Themeda PV and Aristida PV – Terrestrial & Freshwater Ecology Scoping Report

Lichtenburg, North West Province

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CLIENT

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Report Name	**Themeda PV and Aristida PV – Terrestrial & Freshwater Ecology Scoping Report**
Reference	**Lichtenburg PV Cluster**
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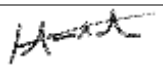
Reviewer	**Andrew Husted**  Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.
Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

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1 Introduction

1.1 Background

The Biodiversity Company was appointed to compile a Scoping Report, as part of the environmental authorisation process for the proposed Elandsfontein PV Cluster project (Figure 1-1). The following information is as provided by the client:

The Applicants, Themeda PV (Pty) Ltd and Aristida PV (Pty) Ltd, are proposing the construction of two photovoltaic (PV) solar energy facilities (known as the Themeda PV and the Aristida PV) located on a site approximately 5km north west of the town of Lichtenburg in the North West Province. Each PV facility will comprise several arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 100 MW each. The development area is situated within the Ditsobotla Local Municipality within the Ngaka Modiri Molema District Municipality on Portion 7 of Farm Elandsfontein 34. The site is accessible via the R503, located south east of the development area.

These two facilities (or cluster) have been jointly considered for the scoping assessment, but each PV facility will be assessed through a separate Environmental Impact Assessment (EIA) process. An assessment area of approximately 232 ha for Aristida PV and 197 ha for Themeda PV is being assessed as part of each EIA process and the infrastructure associated with each includes:

- *PV modules and mounting structures;*
- *Inverters and transformers;*
- *Battery Energy Storage System (BESS);*
- *Site and internal access roads (up to 8m wide);*
- *Auxiliary buildings (22kV or 33kV switch room, gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);*
- *Temporary and permanent laydown area;*
- *Cabling between the panels, to be laid underground where practical; and*
- *An on-site facility substation stepping up from 22kV or 33kV to 132kV, with an extent of up to 1ha to facilitate the connection between the solar PV facility and the grid connection solution.*

The PV facilities intend to connect to the National Grid via the Watershed Main Transmission Substation (MTS) (approximately 5 km east of the facility), however, the connection infrastructure associated with this grid solution is being assessed as part of a separate Environmental Application.

The approach was informed by the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices 320 (20 March 2020) in terms of NEMA, dated 20 March and 30 October 2020: "*Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National*

Environmental Management Act, 1998, when applying for Environmental Authorisation" (Reporting Criteria).

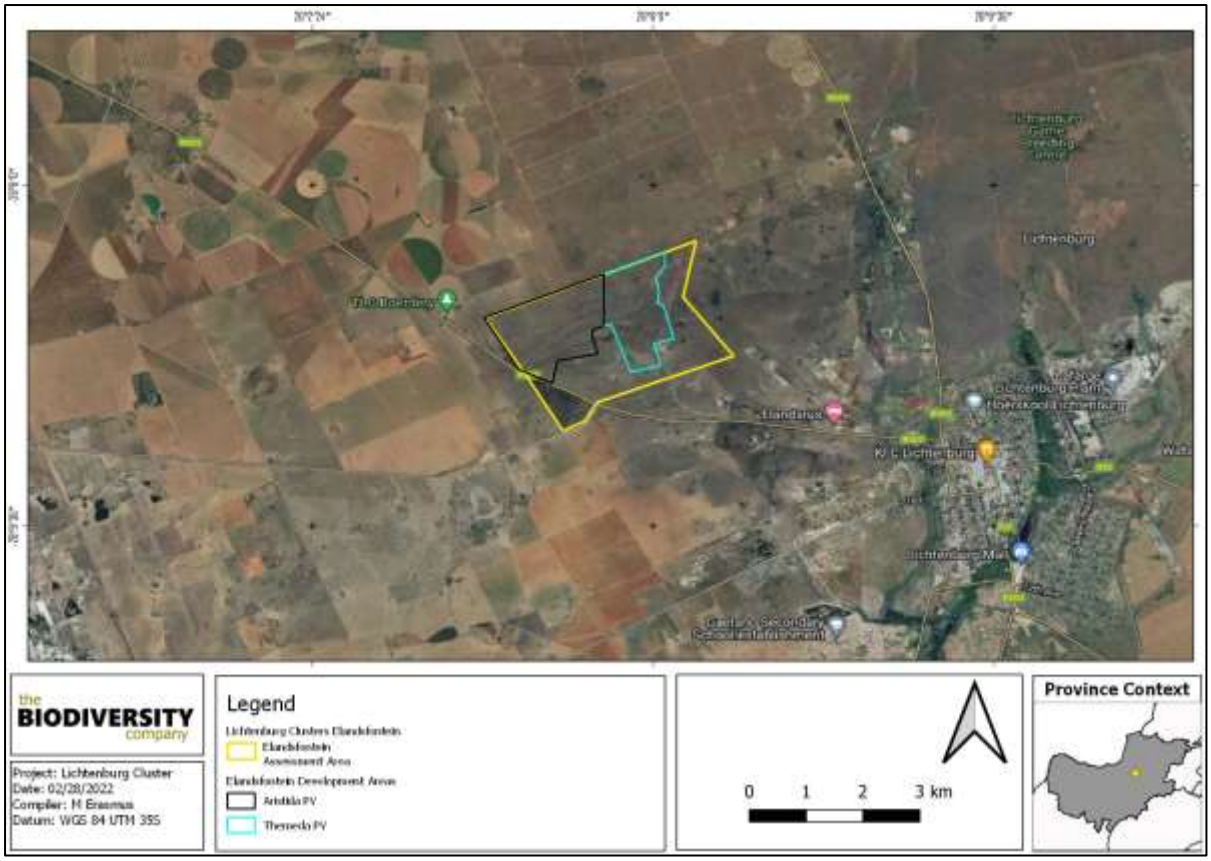

Figure 1-1 Map illustrating the location of the proposed Elandsfontein Cluster

1.2 Scope of Work

The principle aim of the assessment was to provide information to guide the impacts of the proposed activity to the ecological communities of the associated ecosystems within the project area. This was achieved through the following:

- Desktop assessment to identify the relevant ecologically important geographical features within the project area;
- Desktop assessment to compile an expected species list and identify possible threatened flora and fauna species that occur within the project area;
- Identify the possible impacts that might be associated with the project based on desktop information;
- The prescription of possible mitigation measures and recommendations for potential impacts; and

  Identify the approach towards assessment that will follow.

1.3 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 1-1 are applicable to the current project in terms of biodiversity and ecological support systems. The list below, although

extensive, may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-1 A list of key legislative requirements relevant to biodiversity and conservation in the North West

Region	Legislation
International	Convention on Biological Diversity (CBD, 1993)
	The Convention on Wetlands (RAMSAR Convention, 1971)
	The United Nations Framework Convention on Climate Change (UNFCC,1994)
	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
	The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
National	Constitution of the Republic of South Africa (Act No. 108 of 2006)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management Biodiversity Act (Act No. 10 of 2004)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24 , No 42946 (January 2020)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24 , No 43110 (March 2020)
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
	The Environment Conservation Act (Act No. 73 of 1989) and associated EIA Regulations
	National Protected Areas Expansion Strategy (NPAES)
	Environmental Conservation Act (Act No. 73 of 1983)
	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (101 of 1998)
	National Spatial Biodiversity Assessment (NSBA)
	World Heritage Convention Act (Act No. 49 of 1999)
	National Heritage Resources Act, 1999 (Act 25 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations, 2014
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
	Sustainable Utilisation of Agricultural Resources (Draft Legislation).
	White Paper on Biodiversity
Provincial	North-West Biodiversity Sector Plan of 2015 (READ, 2015).
	The North West Biodiversity Management Amendment Bill, 2017
	Bophuthatswana Nature Conservation Act (Act 3 of 1973)
	Transvaal Nature Conservation Ordinance (No. 12 of 1983)

2 Approach

2.1 Ecologically Important Landscape Features

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

- National Biodiversity Assessment 2018 (Skowno *et al*, 2019) - The purpose of the National Biodiversity Assessment (NBA) is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA deals with all three components of biodiversity: genes, species and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are:
    - Ecosystem Threat Status – indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition.
    - Ecosystem Protection Level – indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. Not Protected, Poorly Protected or Moderately Protected ecosystem types are collectively referred to as under-protected ecosystems.
- Protected areas:
    - South Africa Protected Areas Database (SAPAD) and South Africa Conservation Areas Database (SACAD) (DEA, 2021) – The South African Protected Areas Database (SAPAD) and the South Africa Conservation Areas Database (SACAD) contains spatial data for the conservation of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. These databases are updated on a continuous basis and forms the basis for the Register of Protected Areas which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.
    - National Protected Areas Expansion Strategy (NPAES) (SANBI, 2017) – The National Protected Area Expansion Strategy (NPAES) provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and are therefore, of high importance for biodiversity, climate resilience and freshwater protection.

    North West Biodiversity Sector Plan

The North-West Department of Rural, Environment, and Agricultural Development (READ), funded the update (2015/16) of the Biodiversity Sector Plan. The spatial component of the Biodiversity Sector Plan is based on systematic biodiversity planning undertaken by READ. The purpose of a Biodiversity Sector Plan is to inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact on biodiversity. This is done by providing a map of biodiversity priority areas, referred to as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), with accompanying land use planning and decision-making guidelines (READ,2015).

