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Scoping Survey for Bats on the Proposed Tournee 1 and Tournee 2 Solar PV Energy Facilities near Standerton in Mpumalanga, South Africa

February 2023

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AUTHOR CONTRIBUTIONS

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EXPERTISE OF BAT SPECIALIST

Low de Vries is a registered bat assessment specialist with SABAA and has consulted for numerous field projects, which included bat and bird surveys and the removal of dangerous snakes in Mozambique, as well as several biodiversity surveys in South Africa. He obtained a PhD in Zoology while investigating the general ecology of aardwolves with special focus on home range, diet, and prey abundance. After his PhD he spent 14 months on Marion Island assisting with field work on elephant seals, fur seals and killer whales. During his subsequent postdoctoral position at the University of Pretoria he spent six years conducting research on the ecology of bats and has obtained extensive knowledge on bat behaviour and movements, as well as experience in bat handling.

Disclaimer by specialist

I declare that the work presented in this report is my own and has not been influenced in any way by the developer. At no point has the developer asked me as specialist to manipulate the results in order to make it more favourable for the proposed development. I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP) and the EIA Regulations (2014, as amended). I have the necessary qualifications and expertise (*Pr. Sci. Nat. Zoological Science)* in conducting this specialist report.

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ACRONYMS & GLOSSARY OF TERMS

AOI: Area of Influence, the area that is affected by the proposed development.
Acoustic monitoring: Recording and analyses of echolocation calls to determine bat community species composition and abundance.
ACR: African Chiropteran Report.
PAOI: Project Area of Influence, the area that is affected by potential impacts.
Bat call: An echolocation call emitted by a bat used to detect prey and navigate through its surroundings.
Bat detector: Electronic device for the detection and recording of bat echolocation calls. The terms Bat Detector and Song Meter are used interchangeably in this report.
Bat roost: A structure, natural or man-made, were bats roost during the day. This includes caves, trees, rocky outcrops, buildings, and culverts.
bp/h: Bat passes per hour, calculated as a mean or median value from the nightly average bat passes per hour.
Buffer zone: A zone established around areas that are identified as sensitive for bats and includes flyways, foraging areas and bat roosts.
CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora.
Cumulative Impact: Impacts created due to past, present, and future activities and impacts associated with these activities.
Echolocation: A physiological process for locating distant or invisible objects (such as prey) by means of sound waves reflected to the emitter (such as a bat) by the objects.
EMPr: Environmental Management Programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures which must be implemented by several responsible parties throughout the duration of the proposed project.
Endemic: A species that is restricted to a particular area.
EIA (Environmental Impact Assessment): The process of identifying environmental impacts due to activities and assessing and reporting these impacts.
GPS: Global Positioning System device.
IUCN: International Union for Conservation of Nature.
MW: Megawatts.
NEMA: National Environmental Management Act.
Pre-construction phase: The period prior to the construction of a wind energy facility.
Pulse: A single emission of sound by a bat.
Red data species: Species included in the Critically Endangered, Endangered, Vulnerable or Rare categories as defined by the IUCN.
REDZ (Renewable Energy Development Zones): Areas were wind and solar photovoltaic power development can occur in concentrated zones.

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S&EIA: Social and Environmental Impact Assessment (EIA): The process of identifying social and environmental impacts due to activities and assessing and reporting these impacts.
SABAA: South African Bat Assessment Association.
SABPG: South African Best Practice Guidelines for Pre-construction Monitoring of Bats at Wind Energy Facilities
SACNASP: South African Council for Natural Scientific Professions.
SANBI: South African National Biodiversity Institute.
Scoping Report: A report contemplated in regulation 21 of the NEMA amended EIA regulations R326 dated 7 April 2017.
SEF: Solar Energy Facility
Song meters: A particular brand of Bat Detector developed by Wildlife Acoustics. The terms Song Meter and Bat Detector are used interchangeably in this report.
SD card: A storage device for song meter recordings.
ToPS: Threatened or Protected Species.

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1. Introduction

1.1 Project details

Volant Environmental (Pty) Ltd was commissioned by WSP Group Africa (Pty) Ltd to conduct a Scoping Survey for bats on the proposed Tournee 1 and Tournee 2 Solar PV Energy Facilities (SEFs) which will include two 150 MW SEFs. For this purpose of this report data are presented together as both sites were monitored simultaneously, and the sensitivities the same across both sites. This survey serves as a Scoping Survey of the possible bat species and their abundance present on the Project Area of Influence (PAOI) of the proposed SEF.

1.2 Project locations and ecoregion

The proposed SEFs is located 24.5 km Northeast of the town of Standerton in the Lekwa Local Municipality in the Mpumalanga province of South Africa. The town is known for its large commercial and agricultural output, specializing in cattle, dairy, maize and poultry farming. The proposed SEF cluster can be accessed off the R39 that runs just South of the project area. The SEFs is divided into two facilities namely Tournée 1 PV and Tournée 2 PV. Together these facilities cover an area of *ca* 811 ha (Tournee 1 - 306.65 ha; Tournee 2- 505.15 ha) and is currently used as agricultural land with livestock present across a large section of the PAOI.

