservancies;~~

(bb) National Protected Area Expansion Strategy Focus areas;

~~(cc) World Heritage Sites;~~

~~(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;~~

~~(ee) Sites or areas identified in terms of an international convention;~~

~~(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;~~

~~(gg) Core areas in biosphere reserves; or~~

(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; or

~~ii. Inside urban areas:~~

~~(aa) Areas zoned for use as public open space; or~~

~~(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, zoned for a conservation purpose.~~

The activity is within 5 km of a nature reserve; hence this legislated activity will be triggered.

Implications:

- Due to the scale of the project and largely indigenous nature of the site, more than 20 Ha of indigenous vegetation will require clearing, hence triggering a Full Scoping & EIA process.
- The proposed activity may also require the clearing of more than 300 m^2 of indigenous vegetation and greater than 1 Ha of indigenous vegetation and/or an activity in a watercourse to construct access road crossings, hence additional listed activities are likely to be triggered.
- Additional listed activities that may pertain to the type of activity (PV) rather than directly to terrestrial biodiversity features have not been considered in depth at this Scoping stage.

Other potentially relevant legislation, which will be evaluated as required, includes the following:

- NEMA: Environmental management principles set out in NEMA, and other Specific Environmental Management Acts (SEMA's) should guide decision making throughout the project life cycle to reflect the objective of sustainable development. One of the most important and relevant principles is that disturbance of ecosystems, loss of biodiversity, pollution and degradation of environment and sites that constitute the nation's cultural heritage should be avoided, minimised or as a last option remedied. This is supported by the Biodiversity Act as it relates to loss of biodiversity.
- National Environmental Management Act, 1998 (Act No. 107 of 1998): DARDLEA and DEA are the Competent Authority for the implementation of the National Environmental Impact Assessment Regulations, promulgated under the National Environmental Management Act NEMA], as amended.
- Liability for any environmental damage, pollution, or ecological degradation: Arising from all -related activities occurring inside or outside the area to which the permission/right/permit relates is the responsibility of the rights holder. The National Water Act and NEMA both oblige any person to take all reasonable measures to prevent pollution or degradation from occurring, continuing, or reoccurring (polluter pays principle). Where a person/company fails to take such measures, a relevant authority may direct specific measures to be taken and, failing that, may carry out such measures and recover costs from the person responsible.
- Public participation: Public consultation and participation processes prior to granting licences or authorisations can be an effective way of ensuring that the range of ways in which the activities impact on the environment, social and economic conditions are addressed, and considered when the administrative discretion to grant or refuse the licence is made.
- Constitution of Republic of South Africa (1996): Section 24(a) of the Constitution states that everyone has the right *'to an environment that is not harmful to their health or well-being'*. Construction activities must comply with South African constitutional law by conducting their activities with due diligence and care for the rights of others.
- Water Use Authorisations: The National Water Act (No. 36 of 1998): Requires that provision is made both in terms of water quantity and quality for 'the reserve', namely, to meet the ecological requirements of freshwater systems and basic human needs of downstream communities. It is essential in preparing an EMP that any impacts on water resources be they surface water or groundwater resources, and/ or impacts on water quality or flow, are carefully assessed, and evaluated against both the reserve requirement and information on biodiversity priorities. This information will be required in applications for water use licenses or permits and/or in relation to waste disposal authorisations.
- Conservation of Agricultural Resources Act 43 of 1993: Lists Alien invasive species requiring removal.

- National Forests Act 84 of 1998 with Amendments: Lists Protected trees, requiring permits for removal Department of Agriculture, Forestry and Fisheries). Section (3)(a) of the National Forests Act stipulate that '*natural forests must not be destroyed save in exceptional circumstances where, in the opinion of the Minister, a proposed new land use is preferable in terms of its economic, social, or environmental benefits*'.

2.1 Systematic Planning Frameworks

A screening of Systematic Planning Framework for the region was undertaken (summarised in Table 1), that included the following features:

- Critically Endangered and Endangered Ecosystems
- Vulnerable Ecosystems
- Critical Biodiversity Areas
- Ecological Support Areas
- River, Estuarine and Wetland Freshwater Ecosystem Priority Areas (FEPAs) and buffers
- Protected Areas (and buffers) and NPAES
- Critical Habitat for listed endemic or protected species

Table 1: Summary of Regional Planning Biodiversity features.

FEATURE[2]	DESCRIPTION	IMPLICATIONS/COMMENT
National Environmental Screening Tool (Terrestrial Biodiversity)	Very High Terrestrial Biodiversity Medium/High Animal Species Low Plant Species Low/Very High Aquatic Medium/High Agriculture Very High, High & Medium	High sensitivity terrestrial biodiversity receptors are present, refer to relevant sections.
National Vegetation Map (NVM, 2018)	Central Free State Grassland	Least Concern
Critically Endangered and Endangered Ecosystems (NBA 2018)	None	N/A
Vulnerable Ecosystems (NBA)	None	N/A
Free State Biodiversity Plan (2016)	ESA 1, ESA 2, Other Natural Areas (ONA) & Degraded (Cultivated and old lands)	Specific activity within a predominantly natural rural farming area and having a limited footprint area will not significantly fragment Ecological Support Area connectivity requirements if planned to maximise connectivity.
Protected Areas (SAPAD)	Erfdeel Private Nature Reserve is situated on the north-eastern boundary of the site and entire site is within 5 km.	No protected areas nor any ecological processes associated with them are directly affected by the proposed PV project, however the site is directly adjacent to a private Nature Reserve and a buffer would be recommended.
NPAES	NPAES designated areas intersect with the site. Small, designated areas present on northern and south-eastern potions of the site.	No NPAES noror associated ecological processes are likely directly affected significantly.
Strategic Water Source Areas (SWSA)	Situated within a designated SWSA area.	Specific activity unlikely to have any significant impact to downstream water resources.
Freshwater Ecosystem Priority Areas (FEPA's)	Situated within catchment of Valsrivier to the north (Class C: Moderately Modified).	Specific activity unlikely to have any significant impact to nearby rivers, as long as measures are implemented to minimise impacts to watercourses and runoff.
Regional Hotspots & Regions of Endemism	Outside of any endemism hotspots.	N/A.

[2] Refer to Section 2.1.

FEATURE[2]	DESCRIPTION	IMPLICATIONS/COMMENT
Important Bird Areas (IBA's)	Fouriesburg-Bethlehem-Clarens 70 km to east.	The specific activity will unlikely have any impact on IBA's.
Key Biodiversity Areas (KBA's)	None	N/A
Marine/Coastal areas	The site is not located within 1 km of any coastal area.	N/A
Estuaries	The site is not located within 1 km of any estuary.	N/A
RAMSAR sites	None	N/A
Within 32 m of Watercourse	Several non-perennial watercourses are present.	Watercourses will only be affected if proposed activity is undertaken in proximity or where access road crossings are required.
Within 100 m of River	Site is within 100 m of the Valsrivier along the northern boundary.	Development of the site is unlikely to significantly impact any watercourse.
Within 500 m of Wetland	Site is within 500 m of Valley floor natural wetlands associated with the Valsrivier along the northern boundary. Several dams of varying size are present on the site.	Wetlands will only be affected if proposed activity is undertaken in proximity.
Forest	None	N/A
Surrounding Land Uses	Mostly commercial agriculture.	Site is generally intact within minimal transformation.
Critical Habitat for listed endemic/ protected species	There are several red listed faunal species in the surrounding area and vegetation units that are known to have limited distributions (refer to Section 3.1).	

Implications:

- Vegetation unit currently has a Least Concern conservation status; hence natural vegetation does not have an elevated status.
- The current Conservation Planning designation for the site is mostly ESA 1 with ESA 2 patches also present, indicating that within the site ecological processes are considered to be important rather than irreplaceable habitat (i.e. CBA) or conservation targets. The implications of this are that direct loss of habitat is not the main risk, but rather
- Watercourses are present as well as the Valsrivier on the northern boundary and respective buffers will require consideration.
- The Erfdeel Private Nature Reserve is also located on the northern boundary and a buffer would be advisable. No specific guidelines are provided for such buffers in regional planning guidelines.
- No other ecological elements or sensitive features (terrestrial) of significance are identified in the respective regional planning information sources that would be directly or indirectly affected.

2.1.1 National Environmental Screening Tool

The DEA screening tool (dated 06/05/2022) identifies Very High & Low Terrestrial Biodiversity, Low Plant Species (no species), Medium & Low Animal Species, Very High & Low Aquatic, High, Medium & Low Agricultural Sensitivities and Very High. High & Medium Landscape (Solar) sensitivities within or in proximity to the site (PV facility: Figure 2 to Figure 7; Grid connection: Figure 8 to Figure 12). The content of this report will address the findings of the screening tool as well as any site-specific sensitivities that may not have been identified the screening tool. Not all features may necessarily be directly affected by the activity but being in proximity, the associated risks will be investigated further and addressed in the report where appropriate.

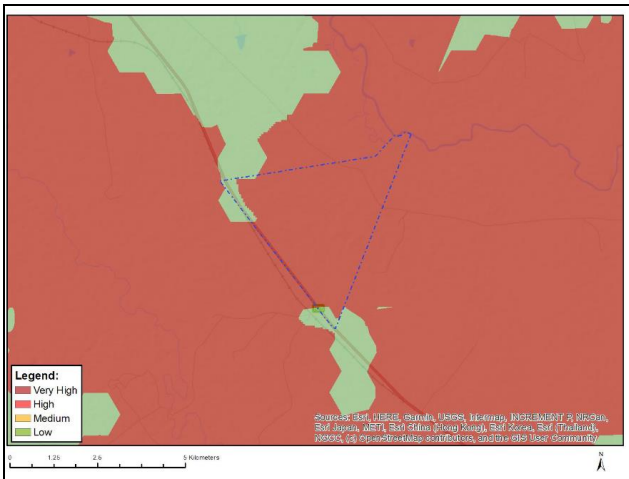

Figure 2: Terrestrial Biodiversity Sensitivity.

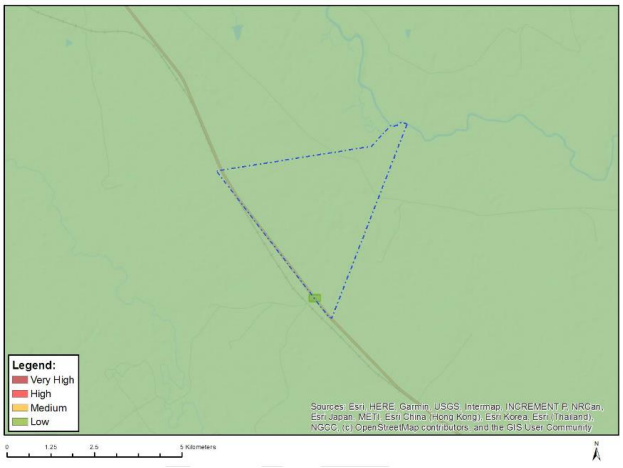

Figure 3: Plant Species Sensitivity.

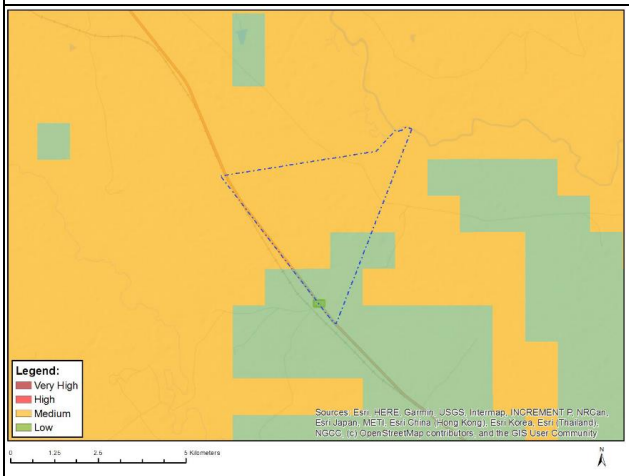

Figure 4: Animal Species Sensitivity.

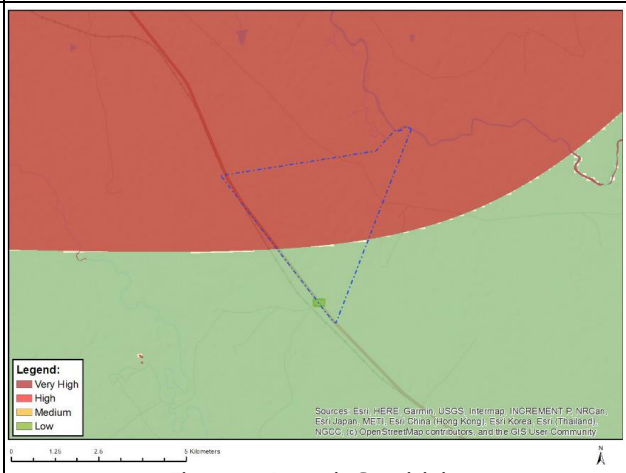

Figure 5: Aquatic Sensitivity.

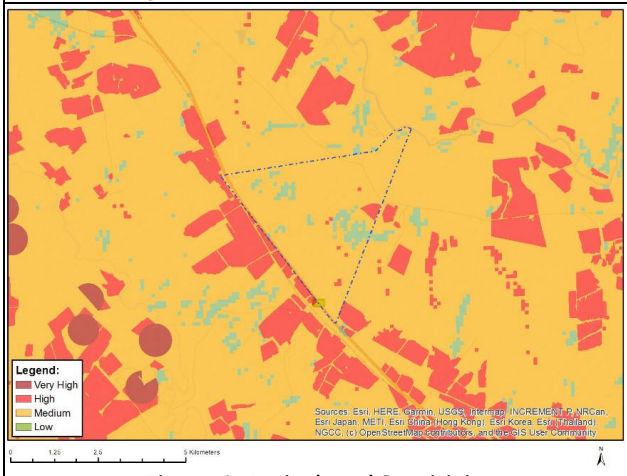

Figure 6: Agricultural Sensitivity.

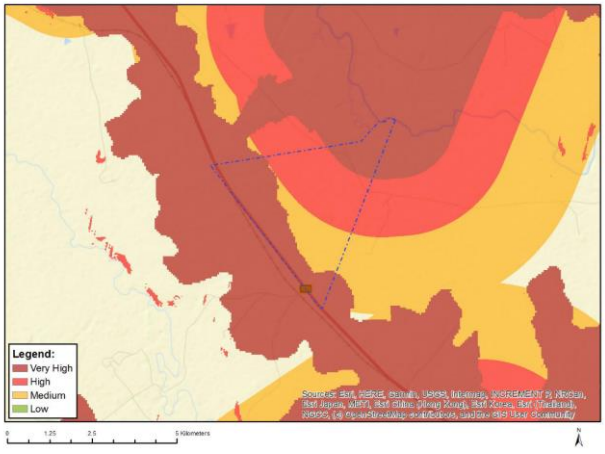

Figure 7: Landscape (Solar) Sensitivity.

Figure 8: Terrestrial Biodiversity Sensitivity.

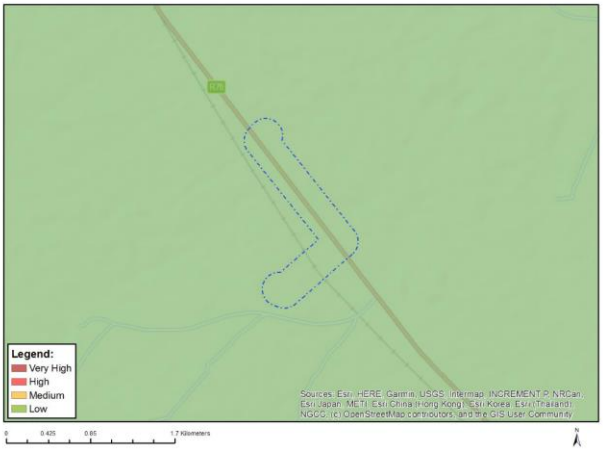

Figure 9: Plant Species Sensitivity.

Figure 10: Animal Species Sensitivity.

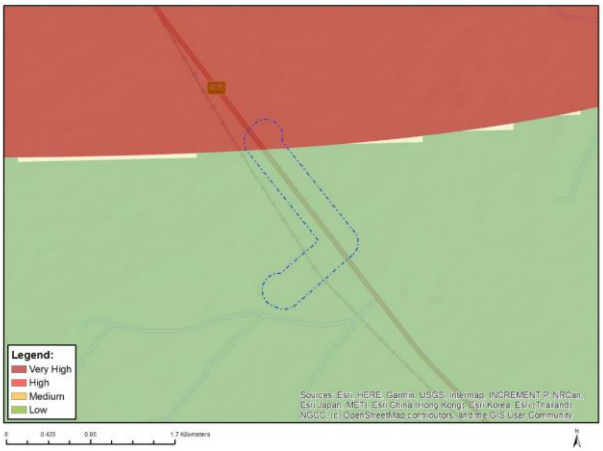

Figure 11: Aquatic Sensitivity.

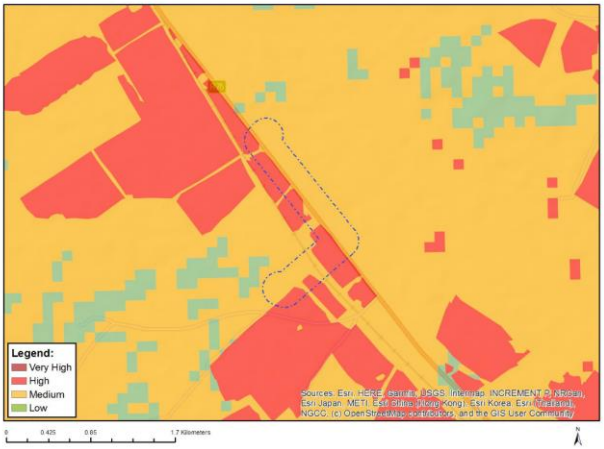

Figure 12: Agricultural Sensitivity.

The DFFE Screening Tool indicates the following ecological sensitivities:

- Terrestrial Biodiversity is *Very High & Low* (Figure 2 & Figure 8).
- Plant species sensitivity is Low (Figure 3 & Figure 9).
- Animal Species sensitivity is Medium & Low (Figure 4 & Figure 10).
- Aquatic Sensitivity is Low & *Very High* (Figure 5 & Figure 11).
- Agricultural Sensitivity is *High, Medium & Low* (Figure 6 & Figure 12).
- Landscape (Solar) Sensitivity is *Very High, High, Medium & Low* (Figure 7)

SENSITIVITY	DESCRIPTION - FEATURE(S) IN PROXIMITY
TERRESTRIAL SENSITIVITY	
Very High	ESA 1 & 2; Erfdeel Private Nature reserve, PAES
High	None
Medium	None
Low	Present
PLANT SENSITIVITY	
Very High	None
High	None
Medium	None
Low	Present
ANIMAL SENSITIVITY	
Very High	*None*
High	None
Medium	*Smaug giganteus* (Reptile) *Hydrictis maculicollis* (Mammal)
Low	Present
AQUATIC SENSITIVITY	
Very High	Strategic water source area & Wetlands
High	None
Medium	None
Low	Present
AGRICULTURAL SENSITIVITY	
Very High	None
High	Land capability: 09. Moderate-High; 10. Moderate-High High Annual Crop Cultivation / Planted Pastures Rotation: Land capability: 06. Low-Moderate; 07. Low-Moderate; 08. Moderate High Annual Crop Cultivation / Planted Pastures Rotation: Land capability: 01. Very low/02. Very low/03.; Low-Very low/04. Low-Very low/05. Low
Medium	Land capability: 06. Low-Moderate; 07. Low-Moderate; 08. Moderate
Low	Land capability: 01. Very low; 02. Very low; 03. Low-Very low; 04. Low-Very low; 05. Low
LANDSCAPE SENSITIVITY	
Very High	Nature Reserve, Within 1.5 km of a nature reserve, Mountain tops and high ridges
High	Slope between 1:4 and 1:10, Between 1.5 and 3 km of a nature reserve
Medium	Between 3 and 5 km of a nature reserve
Low	None

2.1.2 Vegetation of Southern Africa

A single vegetation unit (Table 1, Figure 13) is primarily affected by the proposed project (Mucina & Rutherford, 2006). The site is located entirely within Central Free State Grassland (currently having a Least Concern conservation status) and a conservation target of 24 %. Elements of Vaal-Vet Sandy Grassland (*Endangered*), Eastern Free State Sandy Grassland (Least Concern), and Winburg Grassy Shrubland (Least Concern) may be present on slopes and rocky hills or mesas, which will be assessed further during the assessment process. Highveld Alluvial Vegetation elements may be represented in alluvial or wetland areas. A general description of the vegetation units is provided Section 4.4: Appendix D: Systematic Conservation Planning (as per Mucina & Rutherford, 2006) as a reference point for the baseline vegetation composition.

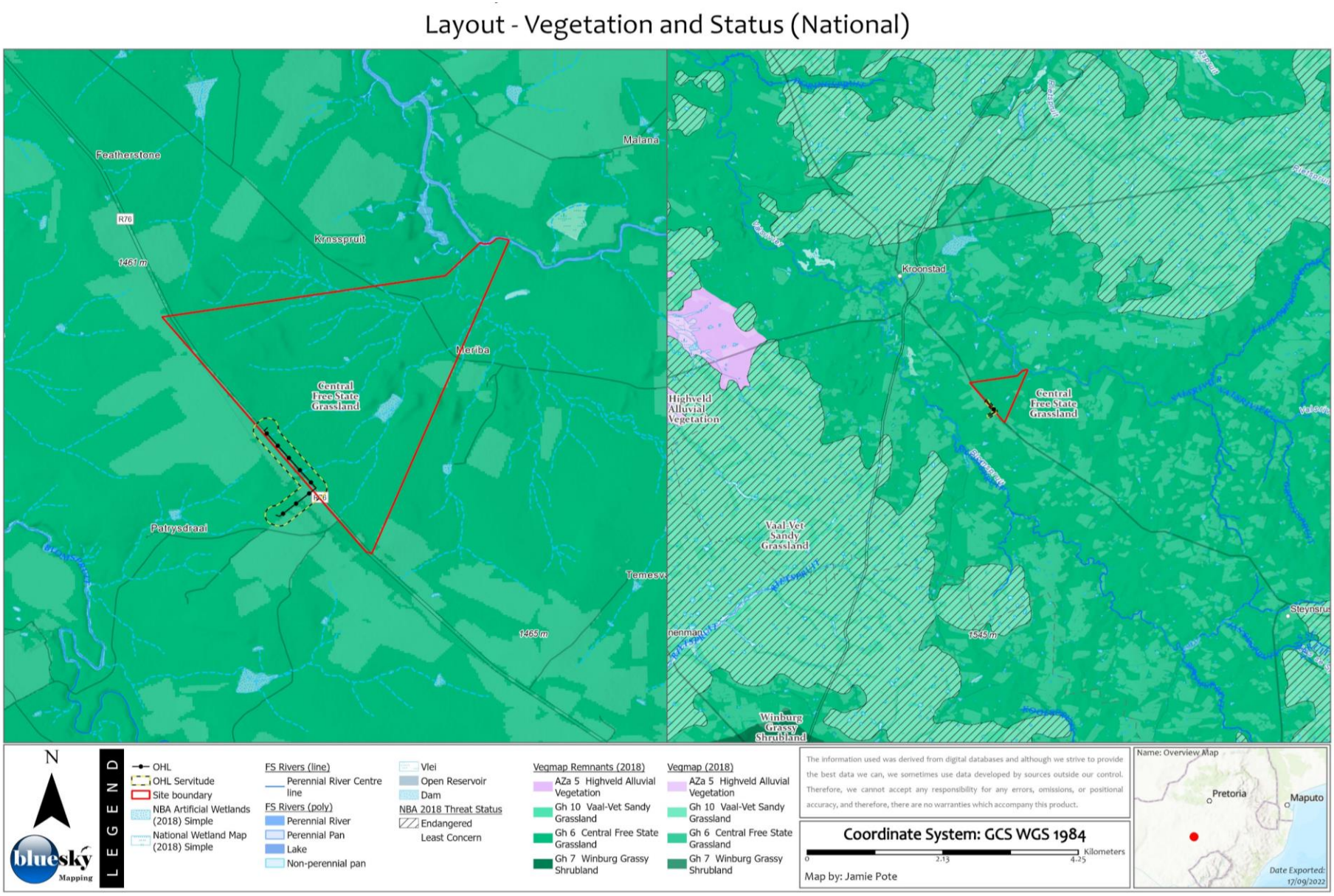

Figure 13: National Vegetation Map and National Biodiversity Assessment Status (2018).

2.1.3 National Biodiversity Assessment

The NBA is the primary tool for monitoring and reporting on the state of biodiversity in South Africa and informs policies, strategic objectives, and activities for managing and conserving biodiversity more effectively. The NBA is especially important for informing the National Biodiversity Strategy and Action Plan (NBSAP), the National Biodiversity Framework (NBF) and the National Protected Area Expansion Strategy (NPAES) and informs other national strategies and frameworks across a range of sectors, such as the National Spatial Development Framework, the National Water and Sanitation Master Plan and the National Biodiversity Economy Strategy. Ecosystem protection level is an indicator that tracks how well represented an ecosystem type is in the protected area network. It has been used as a headline indicator in national reporting in South Africa since 2005. It is computed by intersecting maps of ecosystem types and ecological condition with the map of protected areas. Ecosystem types are then categorised based on the proportion of the biodiversity target for each ecosystem type that is included in one or more protected areas. For terrestrial ecosystems, biodiversity targets are set for each ecosystem type using established species–area accumulation curves (ranging between 16 and 34%).

The outcome of the most recent National Biodiversity Assessment (2018) indicate that Central Free State Grassland has a Least Concern conservation status (Table 1), which is the lowest threat status elevation. This indicates that more than 60 % of the unit remains. There is a moderate to low level of utilization of this unit with lower degradation and transformation compared to units having an elevated status. Development of a portion of the site will thus not significantly affect conservation targets for the affected vegetation unit(s).

As is evident from land-use coverages, the broader area surrounding the site is somewhat fragmented because of agriculture related land-use, including agriculture and urbanisation to the north. The specific site is relatively unmodified, although the specific state or level of degradation will be assessed further in the full assessment process. Some erosion along watercourses and surrounding drainage lines is evident from aerial photographs supported by initial site observations, which could be indicative of historical overgrazing.

Implications:

- The vegetation unit, Central Free State Grassland, has a Least Concern status, indicating that less than 40% has been transformed and there will likely be minimal loss or disruptions to ecological functioning.
- Elements of Eastern Free State Sandy Grassland and Winburg Grassy Shrubland could potentially be present in rocky area including outcrops hills and mesas, which will be assessed further in the detailed assessment process.

2.1.4 Free State Biodiversity Plan

The Free State Conservation Plan (2016) designates the following CBA categories, based on national standards:

- Protected Areas
- Critical Biodiversity Area 1 & 2
- Ecological Support Area 1 & 2
- Other & Degraded Areas

While no Free State Biodiversity Plan guideline report is available, national, and other regional reporting guidelines for Critical Biodiversity Areas can be consulted. The *Western Cape Biodiversity Spatial Plan Handbook* (*Pool-Stanvliet, Duffell-Canham, Pence & Smart, 2017*) is generally considered to be the accepted norm and is based on national standards, and more information is provided in Appendix D: Systematic Conservation Planning for the purposes of this report.

The following can be deduced regarding the categories:

- Critical Biodiversity Area 1: *Areas in a natural condition that are required to meet biodiversity targets*, for species, ecosystems or ecological processes and infrastructure. Maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate in these areas. **Not present.**
- Critical Biodiversity Area 2: *Areas in a degraded or secondary condition* that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure. Maintain in a functional, natural, or near-natural state, with no further loss of natural habitat. These areas should be rehabilitated. **Not present.**
- Ecological Support Area 1: Areas that are not essential for meeting biodiversity targets, but that *play an important role in supporting the functioning of PA's or CBA's and* are often vital for delivering ecosystem services. Maintain in a functional, near-natural state. **Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised**. **Present.**
- Ecological Support Area 2: Areas that are not essential for meeting biodiversity targets, but that *play an important role in supporting the functioning of PA's or CBA's* and are often vital for delivering ecosystem services. Restore and/or **manage to minimise impact on ecological infrastructure functioning; especially soil and water-related services**. **Present.**

The site falls predominantly within an ESA 1 designated area, with patches of ESA 2, Other Natural Areas and Degraded Areas (Figure 14). Two key ESA designated corridors are delineated, the first to the north and east of the site, following the Valsrivier and the second to the south along the Blomspruit River. The site falls across a portion of designated ESA that serves to connect these two corridors, thus the site will serve as an integral part in the connectivity of these corridors, rather than to meet conservation targets (i.e. CBA).

The purpose of ecological corridors is to provide intact pathways for long-term biological movement. They also support the natural movement of species between populations to ensure population viability. Landscape corridors are aligned with areas that have maximum amounts of remaining natural habitat. Local corridors are fine-scale corridors that contribute to connectivity.

Implications:

- Land use guidelines indicate that while ESA sites are not essential for meeting biodiversity targets, they play an important role both in delivering ecosystem services as well as supporting ecological functioning and connectivity. Some habitat loss is generally acceptable within these areas; however, ecological functioning and connectivity should not be compromised.
- The terrestrial biodiversity or ecological assessment will need to determine requirements in terms of maintain ecological processes with specific recommendations relating to a suitable layout that will still address connectivity requirements.

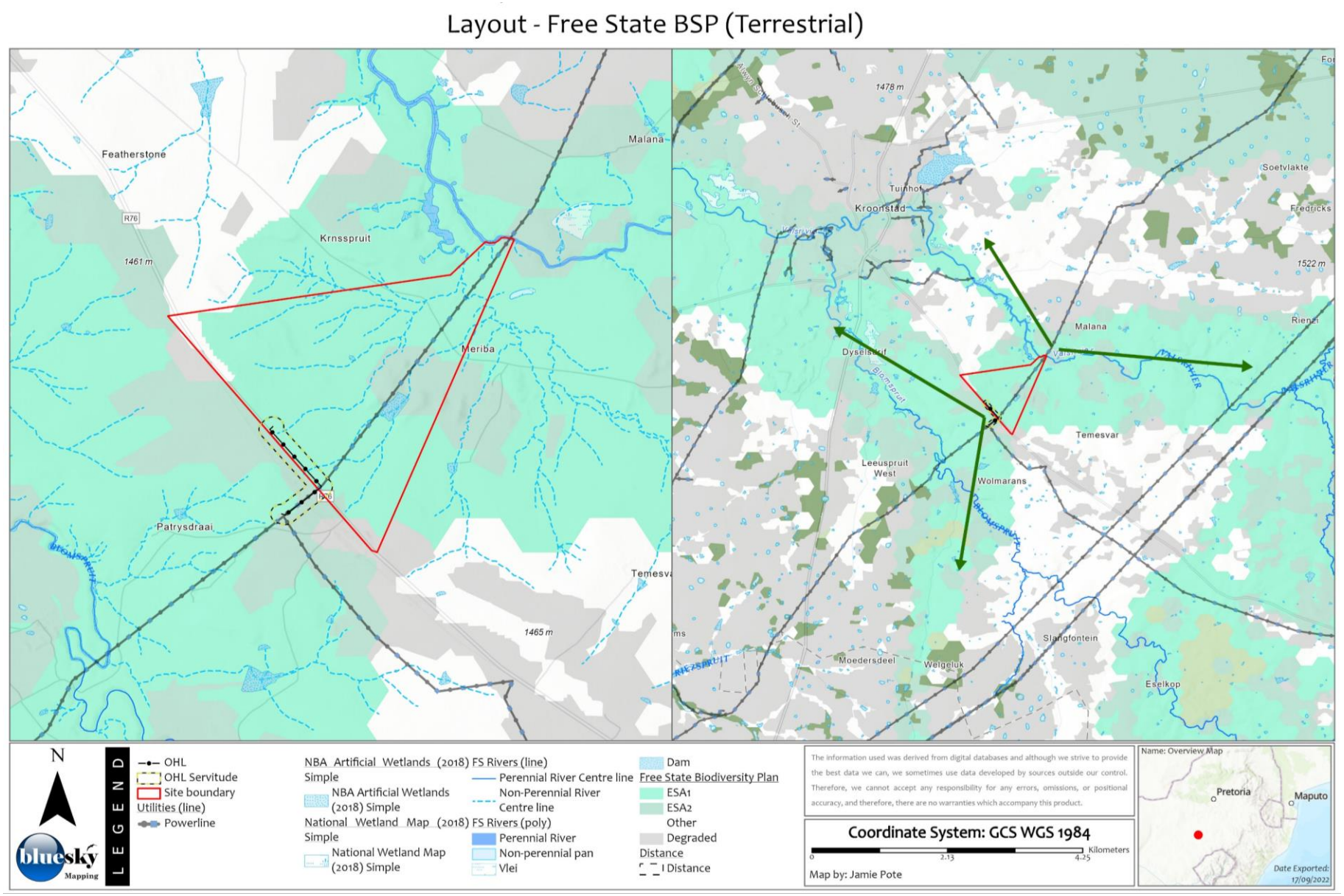

Figure 14: Free State Biodiversity Plan (2016) – Terrestrial.

2.1.5 Other Biodiversity Sector Plans

The site is outside of the planning domain of any other Biodiversity Sector Plans.