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (READ,2015).

Ecological Support Areas (ESAs) are terrestrial and aquatic areas that are not essential for meeting biodiversity representation targets (thresholds), but which play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree or extent of restriction on land use and resource use in these areas may be lower than that recommended for CBAs (READ,2015).

- Hydrological Setting:
    - South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer *et al,* 2018) – A South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was established during the National Biodiversity Assessment of 2018. It is a collection of data layers that represent the extent of river and inland wetland ecosystem types as well as pressures on these systems.
    - Strategic Water Source Areas (SWSAs) (Le Maitre *et al*, 2018) – SWSAs are defined as areas of land that supply a quantity of mean annual surface water runoff in relation to their size and therefore, contribute considerably to the overall water supply of the country. These are key ecological infrastructure assets and the effective protection of surface water SWSAs areas is vital for national security because a lack of water security will compromise national security and human wellbeing.
    - National Freshwater Ecosystem Priority Areas (NFEPA) – The NFEPA spatial data has been incorporated in the above mentioned SAIIAE spatial data set. However, to ensure that this data sets are considered we included it as the Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al*., 2011) are intended to be conservation support tools and are envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act (NEM:BA) biodiversity goals (Nel *et al.,* 2011).

2.2 Assumptions and Limitations

The following assumptions and limitations are applicable for this assessment:

- It is assumed that all information received from the client is correct;
- The extent of the project areas were considered for this assessment;
- Based on the type of activity, the property boundary was determined as the Project Area of Influence (PAOI) for the assessment; and
- This scoping report is based on desktop data.

3 Results & Discussion

3.1 Ecologically Important Landscape Features

The relevance of the proposed development to ecologically important landscape features are summarised in Table 3-1.

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

Desktop Information Considered	Aristida PV facility	Themeda PV facility	Section
Renewable Energy Database	Adjacent to project "In Process" with several projects in the area "approved"		3.1.1
Ecosystem Threat Status	Relevant – Located within a Least Concerned ecosystem		3.1.2.1
Ecosystem Protection Level	Relevant: Located in a Poorly Protected ecosystem		3.1.2.2
Critical Biodiversity Area	Relevant – Overlaps with aquatic ESA 1 & 2.	Relevant – Majority of the facility is classified as terrestrial CBA2. Also overlaps with aquatic ESA 1 & 2.	3.1.3
South African Inventory of Inland Aquatic Ecosystems	Relevant – The Aristida PV has a wetland occur within 500 meters of the PV area	Irrelevant – Does not overlap with any rivers or wetlands.	3.1.4
National Protected Area Expansion Strategy	Irrelevant – –Does not overlap any NPAES areas	Relevant – Does overlap a NPAES Focus area.	3.1.5
Strategic Powerline Corridors	Located in the Northern Corridor		-
Protected Areas (SAPAD & SACAD)	Irrelevant –11.5 km from a protected area: SACAD-Marico Biosphere Reserve		-
National Freshwater Ecosystem Priority Areas	Irrelevant – The project area does not overlap with any FEPA wetlands or rivers. Unclassified wetlands occur within 500 meters of the project area.		-
Strategic Water Source Areas	Irrelevant – Not located within a SWSA, closest SWSA is more than 200 km away. The project area does overlay the Bo-Molopo Karst Belt groundwater SWSA.		-
Renewable Energy Development Zones (REDZ)	Irrelevant – The project area is 60 km from the nearest REDZ		-

3.1.1 Renewable Energy Database

The Renewable Energy Database (http://egis.environment.gov.za/), shows that there are other projects in the near vicinity (Figure 3-1). This increases the potential cumulative impact on the habitats in the area.

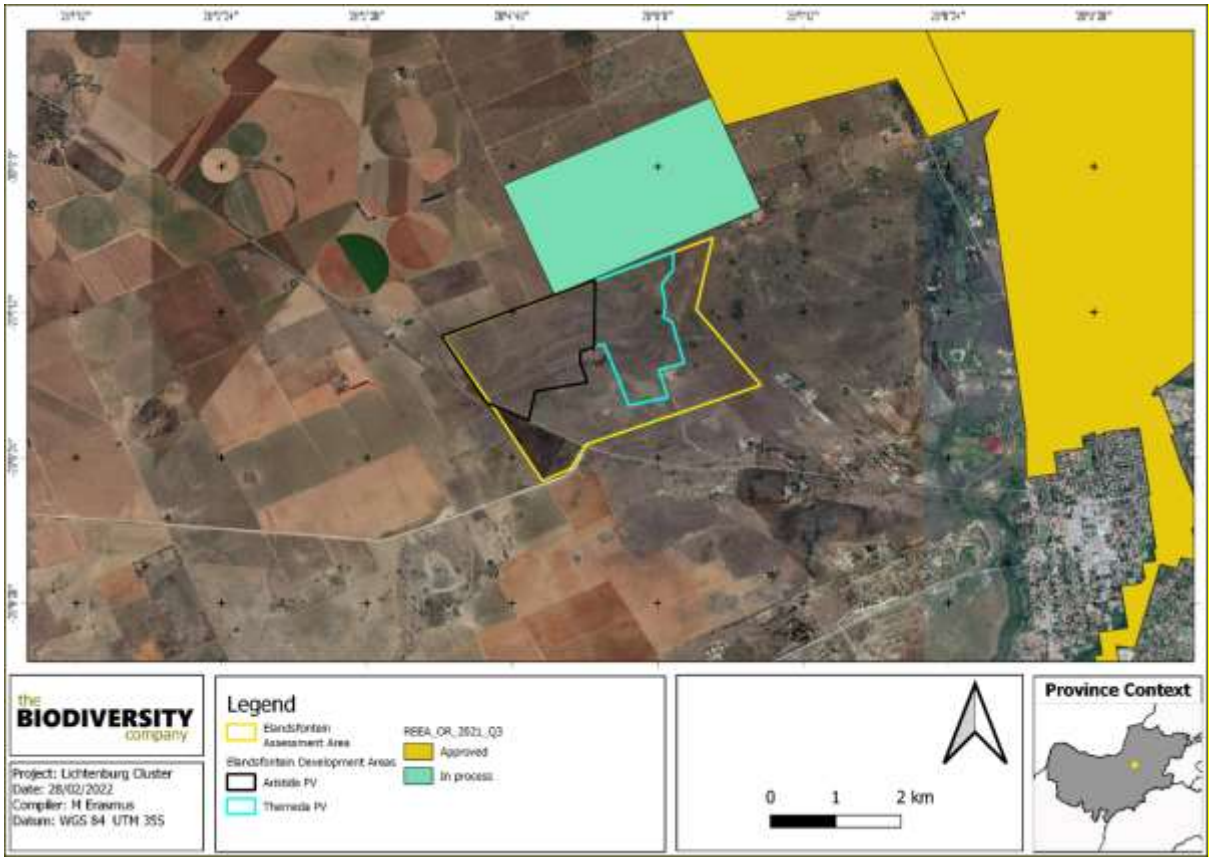

Figure 3-1 The project area in relation to the renewable energy database projects in the area.

3.1.2 The National Biodiversity Assessment 2018

The National Biodiversity Assessment (NBA) was completed as a collaboration between the SANBI, the DEA and other stakeholders, including scientists and biodiversity management experts throughout the country over three years (Skowno *et al*., 2019).

The purpose of the NBA is to assess the state of South Africa's biodiversity with a view to understanding trends over time and informing policy and decision-making across a range of sectors (Skowno *et al*., 2019).

The two headline indicators assessed in the NBA are *ecosystem threat status* and *ecosystem protection level* (Skowno *et al*., 2019). Government Notice No. 320[1] and Government Notice No. 1150[2] require reporting on the description of terrestrial biodiversity and ecosystems on the preferred site as per section 2.3.5 of the ''Theme-Specific Requirements". These procedures are for the assessment and minimum criteria for reporting on identified environmental themes when applying for environmental authorisation.

3.1.2.1 Ecosystem Threat Status

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically

[1] Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity as published in Government Gazette 43110 dated 20 March 2020

[2] Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Plant and Animal Species as published in Government Gazette 43855 dated 30 October 2020

Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset the proposed development areas overlaps with LC ecosystem (Figure 3-2).