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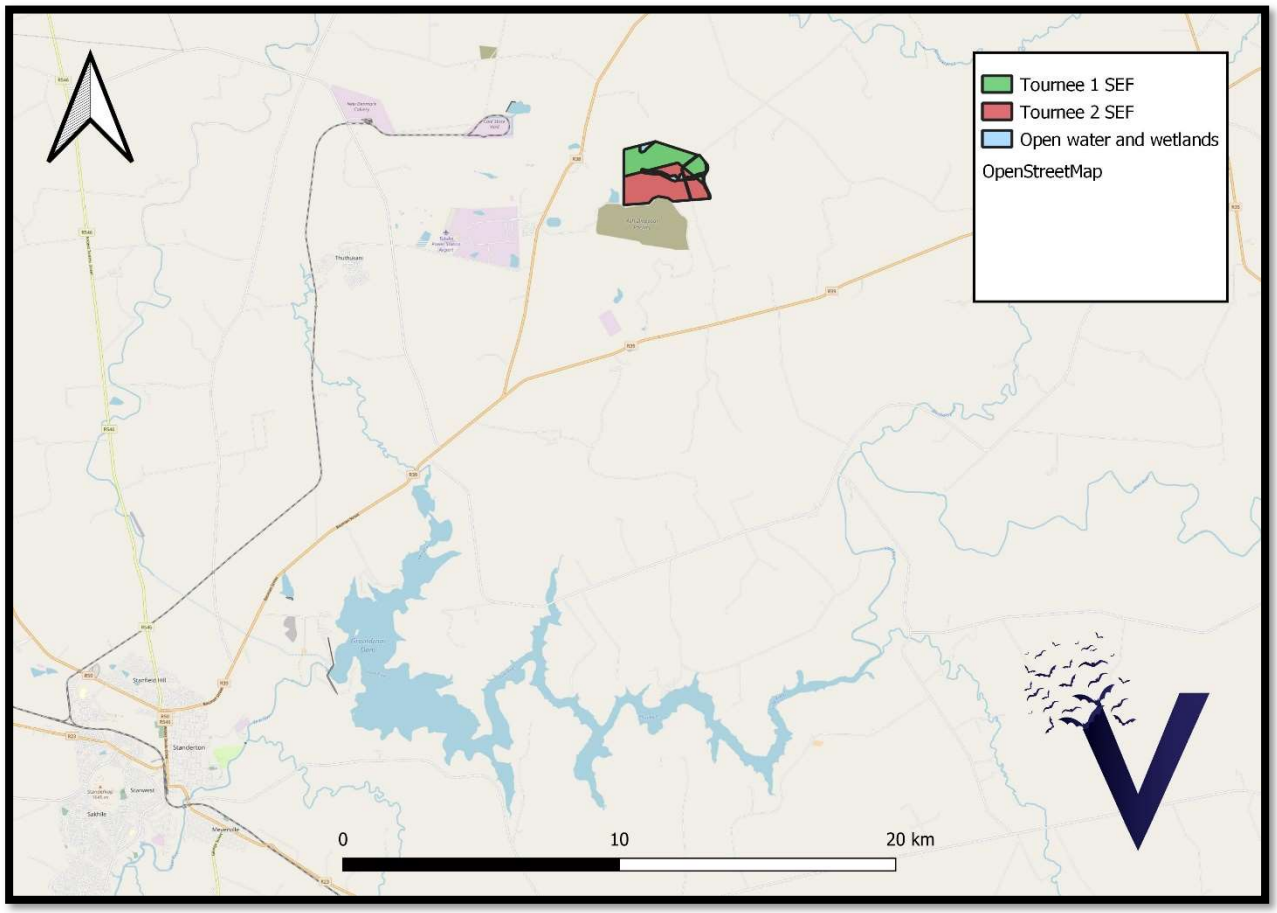

Figure 1. Location of the proposed Tournee Solar Energy Facility

The proposed PAOIs falls across the Grassland Bioregion with Soweto Highveld Grassland vegetation present across the entire proposed development site (SANBI 2018). Based on the South African Best Practice Guidelines for Pre-Construction Monitoring of Bats at Wind Energy Facilities (SABPG, MacEwan et al. 2020) this is classified as the Grassland biome, and all future fatality risks during will be assessed based on this ecoregion.

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Figure 2. Photographic representation of habitat

The extent of the Grassland Biome is relatively well defined based on the specific known vegetation structure when seen in combination with the amount of rainfall in the summer and the average minimum temperatures in the winter. This biome occurs mainly on the high central plateau (Highveld), as well as the inland areas of the eastern seaboard and the established mountainous areas of KwaZulu-Natal and Eastern Cape. The biome is primarily characterised as flat to rolling, but also includes mountainous regions and escarpments. The effect of this biome being at a higher altitude result in larger temperature differences at different times of the year. The climate in winter months specifically, can be cold and dry with the occurrence and relative high frequency of frost. The presence of high amounts of moisture allows for grassland regions to

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be divided into two classes. Moist grassland primarily consists of sour grasses, leached and dystrophic soils and high canopy cover, high plant production and high fire frequency. Dry grasslands are seen as sweet, palatable grasses, where the soils are less leached and are eutrophic and canopy cover, plant production and fire frequency are lower than in moist grasslands. Grasslands are structurally simple and strongly dominated by grasses (*Poaceae*). It is noted that the moisture index effects canopy cover and decreases with lower mean annual rainfall but is influenced by the amount and type of grazing and by the presence of fire. This in turn allows for woody species to occur but are limited to specialised niches/habitats within the grassland biome. Soweto Highveld Grassland specifically is characterised by a moderately undulating landscape on the Highveld plateau. It primarily supports short to medium-high, dense, grassland that is almost entirely dominated *Themeda triandra*. In places that are not disturbed, scattered small wetlands, pans and occasional ridges or rocky outcrops are found that interrupt the continuous grassland cover.

The warmest month (with the highest average high temperature) is February (28.95°C) while the coldest month (with the lowest average low temperature) is June (8.8°C). The area receives an average of 177 mm of rain during January, which is the wettest month of the year based on averages.

1.3 Bat validity period

The current survey is only representative of the period spend at the SEFs during the Scoping Survey, and no conclusion should be drawn from these data for a longer period. Bats are known to migrate before winter periods or annually to maternity roosts (Jacobsen and du Plessis, 1976), and as such the species assemblages for the area could potentially be vastly different during other periods of the year. The data collected during the Scoping Survey should, however, allow for conclusions to be made regarding the potential bat impact of the proposed SEFs.

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1.4 Assumptions and Limitations

Bats are known to migrate, and their population sizes varies seasonally. As such, this Scoping Survey only gives a brief snapshot into bat populations in the area and no conclusions can be drawn from the presence or absence of species. Even though studies have reported on bats migration, the exact routes followed are not known (Pretorius *et al*., 2020). The same is true for breeding behaviour and the formation of maternity colonies for many species.

Distribution records of bats in southern Africa are still poorly reported and limited for many species. In addition, migratory patterns of bats are largely unknown in South Africa. Studies have reported that bats do migrate, but the exact routes followed are not known (Pretorius *et al.*, 2020). The same is true for breeding behaviour and the formation of maternity colonies for many species.

SEF pre-construction monitoring reports on bats are reliant on reporting echolocation calls and identifying species from these calls, but without echolocation call libraries accurate identification is not always possible. Published libraries created from release and handheld calls of captured bats are available for southern Africa but are geographically limited. Since the echolocation calls of a particular species from different regions in South Africa are known to vary to some degree (Monadjem *et al.*, 2020), call libraries created in different regions are not always comparable.

Bat detectors are not always effective in recording echolocation calls for all bat species, and some species may be missed e.g., some fruit bat species that do not echolocate. Other species, such as the Egyptian slit-faced bat (*Nycteris thebaica*), emits low intensity calls that may not be recorded. Bat detectors are also limited in the range over which a call can be recorded, and this can be further influenced by environmental conditions such as humidity. In addition, the microphones that are coupled to the detectors are not omnidirectional and recording quality and number of recordings is influenced by the orientation of the call relative to the microphone.

2. Methods

2.1 Regulatory Requirements

The Minister of Environment, Forestry and Fisheries, gave notice that the submission of a report generated from the national web-based environmental screening tool, as contemplated in Regulation 16(1)(b)(v) of the Environmental Impact Assessment Regulations, 2014, published

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under Government Notice No. R982 in Government Gazette No. 38282 of 4 December 2014, as amended, will be compulsory from 4 October 2019 when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the Environmental Impact Assessment Regulations, 2014.