2.1.6 Regional Hotspots and Centres of Endemism

The site is not situated within any Centre of Endemism. The terrestrial biodiversity assessment including a species survey will further assesses any potential risks to species.

2.1.7 Key Biodiversity Areas

Important Bird Areas

Important Bird and Biodiversity Areas (IBA's) are sites of international significance for the conservation of the world's birds and other biodiversity. They also provide essential benefits to people, such as food, materials, water, climate regulation and flood attenuation, as well as opportunities for recreation and spiritual fulfilment. By conserving IBA's, we look after all the ecosystem goods and services they provide, which means in effect that we support a meaningful component of the South African economy (such as water management and agriculture). Since the late 1970s, more than 12 000 IBA's have been identified in virtually all the world's countries and territories, both on land and at sea. In 1998, 122 South African IBA's were identified and listed in Barnes (1998). This inventory was revised to 112 IBA's in 2015. IBA's have also had considerable and increasing relevance when responses have been developed to several wider environmental issues, such as habitat loss, ecosystem degradation, climate change and the sustainable use of resources. The core aims of the IBA Programme are:

- To identify, monitor and conserve the sites and habitats that support South Africa's priority bird species.
- To develop a network of partners, from grassroots to national level, who collaborate to conserve IBA's.
- To gather new data regularly and monitor IBA's to track status and trends across the network and so that up-to-date information can be passed on to decision-makers, enabling them to take appropriate conservation action.
- To confirm periodically that existing IBA's continue to meet the selection criteria and to identify other critical sites that may qualify for recognition as IBA's as new information becomes available.
- To build capacity in the IBA Programme by sourcing funding, and to acquire and develop appropriate skills in staff and volunteers so that these objectives can be implemented at a regional scale.

The extension of the IBA approach to several other wildlife groups has led to the identification of Important Plant Areas, Prime Butterfly Areas, Important Mammal Areas and Key Biodiversity Areas for Freshwater Biodiversity. South Africa is also the first mega diverse country to practically test the Key Biodiversity Areas (KBA's) standards across a full range of species groups and ecosystems but is not yet published.

The site is not within any current identified or known Important Bird Areas or Key Biodiversity Areas. IBA's and KBA's that are in the surrounding area include Amersfoort-Bethal-Carolina District situated 70 km to the south-east. The National Screening Tool does not identify any bird species that would require further assessment by avifaunal specialist.

Implications:

- Birds are not identified as sensitive receptors for the site.

2.1.8 Protected areas

The South Africa Protected Areas Database (SAPAD) database, a comprehensive database of various protected area categories, is updated on a quarterly basis, and provides a comprehensive source of all national and private nature reserves, world heritage sites and other formal legally protected conservation areas situated within South Africa. When projects are in legally protected and internationally recognized areas, it should be ensured that project activities are consistent with any national land use, resource use, and management criteria (including Protected Area Management Plans, National Biodiversity Strategy and Action Plans (NBSAP's), or similar documents).

Table 2: List of Protected Areas in vicinity

NAME	DISTANCE
Erfdeel Private Nature Reserve	0 km North-East
Serendipidie Private Nature Reserve	< 10 km South
Boslaagte Private Nature Reserve, Dalmanuthaa Game Reserve, Phatakalle Private Nature Reserve, Ezelkop Game Industry Nature Reserve	< 20 km
Free State Safaris Nature Reserve, De Rust Private Nature Reserve, Thabong Game Ranch, Newlands Game Ranch, Goliatskraal Private Nature Reserve, Tara Wildlife Safarism, Bosrant Private Nature Reserve, Doornkloof Private Nature Reserve, Goedehoop Nature Reserve, Nooitgedacht Private Nature Reserve, Mizpah Safaris, Silwerbank Game Reserve	< 50 km

No National Parks are situated within 10 km of the site (Figure 15) and a single Private nature Reserve is situated within 5 km of the site, the Erfdeel Private Nature Reserve which abuts the north-eastern boundary of the site. The site is situated to the south-west of the private nature reserve.

Several other Private Nature Reserves are situated within the 5 km to 50 km range from the site, as listed in Table 2. Two small NPAES designated areas are present, along the northern border and the south-eastern corner. Th small areas are the outer edges of a larger designated NPAES area which extends from the site in a south-east and north—east direction (designated as Freestate Highveld Grassland Focus Areas).

No national protected areas, nor any ecological processes associated with them are likely to be significantly affected by the proposed activity. No Marine Protected Areas or NPAES areas are directly or indirectly affected and no RAMSAR sites are affected directly or indirectly.

Implications:

- The site is located adjacent to a nature reserve and a buffer would be recommended. This will be assessed further in the detailed assessment to ascertain possible impact(s).
- The activity will unlikely have any direct, indirect, or cumulative impact on any other protected environment.
- The site does overlap with the edge of a larger designated NPAES areas but not expected to be of significance, which will likely be negligibly affected.

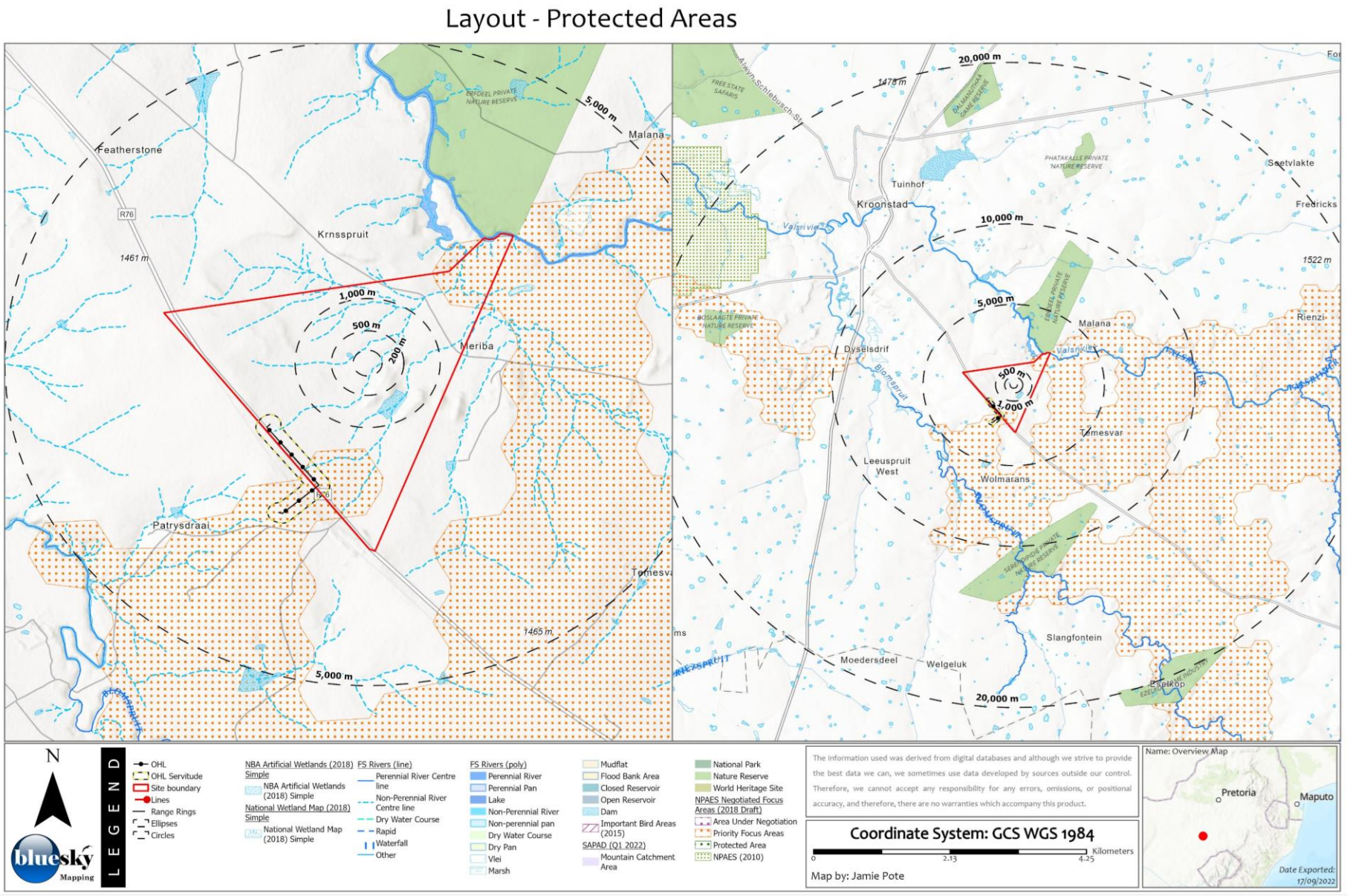

Figure 15: Protected Areas.

2.1.9 Strategic Water Source Areas

Strategic water source areas (Figure 16) are those that supply substantial downstream economies and urban centres. These water source areas are vital to the national economy. Strategic water source areas are those that supply substantial downstream economies and urban centres. These water source areas are vital to the national economy. Strategic water source areas can be regarded as natural "*water factories*", supporting growth and development needs that are often far away. Deterioration of water quality and quantity in these areas can have a disproportionately large negative effect on the functioning of downstream ecosystems and the overall sustainability of growth and development in the regions they support. Appropriate management of these areas, which often occupy only a small fraction of the land surface area, can greatly support downstream sustainability of water quality and quantity.

In South Africa, such management is particularly important for enhancing downstream water quality and quantity. Not only are the country's surface water resources extremely limited – South Africa is one of the driest countries (per capita), with 98 per cent of its surface water already developed – but the country also has a growing water quality problem. Development of this site is unlikely to have an impact on any Strategic Water Source area (Figure 16).

Implications:

- The site falls within a designated SWSA area, being situated adjacent to the Valsrivier, which is a tributary of the Vaal River and upstream of the Bloemhof dam, which is situated near Bloemfontein to the north-west. Both are important water reservoirs for local towns and settlements.
- The proposed activity (PV facility) is unlikely to result in any significant impacts to any critical water supply to downstream economies and urban centres because of development of this site, as it will unlikely alter water flows; however, several runoff mitigation measures may be required, depending on the layout.

2.1.10 Freshwater Ecosystem Priority Areas

The National Freshwater Ecosystem Priority Areas (NFEPA) project responds to the high levels of threat prevalent in river, wetland, and estuary ecosystems of South Africa. It provides strategic spatial priorities for conserving the country's freshwater ecosystems and supporting sustainable use of water resources. These strategic spatial priorities are known as Freshwater Ecosystem Priority Areas, or '*FEPAs*'.

Biodiversity targets set minimum, quantitative requirements for biodiversity conservation. They reflect scientific best judgement and will need to be refined as knowledge evolves. Quantitative biodiversity targets were set for fish species, river ecosystem types, wetland ecosystem types, priority estuaries, wetland clusters and free-flowing rivers:

- Threatened and near-threatened freshwater fish species – all populations (100%) of considered to be critically endangered or endangered species, and at least ten populations of species that are in the International Union for Conservation of Nature (IUCN) vulnerable or near threatened categories and some populations of special concern (e.g., very restricted distributions in South Africa)
- River ecosystem types – 20% of total length per type
- Wetland ecosystem types – 20% of total area per type
- Wetland clusters – 20% of total area per wetland vegetation group
- Free-flowing rivers – 20% of total length per ecoregion group

- Priority estuaries – 100% of all priority estuaries, which already considered biodiversity targets of 20% for estuary ecosystem types and habitat, 50% of the populations of threatened species; 40% of the populations of exploited estuarine species; 30% of the populations of all other estuarine species.

Terrestrial and aquatic resources are interdependent, with one affecting the other. For example, to ensure the healthy functioning of rivers, wetlands, and estuaries, it is essential to protect mountain catchment areas where the water originates, and to safeguard riverside vegetation because these plants prevent soil erosion, sedimentation and water pollution (Vromans et al., 2012).
The health of a river ecosystem is largely dependent on the presence of natural vegetation or "riparian habitat" along its banks, including good vegetative cover within the surrounding landscape (catchment area). Riparian bank vegetation filters pollutants, helps maintain water temperatures, supplies organic matter ('food') in support of aquatic life (fish, insects etc.) and acts as a buffer to adjacent land-uses. The roots of the riparian plants also reduce the effects of floods, by binding riverbanks and thus preventing erosion. Furthermore, bank storage is increased by slowing run off during floods. For these reasons, it is essential that new developments are separated from a river and its "riparian habitat" by a buffer area.

The site is near aquatic features or aquatic functional zones within the property boundaries. The closest perennial rivers are the Vals River (Class C: Moderately Modified) to the north-east, along the north-eastern boundary of the site as well as the Blomspruit River situated further to the south and west of the site. All drainage lines and water courses within the site drain north-east directly into the Vals River (Figure 16). The proposed activity is however unlikely to significantly affect these rivers (or wetlands & seeps) above surrounding levels of disturbance as long as they do not encroach into the remaining vegetation buffers around any watercourses and runoff is manages appropriately.

Implications:

- The site is situated within the catchment of a perennial river (CLASS C: MODERATELY MODIFIED).
- Natural vegetation buffers around these aquatic features should not be further disturbed significantly.
- Necessary measures to be implemented to minimise pollution, manage runoff and erosion risks as well as downstream sedimentation.

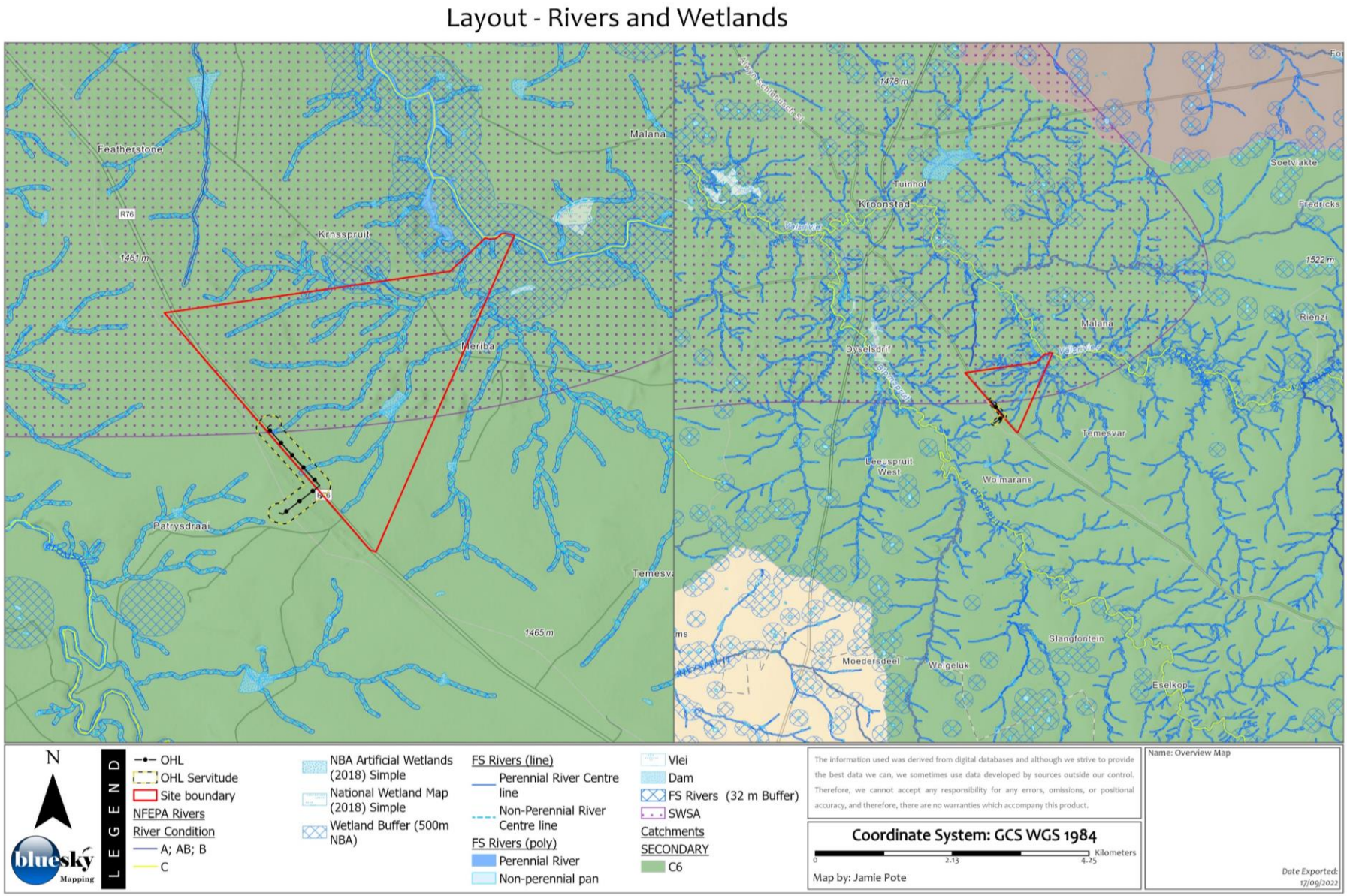

Figure 16: Rivers and Wetlands.

2.2 Vegetation and Ecological Processes and Corridors

2.2.1 Critical Biodiversity Areas

Given that the objective of CBAs is to identify biodiversity priority areas which should be maintained in a natural to near natural state, development within these areas is not encouraged. The following issues need to be considered when considering development within a CBA:

- Are there alternative areas within the site but outside of the CBA that could be developed?
- Does the project undermine the overall ecological functioning of the broad CBA area?
- Can mitigation measures reduce the impact of the development on ecological processes?

No Critical Biodiversity Areas are designated within the site.

2.2.2 Ecological Support Areas

These include supporting zones required to prevent the degradation of Critical Biodiversity Areas and Protected Areas. An ESA may be an ecological process area that connects and therefore sustains Critical Biodiversity Areas or a terrestrial feature (refer to Section 2.1.5). ESAs are generally extensions to the CBA area incorporating small areas that are perhaps no longer natural, or are comprised of secondary vegetation, generally following the drainage line ecological corridors within the wider surrounding landscape that will improve connectivity.

The site falls predominantly within an ESA 1 designated area, with patches of ESA 2, Other Natural Areas and Degraded Areas. Further assessment will inform retaining ecological connectivity across the site and surrounding area.

2.2.3 Ecosystem Processes

Distinct ecological processes are generally associated with surface geology and soils, climate, topography, drainage systems, and the make-up of the remaining native vegetation. These features could be missed or only partly incorporated into land use plans unless they are specifically identified and targeted. Ideally, areas maintaining adaptive diversification (e.g., environmental gradients) or containing historically isolated populations should be identified and protected. The spatial aspect of ecological processes also needs to be determined and such insights incorporated in conservation planning. Finally, connectivity within these areas should be ensured to maintain species migration and gene flow. However, the spatial components of processes have rarely been considered in conservation planning – an approach that is also especially useful for development planning in biodiversity hotspots.

Key Ecosystem Processes within the site will include connectivity within these areas, which should be retained to maintain species migration and gene flow. Game fencing around the site and surrounding farms, may act as a barrier to the free movement of certain faunal groups such as medium to large sized mammals. They will not however act as significant barriers to movement of birds, reptiles and amphibians as well as seed dispersal which is largely wind driven in grassland habitat.

2.2.4 Ecosystem Services

"*Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food, water, timber, and fibre; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services, recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling*". (Millennium Ecosystem Assessment (MEA),

2005). Terrestrial (or land) ecosystems provide valuable ecosystem services that contribute to human well-being. They can provide[3]:

- buffers against natural hazards such as fire and floods
- carbon sequestration (storage), important for reducing the impacts of climate change
- regulation of water supply(e)
- grazing for wild animals and livestock
- natural spaces for recreation & tourism
- the air we breathe(e)
- spiritual, ritual and ceremonies
- horticultural & wildflower industries
- natural heritage
- food, timber, fibre, and medicinal plants

Rivers are central to human welfare and economic development. They provide:

- water for agricultural, industrial, and domestic uses
- flood attenuation and regulation(e)
- food and medicinal plants
- transport and/or purification of biodegradable wastes(e)
- tourism, recreational and cultural use
- enhanced property values

Estuaries, together with an associated buffer of natural vegetation, perform several valuable functions, especially in relation to:

- subsistence fishing
- commercial fisheries (as they provide a refuge for commercial fishes when they are young)
- wildlife habitat e.g., nursery and refuge (providing habitat for amphibians, birds, fish and mammals for all or portions of their life cycles)
- tourism, recreational, cultural use, and craft materials
- enhanced property values

Ecological corridors provide valuable ecosystem services that are often impossible or very costly to replicate or offset. For example, they:

- support the migration (movement) and long-term survival of plant and animal species and their ecological processes (e.g., fire, pollination, seed dispersal), in response to global climate change
- are important areas for storing carbon to reduce the impacts of global climate change
- are important areas for regulating water supply (e.g., filtering and storing drinking water, keeping excess nutrients out of wetlands and rivers, ensuring a high-water yield from mountain catchments)
- supply good quality water from mountain catchment areas, both surface and groundwater.

[3] Within the study area, terrestrial ecosystem services that are likely provided are marked (e).

- the supply of water quality and quantity is not only for human consumption but for ensuring the survival of downstream estuaries, wetlands (vleis) and streams (which in turn provide us with other ecosystem services).
- are of important scenic value, contributing to tourism and the 'sense of place'.
- Coastal & marine areas
- Subsistence & commercial fishing (food)
- Medicinal & Cosmetic resources e.g., kelp & microscopic plants for the feed, food, cosmetics, & pharmaceutical industries.
- Mining (sand and heavy mineral)
- Recreational value (sport and fishing)
- Retail value (market-value of housing)

Net Primary production: This critical ecological process involves the process of photosynthesis – which translates into the amount of carbon plants can fix on an annual basis. This is important for each LM within the district as the amount of carbon fixed translates directly into the amount of forage produced and thus made available for grazing. Consequently, livestock management directly impacts upon forage production as overgrazing reduces the vegetations' ability to maintain this ecosystem process. This ecological process is especially significant for the ORT, as the main land use comprises of livestock grazing. Therefore, this factor has a direct bearing on both the amount of food available for livestock, and the amount of plant material available regarding reducing runoff in wetland areas.

Water production: In more arid areas, many municipalities and towns rely on groundwater or local water resources to supply to town with drinking water. Thus, the higher rainfall areas are key recharge zones for these groundwater resources. Consequently, land use management of these catchment areas are critical for the maintenance of the quality and quantity of water sourced from each area. For example, water courses and wetlands that have been cleared for agricultural purposes, or overgrazed, will not only cause soil erosion, but most importantly cause increased water runoff, thus reducing the amount of water that feeds back into the water table for consumption. Groundwater is also a critical resource for agriculture and food production.

Species movement corridors and climatic refuges: Global climate change is undoubtedly a threat in the coming decades. A key action to mitigate its effects is the maintenance of species' ability to migrate to new locations as the climatic conditions which they require move across the landscape. These corridor and refuge migration strategies occur on both a micro and macro level. On the macro scale corridors provide for species movement at landscape scales. This entails the ability of fauna and flora to undertake large scale movements towards areas which continue to provide the conditions required by a species for growth and reproduction. Movements could entail migrations of up to hundreds of kilometres, and corridors of mostly natural or near natural vegetation across the landscape are needed to permit this to occur. Climactic refuges can be localized areas that have moderated climates – such as mountain kloofs and south facing slopes. These areas provide cooler habitats where species under threat from changing climates can colonise or species and vegetation not widely found in surrounding area.

Ecosystem Services are an integral part of the landscape and due care should be given during design and implementation to maximise ecosystem processes, and will be assessed in more detail.

2.2.5 Ecological Corridors

Several types of ecological corridors are differentiated (WWF):

1. Macro-corridors: those that have a width greater than 5 kilometres and have the objective of restoring the connections of different geographical regions. Due to the scale of the project, such corridors are outside of the scope.
2. Biological corridors: those that have a width that varies in the range of 1 to 5 kilometres. They are created in order to maintain two connected ecosystems. Multiple ecosystems are represented on site, but consideration is recommended where appropriate.
3. Conservation corridors: those that are less than 1 kilometre wide, and their purpose is to establish a connection between relics, mainly when the ecosystem is deeply fragmented. Such corridors would be applicable to this site.

2.2.6 Critical/Important Terrestrial Habitats

Critical or Important Terrestrial habitats include areas that are rare within a region, or which support important species, ecosystems, or ecological processes. Species of Special Concern refers to red data species and important habitats include the locations where these species are known to occur. Red data species are plant, animal, or other organisms (e.g., reptiles, insects etc) that have been assessed and classified according to their potential for extinction in the near future. All known species are listed in the Red Data Book and classified as Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened or Least Concern. Red Data species are those species classified as Extinct, Critically Endangered, Endangered or Vulnerable. Some of the red data species are listed within the NEMBA Threatened or Protected Species (ToPS), and some are protected by provincial ordinances. Critical habitats include those areas that are known locations for such red data species that are under threat of extinction.

Rocky Outcrops

Rocky outcrops can provide habitat for geophytic species that often have limited distributions. Rocky areas may be present in higher lying areas within the grassland, most likely in areas that have not been cultivated, as they would have marginal suitability for agriculture. Some rocky areas are likely present, in particular a small hill or mesa appears to be present on the west side of the farm dam.

Wetland habitat

Wetlands are special habitats as they provide a refuge for birds and other organism, such as frogs and insects. They are important hydrological process areas that are linked to ground or surface water flows. Natural wetlands are all considered to be Critical Biodiversity Areas. Wetlands are protected by the National Water Act and the Conservation of Agricultural Resources Act. No wetland habitat has been identified, but this aspect is be dealt with in a separate aquatic assessment (Refer to separate aquatic specialist assessment). Where observational comments in this report contradict any made in aquatic assessment report, the aquatic specialist will supersede those made in this report. None are deemed to have any significant flora, and any fauna is unlikely to be affected by the proposed activity. Wetlands or Estuaries are protected by various pieces of legislation, such as:

- The *National Water Act* (NWA) 36 of 1998, which stipulates that reserve determination studies need to be undertaken to identify the ecological reserve requirements of a wetland.
- The *NEMA* in terms of principle (r) and the listed activities (Section 24).
- The *Conservation of Agricultural Resources Act* (CARA) 43 of 1983; in which no activities are allowed within the flood area or within 10 meters horizontally outside the flood area.
- The *Integrated Coastal Management Act* (ICMA) 24 of 2008 requires the preparation of Estuary Management Plans by municipalities, unless managed by another Authority e.g., SANParks.

Natural wetlands are present in the form of valley bottom wetlands (vleis) within the site and surrounding area.

Priority Estuaries

No Estuaries are affected by the proposed activity.

Forest

No forest if present.

Fynbos

No Fynbos is associated with the area.

Colonies or Populations of Threatened or Protected Species

Further assessment would be required including surveys for populations of terrestrial fauna and flora species of concern.

Implications:

- Wetland & riparian habitat and rocky outcrops are present and would require further assessment to determine possible species of conservation concern and overall sensitivity.
- Faunal species as identified by the Screening Tool and on site investigations will also be assessed further in the full assessment process.

3 Biodiversity Risk Identification and Assessment

3.1 Baseline Biodiversity Description

3.1.1 Site Locality

The proposed site is situated approximately 9 km south-east of Kroonstad, along the R76 road in the direction of Steynsrus in the Free State province (Refer to Figure 17). The proposed PV site is comprised of two farm portions, a north-western portion, Remainder of Farm Scheveningen 636 (~575 Ha) and a south-eastern portion, Portion 1 of Farm Scheveningen 636 (~429 Ha), and will most likely feed into the national grid, being accessible in proximity to the site via Portion 0 of Farm Oslaagte No 2564.

The sites are within a predominantly commercial stock and game farming area, generally comprising dryland grazing, with associated infrastructure including buildings, dams and other infrastructure. Indigenous vegetation is mostly near natural to natural with transformed and cultivated patches more widespread in the area surrounding the proposed site. The area falls within a moderate summer rainfall area.

3.1.2 Topography and Drainage

Flat to gently undulating landscape supporting short grassland (Figure 17), where in natural condition dominated by *Themeda triandra,* while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats. Dwarf karoo bushes and *Acacia karroo* encroachment are indicative severely degradation, overgrazing and trampling. The site generally slopes from more elevated ground in the south, towards the Vals River along the northern boundary.

3.1.3 Terrestrial Landscape Features (Habitat)

Overview

While largely grass dominated, several herbs and forbs are also common to the unit. The area has low to moderate levels of transformation, primarily agriculture with small watercourses and occasional ridges, mesas or rocky outcrops interrupting the continuous grassland cover. Initial site verification confirms that the vegetation of the site is clearly grassland dominated, with patches having a treee component, in particular around watercourses and along the Vals River. The site is largely natural to near natural with some areas clearly showing indicators of degradation as well as localised erosion, mostly surrounding watercourses, having a deep sandy substrate.

Pockets of trees, having a bushveld appearance are also present, which are partly indicative of degradation, presence of rockier habitat and/or along watercourses or possible seep areas.

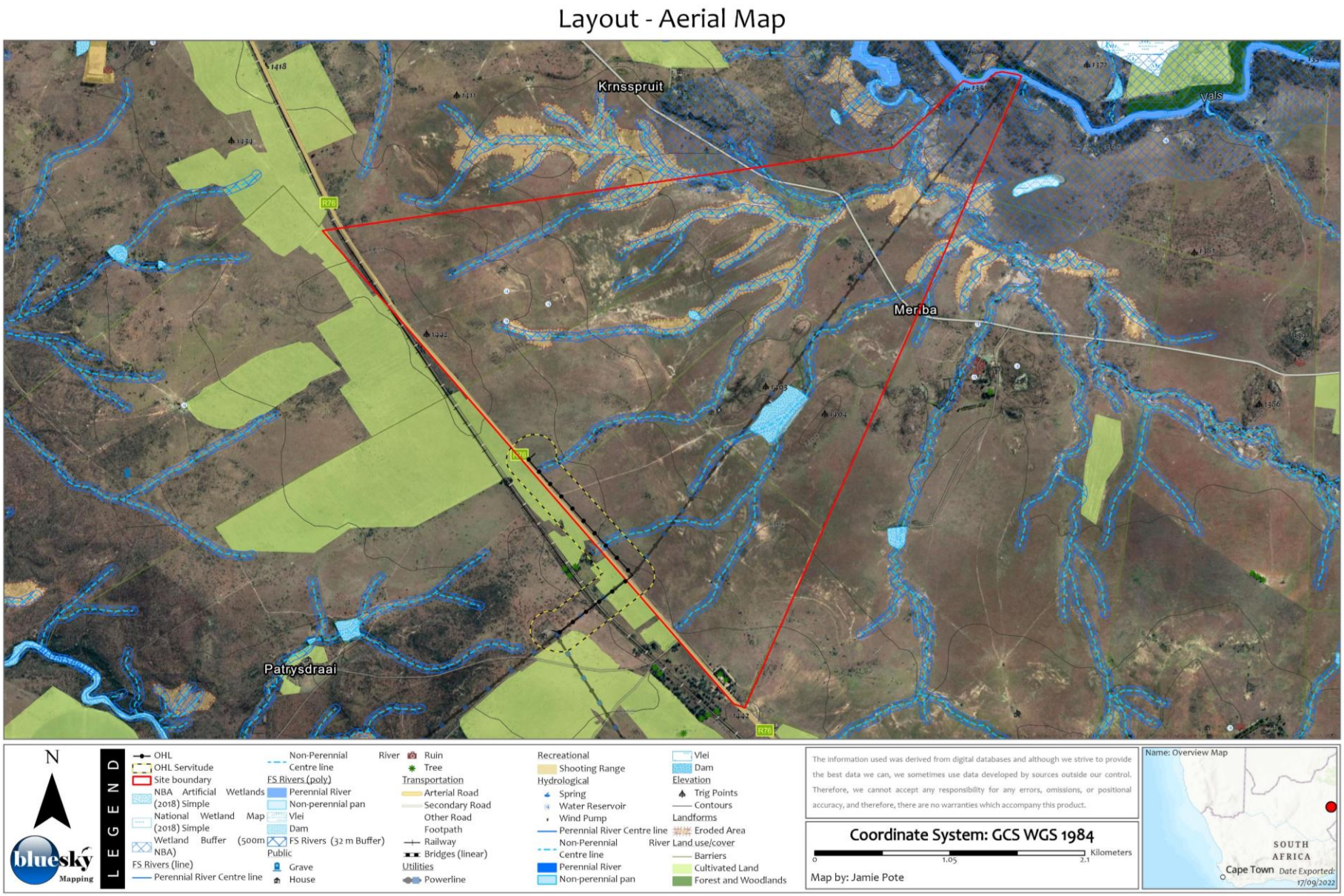

Figure 17: Aerial Photo of the site, (30 m contours indicated).

3.1.4 Preliminary Mapped Vegetation

Vegetation has provisionally been mapped from most recent available aerial photography (Figure 28) as well as preliminary site verification and is comprised of the following broad vegetation communities:

Natural Grassland (Figure 18 & Figure 19) – Natural/Near Natural grassland, most likely used for grazing. Grassland is represented on the site, most likely near natural to pristine, having a Least Concern conservation status. On-site assessment will clarify intactness and/or species composition, including any species of conservation concern, however notable levels of grazing and overgrazing were noted during the site verification in some areas.

Figure 18: Typical natural grassland.

Figure 19: Typical natural grassland with overgrazing evident.