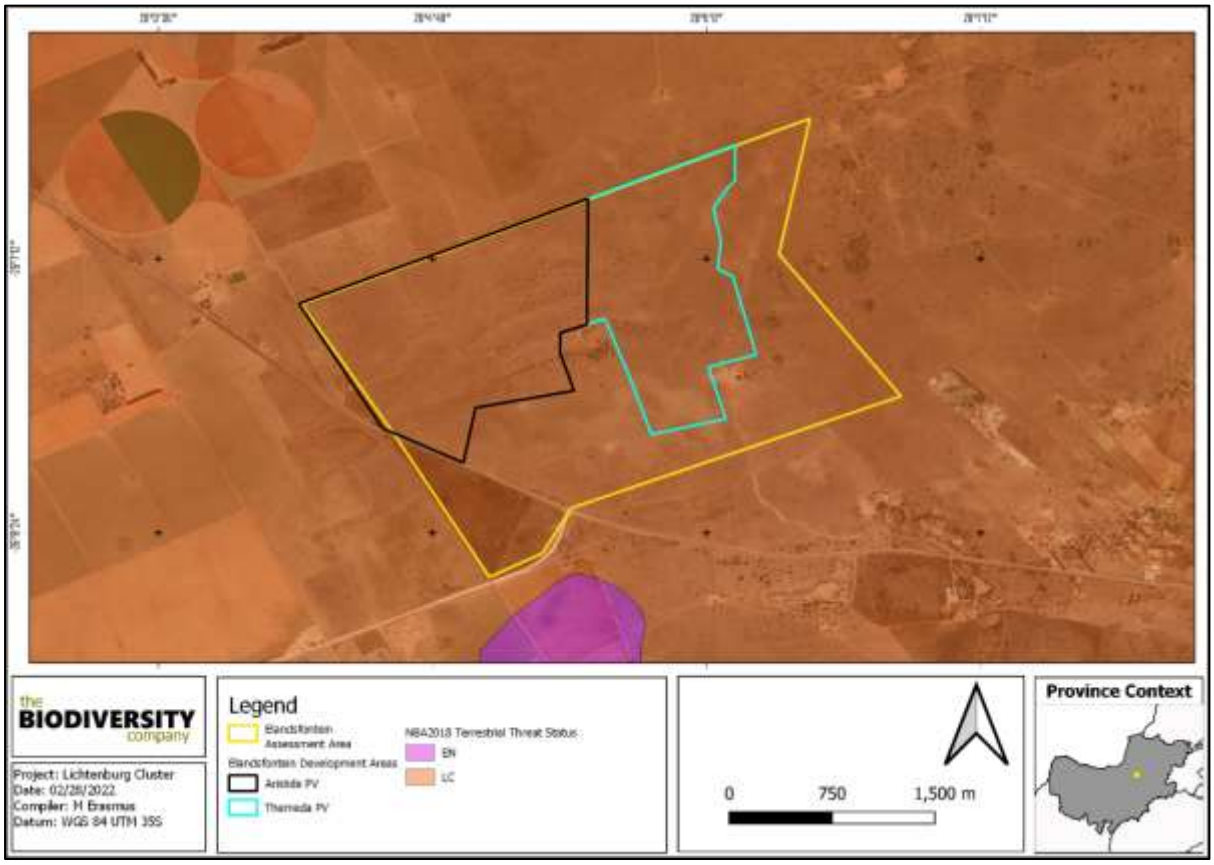

Figure 3-2 Map illustrating the ecosystem threat status associated with the assessment area

3.1.2.2 Ecosystem Protection Level

Indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. Not Protected, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The proposed development areas overlap with PP ecosystems (Figure 3-3).

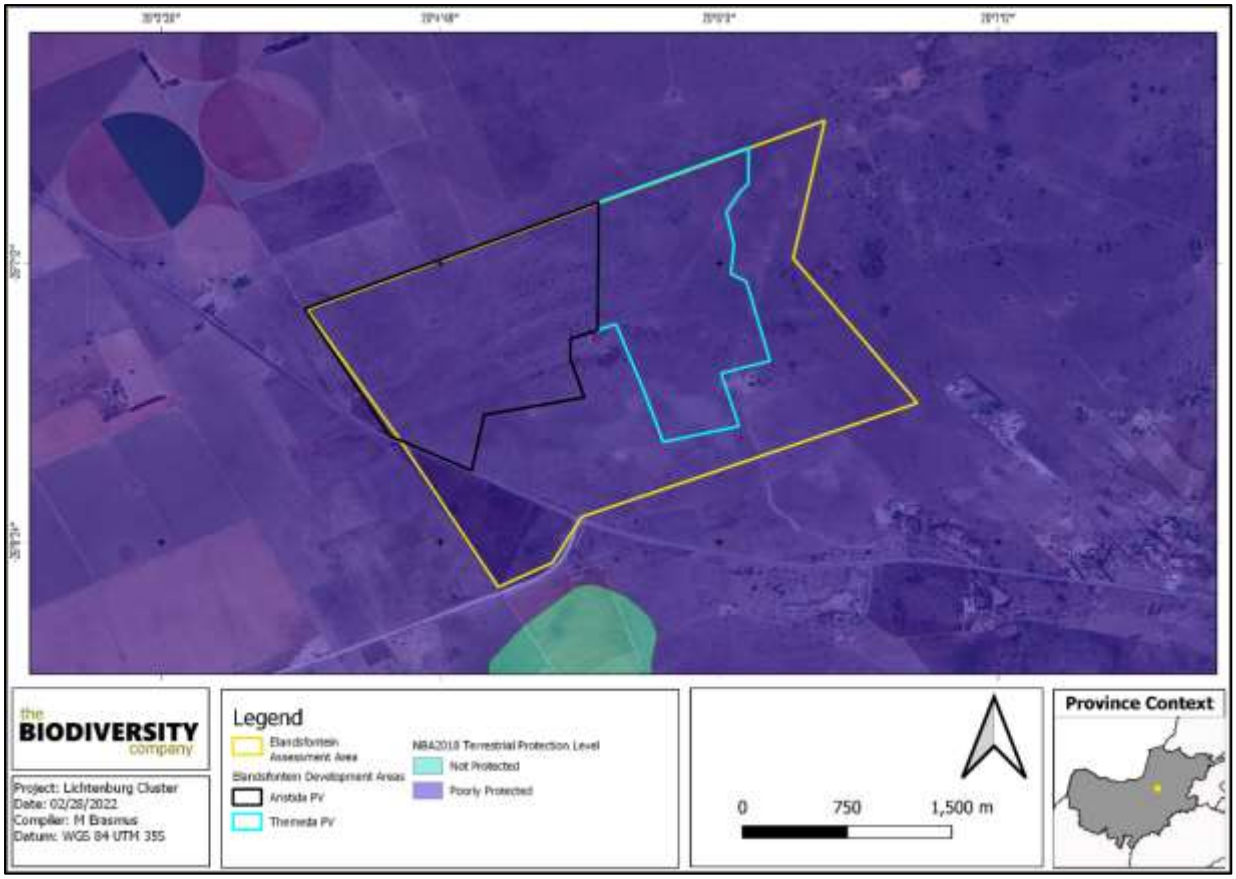

Figure 3-3 Map illustrating the ecosystem protection level associated with assessment area

3.1.3 Biodiversity Spatial Plan

Conservation of CBAs is crucial, in that if these areas are not maintained in a natural or near-natural state, biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI-BGIS, 2017). The proposed Themeda PV overlaps with an area regarded as terrestrial CBA2, (Figure 3-4) both PV areas overlap with aquatic ESA1 and ESA2(Figure 3-5). According to the BSP the terrestrial CBA2 and aquatic ESA1 designations for the area refers to a corridor (T7) and dolomite recharge areas (W5) respectively.

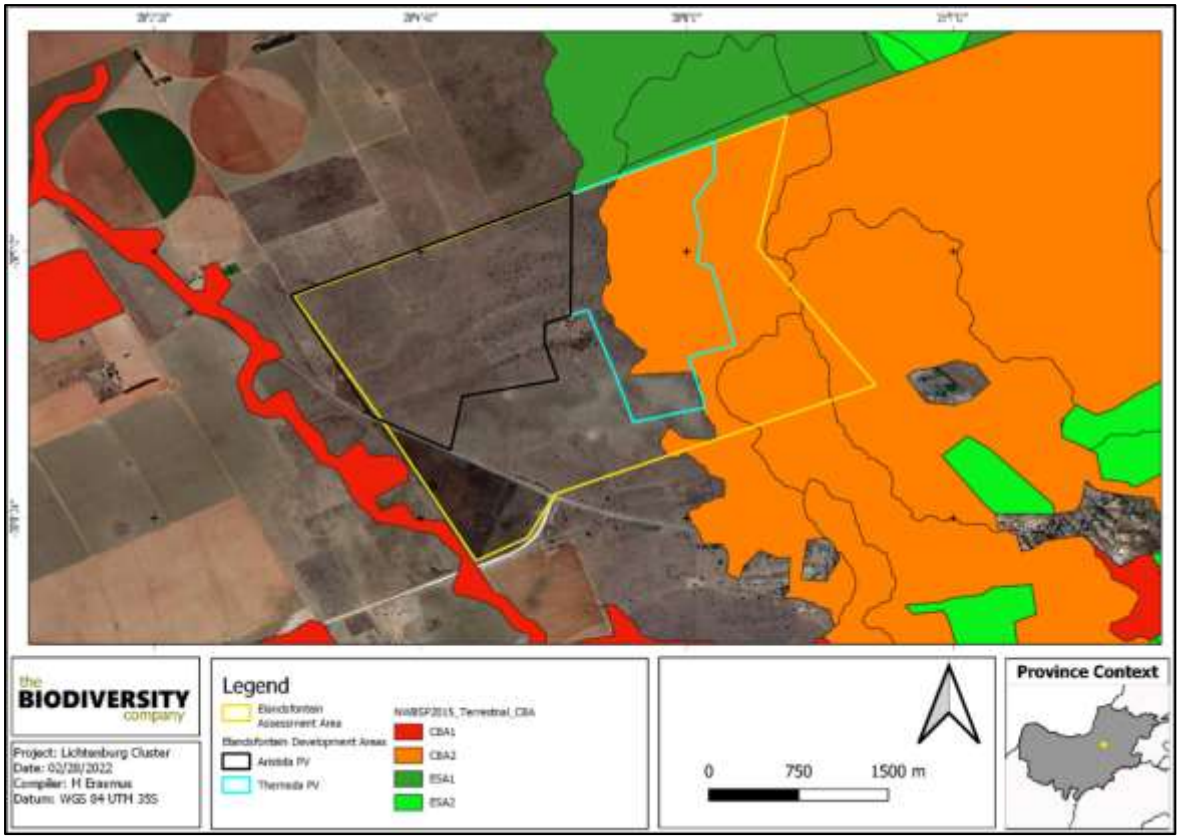

Figure 3-4 ***Map illustrating the terrestrial Critical Biodiversity Areas associated with the assessment area***

