The Avifauna Scoping Assessment for the proposed Jersey Photovoltaic (PV) Facility

Ventersdorp, North- West Province

October 2022

CLIENT

ENVIRONAMICS

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Table of Contents

List of Tables

List of Figures

1 Introduction

1.1 Background

The Biodiversity Company was appointed to undertake an avifauna scoping assessment for the proposed Jersey Solar Photovoltaic (PV) project near Ventersdorp, North-West Province (Figure 1-2). The project area is located 29 km south-west of Ventersdorp and 21 km east of Roodepoort.

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). The National Web based Environmental Screening Tool has characterised the terrestrial theme sensitivity of the project area as "Very High" and the animal theme sensitivity as "Medium".

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making, as to the ecological viability of the proposed project.

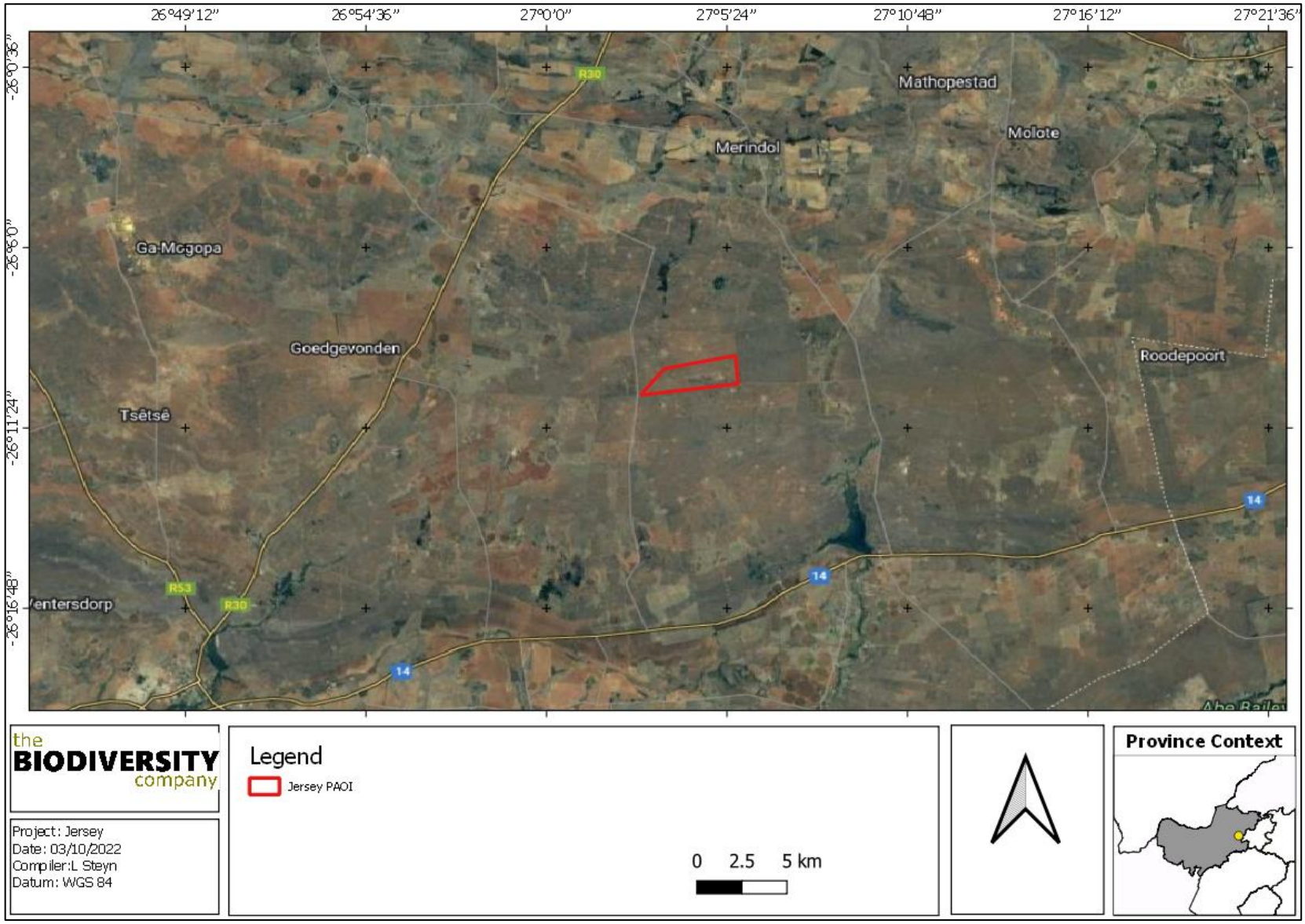

Figure 1-1 Proposed location of the project area in relation to the nearby towns

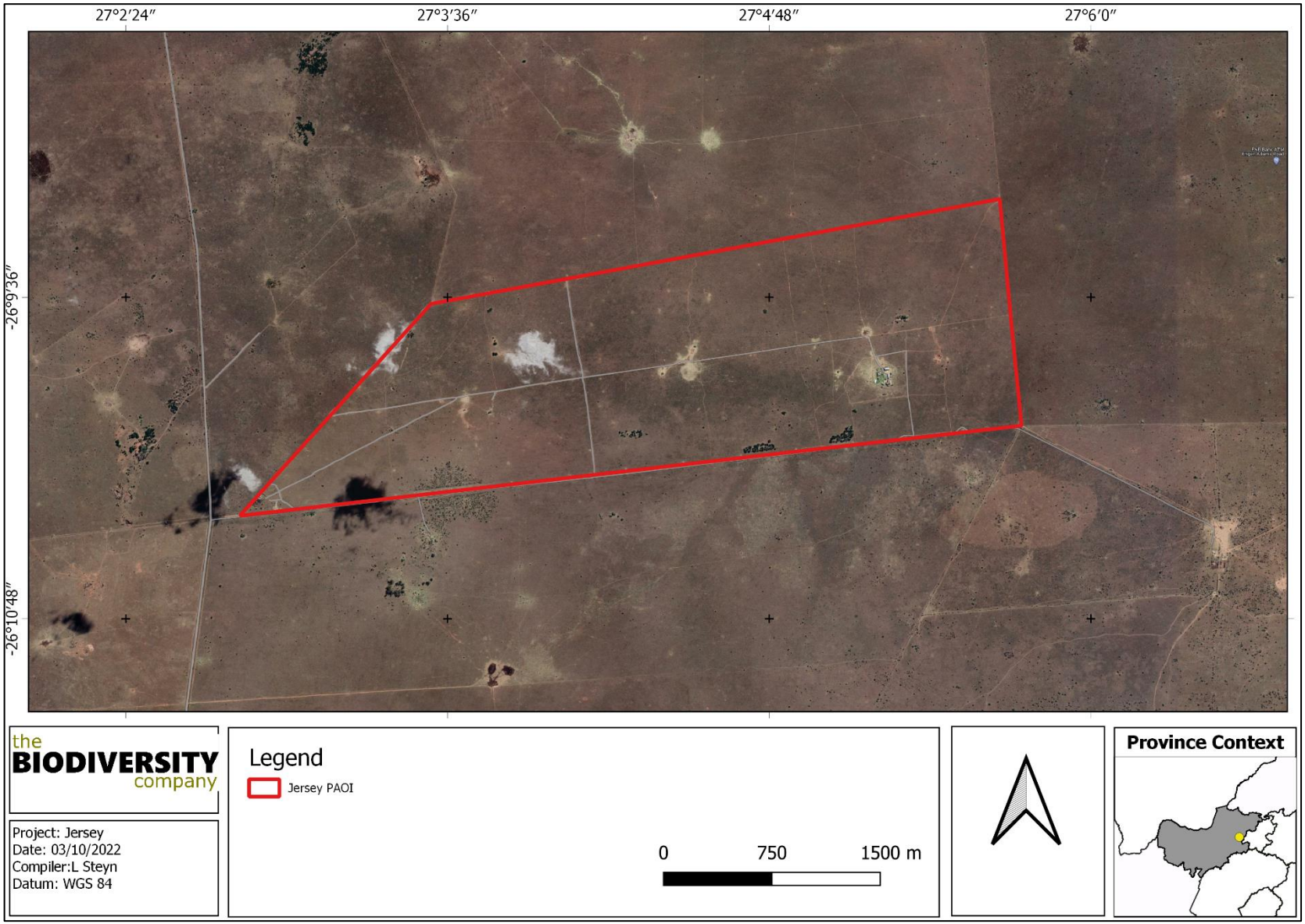

Figure 1-2 The project area

1.2 Specialist Details

Report Name	**The Avifauna Scoping Assessment for the proposed Jersey Photovoltaic (PV) Facility**
Reference	**Jersey PV**
Submitted to	ENVIRONAMICS
Report Writer	**Lindi Steyn** 
	Dr Lindi Steyn has completed her PhD in Biodiversity and Conservation from the University of Johannesburg. Lindi is a terrestrial ecologist with a special interest in ornithology. She has completed numerous studies ranging from Basic Assessments to Environmental Impact Assessments following IFC standards.
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 13 years' experience in the environmental consulting field.
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.