In addition, a set of protocols that an applicant needs to adhere to in the Environmental Authorisation (EA) process were developed and on 20 March 2020 the Minister of Forestry, Fisheries and the Environment gazetted the Protocols for national implementation purposes. The gazette '*Procedures to be followed for the Assessment and Minimum Criteria for Reporting of Identified Environmental Themes in terms of Section 24(5)(a) and (h) of the National Environmental Management Act (1998) when Applying for Environmental Authorisation*', has protocols that have been developed for environmental themes which include agriculture, avifauna, biodiversity (Terrestrial and Aquatic Biodiversity), noise, defence and civil aviation.

The protocols set requirements for the assessment and reporting of environmental impacts of activities requiring EA. The higher the sensitivity rating of the features on the proposed site as identified by the screening tool report, the more rigorous the assessment and reporting requirements.

There are currently no Guidelines in place to monitor bats at SEFs, and as such it is not a requirement for the construction of these facilities. However, a Scoping Survey is recommended to ensure that there are no bats roosting in the area and evaluate the PAOI for foraging habitat.

2.2 Desktop study

A thorough desktop study was undertaken to estimate the likelihood of specific species of bats being present at the proposed SEFs. This included investigations into available literature, including Bats of Southern and Central Africa (Monadjem et al., 2020), the African Chiroptera Report (ACR, 2021) and any other bat surveys or monitoring reports for nearby Wind Energy Facilities (WEFs) and SEF and applications as determined from the REEA (2022 Q1) information. Lack of public access to existing monitoring reports for SEFs and WEFs is a recurring problem in the industry and one that severely hampers scoping as well as pre-construction monitoring studies and the recommendations therein, a problem to be addressed by relevant NGOs and the governmental institutions.

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A search was conducted to identify any protected areas present within 100 km of the proposed SEF project area using the South African Protected Area Data (SAPAD 2022 Q1).

2.3 Field surveys

Considering that there are no set methods for monitoring bats at SEFs all methodologies used for the bat Screening Survey was planned using the South Africa Best Practice guidelines for Pre-Construction monitoring of Bats at Wind Energy Facilities (MacEwan et al. 2020) as a guide and comply with all good practice guidelines. Field surveys were conducted between the 9th and 12th of January 2023.

2.3.1 Passive surveys

Active surveys are not an absolute requirement for Pre-Feasibility Surveys, but rather a means of obtaining data on bats present in an area. We opted to conduct three nights of passive surveys to assess which species of bats are present on the PAOI in place of driven transects. This decision was made due to a lack of roads across the farm portions of the PAOI.
We recorded bats across the three nights with a Wildlife Acoustics Bat detector SM4BAT FS Ultrasonic Recorder. The recorder was placed 9m above the ground on a windmill that was not operational and would thus not interfere with any recordings (Figure 3). This windmill was situated in the Soweto Highveld Grassland, in the northeastern section of the PAOI (Figure 4). The bat detector was set to start recording 30 min before sunset until 30 min after sunrise to ensure that all active bats would be recorded. During the recording time, the device is 'armed' and will begin a recording if a 'Trigger' is detected. A trigger is defined as a sound within the set frequency range (Default: >16 kHz) amplitude (Default: 12 dB) for a minimum duration (Default: 1.5 ms). The recording continues for the duration of the Trigger Window (Default: 3 second) after the last Trigger and saves the recorded data. If there are constant Triggers, the recording will save and close after the maximum length of a recording file (Default: 00m:15s).

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Figure 3. Windmill used to deploy a bat detector on the Project area of Influence.

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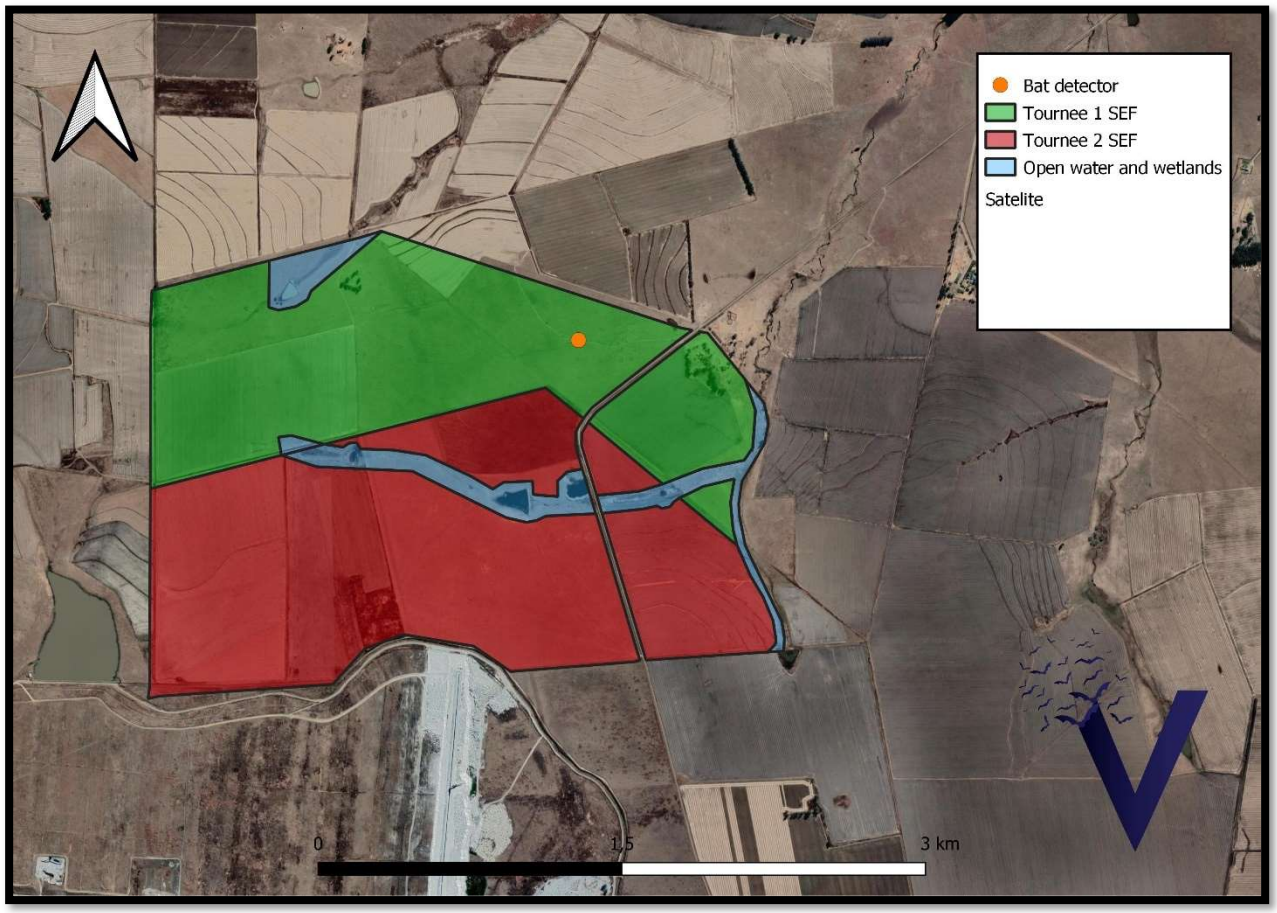

Figure 4. Location of static bat detectors on the Project Area of Influence

2.2.3 Roost surveys

Bats use a variety of roosts including caves, trees, crevices and buildings, and the choice of roost is species dependent. The location of caves is fairly well known, and historical records in conjunction with active searching can be used to uncover them. Detection of non-cave roosts sites are more difficult and can only be achieved through active searching. Transects were walked on the properties during the day, and potential roosting sites investigated with a bat detector. In addition, the search team was on the lookout for signs of bat activity such as traces of fecal material.