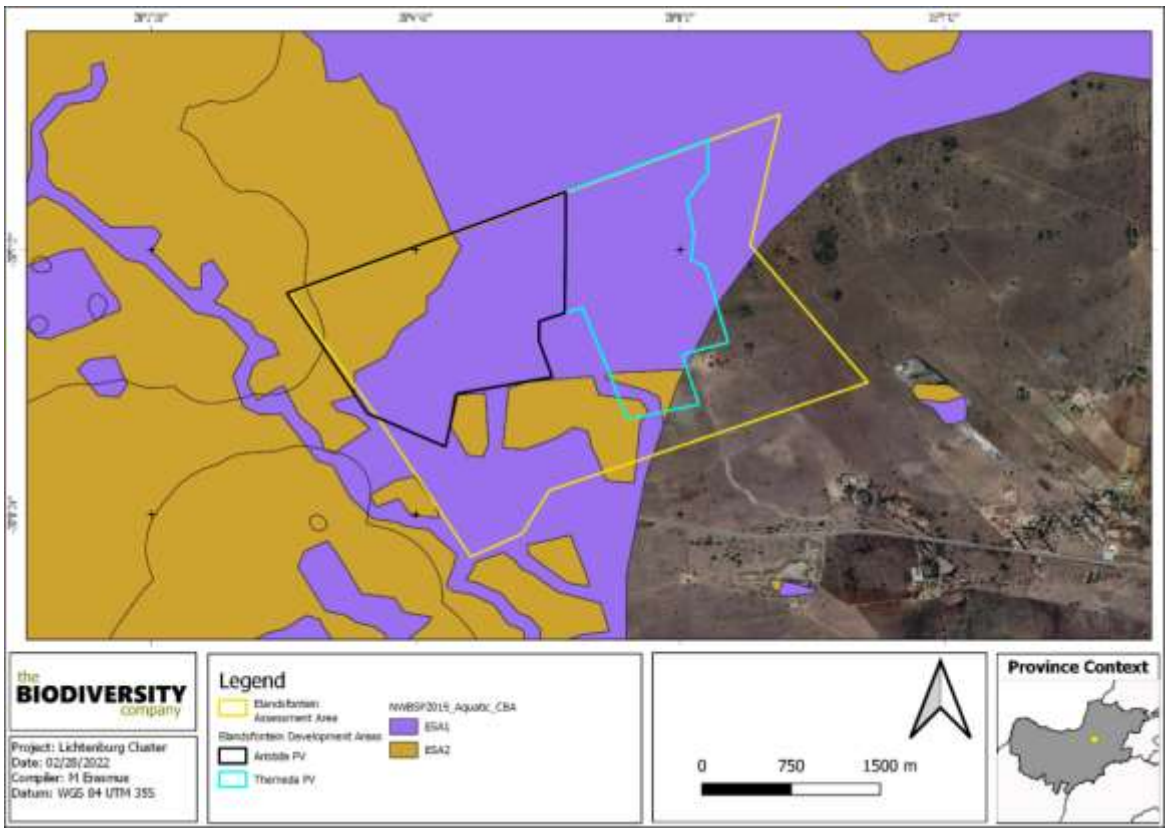

Figure 3-5 ***Map illustrating the aquatic Ecological Support Areas associated with the assessment area***

3.1.4 South African Inventory of Inland Aquatic Ecosystems

This spatial dataset is part of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) which was released as part of the National Biodiversity Assessment (NBA) 2018. National Wetland Map 5 includes inland wetlands and estuaries, associated with river line data and many other data sets within the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) 2018. The two headline indicators assessed in the NBA are *ecosystem threat status* and *ecosystem protection level* (Skowno *et al*., 2019). According to the SAIIAE dataset some potential "unclassified" resources are located within the 500 m regulation area[3], but not within the areas proposed for development (Figure 3-6). The regulation areas have been delineated (separately) for each facility. The Aristida PV area is nearest to a wetland, but in excess of 250 m from the resource.

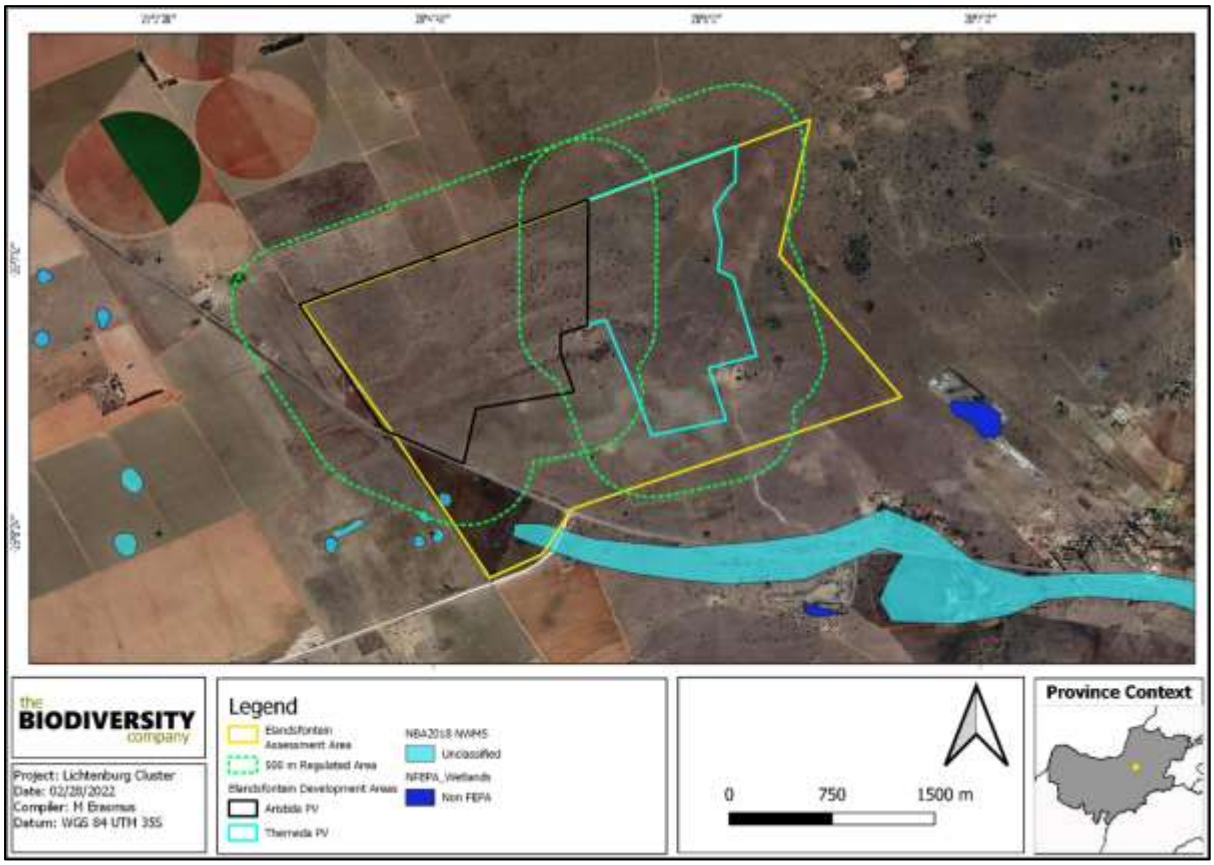

Figure 3-6 Map illustrating wetlands associated with the project area (NBA, 2018 and NFEPA wetland, 2011)

3.1.4.1 Ecosystem Threat Status

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function and composition, on which their ability to provide ecosystem services ultimately depends (Skowno *et al*., 2019).

Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition (Skowno *et al*., 2019). The project area was

[3] The 500 m regulated area refers to a radius for Section 21 (c) and (i) of the NWA.

superimposed on the aquatic ecosystem threat status (Figure 3-7). As seen in this figure, the project area falls across CR and LC ecosystems (Figure 3-7). The Aristida PV area is nearest to a wetland, but in excess of 250 m from the (LC) resource.