1.3 Scope of Work

The scope of work includes 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; and
- Identify the manner that the proposed project impacts based on the scoping assessment information and the desktop information and evaluate the level of risk of these potential impacts.

2 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 2-1 are applicable to the current project. The list below, although extensive, may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

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

Region	Legislation / Guideline
National	Constitution of the Republic of South Africa (Act No. 108 of 1996)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004), Threatened or Protected Species Regulations
	Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, GNR 320 of Government Gazette 43310 (March 2020)
	Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, GNR 1150 of Government Gazette 43855 (October 2020)
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
	The Environment Conservation Act (Act No. 73 of 1989)
	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (101 of 1998)
	National Water Act (NWA) (Act No. 36 of 1998)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations and, Alien and Invasive Species List 20142020, published under NEMBA
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)
Provincial	North-West Biodiversity Sector Plan of 2015 (READ, 2015).
	The North West Biodiversity Management Amendment Bill, 2017

3 Methods

3.1 Desktop Assessment

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

3.1.1 Desktop Avifaunal Assessment

The avifaunal desktop assessment comprised of the following, compiling an expected species list:

- Avifauna list, generated from the SABAP2 dataset by looking at pentads 2610_2705; 2610_2700; 2610_2655; 2605_2705; 2605_2700; 2605_2655; 2600_2705; 2600_2700; 2600_2655; and
- Compilation of a Coordinated Water Bird Count (CWAC) species list if the project area was found to be in a vicinity of a CWAC site.

3.1.2 Ecologically Important Landscape Features

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

- National Biodiversity Assessment 2018 (Skowno *et al*, 2019) (NBA) - The purpose of the NBA is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA deals with all three components of biodiversity: genes, species, and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are:
    - *Ecosystem Threat Status* – indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition.
    - *Ecosystem Protection Level* – indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems.
- Protected areas - South Africa Protected Areas Database (SAPAD) (DEA, 2021) – The SAPAD Database contains spatial data pertinent to the conservation of South African biodiversity. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. SAPAD is updated on a continuous basis and forms the basis for the Register of Protected Areas, which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.
- National Protected Areas Expansion Strategy (NPAES) (SANBI, 2016) – The NPAES provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and therefore, of high importance for biodiversity, climate resilience and freshwater protection.
- Conservation/Biodiversity Sector Plan:

  The North-West Department of Rural, Environment, and Agricultural Development (READ), as custodian of the environment in the North West, is the primary implementing agent 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).

- Important Bird and Biodiversity Areas (IBAs) (BirdLife South Africa, 2017) – IBAs constitute a global network of over 13 500 sites, of which 112 sites are found in South Africa. IBAs are sites of global significance for bird conservation, identified through multi-stakeholder processes using globally standardised, quantitative and scientifically agreed criteria; and

- South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer *et al.,* 2018) – A SAIIAE was established during the NBA of 2018. It is a collection of data layers that represent the extent of river and inland wetland ecosystem types and pressures on these systems.

3.1.3 Field Survey

The avifaunal field survey will be comprised of the following techniques:

- Visual and auditory searches - This typically comprises of meandering and using binoculars to view species from a distance without them being disturbed; and listening to species calls;

- Point counts for the avifauna- Sampling will consist of standardized point counts as well as random diurnal incidental surveys and vantage point surveys. Standardized point counts (following Buckland *et al.* 1993) will be conducted to gather data on the species composition and relative abundance of species within the broad habitat types identified. Each point count was run over a 10 min period. The horizontal detection limit will be set at 200 m. At each point the observer will document the date, start time, and end time, habitat, numbers of each species, detection method (seen or heard), behaviour (perched or flying) and general notes on habitat and nesting suitability for conservation important species. To supplement the species inventory with cryptic and illusive species that may not be detected during the rigid point count protocol, diurnal incidental searches will be conducted. This involved the opportunistic sampling of species between point count periods and road cruising; and

- Utilization of local knowledge.

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

- Book of birds of South Africa, Lesotho and Swaziland (Taylor *et al.,* 2015); and

- Roberts – Birds of Southern Africa (Hockey *et al.,* 2005).

3.1.4 Site Ecological Importance (SEI)

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

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

BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows. The criteria for the CI and FI ratings are provided in Table 3-1 and Table 3-2, respectively.

Table 3-1 Summary of Conservation Importance (CI) criteria

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

Table 3-2 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.

Functional Integrity	Fulfilling Criteria
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 3-3.

Table 3-3 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 3-4.

Table 3-4 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 remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
Medium	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.
Very Low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

Subsequent to the determination of the BI and RR, the SEI can be ascertained using the matrix as provided in Table 3-5.

Table 3-5 Matrix used to derive Site Ecological Importance (SEI) from Receptor Resilience (RR) and Biodiversity Importance (BI)

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

Interpretation of the SEI in the context of the proposed development activities is provided in Table 3-6.

Table 3-6 Guidelines for interpreting Site Ecological Importance (SEI) in the context of the proposed development activities

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

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

3.2 Assumptions and Limitations

The following assumptions and limitations are applicable for this assessment:

- The assessment area was based on the area provided by the client and any alterations to the footprint and/or missing GIS information pertaining to the assessment area would have affected the desktop assessment;
- No infrastructure designs were available at time of the desktop assessment;
- The species likelihood of occurrence is based on desktop information; and
- The impact assessment included is for scoping purposes alone and is based on desktop information.

4 Results & Discussion

4.1 Desktop Assessment

4.1.1 Ecologically Important Landscape Features

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features is summarised in Table 4-1.

Table 4-1 Summary of relevance of the proposed project to ecologically important landscape features.

Desktop Information Considered	Description	Section
Ecosystem Threat Status	Overlaps with a Least Concern ecosystem.	4.1.1.1
Ecosystem Protection Level	Overlaps with a Poorly Protected Ecosystem.	4.1.1.2
Protected Areas	The project area borders on the Fred Coetzee Private Nature Reserve	4.1.1.4
National Protected Areas Expansion Strategy	The project area does not overlap with any NPAES areas, but is adjacent to a priority focus area and a protected area	4.1.1.5
Critical Biodiversity Area	The project area overlaps with an ESA1 area.	4.1.1.3
Important Bird and Biodiversity Areas	The project area is located 26 km from the Magaliesberg IBA.	4.1.1.6
REDZ	The project area is 49 km from the Klerksdorp Renewable Energy Development Zone.	-
Powerline Corridor	The project area overlaps with the Northern Corridor.	-
South African Inventory of Inland Aquatic Ecosystems	The project area does not overlap with any wetlands or rivers	4.1.1.7
National Freshwater Priority Area	The project area does not overlap with any wetlands or rivers.	4.1.1.8
Coordinated Avifaunal Road Count	Irrelevant- The project area is 11.8 km from the closest CAR route.	4.1.1.9
Coordinated Waterbird Count	The project area is 16 km from the Olifantsnek CWAC	4.1.1.10

4.1.1.1 Ecosystem Threat Status

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset the proposed project overlaps with a LC ecosystem (Figure 4-1).