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2.3. Data analyses

Kaleidoscope Pro v5.4.0 (www.wildlifeacoustics.com) was used to analyze all bat call recorded *via* the auto-identification and cluster-analyses features. Due to the lack of release calls from bats in the southern Africa subregion and intra-species variation in bat calls the auto-identification feature is not always 100% accurate but does provide an indication of the potential bat species. As such all clusters created by the software was manually identified based on bat call parameters, including the peak frequency, call duration and bandwidth. Within each cluster one call was selected with a strong amplitude and minimal background noise to identify the species for that cluster.

2.4 Foraging areas

The search team investigated areas with more complex vegetation structures which could potentially act as foraging areas, or areas that could be used as flythroughs. This included, but was not limited to, areas with trees of larger shrubs. It must be noted, however, that the absence of bats in these areas should not exclude these areas as potential foraging habitats.

2.5 Impact assessment

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. The screening tool is based on two criteria, namely probability (Table 1) and consequence (Table 2), where the latter is based on general consideration to the intensity, extent, and duration.

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Table 1. Probability scores of identified impacts and their descriptors.

Score	Descriptor
4	**Definite**: The impact will occur regardless of any prevention measures
3	**Highly Probable**: It is most likely that the impact will occur
2	**Probable**: There is a good possibility that the impact will occur
1	**Improbable:** The possibility of the impact occurring is very low

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Table 2. Consequences scores of identified impacts and their descriptors.

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.
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.

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Table 3. Significance of identified impacts and their descriptors.

	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

The nature of the impact must be characterized 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 4) has been applied according to the nature and significance of the identified impacts.

Table 4. Impact significance colour reference system to indicate the nature of the impacts.

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

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3. Results

3.1 Desktop survey

3.1.1 Bat surveys conducted in the area.

All nearby existing and proposed WEFs and SEF facilities were searched for online to find additional data regarding important bat findings that might be of importance to the proposed SEFs. Investigations into available literature on other bat surveys or monitoring reports nearby (100 km) the proposed SEF applications were undertaken (Table 5) as determined from the REEA (2022 Q1) information. These reports identified the potential impact of the proposed energy generating facilities on bat populations present and mitigation strategies followed. An extensive list of bat species that could possibly be present on or near the proposed SEFs was also compiled using the previous study data and publicly available bat ecological information. Only one energy generating facility on which bat assessments were completed, falls within the search area and is publicly available and can be seen below.

Table 5. Bat reports for Wind Energy Facilities (and other developments) in the region of the proposed Wind Energy Facility.

Project	Report details	Consultant
Camden Wind Energy Facility	Camden I Wind Energy Facility	WSP Group Africa (Pty) Ltd 57.6 Km Northeast

3.1.1.1 Camden I Wind Energy Facility

- It was stated that bat species most likely to be impacted by the proposed WEF was *Miniopterus natalensis, Laephotis* (formally *Neoromicia) capensis* and *Tadarida aegyptiaca*.
- Based on a Desktop Study it was predicted that 18 species of bats could occur in the area.
- A total of six bat species were confirmed on site during the assessment.
- This included *T. aegyptiaca, Mops (Chaerephon) pumilus, L. capensis, M. natalensis, Eptesicus hottentotus* and *Scotophilus dinganii*.

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- Bat mitigation strategies as well as appropriate buffer zones were identified and suggested by the bat specialist.
- Acoustic deterrents were suggested as an additional mitigation strategy is fatalities prove to be more than threshold numbers.
- Two years of operational bat monitoring was suggested if the WEF was approved and constructed.

3.1.2 Potential species present in the area.

Our desktop study, which included the above-mentioned reports, data from the African Chiropteran Report (ACR 2020) and Bats of Southern and Central Africa (Monadjem et al 2020) revealed that seven 18 could potentially be found in the area (Table 6). A single *L. capensis* was captured less than 30 km south form site, but no other species have museum records within 60 km from the PAOI (ARC 2020).

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Table 6. Bat species that could potentially occur on the AOI based on a desktop study

Species name	Common name	Conservation Status IUCN/ SA Red List	Foraging habits	Roosts	Probability of occurrence	Risk of Impact
NYCTERIDAE						
Nycteris thebaica	Egyptian slit faced bat	LC/LC	Clutter forager	Caves, culverts, and trunks of large trees	Medium	Low
MINIOPTERIDAE						
Miniopterus natalensis	Natal long-fingered bat	LC/NT	Clutter-edge forager	Caves	Medium	High
VESPERTILIONIDAE						
Eptesicus hottentotus	Long-tailed serotine	LC/LC	Clutter-edge forager	Caves and rock crevices	Medium	Medium
Neoromicia capensis/Laephotis capensis	Cape serotine	LC/LC	Clutter-edge forager	Under the bark of trees, foliage, and buildings	High	High
Cistugo lesueuri	Lesueur's hairy bat	LC/NT	Clutter-edge forager	Rock crevices	Medium	High
Myotis tricolor	Temminck's myotis	LC/NT	Clutter-edge forager	Caves	Medium	Medium
Scotophilus dinganii	Scotophilus dinganii	LC/LC	Clutter forager	Roosts mainly in holes in trees and roofs of houses	High	Medium
Pipistrellus hesperidus	Dusky pipistrelle	LC/LC	Clutter-edge forager	Wooded areas in trees as well as cracks in rocks	Low	Medium
RHINOLOPHIDAE						
Rhinolophus denti	Dent's horseshoe bat	LC/NT	Clutter forager	Caves and mines	Low	Low
Rhinolophus darlingi	Darling's horseshoe bat	LC/NT	Clutter forager	Caves and mines	Low	Low
Rhinolophus clivosus	Geoffroy's horseshoe bat	LC/NT	Clutter forager	Caves and mines	Low	Low
Rhinolophus simulator	Bushveld horseshoe bat	LC/NT	Clutter forager	Caves and mines	Low	Low
MOLOSSIDAE						
Tadarida aegyptiaca	Egyptian free tailed bat	LC/LC	Open-air forager	Caves, rock crevices, under exfoliating rocks, hollow trees, behind the bark of dead trees and buildings	High	High
Mops condylurus	Angolan free-tailed bat	LC/LC	Open-air forager	Roosts in any suitable crevice and in the roofs of buildings and houses	Medium	High