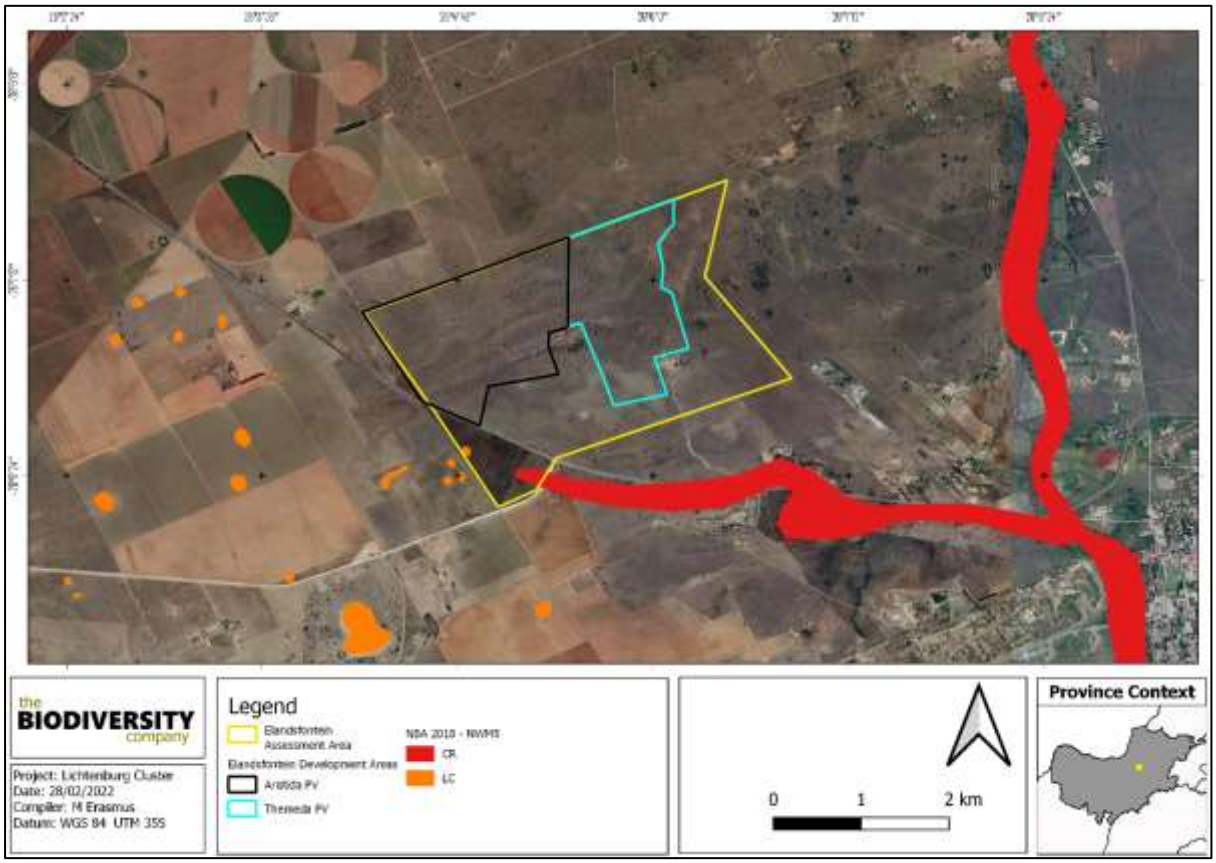

Figure 3-7 The project area showing the regional ecosystem threat status of the associated aquatic ecosystems (NBA, 2018)

3.1.4.2 Ecosystem Protection Level

Ecosystem protection level tells us whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as not protected, poorly protected, moderately protected or well protected, based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Skowno *et al*., 2019).

The project area was superimposed on the ecosystem protection level map to assess the protection status of aquatic ecosystems associated with the development (Figure 3-8). Based on Figure 3-8 the aquatic ecosystems associated with the project area are rated as *poorly protected / not protected.*

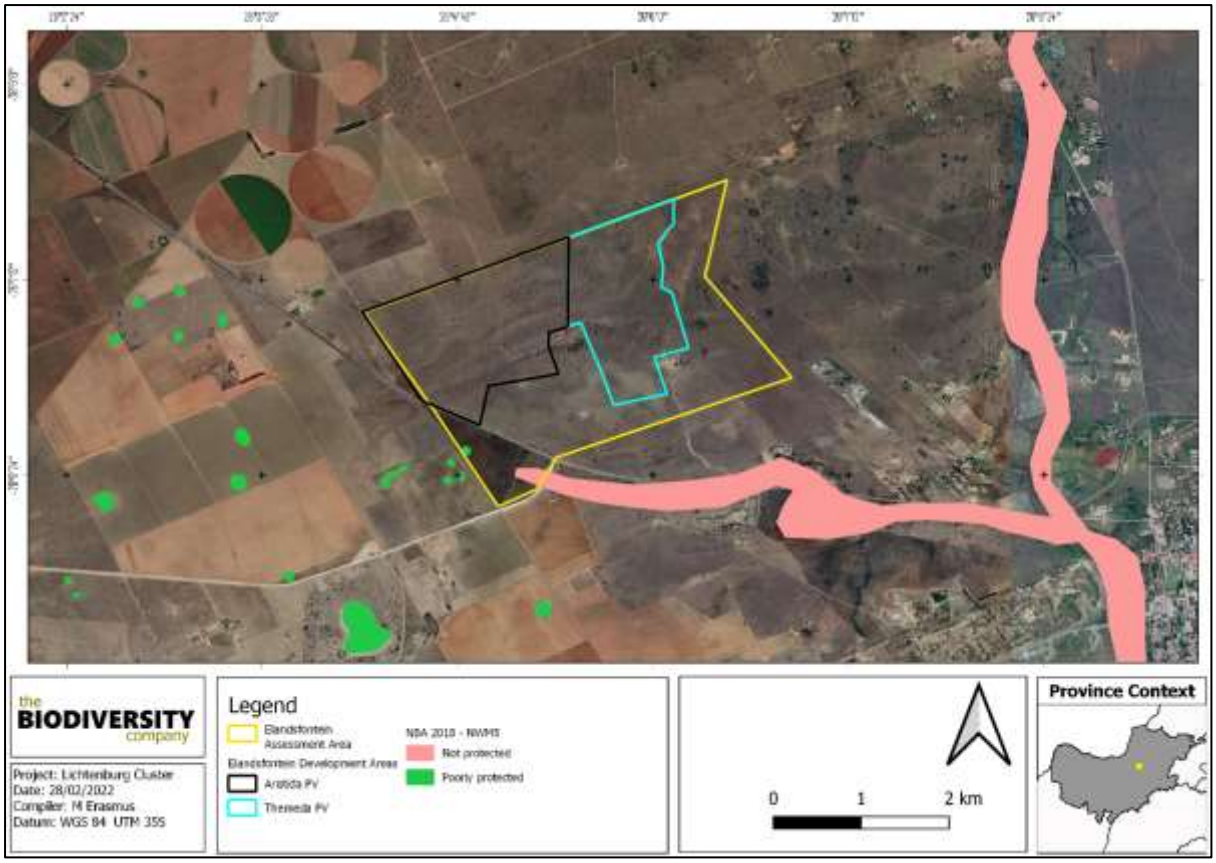

Figure 3-8 The project area showing the regional level of protection of aquatic ecosystems (NBA, 2018)

3.1.5 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2017 (NPAES) focus areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine-scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2017). The Themeda PV partially overlaps with a priority focus area (Figure 3-9).

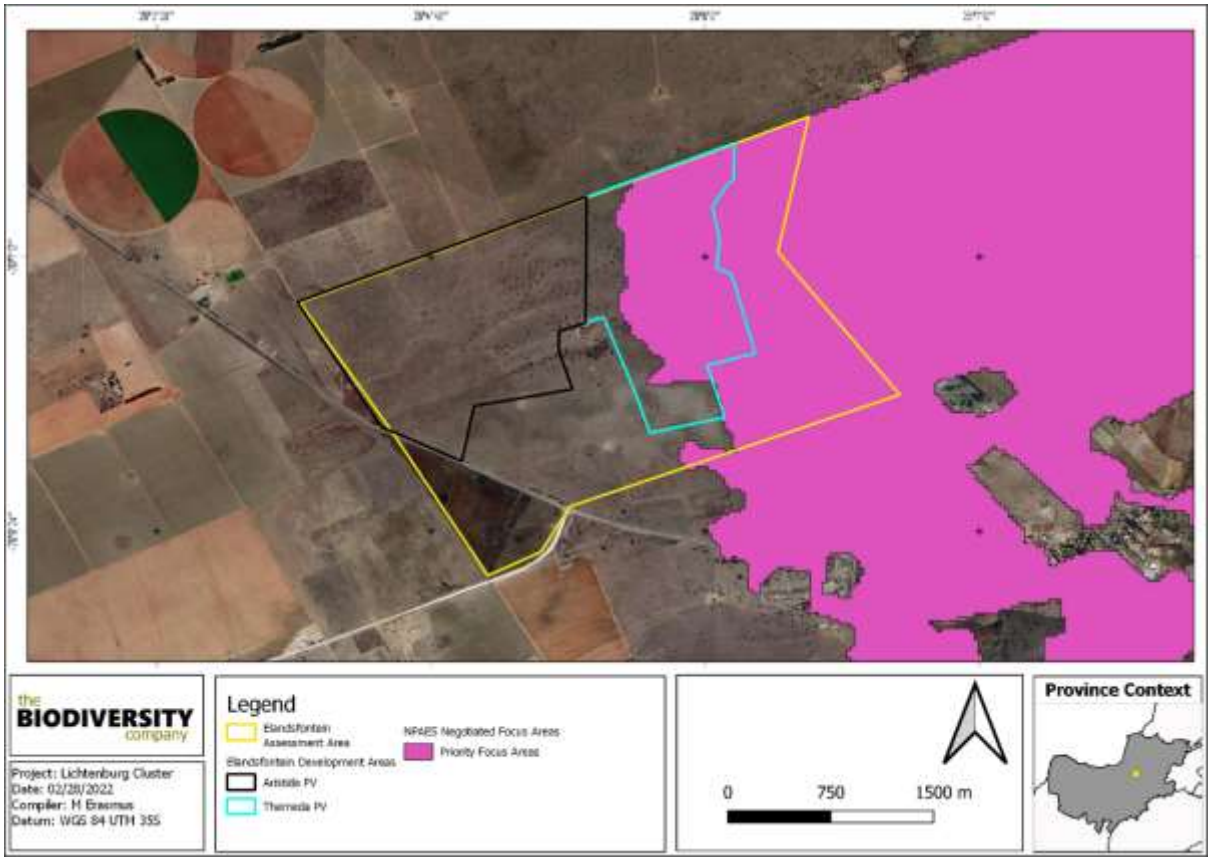

Figure 3-9 The project area in relation to the National Protected Areas Expansion Strategy areas

