

# KOTULO TSATSI PV 3 SOLAR FACILITY

## ANIMAL SPECIES COMPLIANCE STATEMENT



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environmental

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March 2023

# KOTULO TSATSI PV 3 SOLAR

## ANIMAL SPECIES COMPLIANCE STATEMENT

### EXECUTIVE SUMMARY

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The Applicant, Kotulo Tsatsi Energy (Pty) Ltd, is proposing the construction of a photovoltaic (PV) solar energy facility (known as the Kotulo Tsatsi Energy PV3 Solar Facility located on a site located approximately 70km south-west of the town of Kenhardt and 60km north east of Brandvlei in the Northern Cape Province. The development is currently in the EIA process and 3Foxes Biodiversity Solutions has been appointed to provide a Plant Compliance Statement for the development.

The DFFE Screening Tool indicates that the site has a medium and high sensitivity for the Animal Species Theme due to the possible presence of several bird species of concern. No terrestrial fauna of concern were identified by the screening tool. The site verification was able to confirm that there are no faunal or faunal habitats of concern within the development footprint. Based on the results of the field assessment, the site is therefore confirmed to be low sensitivity from an Animal Species Theme perspective.

This Animal Species Theme Compliance Statement therefore finds that the footprint of the Kotulo Tsatsi PV 3 Solar PV Facility is restricted to low sensitivity areas with no observed animal species of conservation concern present, and as such, there are no reasons to oppose the Kotulo Tsatsi PV 3 Solar PV Facility.



## environmental affairs

Department:  
Environmental Affairs  
REPUBLIC OF SOUTH AFRICA

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

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

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

#### PROJECT TITLE

Kotulo Tsatsi PV 3 Solar Project

#### Kindly note the following:

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

#### Departmental Details

**Postal address:**

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

**Physical address:**

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

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

## 1. SPECIALIST INFORMATION

Specialist Company Name:	3Foxes Biodiversity Solutions			
B-BBEE	Contribution level (indicate 1 to 8 or non-compliant)	4	Percentage Procurement recognition	100%
Specialist name:	Simon Todd			
Specialist Qualifications:	BSc. (Zool. & Bot.), BSc Hons (Zool.), MSc (Cons. Biol.)			
Professional affiliation/registration:	SACNASP 400425/11			
Physical address:	23 De Villiers Road, Kommetjie 7975			
Postal address:	23 De Villiers Road, Kommetjie			
Postal code:	7975	Cell:	082 3326502	
Telephone:		Fax:		
E-mail:	Simon.Todd@3foxes.co.za			

## 2. DECLARATION BY THE SPECIALIST

I, Simon Todd, declare that –

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.



\_\_\_\_\_  
Signature of the Specialist

3Foxes Biodiversity Solutions

\_\_\_\_\_  
Name of Company:

25 March 2023

\_\_\_\_\_  
Date:

**Kotulo Tsatsi Energy (Pty) Ltd**  
Kotulo Tsatsi PV 3 Facility - Animal Species Compliance Statement  
Revision No. 1

**Prepared by: 3Foxes Biodiversity Solutions**

**3. UNDERTAKING UNDER OATH/ AFFIRMATION**

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



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Signature of the Specialist

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3Foxes Biodiversity Solutions

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Name of Company

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25 March 2023

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Date

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Signature of the Commissioner of Oaths

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Date

## SHORT CV/SUMMARY OF EXPERTISE – SIMON TODD

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 <p><b>3Foxes Biodiversity Solutions</b> <b>ECOLOGICAL SPECIALIST SERVICES</b> Assessment/Management/Research</p>	<p>Simon Todd Pr.Sci.Nat Director &amp; Principle Scientist C: 082 3326502 Simon.Todd@3foxes.co.za</p> <p>23 De Villiers Road Kommetjie 7975</p>	<p>Ecological Solutions for People &amp; the Environment</p>
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Simon Todd is Director and principal scientist at 3Foxes Biodiversity Solutions and has over 20 years of experience in biodiversity measurement, management and assessment. He has provided specialist ecological input on more than 200 different developments distributed widely across the country, but with a focus on the three Cape provinces. This includes input on the Wind and Solar SEA (REDZ) as well as the Eskom Grid Infrastructure (EGI) SEA and Karoo Shale Gas SEA. He is on the National Vegetation Map Committee as representative of the Nama and Succulent Karoo Biomes. Simon Todd is a recognised ecological expert and is a past chairman and current deputy chair of the Arid-Zone Ecology Forum. He is registered with the South African Council for Natural Scientific Professions (No. 400425/11).

