

**REPORT**

**Eskom Komati Solar Photovoltaics and Battery Energy Storage System - Terrestrial Biodiversity Specialist Assessment - Scoping Report**

*Eskom Holdings SOC Ltd*

Submitted to:

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22521869-352950-3

June 2022



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## Executive Summary

Eskom Holdings SOC (Ltd) (Eskom) is proposing the establishment of a solar electricity generating facility and associated infrastructure as part of its repurposing programme for Komati Power Station situated about 37 km from Middelburg, 43 km from Bethal and 40 km from Witbank, via Vandyksdrift in the Mpumalanga Province of South Africa. Authorisation at a national level, and financing at the international level, must be sought, supported by an Environmental and Social Impact Assessment (ESIA) that is aligned to the requirements of the World Bank Environmental & Social Framework; World Bank Group (WBG) Environmental, Health and Safety Guidelines (EHSG) both for general and sector; the International Finance Corporation (IFC) Performance Standards; Good International Industry Practices (GIIP) and South African legislation and applicable regulations.

Golder Associates Africa (Pty) (Ltd), now a member of WSP (Golder), was appointed to undertake the necessary ecological baseline studies and impact assessments, in support of the scoping, baseline and impact assessment phases of the environmental regulatory process required to authorise development-related activities.

This report describes the baseline terrestrial ecology of areas that will be impacted by the proposed infrastructure developments at Komati Power Station, and documents the results of the scoping-level screening of the potential impacts of the proposed Project on terrestrial ecosystems and biodiversity, i.e. vegetation communities and flora and fauna species.

The report also provides a preliminary set of recommended measures for the mitigation of any negative impacts for inclusion in the updated EMPr for the Project, to ensure that the lender objectives of No Net Loss (NNL) of Natural Habitats, and Net Gain (NG) of Critical Habitats, as well as South African biodiversity legislative and policy requirements, are satisfactorily met.

## DETAILS OF THE SPECIALIST

**Table 1: Details of specialist**

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## Declaration of Independence by Specialist

I, Tebogo Khoza declare that I –

- Act as the independent specialist for the undertaking of a specialist section for the proposed project.
- Do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed;
- Do not have nor will have a vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the competent authority, any information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan, or document.

## ACRONYMS AND ABBREVIATIONS

Abbreviation	Explanation
AC	Alternating Current
BESS	Battery Energy Storage System
CARA	Conservation of Agricultural Resources Act
DC	Direct Current
DSD	Dead Stop Date
EA	Environmental Authorisation
EHSG	Environmental, Health and Safety Guidelines
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESIA	Environmental Social Impact Assessment
GIIP	Good International Industry Practices
IFC	International Finance Corporation
LSA	Local Study Area
MBSP	Mpumalanga Biodiversity Sector Plan
MRA	Mining Rights Area
NEMA	National Environmental Management Act
NEMBA	National Environmental Management Biodiversity Act
NFEPA	Freshwater Ecosystem Priority Areas
NG	Net Gain
NNL	No Net Loss
NPAES	National Protected Area Expansion Strategy
NWM5	National Wetland Map 5
PES	Present Ecological State
PoC	Point of Connection
PV	Photovoltaics
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
ToPS	Threatened or Protected Species
WBG	World Bank Group

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## 1.0 INTRODUCTION AND BACKGROUND

Eskom Holdings SOC (Ltd) (Eskom) is proposing the establishment of a solar electricity generating facility and associated infrastructure as part of its repurposing programme for Komati Power Station. Eskom plans to install 100 MW of Solar Photovoltaics (PV) and 150 MW of Battery Energy Storage System (BESS), for which authorisation at a national level, and financing at the international level, must be sought, supported by an Environmental and Social Impact Assessment (ESIA) that is aligned to the requirements of the World Bank Environmental & Social Framework; World Bank Group (WBG) Environmental, Health and Safety Guidelines (EHSG) both for general and sector; the International Finance Corporation (IFC) Performance Standards; Good International Industry Practices (GIIP) and South African legislation and applicable regulations.

Golder Associates Africa (Pty) (Ltd), now a member of WSP (Golder), was appointed to undertake the necessary ecological baseline studies and impact assessments, in support of the scoping, baseline and impact assessment phases of the environmental regulatory process required to authorise development-related activities.

### 1.1 Purpose of the report

This report describes the baseline terrestrial ecology of areas that will be impacted by the proposed infrastructure developments at Komati Power Station, and documents the results of the scoping-level screening of the potential impacts of the proposed Project on terrestrial ecosystems and biodiversity, i.e. vegetation communities and flora and fauna species.

The report also provides a preliminary set of recommended measures for the mitigation of any negative impacts for inclusion in the updated Environmental Management Programme (EMPr) for the Project, to ensure that the lender objectives of No Net Loss (NNL) of Natural Habitats, and Net Gain (NG) of Critical Habitats, as well as South African biodiversity legislative and policy requirements, are satisfactorily met.

## 2.0 PROJECT LOCATION AND EXTENT

The Komati Power Station is situated about 37 km from Middelburg, 43 km from Bethal and 40 km from Witbank, via Vandyksdrift in the Mpumalanga Province of South Africa (Figure 1).

### 2.1 Current Operation

The station has a total of 9 units, five 100 MW units on the east (Units 1 to 5) and four 125 MW units on the west (Units 6 to 9), with a total installed capacity of 1000 MW. Komati Power Station will reach its end-of-life expectancy in September 2022 when Unit 9 will have reached its dead stop date (DSD). Units 1 to 8 have already reached its DSD.

### 2.2 Proposed Infrastructure and Activities

Eskom is proposing the establishment of a solar electricity generating facility and associated infrastructure as part of its repurposing programme for Komati Power Station. The plan is to install 100 MW of Solar Photovoltaics (PV) and 150 MW of Battery Energy Storage System (BESS). The parcels of land in Komati for the proposed development are owned by Eskom. The proposed infrastructure that are the subject of the current application process are illustrated in Figure 2.

#### 2.2.1 Project Components

The specifications of the Solar PV and BESS project including aspects of construction and operation are outlined below:

- The total site area for PV installation is approximately 200-250 hectares to allow for the construction of a PV facility with capacity up to 100 MW and BESS up to 150 MW.

- Solar PV modules, up to a total of approximately 720,000 m<sup>2</sup>, that convert solar radiation directly into electricity. The solar PV modules will be elevated above the ground, and will be mounted on either fixed tilt systems or tracking systems (comprised of galvanised steel and aluminium). The Solar PV modules will be placed in rows in such a way that there is allowance for a perimeter road and security fencing along the boundaries, and O&M access roads in between the PV module rows.
- Inverter stations, each occupying a footprint up to approximately 30 m<sup>2</sup>, with up to 100 Inverter stations installed on the identified sites. Each Inverter station will contain an inverter step-up transformer, and switchgear. The Inverter stations will be distributed on the site, located alongside its associated Solar PV module arrays. The Inverter station will perform conversion of DC (direct current) to AC (alternating current), and step-up the LV voltage of the inverter to the appropriate voltage to allow the electricity to be fed into the appropriate substation / grid point of connection (PoC). Inverter stations will connect several arrays of Solar PV modules and will be placed along the internal roads for easy accessibility and maintenance.
- Below ground electrical cables with trenching for connecting PV arrays, Inverter stations, O&M buildings, and Combiner Substations.
- Above ground overhead lines for connecting Combiner Substations to grid PoC.
- Adequately designed foundations and mounting structures that will support the Solar PV modules and Inverter stations.
- Access roads that provide access to the Komati PV sites.
- Perimeter roads around the PV sites.
- Internal roads for access to the Inverter stations.
- Internal roads/paths between the Solar PV module rows, to allow access to the Solar PV modules for operations and maintenance activities.
- Infrastructure required for the operation and maintenance of the Komati PV installations: -
  - Meteorological Station
  - O&M Building – comprising control room, server room, security equipment room, offices, boardroom, kitchen, and ablution facilities (including water supply and sewage infrastructure)
  - Spares Warehouse and Workshop
  - Hazardous Chemical Store – approx. 30 m<sup>2</sup>
  - Security Building
  - Parking areas and roads
- Small diameter water supply pipeline from existing supply infrastructure.
- Fire water supply during Construction and Operation.
- Sewage interconnection to existing infrastructure.
- Stormwater channels.
- Perimeter fencing of the Komati PV sites, with access gates.

- Temporary laydown area, occupying a footprint up to approx. 10 hectares. The laydown area will be used during construction and rehabilitated thereafter.
- Temporary concrete batching plant, occupying a footprint up to approx. 1 hectare. The concrete batching plant area will be used during construction and rehabilitated thereafter.
- Temporary site construction office area, occupying a footprint up to approx. 1 hectare. This area will accommodate the offices for construction contractors during construction and rehabilitated thereafter.

### 2.2.2 Solar PV Construction

It is estimated that approximately 200-300 construction workers will be required on the site. During the construction phase of the project the following activities are anticipated:

- Site Preparation - Vegetation and topsoil will be cleared for the footprint of the infrastructure as well as for the access roads to the solar PV site, internal roads and the laydown yard, etc. The topsoil removed will need to be stored for rehabilitation purposes of the site.
- Transportation of Equipment - All equipment to site will be transported by means of national, provincial and district roads. This includes but is not limited to, transformers, solar PV modules, inverters, excavators, graders, trucks, compacting equipment, construction material, etc.
- Site Establishment Works - The site will have temporary laydown areas and offices for the construction contractors. This will include the contractor's chosen electricity supply infrastructure e.g., use of generators and fuel storage that will be required to conform to acceptable measures to ensure no harm to the environment. The laydown area will also be used for assembling of solar PV modules and structures. A concrete batching plant may also be required as part of the site establishment works.
- Construction of the Solar PV Facility
  - Trenches would need to be excavated for underground cabling to connect Solar PV arrays, Inverter stations, and Combiner Substations.
  - Foundations for the solar PV array mounting structures and Inverter stations may need to be excavated, with the final extent depending on the geotechnical studies that will be conducted. The geotechnical studies will determine the type of foundations that can be utilised at the PV site.
  - Construction of access, perimeter, and internal gravel roads may require material to be imported from outside the site, from a permitted quarry.
- Water consumption during construction phase - The water consumption during the construction phase is estimated as 15,000 kilolitres (total for construction period estimated as 24 months) - The Contractor should in any case be made responsible for securing electricity, water, and any other services during construction.
- Construction of Electrical Interconnection Line - Construction and installation of overhead electrical interconnection lines, connecting the Solar PV facilities to the grid PoC.
- Storage of diesel and oil for construction activities.
- Once all the construction activities are completed the site will be rehabilitated where possible and practical. All temporal structures and facilities will be removed from site and the area rehabilitated.
- Solar glare reflection – proximity to air strip.
- End of life waste management for both solar panels and batteries.

### 2.2.3 Solar PV Operation

The solar PV plant has a minimum design life of 25 years.

- During the life of the Solar PV facility, there will be normal maintenance of all electrical and mechanical components of the plant.
- In addition, there will be periodic cleaning and washing of the solar PV modules. This PV module cleaning will be performed when required, and it is estimated to occur 2-4 times a year.
- The water consumption during operation - estimated water required per year during operation is 10,000 kilolitres (total per year for design life of plant).