Rocky habitat (Figure 22 & Figure 23) – Rocky hills and slopes are present. While these areas offer additional habitat, they are not necessarily deemed to have a significantly higher sensitivity compared to the typical grassland, however they cover a smaller proportion of the area and will provide habitat for species that that may not occur in the typical grassland habitat with sandy soils. Steeper slopes in these areas may preclude suitability for PV development.

Figure 20: Typical rocky habitat – small hills.

Figure 21: Typical rocky habitat – slopes.

Riparian (Figure 22 & Figure 23) – Natural vegetation surrounding watercourses and seeps, most likely having riparian elements with some seep functionality at watercourse sources. Grassland vegetation most likely having riparian elements, would not be suitable due to ecological & connectivity importance.

Figure 22: Typical non-perennial watercourse with riparian elements.

Figure 23: Typical perennial river (Vals Rivier) with riparian elements.

Transformed (Figure 24 & Figure 25) – Generally where all indigenous vegetation has been removed and replaced with hardened surfaces such as houses, access roads, other infrastructure (including dams). Includes areas that are not currently used for agriculture. Includes what appears to be a sedimentation

or stormwater pond or similar, adjacent to the coal processing plant on the north-western boundary. Transformed areas cover a negligible proportion of the site.

Figure 24: Man-made dam along watercourse.

Figure 25: Man-made dam along watercourse.

Secondary/Degraded/Old Lands (Figure 26 & Figure 27) – Old lands or other disturbed areas, where grasses regenerate from the surrounding landscape. These areas typically have lower species diversity. No such areas are differentiated in this desktop assessment.

Figure 26: Typical degraded area around dwelling with poor secondary vegetation.

Figure 27: Typical degraded grassland with overgrazing evident.

Cultivated – Cultivated areas are not a significant component of the site and transformation for agricultural is minimal. No irrigated pivots are present and lack of a large water supply in the area suggests that these are dryland crops (i.e., not irrigated). Further analysis of historical aerial photographs as well as ground truthing will clarify extent of historical cultivation. Although such areas would be most suitable for the proposed activity having lower conservation priority, development thereof would potentially have an indirect consequence of replacement areas being required if developed.

This landscape offers suitable habitat for a limited suite of animal species due to homogenous nature of the vegetation, although animals may have been displaced by to some extent in the grassland areas.

Vegetation and Flora

Natural vegetation is representative of the vegetation unit. Exact composition and levels of disturbance will be assessed in more detail during the full assessment.

Due to having a low conservation status, the grassland habitat would in principle provide a suitable footprint for the proposed activity, bearing in mind watercourse and ecological process and connectivity buffers as well as possible faunal species of conservation concern. Specific recommendations will be provided in the detailed assessment regarding these aspects.

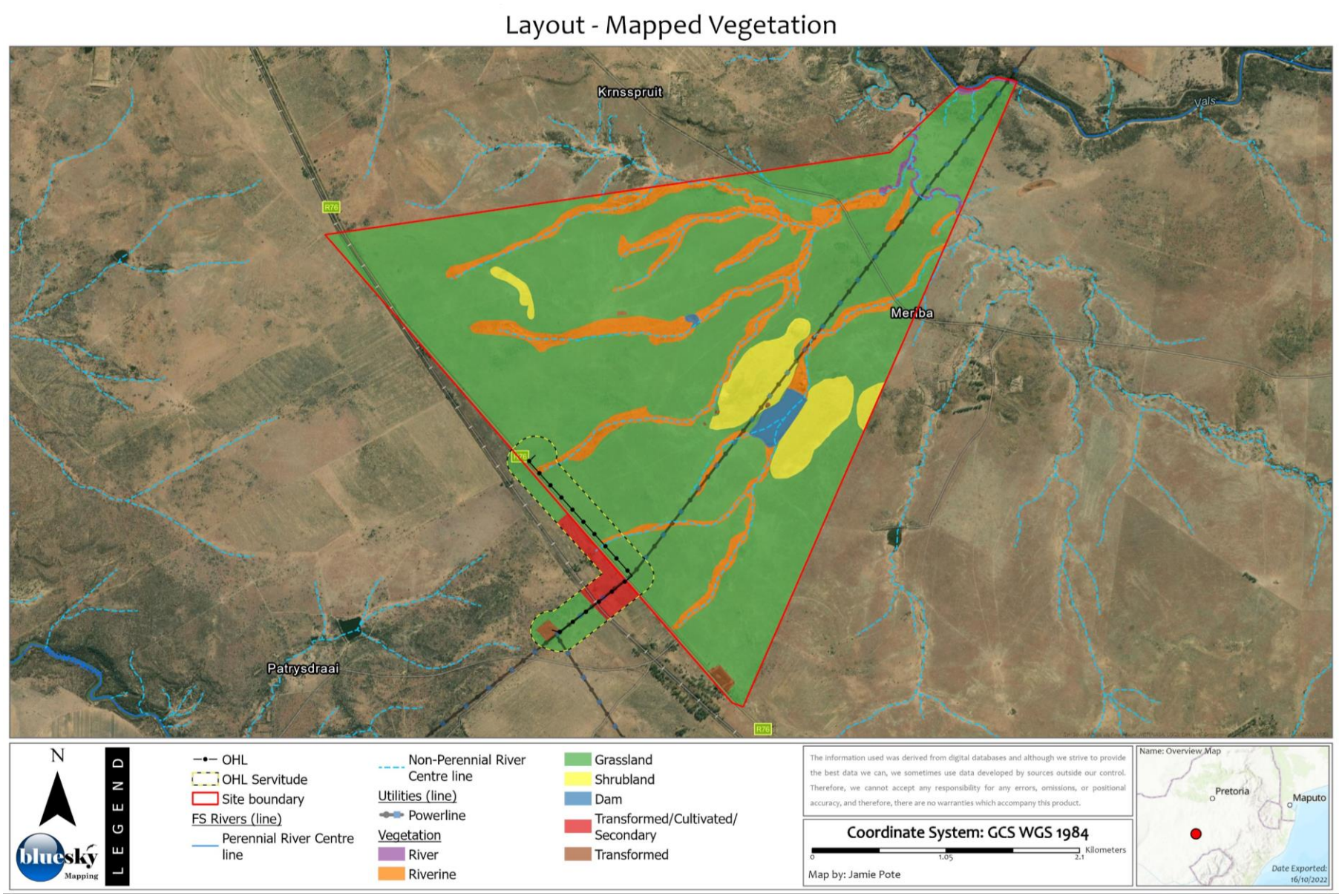

Figure 28: Preliminary on-site mapped vegetation.

3.1.5 Present Ecological State

Present Ecological State will be assessed in the full assessment report but is largely natural to near natural with low invasive species and variable levels of grazing from minimal to overgrazed. Erosion is present along watercourses, largely due to presence of deep sandy dispersive soils.

3.1.6 Flora

Red Listed, Endemic and Protected Flora

No flora species are listed in terms of the National Environmental Screening Tool as being likely to occur. Several protected, endemic, range restricted or threatened species are known from the surrounding area and site screening would still be advised to determine if any are present. Due to the localised nature of the impact, and low plant species sensitivity, the risk of a species being present is low. As per Table 3, no Vulnerable, Endangered or Critically Endangered flora species were confirmed to be present nor are known to be present in the affected area and no species are flagged ito the National Environmental Screening Tool, having distributions ranges that extend significantly further than the site. Site verification would be required to confirm presence or absence.

Several flora species, having protected status in terms of the Free State Nature Conservation Ordinance (Ordinance 8 of 1969) may be present (Table 3), for which permits would be required. Some of these are confirmed to be present as well as additional species, still to be confirmed in full assessment reporting, in order to inform pre-construction permit requirements.

Table 3: Flora including Species of Special Concern (indicated in green)

SCIENTIFIC NAME	FAMILY	STATUS	COMMENT/PRESENCE[4]
Several listed as per National Environmental Screening Tool	-	FSNCO	Site assessment will determine any other listed species. Several species belonging to the Iridaceae and other groups were noted to be present during the initial site assessment, some quite common.
Crinum bulbispermum	Amaryllidaceae	FSNCO	Known from vegetation units.
Kniphofia ritualis	Asphodelaceae	FSNCO	Known from vegetation units.
Ledebouria macowanii	Asparagaceae	FSNCO	Known from vegetation units.
Helichrysum dregeanum	Asteraceae	FSNCO	Known from vegetation units.
Euphorbia clavarioides var. clavarioides	Euphorbiaceae	FSNCO	Known from vegetation units.
Cussonia paniculata	Araliaceae	FSNCO	Known from vegetation units.

3.1.7 Fauna

The habitats and microhabitats present on the project site are not unique and although highly fragmented, are widespread in the broader area, hence the local impact associated with the footprint would be of low significance if mitigation measures are adhered to.

Mammals

National Environmental Screening Tool identifies *Hydrictis maculicollis* (Spotted-necked Otter) as possibly occurring in the area. More comprehensive site survey and assessment will be required to confirm, although its preferred habitat is standing or permanent water, thus it is not likely to pose any significant risk. Possible otter tracks (identification unconfirmed) and burrows were observed during

[4] FSNCO – Free State Nature Conservation Ordinance (8 of 1969).

preliminary site visit along the Vals River along the northern boundary, but other than the dam on Portion 1 of Farm Scheveningen 636, no other permanent standing water likely to contain fish was seen, excluding temporary pools along non-perennial watercourses, within the actual site, which will unlikely have fish present. It is not anticipated that the PV facilities will extend in proximity to the Vals River along the northern boundary.

Avifauna and Bats

National Environmental Screening Tool identifies no bird species as possibly being in the area.

Reptiles

Reptiles such as lizards, snakes and tortoises may be present. National Environmental Screening Tool identifies *Smaug giganteus* (Giant Dragon Lizard or Sungazer), as possibly occurring in the area. Preliminary sitRee investigation and discussions with a landowner and farm manager suggest that this species is known from nearby farms but has not been observed on the affected farm portions. Initial site visit, which included 70 km of walked and driven track across the ~1000 Ha site did not identify any possibly Sungazers or Sungazer burrows within the grassland areas.

Amphibians

National Environmental Screening Tool identifies no amphibian species of conservation concern as possibly being in the area. Amphibians are likely to be present due to the prevalence of watercourses. Site assessment would be recommended to confirm.

Invertebrates

National Environmental Screening Tool identifies no invertebrate species of conservation concern as possibly being in the area. Site assessment not required but would be required to confirm.

Red Listed and Protected Fauna

As per Table 4, no Endangered or Critically Endangered terrestrial fauna species are flagged for the site. The site falls within the potential distribution range of a few faunal species of conservation concern. No further avifaunal investigations have been undertaken but the single mammal and insect species that is flagged both have significantly more widespread distribution than the site. Since the project footprint is likely to be relatively contained, any disturbance or displacement associated with habitat destruction as a direct result of the activity is unlikely to pose a significant negative impact to terrestrial faunal species above background disturbance levels that are already present.

Table 4: Fauna Species of Special Concern

SCIENTIFIC NAME	COMMON NAME	STATUS[5]	COMMENT/PRESENCE
Mammals			
Hydrictis maculicollis	Spotted-necked Otter	NT A3cde	The species occurs throughout most of tropical and sub-tropical sub-Saharan Africa, being restricted to areas of permanent fresh water, offering good shoreline cover and abundant prey base. Thus, while the distribution range is large, the spatial size of their occupied habitats is much smaller and faces continued loss particularly due to habitat destruction and pollution.

5 IUCN: LC – Least Concern; VU – Vulnerable; EN – Endangered; CR – Critically Endangered.

SCIENTIFIC NAME	COMMON NAME	STATUS[5]	COMMENT/PRESENCE
			The Spotted-necked Otter inhabits freshwater habitats where water is not silted or polluted, and rich in small to medium sized fishes. The Spotted-necked Otter also occasionally feeds on crabs, frogs, insects and birds. The Spotted-necked Otter is decreasing throughout its range, mainly as a result of the alteration or degradation of freshwater habitats and riparian vegetation. Unlikely to be present away from permanent or semipermanent watercourses (i.e. Vals River).
Birds			
None of concern			
Reptiles			
Smaug giganteus	Giant Dragon Lizard	Vu A2bcd +4bcd	Endemic to South Africa, where it is found Highveld grasslands of the northern Free State Province and the southwestern parts of Mpumalanga Province. It is unique among the cordylids as it an obligate burrower living in self-excavated burrows (Branch 1998, Parusnath et al. 2017). It can be considered a habitat specialist, that is highly philopatric for burrowing sites. Although it is a large lizard, it will not easily disperse across the landscape to make new burrows should its habitat be destroyed. It is diurnal and insectivorous, although plant material may also be consumed (Jacobsen 1989). Females reproduce only every second year (Van Wyk 1991), and the generation length has been estimated at 15 years (Parusnath et al. 2017). None observed within grassland during initial site visit. Possible burros noted on top of a rocky hill, but unconfirmed and not deemed to be favourable habitat at this stage. Further investigation recommended.
Amphibians			
None of concern	-	-	FSNCO & ToPS listed species may be present.
Invertebrates			
None of concern			FSNCO & ToPS listed species may be present.

Further site investigations will try and confirm if the flagged species are present or not, or if suitable habitat is present and/or any other species of conservation concern are present or potentially present. The Spotted Necked Otter is least likely to be affected, as its preferred habitat (standing water and adjacent riparian vegetation) is not likely to be significantly affected by the proposed activity. The Giant Dragon Lizard is more likely to be affected, if present, as its preferred habitat is the sandy grassland. The initial site investigation which included a 70 km walked and driven track across both sites did not identify possible sites. A faunal assessment, including in particular a survey for burrow sites may be required during EIA phase, in order to identify any areas where it does occur, as it is known to not easily disperse across the landscape to make new burrows should its habitat be destroyed. Both a landowner and farm manager confirmed (during site verification) that they had not seen Sungazers on the property in recent times, but that they were present on other farms in the area.

Alien Invasive Species

Alien invasive species on site are not extensive and include mostly weedy annual species including Blackjacks, Khakibos and Mexican Poppy. These species are likely to become problematic in disturbed areas during and after construction and a suitable management plan will be compiled as part of the assessment.

3.1.8 Aquatic Habitat

Aquatic systems do not function in isolation and in terms of ecological processes, the aquatic systems are very closely linked to the terrestrial system. Perennial, non-perennial watercourses, and wetlands are present in the wider area and within the site. Any aquatic habitat should be excluded from further development, being an arid area, such habitat has an elevated sensitivity.

3.1.9 Terrestrial Vegetation Sensitivity Assessment

An overall desktop Terrestrial Biodiversity Sensitivity assessment, incorporating key vegetation and ecological indicators was undertaken and includes the following key criteria:

- relative levels of *intactness* i.t.o. overall loss of indigenous vegetation cover.
- presence, diversity, and abundance of *species of special concern* (weighted in favour of local endemic species).
- extent of *invasion* (severity and overall ecological impact), as well as the degree to which successful rehabilitation could take place.
- overall degradation incorporating above factors.
- relative importance of the vegetation communities relative to regional conservation status - indicated as vulnerability of the area because of loss.

Intactness

Three basic classes are differentiated as follows:

- **Low**: > 75 % of original vegetation has been removed or lost; and/or no species of special concern present that are critically endangered, endangered, or endemic with highly localised distribution.
- **Moderate**: 25 - 75 % of original vegetation has been removed/lost; and or presence of species of special concern but not having high conservation status or high levels of endemicity or highly localised distributions.
- **High**: < 25 % of original vegetation has been removed or lost; and or presence of species with a highly endemicity and or high conservation status (endangered or critically endangered).

Intactness for the site requires site assessment but based on available information appears to be high in natural and low in cultivated and transformed areas.

Alien Invasion

Three classes are differentiated as follows:

- **Low**: no or few scattered individuals.
- **Moderate**: individual clumps of invasives present but cover less than 50% or original area.
- **High**: dense, impenetrable stands of invasives present, or cover > 50 % of area with substantial loss functioning. Rehabilitation will most likely require specialised techniques over an extended period (> 5 years).

Alien invasion for the site is generally low, with some common weeds such as Blackjack, Khakibos and Mexican Poppy locally common in disturbed areas.

Degradation

Overall Degradation is determined from the above alien invasion and intactness scores, according to the following matrix:

INTACTNESS	INVASION		
	LOW	MODERATE	HIGH
High	Pristine	Near Pristine	Moderately Degraded
Moderate	Near Pristine	Moderately Degraded	Severely Degraded
Low	Moderately Degraded	Severely Degraded	Transformed

Degradation high in transformed and cultivated areas and low to moderate in natural areas, depending on extent of historical grazing, to be assessed further in full assessment.

Overall Sensitivity score

Overall Biodiversity Sensitivity of the vegetation within the site is calculated according to the following matrix which combines degradation and overall conservation status of the vegetation units of the site.

DEGRADATION	CONSERVATION STATUS			
	LEAST THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED
Severely degraded/ Transformed	Very Low	Low	Moderate	Moderate - High
Moderately degraded	Low	Moderate	High	High
Ecologically Pristine or near Pristine	Moderate	Moderate - High	High	Very High (No-Go area)

Refer to Figure 29 for overall sensitivity map and Table 5 for summary of the sensitivity of the respective vegetation units and habitats.

Table 5: Sensitivity Summary for the site.

SPECIES	INTACTNESS	SITE ECOLOGICAL IMPORTANCE			
		ALIEN INVASION	DEGRADATION	STATUS	OVERALL SENSITIVITY
Intact/Near Intact Grassland	Moderate/ High	Low	Near Pristine	LC	Moderate
Intact/Near Intact Rocky Hills	Moderate/ High	Low	Pristine	LC	High[6]
Cultivated/Transformed	Very Low	Low	Transformed	LC	Low/ Very Low
Riparian or Riverine Vegetation	High	Low	Pristine	LC	High or Very High[7]

The assessed categories and approach used in this report aligns with the terrestrial biodiversity assessment protocols.

[6] Rocky Hills has a sensitivity elevated above the surrounding vegetation unit as it may provide habitat for flora and fauna not occurring in the surrounding mozaic grassland. Rocky areas also tent to have a higher concentration of species that either have an elevated conservation status or are protected.

[7] Riverine and Riparian vegetation has a sensitivity elevated above the surrounding vegetation unit, due to its importance in terms of ecological processes and faunal habitat.

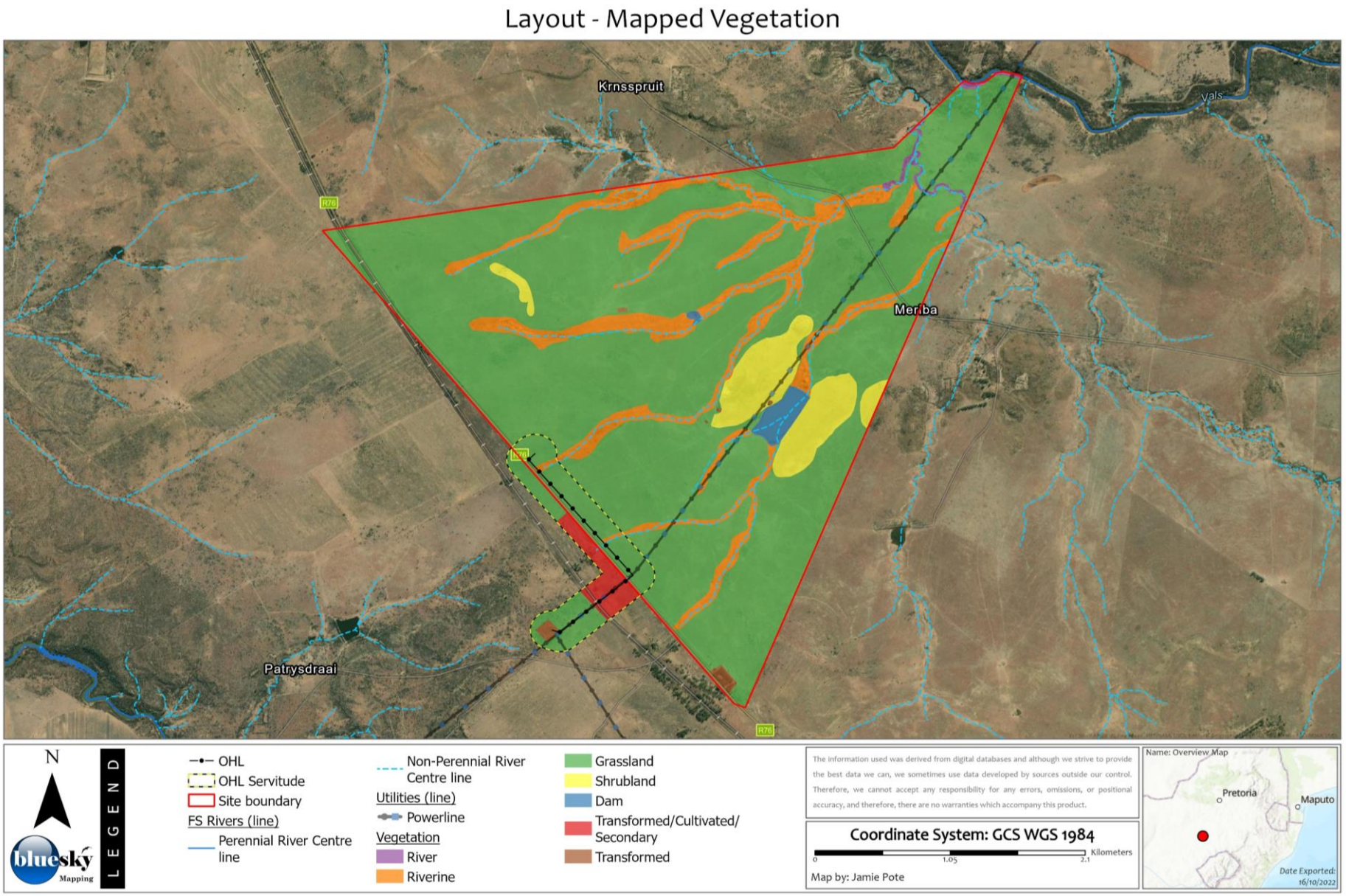

Figure 29: Preliminary Terrestrial Biodiversity Sensitivity Map.

Table 6: Mapped vegetation/habitat.

HABITAT DESCRIPTION	SENSITIVITY	AREA (HA)
Natural (Indigenous) – Natural/Near Natural Grassland and Shrubland.	Moderate	835.9 Ha
Riverine/Riparian/River - Natural vegetation surrounding watercourses and seeps, most likely having riparian elements.	Very High	113.3 Ha
Rocky Hills/Shrubland – Rocky areas having natural grassland with more developed shrub elements.	High	54.3
Cultivated/Old Lands - extensive areas have been transformed for agricultural use either as pastures or crops. No irrigated pivots are present and lack of a large water supply in the area suggests that these are dryland crops (i.e., not irrigated).	Low	15.4 Ha
Dams/Rivers – includes man made dams or artificial water impoundments as well as rivers that may serve as habitat for aquatic species that have limited habitat available in the surrounding landscape.	High	14.6 Ha
Transformed areas - Generally where all indigenous vegetation has been removed and replaced with hardened surfaces such as houses, access roads, other infrastructure. Includes areas that are not currently used for agriculture. Includes what appears to be a sedimentation or stormwater pond or similar, adjacent to the coal processing plant on the north-western boundary.	Low	3.9 Ha
TOTAL AREA		**1 022.8 Ha**

- Low sensitivity areas include all significantly disturbed vegetation, cultivated lands and other transformed land. All transformed areas including hardened surfaces, and cultivated lands have a low sensitivity.
- Moderate sensitivity sites include secondary vegetation identified in the vicinity of the activity. Moderate sensitivity habitat consists of all-natural grassland vegetation, having a Least Concern conservation status as well as being designated as ESA but not having an elevated CBA designation.
- High sensitivity areas include intact habitat having an elevated conservation status, providing critical habitat for species of conservation concern or overall elevated sensitivity where risks must be managed appropriately. High sensitivity habitat consists of man-made dams, rocky areas and mesas, where additional habitat, that is less common in the surrounding landscape is present.
- Very High sensitivity terrestrial areas include habitat deemed to be critical habitat. Very high sensitivity habitat includes riverine and riparian habitat along watercourses, wetlands, and includes eroded areas adjacent to watercourses, which would be deemed sensitive to disturbance.
- No-go areas would include populations of threatened or protected species or areas providing critical ecological processes. Further investigation during the assessment process will identify any species populations and or sensitive features that should be excluded but will as a minimum include all watercourses and wetlands and a suitable buffer in liaison with other specialists.

3.1.10 Critical Habitat

Possible Critical Habitat features including the following would require site verification to confirm:

1. Criterion 1: Habitat for Critically Endangered (CR) and/or Endangered (EN) species
2. Criterion 2: Habitat for Endemic or restricted-range species
3. Criterion 3: Habitat for Migratory or congregatory species
4. Criterion 4: Habitat for Highly threatened and/or unique ecosystems
5. Criterion 5: Habitat for Key evolutionary processes

Further site investigations will aim to determine presence or absence of the Reptile *Smaug giganteus* (Giant Dragon Lizard) and mammal *Hydrictis maculicollis* (Spotted-necked Otter) both being endemic or range restricted species and having a Vulnerable and Near Threatened status respectively. The Spotted-

necked Otter is most likely associated with the riverine areas in particular standing water which would include the dam and the river on the northern boundary, areas that would at most be used for access road crossings. The Giant Dragon Lizard It is unique as it an obligate burrower, living in self-excavated burrows (Branch 1998, Parusnath et al. 2017). It can be considered a habitat specialist, that is highly philopatric for burrowing sites. Although it is a large lizard, it will not easily disperse across the landscape to make new burrows should its habitat be destroyed. Neither were observed during initial site visit, and are not anticipated to be present or abundant, in conjunction with relatively low status (Vulnerable and Near Threatened) and relative abundance of suitable habitat in the surrounding area, it is not anticipated that the proposed activity will pose a significant risk to either species.

3.1.11 No-Go Areas

No-go areas would include populations of threatened or protected species or areas providing critical ecological processes such as watercourses and riverine areas as well as associated recommended buffers. Will be assessed further in detailed assessment and refining of sensitivity mapping.

3.1.12 Potential Development Footprints

It is feasible that a development footprint can be identified within the site. Most suitable areas would minimise biodiversity impacts but also maintain ecological connectivity within the site and adjacent landscape.

3.2 Risks and Potential Impacts to Biodiversity

3.2.1 Potential Terrestrial Biodiversity Impacts (Direct)

The main impacts likely to result from the proposed activity are summarised in Table 7 below.

Table 7: Potential Impacts to Terrestrial Biodiversity with preliminary possible Mitigation measures.

IMPACT	NATURE OF IMPACT	POSSIBLE MITIGATION
Vegetation	Permanent or temporary loss of indigenous vegetation cover because of site clearing. Site clearing before construction will result in the blanket clearing of vegetation within the affected footprint.	Retain as a minimum the conservation target for the vegetation unit represented on site. Only clear vegetation inside the footprint).
Flora Species	Loss of flora species of special concern during pre-construction site clearing activities.	Identify any populations and avoid during layout design and planning and/or relocate any flora species requiring such before construction.
Alien Invasive Species	Susceptibility of post construction disturbed areas to invasion by exotic and alien invasive species and removal of exotic and alien invasive species during construction. Post construction disturbed areas having no vegetation cover are often susceptible to invasion by weedy and alien species, which can not only become invasive but also	Don't introduce topsoil from dubius source if required during post-construction rehabilitation, as a minimum should be been treated as aper a recognised protocol. Implement post-construction Alien Invasive Plant management plan.

IMPACT	NATURE OF IMPACT	POSSIBLE MITIGATION
	prevent natural flora from becoming established.	
Erosion	Susceptibility of some areas to erosion because of construction related disturbances. Removal of vegetation cover and soil disturbance may result in some areas being susceptible to soil erosion after completion of the activity.	Appropriate soil erosion management during construction. Identify and avoid and/or stabilise are erosion sensitive areas (such as around watercourses and dongas and sandy slopes.
Ecological Processes	Disturbances to ecological processes: Activity may result in disturbances to ecological processes.	Allow for connectivity across the site and with surrounding landscape (during layout design stage). Fencing to be permeable to fauna as per specialist recommendation.
Aquatic and Riparian processes	Aquatic and Riparian processes: Aquatic habitat is present and could be affected.	Retain buffer around watercourses. Stormwater management, especially runoff from panels in sloped areas.
Faunal Habitat & Processes	Loss of Faunal Habitat and disruptions to processes: Activity will result in the loss of habitat for faunal species.	Identify important or irreplaceable fauna habitat to be retained. Retain faunal corridors during layout design phase. Only clear vegetation inside the footprint).
Faunal Species	Loss of faunal SSC due to construction activities: Activities associated with bush clearing, killing of perceived dangerous fauna, may lead to increased mortalities among faunal species.	Identify any populations and avoid during layout design and planning and/or relocate any faunal species requiring such before construction.

3.2.2 Potential Terrestrial Biodiversity Impacts (Indirect)

No significant additional ancillary linear infrastructure, such as roads, conveyors, power lines, pipelines, and railways, which can impact on biodiversity and ecosystem services are expected. Stormwater runoff will be managed effectively before being discharged from the site.

3.2.3 Potential Terrestrial Biodiversity Impacts (Cumulative)

Cumulative impacts will be proportional to the extent to which similar projects are developed in the surrounding landscape. Based on available information, it would appear that the surrounding area is not overly developed and would thus accommodate the proposed development. Further investigation

would be required as part of a terrestrial biodiversity or ecological assessment, including ascertaining other PV facilities in the area that are proposed or under investigation.

3.2.4 Terrestrial Biodiversity Impact Reversibility

In general, most impacts will have a moderate to high reversibility due to the nature of the project as well as the vegetation unit, being a grassland, it would be conducive to rehabilitation.

3.2.5 Impacts and Risks to Irreplaceable Biodiversity Resources

Risks to Irreplaceable Biodiversity Resources is low but will require investigation of the potential faunal and flora species that may be present.

3.2.6 Residual Risks and Uncertainties

Site investigations would be required to confirm the state of the habitat, as well as species composition to confirm various aspects that cannot be determined in a desktop assessment.

3.2.7 Terrestrial Biodiversity Sensitivity Summary

The overall site sensitivity, with reference to Figure 30, can be summarised as follows:

- Low sensitivity areas include all significantly disturbed vegetation, cultivated lands and other transformed land. All transformed areas including hardened surfaces, and cultivated lands have a low sensitivity.
- Moderate sensitivity sites include secondary vegetation identified in the vicinity of the activity. Moderate sensitivity habitat consists of all-natural grassland vegetation, having a Least Concern conservation status as well as being designated as ESA but not having an elevated CBA designation.
- High sensitivity areas include intact habitat having an elevated conservation status, providing critical habitat for species of conservation concern or overall elevated sensitivity where risks must be managed appropriately. High sensitivity habitat consists of man-made dams, rocky areas and mesas, where additional habitat, that is less common in the surrounding landscape is present.
- Very High sensitivity terrestrial areas include habitat deemed to be critical habitat. Very high sensitivity habitat includes riverine and riparian habitat along watercourses, wetlands, and includes eroded areas adjacent to watercourses, which would be deemed sensitive to disturbance.
- No-go areas would include populations of threatened or protected species or areas providing critical ecological processes. Further investigation during the assessment process will identify any species populations and or sensitive features that should be excluded but will as a minimum include all watercourses and wetlands and a suitable buffer in liaison with other specialists.

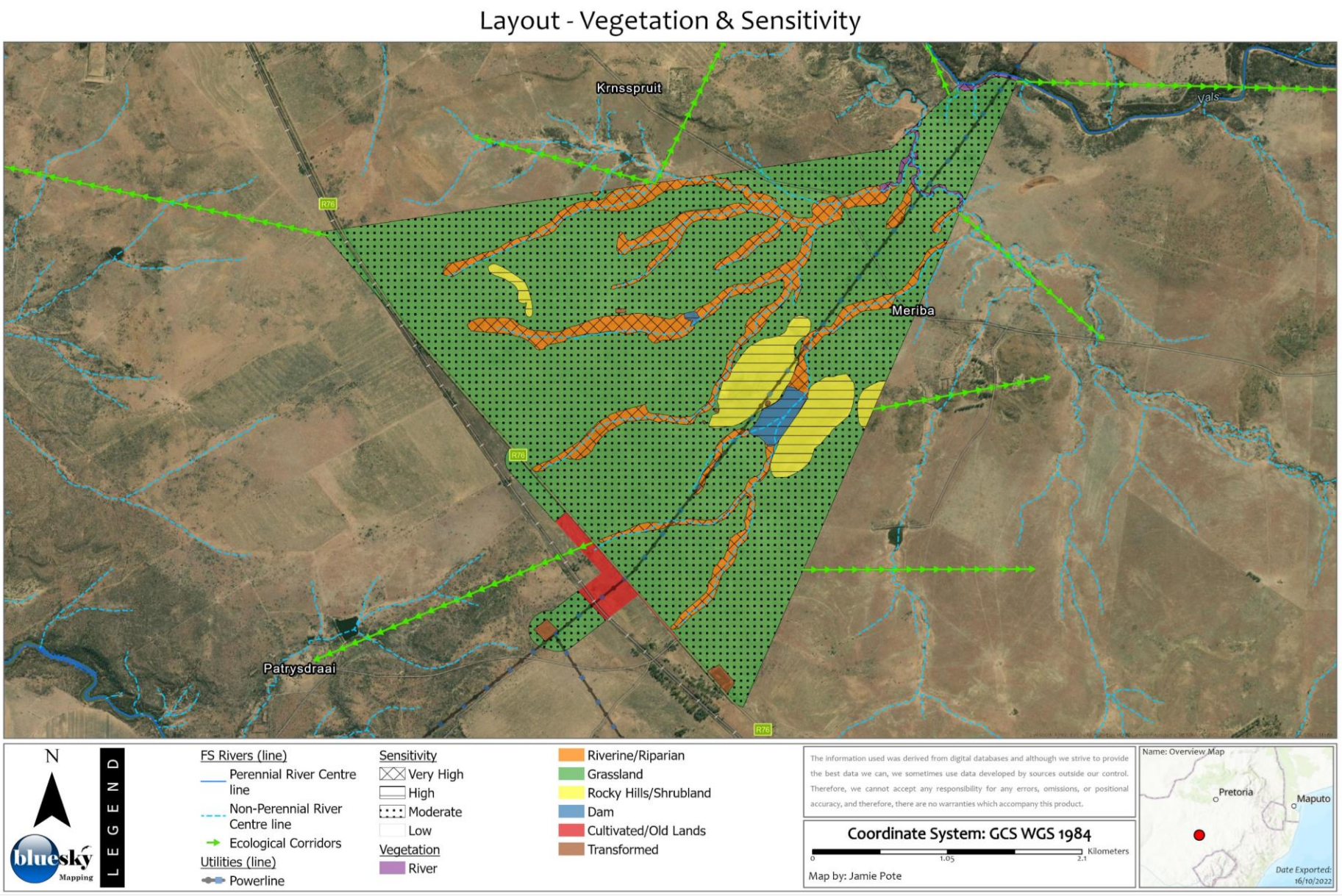

Figure 30: Aerial Overview of site and surrounds.