3.2 Flora Assessment

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

3.2.1 Vegetation Type

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

a) Seasonal precipitation; and

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

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

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

On a fine-scale vegetation type, the project area overlaps with the Carletonville Dolomite Grassland vegetation type (Figure 3-10).

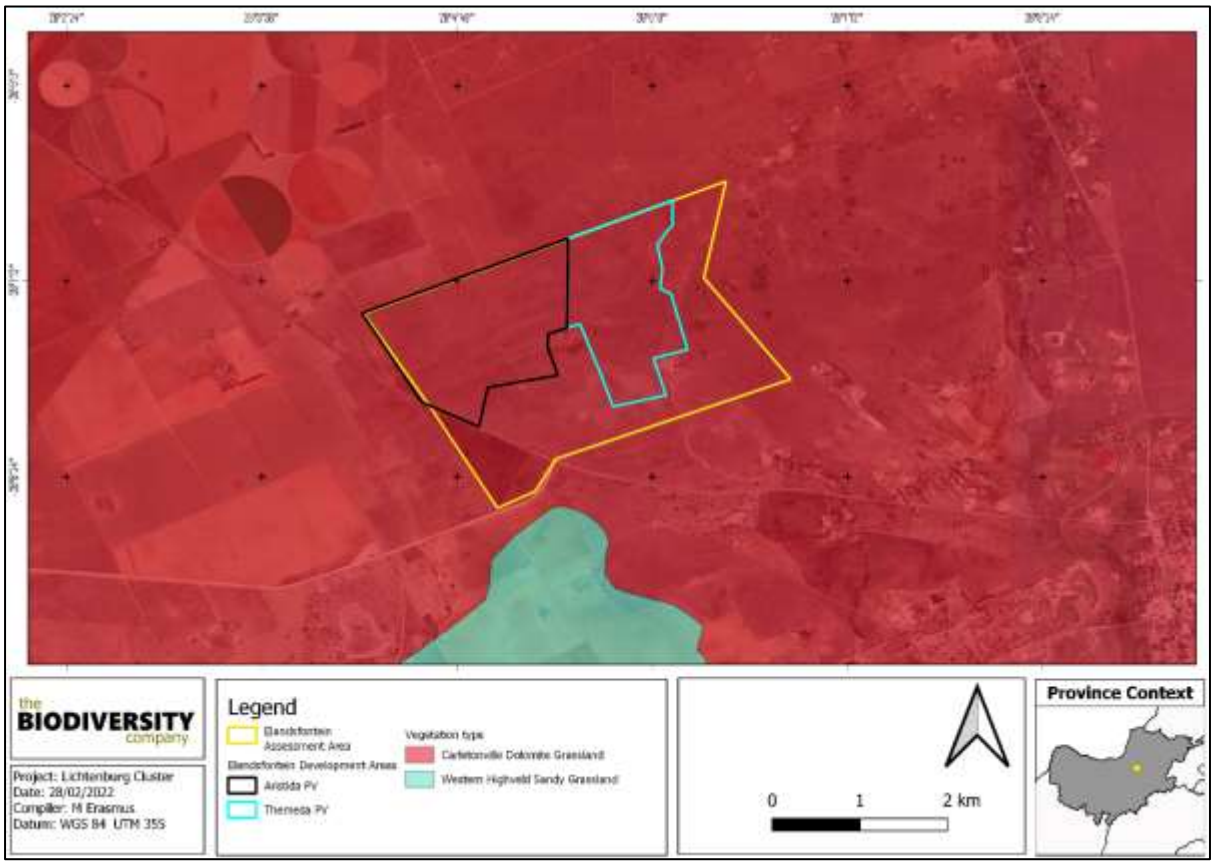

Figure 3-10 Map illustrating the vegetation type associated with the assessment area

3.2.1.1 Carletonville Dolomite Grassland

This vegetation type occurs on slightly undulating plains dissected by prominent rocky chert ridges. Species-rich grasslands forming a complex mosaic pattern dominated by many species (Mucina & Rutherford, 2006). This vegetation type occurs in the North-West, Gauteng and marginally into the Free State Province: In the region of Potchefstroom, Ventersdorp and Carletonville, extending westwards to the vicinity of Ottoshoop, but also occurring as far east as Centurion and Bapsfontein in Gauteng Province.

Important Plant Taxa

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

The following species are important in the **Carletonville Dolomite Grassland** vegetation type:

Graminoids: *Aristida congesta, Brachiaria serrata, Cynodon dactylon, Digitaria tricholaenoides, Diheteropogon amplectens, Eragrostis chloromelas, E. racemosa, Heteropogon contortus, Loudetia simplex, Schizachyrium sanguineum, Setaria sphacelata, Themeda triandra, Alloteropsis semialata subsp. eckloniana, Andropogon schirensis, Aristida canescens, A. diffusa, Bewsia biflora, Bulbostylis burchellii, Cymbopogon caesius, C. pospischilii, Elionurus muticus, Eragrostis curvula, E. gummiflua, E. plana, Eustachys paspaloides, Hyparrhenia hirta, Melinis nerviglumis, M. repens subsp. repens, Monocymbium ceresiiforme, Panicum coloratum, Pogonarthria squarrosa, Trichoneura grandiglumis, Triraphis andropogonoides, Tristachya leucothrix, T. rehmannii.*

Herbs: *Acalypha angustata, Barleria macrostegia, Chamaecrista mimosoides, Chamaesyce inaequilatera, Crabbea angustifolia, Dianthus mooiensis, Dicoma anomala, Helichrysum caespititium, H. miconiifolium, H. nudifolium var. nudifolium, Ipomoea ommaneyi, Justicia anagalloides, Kohautia amatymbica, Kyphocarpa angustifolia, Ophrestia oblongifolia, Pollichia campestris, Senecio coronatus, Vernonia oligocephala.*

Geophytic Herbs: *Boophone disticha, Habenaria mossii.*

Low Shrubs*: Anthospermum rigidum subsp. pumilum, Indigofera comosa, Pygmaeothamnus zeyheri var. rogersii, Rhus magalismontana, Tylosema esculentum, Ziziphus zeyheriana.*

Geoxylic Suffrutices: *Elephantorrhiza elephantina, Parinari capensis subsp. capensis*.

Conservation Status of the Vegetation Type

According to Mucina and Rutherford (2006), this vegetation type is classified as Vulnerable (VU). The national target for conservation protection for both these vegetation types is 24%, but only a small extent is conserved in statutory (Sterkfontein Caves — part of the Cradle of Humankind World Heritage Site, Oog Van Malmanie, Abe Bailey, Boskop Dam, Schoonspruit, Krugersdorp, Olifantsvlei, Groenkloof) and in at least six private conservation areas. Almost a quarter already transformed for cultivation, by urban sprawl or by mining activity as well as the building of the Boskop and Klerkskraal Dams.

3.2.2 Expected Flora Species

The Plants of Southern Africa (POSA) database indicates that 282 species of indigenous plants are expected to occur within the project area (The full list of species will be provided in the final report). No SCC based on their conservation status could be expected to occur within the project, however the threatened *Vachellia erioloba* (Camel thorn) is expected. This is a nationally protected tree (Table 3-2).

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

Family	Taxon	Author	IUCN	Ecology
Fabaceae	*Vachellia erioloba*	(E.Mey.) P.J.H.Hurter	LC	Indigenous

3.3 Faunal Assessment

3.3.1 Amphibians

Based on the IUCN Red List Spatial Data and AmphibianMap, 19 amphibian species are expected to occur within the area (The full list will be provided in the final assessment). One (1) are regarded as threatened (Table 3-3).

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

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

Giant Bull Frog (*Pyxicephalus adspersus*) is a species of conservation concern that will possibly occur in the project area, especially in the area with the wetlands. The Giant Bull Frog is listed as near threatened on a regional scale. It is a species of drier savannas where it is fossorial for most of the year, remaining buried in cocoons. They emerge at the start of the rains, and breed in shallow, temporary waters in pools, pans and ditches (IUCN, 2017).