### *Skills & Primary Competencies*

- Research & description of ecological patterns & processes in Nama Karoo, Succulent Karoo, Thicket, Arid Grassland, Fynbos and Savannah Ecosystems.
- Ecological Impacts of land use on biodiversity
- Vegetation surveys & degradation assessment & mapping
- Long-term vegetation monitoring
- Faunal surveys & assessment.
- GIS & remote sensing

### *Tertiary Education:*

- 1992-1994 – BSc (Botany & Zoology), University of Cape Town
- 1995 – BSc Hons, Cum Laude (Zoology) University of Natal
- 1996-1997- MSc, Cum Laude (Conservation Biology) University of Cape Town

### *Employment History*

- 2009 – Present – Sole Proprietor of Simon Todd Consulting, providing specialist ecological services for development and research.

- 2007 Present – Senior Scientist (Associate) – Plant Conservation Unit, Department of Botany, University of Cape Town.
- 2004-2007 – Senior Scientist (Contract) – Plant Conservation Unit, Department of Botany, University of Cape Town
- 2000-2004 – Specialist Scientist (Contract) - South African National Biodiversity Institute
- 1997 – 1999 – Research Scientist (Contract) – South African National Biodiversity Institute

A selection of recent work is as follows:

### **Strategic Environmental Assessments**

Co-Author. Chapter 7 - Biodiversity & Ecosystems - Shale Gas SEA. CSIR 2016.

Co-Author. Chapter 1 Scenarios and Activities – Shale Gas SEA. CSIR 2016.

Co-Author – Ecological Chapter – Wind and Solar SEA. CSIR 2014.

Co-Author – Ecological Chapter – Eskom Grid Infrastructure SEA. CSIR 2015.

Contributor – Ecological & Conservation components to SKA SEA. CSIR 2017.

### **Relevant Studies Related to the Current Project Area**

- Nuweveld North, East and West WEFs. Fauna & Flora Specialist Study for EIA. Zutari 2021.
- Beaufort West PV Facility. Fauna & Flora Assessment. SiVest Environmental 2022.
- San Solar PV Facility, Kathu. Fauna & Flora Assessment. Savannah Environmental 2022.
- Soventix Phase 3 PV Facility, De Aar. Fauna & Flora Assessment. Ecologes Environmental Consultants, 2022.
- Sadawa PV Facilities, Tankwa Karoo. Fauna & Flora Assessment. Savannah Environmental 2021.
- Kotulo Tsatsi PV 1 Facility near Kenhardt. Fauna & Flora Assessment. Savannah Environmental 2021.
- Hyperion 2 PV Facility, Kathu. Fauna & Flora Assessment. Savannah Environmental 2021.

# KOTULO TSATSI PV 3 SOLAR PV FACILITY

## Animal Species Compliance Statement

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# KOTULO TSATSI PV 3 SOLAR PV PROJECT

## Animal Species Compliance Statement

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### 1. INTRODUCTION

The Applicant, Kotulo Tsatsi Energy (Pty) Ltd, is proposing the construction of a photovoltaic (PV) solar energy facility (known as the Kotulo Tsatsi Energy PV3 Solar Facility located on a site located approximately 70km south-west of the town of Kenhardt and 60km north east of Brandvlei in the Northern Cape Province. The solar energy facility will comprise arrays of PV panels and associated infrastructure and will have a contracted capacity of up to 480MW. The facility will be located within the farm Portion 3 of Farm Styns Vley 280. Savannah Environmental are conducting the required EIA process and 3Foxes Biodiversity Solutions has been appointed to provide Terrestrial Biodiversity inputs for the proposed Kotulo Tsatsi Energy PV3 Solar Facility as part of the EIA application.

As part of the required studies for the required Scoping and EIA application for environmental authorisation, 3Foxes Biodiversity Solutions has been appointed to provide terrestrial ecological input for the development application. The DFFE Screening Tool indicates that the site falls within an area with Low Sensitivity under the Animal Species Theme (Terrestrial Fauna). The site verification was able to confirm this low sensitivity and no animal SCC were observed on the site. Consequently, in terms of the regulations, an Animal Species Compliance Statement is the recommended level of study for the EIA process. To these ends, this Animal Species Compliance Statement for the Kotulo Tsatsi PV 3 Facility, addresses the potential impacts of the project on vegetation and plant species and must be included in the EIA for the development and any mitigation and monitoring measures as identified, must be incorporated into the EMP for the development.