3.3 Findings and Recommendations

3.3.1 Overview of Findings

Due to the scale of the project and largely indigenous nature of the site, more than 20 Ha of indigenous vegetation will require clearing, hence triggering a Full Scoping & EIA process. It is probably that the proposed activity will require the clearing of more than 300 m^2 of indigenous vegetation and greater than 1 Ha of indigenous vegetation and/or an activity in a watercourse to construct access road crossings and/or being in proximity to a nature reserve, hence additional listed activities are likely to be triggered.

The DEA screening tool identifies Very High & Low Terrestrial Biodiversity, Medium & Low Animal Species, Low Plant Species and (no species), Very High & Low Aquatic, High, Medium & Low Agricultural and Very High/High/Medium Landscape (Solar) Sensitivities within or in proximity to the site.

The vegetation unit present, Central Free State Grassland, has a Least Concern status, indicating that less than 40% has been transformed regionally and there will likely be minimal loss or disruptions to ecological functioning. Elements of Vaal-Vet Sandy Grassland (*Endangered*), Eastern Free State Sandy Grassland (Least Concern), and Winburg Grassy Shrubland (Least Concern) may be present on slopes and rocky hills or mesas, which will be assessed further during the assessment process, while Highveld Alluvial Vegetation elements may occur around alluvial or wetland areas. Development of a portion of the site will thus not significantly affect conservation targets for the affected vegetation unit(s), as long as at least 24 % (i.e. the conservation target) is retained.

The site is near several aquatic features or aquatic functional zones that traverse the property. The closest perennial rivers are the Vals River (Class C: Moderately Modified) to the north-east, along the north-eastern boundary of the site as well as the Blomspruit River situated further to the south and west of the site. All drainage lines and water courses within the site drain north-east directly into the Valsrivier (Figure 9). The proposed activity is however unlikely to significantly affect these rivers (or wetlands & seeps) above surrounding levels of disturbance as long as they do not encroach into the remaining vegetation buffers around any watercourses and runoff is manages appropriately. Any aquatic, riverine or riparian habitat should be excluded from further development other than strategically sited linear activities such as access roads and powerlines.

The site falls predominantly within an ESA 1 designated area, with patches of ESA 2, Other Natural Areas and Degraded Areas (Figure 8). Two key ESA designated corridors are represented by the regional planning designations, the first to the north and east of the site, following the Valsrivier and the second to the south along the Blomspruit River. The site falls across a portion of designated ESA that serves to connect these two corridors, thus the site will serve as an integral part in the connectivity of these corridors. Land use guidelines indicate that while ESA sites are not essential for meeting biodiversity targets, they play an important role both in delivering ecosystem services as well as supporting ecological functioning and connectivity. Some habitat loss is generally acceptable within these areas; however, ecological functioning and connectivity should not be compromised. Any development of the site should thus make allowances for ecological connectivity as a minimum.

The purpose of ecological corridors is to provide intact pathways for long-term biological movement. They also support the natural movement of species between populations to ensure population viability. Landscape corridors are aligned with areas that have maximum amounts of remaining natural habitat. Local corridors are fine-scale corridors that contribute to connectivity.

Key Ecosystem Processes within the site will include connectivity within these areas, which should be retained to maintain species migration and gene flow. Game fencing around the site or portions of the site (Portion 1 of Farm Scheveningen 636, being a game farm with introduced extra limital species) may act as a barrier to the free movement of certain faunal groups such as medium to large sized mammals. They will not however act as significant barriers to movement of birds, reptiles and amphibians as well as seed dispersal which is largely wind driven in grassland habitat.

No National Parks are situated within 10 km of the site and a single Private nature Reserve is situated within 5 km of the site, the Erfdeel Private Nature Reserve which abuts the north-eastern boundary of the site. A buffer would be recommended on the northern side of the site to incorporate an undeveloped buffer between any PV infrastructure and the Nature Reserve. No specific guidelines are provided for such buffers in regional planning guidelines, but the closest point on the preliminary PV layout is 1.5 km form the nature reserve, which is feasible. The site intersects with two portions of designated NPAES areas, the along the northern boundary which is excluded from the site development plan and along the south-eastern boundary, which may be slightly impacted. These areas are peripheral to a larger NPAES designated area surrounding the site and unlikely to have significant consequences to bioregional planning.

Some rocky areas are likely present, in particular a series of small hills situated surrounding the dam on Portion 1 of Farm Scheveningen 636. It is recommended to avoid these areas as possible, or as a minimum at least ensure that not all such areas are developed. Steep slopes are in any case not likely to be suitable for PV facilities. Similarly, a series of steeper rocky slopes traverse the site in a Remainder of Farm Scheveningen 636 in a North-South direction. These will be delineated during more detailed mapping as part of the comprehensive assessment report.
No listed flora species of conservation concern are flagged in the desktop screening, although site verification would be advisable. Two faunal species of conservation concern are flagged in the desktop. The Spotted Necked Otter is least likely to be affected, as its preferred habitat (standing water and adjacent riparian vegetation) is not likely to be significantly affected by the proposed activity. The Giant Dragon Lizard is more likely to be affected if it were present, as its preferred habitat is the sandy grassland. Preliminary survey did not find any evidence of the species being present and discussions with the landowner and farm manager suggest that it is not present on the farms. A further survey for potential burrow sites may be required in order to identify any areas where it does occur, as it is known to not easily disperse across the landscape to make new burrows should its habitat be destroyed.

Due to having a low conservation status, in conjunction with having an ESA rather than a CBA categorisation, the grassland habitat is deemed to have a moderate sensitivity status and would potentially provide a suitable footprint for the proposed activity, bearing in mind appropriate watercourse and ecological process and connectivity buffers as well as possible faunal species of conservation concern. Due to the ESA designation, it will be important to also incorporate an undeveloped network for connectivity purposes within the site and the surrounding landscape. As a minimum it is recommended that the conservation target (24 %) for the vegetation unit is retained, which equates to approximately 251 Ha. The current layout plan comprises in the vicinity of 40 % of the total site area, thus significantly more than the conservation targets will be retained, and the retained areas include the most sensitive areas.

Several possibly approaches to incorporate an ecological corridor are feasible and will be investigated and assessed during the assessment process that will follow this Scoping report. The most basic would be to retain a corridor centrally through the site that connects the northern side to the south, where a notable corridor of currently undeveloped land is present on the south side. Optimum placement

appears to be on the west side of the current powerline that traverses the site north-south or under the powerline. This can then be supplemented by a network of smaller corridors along the watercourses and the east-and west sides as depicted in Figure 30, and/or by including a buffer along the perimeter fences. It is also recommended that the northern portion of the site, to the north of the S 202 district road, is not developed, as a buffer between the adjacent nature reserve as well as a 500 m buffer from the Valsrivier. The current preliminary layout retains buffers around watercourses and also keeps the eastern side of the site largely undeveloped which will connect the north and south portions of the site as well as incorporate the rocky hills and the farm dam, all of which are important habitat.

3.3.2 Preliminary Layout

The preliminary layout (Figure 31), has been compiled with guidance from a preliminary desktop sensitivity screening processes which identified the key terrestrial biodiversity and ecological aspects and/or likely sensitive habitat. Initial site verification confirms that the initial site desktop screening processes was largely accurate, and the current preliminary layout will address the key ecological risks with a few minor layout adjustments.

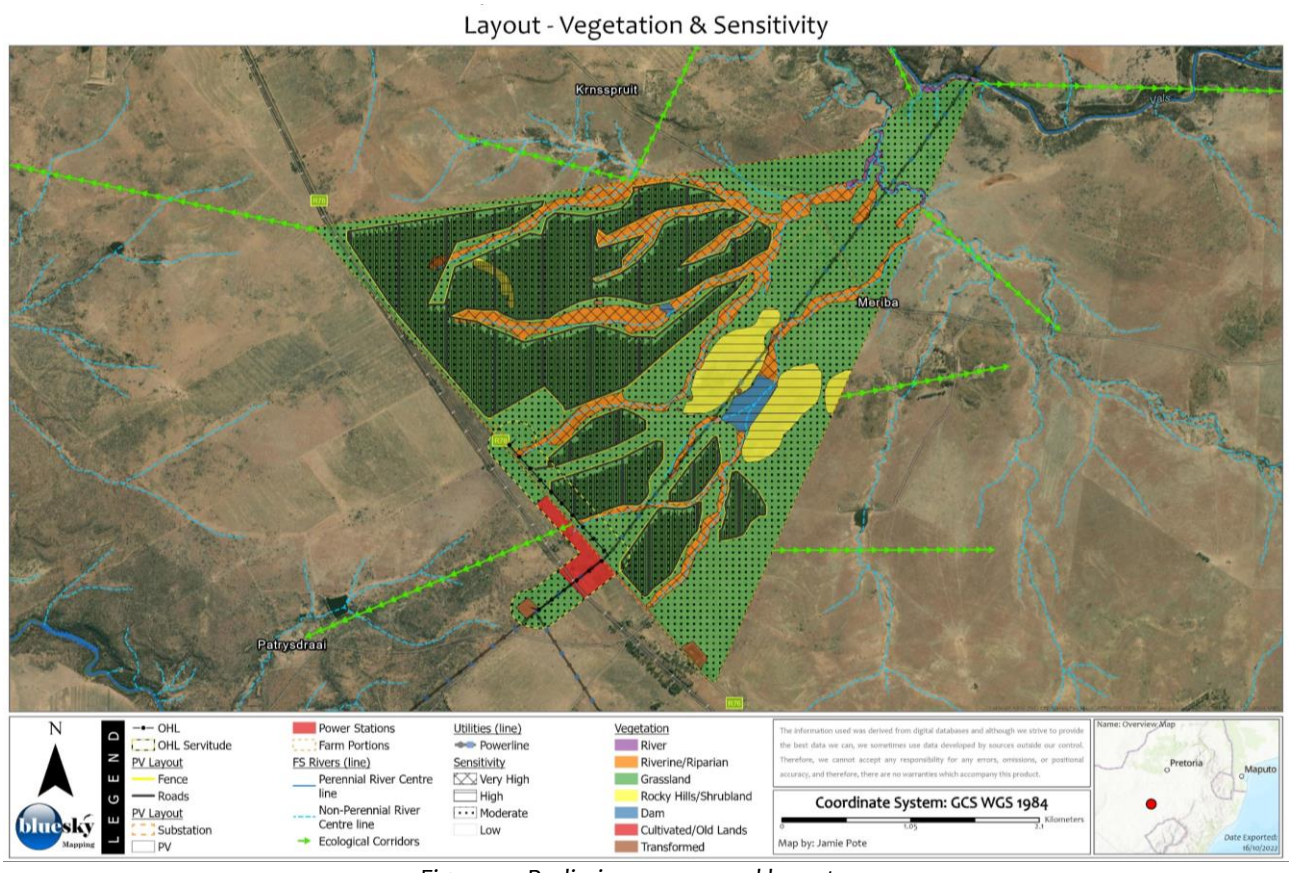

Figure 31: Preliminary proposed layout.

3.3.3 Recommended Approach to determine footprint and/or suitability

In terms of identifying a suitable footprint for the proposed PV facility, the following approach is recommended.

- Natural vegetation does not have an elevated conservation status and is not designated a Critical Biodiversity Area status but rather an Ecological Support Area. This does not preclude for further development, as long as ecological connectivity and processes are accommodated, and further assessment will identify most suitable areas that would minimise biodiversity loss. As a minimum, the conservation target of the vegetation unit (24 %) should be retained across

the site as well as a contiguous network with the site and the surrounding landscape as a corridor or series of viable ecological corridors. Several possible options may be suitable and will be considered further in the detailed assessment phase. The powerline that runs through the site may be one option, which would optimise connectivity as development underneath is not possible, but other alignments may also be suitable.

- Watercourses, Riverine (Riparian) & Wetland areas, dams and rivers as well as rocky hills are not suitable and should be excluded from any development footprint other than for strategic infrastructure requirements such as access roads and powerlines.
- Ecological corridors - while there is no defined standard for ecological corridor width, the site will accommodate a wider corridor along the northern and western boundary which will connect and include several habitats and communities (Biological corridor) as well as narrower (between 50 – 200 m) conservation corridors along drainage lines, which are expected to provide sound and adequate connectivity within the site as well as the surrounding landscape. Furthermore, during operations, the core OV area will no doubt also not exclude ecological processes, as it will accommodate natural vegetation as well as certain faunal species. The rows between PV panels will also allow some free movement of certain faunal groups. This will be addressed in further detail in the assessment process.

To identify a suitable footprint, the recommended approach would be to utilise areas that maximise the use of the grassland areas between watercourses, while maintaining as much natural corridor between the north and south of the site as possible. This will allow for connectivity to be retained both across the site and to surrounding intact areas, without significantly reducing the agricultural capacity of the farms, including retaining some natural grassland for grazing. All watercourses and wetlands, as well as steep rocky habitat, should be avoided other than for strategic access road crossings. It is recommended that a comprehensive site assessment should also inform any provisional site development plans.

3.3.4 Terrestrial Biodiversity Assessment Methodology and Approach

The proposed methodology to be implemented in the full assessment is as follows:

- Undertake a comprehensive desktop study to identify potential risks for terrestrial biodiversity inclusive of the national screening tool, relevant regional biodiversity planning frameworks, any previous studies as well as interrogation of applicable databases.
- A site verification and spring site visit has been conducted, and a follow up summer site visit will be undertaken as part of the assessment process.
- Detailed reporting will be comprised of a *Terrestrial Biodiversity Screening Report*. The screening report will address the following (in line with the gazetted Assessment Protocol requirements):
    - Indicate any assumptions made and gaps in available information. Assessment of all the vegetation types and habitat units within the relevant Regional Planning Frameworks.
    - A desktop-based species list (flora and fauna) highlighting any potential species of special concern categories (endemic, threatened, Red Data species and other protected species requiring permits for destruction/relocation and invasive/exotic weeds) that could be present. Indicate the need for any permitting/licensing or detailed studies that may be required.
    - Description and assessment of the vegetation/habitat units and site sensitivities ranked into very high, high, medium, low, or very low classes based on potential sensitivity and conservation importance using a standardised methodology (desktop based).

- A site ecological sensitivity map will be compiled, indicting the sensitivities as described above, inclusive of any aquatic features as far as possible using most recent available aerial photography. No site verification will be conducted.
- A map indicating any buffers to accommodate Regional Planning requirements (if required).
- Recommendations based on the findings of the assessment

This terrestrial biodiversity screening report will be aligned with the requirements of the 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 (GN 320, 20 March 2020).

3.3.5 Terrestrial Biodiversity Assessment Data sources and references

A comprehensive list of references, including data sources is provided in Section 4. Data sources that that will be utilised for the full assessment include the following:

- National (DEA) Web Based Screening Tool – to generate the sites potential environmental sensitivity.
- National Vegetation Map 2018 (NVM, 2018), Mucina & Rutherford (2006) and National Biodiversity Assessment (NBA, 2019) – description of vegetation types, species (including endemic) and vegetation unit conservation status.
- National and Regional Legislation including Provincial Conservation Acts and Ordinances. NEM:BA Threatened or Protected Species (ToPS).
- Regional Systematic and Bioregional Planning frameworks, guidelines and GIS data sources.
- Botanical Database of Southern Africa (BODATSA) and New Plants of Southern Africa (POSA) – lists of plant species and potential species of concern found in the general area (SANBI)
- International Union for Conservation of Nature (IUCN) - Red List of Threatened Species
- Animal Demography Unit Virtual Museum (VM) – potential faunal species
- Global Biodiversity Information Facility (GBIF) – potential faunal species
- Southern African Bird Atlas Project 2 (SABAP2) – for bird species records
- National Red Books and Lists - mammals, reptiles, frogs, dragonflies & butterflies
- National Freshwater Ecosystem Priority Areas assessment (NFEPA, 2011) - important catchments
- National Protected Areas Expansion Strategy (NPAES, 2018) and South Africa Protected Area database (2020) – protected area information
- SANBI BGIS – All other biodiversity GIS datasets
- Aerial Imagery – Google Earth, Esri, Chief Surveyor General (http://csg.dla.gov.za)
- Cadastral and other topographical country data - Chief Surveyor General (http://csg.dla.gov.za)
- Other sources include peer-reviewed journals, regional and local assessments, and studies in the general location of the project and its area of influence, landscape prioritization schemes (Key Biodiversity Areas), systematic conservation planning assessments and plans (as above), and any pertinent masters and doctoral theses, among others.

4 Appendices

4.1 Appendix A: References

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- World Resources Institute (WRI): https://www.wri.org

4.2 Appendix B: Abbreviations & Glossary

4.2.1 Abbreviations

CARA	Conservation of Agricultural Resources Act, Act 43 of 1983
CBA	Critical Biodiversity Area
DESTEA	Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs
DEA	Department of Environmental Affairs (*now DFFE, see below*)
DFFE	The Department of Environmental Affairs (DEA) was renamed the Department of Forestry and Fisheries and the Environment (DFFE), incorporating the forestry and fisheries functions from the previous Department of Agriculture, Forestry and Fisheries.
DEMC	Desired Ecological Management Class
DWS	Department of Water Affairs and Sanitation
DWAF	Department of Water Affairs and Forestry (former department name)
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMC	Ecological Management Class
EMP	Environmental Management Plan
EMPr	Environmental Management Programme report
ER	Environmental Representative
ESS	Ecosystem Services
IAP's	Interested and Affected Parties
IEM	Integrated Environmental Management
LM	Local Municipality
masl	meters above sea level
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act, Act 107 of 1998
NFA	National Forests Act
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NFA	National Forest Act, Act 84 of 1998
PEMC	Present Ecological Management Class
PES	Present Ecological State
PNCO	Provincial Nature and Environment Conservation Ordinance (No. 19 of 1974).
RDL	Red Data List
RHS	Right Hand Side
RoD	Record of Decision
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SoER	State of the Environment Report
SSC	Species of Special Concern
ToPS	Threatened of Protected Species
ToR	Terms of Reference
+ve	Positive
-ve	Negative

4.2.2 Glossary

Alien Invasive Species (AIS)	An alien species whose introduction and/or spread threaten biological diversity (Convention on Biological Diversity). Note: "*Alien invasive species*" is considered to be equivalent to "*invasive alien species*". An alien species which becomes established in natural or semi-natural ecosystems or habitat, is an agent of change, and threatens native biological diversity (*IUCN*).
Best Environmental Practice	The application of the most appropriate combination of environmental control measures and strategies (Stockholm Convention).
Best Management Practice	Established techniques or methodologies that, through experience and research, have proven to lead to a desired result (BBOP).
Biodiversity	Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.
Biodiversity Offset	Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure and ecosystem function and people's use and cultural values associated with biodiversity (BBOP).
Bioremediation	The use of organisms such as plants or microorganisms to aid in removing hazardous substances from an area. Any process that uses microorganisms, fungi, green plants, or their enzymes to return the natural environment altered by contaminants to its original condition.
Boundary	Landscape patches have a boundary between them which can be defined or fuzzy (Sanderson and Harris, 2000). The zone composed of the edges of adjacent ecosystems is the boundary.
Connectivity	The measure of how connected or spatially continuous a corridor, network, or matrix is. For example, a forested landscape (the matrix) with fewer gaps in forest cover (open patches) will have higher connectivity.
Corridors	Have important functions as strips of a landscape differing from adjacent land on both sides. Habitat, ecosystems, or undeveloped areas that physically connect habitat patches. Smaller, intervening patches of surviving habitat can also serve as "steppingstones" that link fragmented ecosystems by ensuring that certain ecological processes are maintained within and between groups of habitat fragments.
Critically Endangered (CR)	A category on the IUCN Red List of Threatened Species which indicates a taxon is facing an extremely high risk of extinction in the wild (*IUCN*).
Cultural Ecosystem Services	The non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including, e.g., knowledge systems, social relations, and aesthetic values (Millennium Ecosystem Assessment).
Cumulative Impacts	The total impact arising from the project (under the control of the developer), other activities (that may be under the control of others, including other developers, local communities, government) and other background pressures and trends which may be unregulated. The project's impact is therefore one part of the total cumulative impact on the environment. The analysis of a project's incremental impacts combined with the effects of other projects can often give a more accurate understanding of the likely results of the project's presence than just considering its impacts in isolation (BBOP).
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat(*IUCN*).

Degraded Habitat/Land	Land that has been impacted upon by human activities (including introduction of invasive alien plants, light to moderate overgrazing, accelerated soil erosion, dumping of waste), but still retains a degree of its original structure and species composition (although some species loss would have occurred) and where ecological processes still occur (albeit in an altered way). Degraded land is capable of being restored to a near-natural state with appropriate ecological management.
Disturbance	An event that significantly alters the pattern of variation in the structure or function of a system, while fragmentation is the breaking up of a habitat, ecosystem, or land-use type into smaller parcels. Disturbance is generally considered a natural process.
Ecological Processes	Ecological processes typically only function well where natural vegetation remains, and where the remaining vegetation is well-connected with other nearby patches of natural vegetation. Loss and fragmentation of natural habitat severely threatens the integrity of ecological processes. Where basic processes are intact, ecosystems are likely to recover more easily from disturbances or inappropriate actions if the actions themselves are not permanent. Conversely, the more interference there has been with basic processes, the greater the severity (and longevity) of effects. Natural processes are complex and interdependent, and it is not possible to predict all the consequences of loss of biodiversity or ecosystem integrity. When a region's natural or historic level of diversity and integrity is maintained, higher levels of system productivity are supported in the long run and the overall effects of disturbances may be dampened.
Ecosystem Status	Ecosystem status of terrestrial ecosystems is based on the degree of habitat loss that has occurred in each ecosystem, relative to two thresholds: one for maintaining healthy ecosystem functioning, and one for conserving most species associated with the ecosystem. As natural habitat is lost in an ecosystem, its functioning is increasingly compromised, leading eventually to the collapse of the ecosystem and to loss of species associated with that ecosystem (Millennium Ecosystem Assessment).
Ecosystem Services	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. Supporting Ecosystem services are those that are necessary for the maintenance of all other ecosystem services. Some examples include biomass production, production of atmospheric oxygen, soil formation and retention, nutrient cycling, water cycling, and provisioning of habitat.
Ecosystem	All the organisms of a habitat, such as a lake or forest, together with the physical environment in which they live. A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.
Ecotone	The transitional zone between two communities. Ecotones can arise naturally, such as a lakeshore, or can be human created, such as a cleared agricultural field from a forest. The ecotonal community retains characteristics of each bordering community and often contains species not found in the adjacent communities. Classic examples of ecotones include fencerows; forest to marshlands transitions; forest to grassland transitions; or land-water interfaces such as riparian zones in forests. Characteristics of ecotones include vegetational sharpness, physiognomic change, and occurrence of a spatial community mosaic, many exotic species, ecotonal species, spatial mass effect, and species richness higher or lower than either side of the ecotone.
Edge	The portion of an ecosystem near its perimeter, where influences of the adjacent patches can cause an environmental difference between the interior of the patch and its edge. This edge effect includes a distinctive species composition or abundance in the outer part of the landscape patch. For example, when a landscape is a mosaic of perceptibly different types, such as a forest adjacent to a grassland, the edge is the location where the two types adjoin. In a continuous landscape, such as a forest giving way to open woodland, the exact edge location is fuzzy and is sometimes determined by a local gradient exceeding a threshold, as an example, the point where the tree cover falls below thirty-five percent.
Emergent Tree	Trees that grow above the top of the canopy
Endangered (En)	Endangered terrestrial ecosystems have lost significant amounts (more than 60 % lost) of their original natural habitat, so their functioning is compromised.

	A taxon (species) is Endangered when the best available evidence indicates that it meets any of the criteria for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild (*IUCN*).
Endemic	A plant or animal species, or a vegetation type, which is naturally restricted to a defined region or limited geographical area. Many endemic species have widespread distributions and are common and thus are not considered to be under any threat. They are however noted to be unique to a region, which can include South Africa, a specific province or a bioregion, vegetation type, or a localised area. In cases where it is highly localised or known only from a few or a few localities, and is under threat, it may be red listed either in terms of the South Africa Threatened Species Programme, NEMBA Threatened or Protected Species (ToPS) or the IUCN Red List of Threated Species.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Exotic	Non-indigenous; introduced from elsewhere, may also be a *weed* or alien *invasive* species. Exotic species may be invasive or non-invasive.
Ecological Structure	The composition, or configuration, and the proportion of different patches across the landscape. Relates to species diversity, the greater the diversity, the more complex the structure. A description of the organisms and physical features of environment including nutrients and climatic conditions.
Ecological Function	How each of the elements in the landscape interacts based on its life cycle events [Producers, Consumers, Decomposers Transformers]. Includes the capacity of natural processes and components to provide goods and services that satisfy human needs, either directly or indirectly.
Ecological Pattern	The contents and internal order of the landscape, or its spatial (and temporal) components. May be homogenous or heterogenous. Result from the ecological processes that produce them.
Ecological Process	Includes *Physical processes* [Climate (precipitation, insolation), hydrology, geomorphology]; *Biological processes* [Photosynthesis, respiration, reproduction]; *Ecological processes* [Competition, predator-prey interactions, environmental gradients, life histories]
Fragmentation (Habitat Fragmentation)	The 'breaking apart' of continuous habitat into distinct pieces. Causes land transformation, an important current process in landscapes as more and more development occurs.
Habitat Banking	A market where credits from actions with beneficial biodiversity outcomes can be purchased to offset the debit from environmental damage. Credits can be produced in advance of, and without ex-ante links to, the debits they compensate for, and stored over time (IEEP).
Habitat	The home of a plant or animal species. Generally, those features of an area inhabited by animal or plant which are essential to its survival.
IFC PS6	International Finance Corporation Performance Standard 6 – A standard guiding biodiversity conservation and sustainable management of living natural resources for projects financed by the International Finance Corporation (IFC)
Indicator	Information based on measured data used to represent an attribute, characteristic, or property of a system.
Indicator species	A species whose status provides information on the overall condition of the ecosystem and of other species in that ecosystem. They reflect the quality and changes in environmental conditions as well as aspects of community composition.
Indigenous	Native; occurring naturally in a defined area.
Indigenous Species (Native species)	A species that has been observed in the form of a naturally occurring and self-sustaining population in historical times (*Bern Convention 1979*). A species or lower taxon living within its natural range (past or present) including the area which it can reach and occupy using its natural dispersal systems (*modified after the Convention on Biological Diversity*)

Indirect Impact	Impacts triggered in response to the presence of a project, rather than being directly caused by the project's own operations (BBOP)
Intact Habitat / Vegetation	Land that has not been significantly impacted upon by man's activities. These are ecosystems that are in a near-pristine condition in terms of structure, species composition and functioning of ecological processes.
Intrinsic Value	The inherent worth of something, independent of its value to anyone or anything else.
Keystone Species	Species whose influence on ecosystem function and diversity are disproportionate to their numerical abundance. Although all species interact, the interactions of some species are more profound and far-reaching than others, such that their elimination from an ecosystem often triggers cascades of direct and indirect changes on more than a single trophic level, leading eventually to losses of habitats and extirpation of other species in the food web.
Landscape	An area of land that contains a mosaic of ecosystems, including human-dominated ecosystems (Millennium Ecosystem Assessment).
Landscape Approach	Dealing with large-scale processes in an integrated and multidisciplinary manner, combining natural resources management with environmental and livelihood considerations (FAO).
Landscape connectivity	The degree to which the landscape facilitates or impedes movement among resource patches.
Least threatened / Least Concern (LC)	These ecosystems have lost only a small proportion (more than 80 % remains) of their original natural habitat and are largely intact (although they may be degraded to varying degrees, for example by invasive alien species, overgrazing, or overharvesting from the wild). A taxon (species) is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category (*IUCN*).
Matrix	The "*background ecological system*" of a landscape with a high degree of connectivity.
Natural Forest (Indigenous Forest)	The definition of "*natural forest*" in the National Forests Act of 1998 (NFA) Section 2(1)(xx) is as follows: 'A natural forest means a group of indigenous trees • whose crowns are largely contiguous • or which have been declared by the Minister to be a natural forest under section 7(2) This definition should be read in conjunction with Section 2(1)(x) which states that 'Forest' includes: • A natural forest, a woodland, and a plantation • The forest-produce in it; and • The ecosystems which it makes up. The legal definition must be supported by a technical definition, as demonstrated by a court case in the Umzimkulu magisterial district, relating to the illegal felling of Yellowwood (Podocarpus latifolius) and other species in the Gonqogonqo forest. From scientific definitions (also see Appendix B) we can define natural forest as: • A generally multi-layered vegetation unit • Dominated by trees that are largely evergreen or semi-deciduous • The combined tree strata have overlapping crowns, and crown cover is >75% • Grasses in the herbaceous stratum (if present) are generally rare • Fire does not normally play a major role in forest function and dynamics except at the fringes • The species of all plant growth forms must be typical of natural forest (check for indicator species) • The forest must be one of the national forest types
Near Threatened (NT)	A taxon (species) is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future (*IUCN*).

Patch	A term fundamental to landscape ecology, is defined as a relatively homogeneous area that differs from its surroundings. Patches are the basic unit of the landscape that change and fluctuate, a process called patch dynamics. Patches have a definite shape and spatial configuration and can be described compositionally by internal variables such as number of trees, number of tree species, height of trees, or other similar measurements.
Protected Area	A clearly defined geographical space, recognised, dedicated, and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.
Range restricted species	Species with a geographically restricted area of distribution. Note: Within the IFC PS6, restricted range refers to a limited extent of occurrence (EOO): • For terrestrial vertebrates and plants, restricted-range species are defined as those species that have an EOO less than 50,000 square kilometres (km2).
Refugia	A location which supports an isolated or relict population of a once more widespread species. This isolation can be due to climatic changes, geography, or human activities such as deforestation and overhunting.
Resilience	The capacity of a natural system to recover from disturbance (OECD).
Rehabilitation	Measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and/ or minimised. Rehabilitation emphasizes the reparation of ecosystem processes, productivity, and services, whereas the goals of restoration also include the re-establishment of the pre-existing biotic integrity in terms of species composition and community structure (BBOP).
Restoration	The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. An ecosystem has recovered when it contains sufficient biotic and abiotic resources to continue its development without further assistance or subsidy. It would sustain itself structurally and functionally, demonstrate resilience to normal ranges of environmental stress and disturbance, and interact with contiguous ecosystems in terms of biotic and abiotic flows and cultural interactions (IFC).
Riparian	Pertaining to, situated on, or associated with the banks of a watercourse, usually a river or stream.
River Corridors	River corridors perform several ecological functions such as modulating stream flow, storing water, removing harmful materials from water, and providing habitat for aquatic and terrestrial plants and animals. These corridors also have vegetation and soil characteristics distinctly different from surrounding uplands and support higher levels of species diversity, species densities, and rates of biological productivity than most other landscape elements. Rivers provide for migration and exchange between inland and coastal biotas.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED).
Terrestrial	Occurring on, or inhabiting, land.
Threatened Species	Umbrella term for any species categorised as Critically Endangered, Endangered or Vulnerable by the IUCN Red List of Threatened Species (*IUCN*). Any species that is likely to become extinct within the foreseeable future throughout all or part of its range and whose survival is unlikely if the factors causing numerical decline or habitat degradation continue to operate (EU).
Traditional Ecological Knowledge	Knowledge, innovations, and practices of indigenous and local communities around the world. Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is transmitted orally from generation to generation. It tends to be collectively owned and takes the form of stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local

	language, and agricultural practices, including the development of plant species and animal breeds. Traditional knowledge is mainly of a practical nature, particularly in such fields as agriculture, fisheries, health, horticulture, and forestry (CBD).
Transformation	In ecology, transformation refers to adverse changes to biodiversity, typically habitats or ecosystems, through processes such as cultivation, forestry, drainage of wetlands, urban development or invasion by alien plants or animals. Transformation results in habitat fragmentation – the breaking up of a continuous habitat, ecosystem, or land-use type into smaller fragments.
Transformed Habitat/Land	Land that has been significantly impacted upon because of human interferences/disturbances (such as cultivation, urban development, mining, landscaping, severe overgrazing), and where the original structure, species composition and functioning of ecological processes have been irreversibly altered. Transformed habitats are not capable of being restored to their original states.
Tributary	A small stream or river flowing into a larger one.
Untransformed Habitat/Land	Land that has not been significantly impacted upon by man's activities. These are ecosystems that are in a near-pristine condition in terms of structure, species composition and functioning of ecological processes.
Vulnerable (Vu)	Vulnerable terrestrial ecosystems have lost some (more than 60 % remains) of their original natural habitat and their functioning will be compromised if they continue to lose natural habitat. A taxon (species) is Vulnerable when the best available evidence indicates that it meets any of the criteria for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild (*IUCN*).
Watercourse	Natural or man-made channel through or along which water may flow. A river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake, or dam into which, or from which, water flows. and a reference to a watercourse includes, where relevant, its bed and banks;
Weed	An indigenous or non-indigenous plant that grows and reproduces aggressively, usually a ruderal pioneer of disturbed areas. Weeds may be unwanted because they are unsightly, or they limit the growth of other plants by blocking light or using up nutrients from the soil. They can also harbour and spread plant pathogens. Weeds are generally known to proliferate through the production of large quantities of seed.
Wetlands	A collective term used to describe lands that are sometimes or always covered by shallow water or have saturated soils, and where plants adapted for life in wet conditions usually grow.
Catchment	In relation to a watercourse or watercourses or part of a watercourse, means the area from which any rainfall will drain into the watercourse or watercourses or part of a watercourse, through surface flow to a common point or common points.
Estuary	a partially or fully enclosed body of water - (a) which is open to the sea permanently or periodically; and (b) within which the sea water can be diluted, to an extent that is measurable, with fresh water drained from land.
Instream habitat	Includes the physical structure of a watercourse and the associated vegetation in relation to the bed of the watercourse;
Riparian Habitat	Includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.