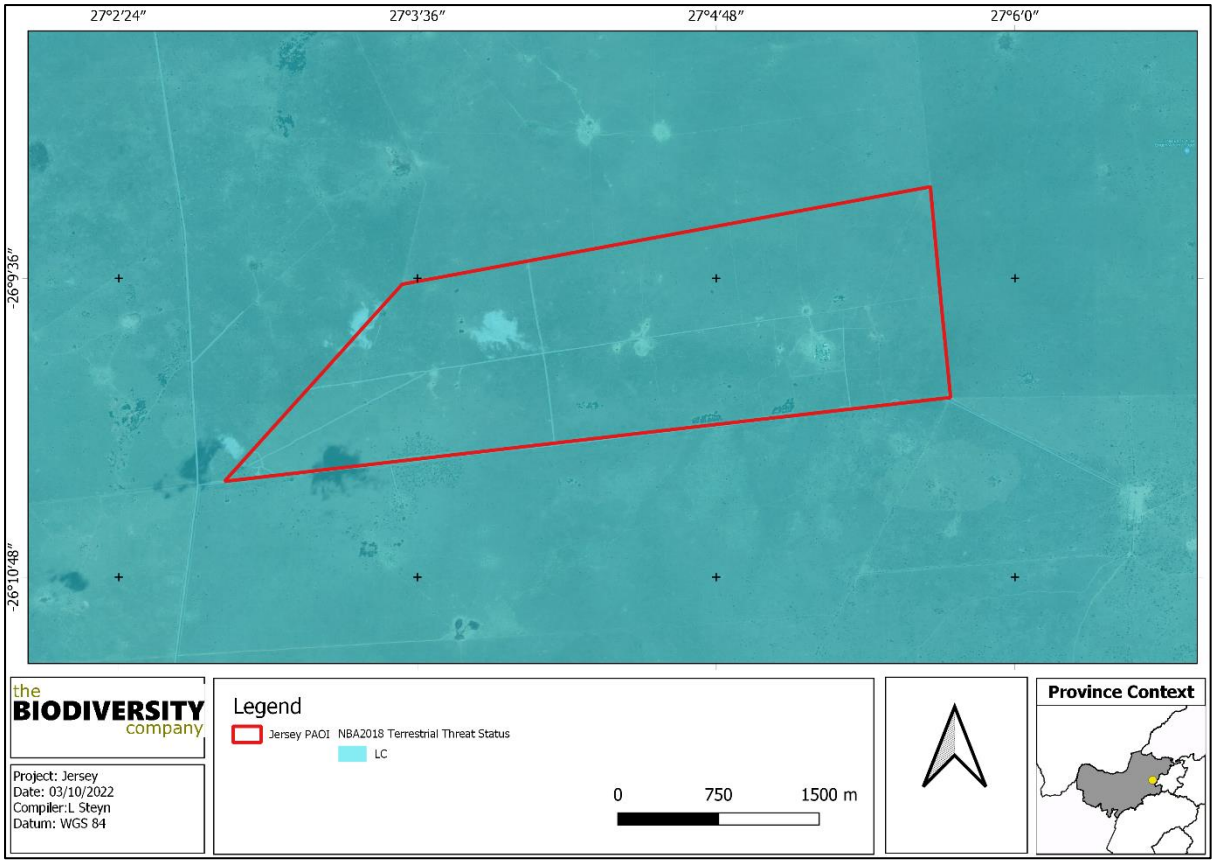

Figure 4-1 Map illustrating the ecosystem threat status associated with the project area

4.1.1.2 Ecosystem Protection Level

This is an indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The proposed project overlaps with a PP ecosystem (Figure 4-2).

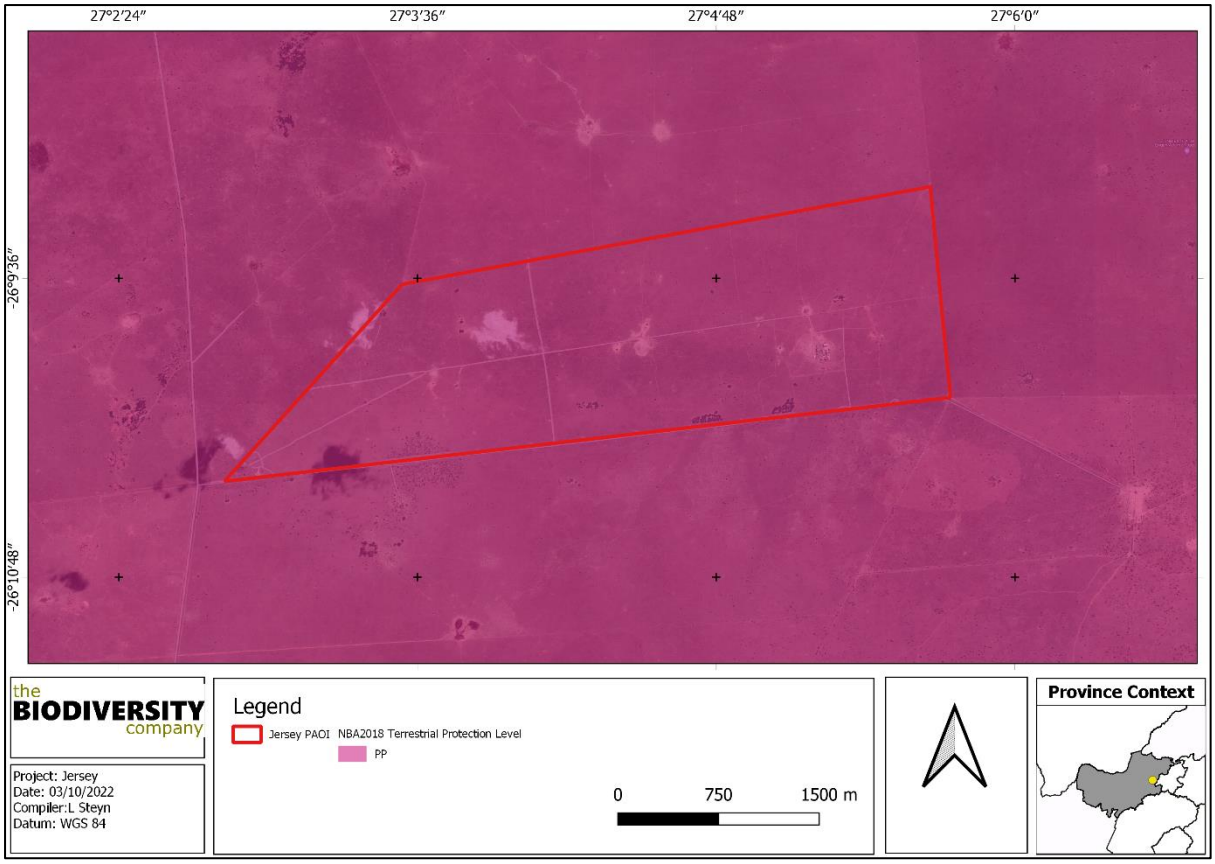

Figure 4-2 Map illustrating the ecosystem protection level associated with the project area

4.1.1.3 Critical Biodiversity Areas and Ecological Support Areas

The North-West Department of Rural, Environment, and Agricultural Development (READ), as custodian of the environment in the North West, is the primary implementing agent 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).

Figure 4-3 shows the project area superimposed on the Terrestrial CBA maps. The project area overlaps with an ESA1 area.