#### 1.1 Scope and Objectives

In terms of the GN 1150 30 October 2020, *Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(A) and (h) and 44 of the National Environmental Management Act, 1998, when applying for environmental authorisation*, the Terrestrial Animal Species Compliance Statement should include the following details:

- An applicant intending to undertake an activity identified in the scope of this protocol on a site identified by the screening tool as being of “medium sensitivity” for terrestrial animal species must submit either a Terrestrial Animal Species Specialist Assessment Report or a Terrestrial Animal Species Compliance Statement, depending on the outcome of a site inspection undertaken in accordance with paragraph 4.
- The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Zoological Science or Ecological Science).
- The compliance statement must:

- be applicable within the study area;
- confirm that the study area is of “low” sensitivity for terrestrial plant species; and
- indicate whether or not the proposed development will have any impact on SCC.
- The compliance statement must contain, as a minimum, the following information:
  - contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae;
  - a signed statement of independence by the specialist;
  - a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
  - a description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;
  - where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMP; and
  - a description of the assumptions made and any uncertainties or gaps in knowledge or data;
  - the mean density of observations/ number of samples sites per unit area; and
  - any conditions to which the compliance statement is subjected.
- A signed copy of the Terrestrial Animal Species Compliance Statement must be appended to the Basic Assessment Report or the Environmental Impact Assessment Report.

## **2. TECHNICAL DESCRIPTION**

### **2.1 Project Description**

Kotulo Tsatsi Energy PV3 Solar Facility is part of the Kotulo Tsatsi PV Cluster and is located approximately 70km south-west of the town of Kenhardt and 60km north east of Brandvlei in the Northern Cape Province. The layout and location of the Facility is illustrated below in Figure 1. The output of the facility would be up to 480MW and the infrastructure associated with the PV development includes the following:

- Solar PV array footprint comprising of:
  - PV modules and mounting structures
  - Inverters and transformers
  - Integrated Energy Storage System (IESS)
  - Cabling between the project components
- On-site facility substation to facilitate the connection between the solar PV facility and the Eskom electricity grid
- Battery Energy Storage System (BESS)
- Internal access roads
- Access roads, internal distribution roads and fencing around the development footprint area.
- Admin block comprising of:

- Site offices and maintenance buildings, including workshop areas for maintenance and storage.
- Assembly plant
- Laydown areas and temporary man camp area
- Access roads, internal distribution roads and fencing around the development area.



**Figure 1.** Satellite image showing the location of the proposed Kotulo Tstatsi PV 3 development, west of the R27, located between Kenhardt and Brandvlei.

### 3. ASSESSMENT METHODOLOGY

#### 3.1 Site Visit

An initial site visit took place on the 14<sup>th</sup> of August 2016 when the proposed development was still a CSP plant, and the follow-up field assessment to verify and sample the current footprint took place on the 12<sup>th</sup> of December 2021. During the site visits, the different biodiversity features, habitat, and landscape units present at the site were identified and mapped in the field. Specific features visible on the satellite imagery of the site were also marked for field inspection and were verified and assessed during the site visit. Walk-through-surveys were conducted within representative areas across the different habitat units identified and all plant and animal species observed were recorded. Active searches for reptiles and amphibians were also conducted within habitats likely to harbour or be important for such. The presence of sensitive habitats such as stands of large trees, pans or rocky outcrops were noted in the field where present and recorded on a GPS. The site is homogenous and open, with the result that any features present are easily observable and it is highly unlikely that there are any species of significance or sensitive features present that were not observed during the site visits.

In terms of fauna, there are always some limitations present due to the relatively short duration of the site visits and the difficulty in confirming the presence of many species. However, the consultant is very familiar with the fauna of the area, having worked extensively in the area on various projects over the course of several years. In terms of the available databases, many remote areas have not been well-sampled in the past with the result that the species lists derived from the available spatial databases for the area do not always adequately reflect the actual fauna present at the project site. This is acknowledged as a limitation of the study; however, it is substantially reduced given the previous experience in the area. In order to further reduce this limitation, and ensure a conservative approach, the species lists derived for the project site from the literature were obtained from an area significantly larger than the project site and are likely to include a much wider array of species than actually occur at the project site. This is a cautious and conservative approach which takes the study limitations into account.