4.3 Appendix C: Preliminary Site photos





















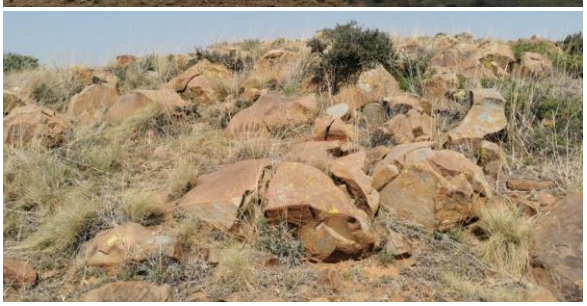



































4.4 Appendix D: Systematic Conservation Planning

4.4.1 Vegetation of Southern Africa

Central Free State Grassland (Gh 6)

VT 49 Transitional Cymbopogon–Themeda Veld (50%) (Acocks 1953). LR 39 Moist Cool Highveld Grassland (78%) (Low & Rebelo 1996).

Distribution: Free State Province and marginally into Gauteng Province: A broad zone from around Sasolburg in the north to Dewetsdorp in the south. Other major settlements located within this unit include Kroonstad, Ventersburg, Steynsrus, Winburg, Lindley and Edenville.
Altitude: 1 300–1 640 m, most of the area at 1 400–1 460 m.
Vegetation & Landscape Features: Undulating plains supporting short grassland, in natural condition dominated by *Themeda triandra* while *Eragrostis curvula* and *E. chloromelas* become dominant in degraded habitats. Dwarf karoo bushes establish in severely degraded clayey bottomlands. Overgrazed and trampled low-lying areas with heavy clayey soils are prone to *Acacia karroo* encroachment.
Geology & Soils: Sedimentary mudstones and sandstone mainly of the Adelaide Subgroup (Beaufort Group, Karoo Supergroup) as well as those of the Ecca Group (Karoo Supergroup) found in the extreme northern section of this grassland, giving rise to vertic, melanic and red soils (typical forms are Arcadia, Bonheim, Kroonstad, Valsrivier and Rensburg)—typical of Dc land type (dominating the landscape). The less common intrusive dolerites of the Jurassic Karoo Dolerite Suite support dry clayey soils typical of the Ea land type.
Climate: Summer-rainfall seasonal precipitation region, with **MAP 560 mm**. Much of the rainfall is of convectional origin and peaks in December to January. The overall MAT around 15 °C. Incidence of frost relatively high (43 days on average).
Important Taxa: Graminoids: *Aristida adscensionis (d), A. congesta (d), Cynodon dactylon (d), Eragrostis chloromelas (d), E. curvula (d), E. plana (d), Panicum coloratum (d), Setaria sphacelata (d), Themeda triandra (d), Tragus koelerioides (d), Agrostis lachnantha, Andropogon appendiculatus, Aristida bipartita, A. canescens, Cymbopogon pospischilii, Cynodon transvaalensis, Digitaria argyrograpta, Elionurus muticus, Eragrostis lehmanniana, E. micrantha, E. obtusa, E. racemosa, E. trichophora, Heteropogon contortus, Microchloa caffra, Setaria incrassata, Sporobolus discosporus.* Herbs*: Berkheya onopordifolia var. onopordifolia, Chamaesyce inaequilatera, Conyza pinnata, Crabbea acaulis, Geigeria aspera var. aspera, Hermannia depressa, Hibiscus pusillus, Pseudognaphalium luteo-album, Salvia stenophylla, Selago densiflora, Sonchus dregeanus.* Geophytic Herbs*: Oxalis depressa, Raphionacme dyeri.* Succulent Herb*: Tripteris aghillana var. integrifolia.* Low Shrubs*: Felicia muricata (d), Anthospermum rigidum subsp. pumilum, Helichrysum dregeanum, Melolobium candicans, Pentzia globosa*.
Conservation: Least Concern (NBA, 2019). Target 24%. Only small portions enjoy statutory conservation (Willem Pretorius, Rustfontein and Koppies Dam Nature Reserves) as well as some protection in private nature reserves. Almost a quarter of the area has been transformed either for cultivation or by building of dams (Allemanskraal, Erfenis, Groothoek, Koppies, Kroonstad, Lace Mine, Rustfontein and Weltevrede). No serious infestation by alien flora has been observed, but encroachment of dwarf karoo shrubs becomes a problem in the degraded southern parts of this vegetation unit. Erosion low (45%), moderate (30%) or very low (20%).
Remarks: On cool moist southern slopes, elements of the Eastern Free State Sandy Grassland (Gm 4) are notable. Stands of Winburg Grassy Shrubland (Gh 7) are present on outcrops (dykes and sills) of dolerite embedded within this grassland. Representation of these units is probable on solitary hills and slopes, rocky outcrops and mesas that may be present, which will be assessed further in the detailed assessment report.
References: Acocks (1953, 1988), Müller (1986), Du Preez & Bredenkamp (1991), Fuls et al. (1992), Müller (2002).

Winburg Grassy Shrubland (Gh 7)

VT 50 Dry Cymbopogon–Themeda Veld (63%) (Acocks 1953). LR 37 Dry Sandy Highveld Grassland (63%) (Low & Rebelo 1996).

Distribution: Free State Province: Series of larger patches between Trompsburg through Bloemfontein and Winburg to Ventersburg. Altitude 1 300–1 660 m, mainly 1 360–1 440 m.

Vegetation & Landscape Features: Solitary hills, slopes and escarpments of mesas creating a mosaic of habitats ranging from open grassland to shrubland. Tall shrubs and sometimes small trees are sheltered against frequent periods of frost during the winter months and regular veld fires in late winter to early spring. The medium-height evergreen shrublands are dominated by a combination of *Olea europaea subsp. africana, Euclea crispa subsp. crispa, Gymnosporia buxifolia, Diospyros lycioides, Rhus burchellii, R. ciliata, R. erosa* (mainly in the south), *Clutia pulchella* and *Grewia occidentalis*. Trees such as *R. lancea, Celtis africana* and *Ziziphus mucronata* are found in more deeply incised drainage lines.

Geology & Soils: Extensive dolerite sills forming ridges, plateaus and slopes of koppies, and small escarpments marking the erosion terraces. The sills cover alternating layers of mudstone and sandstone of sedimentary origin (Adelaide Subgroup of the Beaufort Group). Prominent soil forms are the stony Mispah and gravel-rich Glenrosa derived from Jurassic dolerite. Dominating land type Ea, with Dc also present in places.

Climate: Summer-rainfall region, with MAP around 500 mm. Much of the rainfall is of convectional origin. Overall MAT is slightly higher than 15 °C, with more than 40 days of frost in winter.

Important *Taxa:* Small Trees*: Acacia karroo, Celtis africana, Cussonia paniculata, Pittosporum viridiflorum, Rhus lancea, Scolopia zeyheri, Ziziphus mucronata.* Tall Shrubs*: Buddleja saligna (d), Euclea crispa subsp. ovata (d), Gymnosporia polyacantha (d), Olea europaea subsp. africana (d), Rhus burchellii (d), R. erosa (d), Diospyros lycioides subsp. lycioides, Grewia occidentalis, Gymnosporia buxifolia, Tarchonanthus camphoratus.* Low Shrubs*: Helichrysum dregeanum (d), Pentzia globosa (d), Anthospermum rigidum subsp. pumilum, Asparagus cooperi, A. laricinus, Berkheya annectens, Chrysocoma ciliata, Clutia pulchella, Euryops empetrifolius, Felicia filifolia subsp. filifolia, F. muricata, Nenax microphylla, Osyris lanceolata, Rosenia humilis, Selago saxatilis, Solanum tomentosum var. coccineum.* Graminoids*: Aristida adscensionis (d), A. congesta (d), A. diffusa (d), Cymbopogon pospischilii (d), Cynodon dactylon (d), C. incompletus (d), Eragrostis chloromelas (d), E. lehmanniana (d), E. micrantha (d), E. obtusa (d), E. trichophora (d), Eustachys paspaloides (d), Heteropogon contortus (d), Panicum stapfianum (d), Setaria lindenbergiana (d), S. sphacelata (d), Sporobolus fimbriatus (d), Themeda triandra (d), Tragus koelerioides (d), Digitaria argyrograpta, Elionurus muticus, Enneapogon scoparius, Eragrostis plana, E. superba, Tragus berteronianus, T. racemosus, Triraphis andropogonoides.* Herbs*: Berkheya onopordifolia var. onopordifolia, Hermannia coccocarpa, Indigofera alternans, Mohria caffrorum, Pupalia lappacea, Salvia repens.* Geophytic Herbs*: Oxalis corniculata, O. depressa.* Succulent Herb*: Crassula lanceolata.*

Conservation: Least Concern (NBA, 2019). Target 28%. Almost 2% statutorily conserved in the Willem Pretorius Nature Reserve. More than 10% transformed for cultivation and by urban sprawl. Erosion low (57%), very low (24%) and moderate (18%).

Remarks: The vegetation of this unit differs considerably in species composition and structure, from analogous shrubland typical of koppies south and southwest of Bloemfontein (Gh 4 Besemkaree Koppies Shrubland), in having some Afromontane elements and a more mesic character. Dolerite hills along the Sand River as well as those found in the Willem Pretorius Nature Reserve are home to some sourveld shrub species, such as *Elaeodendron transvaalense, Scolopia zeyheri, Rhus leptodictya and Helinus integrifolius.*

References: *Acocks (1953, 1988), Du Preez (1979), Roussouw (1983), Müller (1986), Du Preez (1991), Malan (1993, 1998), Malan et al. (1994, 1995), Dingaan (1999), Müller (2002).*

Vaal-Vet Sandy Grassland (Gh 10)

VT 50 Dry Cymbopogon–Themeda Veld (47%), VT 48 Cymbopogon–Themeda Veld (sandy) (24%) (Acocks 1953). LR 37 Dry Sandy Highveld Grassland (74%) (Low & Rebelo 1996).

Distribution North-West and Free State Provinces: South of Lichtenburg and Ventersdorp, stretching southwards to Klerksdorp, Leeudoringstad, Bothaville and to the Brandfort area north of Bloemfontein.
Altitude 1 220–1 560 m, generally 1 260–1 360 m.
Vegetation & Landscape Features Plains-dominated landscape with some scattered, slightly irregular undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element. Dominance of *Themeda triandra* is an important feature of this vegetation unit. Locally low cover of T. triandra and the associated increase in *Elionurus muticus, Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall.
Geology & Soils Aeolian and colluvial sand overlying sandstone, mudstone and shale of the Karoo Supergroup (mostly the Ecca Group) as well as older Ventersdorp Supergroup andesite and basement gneiss in the north. Soil forms are mostly Avalon, Westleigh and Clovelly. Dominant land type Bd, closely followed by Bc, Ae and Ba.
Climate Warm-temperate, summer-rainfall climate, with overall MAP of 530 mm. High summer temperatures. Severe frost (37 days per year on average) occurs in winter.
Important Taxa Graminoids: *Anthephora pubescens (d), Aristida congesta (d), Chloris virgata (d), Cymbopogon caesius (d), Cynodon dactylon (d), Digitaria argyrograpta (d), Elionurus muticus (d), Eragrostis chloromelas (d), E. lehmanniana (d), E. plana (d), E. trichophora (d), Heteropogon contortus (d), Panicum gilvum (d), Setaria sphacelata (d), Themeda triandra (d), Tragus berteronianus (d), Brachiaria serrata, Cymbopogon pospischilii, Digitaria eriantha, Eragrostis curvula, E. obtusa, E. superba, Panicum coloratum, Pogonarthria squarrosa, Trichoneura grandiglumis, Triraphis andropogonoides*. Herbs: *Stachys spathulata (d), Barleria macrostegia, Berkheya onopordifolia var. onopordifolia, Chamaesyce inaequilatera, Geigeria aspera var. aspera, Helichrysum caespititium, Hermannia depressa, Hibiscus pusillus, Monsonia burkeana, Rhynchosia adenodes, Selago densiflora, Vernonia oligocephala*. Geophytic Herbs: *Bulbine narcissifolia, Ledebouria marginata.* Succulent Herb: *Tripteris aghillana var. integrifolia*. Low Shrubs: *Felicia muricata (d), Pentzia globosa (d), Anthospermum rigidum subsp. pumilum, Helichrysum dregeanum, H. paronychioides, Ziziphus zeyheriana*.
Endemic Taxon Herb: *Lessertia phillipsiana*.
Conservation Endangered. Target 24%. Only 0.3% statutorily conserved in the Bloemhof Dam, Schoonspruit, Sandveld, Faan Meintjies, Wolwespruit and Soetdoring Nature Reserves. More than 63% transformed for cultivation (ploughed for commercial crops) and the rest under strong grazing pressure from cattle and sheep. Erosion very low (85.3%) and low (11%).
References Louw (1951), Morris (1973, 1976), Bredenkamp & Bezuidenhout (1990), Kooij et al. (1990b, 1992), Bezuidenhout et al. (1994a).

Highveld Alluvial Vegetation (AZa 5)

Distribution Free State, North-West, Mpumalanga and Gauteng Provinces as well as in Lesotho and Swaziland: Alluvial drainage lines and floodplains along rivers embedded within the Grassland Biome and marginal (eastern) units of the Kalahari (Savanna Biome), such as along upper Riet, Harts, upper Modder, upper Caledon, Vet, Sand, Vals, Wilge, Mooi, middle and upper Vaal Rivers etc. and their numerous tributaries. Altitude ranging from 1 000–1 500 m.
Vegetation & Landscape Features Flat topography supporting riparian thickets mostly dominated by Acacia karroo, accompanied by seasonally flooded grasslands and disturbed herblands often dominated by alien plants.
Geology, Soil & Hydrology Deep sandy to clayey (but mostly coarse sand) alluvial soils developed over Quaternary alluvial (fluviatile) sediments. Oakleaf, Dundee, Shortlands, Glenrosa and Mispah soil forms were identified in the Vaal River floodplain (Bezuidenhout 1994). The rivers are perennial, often in flood

in summer. Erosion of banks and deposition of new fine soil on alluvium can be of considerable extent. Some smaller anastomosing channels of major rivers can dry out in winter.
Climate Seasonal, mainly summer rainfall. Precipitation in the western part of the highveld is erratic (MAP 300–400 mm), increasing sharply towards the east and north (up to 600 mm in places). The overall MAP is almost 500 mm (range 373 mm at the western distribution limit and 593 mm at the northern distribution limit near Carletonville). Typical continental thermal regime, showing subtropical features is typical of the summer season (daily temperature often surpassing 35°C), while cold-temperate features (such as frequent frost) prevail in winter.
Important Taxa Riparian thickets Small Trees: *Acacia karroo (d), Salix mucronata subsp. mucronata (d), S. mucronata subsp. woodii, Ziziphus mucronata (d), Celtis africana, Rhus lancea. Tall Shrubs: Gymnosporia buxifolia (d), Rhus pyroides (d), Diospyros lycioides, Ehretia rigida, Grewia flava.* Low Shrubs: *Asparagus laricinus (d), A. suaveolens (d). Woody Climber: Clematis brachiata.* Succulent Shrub: *Lycium hirsutum (d).* Graminoids: *Setaria verticillata (d), Panicum maximum.* Herb: *Pollichia campestris.* Reed beds Megagraminoid: *Phragmites australis (d).* Flooded grasslands & herblands Low Shrubs: *Gomphocarpus fruticosus (d), Felicia muricata.* Succulent Shrub: *Salsola rabieana*. Graminoids: *Agrostis lachnantha (d), Andropogon eucomus (d), Chloris virgata (d), Cynodon dactylon (d), Eragrostis plana (d), Hemarthria altissima (d), Imperata cylindrica (d), Ischaemum fasciculatum (d), Miscanthus junceus (d), Paspalum distichum (d), Andropogon appendiculatus, Brachiaria marlothii, Cyperus denudatus, C. longus, Echinochloa holubii, Eragrostis obtusa, E. porosa, Fimbristylis ferruginea, Panicum coloratum, Pycreus mundii, Sporobolus africanus, S. fimbriatus, Themeda triandra, Urochloa panicoides.* Herbs: *Persicaria lapathifolia (d), Alternanthera sessilis, Barleria macrostegia, Corchorus asplenifolius, Equisetum ramosissimum, Galium capense, Hibiscus pusillus, Lobelia angolensis, Nidorella resedifolia, Persicaria amphibia, P. hystricula, Pseudognaphalium oligandrum, Pulicaria scabra, Rorippa fluviatilis var. fluviatilis, Senecio inornatus, Stachys hyssopoides, Vahlia capensis.* Geophytic Herbs: *Crinum bulbispermum, Haplocarpha lyrata.* Open water Aquatic Herb: *Myriophyllum spicatum*.
Conservation Least threatened. Target 31%. Nearly 10% statutorily conserved in the Barberspan (a Ramsar site), Bloemhof Dam, Christiana, Faan Meintjes, Sandveld, Schoonspruit, Soetdoring and Wolwespruit Nature Reserves. More than a quarter has been transformed for cultivation and by building of dams (Bloemhof, Erfenis, Krugersdrif, Mockes and Vaalharts Dams). The highveld alluvia are prone to invasion by a number of weeds, obviously encouraged by the high nutrient status of soils and ample water supply. Woody plants such as *Salix babylonica, Schinus molle, Melia azedarach, Celtis sinensis, Morus alba, Populus x canescens, Nicotiana glauca* and *N. longiflora* and forbs such as *Argemone ochroleuca, Chenopodium strictum, Conyza canadensis, Datura stramonium, Melilotus alba, Oenothera indecora, Paspalum dilatatum, P. urvillei, Pennisetum clandestinum, Tagetes minuta, Verbena bonariensis, Xanthium strumarium agg.* and *Zinnia peruviana* (see Cilliers et al. 1998, Malan et al. 2001a, b, L. Mucina, unpublished data) often dominate either the riverine thickets or grasslands or form ruderal communities in disturbed habitats. The undergrowth of the alluvial riparian thickets and the accompanying grasslands suffer from heavy overgrazing in many places.
Remark Many patches of this vegetation escaped our mapping efforts due to a lack of proper geographical coverage.
References Acocks (1976), Roussouw (1983), Müller (1986), Bezuidenhout (1988, 1994), Bredenkamp et al. (1989), Bredenkamp & Bezuidenhout (1990), Du Preez & Venter (1990), Kooij et al. (1990a, b), Du Preez (1991), Du Preez & Bredenkamp (1991), Eckhardt et al. (1993b, 1996), Bezuidenhout et al. (1994), Bredenkamp et al. (1994), Hoare (1997), Cilliers et al. (1998), Eckhardt (1998), Malan (1998), Boucher & Tlale (1999a, b), Hoare & Bredenkamp (1999), Myburgh (2000, 2001), Van Wyk et al. (2000), Dingaan et al. (2001), Malan et al. (2001a, b), Myburgh & Bredenkamp (2004), http://www.ngo.grida.no/soesa/nsoer/resource/wetland/sa_ramsar.htm.

4.4.2 Free State Bioregional Plan

Much of the current conservation effort in South Africa is focused on promoting land-use practices that reconcile development opportunities and spatial planning at a landscape scale, with the over-arching goal of maintaining and increasing the resilience of ecosystems, especially in the face of climate change. This landscape approach to biodiversity conservation involves working within and beyond the boundaries of protected areas to manage biodiversity within a mosaic of land-uses.
One of the primary aims is to achieve economic goals whilst the health of ecosystems is maintained, and the loss of important or threatened species or habitats is avoided. Creating functional connectivity in landscapes is a key aspect of promoting ecosystem resilience (the ability of the ecosystem to absorb a certain amount of change yet remain functional). Ecosystem resilience can be maintained or built through an approach that focuses on intact areas, maintaining biodiversity priority areas in a natural or near-natural state, maximising connectivity between these areas and maximising the diversity of species and ecosystems. Resilient ecosystems can:

- Maintain the ecological and evolutionary processes that allow biodiversity to persist in these ecosystems;
- Better-withstand human-induced pressures (from, for example, too frequent fires);
- Adapt to the impacts of climate change, such as increased rainfall variability;
- Mitigate the effects of climate change by continuing to capture and store carbon;
- Deliver ecosystem services, such as the provision of clean water and flood attenuation.

The main purpose of a biodiversity sector plan is to ensure that the most recent and best quality spatial biodiversity information can be accessed and used to inform land-use and development planning, environmental assessments and authorisations, and natural resource management. A biodiversity sector plan achieves this by providing a map (or maps) of terrestrial and freshwater areas that are important for conserving biodiversity pattern and ecological processes – these areas are called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). The maps are provided together with contextual information on biodiversity, and land-use guidelines that can be incorporated into the policies and decisions of a wide range of sectors. A Biodiversity Sector Plan is based on a fine-scale systematic biodiversity plan (1:50 000 or finer), and has boundaries aligned with administrative boundaries (such as a municipality or groups of municipalities).

A Biodiversity Conservation Plan can be used to guide conservation action (such as identifying priority sites for expansion of protected areas), or to feed spatial biodiversity priorities into planning and decision-making in a wide range of cross-sectoral planning processes and instruments such as provincial and municipal integrated development plans and spatial development frameworks, land-use management schemes, environmental management frameworks and environmental management plans. The flowing core categories are designated:

- Protected Areas: Areas that are formally protected by law and recognised in terms of the Protected Areas Act (this includes contract protected areas declared through the biodiversity stewardship programme).
- Critical Biodiversity Areas (CBAs): Areas that are required to meet biodiversity targets for species, ecosystems or ecological processes. These include:
- All areas required to meet biodiversity pattern targets and to ensure continued existence and functioning of species and ecosystems, special habitats and species of conservation concern;
- Critically Endangered ecosystems; and
- Critical linkages (corridor 'pinch-points') to maintain connectivity.

CBAs are areas of high biodiversity value and need to be kept in a natural state, with no further loss of habitat or species.

- Ecological Support Areas (ESAs): Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of protected areas or CBAs and for delivering ecosystem services. In the terrestrial assessment they support landscape connectivity and strengthen resilience to climate change. ESAs need to be maintained in at least a functional and often natural state, supporting the purpose for which they were identified. They include features such as riparian habitat surrounding rivers or wetlands, corridors, over-wintering sites for Blue Cranes, and so on.
- Other Natural Areas (ONAs): Areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructural functions.
- Moderately or Heavily Modified Areas (sometimes called 'transformed'): Areas that have been heavily modified by human activity so that they are by-and-large no longer natural, and do not contribute to biodiversity targets. Some of these areas may still provide limited biodiversity and ecological infrastructural functions but, their biodiversity value has been significantly and, in many cases, irreversibly compromised.

Table 8: Summary of map categories shown in the terrestrial CBA map, and their meanings.

Map Category	Description	Sub- Category	Description
Protected Areas	Areas that are formally protected by law and recognised in terms of the Protected Areas Act, including contract protected areas declared through the biodiversity stewardship programme.	National Parks & nature Reserves	Includes formally proclaimed national Parks, nature Reserves, Special nature Reserve, and Forest nature Reserves.
		Protected Environments: Natural	Includes Protected Environments, declared in terms of Protected Areas Act (Act 57 of 2003, as amended).
		Protected Environments: Modified	Heavily modified areas in formally proclaimed Protected Environments.
Critical Biodiversity Areas (CBA)	All areas required to meet biodiversity pattern and process targets; critically Endangered ecosystems, critical linkages (corridor pinch-points) to maintain connectivity; CBAs are areas of high biodiversity value that must be maintained in a natural state.	CBA: Irreplaceable	This category includes: (1) Areas required to meet targets and with irreplaceability values of more than 80%. (2) critical linkages or pinch-points in the landscape that must remain natural; (3) critically Endangered Ecosystems.
		CBA: Optimal	The CBA Optimal Areas (previously called 'important and necessary' in the MBCP) are the areas optimally located to meet both the various biodiversity targets and other criteria defined in the analysis. Although these areas are not 'irreplaceable' they are the most efficient land configuration to meet all biodiversity targets and design criteria.
Ecological Support Areas (ESA)	Areas that are not essential for meeting targets, but that play an important role in supporting the functioning of CBAs and that deliver important ecosystem services	ESA: Landscape corridor	The best option to support landscape-scale ecological processes, especially allowing for adaptation to the impacts of climate change.
		ESA: Local corridor	Finer-scale alternative pathways that build resilience into the corridor network by ensuring connectivity between climate change focal areas, reducing reliance on single landscape-scale corridors.
		ESA: Species Specific	Areas required for the persistence of particular species. Although these may be production landscapes, a change in land-use may result in loss of this species from the area. (Only one species-specific ESA was included in the analysis — an over-wintering site for blue cranes).
		ESA: Protected Area Buffers	Areas surrounding protected areas that moderate the impacts of undesirable land-uses that may affect the ecological functioning or tourism potential of PA's. Buffer distance varies according to

Map Category	Description	Sub- Category	Description
			reserve status: national Parks — 10 km; nature Reserves — 5 km buffer; Protected Environments — 1 km buffer.
Other Natural Areas (ONA)	Areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructural functions.		
Moderately or Heavily Modified Areas	Areas in which significant or complete loss of natural habitat and ecological function has taken place due to activities such as ploughing, hardening of surfaces, open-cast mining, cultivation and so on.	Heavily Modified	All areas currently modified to such an extent that any valuable biodiversity and ecological functions have been lost.
		Moderately Modified: Old lands	Old, cultivated lands that have been allowed to recover (within the last 80 years), and support some natural vegetation. Although biodiversity pattern and ecological functioning may have been compromised, the areas may still play a role in supporting biodiversity and providing ecosystem services.

Networks of ecological corridors

Ecological corridors of natural and near-natural land ensure connectivity between various spatial elements in the land- scape. They link key protected areas with climate change refugia and other features of the landscape that promote adaptation to the effects of climate change. Two types of ecological corridors are differentiated:

- Landscape corridors, which are the best large-scale options for linking areas that are important for climate change resilience across provinces.
- Local corridors, which take effect at a finer scale to make the network of landscape corridors more robust to disturbance; they provide alternative pathways and critical linkages that should not be lost in the land- scape.

Because of the technology used in the development of Systematic Planning it was possible to minimise the presence of 'narrow bottlenecks' and avoid including large areas of modified land in the network of ecological corridors, wherever possible. Special attention was also paid to ensuring seamless alignment with ecological corridors that have been identified in the biodiversity plans of KwaZulu-Natal, Free State and Gauteng.

Areas important for climate change resilience

The spatial analysis undertaken identified parts of the landscape where it is likely that ecosystems will be most able to maintain a stable ecological composition and structure in the face of climate change, based on a range of possible future climate change scenarios (NBA 2011; Holness, pers. comm.). These areas are referred to as areas important for climate change resilience. They include diverse landscapes such as:

- Local refugia (e.g. kloofs and south facing slopes): Areas important for landscape connectivity (e.g. riparian corridors)
- Areas with steep temperature, precipitation and altitude gradients (e.g. south-facing slopes);
- Areas of high biotic diversity where many different habitat and biome types are found in close proximity and plant endemism is high.

Desired Management Objectives

The desired management objective for a parcel of land, or freshwater feature, refers to the ecological condition in which it should be maintained. These not only determine the ecological state or condition in which the land or freshwater feature should be maintained, but also provide the broad direction for appropriate land- or resource-use activities and management practices. Only those land- or resource-use activities that are compatible with maintaining the desired management objective should be encouraged. Different categories on the CBA maps have specific desired management objectives, according to their biodiversity priority (Table 9). In broad terms, the biodiversity priority areas need to

be maintained in a healthy and functioning condition, whilst those that are less important for biodiversity can be used for a variety of other land-uses.

Table 9: Map categories, definitions, and desired management objectives

Map Category	Definition	Desired Management Objectives
Protected Areas	Those areas that are proclaimed as protected areas under national or provincial legislation, including gazetted Protected Environments.	Areas that are meeting biodiversity targets and therefore must be kept in a natural state, with a management plan focused on maintaining or improving the state of biodiversity.
Critical Biodiversity Areas (CBAs)	Areas that are required to meet biodiversity targets, for species, ecosystems, or ecological processes.	Must be kept in a natural state, with no further loss of habitat. Only low-impact, biodiversity-sensitive land-uses are appropriate.
Ecological Support Areas (ESAs)	Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of protected areas or CBAs and for delivering ecosystem services.	Maintain in a functional, near-natural state, but some habitat loss is acceptable. A greater range of land-uses over wider areas is appropriate, subject to an authorisation process that ensures the underlying biodiversity objectives are not compromised.
Other natural Areas (ONAs)	Areas that have not been identified as a priority in the current systematic biodiversity plan but retain most of their natural character and perform a range of biodiversity and ecological infrastructural functions. Although they have not been prioritised for biodiversity, they are still an important part of the natural ecosystem.	An overall management objective should be to minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning. These areas offer the greatest flexibility in terms of management objectives and permissible land-uses, but some authorisation may still be required for high-impact land-uses.
Heavily or Moderately Modified Areas	Areas that have been modified by human activity to the extent that they are no longer natural, and do not contribute to biodiversity targets. These areas may still provide limited biodiversity and ecological infrastructural functions, even if they are never prioritised for conservation action.	Such areas offer the most flexibility regarding potential land-uses, but these should be managed in a biodiversity-sensitive manner, aiming to maximise ecological functionality and authorisation is still required for high-impact land-uses. Moderately modified areas (old lands) should be stabilised and restored where possible, especially for soil carbon and water-related functionality.

Figure 14 indicates the Terrestrial categorisation of the site and surrounding area.

The general guideline recommendations for these categorisations are described below.

Land-use guidelines for terrestrial Critical Biodiversity Areas (CBAs)

Critical Biodiversity Areas are required to meet biodiversity targets and need to be maintained in a healthy natural state.

Irreplaceable CBAs are the most important biodiversity areas in the province, outside of the protected area network. They represent the last remaining options for securing critical biodiversity and ecosystems and for achieving biodiversity targets. If these areas suffer any further loss of habitat or ecological function, it is likely that the biodiversity targets will not be met and the status of species and ecosystems will decline.

Some CBAs are considered irreplaceable because they form what are called 'critical linkages or pinch-points, or because they incorporate threatened ecosystems. critical linkages are highly constrained areas within a natural landscape that are vital for maintaining the linkage and ecological integrity of the corridor network. If these critical linkages are lost, it would result in disruption of the corridor network.

Optimal CBAs have an irreplaceability of less than 80% but are the most optimally located and the most efficient solution (i.e., occupying the smallest possible area) to meet biodiversity targets as well as other criteria such as avoiding high-cost areas where there are competing land-uses. There may be options to achieve the targets elsewhere, but these will require more land or may lead to increasing conflict between competing land uses.