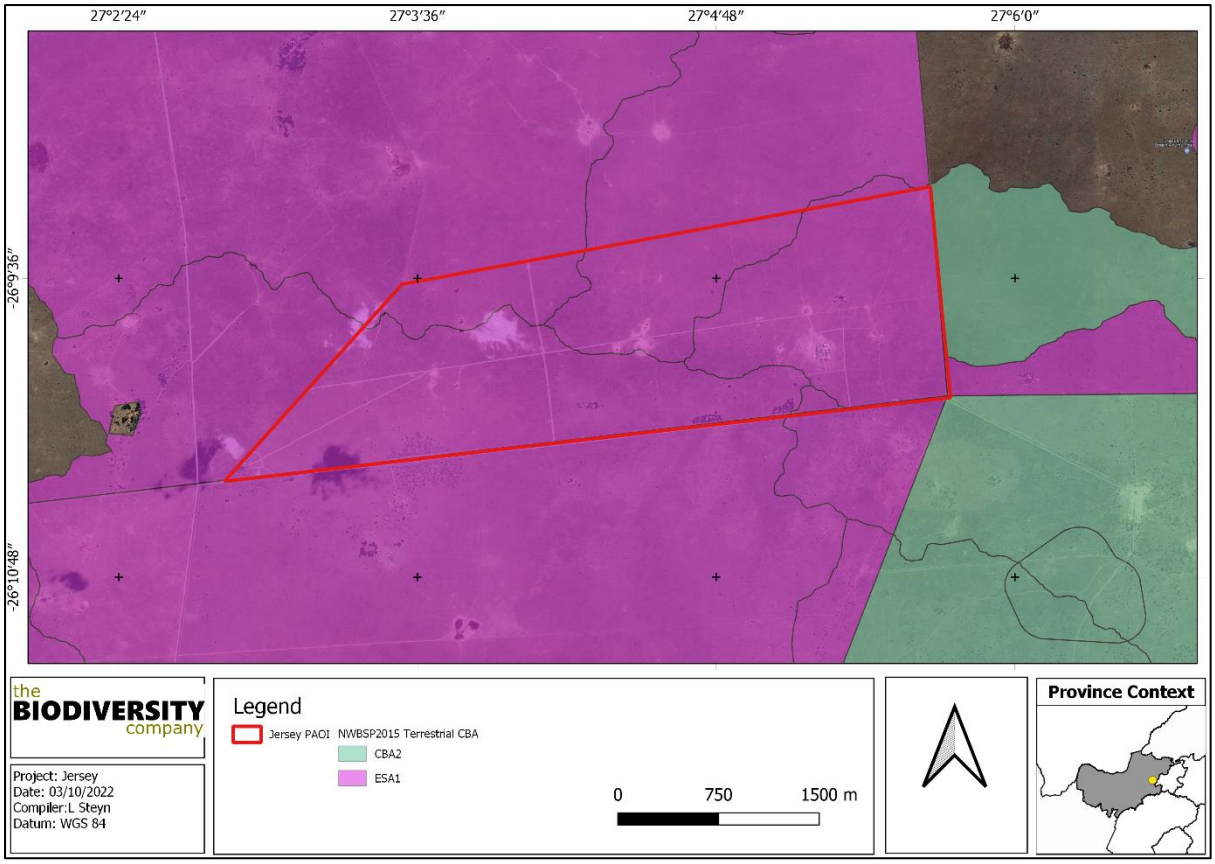

Figure 4-3 Map illustrating the locations of CBAs in the project area

4.1.1.4 Protected areas

According to the protected area spatial datasets from SAPAD (2021) and SACAD (2021), the project area borders on the Fred Coetzee Private Nature Reserve, which means the project area is within the 5 km protected area buffer zone (Figure 4-4).

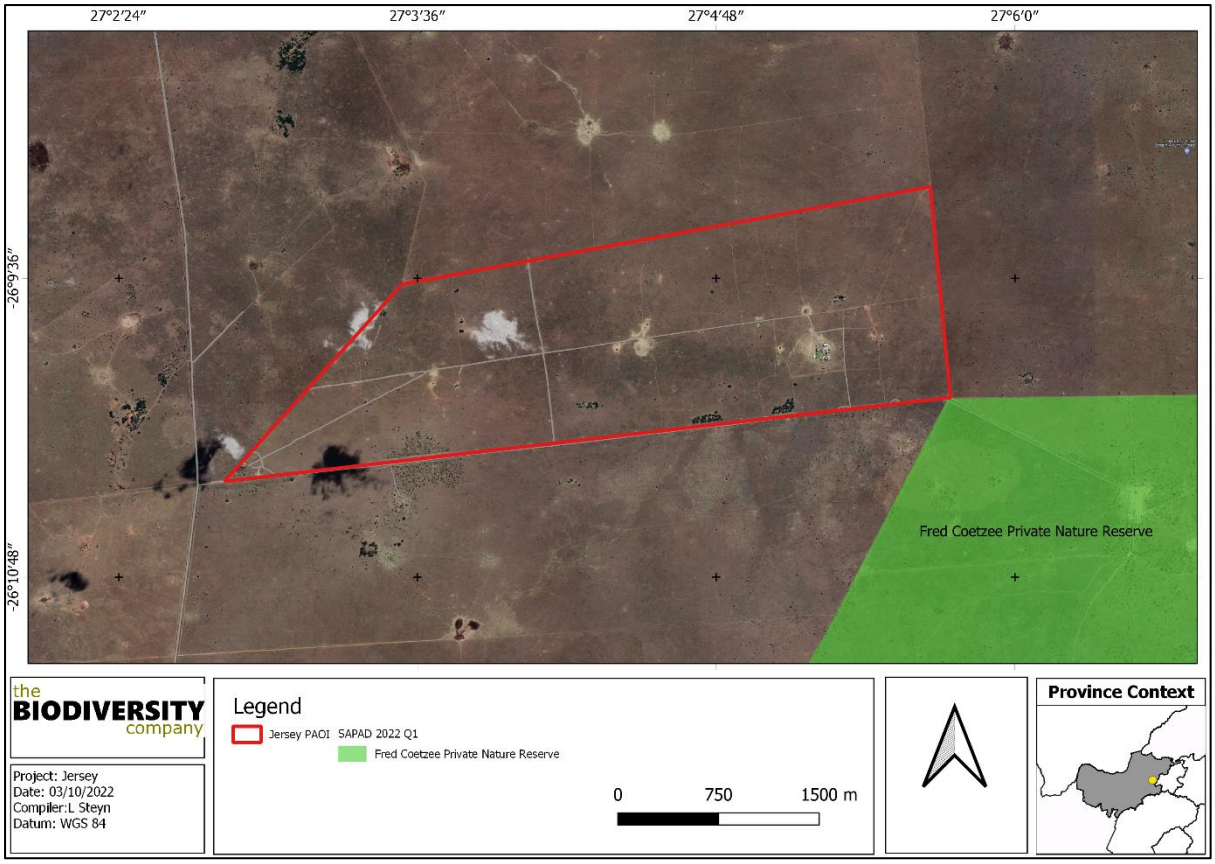

Figure 4-4 The project area in relation to the protected areas

4.1.1.5 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2016 (NPAES) 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 a 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, 2016).

The project area does not overlap with any NPAES areas, but is adjacent to a priority focus area and a protected area (Figure 4-5).

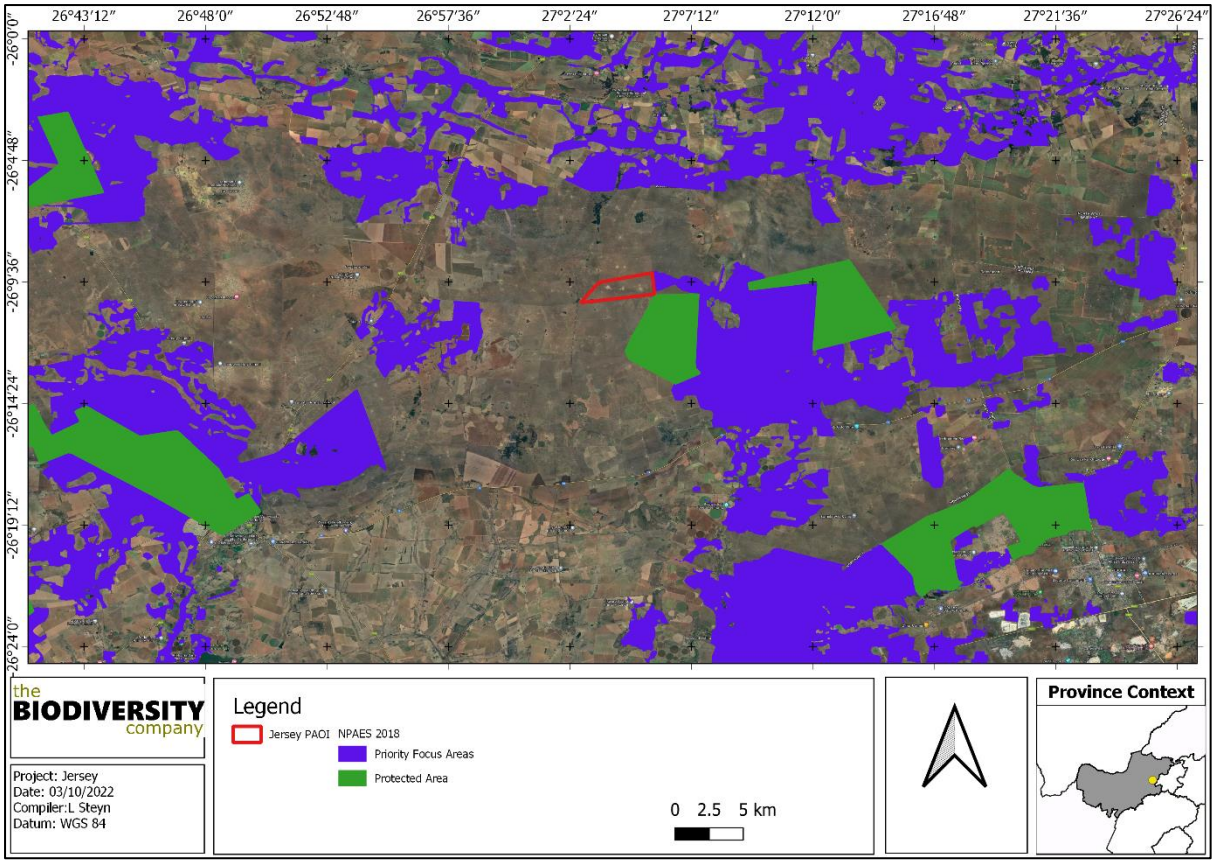

Figure 4-5 The project area in relation to the National Protected Area Expansion Strategy

4.1.1.6 Important Bird and Biodiversity Area

Important Bird & Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife South Africa, 2017).