### 3.2 Data Sourcing and Review

Data sources from the literature consulted and used where necessary in the study includes the following:

- The following web-based sources were searched for faunal records from the broad area:
- Virtual Museum ReptileMap, MammalMap and FrogMap databases [https://vmus.adu.org.za/vm\\_projects.php](https://vmus.adu.org.za/vm_projects.php)
- iNaturalist citizen science site <https://www.inaturalist.org/>
- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and the ADU databases (ReptileMap, Frogmap and MammalMap) <http://vmus.adu.org.za>.
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, EWT & SANBI (2016) and Skinner and Chimimba (2005) for mammals.
- The faunal species considered likely to occur at the site are based on species which are known to occur in the broad geographical area, as well as an assessment of the availability and quality of suitable habitat at the site.
- The conservation status of mammals is based on the IUCN Red List Categories (EWT/SANBI 2016), while reptiles are based on the South African Reptile Conservation Assessment (Bates et al. 2013) and amphibians on Minter et al. (2004) as well as the IUCN (2022).

## 4. ASSUMPTIONS AND LIMITATIONS

A number of limitations and assumptions are inherent in faunal studies generally and with the assessment of rare fauna. These include the following:

- It is not possible to confirm the absence of a species with 100% certainty. A species may be absent from an area during sampling but may move through the area occasionally or seasonally. This effect is however to a large degree mitigated through the use of the camera traps at the site which provide an effective characterisation of the medium sized and larger fauna of the site.
- Some species are rare or difficult to locate and it may be very difficult to confirm either the absence or presence of such species without long-term studies.
- The presence of such species is assessed in the current study based on observations of such species from the wider area in the various publicly available databases and citizen science websites (Virtual Museum & iNaturalist), as well as the habitat suitability, quality and condition as observed in the field.

following which the number of individuals of protected species that would be affected by the development can be quantified and used to populate the permit application. Depending on the identity of the species concerned, some would be destroyed, while other species would need to be translocated within the site to a safe site outside the development footprint, based on the recommendations of the walk-through study.

## 5. DESCRIPTION OF THE RECEIVING ENVIRONMENT

The Kotulo Tsatsi PV 3 PV area falls entirely within the Bushmanland Basin Shrubland vegetation type, with some pans representing the Bushmanland Vloere vegetation type also present. Within the PV development area, the vegetation cover is generally fairly low, but varies depending on the soil depth and type (**Figure 2**). There are also some stony areas present where the vegetation cover is low and some pans with very little vegetation present.

In terms of the fauna that potentially occur in the broad area, the potential diversity is considered to be moderate and numbers approximately 48 mammals, 30 reptiles and about 8 frog and toads (See Appendix 1-3). Species observed in the area include Yellow Mongoose *Cynictis penicillata*, South African Ground Squirrel *Xerus inauris*, Steenbok *Raphicerus campestris*, Common Duiker *Sylvicapra grimmia*, Aardvark *Orycteropus afer*, Aardwolf *Proteles cristatus*, Cape Porcupine *Hystrix africaeaustralis*, Bat-Eared Fox *Otocyon megalotis* and Stiped Polecat *Ictonyx striatus*. Widespread predators such as Caracal *Caracal caracal*, Black-backed Jackal *Canis mesomelas* and Cape Fox *Vulpes chama* are also likely to be present at typically low density for an arid area. *Parotomys littledalei*, Littledale's Whistling Rat, is listed as Near Threatened and is the only terrestrial faunal species of concern that may be present in the area. This species is typically associated with riverine habitat, particularly with *Lycium* bushes or *Psilocaulon absimile* plants, where there is some perennially green vegetation. As there is no suitable habitat present for this species on the site, it is considered highly unlikely that this species is present on-site. Reptile abundance on the site is low, which likely relates to general lack of vegetation or rock cover. The Namaqua Sand Lizard *Pedioplanis namaquensis* and Ground Agama *Agama aculeata* are the only

species observed during the site visits. Due to the aridity of the area, amphibian abundance is very low. The pans are usually quite saline with the result that these features are not usually used by amphibians for breeding purposes. There are no amphibians of concern that are known to occur in the area.



**Figure 2.** Typical open plains within the Kotulo Tsatsi PV 3 site representing the Bushmanland Basin Shrubland vegetation type.