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Species name	Common name	Conservation Status IUCN/ SA Red List	Foraging habits	Roosts	Probability of occurrence	Risk of Impact
HIPPOSIDERIDAE						
Cloeotis percivali	Percival's short-eared trident bat	LC/T	Clutter forager	Cave and hollow dependent	Low	**Low**
Hipposideros caffer	Sundevall's leaf-nosed bat	LC/LC	Clutter forager	Cave and hollow dependent	Low	**Low**
EMBALLONURIDAE						
Taphozous mauritianus	Mauritian tomb bat	LC/LC	Open-air forager	Open-air forager	Medium	**High**
PTEROPODIDAE						
Epomophorus crypturus	Peters's epauletted fruit bat	LC/LC	Clutter forager	In valleys and low-lying areas where large fruiting trees are present.	Low	**High**
Epomophorus wahlbergi	Wahlberg's Epauletted Fruit bat	LC/LC	Clutter forager	Roosts in dense foliage of large, leafy trees	Low	**High**
Rousettus aegyptiacus	Egyptian rousette	LC/LC	Clutter forager	Caves	Low	**High**

3.1.3 Protected areas

The reserves consist of privately as well as publicly owned land used for wildlife conservation as well as specific livestock farming (Table 7). These sites are all registered designated protected areas (SAPAD 2022, Q1). In addition to protected areas present around the proposed SEF site, a search for cave roosts was conducted but no caves were found in the PAOI. As knowledge about historical caves are rarely available, it does impose risks of these sites being missed.

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Table 7. The identified public/privately owned protected areas identified close to proposed WEF site.

NAME	LOCATION FROM SEF SITE
Moreson Nature Reserve	98 Km Southwest
Shozaloza Safaris	100 Km Southwest
Lourensa Game Farm	90 Km Southwest
Vaaldam Nature Reserve	90 Km West
S. J. Van Der Merwe Private Nature Reserve	90 Km West
J. N. Van Der Merwe Private Nature Reserve	90 Km West
Daisy Private Nature Reserve	100 Km Northwest
Voortrekker Private Nature Reserve	99 Km Northwest
Nicolaas Private Nature Reserve	99 Km Northwest
Devon Protected Environment	96 Km Northwest
John Cairns Private Nature Reserve	97 Km North
Witbank Nature Reserve	98 Km North
Heyns Private Nature Reserve	98 Km North
Burnside Private Nature Reserve	99 Km North
Chrissiesmeer Protected Environment	90 Km Northeast
Rietvlei Private Nature Reserve	59 Km Northeast
Ahlers Private Nature Reserve	73 Km Northeast
Langcarel Private Nature Reserve[1]	65 Km East
Jericho Dam Nature Reserve	100 Km East
Majuba Nature Reserve	43 Km Southeast
Afrikan Farms Protected Environment	47 Km Southeast

[1] Reserve currently going through process to be de-proclaimed

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NAME	Location from SEF site
Mabola Protected Environment	97 Km Southeast
Tafelkop Nature Reserve	97 Km Southeast
Mkhothane Protected Environment	73 Km Southeast
Lotterkrantz Private Nature Reserve	47 Km South
Sneeuwberg Protected Environment	85 Km South
Rosedale Private Nature Reserve	98 Km South

3.2 Passive monitoring

Only one species of bat, *L. capensis*, was recorded during passive monitoring, and in relatively low numbers. *Laephotis capensis* is not endemic to South Africa and not listed as Least Concern based on the IUCN red data lists (Table 8). These bats roost under the bark of trees and in the roofs of houses and as such there could potentially be roosts available for this species.

Table 8. Bat species detected on the Project Area of Influence.

Species name	Common name	Conservation Status	Foraging habits	Number of calls
Family: Vespertilionidae				
L. capensis	Cape serotine	Least concern	Clutter-edge	45

Normally one expects bat activity to peak early in the evening as bats are more active during these times, however, bat activity at the Tournee 1 and Tournee 2 SEFs peaked during the middle of the evening at 23:00 (Figure 5). This is a strong indication that there are no bat roosts or colonies present close to the PAOI, as there would have been a peak in activity much earlier. Bat activity also ends early at 2:00, indicating that there are no bats in the area returning to roosts. It must, however, be stated that an accurate estimate of bat activity cannot be obtained during three nights of monitoring and that more data is required.

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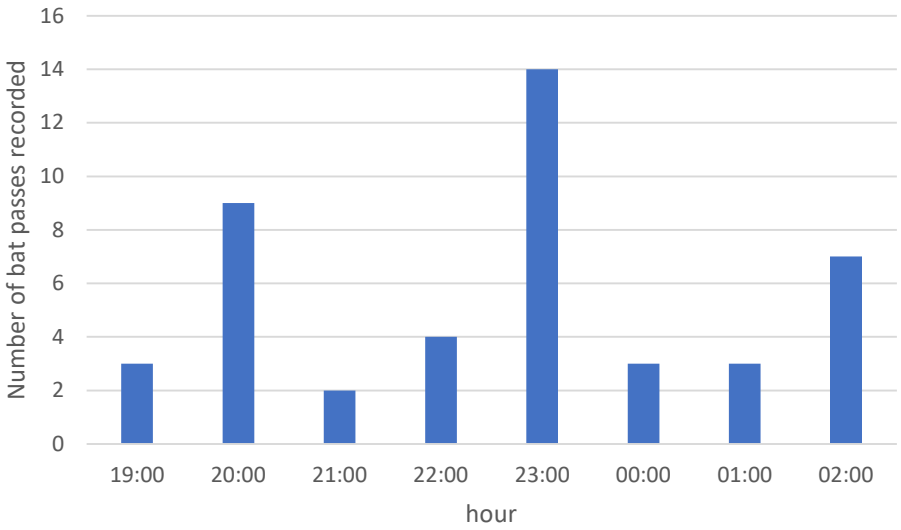

Figure 5. Number of bat passes per hour.

3.3 Roost inspections

All potential roosts were inspected for signs of bats, including large trees and a cluster of buildings (Figure 6). Although the buildings appear to provide suitable roosting locations (Figure 7), we were unable to detect any signs of bats, nor record any calls. These buildings are all located in the north-eastern section of the PAOI and includes a homestead and several storage facilities. Considering the close proximity of these buildings to the bat detector placed on the PAOI, and the low number of calls recorded, it is highly unlikely that these buildings are utilised by bats. Several patches of exotic trees were also found on the PAOI, but we did not detect any bats or active roosts in any of these trees (Figure 8).

No caves were found within the boundaries of the PAOI, and there are no known caves present within 20 km of any sites. The landowner was asked about caves on their properties, but he was not aware of any.