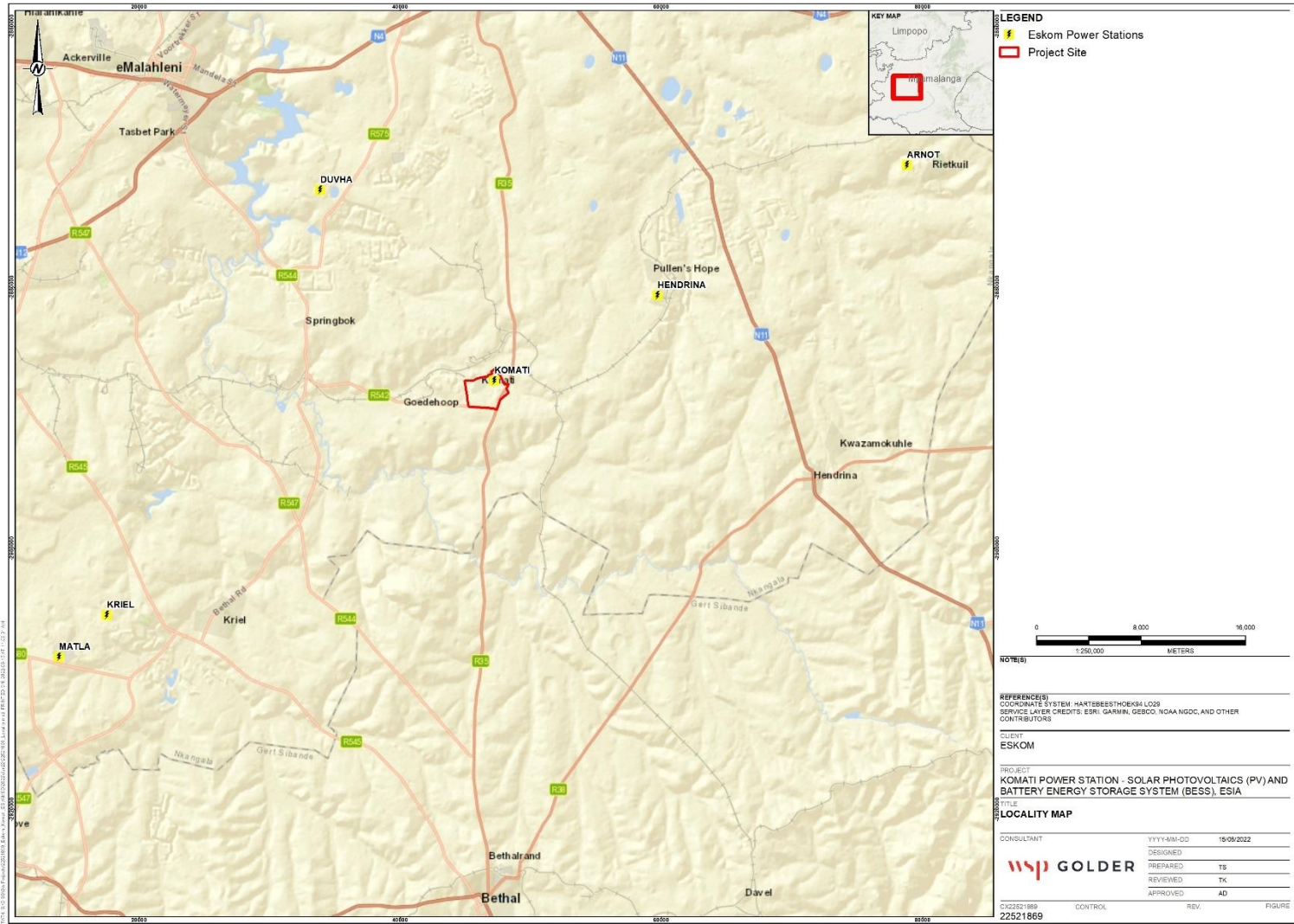


Figure 1: Eskom Komatipoort Locality Map



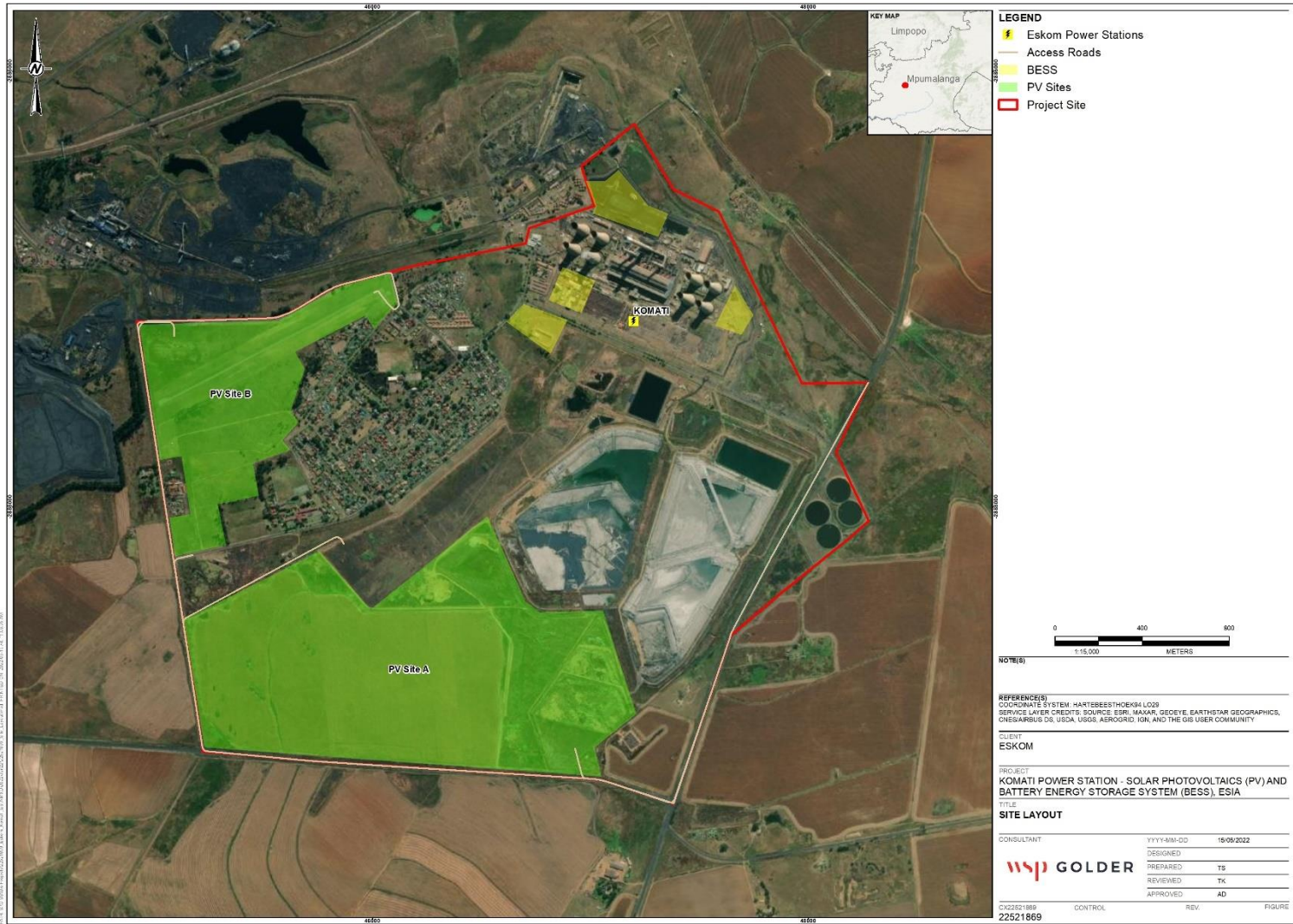


Figure 2: Proposed infrastructure overview

### 3.0 APPLICABLE LEGISLATION, POLICY AND STANDARDS

The ESIA must be aligned to the requirements of the World Bank Environmental & Social Framework; World Bank Group (WBG) Environmental, Health and Safety Guidelines (EHSG) both for general and sector; the IFC Performance Standards; and Good International Industry Practices (GIIP) and South African legislation and applicable regulations.

Biodiversity-related South African legislation and policy, and international lender standard requirements that were used to guide this scoping assessment are summarized as follows.

#### 3.1 South African Legislation and Policy

Applicable national and provincial legislation, associated regulations and policies that are pertinent to biodiversity, which were used to guide the Environmental Impact Assessment (EIA), include:

- National Environmental Management Act (NEMA) (Act No. 107 of 1998) including Section 24, concerning Procedures for the assessment and minimum criteria for reporting on identified themes in terms of Sections 24(5)(a) and (h) and 44 of the NEMA, when applying for environmental authorisation;
  - Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial biodiversity; and
  - Protocol for the specialist assessment and minimum report content requirements for environmental impacts on aquatic biodiversity;
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA), specifically:
  - ToPS – National lists of critically endangered, endangered, vulnerable and protected species (2007);
  - National list of threatened terrestrial ecosystems for South Africa (2011) (NEMBA Threatened Ecosystems, 2011);
  - National list of alien and invasive species (2016);
- Environment Conservation Act (Act No. 73 of 1989), specifically the Lists of declared weeds and invader plants (CARA, 1983);
- National Water Act (Act No. 36 of 1998);
- Mpumalanga Biodiversity Sector Plan (2015); and
- National Protected Area Expansion Strategy (2016).

Recent, relevant South African national policies and guidance were also taken into consideration, in the development of the baseline description and impact assessment process, including:

- Draft National Biodiversity Offset Policy (2017); and
- Species Environmental Assessment Guideline (SANBI, 2020).

#### 3.2 Lender requirements

The ESIA must be aligned to the requirements of the World Bank Environmental & Social Framework; World Bank Group (WBG) Environmental, Health and Safety Guidelines (EHSG) both for general and sector; and the International Finance Corporation (IFC) Performance Standards. The specific standards relevant to the assessment of biodiversity for the ESIA, and which guide this scoping study, are summarized in the sections that follow.



### 3.2.1 World Bank Environmental and Social Standard 6

The World Bank's (WB) Environmental and Social Standard 6 (ESS6) on Biodiversity Conservation and Sustainable Management of Living Natural Resources (World Bank, 2016) separates habitat into four categories for the purposes of implementing a differentiated risk management approach to habitats based on their sensitivity and values. The categories include 'Modified habitat', 'Natural habitat', 'Critical Habitat' and 'Legally protected and internationally and regionally recognized areas of biodiversity value'; each of which have varying levels of Borrower obligation in terms of biodiversity mitigation and management, and offset requirements.

Whilst the assessment of Modified and Natural habitats is largely based on the establishment of the ecological condition of mapped habitat/vegetation units, and the boundaries of legally protected and/or internationally recognised areas of high biodiversity value are generally defined; the identification and assessment of Critical Habitat requires additional, focussed effort – usually focussed on the presence of Critically Endangered, Endangered, range-restricted or migratory/congregatory species in significant numbers.

### 3.2.2 International Finance Corporation's Performance Standard 6

The IFC's Performance Standard 6 also sets specific biodiversity protection and conservation standards relating to potential project impact; that are largely aligned with the ESS6 requirements. The specific requirements are separated according to the following categories:

- **Modified Habitat:** areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition. PS6 relates to areas of modified habitat that have significant biodiversity value and requires that impacts on such biodiversity must be minimised, and mitigation measures implemented as appropriate.
- **Natural Habitat:** viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition. In such areas, the conservation outcome required by PS6 is no-net-loss of biodiversity value achieved using the "like-for-like" or better principle of biodiversity offsets, where feasible.
- **Critical Habitat:** areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes. When a project occurs in critical habitat supporting exceptional biodiversity value, a net gain in biodiversity value is required by PS6. This is achievable through appropriate biodiversity offsets.
- **Legally Protected and Internationally Recognised Areas:** such areas often have high biodiversity value; when this is the case these areas are likely to qualify as critical habitat. As such, the conservation outcome required by PS6 is also a net gain in biodiversity value, as well as obtaining the relevant legal permits, following standard governmental regulatory procedures, and engagement of affected communities and other stakeholders.
- **Invasive Alien Species:** the development project should not intentionally introduce any new alien species (unless carried out within the appropriate regulatory permits) and should not deliberate any alien species with a high risk of invasive behaviour under any circumstance. PS6 requires that any introduction of alien species be the subject of a risk assessment for potential invasive behaviour, and that the project should implement measures to avoid the potential for accidental or unintended introductions.