Permissible land uses are those that are compatible with maintaining the natural vegetation cover of CBAs in a healthy ecological state, and that do not result in loss or degradation of natural habitat. Some low-intensity agricultural land-uses, such as grazing of livestock, may be acceptable in CBAs, on condition that best-practice guidelines aimed at benefiting the biodiversity assets and reducing the vulnerability of each site are implemented. An example of such best-practice guidelines is the recently released grazing and burning guidelines for managing grasslands for biodiversity and livestock production (SANBI, 2014). Land uses that should not be in terrestrial CBAs because they cause loss of natural habitat or ecosystem functionality, include:

- Any form of mining or prospecting.
- Extensive or intensive grazing that results in species diversity being lost through selective- or over-grazing.
- conversion of natural habitat for intensive agriculture (cultivation) or plantation forestry.
- Expansion of existing settlements or residential, commercial or industrial infrastructure.
- new hard infrastructure, and linear developments such as roads, railways and pipelines.
- complete-barrier fencing (i.e. game-proof fences) in in CBA (or ESA) corridors.
- Linear infrastructure of any sort that disrupts the connectivity of CBA (or ESA) corridors.

Land-use guidelines for terrestrial Ecological Support Areas

Ecological support areas (ESAs) are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of CBAs and deliver important ecosystem services. They facilitate landscape connectivity, promote resilience to climate change, and buffer elements of the landscape including protected areas and sites that are important for the survival of individual species.

ESA: Landscape and Local Corridors: The purpose of ecological corridors is to provide intact pathways for long-term biological movement. Landscape-scale corridors represent the best option for promoting resilience to climate change and the persistence of biodiversity as they provide pathways for the movement of plants and animals in response to environmental change. They also support the natural movement of species between populations to ensure population viability. Landscape corridors are aligned with areas that have maximum amounts of remaining natural habitat. Local corridors are fine-scale corridors that contribute to connectivity between climate change refugia. They represent alternative pathways for movement of species, and thus lessen impacts on critical linkages and landscape-scale corridors and provide networks that are more resistant to disturbance.

ESA: Species-Specific Sites: These are areas required for the persistence of specific species. Only one area, an important over-wintering site for blue cranes, that is shared with Gauteng, and which comprises a matrix of natural and cultivated lands, was identified as an ESA in the MBSP.

ESA: Protected Area Buffers: These are areas around protected areas where changes in land-use may affect the ecological functioning or tourism potential of the adjacent protected area. The purpose of buffer zones is to reduce the impacts of undesirable land-uses on the environment, and to provide opportunities for tourism. Modification of the natural habitat within the buffer zones may have negative impacts on the zonation and management plan of the adjacent protected area.

Permissible land-uses: There is more flexibility in terms of options for compatible land-uses in ESAs than there is in CBAs. However, ESAs do need to remain ecologically functional, which means that they need to be maintained in at least a near-natural state, although some loss of biodiversity pattern through a variety of land uses is acceptable.

Land-use guidelines for terrestrial Other Natural Areas

The overall purpose of these land-use guidelines is to promote the effective management of biodiversity as required in Section 41(a) of the Biodiversity Act (Act 10 of 2004, as amended) and in terms of the National Environmental Management Act (Act 107 of 1998, as amended). The guidelines provide advice on which land-uses and activities are most compatible with maintaining the ecological integrity of CBAs and ESAs, and other parts of the landscape, based on the desired management objectives for the land and the anticipated impact of each land-use activity on biodiversity patterns and ecological processes. The land-use guidelines have been developed in consultation with some planners from other sectors, and in a way that aims to minimise potential conflict between land uses. However, their focus is on identifying land-uses that are biodiversity compatible. They should, therefore, be used in conjunction with any other sector-specific guidelines that may be available for the province.

Land-use guidelines are presented below for terrestrial and freshwater ecosystems. These guidelines are intended primarily to guide planning and decision-making in terrestrial and freshwater Critical Biodiversity Areas and Ecological Support Areas on land outside of protected areas. However, brief guidelines are also provided for certain categories of protected areas, such as Protected Environments, in which a range of land uses other than biodiversity conservation is possible. In the sections that follow, general recommendations are given for each category on the CBA maps, relating to desired management objectives and appropriate land uses.

Other natural Areas (OnAs) are not required to meet biodiversity targets, and so are not identified as a priority. They do, however, retain much of their natural character. The biodiversity in these non-priority landscapes may still be of value and contribute to maintenance of viable species populations and natural ecosystem functioning and Other natural Areas may provide essential ecological infrastructure and ecosystem services.

Permissible land uses: ONA's offer the greatest flexibility in terms of management objectives and permissible land-uses and are generally recommended (along with Modified Areas) as the sites for higher-impact land-uses. However, because ONAs may still have significant ecological, aesthetic and social value, they should not be regarded as 'ecological wastelands' or areas where 'anything goes.' Planners are still required to give due consideration to assessing environmental factors, socio-economic efficiency, aesthetics and impacts on the sense-of-place in making decisions about the location of land uses in these areas. Environmental authorisation may still be required for high-impact land-us- es in terms of the listed activities in the EIA Regulations, and other relevant legislation.

Land-use guidelines for terrestrial Heavily or Moderately Modified Areas

Heavily modified areas are those in which significant or complete loss of natural habitat and ecological functioning has taken place due to activities such as ploughing, hardening of surfaces, mining,

cultivation, and other activities that modify natural habitat. Even so, they may include small remnants of natural habitat such as the patches or strips of natural habitat that survive between cultivated lands, along river-lines and ridges and in open spaces in towns. These disconnected remnants are often biologically impoverished, highly vulnerable to damage and have limited likelihood of being able to persist but may contain residual biodiversity value or may provide ecological infrastructure or certain ecosystem services.

Moderately Modified - Old Lands (sometimes called 'old fields' in other documents) are those areas that were used for cultivation or mining in the past (within the last 80 years) but are no longer used for these purposes and have been left to re-vegetate. These old lands are areas where biodiversity pattern and ecological function have been seriously compromised in the past, but they may still play an important role in the provision of ecosystem services or may provide important habitats for certain animal species. For example, old lands can provide important feeding grounds for birds such as blue cranes, and disused mine shafts can provide suitable habitats for certain bats.

Permissible land-uses: Heavily modified areas are those preferred for intensive land-uses such as the construction of settlements, industrial development and other
land-uses that have a high impact. These land-uses should still be located and managed in ways that maintain any residual ecological functionality, and that does not impact negatively on species for which these modified sites may be important. In some cases, restoration may be advisable.

Appendix E: Declaration, Specialist Profile & Registration

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

	(For official use only)
File Reference Number:	
NEAS Reference Number:	DEA/EIA/
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

PROJECT TITLE

Proposed Bonsmara PV (Solar) facility

Kindly note the following:

1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
2. This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
4. All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
5. All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

Departmental Details

Postal address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Private Bag X447
Pretoria
0001

Physical address:
Department of Environmental Affairs
Attention: Chief Director: Integrated Environmental Authorisations
Environment House
473 Steve Biko Road
Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at:
Email: EIAAdmin@environment.gov.za

1. SPECIALIST INFORMATION

Specialist Company Name:	None			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100 %
Specialist name:	Jamie Pote			
Specialist Qualifications:	BSc (Hons)			
Professional affiliation/registration:	SACNASP (115233) – Ecological Science IAIAsa (5045)			
Physical address:				
Postal address:	Postnet Suite 57, PBag X13130, Humewood			
Postal code:	6013	Cell:		
Telephone:		Fax:		
E-mail:	jamiepote@gmail.com			

2. DECLARATION BY THE SPECIALIST

I, Mr Jamie Pote_____, 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 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

N/A

Name of Company:

01 September 2022

Date

Details of Specialist, Declaration and Undertaking Under Oath

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, JAMIE POTE, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

N/A
Name of Company

01/09/2022
Date

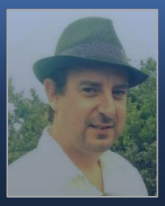
118-1138
Signature of the Commissioner of Oaths

2022-09-01
Date

SUID-AFRIKAANSE POLISIEDIENS
VISPOL AANKLAGER
2022 -09- 01
VISPOL COMMISSIONER OF OATHS
SOUTH AFRICAN POLICE SERVICE

Details of Specialist, Declaration and Undertaking Under Oath

Page 3 of 3



Jamie Pote

BIODIVERSITY ADVISOR, ECOLOGIST AND ENVIRONMENTAL SCIENTIST

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Bluesky-SA

EDUCATION

Bachelor of Science
Rhodes University
2002 (Botany & Environmental Science)

Bachelor of Science (Honours)
Rhodes University
2003 (Botany)

Professional Natural Scientist
SACNASP: 2016 (Ecological Science)

SERVICES

Terrestrial Biodiversity Specialist Assessments
IFC PS6 Biodiversity & Critical Habitat Assessments
Terrestrial Biodiversity Compliance Statements
Geographic Information Systems
Environmental Management Plans & Programmes
Environmental Compliance & Monitoring
Independent Environmental & Ecological reviews
Bioremediation, Restoration & Rehabilitation Plans
Permit and License applications (Flora & Fauna)
Flora Search & Rescue Plans & Relocations
Invasive Alien Plant Control & Management Plans
Environmental & Mining Applications

ABOUT ME

18 years broad professional experience in Biodiversity, Ecological and Vegetation Assessments on over 250 projects in southern, western and central Africa. Environmental Assessment Practitioner on over 50 projects in the mining, infrastructure, housing and agricultural sectors. Environmental monitoring and auditing on over 50 civil infrastructure and construction projects. Have managed all aspects of projects from inception through to implementation. Advanced GIS mapping tools and Analysis.

EXPERIENCE AND CLIENTS

Key Sectors

- *Wind, Solar Energy Facilities*
- *Infrastructure and Housing*
- *Agriculture and Forestry*
- *Mining and Industrial*

Key Projects

- *Over 250 independent Biodiversity/Ecological Assessments throughout southern, western and central Africa.*
- *Basic Assessments, Mining applications and compliance monitoring on over 50 projects for various clients including the Eastern Cape Department of Roads and Public Works, Department of Transport and the South African National Roads Agency (SANRAL) throughout the Eastern Cape, including over 300 individual borrow pits.*
- *South-End Precinct Mixed Use Development for Mandela Bay Development Agency - Environmental application, Ecological assessments and Pre-Construction compliance.*
- *Coega Development Corporation IDZ projects – Ecological assessments, Flora search & rescue and Construction monitoring.*
- *Environmental applications, construction monitoring and auditing for a wide range of projects, including infrastructure and housing clients.*
- *Various agricultural expansion and infrastructure projects.*
- *Various wind and solar energy and associated infrastructure projects.*
- *Numerous infrastructure projects including electrical, water and roads.*
- *Various Environmental Management and Rehabilitation Plans.*

24/06/2021

SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Jamie Robert Claude Pote

Registration Number: 115233

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Ecological Science (Professional Natural Scientist)

Effective **20 July 2016** Expires **31 March 2023**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

Mr Jamie Pote (BSc (Hons) PR. Sci. Nat.

PROJECT EXPERIENCE

PERFORMANCE STANDARD BIODIVERSITY AND CRITICAL HABITAT ASSESSMENTS (IFC PS6)

- DBSA Environmental & Social Safeguards Standards 9: Biodiversity Conservation and Sustainable Management Assessment: The Ilitha Fibre Project, Ethekwini 2021
- Critical Habitat & Biodiversity Assessment - Roggeveld Wind Energy Project 2020
- Biodiversity Assessment for Kalukundi Copper/Cobalt Mine, Democratic Republic of Congo 2008

TERRESTRIAL BIODIVERSITY ASSESSMENTS AND COMPLIANCE STATEMENTS

- Terrestrial Biodiversity Assessment (Addo BSD Offices) 2021
- Terrestrial Biodiversity Assessment (Blaauwater Farms) 2021
- Terrestrial Biodiversity Assessment (Buffelshoek Farm, Loerie) 2021
- Terrestrial Biodiversity & Aquatic Assessment & Review (Falcon Ridge Dam) 2021
- Terrestrial Biodiversity Assessment (Gubenxa Valley Deciduous Fruit) 2021
- Terrestrial Biodiversity Assessment (Little Chelsea Mixed-use) 2021
- Terrestrial Biodiversity Compliance Statement (Maidenhead Farm) 2021
- Terrestrial Biodiversity Review, Mulilo Total Hydra Storage Project Grid Interconnection 2021
- Terrestrial Biodiversity Compliance Statement (Lahlangubo River Bridge) 2021
- Terrestrial Biodiversity Assessment (Mbashe access roads - 3 sites) 2021
- Terrestrial Biodiversity Assessment (Burlington Farm Citrus Development, Cookhouse) 2020
- Terrestrial Biodiversity Compliance Statement: CHDM Cluster 9 Phase 3D Pipeline 2020
- Terrestrial Biodiversity Review, Mulilo Total Hydra Storage Project BESS 2020
- Terrestrial Biodiversity Assessment (Mbashe housing projects, Dutywa & Willowvale) 2020
- Terrestrial Biodiversity Assessment (Helpmekaar Dam, Tarkastad) 2020
- Terrestrial Biodiversity Assessment (Herbertsdale pipeline, Mossel Bay) 2020
- Terrestrial Biodiversity Assessment (Keurbooms Erf 155, Keurboomstrand) 2020
- Terrestrial Biodiversity Assessment (Lowmar Hydroelectric Project, Cradock) 2020
- Terrestrial Biodiversity Assessment (Mossel Bay Gas Power Plant) 2020
- Terrestrial Biodiversity Assessment (Erf 1820, Mthatha) 2020
- Terrestrial Biodiversity Assessment (Newlyn Manganese Terminal, Coega SEZ) 2020
- Terrestrial Biodiversity Assessment Thornhill Phase 2 Sanitation Link 2020

ENERGY PROJECTS (WIND FARM AND PHOTOVOLTAIC INFRASTRUCTURE)

- Preliminary Biodiversity Screening for Chrisdelina Ranch Agricultural Project, Kizenga District 2020
- Preliminary Biodiversity Screening and GIS mapping for Balekani Photovoltaic Solar Project 2020
- Preliminary Biodiversity Screening and GIS mapping for Sihhoye Photovoltaic Solar Project 2020
- Preliminary Biodiversity Screening and GIS mapping Mpaka Photovoltaic Solar Project 2020
- Preliminary Biodiversity Screening and GIS mapping for Chiwelwa Hydroelectric project 2020
- Ecological Assessment for Vermaak Boerdery Hydro Turbine (Cookhouse), Eastern Cape 2020
- Ecological Assessment for Windcurrent Wind Farm, Eastern Cape 2012
- Ecological Assessment for Universal Windfarm, NMB 2011
- Ecological Assessment for Inca Energy Windfarm, Northern Cape 2011
- Ecological Assessment for Broadlands Photovoltaic Farm, Eastern Cape 2011
- Botanical Assessment for Electrawinds Windfarm Coega, NMB 2010
- Botanical Assessment and Open Space Management Plan for Mainstream WEF Phase 2, Eastern Cape 2010

SPECIALISED ECOLOGICAL REPORTS AND REVIEWS

- Rebels Vlei Riparian delineation 2021

- Buck Kraal Dam Rehabilitation Plan Review 2020
- Rehabilitation Plan for Hitgeheim Farm (Farm 960), Sunland, Eastern Cape 2017
- Green Star Rating Ecological Assessment for SANRAL office, Bay West City, NMBM 2015
- Section 24G Assessment and Rehabilitation Plan for Bingo Farm, Eastern Cape 2014
- Mapping and Ecological services for Congo Agriculture, Republic of Congo 2013
- Rehabilitation Plan for Nieu Bethesda, Eastern Cape 2011
- Mapping of pipeline for Kenton Water Board, Eastern Cape 2010
- Rehabilitation Plan for N2 Upgrade - Coega to Colchester, NMB 2010
- Representative for landowner group for Seaview burial Park, NMB 2010
- Botanical Sensitivity Analysis for LSDF, Greenbushes-Hunters Retreat, NMB 2008
- Forestry Rehabilitation Assessment Report for Amahlathi Forest Rehabilitation, Eastern Cape 2007
- Botanical & Riparian Assessment for Orange River Weirs-Boegoeberg, Douglas Dam and Sendelingsdrif, Northern Cape 2006
- Botanical Assessment for State of the Environment Report for Chris Hani District Municipality SoER, Eastern Cape 2003

ROAD AND RAILWAY INFRASTRUCTURE PROJECTS

- Ecological Assessment for CDC IDZ Mn Terminal, conveyor and railway line, NMB 2013
- Ecological Assessment Review for Penhoek Road widening, Eastern Cape 2012
- Ecological Assessment for R61 road widening, Eastern Cape 2012
- Botanical Assessment for Chelsea RD - Walker Drive Ext., NMB 2010
- Botanical Assessment for Motherwell - Blue Water Bay Road, NMB 2010
- Ecological Assessment for Port St John Road, Eastern Cape 2010
- Botanical Basic Assessment for Bholani Village Rd, Port St Johns, Eastern Cape 2009
- Botanical Report, EMP and Rehab Plan for Coega-Colchester N2 Upgrade, NMB 2009
- Botanical Assessment for Manganese Conveyor Screening Report, NMB 2008
- Ecological Assessment for Road Layout for Whiskey Creek- Kenton, Eastern Cape 2006

MINING PROJECTS

- Ecological Assessment for Bochum Borrow Pits, Limpopo 2013
- Ecological Assessment and Mining and Rehabilitation Plan for Greater Soutpansberg Mining Project, Limpopo (3 proposed Mines) 2013
- Ecological Assessment for Thulwe Road Borrow Pits, Limpopo 2013
- Ecological Assessment and Mining and Rehabilitation Plan for Baghana Mining, Ghana 2010
- Botanical Assessment for Zwartenbosch Quarry, Eastern Cape 2008
- Botanical description & map production for Quarry - Rudman Quarry, Eastern Cape 2008
- Botanical Basic Assessment, Rehab Plan & Maps for Borrow Pit - Rocklands/Patensie, Eastern Cape 2008
- Botanical Assessment & Maps for Sandman Sand Gravel Mine, Eastern Cape 2008
- Botanical Assessment & GIS maps for Shamwari Borrow Pit, Eastern Cape 2008
- Detailed Botanical Assessment, EMP and Rehab Plan for Kalukundi Copper/Cobalt Mine, Democratic Republic of Congo 2008
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit Humansdorp/Oyster Bay, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Cala, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Camdeboo, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Somerset East, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Nkonkobe, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Ndlambe, Eastern Cape 2008
- Botanical Assessment, Rehab Plan & Maps for AWRM - Blue Crane Route, Eastern Cape 2008

- Botanical Assessment, EMP and Rehabilitation Plan for AWRM - Cathcart, Eastern Cape 2008
- Botanical Assessment, GIS maps and Rehab Plan for Mthatha Prospecting, Eastern Cape 2008
- Regional Botanical Map for mining prospecting permit, Welkom 2008
- Botanical Assessment for Scoping Report and Detailed Botanical Assessment and Rehab Plan for Elitheni Coal Mine, Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Oyster Bay, Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Bathurst/GHT, Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit – Jeffreys Bay, Eastern Cape 2007
- Botanical Assessment, Rehab Plan & Maps for Borrow Pit - Storms River/Kareedouw, Eastern Cape 2007
- Biophysical Assessment for Humansdorp Quarry, Eastern Cape 2006
- Botanical Assessment, Rehab Plan & Maps for Quarry-Cathcart & Somerset East, Eastern Cape 2006
- Botanical Assessment, Rehab Plan & Maps for Quarry - Despatch Quarry, NMB 2006
- GIS Mapping & Botanical Assessment and Rehab Plan for Quarry - JBay Crushers, Eastern Cape 2006
- Botanical Assessment, EMP and Rehabilitation Plan for Polokwane Silicon Smelter, Limpopo 2006
- Application for Mining Permit for Bruce Howarth Quarry, Eastern Cape 2006

POWERLINE INFRASTRUCTURE PROJECTS

- Ecological Assessment: Dieprivier-Karreedouw 132kV Powerline realignment, Kouga LM 2016
- Eskom Ecological Walkdown: Dieprivier-Karreedouw 132 kV Powerline, Kouga LM 2016
- Eskom Solar one Ecological Walkdown: Nieuwehoop 400 kV powerline 2015
- Rehabilitation Plan and Auditing for Grassridge-Poseidon Powerline Rehab, Eastern Cape 2013
- Ecological Assessment for Dieprivier Karreedouw 132kV Powerline, Eastern Cape 2012
- Flora and Fauna search and Rescue plan for Van Stadens Windfarm Powerline, NMB 2012
- Botanical Assessment for Dedisa-Grassridge Powerline, Eastern Cape 2010
- Ecological Assessment for Grahamstown-Kowie Powerline, Eastern Cape 2010
- Species of Special Concern Mapping Transmission Line for San Souci to Nivens Drift 132kV powerline, NMB 2009
- Botanical Assessment for Eskom Powerline - Albany-Kowie, Eastern Cape 2009
- Botanical Assessment for Eskom 132 kV Dedisa Grassridge Power line-Coega, NMB 2006
- Botanical Assessment for Eskom Power line – Tyalara-Wilo, Eastern Cape 2006
- Botanical Assessment for Steynsburg - Teebus 132 kV powerline, Eastern Cape 2004

PIPELINE INFRASTRUCTURE PROJECTS

- Terrestrial Biodiversity Assessment for Thornhill Phase 2 Sanitation Link, Ndlambe, Eastern Cape 2020
- Botanical Assessment for Ngqamakhwe Regional Water Supply Scheme (Phase 3) 2018
- Ecological Assessment for Butterworth Emergency Bulk Water Supply Scheme 2017
- Ecological Assessment for Karringmelkspruit Emergency Bulk Water Supply (Lady Grey) 2017
- Ecological Assessment for Wanhoop-Willowmore Bulk Water Supply, Eastern Cape 2016
- Ecological Assessment for Steytlerville Bulk Water Supply, Eastern Cape (Phase 4) 2013
- Ecological Assessment for Steytlerville Bulk Water Supply, Eastern Cape (Phase 5) 2013
- Detailed Ecological Assessment for Suikerbos Pipeline, Gauteng 2012
- Basic Botanical Assessment for Wanhoop farm pipeline, Eastern Cape 2010
- Basic Botanical Assessment for Chatty Sewer, NMB 2010
- Species of Special Concern Mapping for Seaview Pipeline, NMB 2009
- Species of Special Concern Mapping for Chelsea Bulk Water Pipeline, NMB 2009
- Map Production for Russell Rd Stormwater, NMB 2008
- Basic Botanical Assessment for Albany Pipeline, Eastern Cape 2008
- Environmental Risk Assessment for Elands River pipeline, Eastern Cape 2007

- Detailed Botanical Assessment for Motherwell Pipeline, NMB 2007
- Detailed Botanical Assessment, GIS maps for Erasmuskloof Pipeline, Eastern Cape 2007
- Botanical & Floristic Report for Hankey pipeline, Eastern Cape 2006
- Detailed Botanical Assessment for Port Alfred water pipeline, Eastern Cape 2004

GENERAL INFRASTRUCTURE DEVELOPMENT PROJECTS

- Ecological Assessment for Amalinda crossing, BCM, Eastern Cape 2019
- Ecological Assessment for Cookhouse Bridge rehabilitation and temporary deviation, Eastern Cape 2019
- Ecological Assessment for Nelson Mandela University Access Road, NMB 2019
- Botanical Assessment for Zachtevlei Dam (Lady Grey), Eastern Cape 2017
- Botanical Assessment for Gcebula River bridge (Peddie), Eastern Cape 2017
- Botanical Assessment for Kouga Dam wall upgrade, Eastern Cape 2012
- Botanical Assessment for Jansenville Cemetery, Eastern Cape 2009
- Botanical Assessment for Radar Mast construction for South African Weather Service – BCM & NMB 2008
- Botanical Assessment and GIS mapping for golf course realignment for East London Golf Course, BCM, Eastern Cape 2007
- Botanical Assessment for PE Airport Extention, NMB 2006
- Botanical Assessment for Kidd's Beach Desalination Plant, BCM, Eastern Cape 2006

HOUSING DEVELOPMENT PROJECTS

- Terrestrial Biodiversity Assessment for Erf 1820 Mthatha, KSDM, Eastern Cape 2020
- Ecological Assessment for Erf 599 Walmer Mixed Use Development, Nelson Mandela Bay 2019
- Ecological Assessment Portion 21-23 and 41 of Farm 807, Gonubie, Buffalo City 2019
- Ecological Assessment for Emerald Sky Housing Project, BCMM 2019
- Ecological Assessment for Erf 14, Kabega, Port Elizabeth 2017
- Ecological Assessment for Fairwest Rental Housing, Port Elizabeth 2017
- Ecological Assessment for Hankey Housing, Kouga District Municipality 2015
- Ecological Assessment for Lebowakgoma Housing, Limpopo 2013
- Ecological Assessment for Giyani Development, Limpopo 2013
- Ecological Assessment for Palmietfontein Development, Limpopo 2013
- Ecological Assessment for Seshego Development, Limpopo 2013
- Botanical Assessment for Sheerness Road, BCM, Eastern Cape 2013
- Ecological Assessment for Ethembeni Housing, NMB 2012
- Ecological Assessment for Pelana Housing, Limpopo 2012
- Flora Search and Rescue Plan for Kwanobuhle Housing, Western Cape 2011
- Botanical Assessment for The Crags 288/03, Western Cape 2010
- Ecological Assessment Revision Report for Fairview Housing, NMB 2010
- Botanical Assessment, EMP and Open Space Management Plan for Hornlee Housing Development, Western Cape 2010
- Botanical Assessment for Little Ladywood, Western Cape 2010
- Botanical Assessment and Open Space Management Plan for Motherwell NU31, NMB 2010
- Botanical Assessment and Open Space Management Plan for Plett 443/07, Western Cape 2010
- Botanical Assessment for Willow Tree Farm, NMB 2010
- Botanical Assessment for Kouga RDP Housing, Eastern Cape 2009
- Botanical Assessment for Fairview Erf 1226 (Wonderwonings), NMB 2009
- Species List Compilation for Zeekoerivier Humansdorp, Eastern Cape 2009
- Botanical Assessment for Woodlands Golf Estate (Farm 858), BCM, Eastern Cape 2009

- Botanical Assessment for Plettenberg Bay - 438/4, Western Cape 2009
- Vegetation Assessment for Kwanokuthula RDP housing project, Western Cape 2008
- Site screening assessment for Greenbushes Site screening, NMB 2008
- Botanical Assessment for Fairfax development, Eastern Cape 2008
- Botanical Assessment for Plettenberg Bay Brakkloof 50&51, Western Cape 2008
- Botanical Assessment, GIS mapping for Theescombe Erf 325, NMB 2008
- Site Screening for Mount Road, NMB 2008
- Botanical Assessment for Greenbushes Farm 40 Swinburne 404, NMB 2008
- Botanical Assessment for Greenbushes 130, NMB 2008
- Botanical Assessment for Greenbushes Kuyga no. 10, NMB 2008
- Botanical Assessment for Plettenberg Bay - 438/24, Western Cape 2007
- Botanical Assessment for Plettenberg Bay - Olive Hills 438/7, Western Cape 2007
- Botanical Assessment for Gonubie Portion 809/9, BCM, Eastern Cape 2006
- Botanical Assessment for Glengariff Farm 723, BCM, Eastern Cape 2006
- Botanical Assessment for Gonubie Portion 809/10, BCM, Eastern Cape 2006
- Botanical Assessment for Gonubie Portion 809/4 & 5, BCM, Eastern Cape 2006
- Botanical Assessment for Plettenberg bay - Ladywood 438/1&3, Western Cape 2006
- Botanical Assessment and Rehab Plan for Winterstrand Desalination Plant, BCM 2006
- Botanical Assessment for Bosch Hoogte, NMB 2006
- Botanical Assessment for Plettenberg bay Farm 444/38, Western Cape 2006
- Botanical Assessment for Plettenberg Bay - 444/27, Western Cape 2006
- Botanical Assessment for Leisure Homes, BCM, Eastern Cape 2006
- Botanical Basic Assessment for Trailees Wetland Assessment, Eastern Cape 2005
- Botanical Assessment and Rehab Plan for Arlington Racecourse - PE, NMB 2005
- Botanical Assessment for Smart Stone, NMB 2005
- Botanical Assessment for Peninsular Farm (Port Alfred), Eastern Cape 2005
- Botanical Assessment for Mount Pleasant - Bathurst, Eastern Cape 2005
- Botanical Assessment and RoD amendments for Colchester Erven 1617 & 1618 (Riverside), NMB 2005
- Basic Botanical Assessment for Parsonsvlei 3/4, Eastern Cape 2005
- Botanical Assessment for Bridgemead – Malabar PE, NMB 2004

AGRICULTURAL PROJECTS

- Ecological Assessment for Vermaak Boerdery Hydro Turbine (Cookhouse)2020 2020
- Thornhill Eggland Specialist Ecological Assessment 2020
- Ecological Assessment for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape 2015
- Ecological Assessment for Citrus expansion on farm 960, Patensie (AIN du Preez Boerdery) 2014
- Ecological Assessment for Doornkraal Pivot (Hankey), Eastern Cape 2014
- Ecological Assessment for Tzaneen Chicken Farm, Limpopo 2013
- Botanical Assessment and Open Space Management Plan for Kudukloof, NMB 2010
- Botanical Assessment and Open Space Management Plan for Landros Veeplaats, NMB 2010
- Botanical Assessment and Flora Relocation Plan for Wildemans Plaas, NMB 2006

GOLF ESTATE AND RESORT DEVELOPMENT PROJECTS

- Species List& Comments Report for Kidds Beach Golf Course, BCM, Eastern Cape 2009
- Botanical Assessment for Plettenberg Bay -Farm 288/03, Western Cape 2009
- Botanical Assessment for Rockcliff Golf Course, BCM, Eastern Cape 2008
- Botanical Assessment for Rockcliff Resort Development, BCM, Eastern Cape 2007
- Botanical Assessment, EMP and Rehabilitation Plan for Tiffendel Ski Resort, Eastern Cape 2006

MIXED USE DEVELOPMENT PROJECTS

- Ecological Assessment for South-End Precinct Mixed Use Development, Nelson Mandela Bay 2018
- Botanical Assessment, EMP and Open Space Management Plan for Bay West City, NMB 2010
- Botanical Assessment, GIS maps, Open Space and Rehab Plans for Fairview Erf 1082, NMB 2009
- Botanical Assessment and GIS maps for Utopia Estate PE, NMB 2008
- Botanical Assessment and GIS mapping for Madiba Bay Leisure Park, NMB 2007
- Botanical Assessment and GIS mapping for Madiba Bay Leisure Park, NMB 2007
- Botanical Basic Assessment for Cuyler Manor (Farm 320), Uitenhage, NMB 2007

BUSINESS AND INDUSTRIAL DEVELOPMENT PROJECTS

- Ecological Assessment for Parsonsvlei Erf 984 & 1134 Parsonsvlei, NMB 2020
- Mthatha Retails and Service Center 2020
- Ecological Assessment for Walmer Erf 11667 - Bidfood Warehousing Development, NMB 2020
- Ecological Assessment for Portion 87 of the Farm Little Chelsea No 10, NMB 2020
- Ecological Assessment for Bay West City ENGEN Service Station, NMB 2015
- Ecological Assessment for Green Star grading for SANRAL, NMB 2014
- Ecological Assessment for OTGC Tank Farm, NMB 2012
- Botanical Assessment and Open Space Management Plan for Petro SA Refinery, Coega IDZ, NMB 2010
- Botanical Assessment for Bluewater Bay Erf 805, NMB 2009
- Ecological Assessment for Bay West City, NMB 2007
- Botanical Assessment for Kenton Petrol Station, Eastern Cape 2005
- Botanical Assessment and RoD amendments for Colchester Petrol Station, NMB 2005

ECO-ESTATE DEVELOPMENT PROJECTS

- Botanical Re-Assessment of Swanlake Eco Estate, Aston Bay, Eastern Cape 2018
- Detailed Botanical Assessment and Open Space Management Plan for Olive Hills, Western Cape 2010
- Botanical Assessment and EMP for Zwartenbosch Road, Eastern Cape 2010
- Botanical Assessment - Poultry Farm for Coega Kammaskloof Farm 191, NMB 2008
- Botanical Assessment - Housing development for Coega Ridge, NMB 2008
- Botanical Assessment, Rehabilitation Plan, EMP and GIS maps for Amanzi Estate, NMB, 2008
- Botanical Assessment for Roydon Game farm, Queenstown, Eastern Cape 2007
- Botanical Assessment for Winterstrand Estate (Farm 1008), BCM, Eastern Cape 2007
- Botanical Assessment for Homeleigh Farm 820, BCM, Eastern Cape 2007
- Botanical Basic Assessment, Rehab Plan & Maps for Candlewood, Tsitsikamma, Western Cape 2007
- Botanical Assessment, EMP and Rehab Plan for Carpe Diem Eco development, Eastern Cape 2007
- Botanical Assessment, EMP and Rehabilitation Plan for Seaview Eco-estate, NMB 2006
- Botanical Assessment for Kidd's Beach portion 1076, BCM, Eastern Cape 2006
- Botanical Assessment for Palm Springs, Kidds Beach East London, BCM, Eastern Cape 2006
- Botanical Assessment for Nahoon Farm 29082, BCM, Eastern Cape 2006
- Botanical Assessment for Rosehill Farm, Eastern Cape 2005
- Botanical Assessment for Resolution Game Farm, Eastern Cape 2005
- Botanical Assessment for Gonubie Portion 809/11, BCM, Eastern Cape 2005
- Botanical Assessment for Kidd's Beach portion 1075, BCM, Eastern Cape 2005