3.3.2 Reptiles

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 42 reptile species are expected to occur within the area (The full list will be provided in the final assessment). None are regarded as SCC

3.3.3 Mammals

The IUCN Red List Spatial Data lists 68 mammal species that could be expected to occur within the area (The full list will be provided in the final assessment). This list includes large mammal species that are normally restricted to protected areas, as these were observed during the screening assessment. Ten (10) (smaller non protected area restricted species) of these expected species are regarded as threatened (Table 3-4), five of these have a low likelihood of occurrence based on the lack of suitable habitat and food sources in the project area. Descriptions of species with a moderate likelihood of occurrence are discussed below.

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

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Aonyx capensis	Cape Clawless Otter	NT	NT	Low

Atelerix frontalis	South Africa Hedgehog	NT	LC	Moderate
Crocidura mariquensis	Swamp Musk Shrew	NT	LC	Low
Felis nigripes	Black-footed Cat	VU	VU	Moderate
Hydrictis maculicollis	Spotted-necked Otter	VU	NT	Low
Mystromys albicaudatus	White-tailed Rat	VU	EN	Low
Panthera pardus	Leopard	VU	VU	Low
Parahyaena brunnea	Brown Hyaena	NT	NT	Low
Poecilogale albinucha	African Striped Weasel	NT	LC	Low
Smutsia temminckii	Temminck's Ground Pangolin	VU	VU	Low

Atelerix frontalis (South African Hedgehog) has a tolerance to a degree for habitat modification and occurs in a wide variety of semi-arid and sub-temperate habitats (IUCN, 2017). Based on the Red List of Mammals of South Africa, Lesotho and Swaziland (2016), A. frontalis populations are decreasing due to the threats of electrocution, veld fires, road collisions, predation from domestic pets and illegal harvesting. Suitable grasslands occur in the project area, although somewhat disturbed, that can function as habitat for this species, as such the likelihood of occurrence is rated as moderate.

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

3.4 Freshwater Assessment

3.4.1 Hydrological Setting

The project area is within the Vaal Water Management Area (WMA), Highveld – Lower Aquatic Ecoregion and within the C31A quaternary catchment.

3.4.2 Present Ecological Status

3.4.2.1 Status of Sub-Quaternary Reaches (SQR)

The project area overlaps the C31A quaternary catchment. Desktop information for the SQR was obtained from DWS (2014) (Figure 3-11). The C31A-01176 SQR spans 14.97 km of the unnamed tributary of the Harts River, with the nearest watercourse more than 5 km from the project area.

The PES category of the reach is classed as Seriously modified (class E) (Table 3-5). The moderately modified state of the reach was attributed to serious potential flow modifications activities, potential instream habitat modification activities, impacts to wetland and riparian zone, impacts to the instream habitat continuity, physico-chemical conditions (water quality) and large riparian and wetland zone continuity.

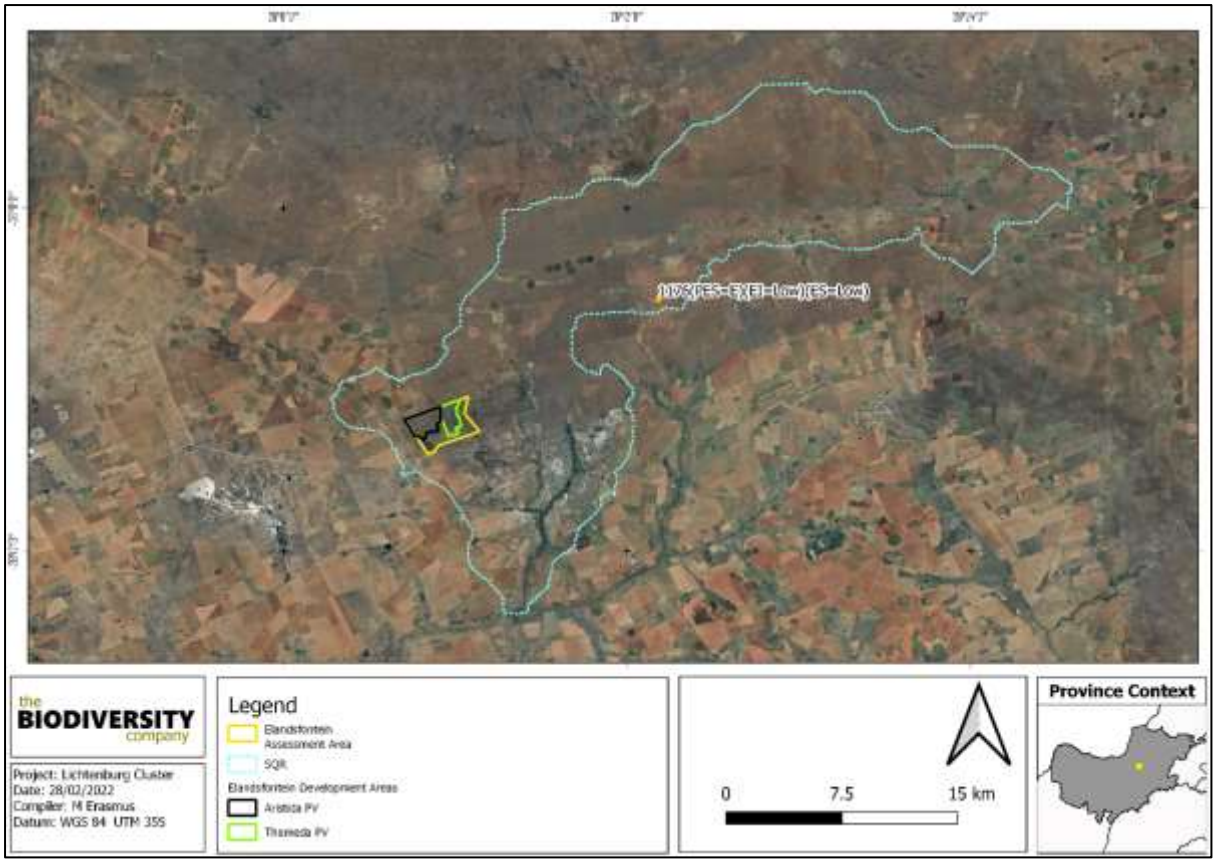

Figure 3-11 Location of the project area in relation to the SQR

Table 3-5 Summary of the Present Ecological State of the C31A-01176 SQR

Component/Catchment	C31A-01176
Present Ecological Status	Seriously Modified (class E)
Ecological Importance Class	Low
Ecological Sensitivity	Low
Default Ecological Category	Largely Modified (class D)

3.5 National Environmental Screening Tool

This section provides the Plant Species, Animal Species, Aquatic Biodiversity and Terrestrial Biodiversity sensitivities of the development footprint as generated from the National Environmental Screening Tool. The Screening Tool identifies related exclusions and/ or specific requirements including specialist studies applicable to the proposed site and/or development, based on the national sector classification and the environmental sensitivity of the site. The screening tool can be accessed at https://screening.environment.gov.za/screeningtool/#/pages/welcome. The following is deduced from the National Web-based Environmental Screening Tool:

- Terrestrial Biodiversity Theme sensitivity is “Very High” for the proposed project due to the project area traversing a Critical Biodiversity Area 2 and also Protected Areas Expansion Strategy;

- Plant Species Theme sensitivity ranges from Medium with a single sensitive species predicted to be present;
- Animal Species Theme sensitivity is classified as “Low”; and
- The Aquatic Theme Sensitivity is ‘Very High’ as the area falls within the aquatic Critical Biodiversity Area, a groundwater Strategic Water Source Area and with wetlands in the area.

Table 3-6 A summary of the assigned sensitivities per theme for each facility

Theme	Aristida PV	Themeda PV
	Sensitivity	
Plant Species	Low to Medium	
Animal Species	Low	
Terrestrial Biodiversity	Low	Low to Very High
Aquatic Biodiversity	Very High	

4 Specialist Management Plan

The aim of the management outcomes is to present the mitigations in such a way that the can be incorporated into the Environmental Management Programme (EMPr), allowing for more successful implementation and auditing of the mitigations and monitoring guidelines Table 4-1 presents the recommended mitigation measures and the respective timeframes, targets and performance indicators for the terrestrial study (Table 4-1).

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

- Prevent the further loss and fragmentation of vegetation communities and the CBA areas in the vicinity of the project area;
- As far as possible, reduce the negative fragmentation effects of the development and enable safe movement of faunal species; and
- Prevent the direct and indirect loss and disturbance of faunal species and community (including occurring and potentially occurring species of conservation concern).

The management plan is relevant for both PV developments as well as the grid connection.