### 3.3 Good International Industry Practices (GIIP)

Best practice guidelines that were taken into consideration in the development of the scoping report include:

- BirdLife South Africa's best practise guidelines for the assessment and monitoring of impacts of solar power generating facilities on birds in southern Africa (Jenkins et al., 2017).

## 4.0 METHODOLOGY

This scoping level terrestrial biodiversity baseline description and preliminary impact assessment took cognisance of Government Notice No. 320, published in 2020 under the National Environmental Management Act (1998) concerning 'Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Theme in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (1998), when applying for Environmental Authorisation'.

In line with the assessment and reporting requirements set out in the protocol, this scoping-level terrestrial ecology assessment included two main study components; a desktop literature review, supplemented by a scoping site visit. The objectives and tasks associated with these components are described below.

### 4.1 Study Area

The study area for the scoping study was defined as follows (Figure 3):

- Local Study Area (LSA): The proposed development footprint plus all areas encompassed by the Project site boundary, within which direct impacts on biodiversity receptors (i.e. direct habitat loss, fauna mortality) could occur.
- Regional Study Area (RSA) was considered to be the catchment within which the proposed development is situated (Figure 3) which is considered to be an ecologically appropriate area of analysis for the identification of sensitive biodiversity receptors with potential to occur in the LSA, and within which indirect impacts on biodiversity receptors (e.g., dust deposition, sensory disturbance, hydrological changes) could occur.

### 4.2 Literature Review

The aim of the desktop literature review component was to collate and review the extensive available ecological information related to important biodiversity and conservation features in the project area, key ecological processes and function, and the likely composition and structure of local flora and fauna communities.

The existing comprehensive specialist reports that were reviewed and consolidated to assess terrestrial fauna, flora and vegetation include:

- 1) Animal Demographic Unit – Virtual Museum;
- 2) South African Bird Atlas – Project 2;
- 3) Construction and Operation of Ash Dam Extension 3 & The Deviation of Transmission and Distribution Lines at Komati Power Station, Mpumalanga (2008);
- 4) National spatial planning datasets, namely the Mpumalanga Biodiversity Sector Plan (MBSP), National Freshwater Ecosystem Priority Areas (NFEPAs), National Wetland Map 5 (NWM5), National Environmental Management Biodiversity Act (NEMBA) Threatened Ecosystems, and National Protected Area Expansion Strategy (NPAES), provide a regional/national context for assessing the biodiversity significance of the site.

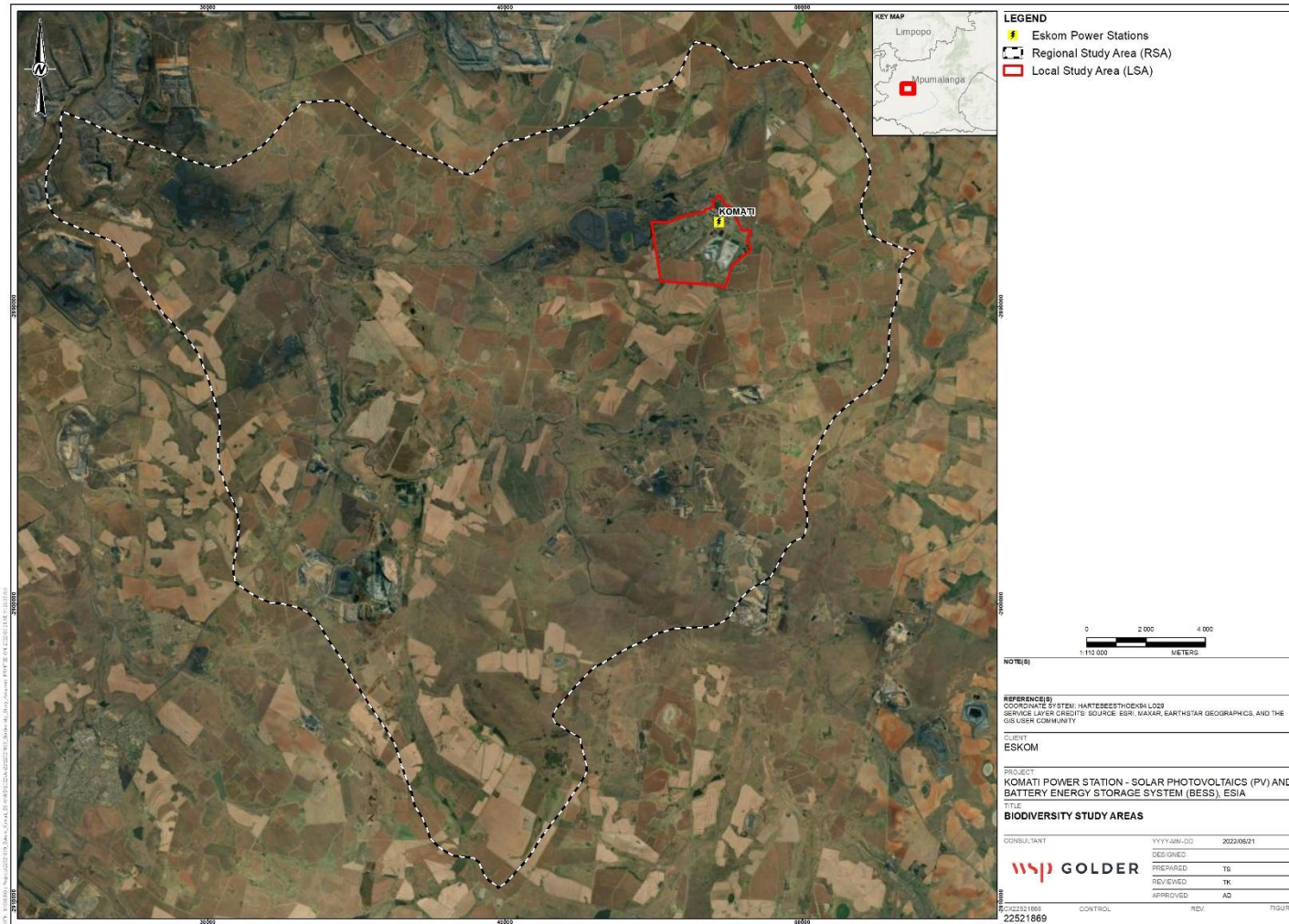


Figure 3: Local and regional study areas

### 4.3 Scoping Site Visit

The desktop assessment is supported by data gathered during field surveys that were conducted on 31 May – 01 June, and 17 June 2022. The objectives of the field visit were to:

- Verify and update the information in the preliminary desk-based vegetation map (i.e. verify boundaries); and
- Search for species of conservation concern (specifically birds) within the proposed infrastructure footprint and surrounds to scope the (forthcoming) avifauna baseline assessment.

### 4.4 Scoping Level Screening of Impacts and Mitigation

Appendix 2 of GNR 982, as amended, requires the identification of the significance of potential impacts during scoping. To this end, an impact screening tool has been used in the scoping phase (Table 2). The screening tool is based on two criteria; namely probability (Table 3) and consequence (Table 4), where the latter is based on general consideration to the intensity, extent, and duration.

**Table 2: Significance screening tool**

		CONSEQUENCE SCALE			
PROBABILITY SCALE		1	2	3	4
	1	Very Low	Very Low	Low	Medium
	2	Very Low	Low	Medium	Medium
	3	Low	Medium	Medium	High
	4	Medium	Medium	High	High

**Table 3: Probability scores and descriptors**

SCORE	DESCRIPTOR
4	<b>Definite:</b> The impact will occur regardless of any prevention measures
3	<b>Highly Probable:</b> It is most likely that the impact will occur
2	<b>Probable:</b> There is a good possibility that the impact will occur
1	<b>Improbable:</b> The possibility of the impact occurring is very low

**Table 4: Consequence score descriptions**

SCORE	NEGATIVE	POSITIVE
4	Very severe: An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	Very beneficial: A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit.

SCORE	NEGATIVE	POSITIVE
3	Severe: A long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.	Beneficial: A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
2	Moderately severe: A medium to long term impacts on the affected system(s) or party (ies) that could be mitigated.	Moderately beneficial: A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way.
1	Negligible: A short to medium term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	Negligible: A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper and quicker, or some combination of these.

The nature of the impact must be characterised as to whether the impact is deemed to be positive (+ve) (i.e. beneficial) or negative (-ve) (i.e. harmful) to the receiving environment/receptor. For ease of reference, a colour reference system (Table 5) has been applied according to the nature and significance of the identified impacts.

**Table 5: Impact Significance Colour Reference System to Indicate the Nature of the Impact**

Negative Impacts (-ve)	Positive Impacts (+ve)
Negligible	Negligible
Very Low	Very Low
Low	Low
Medium	Medium
High	High



## 4.5 Study Assumptions and Limitations

### 4.5.1 Data used for Specialist Assessments

- The baseline description is based on available national datasets and published literature for the Komati region, supplemented by field survey data (observations and photographs) taken during the wetland survey and avifauna scoping surveys conducted during May and June 2022 respectively.
- Vegetation, flora and fauna studies will be conducted later in the year, during the appropriate season (anticipated early wet season 2022).
- This scoping report was prepared on the basis of the site sensitivity verification process undertaken in response to the national web-based screening report. The site sensitivity verification was completed via desktop analysis of the extensive existing baseline knowledge of species and habitats in the study area, supplemented by cross-referencing to the most recent species conservation assessments.
- It is therefore considered that there are no sampling or information limitations pertaining to terrestrial animal or plant species impacting on this scoping-level terrestrial biodiversity description, screening of impacts, and preliminary recommended mitigation measures.

### 4.5.2 Assumptions, uncertainties, or gaps in knowledge

- The baseline description is qualitative and based on the available desktop information supplemented by preliminary scoping-level data gathered during the site visits.
- The preliminary identification of potential impacts and mitigation measures focus on fauna and flora species of concern with potential to occur in the study area.
- The selection of species of concern for the scoping level screening of impacts was based on the level of knowledge (that is, ecology and conservation status) of the species to act as surrogates for all species in the area, and adopts the hypothesis that conditions which support vertebrates and/or vascular plant species of concern are likely to also support species of concern from other taxonomic groups.

## 5.0 BASELINE DESCRIPTION

This section summarises the baseline biodiversity environment of the local and regional study areas. It draws upon existing studies, published information, local knowledge and scoping site visits.

### 5.1 Regional Biodiversity Context

The regional study area is located in the high lying (elevations from 1200 to 1800 m) Highveld ecoregion, which is characterised by plains with a moderate to low relief, as well as various grassland vegetation types. The ecoregion predominantly receives early to late summer rainfall ranging between 400 to 1000 mm per annum. The mean annual temperature is moderate (in the east) and hot (in the west) ranging between 12 to 20°C (Kleynhans, 2005).

The regional study area is situated in a landscape that is characterised by intensive agricultural crop cultivation, numerous coal mines and collieries, rail lines, and the power station itself, interspersed by areas of wetlands and secondary grasslands in valley bottoms where conditions for cultivation are unsuitable.

#### 5.1.1 Environmental Screening Tool

The proposed infrastructure footprint was assessed at desktop level using the National Web-based Environmental Screening Tool. According to the Tool, the Terrestrial Biodiversity Theme for the study area is rated 'Very High Sensitivity' due to its overlap with land mapped as 'Critical Biodiversity Area' (CBA) 2 by the Mpumalanga Biodiversity Sector Plan, 2019 (Figure 4).

The National Web Based Screening Tool also indicated that remnant wetland areas of the LSA are considered to be of Medium sensitivity due to their support of several plant Species of Conservation Concern (SCC), including *Pachycarpus suaveolens*; and as 'high to very high' sensitivity in terms of the Animal Species Theme due to the potential presence of fauna SCC including Black-footed cat (*Felis nigripes*), Maquassie Shrew (*Crocidura maquassiensis*), African Marsh Rat (*Dasymys robertsii*), Spotted-necked Otter (*Hydricotis maculicollis*), and Oribi (*Ourebia ourebi ourebi*).