According to Birdlife South Africa (2017), the selection of IBAs is achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The criteria ensure that the sites selected as IBAs have true significance for the international conservation of bird populations and provide a common currency that all IBAs adhere to, thus creating consistency among, and enabling comparability between, sites at national, continental and global levels. Figure 4-6 shows that the project area is located 26 km from the Magaliesberg IBA.

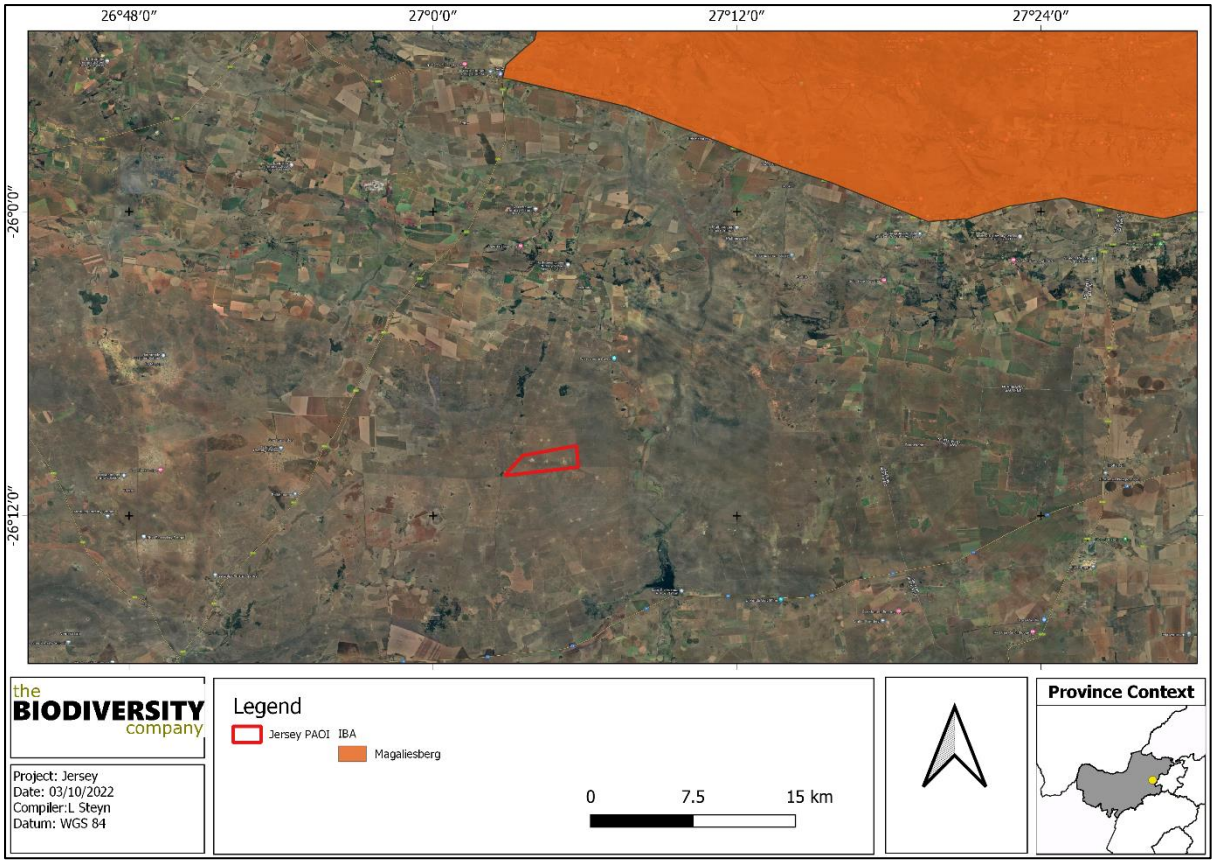

Figure 4-6 The project area in relation to the nearest IBAs

4.1.1.7 Hydrological Setting

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.,* 2019; Skowno *et al.,* 2019).

The project area does not overlap with any wetlands or rivers, the closest river being the Mooi River 4 km east of the project area and the closest wetland is 900 m to the west (Figure 4-7).

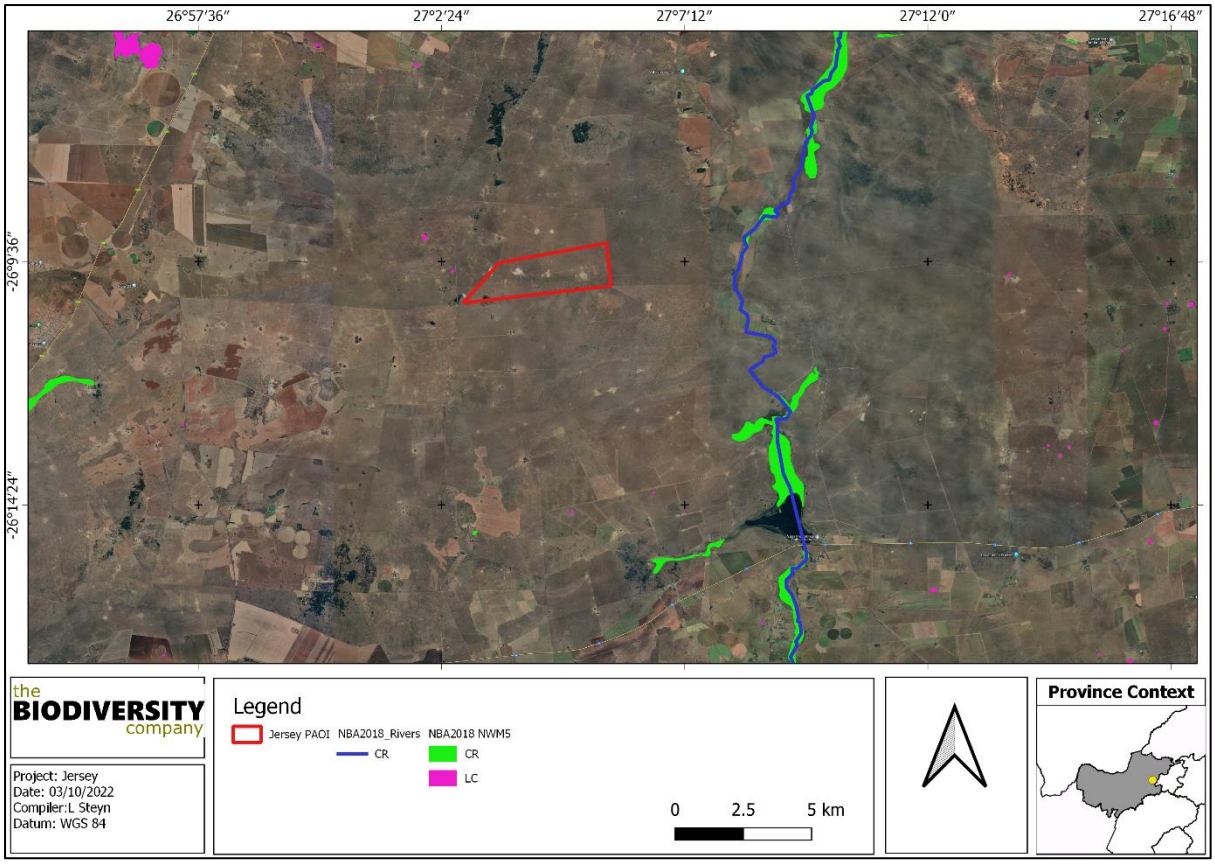

Figure 4-7 Map illustrating ecosystem threat status of rivers and wetland ecosystems in relation to the project area

4.1.1.8 National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.,* 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al.,* 2011). Figure 4-8 shows that the project area does not overlap with any wetlands or rivers.