## 6. PROPOSED MITIGATION ACTIONS

The following avoidance and mitigation measures should be included in the EMP for the Kotulo Tsatsi PV 3 Solar PV Facility in order to avoid, reduce and manage impacts on fauna and associated habitats:

- All vehicles should adhere to a low speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h.
- Driving to the from the site between sunset and sunrise should be minimised and restricted to essential vehicles only.
- All laydown areas, construction sites etc with waste disposal bins, should be provided with lockable bins that are tamper proof by baboons, monkeys and other fauna.
- Search and rescue for reptiles and other vulnerable species during construction, before areas of intact vegetation are cleared. Such search and rescue should be conducted by relevant experts with experience in search and rescue of the faunal groups concerned.

- Limiting access to the site and ensuring that construction staff and machinery remain within the demarcated construction areas during the construction phase. Environmental induction for all staff and contractors on-site.
- No excavated holes or trenches should be left open for extended periods as fauna may fall in become trapped.
- The design should ensure that there is no electrical fencing around substations (and associated battery facilities) or other features within 30cm of the ground as tortoises become stuck against such fences and are electrocuted to death. Alternatively, a guard wire set at 20cm can be used to keep larger tortoises away from the fence.

The following monitoring and management actions should be included in the EMP:

- A log should be kept detailing all fauna-related incidences or mortalities that occur on site, including roadkill, electrocutions etc. during construction and operation. These should be reviewed annually and used to inform operational management and mitigation measures.
- There should be on-going maintenance and monitoring of the perimeter fences of the PV areas to ensure that there is not sedimentation or vegetation build-up that brings the electrified strands closer to the ground than the recommended 30cm. Should some fauna burrow under the fence, such burrow access-points can be allowed to remain provided that the fauna accessing the facility are not causing problems inside the facility or would be endangered themselves.

## 6.1 Cumulative Impacts

Cumulative impacts associated with the Kotulo Tsatsi PV 3 Solar PV Facility are assessed in the Terrestrial Biodiversity Assessment and are not assessed in detail here. From a faunal species and associated habitat perspective, the Kotulo Tsatsi PV 3 Solar PV Facility would have very low impact on fauna SCC and the broader area has been little impacted by renewable energy development to date. As a result, the contribution of the Kotulo Tsatsi PV 3 Solar PV Facility to cumulative impact on fauna is considered acceptable.

## 7. COMPARATIVE ASSESSMENT OF ALTERNATIVES

There are no alternatives to be considered with regards to the PV facility.

### 7.1 No-Go Alternative

Under the no-go alternative, the current landuse consisting of extensive livestock grazing would continue. When applied correctly, such livestock grazing is considered to be largely compatible with long-term biodiversity conservation, although in practice there are some negative effects associated with such landuse such as predator control and negative impacts on habitat availability for the larger ungulates that would historically have utilised the area. Under the current circumstances, the no-



go alternative is considered to represent a low long-term negative impact on the environment, but has less impact than the loss of habitat resulting from the construction of the PV facility.

## **8. CONCLUSION**

- This compliance statement is applicable to the Kotulo Tsatsi PV 3 Solar PV Facility development with specific reference to the layout as provided for the assessment.
- The DFFE Screening Tool identified no terrestrial fauna of concern present in the area. No fauna species of concern were observed within the site during the field assessment, confirming the low sensitivity of the project footprint.
- Given the above results, the site is therefore considered low sensitivity from an Animal Species Theme perspective.

### **8.1 Impact Statement**

The footprint of the Kotulo Tsatsi PV 3 Solar PV Facility is restricted to low sensitivity areas with no observed faunal species of conservation concern present or likely to be present. As such, from a faunal species perspective there are no reasons to oppose the Kotulo Tsatsi PV 3 Solar PV Facility.

## 9. REFERENCES

- Alexander, G. & Marais, J. 2007. A Guide to the Reptiles of Southern Africa. Struik Nature, Cape Town.
- Branch W.R. 1998. Field guide to snakes and other reptiles of southern Africa. Struik, Cape Town.
- Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J. & de Villiers, M. S. 2013. Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland. Strelitzia 32. SANBI, Pretoria.
- Department of Environmental Affairs and Tourism, 2007. National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004): Publication of lists of Critically Endangered, Endangered, Vulnerable and Protected Species. Government Gazette, Republic of South Africa.
- Du Preez, L. & Carruthers, V. 2009. A Complete Guide to the Frogs of Southern Africa. Struik Nature., Cape Town.
- Minter LR, Burger M, Harrison JA, Braack HH, Bishop PJ & Kloepfer D (eds). 2004. Atlas and Red Data book of the frogs of South Africa, Lesotho and Swaziland. SI/MAB Series no. 9. Smithsonian Institution, Washington, D.C.
- Mucina L. & Rutherford M.C. (eds) 2006. The Vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- Skinner, J.D. & Chimimba, C.T. 2005. The mammals of the Southern African Subregion. Cambridge University Press, Cambridge.