### 5.1.2 Terrestrial Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs)

The proposed development site was compared to available spatial biodiversity planning datasets in order to assess the local and regional biodiversity context of the site. The following datasets were considered:

- 1) Mpumalanga Biodiversity Sector Plan (MBSP; 2015)

The LSA predominantly falls within areas categorised Heavily or Moderately Modified Areas, whilst Other Natural Areas occur at some of the proposed development site portions. A Critical Biodiversity Area occurs at the west, largely covering the portion proposed for the establishment of the solar PV Site B (Figure 4).

CBAs are those areas (outside of Protected Areas) that are required to meet biodiversity targets for biodiversity pattern (species and ecosystems) and ecological processes. These are areas of high biodiversity value and should remain in a natural state that is maintained in good ecological condition (Lötter, 2015). The CBA within which the proposed PV Site B is situated is bordered by the Goedehoop Colliery operations on the north and west, and a residential area on the east and farmlands on the south, all of which encompass Heavily or Moderately Modified Areas. Thus the level of anthropogenic disturbance renders the CBA unlikely to meet biodiversity targets for species and ecosystems and ecological processes.

### 5.1.3 Priority Areas for Protected Area Expansion

None of the proposed infrastructure coincides with areas that have been identified as Priority Focus Areas as part of the National Protected Area Expansion Strategy (2016) (Figure 5).

### 5.1.4 Protected Areas

No Protected Areas, Important Bird Areas (IBAs) nor Key Biodiversity Areas (KBAs) occur within the proposed development site (Lötter, 2015; BirdLife International (2022)). The nearest IBA is Amersfoort - Bethal - Carolina District which is situated approximately 15 km southeast of the LSA.

### 5.1.5 Freshwater Ecosystem Priority Area sub-catchments

The proposed development footprint in relation to FEPA sub-catchments is illustrated on Figure 6. The closest NFEPA Water Management Area occurs approximately 40km away from the proposed development footprint, and as such are not included as receptors for the current impact assessment, or considered further here.

### 5.1.6 Strategic Water Source Areas

Similarly to FEPA sub-catchments, no strategic water source areas occur within close proximity to the proposed development footprint, and as such are not included as receptors for the current impact assessment, or considered further here.

### 5.1.7 National Wetland Map 5

The proposed development footprint in relation to wetlands mapped as part of the National Wetland Map 5 project (van Deventer, 2019) is illustrated on Figure 7. These include an area of hillslope seep wetland to the west of the existing power station infrastructure, and a channelled valley bottom wetland system along the northern boundary of the site.

### **5.1.8 Indigenous forests**

No indigenous forest habitat occurs within the study area, which is characterised by currently/previously cultivated areas, disturbed grounds, secondary grassland (e.g. at the airstrip) and the existing power station infrastructure.



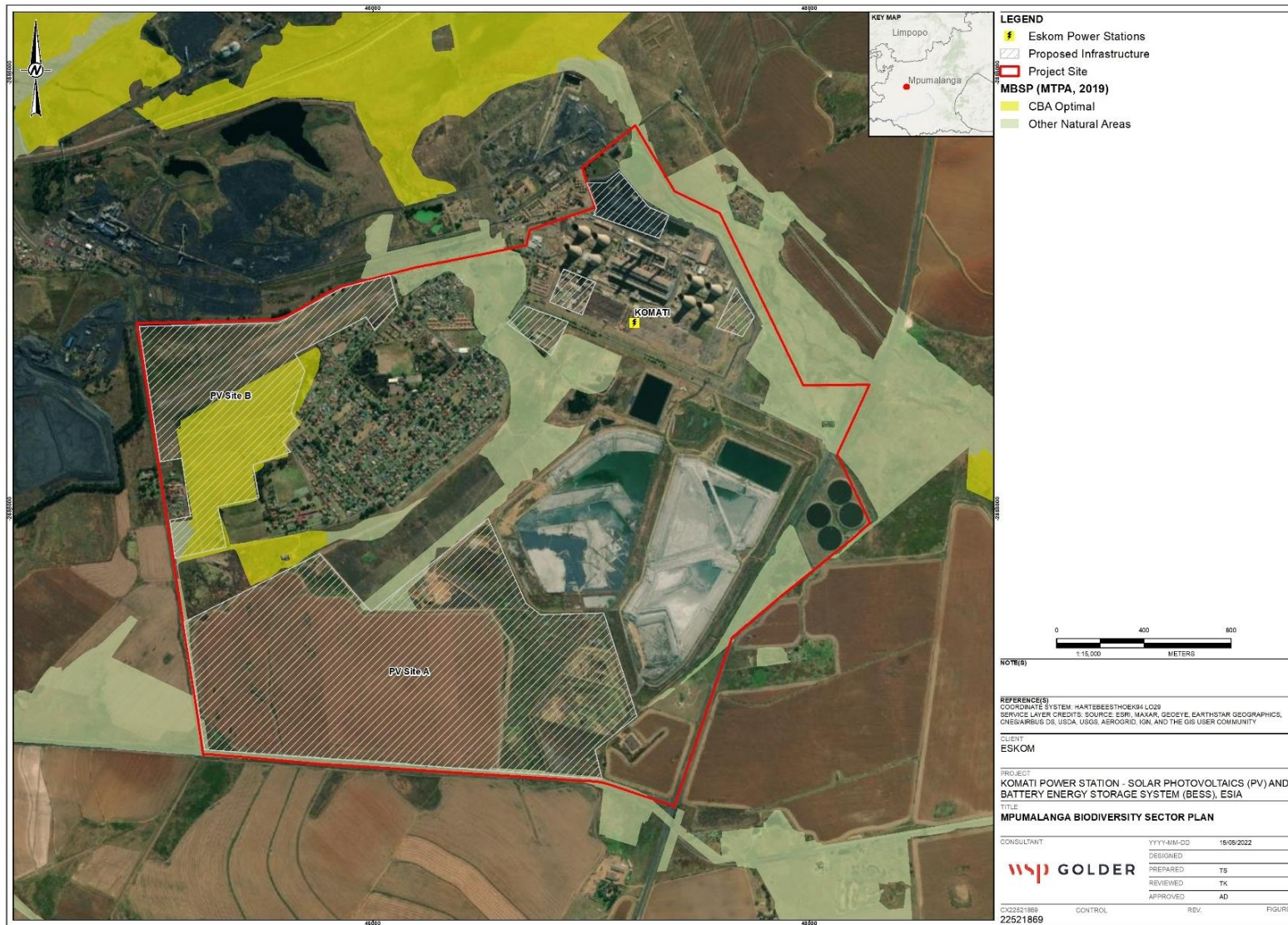


Figure 4: Mpumalanga Biodiversity Sector Plan in relation to the proposed development



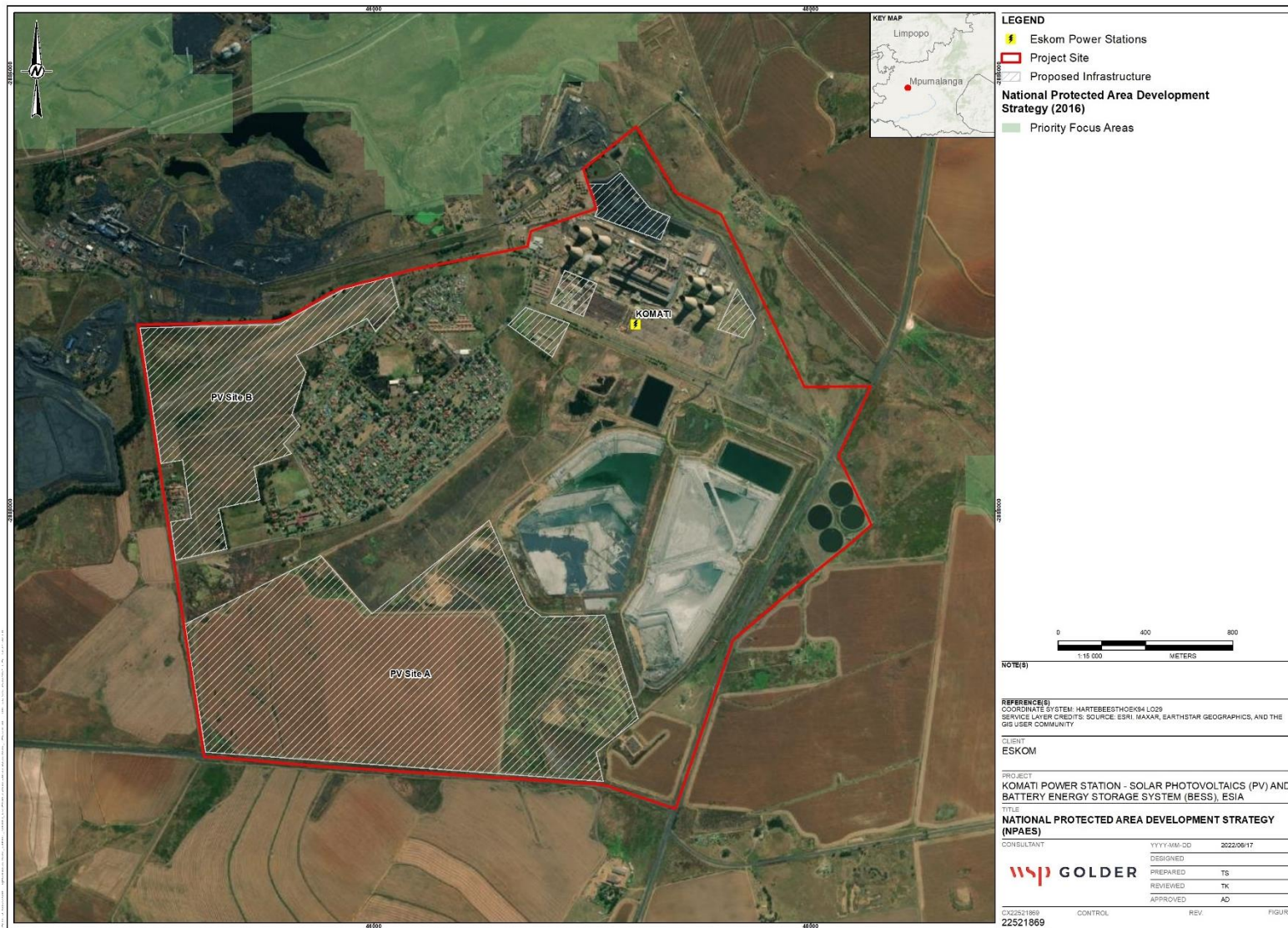


Figure 5: Priority Areas for Protected Area Expansion in relation to the proposed development