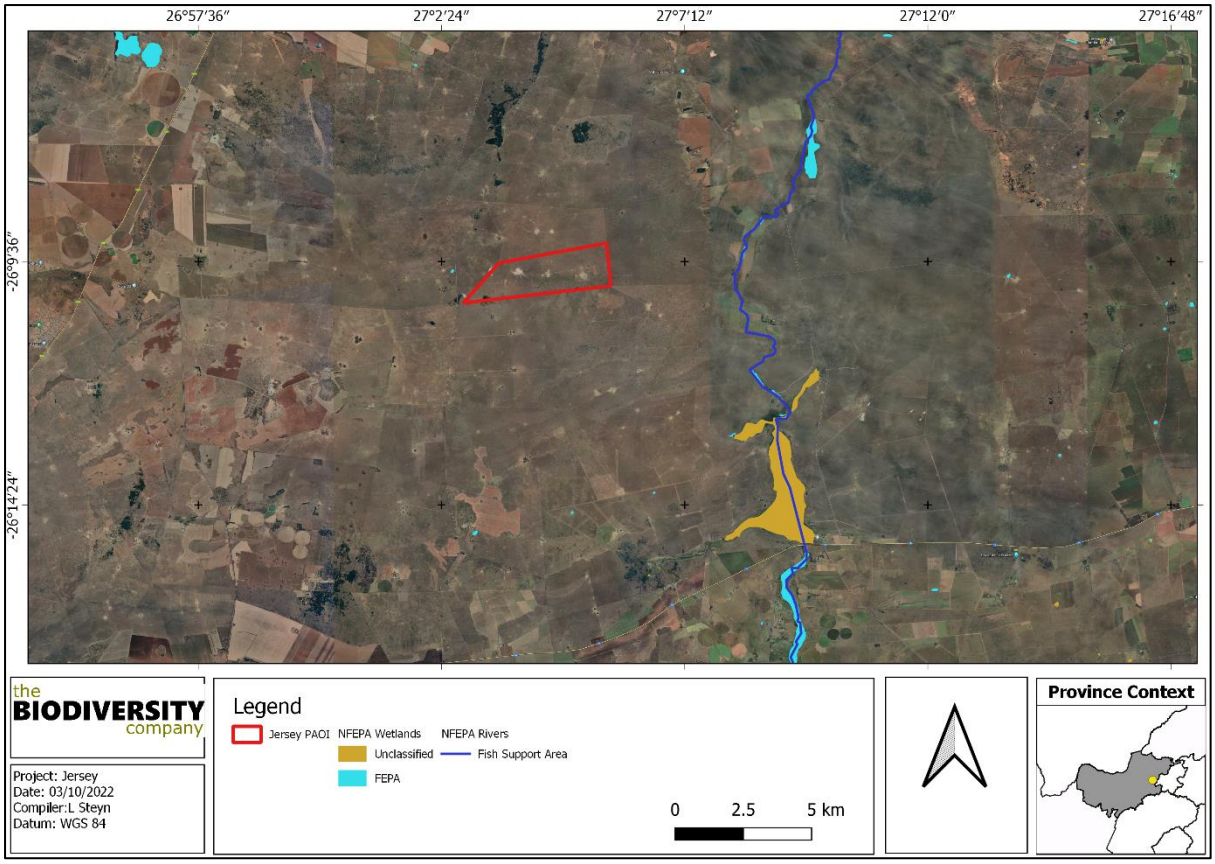

Figure 4-8 The project area in relation to the National Freshwater Ecosystem Priority Areas

4.1.1.9 Coordinated Avifaunal Roadcount (CAR)

The ADU/Cape bird club pioneered avifaunal roadcount of larger birds in 1993 in South africa. Originally it was started to monitor the Blue Crane *Anthropoides paradiseus* and Denham's/Stanley's Bustard *Neotis denhami*. Today it has been expanded to the monitoring of 36 species of large terrestrial birds (cranes, bustards, korhaans, storks, Secretarybird and Southern Bald Ibis) along 350 fixed routes covering over 19 000 km. Twice a year, in midsummer (the last Saturday in January) and midwinter (the last Saturday in July), roadcounts are carried out using this standardised method. These counts are important for the conservation of these larger species that are under threat due to loss of habitat through changes in land use, increases in crop agriculture and human population densities, poisoning as well as man-made structures like power lines. With the prospect of wind and solar farms to increase the use of renewable energy sources monitoring of these species is most important (CAR, 2020). Figure 4-9 shows that the project area is 11.8 km from the closest CAR route.

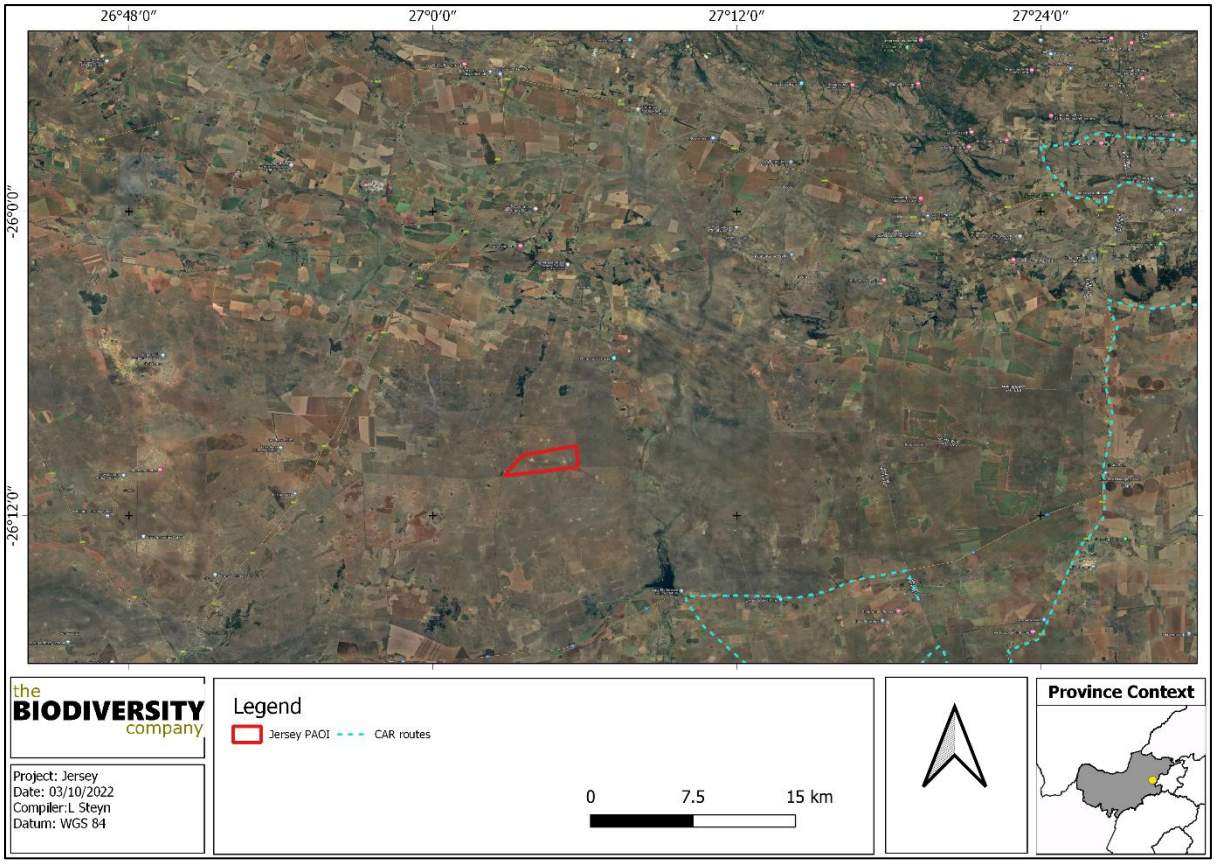

Figure 4-9 The project area in relation to the closest CAR route

4.1.1.10 Coordinated Waterbird Counts (CWAC)

The Animal demographic unit launched the Coordinated Waterbird Counts (CWAC) project in 1992 as part South Africa's commitment to International waterbird conservation. Regular mid-summer and mid-winter censuses are done to determine the various features of water birds including population size, how waterbirds utilise water sources and determining the heath of wetlands. For a full description of CWAC please refer to http://cwac.birdmap.africa/about.php.