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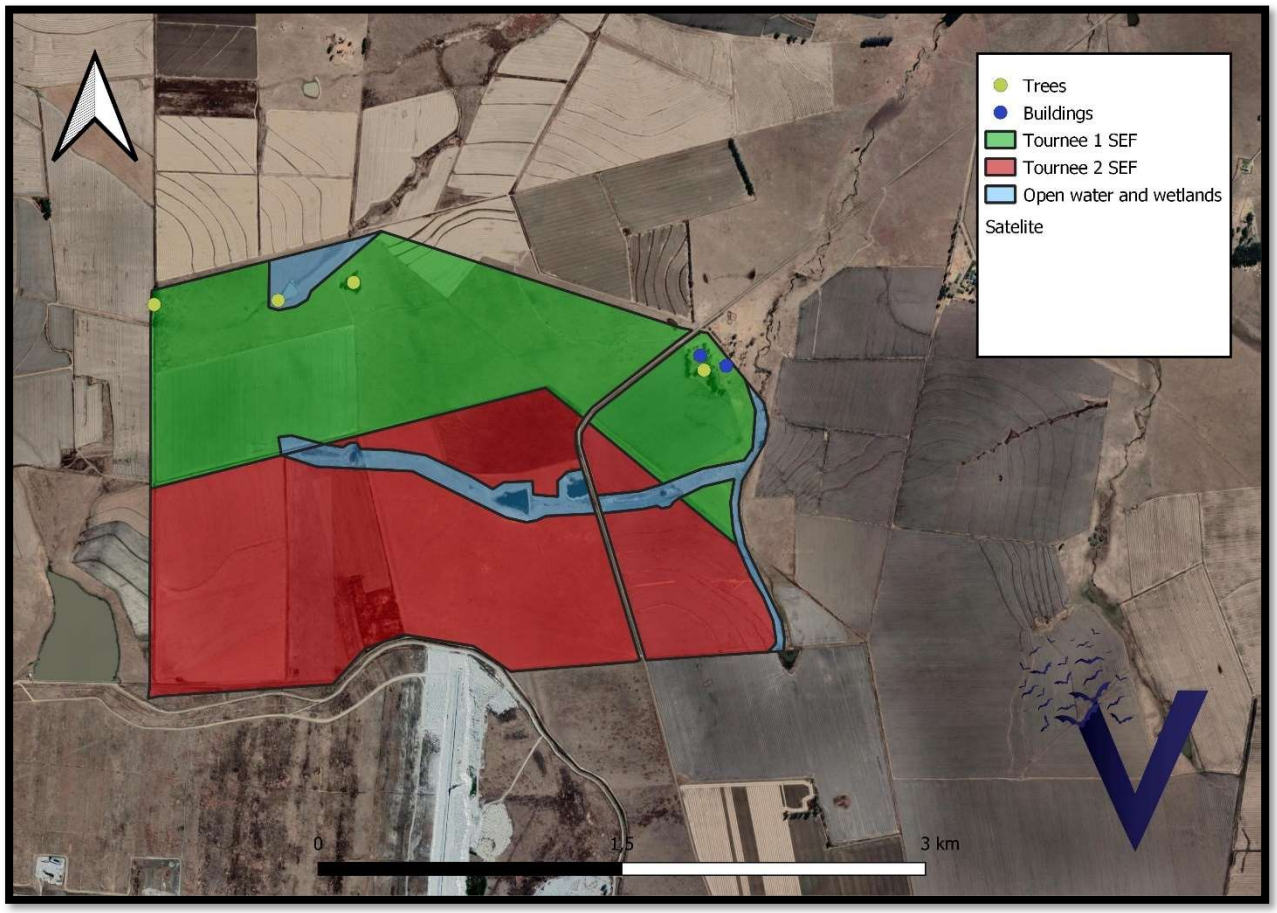

Figure 6. Potential roosts found on the Project area of Influence.

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Figure 7. Buildings that could act as potential bat roosts on the Project area of Influence.

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Figure 8. Patches of exotic trees that could act as roosting locations for bats.

3.3 Bat sensitive zones

Several potential bat sensitive areas, including water sources and potential foraging areas, are outlined below. Based on the Guidelines for Bats and Wind Energy Facilities a 200 m buffer should implemented around sites that are considered to be of Medium Sensitivity to bats such as water

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sources (MacEwan et al. 2022). However, these buffers are do not apply to SEFs, but it is recommended that all sources of water are avoided.

3.3.1 Water sources and foraging areas

Bats are heavily reliant on sources of open water and will visit at least one such source during the course of a night. Several sources of open water were found on the PAOI that are connected with sections of wetlands (Figure 9 and Figure 10). The sections of wetland between the water sources are predicted to host numerous insects and would qualify as good foraging areas for bats. However, most these wetlands and sources of open water have already been buffered with only one section of wetland outside of the buffered area in the north-west section, and as such it expected that there will be minimal impact on bats due to the construction of the proposed SEF.

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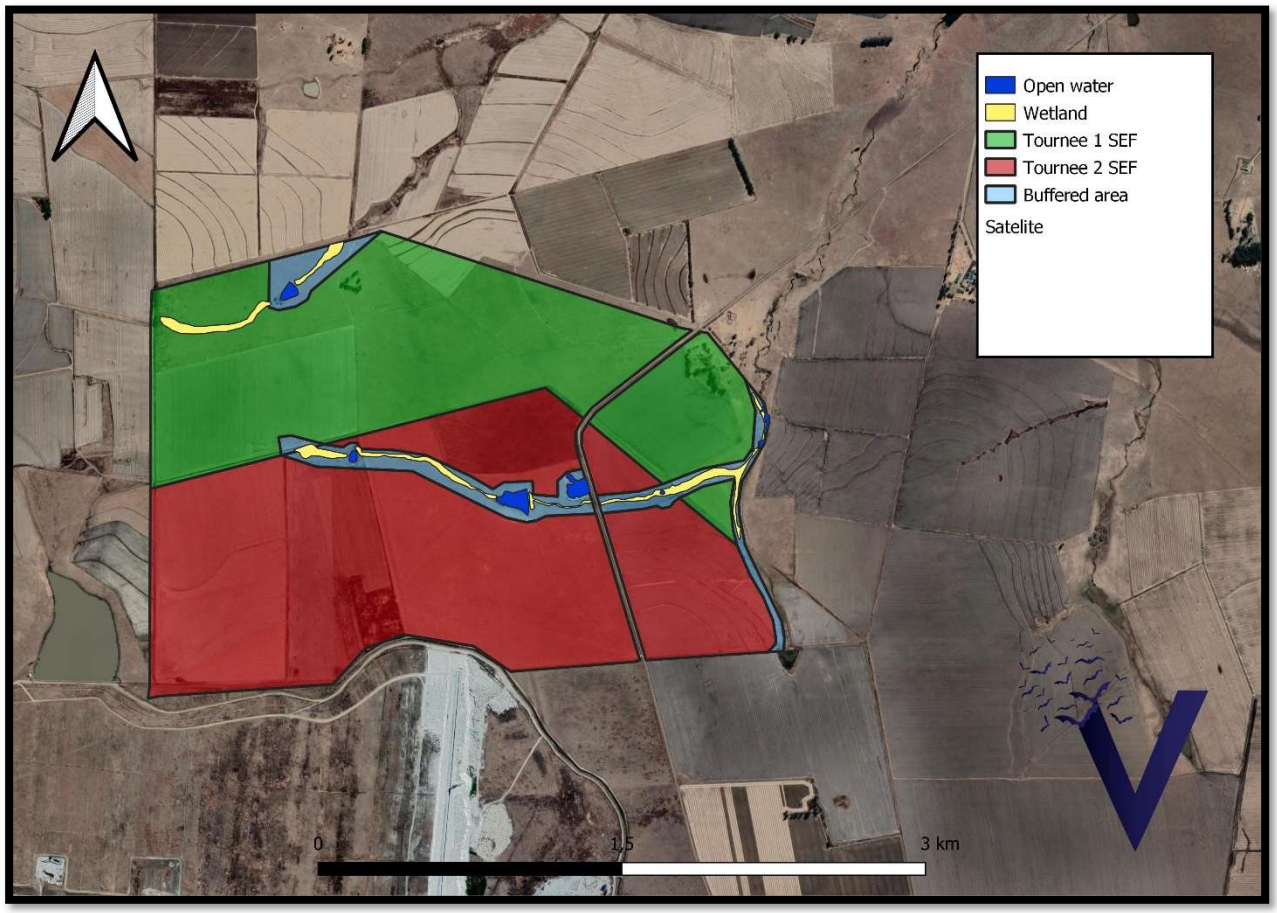