FLORA AND FAUNA RELOCATION PLANS, PERMITS AND IMPLEMENTATION

- Flora Search and Rescue for Nelson Mandela University Phase 2 & 3 Residences, Eastern Cape 2020

- Flora Search and Rescue for Fairwest Housing Estate, Nelson Mandela Bay, Eastern Cape 2019
- Flora Search and Rescue for Utopia Estate, Nelson Mandela Bay, Eastern Cape 2019
- Flora Search and Rescue for Citrus expansion on Boschkraal Citrus Farm, Sunland, Eastern Cape 2018
- Flora Search and Rescue for Wanhoop pipeline, Willowmore, Eastern Cape 2018
- Flora Search and Rescue for Wilgekloof pipeline, Willowmore, Eastern Cape 2018
- Flora Search and Rescue for Citrus expansion on Hitgeheim Farm (Farm 960), Sunland, Eastern Cape 2017
- Flora Search and Rescue for Steytlerville Bulk Water Supply, Eastern Cape (Phase 5) 2016
- Flora Search and Rescue for Citrus expansion on Farm 960, Patensie (AIN du Preez Boerdery) 2016
- Flora Search and Rescue for Steytlerville Bulk Water Supply & WTW, Eastern Cape (Phase 4) 2015
- Flora and Fauna Search and Rescue for Riversbend Citrus Farm, NMB 2014
- Flora and Fauna Search and Rescue for Mainstream Windfarm, Eastern Cape 2013
- Flora Search and Rescue for Steytlerville Bulk Water Supply, Eastern Cape (Phase 1, 2 & 3) 2013
- Flora and Fauna Search and Rescue for OTGC Tank Farm, Coega IDZ, NMB 2013
- Flora and Fauna Search and Rescue for Jeffreys Bay School, Eastern Cape 2013
- Flora Search and Rescue Plan for Red Cap Wind Farm, Eastern Cape 2012
- Flora Relocation for Disco Poultry Farm, NMB 2010
- Flora Relocation for Mainstream Windfarm, Eastern Cape 2010

ENVIRONMENTAL MANAGEMENT PLANS

- Final Environmental Management Programme (EMPr) and Maintenance Management Plan for South End Precinct Mixed Use Zone, Nelson Mandala Bay Municipality 2020
- Final Environmental Management Programme (EMPr) for Coega Land-Based Aquaculture Development Zone (ADZ), Coega Industrial Development Zone (IDZ), Nelson Mandela Bay Municipality 2019
- Basic Botanical Assessment for Kromensee EMP (Jeffries Bay), Eastern Cape 2010
- Wetland Management Plan for NMB Portnet, NMB 2010
- Baseline Botanical Study, Vegetation mapping and EMP for Local Nature Reserve for Plettenberg Bay Lookout LNA, Western Cape 2009
- Biodiversity & Ecological Processes for Bathurst-Commonage, Eastern Cape 2006
- EMP for Kromensee EMP (Jeffries Bay), Eastern Cape 2006
- Floral Survey for Mbotyi Conservation Assessment, Eastern Cape 2005
- Identifying and Assessment on Aquatic Weeds for Pumba Private Game Reserve, Eastern Cape 2005

BASIC ASSESSMENT APPLICATION PROJECTS (DEDEAT)

- Basic Assessment Application for Parsonsvlei Erf 984 & 1134 Parsonsvlei 2020
- Construction of Deviation and Rehabilitation of Bridge along DR02481 road 2020
- Basic Assessment Application for Vermaak Boerdery Hydro Turbine (Cookhouse) 2020
- Basic Assessment Application for Walmer Erf 11667 Bidfood Warehousing Development 2020
- Basic Assessment Application for Portion 87 of the Farm Little Chelsea No 10 2020
- Basic Assessment Application for Nelson Mandela University Access Road, NMB 2019
- Basic Assessment, WULA and Borrow Pit/Quarry Mining Application, Clarkebury Rd, Idutywa 2019

- Basic Assessment Application for Erf 599 Walmer Mixed Use Development, Nelson Mandela Bay 2019
- Basic Assessment Application for Cookhouse Bridge rehabilitation and temporary deviation 2019
- Basic Assessment Application for Erf 14 Kabega, NMBM 2017
- Basic Assessment Application for Hankey Housing, Kouga District Municipality 2017
- Basic Assessment Application for Fairwest Rental Housing, Nelson Mandela Bay 2017
- Basic Assessment Application for Citrus expansion on Hitgeheim Farm, Sunland, Eastern Cape 2015

- Basic Assessment Application for Hankey Housing, Kouga District Municipality 2015
- Basic Assessment Application for Citrus expansion on farm 960, Patensie (AIN du Preez Boerdery) 2014
- Basic Assessment Application for South-End Precinct Mixed Use Development, Nelson Mandela Bay 2018

MINING PERMIT/ENVIRONMENTAL MANAGEMENT PROGRAMME APPLICATIONS (DMR)

- Mining BAR/EMP's for Blue Crane Route & Camdeboo LM 12 Borrow Pits – (DoT) 2019
- Mining BAR/EMP's for Elundini LM 6 Borrow Pits (DoT)
- Mining BAR/EMP's for Baviaans LM 6 Borrow Pits (DoT)
- Mining BAR/EMP's for Kouga & Koukamma LM 12 Borrow Pits (DoT)
- Mining BAR/EMP's for Sakhisizwe & Engcobo LM 12 Borrow Pits (DoT)
- Mining BAR/EMP's for Senqu LM 12 Borrow Pits (DoT)
- Mining BAR/EMP's for 24 Borrow Pits in 6 districts within the Eastern Cape– (SANRAL) 2018
- Mining BAR/EMP's for Ingquza Hill LM Borrow Pits – (SANRAL) 2017
- Mining BAR/EMP's for Baviaans LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Senqu LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Inkwanca (Enoch Mgijima) LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Kouga/Koukamma LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Sakhisizwe/Engcobo LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Raymond Mahlaba LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Camdeboo LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Elundini LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Emalahleni/Intsika Yethu LM Borrow Pits – (DRPW) 2017
- Mining BAR/EMP's for Nkonkobe LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Mbhashe LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Mbizana LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Senqu LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Elundini LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Emalahleni LM Borrow Pits – (SANRAL) 2016
- Mining BAR/EMP's for Emalahleni LM Borrow Pits – (DRPW) 2016
- Mining BAR/EMP's for Ikwezi/Baviaans LM Borrow Pits – (DRPW) 2016
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (Tarkastad) (DRPW) 2015
- Mining BAR/EMP's for Chris Hani DM Borrow Pits – Intsika Yethu and Emalahleni (DRPW) 2015
- Mining BAR/EMP's for Joe Gqabi DM Borrow Pits – Senqu (DRPW) 2015
- Mining BAR/EMP's for Makana/Ndlambe LM Borrow Pits – Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Amahlathi LM Borrow Pits – Amatole (DRPW) 2015
- Mining BAR/EMP's for Mbashe/Mqume LM Borrow Pits – Amatole (DRPW) 2015
- Mining BAR/EMP's for Sundays River Valley LM Borrow Pits – Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Kouga LM Borrow Pits – Sarah Baartman (DRPW) 2015
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - MR00716 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR02581 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08041, DR08247, DR08248 & DR08504 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08599, DR08601 & DR08570 (DRPW) 2014
- Mining BAR/EMP's for Chris Hani DM Borrow Pits - DR08235, DR08551 & DR08038 (DRPW) 2014
- Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08092, DR08093 & DR08649 (DRPW) 2014
- Mining BAR/EMP's for Alfred Nzo DM Borrow Pits - DR08090, DR08412, DR08425, DR08129, DR08109, DR08106, DR08104 & DR08099 – Matatiele (DRPW) 2014

ENVIRONMENTAL COMPLIANCE AUDITING

- Environmental Compliance Audit (Habata Boerdery) 2021
- Environmental Compliance Audit (Sontule Farm) 2021

ENVIRONMENTAL MANAGEMENT, AUDITING, COMPLIANCE AND MONITORING PROJECTS

- Environmental Auditing Services Pre-construction and Construction (Rocky Coast Farm) 2021
- Environmental Auditing Services (Middledrift Breeder Facility) 2021
- Coega Aquaculture Development Zone Environmental Compliance and Monitoring for Construction (24 Months) 2020
- Construction of NMU West End Student Residences Phases 1 & 3 Environmental Control Office (30 Months) 2020
- Environmental Auditing and construction monitoring for construction of Phase 1 River Park (South End Precinct) 2020
- Waste Management License audit for Bedford Recycling project 2020
- Auditing for Construction of Fairwest Village Housing Project 2019
- Auditing for Construction of Utopia Estate monthly auditing 2019
- ECO for DRPW IRM Road Maintenance projects, Baviaans LM 2019
- ECO for DRPW IRM Road Maintenance projects, Senqu LM 2019
- ECO for DRPW IRM Road Maintenance projects, Kouga/Koukamma LM 2019
- ECO for DRPW IRM Road Maintenance projects, Sakhisizwe/Engcobo LM 2019
- ECO for DRPW IRM Road Maintenance projects, Elundini LM 2019
- ECO for DRPW IRM Road Maintenance projects, Emalahleni/Intsika Yethu LM 2019
- ECO for Construction of Fairwest Village Housing Project 2019
- ECO for Construction of Utopia Estate Mixed Use Project 2019
- ECO for Construction of NMU West End Student Residences Phases 1 & 3 2019
- ECO for Construction of Eco-Pullets pullet rearing facility, Paterson 2018
- ECO for DRPW IRM Road Maintenance projects, Raymond Mahlaba LM 2018
- ECO for DRPW IRM Road Maintenance projects, Inkwanca (Enoch Mgijima) LM 2018
- ECO for Citrus expansion on Farm 960, Patensie (AIN du Preez Boerdery) 2017
- ECO for Citrus expansion on Hitgeheim Farm (Farm 960), Sunland, Eastern Cape 2017
- DEO for improvement of national route R67 section 5 from Whittlesea (km 0.00) to Swart Kei river (km 15.40) – Murray & Roberts 2017
- ECO for SANRAL RRP Road Maintenance projects, Mbizana LM 2017
- ECO and Botanical Specialist for the special maintenance of national route R61 Section 2 from Elinus Farm (km 42.2) to N10 (km 85.0) (SANRAL) 2016
- Environmental Control Officer (ECO): Construction of NSRI Slipway - Port Elizabeth Harbour 2016
- ECO for SANRAL RRP Road Maintenance projects, Mbashe LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Nkonkobe LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Mbizana LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Senqu LM 2016
- ECO for SANRAL RRP Road Maintenance projects, Elundini LM 2016
- ECO and Environmental Management for closure of Bushmans River Landfill site 2016
- ECO for DRPW IRM Road Maintenance projects, Amahlathi Municipality 2015
- ECO for DRPW IRM Road Maintenance projects, Makana/Ndlambe Municipality 2015
- ECO for DRPW IRM Road Maintenance projects, Mbashe/Mqume Municipality 2015
- ECO for DRPW IRM Road Maintenance projects, Port St Johns, Mbizana, Ingquza Hill LM's 2015
- ECO for Riversbend Citrus Farm, NMB 2014
- ECO for Alfred Nzo DM Road resurfacing - DR08071, DR08649, DR08092, DR08418, DR08452, DR08015, DR08085, DR08639 & DR08073, Eastern Cape - MSBA 2014

- ECO Audits for Koukamma Flood Damage Road Repairs – Hatch Goba 2014
- EMP and ECO for Utopia Estate, NMB 2013
- Final EMPr submission for Seaview Garden Estate, NMB 2012
- ECO audits for NMB Road surfacing, NMB (multiple contacts) 2011
- EMPr submission and ECO for Seaview Garden Estate, NMB 2010
- ECO for Mainstream Windfarm wind monitoring mast installation, Eastern Cape 2010
- EMP and ECO for Sinati Golf Estate EMP, BCM, Eastern Cape 2009
- Flora Relocation Plan and Permit application for Wildemans Plaas, NMB 2006

ENVIRONMENTAL SCREENING PROJECTS

- Somerset East Stormwater Environmental Screening Report 2021
- Woodlands Diary Road Upgrade Environmental Screening Report, Kouga LM 2021
- Risk Assessment and Screening for proposed Heatherbank access road, NMB 2020
- Environmental Screening Report for Proposed Life Hospital parking expansion, NMB 2019
- Environmental Screening Report for Erf 984 & 1134 development, Parsonsvlei, NMB 2019
- Environmental Screening Report for proposed Khayalethu School, Buffalo City 2018
- Environmental Screening Report for Proposed Housing Development of Erf 8700, Kabega Park, NMB 2017
- Environmental Screening Report for Proposed Housing Development of Erf 14, Kabega Park, NMB 2017
- Environmental Screening Report for Proposed Fairwest Social Housing project, Fairview, NMB 2016
- Environmental Screening Report for Development of Little Chelsea No 25, NMB 2016
- Terrestrial Vegetation Risk Assessment for proposed Skietnek Citrus Farm development (Kirkwood) 2015
- Preliminary Environmental Risk Assessment: NSRI Slipway Port Elizabeth 2015
- Environmental Screening Report for Proposed Development of a Dwelling on Erf 899, Theescombe 2015
- Environmental Screening Report for Proposed Development on Erf 559, Walmer, Port Elizabeth 2015
- Environmental Screening Report for Proposed Housing Scheme Development of Erf 8709, Wells Estate 2015
- Environmental Screening Report for Development of Portion 10 of Little Chelsea No 87, NMB 2015

SECTION 24G APPLICATIONS

- 12 000 ML Dam constructed on farm 960, Patensie (MGM Trust) 2015
- Illegal clearing of 20 Ha of lands on Hitgeheim Farm, Sunland, Eastern Cape 2015

CONFERENCES AND PUBLICATIONS

- Pote, J., Shackleton, C.M., Cocks, M. & Lubke, R. 2006. *Fuelwood harvesting and selection in Valley Thicket*, South Africa. Journal of Arid Environments, 67: 270-287.
- Pote, J., Cocks, M., Dold, T., Lubke, R.A. and Shackleton, C. 2004. *The homegarden cultivation of indigenous medicinal plants in the Eastern Cape*. Indigenous Plant Use Forum, 5 - 8 July 2004, Augsburg Agricultural School, Clanwilliam, Western Cape.
- Pote, J. & Lubke, R.A. 2003. *The selection of indigenous species suitable for use as fuelwood and building materials as a replacement of invasive species that are currently used by the under-privileged in the Grahamstown commonage.* Working for Water Inaugural Research Symposium 19 - 21 August 2003, Kirstenbosch. Poster presentation.
- Pote, J. & Lubke, R.A. 2003. *The screening of indigenous pioneer species for use as a substitute cover crop for rehabilitation after removal of woody alien species by WfW in the grassy fynbos biome in the Eastern Cape*. Working for Water Inaugural Research Symposium 19 - 21 August 2003, Kirstenbosch, South Africa.

OTHER RESEARCH EXPERIENCE

- Resource assessment of bark stripped trees in indigenous forests in Weza/Kokstad area (June 2000; Dr C. Geldenhuis & Mr. M. Kaplin).
- Working for Water research project for indigenous trees for woodlots (December 2000/January 2001; Prof R.A. Lubke, Rhodes University).
- Project coordinator and leader of the REFYN project – A BP conservation gold award: Conservation and Restoration of Grassy-Fynbos. A multidisciplinary project focusing on management, restoration and public awareness/education (2001 – 2002).
- Conservation Project Management Training Workshops: Royal Geographical Society, London 2001 – Fieldwork Techniques, Habitat Assessment, Biological Surveys, Project Planning, Public Relations and Communications, Risk Assessment, Conservation Education
- Selection and availability of wood in Crossroads village, Eastern Cape, South Africa. Honours Research Project 2002. Supervisors: Prof. R.A. Lubke & Prof. C. Shackleton.
- Floral Morphology, Pollination and Reproduction in Cyphia (LOBELIACEAE). Honours Research Project 2002. Supervisor: Mr. P. Phillipson.
- Forestry resource assessment of bark-stripped species in Amatola District (December 2002; Prof R.A. Lubke).
- Homegarden Cultivation of Medicinal Plants in the Amathole area. Postgraduate Research Project (2003-2005; Prof R.A. Lubke, Prof C.M. Shackleton and Ms C.M., Cocks).

4.5 Appendix I: Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity

SCOPE

The protocol (*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 (GN 320, 20 March 2020)*) provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities requiring environmental authorisation.

The protocol (*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 NEMA, gazetted on 30 October 2020*), provides the criteria for the assessment and reporting of impacts on plant and animal species for activities requiring environmental authorisation.

These protocols replace the requirements of Appendix 6 of the Environmental Impact Assessment Regulation8.

The assessment and minimum reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (https://screening.environment.gov.za/screeningtool). The requirements for terrestrial biodiversity are for landscapes or sites which support various levels of biodiversity. The relevant terrestrial biodiversity data in the screening tool has been provided by the South African National Biodiversity Institute9.

SITE SENSITIVITY VERIFICATION AND MINIMUM REPORT CONTENT REQUIREMENTS

Prior to commencing with a specialist assessment, the current use of the land and the potential environmental sensitivity of the site under consideration as identified by the screening tool must be confirmed by undertaking a site sensitivity verification.

1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.
2. The site sensitivity verification must be undertaken using:
   a. a desk top analysis, using satellite imagery,
   b. a preliminary on-site inspection; and
   c. any other available and relevant information.
3. The outcome of the site sensitivity verification must be recorded in the form of a report that:
   a. confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.
   b. contains a motivation and evidence (e.g., photographs) of either the verified or different use of the land and environmental sensitivity; and
   c. is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

TERRESTRIAL BIODIVERSITY SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS

8 The Environmental Impact Assessment Regulations, as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act 107 of 1998).

9 The biodiversity dataset has been provided by the South African National Biodiversity Institute (for details of the dataset, click on the options button to the right of the various biodiversity layers on ther screening tool).

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
1	General Information	
1.1	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified on the screening tool as being "very high sensitivity" for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment.	✓
1.2	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being 'low sensitivity' for terrestrial biodiversity, must submit a Terrestrial Biodiversity Compliance Statement.	✓
1.3	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.	✓
1.4	Similarly, where the information gathered from the site sensitivity verification differs from that identified as having a 'low' terrestrial biodiversity sensitivity on the screening tool, a Terrestrial Biodiversity Specialist Assessment must be conducted.	✓
1.5	If any part of the proposed development footprint falls within an area of 'very high' sensitivity, the assessment and reporting requirements prescribed for the 'very high' sensitivity apply to the entire footprint, excluding linear activities for which impacts on terrestrial biodiversity are temporary and the land in the opinion of the terrestrial biodiversity specialist, based on the mitigation and remedial measures, can be returned to the current state within two years of the completion of the construction phase, in which case a compliance statement applies. Development footprint in the context of this protocol means the area on which the proposed development will take place and includes any area that will be disturbed.	✓
	VERY HIGH SENSITIVITY RATING for terrestrial biodiversity features	
2	Terrestrial Biodiversity Specialist Assessment	
2.1	The assessment must be prepared by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with expertise in the field of terrestrial biodiversity.	✓
2.2	The assessment must be undertaken on the preferred site and within the proposed development footprint.	✓
2.3	The assessment must provide a baseline description of the site which includes, as a minimum, the following aspects:	✓
2.3.1	a description of the ecological drivers or processes of the system and how the proposed development with impact these;	✓
2.3.2	ecological functioning and ecological processes (e.g., fire, migration, pollination, etc.) that operate within the preferred site;	✓
2.3.3	the ecological corridors that the proposed development would impede including migration and movement of flora and fauna;	✓
2.3.4	the description of any significant terrestrial landscape features (including rare or important flora-faunal associations, presence of strategic water source areas (SWSAs) or freshwater ecosystem priority area (FEPA) sub catchments);	✓

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
2.3.5	a description of terrestrial biodiversity and ecosystems on the preferred site, including:	✓
(a)	main vegetation types;	✓
(b)	threatened ecosystems, including fisted ecosystems as well as locally important habitat types identified;	✓
(c)	ecological connectivity, habitat fragmentation, ecological processes and fine- scale habitats; and	✓
(d)	species, distribution, important habitats (e.g., feeding grounds, nesting sites, etc.) and movement patterns identified;	✓
2.3.6	the assessment must identify any alternative development footprints within the preferred site which would be of 'low' sensitivity as identified by the screening tool and verified through the site sensitivity verification; and	✓
2.3.7	the assessment must be based on the results of a site inspection undertaken on the preferred site and must identify:	✓
2.3.7.1	terrestrial critical biodiversity areas (CBAs), including:	✓
(a)	the reasons why an area has been identified as a CBA;	✓
(b)	an indication of whether or not the proposed development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation;	✓
(c)	the impact on species composition and structure of vegetation with an indication of the extent of clearing activities in proportion to remaining extent of the ecosystem type(s);	✓
(d)	the impact on ecosystem threat status;	✓
(e)	the impact on explicit subtypes in the vegetation;	✓
(f)	the impact on overall species and ecosystem diversity of the site; and	✓
(g)	the impact on any changes to threat status of populations of species of conservation concern in the CBA;	✓
2.3.7.2	terrestrial ecological support areas (ESAs), including:	✓
(a)	the impact on the ecological processes that operate within or across the site;	✓
(b)	the extent the proposed development will impact on the functionality of the ESA; and	✓
(c)	loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration | and movement of flora and fauna;	✓
2.3.7.3	protected areas as defined by the National Environmental Management: Protected Areas Act, 2004 including	✓
(a)	an opinion on whether the proposed development aligns with the objectives or purpose of the protected area and the zoning as per the protected area management plan;	✓
2.3.7.4	priority areas for protected area expansion, including-	✓
(a)	the way in which in which the proposed development will compromise or contribute to the expansion of the protected area I network;	✓
2.3.7.5	Strategic Water Source Areas (SWSAs) including:	✓
(a)	the impact(s) on the terrestrial habitat of SWSA; and	✓

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
(b)	the impacts of the proposed development on the SWSA water quality and quantity (e.g., describing potential increased runoff leading to increased sediment load in water courses),	✓
2.3.7.6	FEPA sub catchments, including-	✓
(a)	the impacts of the proposed development on habitat condition and species in the FEPA sub catchment;	✓
2.3.7.7	indigenous forests, including:	✓
(a)	impact on the ecological integrity of the forest and	✓
(b)	percentage of natural or near natural indigenous forest area lost and a statement on the implications in relation to the remaining areas.	✓
2.4	The findings of the assessment must be written up in a Terrestrial Biodiversity Specialist Assessment Report	✓
3	Terrestrial Biodiversity Specialist Assessment Report	
3.1	The Terrestrial Biodiversity Specialist Assessment Report must contain, as a minimum, the following information:	✓
3.1.1	contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	✓
3.1.2	a signed statement of independence by the specialist;	✓
3.1.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment,	✓
3.1.4	description of the methodology used to undertake the site verification and impact assessment and site inspection, including equipment and modeling used, where relevant;	✓
3.1.5	a description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;	✓
3.1.6	a location of the areas not suitable for development, which are to be avoided during construction and operation (where relevant);	✓
3.1.7	additional environmental impacts expected from the proposed development;	✓
3.1.8	any direct, indirect, and cumulative impacts of the proposed development;	✓
3.1.9	the degree to which impacts, and risks can be mitigated;	✓
3.1.10	the degree to which the impacts and risks can be reversed;	✓
3.1.11	the degree to which the impacts and risks can cause loss of irreplaceable resources;	✓
3.1.12	proposed impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr),	✓
3.1.13	a motivation must be provided if there were development footprints identified as per paragraph 2.3.6 above that were identified as having a 'low' terrestrial biodiversity sensitivity and that were not considered appropriate,	✓
3.1.14	a substantiated statement based on the findings of the specialist assessment, regarding the acceptability, or not. of the proposed development if it should receive approval a not; and	✓
3.1.15	any conditions to which this statement is subjected.	✓

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
3.2	The findings of the Terrestrial Biodiversity Specialist Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr where relevant.	✓
3.3	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	✓
	LOW SENSITIVITY RATING – for terrestrial biodiversity features	
4	Terrestrial Biodiversity Compliance Statement	✓
4.1	The compliance statement must be prepared by a specialist registered with the SACNASP and having expertise in the field of ecological sciences.	✓
4.2	The compliance statement must:	✓
4.2.1	be applicable to the preferred site and proposed development footprint;	✓
4.2.2	confirm that the site is of 'low' sensitivity for terrestrial biodiversity; and	✓
4.2.3	indicate whether or not the proposed development will have any impact on the biodiversity feature.	✓
4.3	The compliance statement must contain, as a minimum, the following information:	✓
4.3.1	the contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;	✓
4.3.2	a signed statement of independence by the specialist;	✓
4.3.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
4.3.4	a baseline profile description of biodiversity and ecosystems of the site;	✓
4.3.5	the methodology used to verify the sensitivities of the terrestrial biodiversity features on the site, including equipment and modeling used, where relevant;	✓
4.3.6	in the case of a linear activity, confirmation from the terrestrial biodiversity specialist that, in their opinion, based on the mitigation and remedial measures propped, the land can be returned to the current state within two years of completion of the construction phase;	✓
4.3.7	where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr;	✓
4.3.8	a description of the assumptions made and any uncertainties or gaps in knowledge or data; and	✓
4.3.9	any conditions to which this statement is subjected.	✓
4.4	A signed copy of the compliance statement must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	✓

ANIMAL SPECIES SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
1	General Information	
1.1	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "very high" or "high" sensitivity for terrestrial animal species must submit a Terrestrial Animal Species Specialist Assessment Report.	✓

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
1.2	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of "medium sensitivity" for terrestrial animal species must submit either a Terrestrial Animal Species Specialist Assessment Report or a Terrestrial Animal Species Compliance Statement, depending on the outcome of a site inspection undertaken in accordance with paragraph 4.	✓
1.3	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of "low" sensitivity for terrestrial animal species must submit a Terrestrial Animal Species Compliance Statement.	✓
1.4	Where the information gathered from the site sensitivity verification differs from the screening tool designation of "very high" or "high", for terrestrial animal species sensitivity and it is found to be of a "low" sensitivity, then a Terrestrial Animal Species Compliance Statement must be submitted.	✓
1.5	Where the information gathered from the site sensitivity verification differs from the screening tool designation of "low" terrestrial animal species sensitivity and it is found to be of a "very high" or "high" terrestrial animal species sensitivity, a Terrestrial Animal Species Specialist Assessment must be conducted.	✓
1.6	If any part of the development falls within an area of confirmed "very high" or "high" sensitivity, the assessment and reporting requirements prescribed for the "very high" or "high" sensitivity, apply to the entire development footprint. Development footprint in the context of this protocol means, the area on which the proposed development will take place and includes the area that will be disturbed or impacted.	✓
1.7	The Terrestrial Animal Species Specialist Assessment and the Terrestrial Animal Species Compliance Statement must be undertaken within the study area.	✓
1.8	Where the nature of the activity is not expected to have an impact on species of conservation concern (SCC) beyond the boundary of the preferred site, the study area means the proposed development footprint within the preferred site.	✓
1.9	Where the nature of the activity is expected to have an impact on SCC beyond the boundary of the preferred site, the project areas of influence (PAOI) must be determined by the specialist in accordance with Species Environmental Assessment Guideline10, and the study area must include the PAOI, as determined.	✓
	VERY HIGH AND HIGH SENSITIVITY RATING for terrestrial animal species	
2	Terrestrial Animal Species Specialist Assessment	✓
	VERY HIGH SENSITIVITY RATING Critical habitat for range-restricted species11 of conservation concern, that have a global range of less than 10 km2.	✓

10 Available at https://bgis.sanbi.org/
11 Species with a geographically restricted area of distribution.

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
	SCC listed on the IUCN Red List of Threatened Species12 or on South Africa's National Red List website13 as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare. Species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle. The number of mature individuals that ranks the site among the largest 10 aggregations known for the species. These areas are irreplaceable for SCC. **HIGH SENSITIVITY RATING** Confirmed habitat for SCC. SCC, listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare. These areas are unsuitable for development due to a very likely impact on SCC.	
2.1	The assessment must be undertaken by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with a field of practical experience relevant to the taxonomic group ("taxa") for which the assessment is being undertaken.	✓
2.2	The assessment must be undertaken in accordance with the Species Environmental Assessment Guideline14; and must:	✓
2.2.1	identify the SCC which were found, observed or are likely to occur within the study area;	✓
2.2.2	provide evidence (photographs or sound recordings) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility15, immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3);	✓
2.2.3	identify the distribution, location, viability16 and provide a detailed description of population size of the SCC, identified within the study area;	✓
2.2.4	identify the nature and the extent of the potential impact of the proposed development on the population of the SCC located within the study area;	✓
2.2.5	determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases, including the IUCN Red List of Threatened Species, South African Red List of Species, and/or other relevant databases;	✓
2.2.6	determine the potential impact of the proposed development on the habitat of the SCC located within the study area;	✓

12 https://www.iucnredlist.org/
13 This category includes the categories Extremely Rare, Critically Rare, and Rare
14 Available at https://bgis.sanbi.org/
15 The preferred platform is iNaturalist.org but any other national or international virtual museum.
16 the ability to survive and reproduce in the long term.

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
2.2.7	include a review of relevant literature on the population size of the SCC, the conservation interventions as well as any national or provincial species management plans for the SCC. This review must provide information on the need to conserve the SCC and indicate whether the development is compliant with the applicable species management plans and if not, include a motivation for the deviation;	✓
2.2.8	identify any dynamic ecological processes occurring within the broader landscape that might be disrupted by the development and result in negative impact on the identified SCC, for example, fires in fire-prone systems;	✓
2.2.9	identify any potential impact of ecological connectivity in relation to the broader landscape, resulting in impacts on the identified SCC and its long-term viability;	✓
2.2.10	determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each SCC;	✓
2.2.11	discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, Data Deficient or Near Threatened Species, as well as any undescribed species17; or roosting and breeding or foraging areas used by migratory species where these species show significant congregations, occurring in the vicinity; and	✓
2.2.12	identify any alternative development footprints within the preferred site which would be of "low" or "medium" sensitivity as identified by the screening tool and verified through the site sensitivity verification.	✓
2.3	The findings of the assessment must be written up in a Terrestrial Animal Species Specialist Assessment Report.	✓
3	Terrestrial Animal Species Specialist Assessment Report	✓
3.1	This report must include as a minimum the following information:	✓
3.1.1	contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	✓
3.1.2	a signed statement of independence by the specialist;	✓
3.1.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
3.1.4	a description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	✓
3.1.5	a description of the mean density of observations/number of sample sites per unit area18 and the site inspection observations;	✓
3.1.6	a description of the assumptions made and any uncertainties or gaps in knowledge or data;	✓

17 Undescribed species are to be assessed as "High Sensitivity".
18 Species Environmental Assessment Guideline

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
3.1.7	details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported19;	✓
3.1.8	the online database name, hyperlink, and record accession numbers for disseminated evidence of SCC found within the study area;	✓
3.1.9	the location of areas not suitable for development and to be avoided during construction where relevant;	✓
3.1.10	a discussion on the cumulative impacts;	✓
3.1.11	impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	✓
3.1.12	a reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	✓
3.1.13	a motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above that were identified as having "low" or "medium" terrestrial animal species sensitivity and were not considered appropriate.	✓
3.2	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	✓
4	MEDIUM SENSITIVITY SPECIES OF CONSERVATION CONCERN CONFIRMATION	
	MEDIUM SENSITIVITY RATING – for terrestrial animal species: Suspected habitat for SCC based either on historical records (prior to 2002) or being a natural area included in a habitat suitability model for this species20. SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	✓
4.1	Medium sensitivity data represents suspected habitat for SCC based on occurrence records for these species collected prior to 2002 or is based on habitat suitability modelling.	✓
4.2	The presence or likely presence of the SCC identified by the screening tool must be investigated through a site inspection by a specialist registered with the SACNASP with a field of practice relevant to the taxonomic groups ("taxa") for which the assessment is being undertaken.	✓
4.3	The assessment must be undertaken within the study area.	✓

19 The actual name of the sensitive species may not appear in the final EIA report nor any of the specialist reports released into the public domain. It should be referred to as a sensitive plant or animal and its IUCN extinction risk category should be included e.g., Critically Endangered sensitive plant or Endangered sensitive butterfly.

20 The methodology by which habitat suitability models have been developed are explained within the Species Environmental Assessment Guideline.