## 10. Annex 1. List of Mammals

List of mammals which are known to occur and are likely to occur in the vicinity of the Kotulo Tsatsi PV 3 site. Habitat notes and distribution records are based on Skinner & Chimimba (2005) and MammalMap (ADU).

Scientific Name	Common Name	Status	Habitat	Likelihood
<b>Macroscledidea (Elephant Shrews):</b>				
<i>Macroscelides proboscideus</i>	Round-eared Elephant Shrew	LC	Species of open country, with preference for shrub bush and sparse grass cover, also occur on hard gravel plains with sparse boulders for shelter, and on loose sandy soil provided there is some bush cover	High
<i>Elephantulus rупrestris</i>	Western Rock Elephant Shrew	LC	Rocky koppies, rocky outcrops or piles of boulders where these offer sufficient holes and crannies for refuge.	Low
<b>Tubulentata:</b>				
<i>Orycteropus afer</i>	Aardvark	LC	Wide habitat tolerance, being found in open woodland, scrub and grassland, especially associated with sandy soil	Confirmed
<b>Hyracoidea (Hyaxes)</b>				
<i>Procavia capensis</i>	Rock Hyrax	LC	Outcrops of rocks, especially granite formations and dolomite intrusions in the Karoo. Also erosion gullies	V.Low
<b>Lagomorpha (Hares and Rabbits):</b>				
<i>Pronolagus rупrestris</i>	Smith's Red Rock Rabbit	LC	Confined to areas of krantzes, rocky hillsides, boulder-strewn koppies and rocky ravines	V.Low
<i>Lepus capensis</i>	Cape Hare	LC	Dry, open regions, with palatable bush and grass	High
<i>Lepus saxatilis</i>	Scrub Hare	LC	Common in agriculturally developed areas, especially in crop-growing areas or in fallow lands where there is some bush development.	High
<b>Rodentia (Rodents):</b>				
<i>Cryptomys hottentotus</i>	African Mole Rat	LC	Wide diversity of substrates, from sandy soils to heavier compact substrates such as decomposed schists and stony soils	Low
<i>Hystrix africaeaustralis</i>	Cape Porcupine	LC	Catholic in habitat requirements.	Confirmed
<i>Petromus typicus</i>	Dassie Rat	LC	Mountainous regions and inselbergs, where they are confined to rocky outcrops and live in crevices or piles of boulders	V.Low
<i>Pedetes capensis</i>	Springhare	LC	Occur widely on open sandy ground or sandy scrub, on overgrazed grassland, on the fringes of vleis and dry river beds.	V.Low
<i>Xerus inauris</i>	South African Ground Squirrel	LC	Open terrain with a sparse bush cover and a hard substrate	High

