ARCUS

An ERM Group Company

BAT SCOPING AND IMPACT ASSESSMENT REPORT FOR THE SOYUZ 2 WIND ENERGY FACILITY IN THE BRITSTOWN WIND FARM CLUSTER, NORTHERN CAPE PROVINCE

On behalf of

Soyuz 2 (Pty) Ltd

August 2022

Prepared By:

Arcus Consultancy Services South Africa (Pty) Limited

240 Main Road
1st Floor Great Westerford
Rondebosch
7700

T +27 (0) 21 412 1529 l **E** Ashlin.Bodasing@arcusconsulting.co.za
W www.arcusconsulting.co.za

Registered in South Africa No. 2015/416206/07

TABLE OF CONTENTS

CONTENTS OF THE SPECIALIST REPORT – CHECKLIST

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	Section of Report
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	Appendix 2, Appendix 3
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix 2
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 1
(cA) an indication of the quality and age of base data used for the specialist report;	Section 3
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	To be included in final EIA
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 3
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 2
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	To be included in final EIA
(g) an identification of any areas to be avoided, including buffers;	Section 4, Figure 2
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 1, Figure 2
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 1.3
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment, or activities;	Section 4
(k) any mitigation measures for inclusion in the EMPr;	Section 4
(l) any conditions for inclusion in the environmental authorisation;	Section 4
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 4
(n) a reasoned opinion— i. as to whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	Section 4, Section 6
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	None received as yet
(p) any other information requested by the competent authority	None received
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Government Notice No. 320 has been gazetted, and a verification report aligned with the requirements have been included in this report (Appendix 1). No protocol for bat assessment has been gazetted.

1 INTRODUCTION

Soyuz 2 (Pty) Ltd is considering the development of an up to 480 MW wind farm in the Northern Cape. The proposed wind farm will form part of the Britstown Wind Farm Cluster, which will be comprised of a cluster of six wind farms. The development site for the cluster is approximately 125,000 ha in extent and is located approximately 23 km south of the Britstown town centre. Arcus was appointed to conduct the pre-construction bat monitoring for the projects (which is still underway and expected to conclude in October 2022), the results of which have informed the scoping impact assessment process required for environmental authorisation in terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and associated EIA regulations of 2014 as amended (EIA regulations). At the conclusion of this monitoring campaign, the final results and impacts will be explored in the Bat Environmental Impact Assessment Reports.

The aim of the bat monitoring programme is to document bat activity in the area of interest and, based on this activity, assess the proposed wind farms with regards to potential impacts to bats and the risk to development consent. These data establish a pre-construction baseline of bat species diversity and activity and are used to inform the impact assessments. The monitoring data also assists in providing solutions to avoid and mitigate impacts by informing the final design and construction and operational management strategy of the wind farms. The baseline will also be used to compare impacts to bats during the operational phase of the projects.

This scoping report includes the results from the bat activity monitoring undertaken between 6 October 2021 and 24 February 2022 (142 nights). These data were used to provide a **<u>preliminary assessment of potential impacts that could be subject to change</u> of the Soyuz 2 Wind Energy Facility (WEF)**.

The final results and impacts to bat will be explored in the Environmental Impact Assessment Report.

1.1 Description of Proposed Development

The applicant Soyuz 2 (Pty) Ltd is proposing the development of a commercial Wind Energy Facility (WEF) and associated infrastructure on a site located approximately 23 km South of Britstown within the Emthanjeni Local Municipality and the Pixley ka Seme District Municipality in the Northern Cape Province.

Five additional WEF's are concurrently being considered on the surrounding properties and are assessed by way of separate impact assessment processes contained in the 2014 Environmental Impact Assessment Regulations (GN No. R982, as amended) for listed activities contained in Listing Notices 1, 2 and 3 (GN R983, R984 and R985, as amended). These projects are known as Soyuz 1 WEF, Soyuz 3 WEF, Soyuz 4 WEF, Soyuz 5 WEF and Soyuz 6 WEF.

A preferred project site with an extent of approximately 125,000 ha has been identified as a technically suitable area for the development of the six WEF projects. It is proposed that each WEF will comprise of up to 75 turbines with a combined contracted capacity of up to 480 MW. It is anticipated that each WEF will have an actual (permanent) footprint of up to 150 ha.

The Soyuz 2 WEF project site covers approximately 38 000 ha and comprises the following farm portions:

- Portion 3 of Farm Twyfelhoek No. 127
- Portion 4 of Farm Twyfelhoek No. 127

- Remaining Extent (Portion 0) of Farm Lemoenkloof No. 141.
- Portion 1 of Farm Lemoenkloof No. 141
- Portion 0 of Farm Twyfelhoek No. 127.
- Portion 5 (a portion of portion 1) of Farm Twyfelhoek No. 127
- Portion 9 (a portion of portion 1) of Farm Twyfelhoek No. 127
- Remaining Extent of Portion 1 of Farm Twyfelhoek No. 127
- Portion 0 of Farm No. 146
- Portion 3 of Farm No. 144.
- Portion 0 of Farm Dreunfontein No. 126
- Remaining Extent Portion 1 of Farm Dreunfontein No. 126