Figure 4-10 shows the project area is 16 km from the Olifantsnek CWAC.

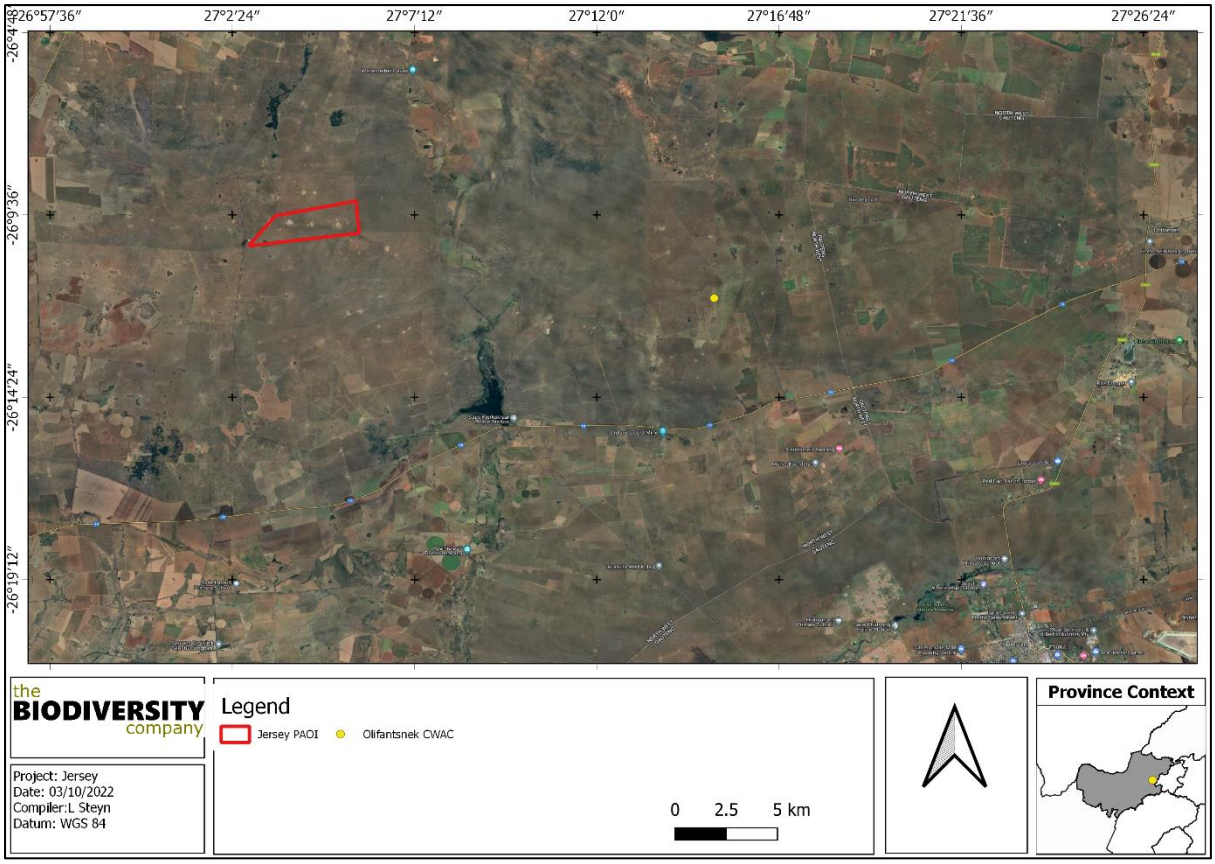

Figure 4-10 The project area in relation to the CWAC site

Table 4-2 The species recorded at the Olifantsnek CWAC

Common name	Taxonomic name	Average reporting rate
Coot, Red-knobbed	*Fulica cristata*	21.00
Cormorant, Reed	*Microcarbo africanus*	3.89
Cormorant, White-breasted	*Phalacrocorax lucidus*	7.67
Crake, Black	*Zapornia flavirostra*	2.60
Darter, African	*Anhinga rufa*	8.13
Duck, African Black	*Anas sparsa*	2.43
Duck, Domestic	*Anas platyrhynchos*	1.00
Duck, Knob-billed	*Sarkidiornis melanotos*	1.00
Duck, White-faced Whistling	*Dendrocygna viduata*	6.50
Duck, Yellow-billed	*Anas undulata*	15.14
Eagle, African Fish	*Haliaeetus vocifer*	1.29
Egret, Great	*Ardea alba*	1.20
Egret, Little	*Egretta garzetta*	4.00
Egret, Western Cattle	*Bubulcus ibis*	22.00
Goose, Domestic	*Anser anser*	1.00
Goose, Egyptian	*Alopochen aegyptiaca*	25.60
Goose, Spur-winged	*Plectropterus gambensis*	7.25

Grebe, Great Crested	*Podiceps cristatus*	4.33
Grebe, Little	*Tachybaptus ruficollis*	10.60
Greenshank, Common	*Tringa nebularia*	1.50
Gull, Grey-headed	*Chroicocephalus cirrocephalus*	14.00
Hamerkop	*Scopus umbretta*	2.25
Heron, Black	*Egretta ardesiaca*	4.00
Heron, Black-headed	*Ardea melanocephala*	1.40
Heron, Goliath	*Ardea goliath*	1.17
Heron, Grey	*Ardea cinerea*	1.29
Heron, Purple	*Ardea purpurea*	1.00
Heron, Squacco	*Ardeola ralloides*	1.00
Heron, Striated	*Butorides striata*	1.44
Ibis, Glossy	*Plegadis falcinellus*	1.00
Ibis, Hadada	*Bostrychia hagedash*	12.67
Jacana, African	*Actophilornis africanus*	1.50
Kingfisher, Giant	*Megaceryle maxima*	2.50
Kingfisher, Malachite	*Corythornis cristatus*	2.00
Kingfisher, Pied	*Ceryle rudis*	3.88
Lapwing, African Wattled	*Vanellus senegallus*	4.75
Lapwing, Blacksmith	*Vanellus armatus*	40.33
Mallard	*Anas platyrhynchos*	1.00
Moorhen, Common	*Gallinula chloropus*	3.00
Plover, Kittlitz's	*Charadrius pecuarius*	7.75
Plover, Three-banded	*Charadrius tricollaris*	5.92
Sandpiper, Common	*Actitis hypoleucos*	4.22
Sandpiper, Wood	*Tringa glareola*	1.50
Snipe, African	*Gallinago nigripennis*	3.17
Spoonbill, African	*Platalea alba*	1.60
Stilt, Black-winged	*Himantopus himantopus*	1.50
Stint, Little	*Calidris minuta*	2.75
Swamphen, African	*Porphyrio madagascariensis*	1.00
Teal, Red-billed	*Anas erythrorhyncha*	7.50
Tern, Caspian	*Hydroprogne caspia*	2.00
Tern, Whiskered	*Chlidonias hybrida*	4.50
Wagtail, African Pied	*Motacilla aguimp*	2.00
Wagtail, Cape	*Motacilla capensis*	5.25

4.1.2 Avifauna Expected

The SABAP2 Data lists 249 avifauna species that could be expected to occur within the project area (The full list will be provided in the final assessment). Eleven (11) of these expected species are regarded as threatened (Table 4-3). Two (2) of the species have a low likelihood of occurrence due to the expected lack of suitable habitat in the project area, these species can however very likely still move over the project area and can still be influenced by the development.