<i>Graphiurus ocellaris</i>	Spectacled Dormouse	LC	Associated with sandstones of Cape Fold mountains, which have many vertical and horizontal crevices.	V.Low
<i>Rhabdomys pumilio</i>	Four-striped Grass Mouse	LC	Essentially a grassland species, occurs in wide variety of habitats where there is good grass cover.	High
<i>Mus minutoides</i>	Pygmy Mouse	LC	Wide habitat tolerance	High
<i>Micaelamys namaquensis</i>	Namaqua Rock Mouse	LC	Catholic in their habitat requirements, but where there are rocky koppies, outcrops or boulder-strewn hillsides they use these preferentially	High
<i>Parotomys brantsii</i>	Brants's Whistling Rat	LC	Associated with a dry sandy substrate in more arid parts of the Nama-karoo and Succulent Karoo. Species selects areas of low percentage of plant cover and areas with deep sands.	High
<i>Parotomys littledalei</i>	Littledale's Whistling Rat	NT	Riverine associations or associated with Lycium bushes or <i>Psilocaulon absimile</i>	High
<i>Desmodillus auricularis</i>	Cape Short-tailed Gerbil	LC	Tend to occur on hard ground, unlike other gerbil species, with some cover of grass or karroid bush	High
<i>Gerbilliscus leucogaster</i>	Bushveld Gerbil	DD	Bushlands and grasslands	Likely
<i>Gerbillurus paeba</i>	Hairy-footed Gerbil	LC	Gerbils associated with Nama and Succulent Karoo preferring sandy soil or sandy alluvium with a grass, scrub or light woodland cover	High
<i>Gerbillurus vallinus</i>	Brush-tailed hairy-footed Gerbil	LC	Confined to areas with rainfall less than 150 mm	High
<i>Malacothrix typica</i>	Large-Eared African Desert Mouse	LC	Found predominantly in Nama and Succulent Karoo biomes, in areas with a mean annual rainfall of 150-500 mm.	Medium
<b>Primates:</b>				
<i>Papio ursinus</i>	Chacma Baboon	LC	Can exploit fynbos, montane grasslands, riverine courses in deserts, and simply need water and access to refuges.	Low
<b>Eulipotyphla (Shrews):</b>				
<i>Crocidura cyanea</i>	Reddish-Grey Musk Shrew	LC	Occurs in relatively dry terrain, with a mean annual rainfall of less than 500 mm. Occur in karroid scrub and in fynbos often in association with rocks.	High
<b>Carnivora:</b>				
<i>Proteles cristatus</i>	Aardwolf	LC	Common in the 100-600mm rainfall range of country, Nama-Karoo, Succulent Karoo Grassland and Savanna biomes	Confirmed
<i>Caracal caracal</i>	Caracal	LC	Caracals tolerate arid regions, occur in semi-desert and karroid conditions	High

<i>Felis silvestris</i>	African Wild Cat	LC	Wide habitat tolerance.	High
<i>Felis nigripes</i>	Black-footed cat	LC	Associated with arid country with MAR 100-500 mm, particularly areas with open habitat that provides some cover in the form of tall stands of grass or scrub.	High
<i>Genetta genetta</i>	Small-spotted genet	LC	Occur in open arid associations	High
<i>Suricata suricatta</i>	Meerkat	LC	Open arid country where substrate is hard and stony. Occur in Nama and Succulent Karoo but also fynbos	Confirmed
<i>Cynictis penicillata</i>	Yellow Mongoose	LC	Semi-arid country on a sandy substrate	Confirmed
<i>Galerella pulverulenta</i>	Cape Grey Mongoose	LC	Wide habitat tolerance	High
<i>Vulpes chama</i>	Cape Fox	LC	Associated with open country, open grassland, grassland with scattered thickets and coastal or semi-desert scrub	High
<i>Canis mesomelas</i>	Black-backed Jackal	LC	Wide habitat tolerance, more common in drier areas.	High
<i>Otocyon megalotis</i>	Bat-eared Fox	LC	Open country with mean annual rainfall of 100-600 mm	Confirmed
<i>Ictonyx striatus</i>	Striped Polecat	LC	Widely distributed throughout the sub-region	Confirmed
<i>Mellivora capensis</i>	Ratel/Honey Badger	LC	Catholic habitat requirements	Moderate
<b>Rumanantia (Antelope):</b>				
<i>Sylvicapra grimmia</i>	Common Duiker	LC	Presence of bushes is essential	High
<i>Antidorcas marsupialis</i>	Springbok	LC	Arid regions and open grassland.	V.Low
<i>Raphicerus campestris</i>	Steenbok	LC	Inhabits open country,	Confirmed
<i>Oreotragus oreotragus</i>	Klipspringer	LC	Closely confined to rocky habitat.	V.Low

## 11. Annex 2. List of Reptiles

List of reptiles which are likely to occur at the Kotulo Tsatsi PV 3 site, based on records from the SARCA database. Red list status is from Bates et al. 2014.