Table 4-1 Mitigation measures including requirements for timeframes, roles and responsibilities for the terrestrial study

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

Storm Water must be managed through the implementation of a storm water management plan	Life of operation	Environmental Officer & Design Engineer	Presence of erosion	Ongoing
It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.	Life of operation	Project manager, Environmental Officer	Any instances	Ongoing
A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.	Life of operation	Environmental Officer & Contractor	Fire Management	During Phase
Rocks removed in the construction phased may not be dumped, but can be used in areas where erosion control needs to be performed	Operational phase	Environmental Officer & Contractor	Rock piles	During Phase
Management outcome: Fauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments, • Signs must be put up to enforce this	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into these areas	Ongoing
Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals	Construction/Operational Phase	Environmental Officer	Noise levels	Ongoing
No trapping, killing, or poisoning of any wildlife is to be allowed • Signs must be put up to enforce this;	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Light pollution and period of light.	Ongoing
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons. In this case during the winter months of May - August	Life of operation	Project manager, Environmental Officer & Design Engineer	Activities should take place during the day	Ongoing

Heat generated from the BESS and substation must be monitored to ensure it does not negatively affect the local fauna	Life of operation	Environmental Officer & Contractor	Heat generated by substations and BESS	Ongoing
Any holes/deep excavations must be dug and planned in a progressive manner. Avoid numerous open excavations at a single time, try minimise the extent of open excavations. If feasible, these excavations should be temporarily covered to avoid fauna falling in. Should the holes overnight they must be covered temporarily to ensure no small fauna species fall in.	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of trapped animals and open holes	Ongoing
Ensure that cables and connections are insulated successfully to reduce electrocution risk.	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted fauna	Ongoing
Small holes (30cm by 30cm) must be placed in the fence along the corridor areas to allow animals to move between the areas, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area	Planning and construction	Environmental Officer & Contractor, Engineer	Fauna movement corridor	Ongoing
Use environmentally friendly cleaning and dust suppressant products	Construction and operation	Environmental Officer & Contractor, Engineer	Presence of chemicals in and around the project area	Ongoing

Management outcome: Alien species				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas.	Construction/Operational Phase	Project manager, Environmental Officer & Contractor	Footprint Area	Life of operation
An alien management plan must be implemented quarterly for 2 years after phase	Construction phase and Decommissioning phase	Project manager, Environmental Officer & Contractor	Assess presence and encroachment of alien vegetation	Quarterly for 2 years after phase

Management outcome: Dust				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces.	Life of operation	Contractor	Dustfall	Dust monitoring program.

• No non environmentally friendly suppressants may be used as this could result in pollution of water sources				

Management outcome: Waste management

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Waste management must be a priority and all waste must be collected and stored effectively.	Life of operation	Environmental Officer & Contractor	Waste Removal	Weekly
Litter, spills, fuels, chemicals and human waste in and around the project area.	Construction/Closure Phase	Environmental Officer & Health and Safety Officer	Presence of Waste	Daily
A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.	Life of operation	Environmental Officer & Health and Safety Officer	Number of toilets per staff member. Waste levels	Daily
The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility	Life of operation	Environmental Officer & Health and Safety Officer	Availability of bins and the collection of the waste.	Ongoing
Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Collection/handling of the waste.	Ongoing
Refuse bins will be emptied and secured Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Management of bins and collection of waste	Ongoing, every 10 days

Management outcome: Erosion

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Speed limits must be put in place to reduce erosion. • Reducing the dust generated by the listed activities above, especially the earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds; • Signs must be put up to enforce this.	Life of operation	Project manager, Environmental Officer	Water Runoff from road surfaces	Ongoing
Where possible, existing access routes and walking paths must be made use of.	Life of operation	Project manager, Environmental Officer	Routes used within the area	Ongoing

Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds.	Life of operation	Project manager, Environmental Officer	Re-establishment of indigenous vegetation	Progressively

5 Conclusion

5.1 Terrestrial Assessment

The project area was identified with the environmental screening tool as possessing a 'Very High' sensitivity within a terrestrial biodiversity context, with the Themeda PV area regarded as overlapping a CBA 2 area. Three fauna species of conservation were identified as having a high or moderate likelihood of occurrence. They are the Giant Bullfrog (High likelihood), South African Hedgehog (Moderate), and Black-footed Cat (Moderate). From a flora perspective a nationally protected tree *Vachellia erioloba* is expected to occur in the project area. The development of solar plants, powerlines and substations (several planned developments in the close vicinity) can lead to the loss of endemic species and threatened species, loss of habitat and vegetation types. This will be investigated further during the impact phase of the project.

5.2 Freshwater Assessment

The project area was assigned by the environmental screening tool as possessing a 'Very High' sensitivity rating as it falls within the aquatic Critical Biodiversity Area, a groundwater Strategic Water Source Area and with wetlands in the area. The project area overlaps an aquatic Ecological Support Area. No water resources were identified within the project area, however resources are located within the regulation area. Due to the presence of water resources within the 500 m regulation area Water Use Authorisation (GN 509) is likely to be required for the project. This will be investigated further during the impact phase of the project.

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7 Appendix A: Terrestrial methods to be utilised

7.1 Desktop Flora Assessment

The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006) and SANBI (2019) will be used to identify the vegetation type that will occur under natural or pre-anthropogenically altered conditions. Furthermore, the Plants of Southern Africa (POSA) database will be accessed to compile a list of expected flora species within the project area. The Red List of South African Plants (Raimondo *et al.,* 2009; SANBI, 2020) will be utilized to provide the most current national conservation status of flora species.

7.2 Desktop Faunal Assessment

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

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

7.3 Flora Survey

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

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

The timed random meander method is highly efficient for conducting floristic analysis, specifically in detecting flora SCC and maximising floristic coverage. In addition, the method is time and cost effective and highly suited for compiling flora species lists and therefore gives a rapid indication of flora diversity. The timed meander search was performed based on the original technique described by Goff *et al.* (1982). Suitable habitat for SCC will be identified according to Raimondo *et al.* (2009) and targeted as part of the timed meanders.

At each sample site notes will be made regarding current impacts (e.g., livestock grazing, erosion etc.), subjective recording of dominant vegetation species and any sensitive features

(e.g., wetlands, outcrops etc.). In addition, opportunistic observations will be made while navigating through the project area.

7.4 Fauna Survey

The faunal assessment within this report pertains to herpetofauna (amphibians and reptiles), and mammals. The faunal field survey will be comprised of the following techniques:

- Visual and auditory searches - This typically comprised of meandering and using binoculars to view species from a distance without them being disturbed; and listening to species calls;
- Active hand-searches - are used for species that shelter in or under particular micro-habitats (typically rocks, exfoliating rock outcrops, fallen trees, leaf litter, bark etc.); and
- Utilization of local knowledge.

Relevant field guides and texts that will be consulted for identification purposes include the following:

- Field Guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
- A Complete Guide to the Snakes of Southern Africa (Marais, 2004);
- Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland (Bates et al, 2014);
- A Complete Guide to the Frogs of Southern Africa (du Preez and Carruthers, 2009);
- Smithers' Mammals of Southern Africa (Apps, 2000);
- A Field Guide to the Tracks and Signs of Southern and East African Wildlife (Stuart and Stuart, 2000);
- Sinclair and Ryan (2010), Birds of Africa. Secondary source for identification;
- Taylor et al. (2015), Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland. Used for conservation status, nomenclature and taxonomical ordering.

7.5 Terrestrial Site Ecological Importance

The 'Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa' were used for the methods to determine the site ecological importance.

The different habitat types within the project area will be delineated and identified based on observations during the field assessment, and available satellite imagery. These habitat types will be assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern and their ecosystem processes.

Site Ecological Importance (SEI) is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community or habitat type present on the site) and Receptor Resilience (RR) (its resilience to impacts) as follows.

BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows. The criteria for the CI and FI ratings are provided in Table 7-1 and Table 7-2, respectively.

Table 7-1 Summary of Conservation Importance (CI) criteria

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

Table 7-2 Summary of Functional Integrity (FI) criteria

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

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

BI can be derived from a simple matrix of CI and FI as provided in Table 7-3.

Table 7-3 Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI)

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

The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor, as summarised in Table 7-4.

Table 7-4 Summary of Resource Resilience (RR) criteria

Resilience	Fulfilling Criteria
Very High	Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
Medium	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.

Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
Very Low	Habitat that is unable to recover from major impacts, or species that are unlikely to: (i) remain at a site even when a disturbance or impact is occurring, or (ii) return to a site once the disturbance or impact has been removed.

Subsequent to the determination of the BI and RR, the SEI can be ascertained using the matrix as provided in Table 7-5.

Table 7-5 Matrix used to derive Site Ecological Importance from Receptor Resilience (RR) and Biodiversity Importance (BI)

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

Interpretation of the SEI in the context of the project is provided in Table 7-6.

Table 7-6 Guidelines for interpreting Site Ecological Importance in the context of the development activities

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

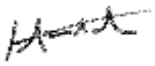
The SEI evaluated for each taxon can be combined into a single multi-taxon evaluation of SEI for the assessment area. Either a combination of the maximum SEI for each receptor should be applied, or the SEI may be evaluated only once per receptor but for all necessary taxa simultaneously. For the latter,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

8 Appendix B

8.1 Appendix A – Specialist Declaration of Independence

I, Andrew Husted, declare that:

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



Andrew Husted

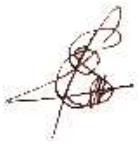
Ecologist

The Biodiversity Company

February 2022

I, Martinus Erasmus, declare that:

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



Martinus Erasmus

Biodiversity Specialist

The Biodiversity Company

February 2022

I, Khethokuhle Hlatshwayo, declare that:

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

Khethokuhle Hlatshwayo

Aquatic Ecologist

The Biodiversity Company

February 2022