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

Species	Common Name	Conservation Status		Likelihood of Occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Coracias garrulus	Roller, European	NT	LC	High
Ephippiorhynchus senegalensis	Stork, Saddle-billed	EN	LC	Low
Eupodotis senegalensis	Korhaan, White-bellied	VU	LC	Moderate
Falco biarmicus	Falcon, Lanner	VU	LC	High
Glareola nordmanni	Pratincole, Black-winged	NT	NT	Low
Grus paradisea	Crane, Blue	NT	VU	Moderate
Gyps africanus	Vulture, White-backed	CR	CR	High
Gyps coprotheres	Vulture, Cape	EN	EN	High
Mirafra cheniana	Lark, Melodious	LC	NT	Moderate
Mycteria ibis	Stork, Yellow-billed	EN	LC	Low
Sagittarius serpentarius	Secretarybird	VU	EN	High

Coracias garrulous (European Roller) is a summer migrant with the population from South-central Europe and Asia occurring throughout sub-Saharan Africa. The European Roller has a preference for bushy plains and dry savannah areas. It is globally listed as LC (BirdLife International, 2019a) but NT on a regional scale (Taylor *et al,* 2015). Threats include persecution on migration in some Mediterranean countries and numerous individuals are killed for food in Oman and India. The loss of suitable breeding habitat due to changing agricultural practices, conversion to monoculture, loss of nest sites, and use of pesticides (reducing food availability) are the main threats to the species in Europe (BirdLife International, 2019a). It is sensitive to loss of hedgerows and riparian forest in Europe which provide essential habitats for perching and nesting. Based on the suitable habitat in the project area the likelihood of occurrence is rated as high.

Eupodotis senegalensis (White-bellied Korhaan) is Near-endemic to South Africa, occurring from the Limpopo Province and adjacent provinces, south through Swaziland to KwaZulu-Natal and the Eastern Cape. It generally prefers tall, dense sour or mixed grassland, either open or lightly wooded, occasionally moving into cultivated or burnt land, some of which are present in the project area thus likelihood of occurrence was rated as moderate (Hockey et al, 2005).

Falco biarmicus (Lanner Falcon) is native to South Africa and inhabits a wide variety of habitats, from lowland deserts to forested mountains (IUCN, 2017). Their diet is mainly composed of small birds such as pigeons and francolins (IUCN, 2017). In southern Africa, local declines of Lanner Falcon populations are possibly due to seed dressings and pesticides (IUCN, 2017). The likelihood of occurrence for this species in the project area is rated as high due to the suitable habitat and the expected presence of many bird species on which Lanner Falcons may predate.

Grus paradiseus (Blue Crane) is listed as NT on a regional scale and as VU on a global scale. This species has declined, largely owing to direct poisoning, power-line collisions and loss of its grassland breeding habitat owing to afforestation, mining, agriculture and development (IUCN, 2017). This species

breeds in natural grass- and sedge-dominated habitats, preferring secluded grasslands at high elevations where the vegetation is thick and short. Grasslands are found in the project area and wetlands are found outside the footprint, although not ideal habitat the species has a moderate likelihood of occurrence.

Gyps africanus (White-backed Vulture) is the most widespread and common vulture in Africa, ranging from the northernmost countries within sub-Saharan Africa south to South Africa (IUCN, 2017). It mainly occupies lowland, open wooded savannas, particularly areas of *Vachellia* and needs tall trees for nesting (IUCN, 2017). However, there have been records of White-backed Vultures nesting on electricity pylons in South Africa (IUCN, 2017). It is threatened largely by the same threats to other African vulture species, such as habitat conversion to agro-pastoral systems, loss of wild ungulates leading to a reduced availability of carrion, hunting for trade, persecution and poisoning (IUCN, 2017). The presence of open savannas within the project area contributed to a high likelihood of occurrence for this species.

Gyps coprotheres (Cape Vulture) is found in southern Africa, where it prefers protected areas and woody vegetation for foraging and steep cliffs for roosting (IUCN, 2017). Various threats are leading to a decline in this species' population numbers, including poisoning (deliberate and accidental), collision with cables, wind farm developments, habitat loss and unsustainable harvesting for traditional uses (IUCN, 2017). Suitable food at the nearby reserves increases the likelihood of occurrence and it is rated as high.

Mirafra cheniana (Melodious Lark) is seen as NT n a global scale. This species is a non endemic species that can be found in the central South African regions. It is threatened by habitat loss and change (IUCN, 2019). This species has a moderate likelihood of occurring in the project area.

Sagittarius serpentarius (Secretarybird) occurs in sub-Saharan Africa and inhabits grasslands, open plains, and lightly wooded savanna (IUCN, 2017). It is also found in agricultural areas and sub-desert (IUCN, 2017). It mainly eats insects (86% of diet) but will also prey on rodents and other mammals, lizards, snakes, eggs, young birds and amphibians (IUCN, 2017). The loss and degradation of grassland habitat is the main threat to Secretarybirds, but there are also other potential threats such as illegal trade, hunting, nest-raiding, powerlines and poisoning (IUCN, 2017). The likelihood of occurrence for this species is rated as high due to the open areas present in the project area.

5 Impact Identification

Anthropogenic activities drive habitat destruction causing displacement of fauna and flora and possibly direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and movement/flight corridors. The removal of natural vegetation may reduce the habitat available for avifauna species and may reduce the species compositions within the area.

The project area overlaps with an ESA1 area and borders a priority focus area and a protected area. A total of 249 avifauna species that could be expected to occur within the project area of which eleven (11) are regarded as threatened. The main impacts associated with avifauna is the loss of habitat, collision and electrocution risks.

Table 5-1 Scoping evaluation table summarising the impacts identified to avifauna

Impact **Biodiversity loss/disturbance**			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Destruction, fragmentation and degradation of habitats and ecosystems	Direct impacts: » Disturbance / degradation / loss to vegetation and habitats » Ecological corridors are disrupted	Regional	None identified at this stage

	» Habitat fragmentation Indirect impacts: » Erosion risk increases » Fire risk increases » Increase in invasive alien species		
Direct mortality of avifauna	Direct impacts: » Loss of SCC species » Loss of avifauna diversity Indirect impacts: » Loss of diversity and species composition in the area. » Possible impact on the food chain	Regional/International	None identified at this stage
Reduced migration of avifauna	Direct impacts: » Loss of genetic diversity Indirect impacts: » Reduced seed dispersal » Loss of ecosystem services	Regional/National	None identified at this stage
Environmental pollution due to water runoff, PV cleaning products, spills from vehicles and erosion	Direct impacts: » Pollution in nearby waterbodies and the surrounding environment » Avifaunal mortality (direct and indirectly) Indirect impacts: » Ground water pollution » Loss of ecosystem services	Regional	None identified at this stage
Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, dust, heat radiation and light pollution.	Direct impacts: » Disruption/alteration of ecological life cycles due to noise » Avifaunal mortality due to light pollution (nocturnal species becoming more visible to predators) » Heat radiation could lead to the displacement of species Indirect impacts: » Loss of ecosystem services	Regional	None identified at this stage
Staff and others interacting directly with avifauna (potentially dangerous) or poaching of birds/eggs	Direct impacts: » Loss of SCCs species Indirect impacts: » Loss of ecosystem service » Loss of genetic diversity	Regional	None identified at this stage

Description of expected significance of impact

The development of the area could result in the loss or degradation of the habitat and vegetation, most of which is still in a natural condition and is expected to support a number of avifauna species. The construction of the solar facility could also lead to the displacement/mortalities of the avifauna and more specifically SCC avifauna species. The operation could result in collisions and electrocutions.

Gaps in knowledge & recommendations for further study

- This is completed at a desktop level only.
- Identification and descriptions of habitats.
- Identification of the Site Ecological Importance.
- Location and identification of SCCs as well as in the case of avifauna their location of the nests.
- Determine a suitable buffer width for the identified features.

Recommendations with regards to general field surveys

- Field surveys to prioritise the development areas, but also consider the 500 m PAOI.
- Fieldwork to be undertaken during the wet season period.

» Avifauna assessment field work to be conducted over two seasons to ensure migratory species are considered.

6 Conclusion

Based on the desktop assessment it can be said that the project area is sensitive with a moderate to high likelihood of species of conservation concern occurring. This assumption is based on the ESA1 classification of the area as well as the proximity to priority focus areas and protected areas. A total of 249 avifauna species that could be expected to occur within the project area of which eleven (11) are regarded as threatened.

The expected post-mitigation risk significance for the project in isolation is expected to be medium, but in consideration of other projects in the area, it is considered to be high. The development of the area could result in the loss or degradation of the habitat and vegetation, most of which is still in a natural condition and is expected to support a number of avifauna species. The construction of the solar facility could also lead to the displacement/mortalities of the avifauna and more specifically SCC avifauna species. The operation could result in collisions and electrocutions.

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8 Appendix Items

8.1 Appendix A – Specialist Declaration of Independence

I, Lindi Steyn, 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.

Lindi Steyn

Terrestrial Ecologist

The Biodiversity Company

October 2022