Figure 9. Locations of water sources on the Project Area of Influence

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Figure 10. Examples of open water on the Project Area of Influence with seepage from one of the dams into the wetland seen in the bottom right

4. Impact assessment

4.1 Impacts Identified

No active bat roosts were found on the PAOI and based on data obtained from the bat recorded we do not expect that there are any active bat roosts in the area. Recorded bat activity was also relatively low with few calls recorded, and from only one bat species. It is thus expected that the

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impact of the proposed SEFs during the construction phase will be restricted to habitat destruction. There are no expected impacts during the Operational Phases.

Construction phase

- Habitat destruction: Areas used as foraging habitat may be destroyed when access roads and infrastructure are constructed.

4.2 Evaluation of Impacts

4.2.1 Habitat destruction

Construction of the proposed Tournee 1 and Tournee 2 SEFs will necessitate the construction of roads and infrastructure, and it is expected that a certain amount of habitat may have to be removed. As no bat roosts were found on the PAOI, and all sources of open water are already buffered, the only potential impact on bats would be due to the removal of foraging habitat, but if areas that are deemed to be sensitive to bats are avoided, it is expected that the impact on bats will be Very Low (Table 9).

Table 9. Anticipate impacts on bats due to the removal of habitat during the construction phase.

Impact Magnitude		Score	Impact Extent		Score
Without mitigation	Low	3	Without mitigation	Site only	1
With mitigation	Very low	1	With mitigation	Site only	1
Impact Reversibility		**Score**	**Impact Duration**		**Score**
Without mitigation	Recoverable	3	Without mitigation	Medium term	3
With mitigation	Recoverable	3	With mitigation	Short term	2
Probability		**Score**	**Rating**		**Score**
Without mitigation	Medium	3	Without mitigation	**Low**	**30**
With mitigation	Low	2	With mitigation	**Very low**	**14**

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5. Conclusion

Large sections of the PAOI have already been transformed and consists of agricultural land, with few areas that were deemed to be sensitive to bats. Some of the most sensitive areas for bats are open water and foraging areas, but these are already located within buffer zones, and there will thus not be any negative impacts on bats if the proposed Tournee 1 and Tournee 2 SEFs are constructed. One of the largest impacts that SEFs can have on bats in an area is the due to the destruction of roosting habitat but considering that no bat colonies were detected in the area this is not a consideration for the development. In addition, while some bats were recorded during the three-night survey period, these were from only one species and relatively few calls were recorded. The overall impact on bats is thus considered as Low to Very Low, and we foresee no lasting impacts on bat populations in the area due of the construction of the Tournee 1 and Tournee 2 SEFs. Considering that only a Scoping Survey is required for bats do additional surveys will be required before going into the Environmental Impact Assessment Phase.

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Appendix 1: Specialist qualifications

SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Low de Vries

Registration Number: 124178

is a registered scientist

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

Zoological Science (Professional Natural Scientist)

Effective **13 November 2019** Expires **31 March 2023**

Chairperson

Chief Executive Officer

To verify this certificate scan this code

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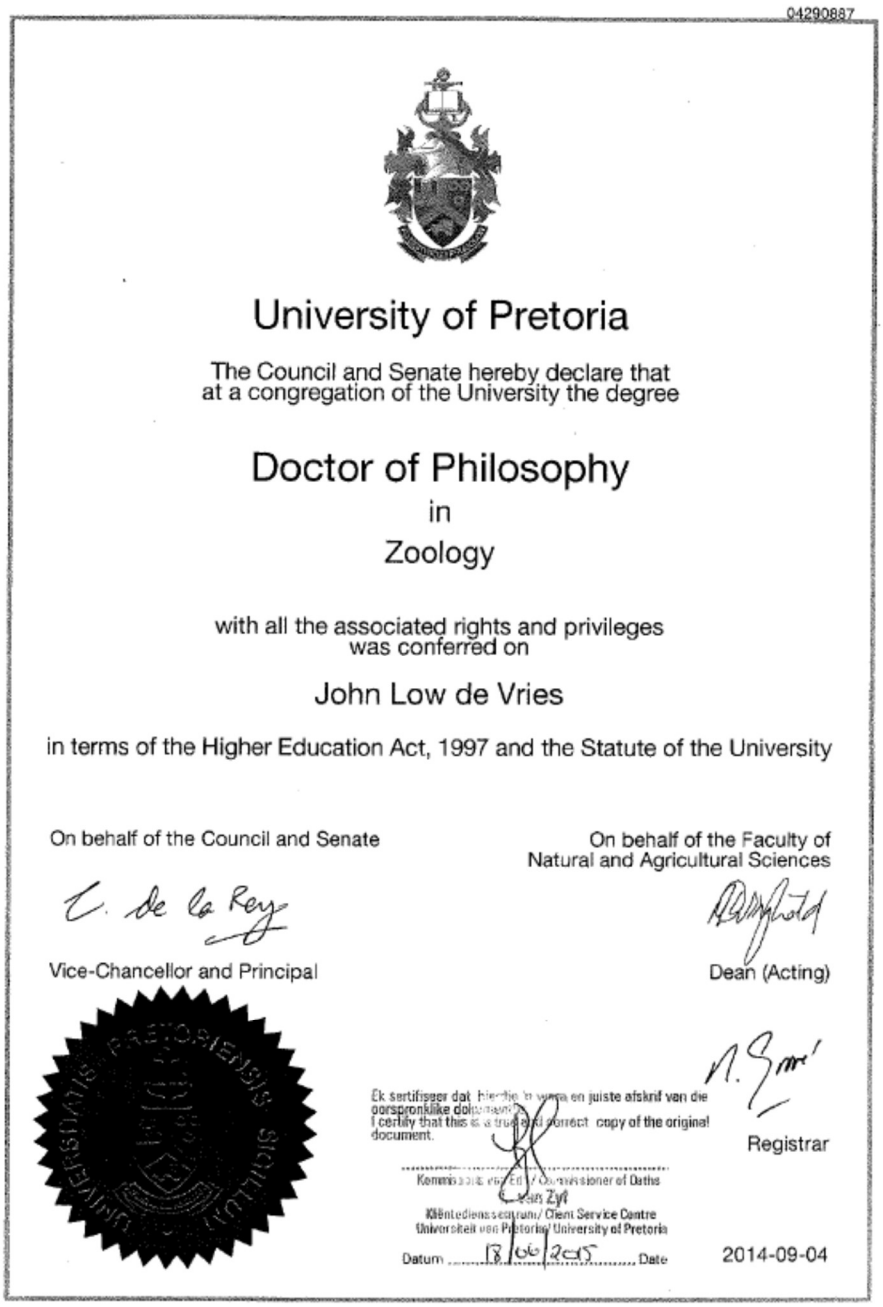