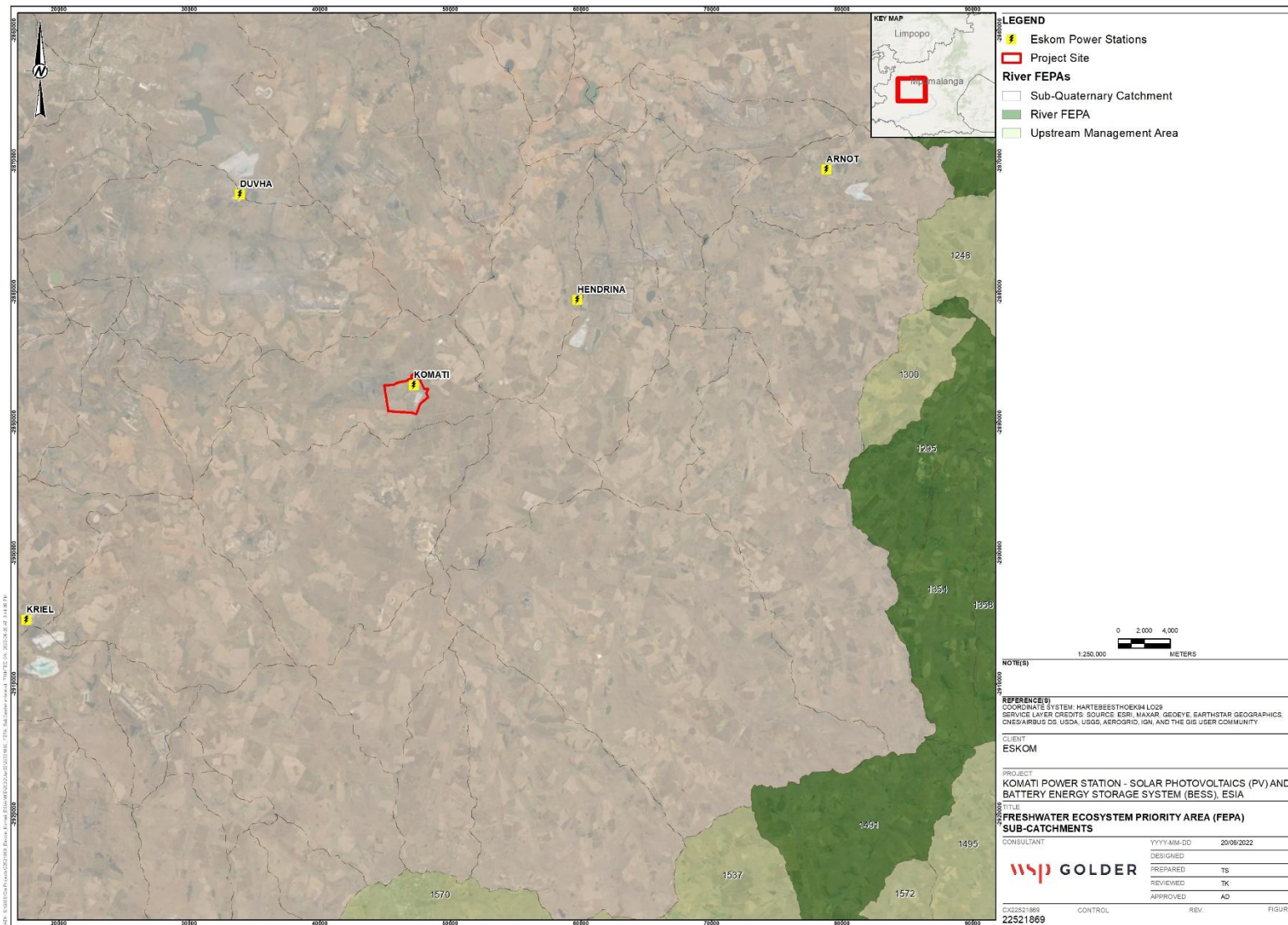


Figure 6: Proposed development in relation to FEPA sub-catchments



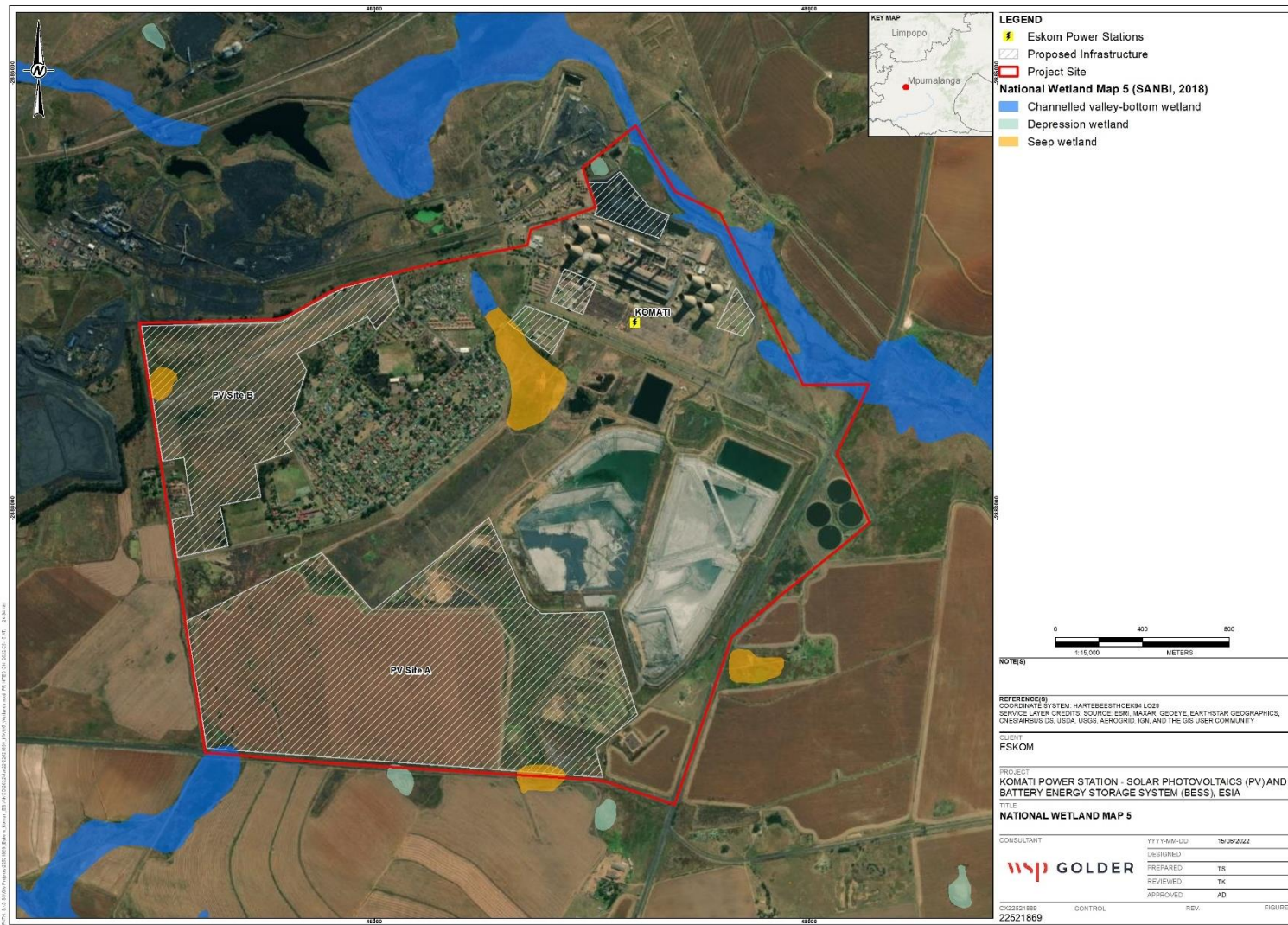


Figure 7: Proposed development in relation to mapped wetland habitat (National Wetland Map 5, 2015)

## 5.2 Terrestrial Vegetation and Flora

### 5.2.1 Vegetation types

The site is situated within a single vegetation type, Eastern Highveld Grassland (Gm12) (Figure 8), remnant patches of which may occur in non-transformed areas of the project site.

The Eastern Highveld Grassland spans across approximately 1,2 million hectares in the Mpumalanga Province. This is a poorly protected vegetation type with only about 35% remaining natural (Lötter M.c., 2014). According to Mucina & Rutherford (2006), the Eastern Highveld Grassland (Gm 12) vegetation unit is dominated by the usual highveld grass composition, including species such as *Aristida aequiglumis*, *A. congesta*; *Digitaria monodactyla*, *D. tricholaenoides*; *Eragrostis chloromelas*, *E. curvula*, *E. plana*. *E. racemosa*; *Themeda triandra*; *Tristachya leucothrix*, and *T. rehmanii*, with small scattered rocky outcrops with wiry, sour grasses and some woody species.

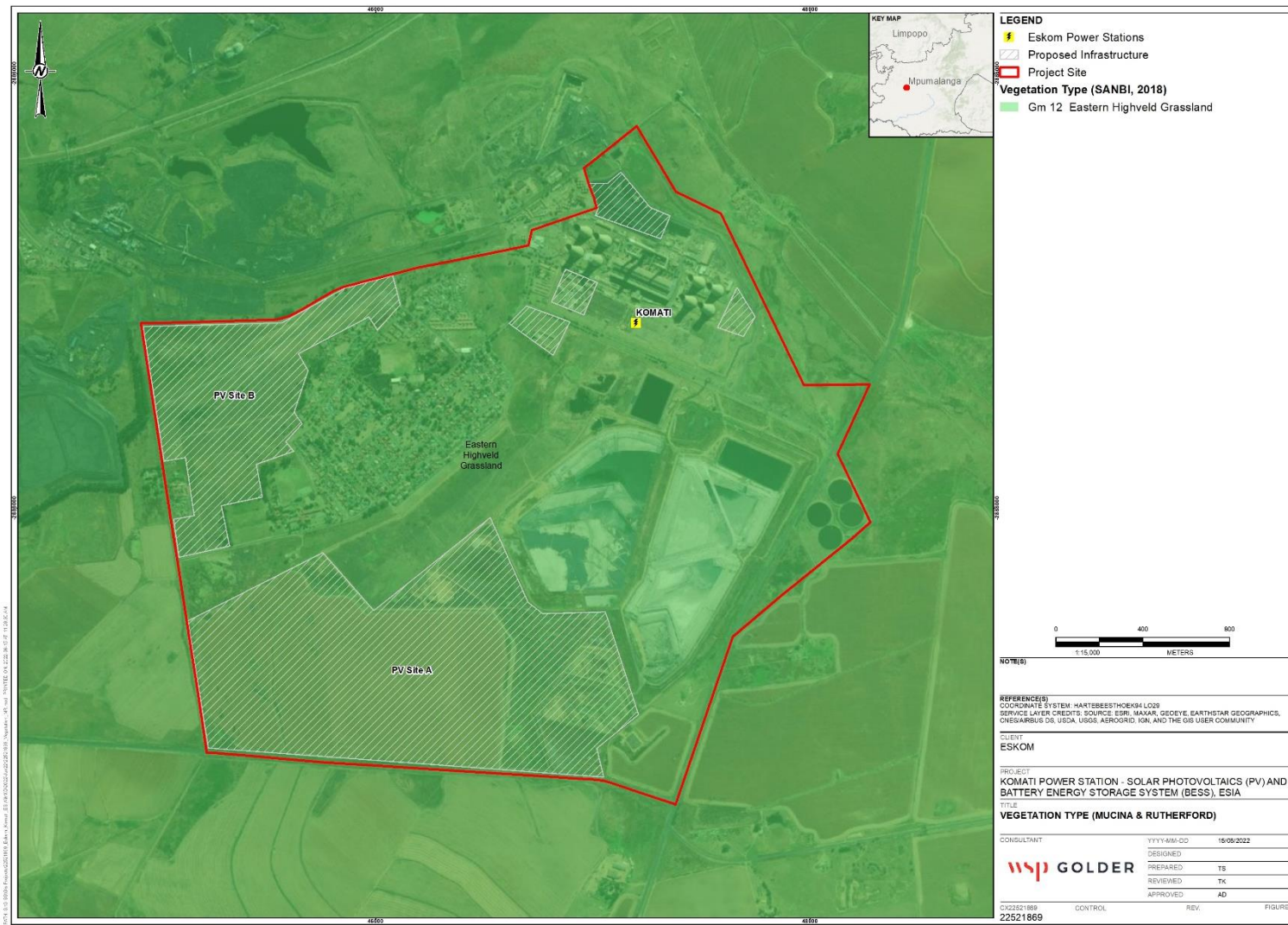


Figure 8: Proposed development in relation to Mucina & Rutherford vegetation types



## **5.2.2 Vegetation and Flora Features of Conservation Concern**

### **5.2.2.1 *NEMBA Threatened Ecosystems***

Eastern Highveld Grassland is considered to be Vulnerable nationally (Figure 9) (Government notice 1002/2011, in terms of section 52(1)(a) of NEMBA), as only a very small fraction is conserved in statutory reserves (Nooitgedacht Dam and Jericho Dam Nature Reserves) and approximately 44% has been transformed, primarily by cultivation, plantations, mines, urbanisation and the building of dams.