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
4.4	The site inspection to determine the presence or likely presence of SCC must be undertaken in accordance with the Species Environmental Assessment Guidelines.	✓
4.5	The site inspection is to confirm the presence, likely presence or confirmed absence of a SCC identified within the site identified as "medium" sensitivity by the screening tool.	✓
4.6	Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Animal Species Specialist Assessment must be submitted in accordance with the requirements specified for "very high" and "high" sensitivity in this protocol.	✓
4.7	Similarly, where no SCC are found on site during the site inspection or the presence is confirmed to be unlikely, a Terrestrial Animal Species Compliance Statement must be submitted.	✓
5	LOW SENSITIVITY RATING – for terrestrial animal species	
	Terrestrial Animal Species Compliance Statement Areas where no natural habitat remains. Natural areas where there is no suspected occurrence of SCC.	✓
5.1	The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Zoological Science or Ecological Science).	✓
5.2	The compliance statement must:	✓
5.2.1	be applicable to the study area;	✓
5.2.2	confirm that the study area, is of "low" sensitivity for terrestrial animal species; and	✓
5.2.3	indicate whether or not the proposed development will have any impact on SCC.	✓
5.3	The compliance statement21 must contain, as a minimum, the following information:	✓
5.3.1	contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae;	✓
5.3.2	a signed statement of independence by the specialist;	✓
5.3.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
5.3.4	a description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;	✓
5.3.5	the mean density of observations/ number of samples sites per unit area.	✓
5.3.6	where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;	✓
5.3.7	a description of the assumptions made and any uncertainties or gaps in knowledge or data; and	✓
5.3.8	any conditions to which the compliance statement is subjected.	✓

21 An example of a what is contained in a Compliance Statement for Animal Species Impact Assessment can be found in the Species Environmental Impact Assessment Guideline

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
6	A signed copy of the Terrestrial Animal Species Compliance Statement must be appended to the Basic Assessment Report or the Environmental Impact Assessment Report.	✓

PLANT SPECIES SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
1	General Information	
1.1	An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of "very high" or "high" sensitivity for terrestrial plant species must submit a Terrestrial Plant Species Specialist Assessment Report.	✓
1.2	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of "medium sensitivity" for terrestrial plant species must submit either a Terrestrial Plant Species Specialist Assessment Report or a Terrestrial Plant Species Compliance Statement, depending on the outcome of a site inspection undertaken in accordance with paragraph 4.	✓
1.3	An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of "low" sensitivity for terrestrial plant species must submit a Terrestrial Plant Species Compliance Statement.	✓
1.4	Where the information gathered from the site sensitivity verification differs from the screening tool designation of "very high" or "high", for terrestrial plant species sensitivity and it is found to be of a "low" sensitivity, then a Terrestrial Plant Species Compliance Statement must be submitted.	✓
1.5	Where the information gathered from the site sensitivity verification differs from the screening tool designation of "low" terrestrial plant species sensitivity and it is found to be of a "very high" or "high" terrestrial plant species sensitivity, a Terrestrial Plant Species Specialist Assessment must be conducted.	✓
1.6	If any part of the development falls within an area of confirmed "very high" or "high" sensitivity, the assessment and reporting requirements prescribed for the "very high" or "high" sensitivity, apply to the entire development footprint. Development footprint in the context of this protocol means, the area on which the proposed development will take place and includes the area that will be disturbed or impacted.	✓
1.7	The Terrestrial Plant Species Specialist Assessment and the Terrestrial Plant Species Compliance Statement must be undertaken within the study area.	✓
1.8	Where the nature of the activity is not expected to have an impact on species of conservation concern (SCC) beyond the boundary of the preferred site, the study area means the proposed development footprint within the preferred site.	✓
1.9	Where the nature of the activity is expected to have an impact on SCC beyond the boundary of the preferred site, the project areas of influence (PAOI) must be determined by the specialist in accordance with Species	✓

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
	Environmental Assessment Guideline22, and the study area must include the PAOI, as determined.	
	VERY HIGH AND HIGH SENSITIVITY RATING for terrestrial plant species	
2	Terrestrial Plant Species Specialist Assessment	✓
	VERY HIGH SENSITIVITY RATING Critical habitat for range-restricted species23 of conservation concern, that have a global range of less than 10 km2. SCC listed on the IUCN Red List of Threatened Species24 or on South Africa's National Red List website25 as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria or listed as Nationally Rare. Species aggregations that represent ≥1% of the global population size of a species, over a season, and during one or more key stages of its life cycle. The number of mature individuals that ranks the site among the largest 10 aggregations known for the species. These areas are irreplaceable for SCC. **HIGH SENSITIVITY RATING** Confirmed habitat for SCC. SCC, listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable, according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare. These areas are unsuitable for development due to a very likely impact on SCC.	✓
2.1	The assessment must be undertaken by a specialist registered with the South African Council for Natural Scientific Professionals (SACNASP) with a field of practical experience relevant to the taxonomic group ("taxa") for which the assessment is being undertaken.	✓
2.2	The assessment must be undertaken within the study area.	✓
2.3	The assessment must be undertaken in accordance with the Species Environmental Assessment Guideline26; and must:	✓
2.3.1	Identify the SCC which were found, observed or are likely to occur within the study area;	✓
2.3.2	provide evidence (photographs) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility27, immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3);	✓
2.3.3	identify the distribution, location, viability28 and provide a detailed description of population size of the SCC, identified within the study area;	✓

22 Available at https://bgis.sanbi.org/
23 Species with a geographically restricted area of distribution.
24 https://www.iucnredlist.org/
25 This category includes the categories Extremely Rare, Critically Rare, and Rare
26 Available at https://bgis.sanbi.org/
27 The preferred platform is iNaturalist.org but any other national or international virtual museum.
28 the ability to survive and reproduce in the long term.

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
2.3.4	identify the nature and the extent of the potential impact of the proposed development on the population of the SCC located within the study area;	✓
2.3.5	determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases, including the IUCN Red List of Threatened Species, South African Red List of Species, and/or other relevant databases;	✓
2.3.6	determine the potential impact of the proposed development on the habitat of the SCC located within the study area;	✓
2.3.7	include a review of relevant literature on the population size of the SCC, the conservation interventions as well as any national or provincial species management plans for the SCC. This review must provide information on the need to conserve the SCC and indicate whether the development is compliant with the applicable species management plans and if not, include a motivation for the deviation;	✓
2.3.8	identify any dynamic ecological processes occurring within the broader landscape that might be disrupted by the development and result in negative impact on the identified SCC, for example, fires in fire-prone systems;	✓
2.3.9	identify any potential impact of ecological connectivity in relation to the broader landscape, resulting in impacts on the identified SCC and its long-term viability;	✓
2.3.10	determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each SCC;	✓
2.3.11	discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, Data Deficient or Near Threatened Species, as well as any undescribed species29;	✓
2.3.12	identify any alternative development footprints within the preferred site which would be of "low" or "medium" sensitivity as identified by the screening tool and verified through the site sensitivity verification.	✓
2.4	The findings of the assessment must be written up in a Terrestrial Plant Species Specialist Assessment Report.	✓
3	Terrestrial Plant Species Specialist Assessment Report	✓
3.1	This report must include as a minimum the following information:	✓
3.1.1	contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	✓
3.1.2	a signed statement of independence by the specialist;	✓
3.1.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
3.1.4	a description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	✓
3.1.5	a description of the assumptions made and any uncertainties or gaps in knowledge or data;	✓

29 Undescribed species are to be assessed as "High Sensitivity".

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
3.1.6	a description of the mean density of observations/number of sample sites per unit area30 and the site inspection observations;	✓
3.1.7	details of all SCC found or suspected to occur on site, ensuring sensitive species31 are appropriately reported;	✓
3.1.8	the online database name, hyperlink, and record accession numbers for disseminated evidence of SCC found within the study area;	✓
3.1.9	the location of areas not suitable for development and to be avoided during construction where relevant;	✓
3.1.10	a discussion on the cumulative impacts;	✓
3.1.11	impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	✓
3.1.12	a reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	✓
3.1.13	a motivation must be provided if there were any development footprints identified as per paragraph 2.3.12 above that were identified as having "low" or "medium" terrestrial plant species sensitivity and were not considered appropriate.	✓
3.2	A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.	✓
4	MEDIUM SENSITIVITY SPECIES OF CONSERVATION CONCERN CONFIRMATION	
	MEDIUM SENSITIVITY RATING – for terrestrial plant species: Suspected habitat for SCC based either on there being records for this species collected in the past, prior to 2002, or being a natural area included in a habitat suitability model32. SCC listed on the IUCN Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered or Vulnerable according to the IUCN Red List 3.1. Categories and Criteria and under the national category of Rare.	✓
4.1	Medium sensitivity data represents suspected habitat for SCC based on occurrence records for these species collected prior to 2002 or is based on habitat suitability modelling.	✓
4.2	The presence or likely presence of the SCC identified by the screening tool must be investigated through a site inspection by a specialist registered with the SACNASP with a field of practice relevant to the taxonomic groups ("taxa") for which the assessment is being undertaken.	✓

30 Species Environmental Assessment Guideline
31 The actual name of the sensitive species may not appear in the final EIA report nor any of the specialist reports released into the public domain. It should be referred to as a sensitive plant or animal and its IUCN extinction risk category should be included e.g., Critically Endangered sensitive plant or Endangered sensitive butterfly.
32 The methodology by which habitat suitability models have been developed are explained within the Species Environmental Assessment Guideline.

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
4.3	The assessment must be undertaken within the study area.	✓
4.4	The site inspection to determine the presence or likely presence of SCC must be undertaken in accordance with the Species Environmental Assessment Guidelines.	✓
4.5	The site inspection is to confirm the presence, likely presence or confirmed absence of a SCC identified within the site identified as "medium" sensitivity by the screening tool.	✓
4.6	Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Plant Species Specialist Assessment must be submitted in accordance with the requirements specified for "very high" and "high" sensitivity in this protocol.	✓
4.7	Similarly, where no SCC are found on site during the site inspection or the presence is confirmed to be unlikely, a Terrestrial Plant Species Compliance Statement must be submitted.	✓
5	LOW SENSITIVITY RATING – for terrestrial plant species	
	Terrestrial Plant Species Compliance Statement Areas where no natural habitat remains. Natural areas where there is no suspected occurrence of SCC.	✓
5.1	The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Botanical Science or Ecological Science).	✓
5.2	The compliance statement must:	✓
5.2.1	be applicable to the study area;	✓
5.2.2	confirm that the study area, is of "low" sensitivity for terrestrial plant species; and	✓
5.2.3	indicate whether or not the proposed development will have any impact on SCC.	✓
5.3	The compliance statement33 must contain, as a minimum, the following information:	✓
5.3.1	contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae;	✓
5.3.2	a signed statement of independence by the specialist;	✓
5.3.3	a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	✓
5.3.4	a description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;	✓
5.3.5	where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;	✓
5.3.6	a description of the assumptions made and any uncertainties or gaps in knowledge or data;	✓

33 An example of a what is contained in a Compliance Statement for Plant Species Impact Assessment can be found in the Species Environmental Impact Assessment Guideline

TABLE 1:	ASSESSMENT AND REPORTING OF IMPACTS ON TERRESTRIAL BIODIVERSITY	REPORT REFERENCE
5.3.7	the mean density of observations/ number of samples sites per unit area34; and	✓
5.3.8	any conditions to which the compliance statement is subjected.	✓
6	A signed copy of the Terrestrial Plant Species Compliance Statement must be appended to the Basic Assessment Report or the Environmental Impact Assessment Report.	✓

34 Refer to the Species Environmental Assessment Guideline

4.6 Appendix J: Site Sensitivity Verification Report

4.6.1 Purpose of Report

The "*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 Act, when applying for Environmental Authorisation*", as published on 20 March, 2020 in National Gazette, No. 43110 in terms of NEMA (Act 107 of 1998) sections 24(5)(a), (h) and 44, lists protocols and minimum report requirements for environmental impacts on terrestrial biodiversity and provides the criteria for the assessment and reporting of impacts on terrestrial biodiversity for activities requiring environmental authorisation. The assessment and minimum reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the National web based Environmental Screening Tool. Prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration, identified by the screening tool, must be confirmed by undertaking a **site sensitivity verification**, which must include the following.

1. The site sensitivity verification must be undertaken by an environmental assessment practitioner or a specialist.
2. The site sensitivity verification must be undertaken through the use of:
    a. a desk top analysis, using satellite imagery.
    b. a preliminary on -site inspection; and
    c. any other available and relevant information.
3. The outcome of the site sensitivity verification must be recorded in the form of a report that:
    a. confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool.
    b. contains a motivation and evidence of either the verified or different use of the land and environmental sensitivity; and
    c. is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

The National Web Based Screening Tool was used to generate the potential environmental sensitivity of the site which has then been compared to various online and other databases and information sources in order to verify and confirm the validity of the screening tool findings. This was further supported with on-site observations and analysis of most recent aerial photography.

This terrestrial biodiversity site verification has been undertaken as per the requirements of the 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 (GN 320, 20 March 2020).

4.6.2 Data sources and references

Data sources that were utilised for this report include the following:

- National (DFFE) Web Based Screening Tool – to generate the sites potential environmental sensitivity.
- National Vegetation Map 2018 (NVM, 2018), Mucina & Rutherford (2006) and National Biodiversity Assessment (NBA, 2019) – description of vegetation types, species (including endemic) and vegetation unit conservation status.
- National and Regional Legislation including Provincial Nature Conservation Ordinance (P.N.C.O). NEM:BA Threatened or Protected Species (ToPS).
- Botanical Database of Southern Africa (BODATSA) and New Plants of Southern Africa (POSA) – lists of plant species and potential species of concern found in the general area (SANBI.)
- International Union for Conservation of Nature (IUCN) - Red List of Threatened Species.
- Animal Demography Unit Virtual Museum (VM) – potential faunal species.
- Global Biodiversity Information Facility (GBIF) – potential faunal species.

- Southern African Bird Atlas Project 2 (SABAP2) – for bird species records.
- National Red Books and Lists - mammals, reptiles, frogs, dragonflies & butterflies.
- National Freshwater Ecosystem Priority Areas assessment (NFEPA, 2011) - important catchments.
- National Protected Areas Expansion Strategy (NPAES, 2018) and South Africa Protected Area database (2020) – protected area information.
- Critical Biodiversity Areas of the Northern Cape (2016) – Bioregional Plan.
- Namakwa District Biodiversity Sector Plan (2008) – Bioregional Plan.
- Succulent Karoo Ecosystem Planning (SKEP, 2002).
- SANBI BGIS – All other biodiversity GIS datasets.
- Aerial Imagery – Google Earth, ESRI, Chief Surveyor General (http://csg.dla.gov.za).
- Cadastral and other topographical country data - Chief Surveyor General (http://csg.dla.gov.za).
- Other sources include peer-reviewed journals, regional and local assessments, and studies in the general location of the project and its area of influence, landscape prioritization schemes (Key Biodiversity Areas), systematic conservation planning assessments and plans (as above), and any pertinent masters and doctoral theses, among others.

4.6.3 Site visit

A site visit was conducted on 27 June 2022, during winter. Although the site falls within a summer rainfall area, for the purposes of this report, the site visit is deemed ot be adequate as the site is generally significantly transformed. The site visit and assessment were undertaken by Mr Jamie Pote, SACNASP registered ecological scientist with a BSc (Hons) degree in Botany and a BSc degree in Botany and environmental Science, with nearly 20 years' experience undertaking ecological assessments.

4.6.4 Assumptions, Uncertainties and Gaps in Knowledge

The findings and recommendations of this report may be susceptible to the following uncertainties and limitation:

- No assessment has been made of aquatic aspects relating to any wetlands, pans and rivers/seeps and/or estuaries outside of the scope of a terrestrial biodiversity report and have been undertaken by an aquatic specialist.
- No specific faunal assessment has been undertaken, but animals have been assessed in term of the terrestrial Biodiversity Assessment requirements.
- Any flora surveys based upon a limited sampling time-period, may not reflect the actual species composition of the site due to seasonal variations in flowering times.
- As far as possible, site collected data has been supplemented with desktop and database-centred distribution data as well as previous studies undertaken in the area.

4.6.5 Site and Activity Description

The proposed project consists of an area to the south of Harmony Target Mine, situated to the south-west of Allanridge (located north-west of Welkom) within the Free State province, in an extensive relatively flat plain, with some scattered, slightly irregular undulating plains and hills, bisected by non-perennial watercourses and interspersed with small to medium sized water bodies, mostly associated with water storage relating to the surrounding urban, mining and agricultural activities. The area under assessment includes an area of approximately 245 Ha, a portion of which will be utilised for the proposed PV facility. The proposed overhead powerline will connect the PV facility with the electrical network within the Target Mine area.

4.6.6 National Environmental Screening Tool

The DEA screening tool (06/05/2022) identifies Very High & Low Terrestrial Biodiversity, Low Plant Species (no species), Medium & Low Animal Species, Very High & Low Aquatic, High, Medium & Low Agricultural Sensitivities and Very High. High & Medium Landscape (Solar) sensitivities within or in

proximity to the site (PV facility: Figure 32 to Figure 37; Grid connection: Figure 38 to Figure 42). The content of this report will address the findings of the screening tool as well as any site-specific sensitivities that may not have been identified the screening tool. Not all features may necessarily be directly affected by the activity but being in proximity, the associated risks will be investigated further and addressed in the report where appropriate.

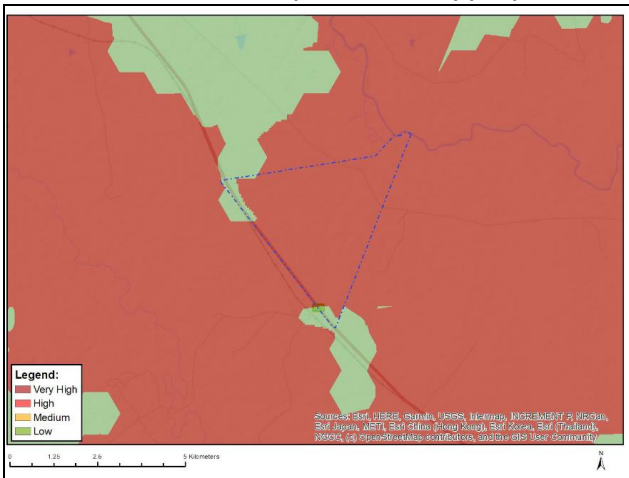

Figure 32: Terrestrial Biodiversity Sensitivity.

Figure 33: Plant Species Sensitivity.

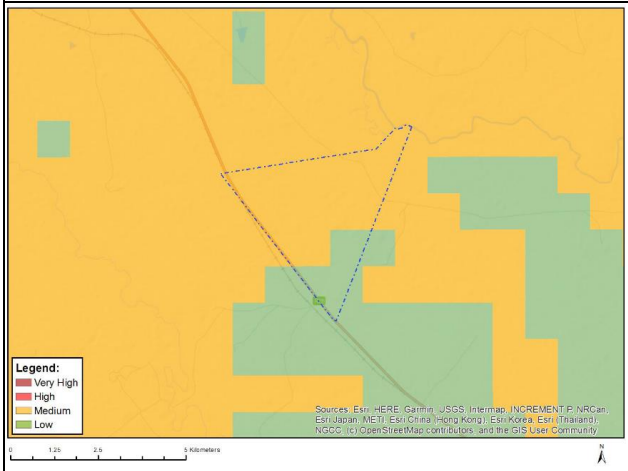

Figure 34: Animal Species Sensitivity.

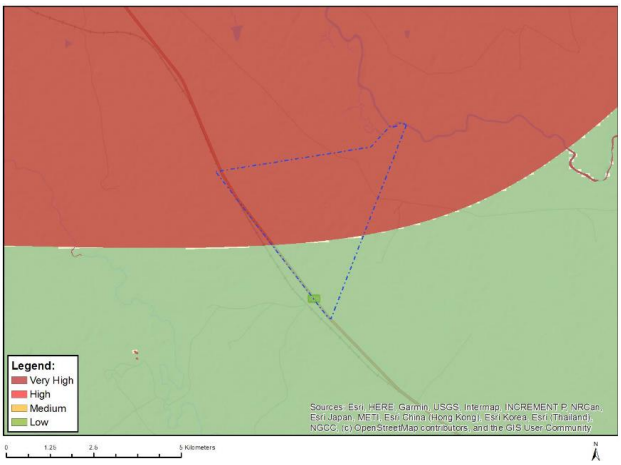

Figure 35: Aquatic Sensitivity.

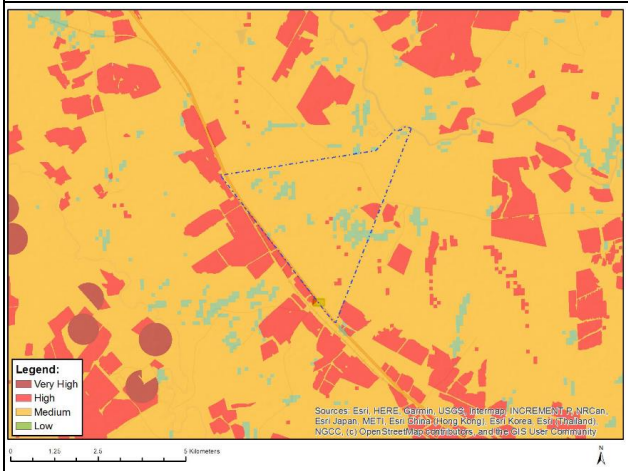

Figure 36: Agricultural Sensitivity.

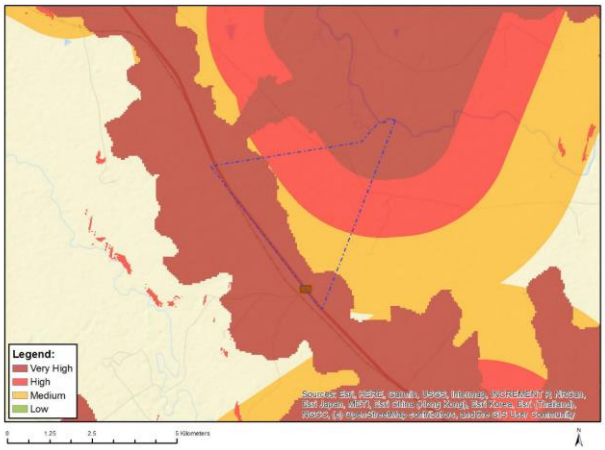

Figure 37: Landscape (Solar) Sensitivity.

Figure 38: Terrestrial Biodiversity Sensitivity.

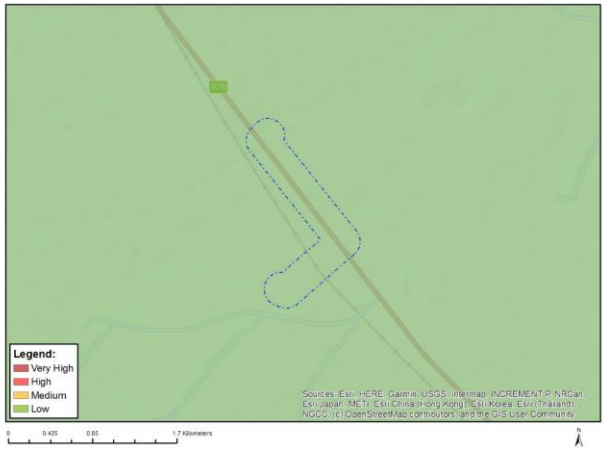

Figure 39: Plant Species Sensitivity.

Figure 40: Animal Species Sensitivity.

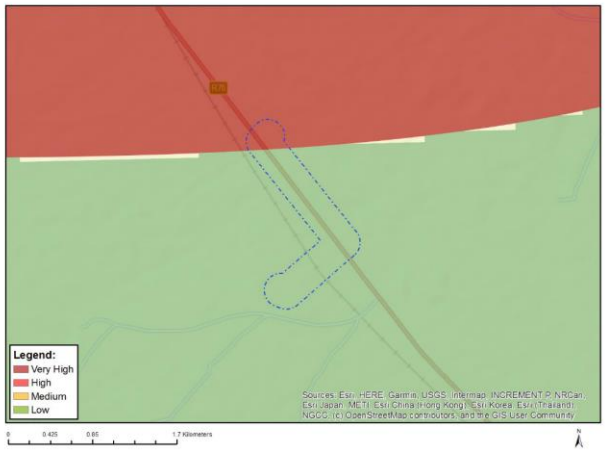

Figure 41: Aquatic Sensitivity.

Figure 42: Agricultural Sensitivity.

The DFFE Screening Tool indicates the following ecological sensitivities:

- Terrestrial Biodiversity is *Very High & Low* (Figure 32 & Figure 38).
- Plant species sensitivity is Low (Figure 33 & Figure 39).
- Animal Species sensitivity is Medium & Low (Figure 34 & Figure 40).
- Aquatic Sensitivity is Low & *Very High* (Figure 35 & Figure 41).
- Agricultural Sensitivity is *High, Medium & Low* (Figure 36 & Figure 42).
- Landscape (Solar) Sensitivity is *Very High, High, Medium & Low* (Figure 37)

SENSITIVITY	DESCRIPTION - FEATURE(S) IN PROXIMITY
TERRESTRIAL SENSITIVITY	
Very High	ESA 1 & 2; Erfdeel Private Nature reserve, PAES
High	None
Medium	None
Low	Present
PLANT SENSITIVITY	
Very High	None
High	None
Medium	None
Low	Present
ANIMAL SENSITIVITY	
Very High	*None*
High	None
Medium	*Smaug giganteus* (Reptile) *Hydrictis maculicollis* (Mammal)
Low	Present
AQUATIC SENSITIVITY	
Very High	Strategic water source area & Wetlands
High	None
Medium	None
Low	Present
AGRICULTURAL SENSITIVITY	
Very High	None
High	Land capability: 09. Moderate-High; 10. Moderate-High High Annual Crop Cultivation / Planted Pastures Rotation: Land capability: 06. Low-Moderate; 07. Low-Moderate; 08. Moderate High Annual Crop Cultivation / Planted Pastures Rotation: Land capability: 01. Very low/02. Very low/03.; Low-Very low/04. Low-Very low/05. Low
Medium	Land capability: 06. Low-Moderate; 07. Low-Moderate; 08. Moderate
Low	Land capability: 01. Very low; 02. Very low; 03. Low-Very low; 04. Low-Very low; 05. Low
LANDSCAPE SENSITIVITY	
Very High	Nature Reserve, Within 1.5 km of a nature reserve, Mountain tops and high ridges
High	Slope between 1:4 and 1:10, Between 1.5 and 3 km of a nature reserve
Medium	Between 3 and 5 km of a nature reserve
Low	None

As apparent from the DFFE National Environmental Screening Tool, the following can be deducted:

1. The **Terrestrial Biodiversity Theme** is Very High, with Ecological Support Area 1 & 2 (ESA) covering the site and broader surrounding area, as well as being adjacent to a private nature reserve. The site visit and assessment confirmed that the vegetation is generally natural and thus the ESA 1 & 2 categorisation is feasible.
2. The **Plant Species Theme** is Low with no flagged species of conservation concern. The detailed site visit will assess the presence or likely presence of any other species of conservation concern, including those requiring permits for removal, however none were identified during the initial site verification.
3. The **Animal Species Theme** is Medium, associated with the Reptile *Smaug giganteus* (Sungazer) and Mammal Spotted Necked Otter (*Hydrictis maculicollis*). Site verification confirms that suitable habitat is present, however initial investigations did not identify Sungazer colonies within the footprint area and the most suitable habitat for Spotted Necked Otters is the Vals River, which is also outside of the proposed footprint.
4. The **Aquatic Theme** is Very High/Medium, with the site overlapping with a designated SWSA. This is confirmed as the watercourses are tributaries of the Vals River which flows into downstream dams for urban settlements.

5. The Landscape (Solar) **Theme** is Very High/ High/Medium, being ion proximity to a nature reserve and also having slopes not suited to PV. The nature reserve is confirmed, and the slopes are also present, but cover a limited portion of the site.

The site assessment will physically screen for the presence of these, and other possible ecological related risks or species that are not identified in the screening tool. Not all features are directly affected, but being in proximity, the risks associated with the activity will be investigated further and addressed in the report.

4.6.7 Findings, Outcomes and Recommendations

Terrestrial Biodiversity

Site verification of the Terrestrial Biodiversity sensitivities is summarised in Table 10 and depicted in *Figure 43*, where ESA 1 is light green and CBA 1 is dark green. Rivers and Wetlands are also indicated.

Table 10: Terrestrial Biodiversity Features.

Feature		COMMENT
Critical Biodiversity Area 1	Present	Most of the site is within CBA 1, which corresponds to natural to near natural grassland with a low conservation status.
Critical Biodiversity Area 2	Present	A small fragment of CBA 2 near the -western side of the site, which corresponds to a man-made dam surrounded by low rocky hills.

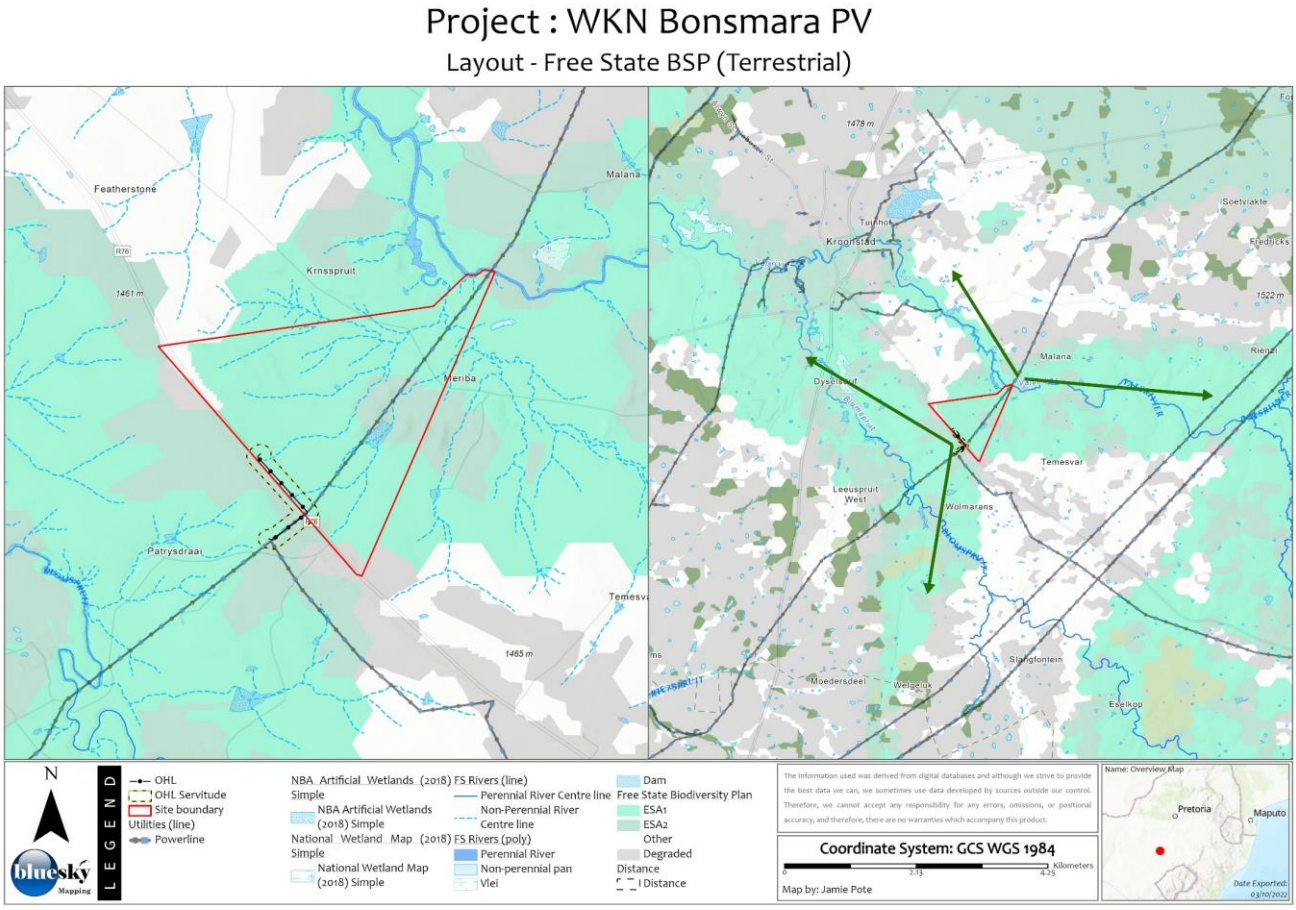

Figure 43: Free State Biodiversity Plan and Rivers and Wetlands.

Plant Species (Flora)

National Environmental Screening Tool flagged no flora species. Detailed Site investigations will assess any other species of conservation concern.

Animal Species (Fauna)

Further site investigations will confirm if the flagged species are present or not, or if suitable habitat is present and/or any other species of conservation concern are present or potentially present. The Spotted Necked Otter is least likely to be affected, as its preferred habitat (standing water and adjacent riparian vegetation) is not likely to be significantly affected by the proposed activity. The Giant Dragon Lizard is more likely to be affected, if present, as its preferred habitat is the sandy grassland. The initial site investigation which included a 70 km walked and driven track across both sites did not identify possible sites. A faunal assessment, including in particular a survey for burrow sites may be required in order to identify any areas where it does occur, as it is known to not easily disperse across the landscape to make new burrows should its habitat be destroyed. Both a landowner and farm manager confirmed that they had not seen Sungazers on the property in recent times, but that they were present on other farms in the area.

Aquatic

Wetland and watercourse features are present in the broader area, including several wetlands that are within the project area, but outside of the proposed PV footprint. The site falls within a designated SWSA area, being situated adjacent to the Valsrivier, which is a tributary of the Vaal River and upstream of the Bloemhof dam, which is situated near Bloemfontein to the north-west. Both are important water reservoirs for local towns and settlements.

4.6.8 Conclusions

While the terrestrial biodiversity screening tool designated the site as having an Ecological Support Area 1 & 2. This designation is likely associated with broader landscape level ecological processes to retain ecological connectivity at a landscape level. Species of Conservation concern (fauna) could be present as suitable habitat is present, however, none have been identified during site verification and initial site survey.

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