04290887

University of Pretoria

The Council and Senate hereby declare that
at a congregation of the University the degree

Doctor of Philosophy

in

Zoology

with all the associated rights and privileges
was conferred on

John Low de Vries

in terms of the Higher Education Act, 1997 and the Statute of the University

On behalf of the Council and Senate

Vice-Chancellor and Principal

On behalf of the Faculty of
Natural and Agricultural Sciences

Dean (Acting)

Registrar

Ek sertifiseer dat hierdie 'n ware en juiste afskrif van die oorspronklike dokument is.
I certify that this is a true and correct copy of the original document.

Kommissaris van Ede / Commissioner of Oaths

Klientediensesentrum/ Client Service Centre
Universiteit van Pretoria/ University of Pretoria

Datum 18/06/2015 Date

2014-09-04

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Appendix 2: Curriculum Vitae of bat specialist

Personal details

Full Name	John Low de Vries
DOB	7 November 1984
Nationality	South African
Marital Status	Married
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ID number	841107 5188087

Education

Completed	Degree and Institution
2002	Matric, Hoërskool Jeugland, Kempton Park, South Africa
2006	B. Sc Zoology, University of Pretoria, Pretoria, South Africa
2007	B. Sc (Hons) Zoology, University of Pretoria, Pretoria, South Africa
2014	PhD Zoology, University of Pretoria, Pretoria, South Africa

Key areas of expertise

- Bat Specialist — Conducting surveys on bat diversity and abundance and researh on bat ecology.
- Environmental Assessment Practitioner — Writing and collating Basic Assessment (BA) for proposed Wind Energy Facilities

Memberships & Certificates

- SACNASP Registered Professional Natural Scientist in the field of Zoological Science - Registration Number: 124178
- Bat Assessment Specialist with South African Bat Assessment Association (SABAA)

Other Training

- Multivariate statistical modelling (Cape Town, South Africa)
- Bat handling and identification course (AfricanBats)
- Snake handling (Chameleon Village (South Africa)
- ArcGis online course

- First Aid level 2 (Johannesburg, South Africa)

Focal Experience relevant to current project

2022-current - Bat specialist for a wind energy facility and associated grid connection Free State, South Africa
2022-current - Bat specialist for a wind energy facility and associated grid connection near Doringbaai, Western Province, South Africa
2021 -current – Bat specialist for three wind energy facilities and associated grid connection near Dordrecht, Eastern Cape Province, South Africa
2021-current – Bat specialist for wind energy facility and associated grid connection near Belfast, Northern Cape Province, South Africa
2021-current – Bat specialist for wind energy facility and associated grid connection near Aggeneys, Northern Cape Province, South Africa
2021-current – Bat specialist for wind energy facility and associated grid connection near Pofadder, Northern Cape Province, South Africa
2020-2021– Bat specialist for wind energy facility and associated grid connection near Loeriesfontein, Northern Cape Province, South Africa
2020-2021 – Bat specialist for wind energy facility and associated grid connection near Gouda, Northern Cape Province, South Africa
2017 - Biodiversity survey of Bats in Gorongosa National Park, Mozambique
2016-current – Bat Ecologist for the Centre for Viral Zoonoses at the University of Pretoria

Publications

Wood, M., **de Vries, JL**., Monadjem, A., Markotter, W. A critical review of factors influencing interspecific variation in home range size of bats. Mammal Review. *In submission*

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Conference Contributions

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Kimberley biodiversity research symposium, 2009. **de Vries, J.L.,** Bennett, N.C., Pirk, C.W.W., Dalerum, F., Cameron, E.Z. Den, and home range use of the aardwolf, *Proteles cristatus*

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Employment & work-related experiences

2020 - present	Director and founder of Volant Environmental
2016 - present	Postdoctoral fellow, University of Pretoria
2015 - 2016	Postdoctoral fellow, NZG
2014 - 2015	Marion Island field assistant, University of Pretoria
2013	Documentary presenter, Oxford Scientific Films
2010 - 2011	Wildlife Education Trainer, Enviro- Insight
2010 - 2011	Game Raning Lecturer, Damelin Centurion
2009 - 2018	Lecturer and tutor, University of Pretoria

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Recent Project Experience

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Time span	Nature of project	Capacity	Industry / Sector	Client / Developer	Country (Province)
2022	Thand Tau Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Free State)
2022	Camden Bird Impact Assessment	Bird Specialist	Renewable Energy / Onshore Wind	EDF Renewables	South Africa (Mpumalanga)
2022	Castle Wind Energy walkthrough	Bat Specialist	Renewable Energy / Onshore Wind	Savannah Environmental	South Africa (Northern Cape)
2022	Doringbaai Wind Energy Facility	Bat Specialist	Renewable Energy / Onshore Wind	WKN-Windcurrent	South Africa (Western Cape)
2022	Aggeneys Bat Impact Assessment Review	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Northern Cape)
2021	Dordrecht Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Indwe Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Waschbank Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Gorachouqua Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2021	Khoemana Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2021-2022	Dalmanutha Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Mpumalanga)
2020-2021	Bergrivier Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Western Cape)
2020-2021	Botterblom Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Northern Cape)

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2012	Dangerous snake removal	Herpetologist	Mining (Coal)	Anadarko	Mocimboa da Paia, Mozambique

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