Family	Genus	Species	Subspecies	Common name	Red list category
Agamidae	Agama	<i>aculeata</i>	<i>aculeata</i>	Common Ground Agama	Not evaluated.
Agamidae	Agama	<i>anchietae</i>		Anchieta's Agama	Least Concern
Agamidae	Agama	<i>atra</i>		Southern Rock Agama	Least Concern
Colubridae	Boaedon	<i>fuliginosus</i>		Brown House Snake	Least Concern
Colubridae	Dipsina	<i>multimaculata</i>		Dwarf Beaked Snake	Least Concern
Colubridae	Psammophis	<i>notostictus</i>		Karoo Sand Snake	Least Concern
Colubridae	Telescopus	<i>beetzii</i>		Beetz's Tiger Snake	Least Concern
Cordylidae	Karusasaurus	<i>polyzonus</i>		Karoo Girdled Lizard	Least Concern
Elapidae	Aspidelaps	<i>lubricus</i>	<i>lubricus</i>	Coral Shield Cobra	Not Listed
Elapidae	Naja	<i>nivea</i>		Cape cobra	Least Concern
Gekkonidae	Chondrodactylus	<i>angulifer</i>	<i>angulifer</i>	Common Giant Ground Gecko	Least Concern
Gekkonidae	Chondrodactylus	<i>bibronii</i>		Bibron's Gecko	Least Concern
Gekkonidae	Pachydactylus	<i>capensis</i>		Cape Gecko	Least Concern
Gekkonidae	Pachydactylus	<i>latirostris</i>		Quartz Gecko	Least Concern
Gekkonidae	Pachydactylus	<i>montanus</i>		Namaqua Mountain Gecko	Least Concern
Gekkonidae	Pachydactylus	<i>purcelli</i>		Purcell's Gecko	Least Concern
Lacertidae	Meroles	<i>suborbitalis</i>		Spotted Desert Lizard	Least Concern
Lacertidae	Pedioplanis	<i>inornata</i>		Plain Sand Lizard	Least Concern
Lacertidae	Pedioplanis	<i>laticeps</i>		Karoo Sand Lizard	Least Concern
Lacertidae	Pedioplanis	<i>lineoocellata</i>	<i>pulchella</i>	Common Sand Lizard	Least Concern
Lacertidae	Pedioplanis	<i>namaquensis</i>		Namaqua Sand Lizard	Least Concern
Lamprophiidae	Psammophis	<i>notostictus</i>		Karoo Sand Snake	Least Concern
Scincidae	Trachylepis	<i>occidentalis</i>		Western Three-striped Skink	Least Concern
Scincidae	Trachylepis	<i>sparsa</i>		Karasburg Tree Skink	Least Concern
Scincidae	Trachylepis	<i>spilogaster</i>		Kalahari Tree Skink	Least Concern
Scincidae	Trachylepis	<i>sulcata</i>	<i>sulcata</i>	Western Rock Skink	Least Concern
Scincidae	Trachylepis	<i>variegata</i>		Variegated Skink	Least Concern
Testudinidae	Psammobates	<i>tentorius</i>	<i>tentorius</i>	Karoo Tent Tortoise	Not listed
Testudinidae	Psammobates	<i>tentorius</i>	<i>verroxii</i>	Verrox's Tent Tortoise	Not listed
Typhlopidae	Rhinotyphlops	<i>schinzi</i>		Schinz's Beaked Blind Snake	Least Concern



## 12. Annex 4. List of Amphibians

List of amphibians which are likely to occur in the vicinity of the Kotulo Tsatsi PV 3 site based on records from the Frog Atlas of Southern Africa as well as distribution maps available in the literature. Habitat notes and distribution records are based on Du Preez and Carruthers (2009), while conservation status is from Minter et al. 2004.

Scientific Name	Common Name	Status	Habitat	Distribution	Likelihood
<i>Vandijkophrynus gariensis</i>	Karoo Toad	Not Listed	Karoo Scrub	Widespread	High
<i>Poyntonophrynus vertebralis</i>	Southern Pygmy Toad	LC	Nama karroo shrubland, grassland and dry savanna. Breeds in temporary shallow pans, pools or depressions containing rainwater, and rock pools along rivers.	Endemic	High
<i>Pyxicephalus adspersus</i>	Giant Bullfrog	LC	Breed in shallow margins of rain-filled depressions.	Widespread	Low
<i>Xenopus laevis</i>	Common Platanna	LC	Any more or less permanent water	Widespread	V. Low
<i>Cacosternum boettgeri</i>	Common Caco	LC	Marshy areas, vleis and shallow pans	Widespread	Low
<i>Amietia fuscigula</i>	Cape River Frog	LC	Large still bodies of water or permanent streams and rivers.	Widespread	V. Low
<i>Tomopterna tandyi</i>	Tandy's Sand Frog	LC	Nama karroo grassland and savanna	Widespread	Medium
<i>Tomopterna cryptotis</i>	Tremolo Sand Frog	LC	Widespread in savanna and grassland	Widespread	Low