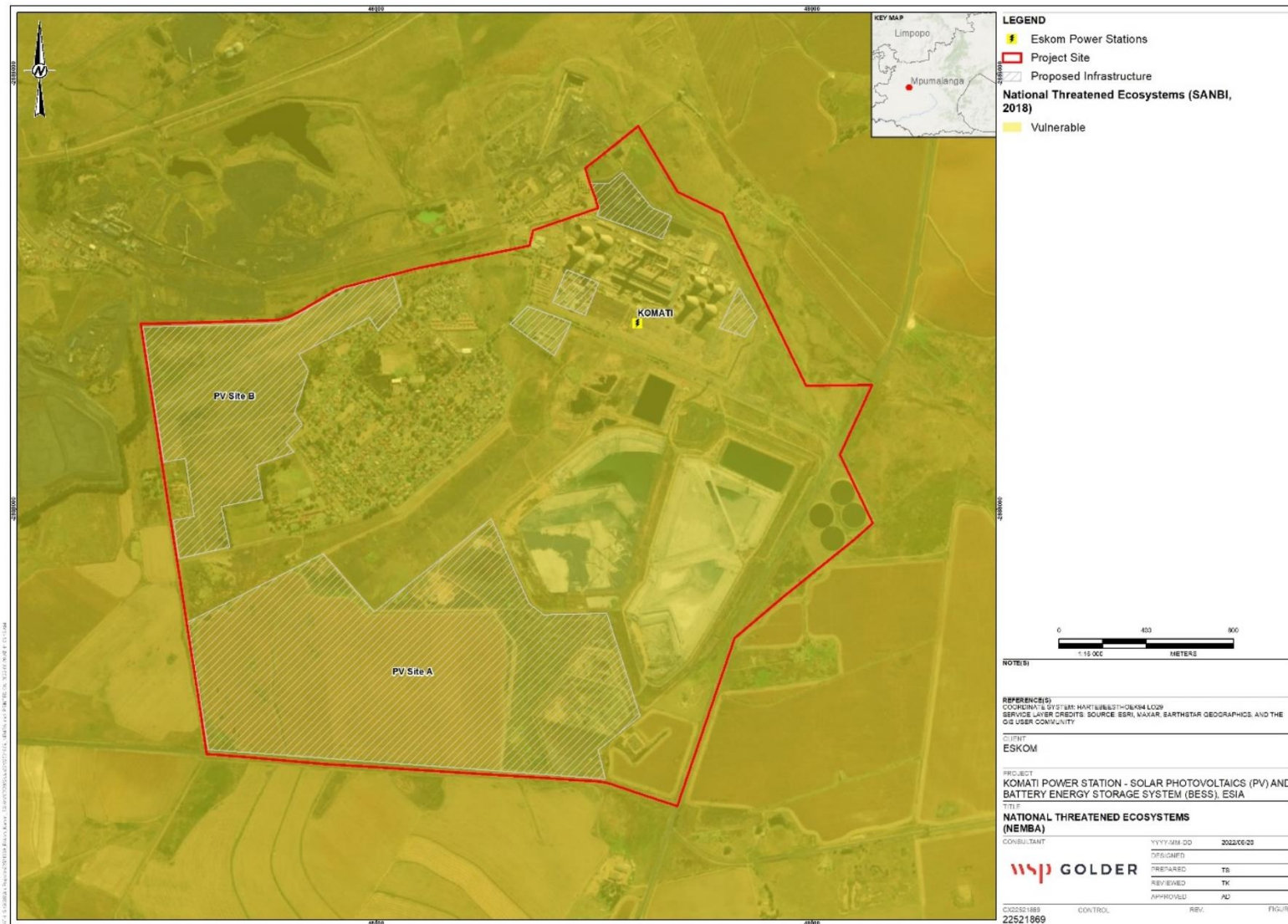


Figure 9: Proposed development in relation to the National Threatened Ecosystems (SANBI, 2018)



### 5.2.2.2 Flora Species of Conservation Concern

A list of flora SCC which occur within the region are provided in Table 6. Eight of the species are nationally red-listed with classifications ranging between Near Threatened to Rare. The species *Eucomis montana* and *Eucomius autumnalis* are protected under the Mpumalanga Nature Conservation Act No. 10 of 1998.

**Table 6: Confirmed/expected SCC in the region**

Scientific Name	RSA Red List Status	Mpumalanga Protected/Threatened Species
<i>Anacampseros subnuda subsp. lubbersii</i>	Vulnerable	-
<i>Callilepis leptophylla</i>	Least Concern	✓
<i>Eucomis montana</i>	Least Concern	✓
<i>Eucomius autumnalis</i>	Least Concern	✓
<i>Frithia humilis</i>	Vulnerable	-
<i>Gladiolus paludosus</i>	Vulnerable	-
<i>Ilex mitis var. mitis</i>	Least Concern	✓
<i>Jamesbrittenia macrantha</i>	Near Threatened	-
<i>Khadia alticola</i>	Rare	-
<i>Khadia carolinensis</i>	Vulnerable	-
<i>Miraglossum davyi</i>	Vulnerable	-
<i>Pachycarpus suaveolens</i>	-	✓
<i>Streptocarpus denticulatus</i>	Vulnerable	-

## 5.3 Fauna

According to the Mpumalanga Biodiversity Sector Plan Handbook (2014), the province hosts a relatively high faunal diversity with approximately 173 mammal, 575 bird, 171 reptile, 51 amphibian and 62 fish species. This high species richness is attributed to the wide variety of habitats within the savanna, forest and grassland biomes. However, the project area is expected to host a low species diversity due to current and historic agriculture and mining/power-generation land uses resulting in the largely disturbed nature of the area.

### 5.3.1 Mammals

Although no mammal species were directly observed within the LSA during an Environmental Impact Assessment undertaken for the Komati Power Station in 2008 (Synergistics Environmental Services, 2008), signs of Common Reedbuck (*Redunca redunca*), Grey Duiker (*Sylvicapra grimmia*) and Porcupine (*Hystrix africaeaustralis*) were observed. Data obtained from the Animal Demographic Unit (ADU) Virtual Museum show that six species have been photographed within the grid coordinates (Quarter Degree Square (QDS)) of interest (i.e. 2629AB and the neighbouring 2629BA; Table 7).

**Table 7: Confirmed/expected mammal species within the 2629AB and 2629BA QDS (Synergistics Environmental Services, 2008; Animal Demographic Unit Virtual Museum, 2022)**

Common Name	Scientific Name	RSA Red List Status	Mpumalanga Protected Species
African Marsh Rat	<i>Dasymys robertsii</i>	Vulnerable	-
Black-footed cat	<i>Felis nigripes</i>	Vulnerable	-
Blesbok	<i>Damaliscus pygargus phillipsi</i>	Least Concern	-
Common Genet	<i>Genetta genetta</i>	Least Concern	-
Maquassie Shrew	<i>Crocidura maquassiensis</i>	Vulnerable	-
Oribi	<i>Ourebia ourebi ourebi</i>	Vulnerable	Protected
Serval	<i>Leptailurus serval</i>	Near Threatened	-
Southern African Hedgehog	<i>Atelerix frontalis</i>	Near Threatened	Protected
Spotted-necked Otter	<i>Hydricteis maculicollis</i>	Vulnerable	Protected
Xeric Four-striped Grass Rat	<i>Rhabdomys pumilio</i>	Least Concern	-

### **Mammal species of conservation concern**

Three of the ten species that have been confirmed or expected within the 2629AB and 2629BA are classified as Least Concern. Although the national screening tool indicates the potential presence of the provincially protected species including Black-footed cat, Oribi and the Spotted-necked Otter, these are not considered likely to be present due to the transformed nature of the habitats within the study area. There is a potential for Maquassie Shrew and/or African Marsh Rat to occur in remnant wetland habitats, however the presence of African Marsh Rat is considered unlikely since African Marsh Rats are dependent on intact rivers and wetland ecosystems and have not been found in artificial or degraded wetlands (Pillay, 2016); whilst the transformed nature of much of the study area limits its suitability for the rare Maquassie Shrew.

### **5.3.2 Birds**

A total of 115 bird species have been confirmed or are expected to occur within the 2605\_2925 coverage based on the data retrieved from the South African Bird Atlas Project 2 (SABAP2; 2022), of these species, 29 were classified as species of conservation concern (Table 8). Only two of these species are red listed at the national level; the Saddle-billed Stork (*Ephippiorhynchus senegalensis*) which is listed as Endangered (EN) and the Secretary bird (*Sagittarius serpentarius*) listed as Vulnerable (VU) at national and global level.

**Table 8: Confirmed/expected bird species within the 2629AB QDS (Animal Demographic Unit Virtual Museum, 2022)**

Common Name	Scientific Name	SA National redlist status (2016)	IUCN 2020 (Global Status)	Mpumalanga Protected Species
Common Sandpiper	<i>Actitis hypoleucos</i>	-	Least Concern	Protected
Egyptian Goose	<i>Alopochen aegyptiaca</i>	-	Least Concern	Protected
African Pipit	<i>Anthus cinnamomeus</i>	-	Least Concern	Protected
Common Buzzard	<i>Buteo buteo</i>	-	Least Concern	Protected

Common Name	Scientific Name	SA National redlist status (2016)	IUCN 2020 (Global Status)	Mpumalanga Protected Species
Little Stint	<i>Calidris minuta</i>	-	Least Concern	Protected
Ruff	<i>Calidris pugnax</i>	-	Least Concern	Protected
Common Ringed Plover	<i>Charadrius hiaticula</i>	-	Least Concern	Protected
Kittlitz's Plover	<i>Charadrius pecuarius</i>	-	Least Concern	Protected
Three-banded Plover	<i>Charadrius tricollaris</i>	-	Least Concern	Protected
Saddle-billed Stork	<i>Ephippiorhynchus senegalensis</i>	Endangered	Least Concern	Protected
African Snipe	<i>Gallinago nigripennis</i>	-	Least Concern	Protected
Black-winged Stilt	<i>Himantopus himantopus</i>	-	Least Concern	Protected
Barn Swallow	<i>Hirundo rustica</i>	-	Least Concern	Protected
Little Bittern	<i>Ixobrychus minutus</i>	-	Least Concern	Protected
Cape Wagtail	<i>Motacilla capensis</i>	-	Least Concern	Protected
Capped Wheatear	<i>Oenanthe pileata</i>	-	Least Concern	Protected
African Spoonbill	<i>Platalea alba</i>	-	Least Concern	Protected
Glossy Ibis	<i>Plegadis falcinellus</i>	-	Least Concern	Protected
African Swamphen	<i>Porphyrio madagascariensis</i>	-	Least Concern	Protected
Tawny-flanked Prinia	<i>Prinia subflava</i>	-	Least Concern	Protected
Secretary bird	<i>Sagittarius serpentarius</i>	Vulnerable	Vulnerable	Protected
African Stonechat	<i>Saxicola torquatus</i>	-	Least Concern	Protected
African Sacred Ibis	<i>Threskiornis aethiopicus</i>	-	Least Concern	Protected
Wood Sandpiper	<i>Tringa glareola</i>	-	Least Concern	Protected
Common Greenshank	<i>Tringa nebularia</i>	-	Least Concern	Protected
Marsh Sandpiper	<i>Tringa stagnatilis</i>	-	Least Concern	Protected
Blacksmith Lapwing	<i>Vanellus armatus</i>	-	Least Concern	Protected
Crowned Lapwing	<i>Vanellus coronatus</i>	-	Least Concern	Protected
African Wattled Lapwing	<i>Vanellus senegallus</i>	-	Least Concern	Protected

The national screening tool report for the site also indicates that three additional bird species are considered likely to occur; African Grass Owl (*Tyto capensis*), Caspian tern (*Hydroprogne caspia*) and White-bellied Bustard

(*Eupodotis senegalensis*). During the avifauna scoping site visit conducted on 17 June 2022, habitats with potential to support African Grass Owl were mapped (Figure 10), since this species has the greatest likelihood of being affected by the proposed Project, should this species be present (breeding) in the LSA. Comprehensive surveys to confirm the presence of any significant populations of bird SCC within the LSA will be conducted later in 2022 (see Section 7.0).

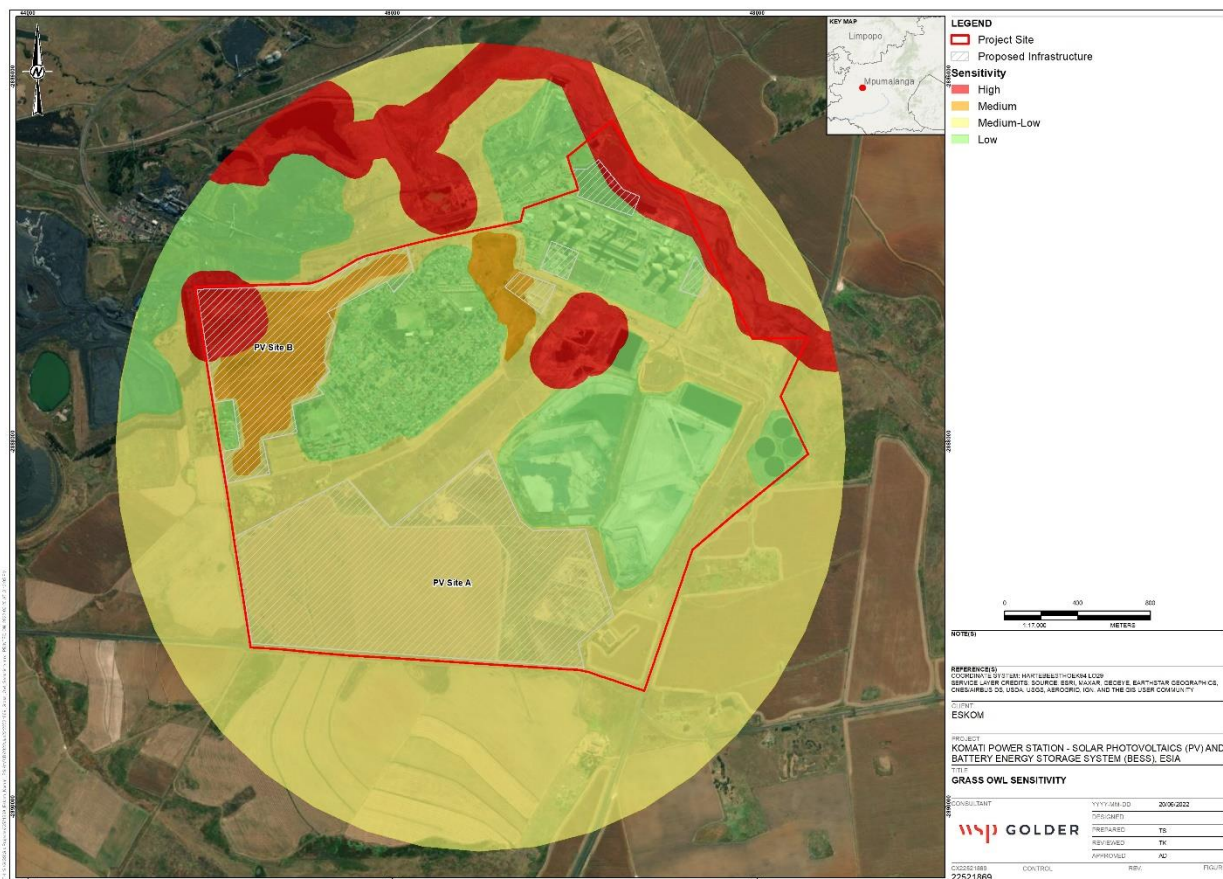


Figure 10: Grass owl sensitivity map

### 5.3.3 Herpetofauna

Data retrieved from the ADU Virtual Museum indicate the occurrence of three frog species within the 2629BA QDS, no records of amphibians are held for the 2629AB QDS (Table 9). None of the frog species are considered SC. Ten reptile species were recorded from both 2629BA and 2629AB QDSs (Table 10). All herpetofauna species were classified as Least Concern. No herpetofauna SCC were flagged for the study area by the national screening tool.

Table 9: Previously confirmed frog species within the 2629BA QDS (Animal Demographic Unit Virtual Museum, 2022)

Common Name	Scientific Name	RSA Red List Status
Guttural Toad	<i>Sclerophrys gutturalis</i>	Least Concern
Common Platanna	<i>Xenopus laevis</i>	Least Concern
Delalande's River Frog	<i>Amietia delalandii</i>	Least Concern

**Table 10: Previously confirmed Reptile species within the 2629AB and 2629BA QDS (Animal Demographic Unit Virtual Museum, 2022)**

Common Name	Scientific name	RSA Red List status	Mpumalanga Protected Species
Bibron's Blind Snake	<i>Afrotyphlops bibronii</i>	Least Concern	-
Black-headed Centipede-eater	<i>Aparallactus capensis</i>	Least Concern	-
Cape Skink	<i>Trachylepis capensis</i>	Least Concern	Protected
Mole Snake	<i>Pseudaspis cana</i>	Least Concern	-
Red-lipped Snake	<i>Crotaphopeltis hotamboeia</i>	Least Concern	-
Rhombic Egg-eater	<i>Dasypletis scabra</i>	Least Concern	-
Rinkhals	<i>Hemachatus haemachatus</i>	Least Concern	-
Speckled Rock Skink	<i>Trachylepis punctatissima</i>	Least Concern	Protected
Spotted Grass Snake	<i>Psammophylax rhombeatus</i>	Least Concern	-
Transvaal Gecko	<i>Pachydactylus affinis</i>	Least Concern	Protected

## 5.4 Existing Impacts on Biodiversity and Drivers of Change

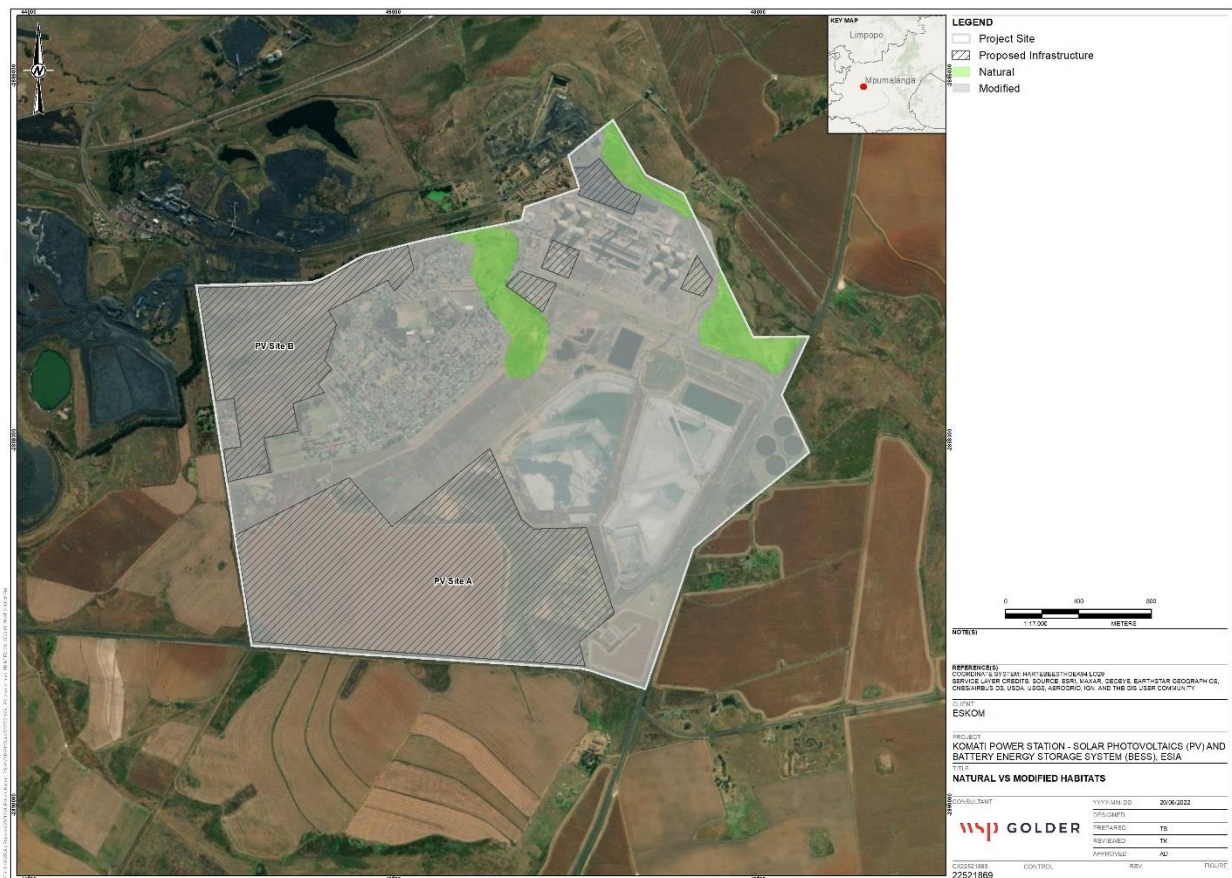
The proposed project infrastructure will be situated in close proximity to the existing power generation facilities and activities. All areas visited are currently experiencing some level of impact from the surrounding agricultural activities primarily through habitat transformation, and disturbance arising from power generation facilities and activities.

The presence of the existing power station facilities within close proximity to the proposed development footprint is expected to have an established impact on faunal species that are susceptible to sensory disturbance, particularly mammals and bird species which would actively avoid areas of high mechanical/human disturbance. Site lighting at night is also considered to be a likely factor in deterrence of these fauna from utilising the proposed development footprint for foraging/roosting purposes, and may also be driving changes in localised invertebrate distribution patterns, with certain species (and their predators e.g. bats) likely to be attracted to site security lighting at night, whilst others are deterred by it.

## 5.5 Natural, Modified and Critical Habitats

The study area is dominated by agricultural cultivation, power station infrastructure and residential/industrial areas, interspersed with some remnant wetland habitat. While some very disturbed wetland habitat has been identified in the eastern extent of PV Site A, it is no longer considered to constitute 'Natural' habitat as defined by WB ESS6 or IFC PS6, due to its heavily degraded state and loss of ecological function. The channelled valley bottom wetland to the north east of the site, and the seep wetland that crosses the northern boundary of the site, while moderately modified/disturbed, still support biodiversity and deliver ecological services to an extent that enables them both to be considered 'Natural' habitat (Figure 11) as defined by the lender standards.





**Figure 11: Natural, modified and critical habitat**

At present, no areas of potentially Critical habitat, as defined by IFC and WB standards, have been identified within the study area.

## 6.0 SCREENING OF POTENTIAL IMPACTS

The construction and operation of the proposed new infrastructure is anticipated to result in the following key impacts on terrestrial biodiversity receptors:

- 1) Direct impacts through clearing of land and resultant loss of biodiversity (flora and fauna SCC, ecosystems of concern).
- 2) Establishment and spread of alien and invasive species.
- 3) Loss and fragmentation of faunal habitats.
- 4) Injury and mortality of fauna SCC.
- 5) Collision risks to birds.

The outcomes of the screening of the potential impacts are summarised in Table 11 and described in detail in the following sections.

### 6.1 Construction Phase

Construction phase impacts largely arise as a result of direct impacts on the receiving environment due to clearing of land in advance of project development, and resultant loss of biodiversity. The earthworks and

activities involved during the construction phase of the Project can potentially exert negative impacts on sensitive ecosystems, and flora and fauna species. Potential impacts primarily relate to vegetation clearing, direct loss/mortalities, sensory disturbance, and general anthropogenic influences associated with the construction of the proposed infrastructure.

### **6.1.1 Direct loss and disturbance of natural habitat and associated flora Species of Conservation Concern**

The proposed development areas largely fall within non-transformed areas however surrounded by farmlands and mining operations. Furthermore, the areas appear to lack the diversity of species and likely dominated by a single species. The consequence of the potential impact is therefore considered moderately severe, while the possibility of the impact occurring is highly probable, amounting to a potential impact of Medium significance. With the implementation of mitigation measures such as restricting vegetation clearing to the development footprint, the consequence of the impact occurring can be reduced, resulting in a residual impact of Low significance

### **6.1.2 Establishment and spread of alien and invasive species**

Disturbances caused by vegetation clearing and earth works during construction will exacerbate the establishment and spread of alien invasive vegetation. Alien plant infestations can spread exponentially, suppressing, or replacing indigenous vegetation. This may result in a breakdown of ecosystem functioning and a loss of biodiversity. Consequently, the potential impact is considered moderately severe, while the possibility of the impact occurring is highly probable, amounting to a potential impact of Medium significance.

With the development of an auditable AIS Management Plan for the project, and the strict implementation of the recommended active control and monitoring measures throughout the construction phase, the probability of the impact occurring can be reduced, resulting in a residual impact of Low significance

### **6.1.3 Loss and fragmentation of faunal habitats**

The proposed development sites are surrounded by farmlands and mining operations, and as such remnant areas of fauna habitat restricted to wetlands/grasslands are already considered to be fragmented. This loss of landscape connectivity renders inhabiting populations of fauna isolated from other populations within the region. The LSA supports some potential habitat for Grass owl, the destruction of which is probable and would result in severe consequences, amounting to a potential impact of Medium significance. Should Grass Owl be confirmed on the site during avifauna surveys, mitigation measures will need to be applied to ensure that loss/fragmentation of their habitat is avoided, in which case the probability and potential consequence of the impact can be reduced, resulting in a residual potential impact of Very Low significance.

### **6.1.4 Injury and mortality of faunal species of conservation concern**

The bulk earthworks involved in site development in advance have the potential to injure/kill individual faunal species of concern, particularly ground-dwelling and relatively slow-moving herpetofauna species that are vulnerable to heavy machinery movements and site clearance activities. However, the probability of the potential impact occurring is expected to be low given the transformed/disturbed nature of most available habitat. The potential consequence of the potential impact is thus considered negligible, resulting in a potential impact of Low significance.

The application of the recommended mitigations to implement measures to reduce the level of noise/sensory disturbance arising from site activities and infrastructure, will reduce the likelihood of the impact resulting in a residual impact of Very Low significance.

## 6.2 Operational Phase

Operational phase impacts relate to the ongoing risk of spread of the alien and invasive plant species that were present at baseline, and may have been spread into new areas during the construction phase; fragmentation of fauna habitats/barriers to movement due to security fencing, and the risk of injury/mortality presented to fauna by vehicular traffic and solar PV infrastructure.

### 6.2.1 Spread of alien and invasive species

The potential establishment of alien invasive species in, and immediately adjacent to, the proposed development footprint will continue to be an impact of concern during the operational phase. Without mitigation, the consequence of the potential impact is considered moderately severe, while the possibility of the impact occurring is highly probable, amounting to a potential impact of Medium significance.

With the development of an auditable AIS Management Plan for the project, and the strict implementation of the recommended active control and monitoring measures throughout the operational phase, the probability of the impact occurring can be reduced, resulting in a residual impact of Low significance.

### 6.2.2 Fragmentation of fauna habitats/barriers to movement

The solar PV arrays will be fenced off for security purposes, which will present a barrier to movement for larger faunal species. The likelihood of the impact occurring is considered improbable, since significant populations of larger mammals are not expected to utilise the immediate surrounds due to sensory disturbance/habitat transformation; while the consequence of the impact, should it occur, could be moderately severe, amounting to an impact of Low significance. No specific mitigation measures are proposed, since the security fencing will remain in place for the duration of the operation period (and as such the potential barrier to movement will remain), and the pre-mitigation impact is of Low significance, which is considered acceptable.

### 6.2.3 Injury and mortality of bird species of conservation concern

The presence of the Solar PV modules and ancillary infrastructure (particularly overhead transmission lines) in the landscape throughout the operational period may pose a risk of collision/electrocution to birds. The probability of the impact occurring is considered highly probable, and the consequence of the impact is expected to be moderately severe, amounting to an impact of Medium significance prior to mitigation. With the implementation of mitigation measures such as using avian-safe infrastructure designs, the probability of collisions/ electrocution occurring can be reduced, resulting in a residual impact of Low significance.

### 6.2.4 Injury and mortality of other faunal species of conservation concern

Increased vehicular traffic in the study area during the operation phase may pose a risk of injury and mortality of fauna SCC (and non-SCC). The probability of the impact occurring is considered probable, and the consequence moderately severe since the study area consists of significant vehicular traffic due to existing land uses. The significance of the impact is therefore considered to be Low. Upon implementation of recommended mitigation measures such as adhering to prescribed speed limits for construction and maintenance vehicles, the probability of the impact occurring can be reduced, resulting in a residual impact of Very Low significance.



**Table 11: Terrestrial Biodiversity Impact summary**

ACTIVITY	POTENTIAL IMPACT	AFFECTED RECEPTORS	PHASE In which impact is anticipated	Without Mitigation			With Mitigation		
				Probability	Consequence	Significance without Mitigation	Probability	Consequence	Significance with Mitigation
Clearance of indigenous vegetation	Direct Loss and disturbance of natural habitat and associated flora SCC	Sensitive habitats, flora SCC	Construction	3	2	Medium	3	1	Low
	Establishment and spread of AIS	Sensitive habitats, flora SCC	Construction	3	2	Medium	2	2	Low
	Loss and fragmentation of faunal habitat	Fauna SCC (Grass owls)	Construction	2	3	Medium	1	2	Very Low
Vehicular Traffic, noise and lighting	Injury and mortality of fauna SCC	Fauna SCC	Construction	3	1	Low	2	1	Very Low
Maintenance of Solar PV infrastructure	Establishment and spread of AIS	Sensitive habitats, flora SCC	Operation	3	2	Medium	2	2	Low
	Fragmentation of fauna habitats/barriers to movement	Fauna SCC	Operation	2	2	Low	-	-	-
PV and powerline infrastructure	Electrocution of bird SCC	Birds SCC	Operation	3	2	Medium	1	2	Very Low
Vehicular Traffic	Injury and mortality of fauna SCC	Fauna SCC	Operation	3	1	Low	2	1	Very Low

## 6.3 Mitigation Measures

Mitigation measures that are designed to avoid and minimise the loss and degradation of the ecological resources on the site are summarised in the sections that follow.

### 6.3.1 Identification of areas to be avoided (including buffers)

- Loss of Natural habitat should be avoided by ensuring that proposed infrastructure/activities are situated outside of these areas. Should Natural habitat loss be unavoidable, net gain will need to be secured via an appropriately designed offset, to achieve the requirements of IFC PS6 and WB ESS6, as well as those of the DFFE.
- Areas of undisturbed, natural grassland and wetland habitat should be avoided to the extent possible. Areas of direct loss must be addressed via additional conservation actions/offsets as required.
- A loss/disturbance buffer zone of at least 100 m should be maintained between the maximum extent of construction works and the outer boundary of wetlands and riparian zones.

### 6.3.2 Minimisation

- To prevent loss of natural habitat (grasslands, wetlands) and flora SCC beyond the direct disturbance footprint, prior to any vegetation clearing, the development footprints should be clearly marked out with flagging tape/posts in the field. Vegetation clearing should be restricted to the proposed project footprints only, with no clearing permitted outside of these areas.
- The extent of disturbance should be limited by restricting all construction activities to the servitude as far as practically possible.
- Locate all stockpiles, laydown areas and temporary construction infrastructure at least 50 m from the edge of delineated wetlands.
- A search and rescue survey for all flora SCC should then be conducted within these marked footprints prior to the commencement of construction to determine the number of potentially impacted plant species of conservation concern. Based on the findings of the survey, clearing and/or relocation permits should be obtained from the relevant authority to clear or rescue and relocate potentially impacted plant SCC.
- Rescued plants should be relocated to an adjacent area of natural habitat..
- Glare reduction measures for PV panels and the use of safe perching devices and/or deterrents to reduce the risk of bird collision with panels or electrocution on associated powerline infrastructure should be implemented.
- Speed limits on mine should be expanded to construction areas via appropriate signage and enforced on all access roads to proposed new infrastructure locations. Dust suppression activities should also be expanded to include additional road at new infrastructure areas.
- A search and rescue survey for herpetofauna species should be done immediately in advance of site clearance activities in non-transformed habitats (i.e. remnant grasslands and wetlands). Any observed individuals should be relocated to nearby areas of natural habitats. Where snakes require relocation, this should be done by a certified snake handler for health and safety reasons.
- Dirty water resulting from construction and operational phases should not be allowed to freely flow on surfaces and or into the nearby watercourses and should be directed to the storm water management infrastructure (drains for example).

- The development of a biodiversity management plan that provides a practical framework for the delivery of the preceding mitigation measures is recommended.

### 6.3.3 Alien and Invasive Species Management

- An alien and invasive species management plan should be developed for the Project, which includes details of strategies and procedures that must be implemented on site to control the spread of alien and invasive species. A combined approach using both chemical and mechanical control methods, with periodic follow-up treatments informed by regular monitoring, is recommended.

### 6.3.4 Biodiversity Management Plan

- Specific provision for biodiversity conservation, including details of any required offsets, should be made in the project BMP/BAP, in alignment with the objectives of the MBSP (2019).
- Inclusion of a practical framework and schedule, details of key performance indicators, and recommended monitoring protocols for the delivery of existing and currently recommended mitigation measures in the BMP is recommended.

## 6.4 Monitoring Requirements

The following monitoring requirements are anticipated:

- The presence of alien and invasive flora species should be documented prior to the commencement of the development of the infrastructure and rehabilitation activities, and the baseline case used as a benchmark against which the spread of these species can be monitored. Annual monitoring inspections should identify target areas for clearing and subsequent rehabilitation/re-vegetation programmes.
- A record of fauna mortalities/injury due to interactions with Project infrastructure/activities should be kept on site and regularly reviewed to inform the need for implementation of any additional mitigation measures.

## 6.5 Cumulative Impacts

The landscape within which the proposed infrastructure is located is heavily to moderately modified and fragmented as a consequence of the existing mining operations, farmlands and residential areas. While the currently proposed project infrastructure largely avoids the loss of significant areas of natural habitat and associated flora SCC due to active avoidance of these areas as part of the ongoing planning process, vegetation clearing would result in loss of additional species and habitats of conservation concern, contributing to cumulative impacts in terms of direct losses of these receptors.

## 7.0 ADDITIONAL PLANNED BASELINE DATA GATHERING STUDIES AT ESIA STAGE

Additional baseline data gathering surveys and impact assessments that will be conducted at ESIA phase, and reported in the format required by the NEMA-gazetted protocols for minimum reporting requirements for terrestrial and avifauna specialist assessments, will include the following:

- Terrestrial Biodiversity Specialist Assessment:
  - Terrestrial fauna surveys (focussing on mammal and herpetofauna SCC with potential to occur in the LSA) will be done later in 2022 (wet season)
  - Vegetation mapping and flora surveys (focussing on the identification of any flora SCC with potential to occur in the LSA, and mapping of AIS) will be done during late October 2022 (wet season).
- Avifauna Specialist Assessment:

- A comprehensive field survey will be conducted during a single, 5 day, peak season survey, and will include sample counts of small terrestrial species, counts of large terrestrial species and raptors, focal site surveys and incidental observations.
- The Avifaunal Impact Assessment Report will be compiled within one month upon completion of the field survey and analysis of the primary field data, and will contain full analysis of the findings.



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## Signature Page

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**APPENDIX A**

# Document Limitations

**APPENDIX B**

**Specialist CVs**





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