The Soyuz 2 WEF project site is proposed to accommodate the following infrastructure, which will enable the wind farm to supply a contracted capacity of up to 480 MW:

- Up to 75 wind turbines with a maximum hub height of up to 160 m and a rotor diameter of up to 200 m;
- A transformer at the base of each turbine;
- Concrete turbine foundations;
- Turbine, crane and blade hardstands;
- Temporary laydown areas (with a combined footprint of up to 14 ha) which will accommodate the boom erection, storage and assembly area;
- Cabling between the turbines, to be laid underground where practical;
- Battery Energy Storage System (with a footprint of up to 5 ha)
- Two on-site substations with a combined footprint of up to 4 ha in extent to facilitate the connection between the wind farm and the electricity grid;
- Access roads to the site and between project components inclusive of stormwater infrastructure. A 12 m road corridor may be temporarily impacted upon during construction and rehabilitated to 6m wide after construction. The WEF will have a total road network of up to 125 km.
- A temporary site camp establishment and concrete batching plants (with a combined footprint of up to 2 ha); and
- Operation and Maintenance buildings (with a combined footprint of up to 2 ha) including a gate house, security building, control centre, offices, warehouses, a workshop and visitor's centre.

In order to evacuate the energy generated by the WEF to the national grid, a separate Basic Assessment will be undertaken to assess two grid connection alternatives:

- Alternative 1: A 132 / 400kV overhead powerline (OHL) within a 500 m assessment corridor from the Switching Station on site to a proposed new 132 / 400 kV MTS located north of the WEF and adjacent to the Hydra – Kronos 400 kV line.

- Alternative 2: A 132 / 400 kV overhead powerline (OHL) within a 500 m assessment corridor from the Switching Station on site to a proposed new 132 / 400 kV MTS located south of the WEF and adjacent to the Droerivier - Hydra 400 kV line.

The EA applications for the wind farm project and grid connection infrastructure are being undertaken in parallel as they are co-dependent, i.e., one will not be developed without the other.

1.2 Terms of Reference

The aim of this report is to present the baseline environment with respect to bats that may be influenced by the development and operation of the wind farm. Based on this baseline, a description and evaluation of the potential impacts the project may pose to bats is provided. The following terms of reference were utilised for the preparation of this report:

- Describe the baseline receiving environment in and surrounding the site, including a description of key no-go areas or features or other sensitive areas to be avoided;
- Describe the methodology and processes used to source information, collect baseline data, generate models and the age or season when the data were collected;
- Describe any assumptions made and any uncertainties or gaps in knowledge;
- Describe relevant legal matters, policies, standards and guidelines.
- Identify potentially significant environmental impacts that may arise in the construction, operation and decommissioning phases of the project, including cumulative impacts (to be further expanded in the EIA Report);
- Conduct an impact assessment of identified impacts under the pre-mitigation and post-mitigation scenarios (to be further expanded in the EIA Report);
- Conduct an assessment of any alternatives, where relevant, and the No-Go alternative;
- Provide a discussion on the overall impact and a reasoned opinion as to whether the proposed activity, or portions of the activity can be authorised (to be further expanded in the EIA Report); and
- Identify potential mitigation or enhancement measures to minimise impacts to bats (to be further expanded in the EIA Report).

1.3 Assumptions and Limitations

The following assumptions and limitations relevant to this study are noted:

- The knowledge of certain aspects of South African bats including natural history, population sizes, demographics, local and regional distribution patterns, spatial and temporal movement patterns (including migration and flying heights) and how bats may be impacted by wind energy, including cumulatively, is very limited for many species.
- Bat echolocation calls (i.e. ultrasound) operate over ranges of metres therefore acoustic monitoring samples only a small amount of space (Adams et al. 2012). Recording a bat using sound is influenced by the type and intensity of the echolocation call produced, the species of bat, the bat detector system used, the orientation of the signal relative to the microphone and environmental conditions such as humidity. One must therefore adopt a precautionary approach when extrapolating data from echolocation surveys over large areas due to the limited sample size (i.e., only small areas are actually sampled).
- There can be considerable variation in bat calls between different species and within species. The accuracy of the species identification is dependent on the quality of the calls used for identification. Species call parameters can often overlap, making species identification difficult.

- Automatic bat classifiers in Kaleidoscope Pro Version 5.4.7 (Wildlife Acoustics, Inc) were used to identify bat species. Post-processing was used to manually verify the performance of the classifiers but owing to the large number of files recorded, not all recordings could be verified manually. There may be instances where the software was unable to identify species or made incorrect identifications.
- Bat activity recorded by bat detectors cannot be used to directly estimate abundance or population sizes because detectors cannot distinguish between a single bat flying past a detector multiple times or between multiple bats of the same species passing a detector once each (Kunz et al. 2007a). This is interpreted using the specialists' knowledge and is presented as relative abundance.
- The potential impacts of wind energy on bats presented in this report represent the current knowledge in this field. New evidence from research and consultancy projects may become available in future, meaning that impacts and mitigation options presented and discussed in this report may need to be adjusted if the project is developed.
- While the data presented in this report provides a baseline of bat activity for the period sampled, it does not allow for an understanding of interannual variation in bat activity. It is therefore possible that during the lifespan of the facility, bat activity could be significantly different (lower or higher) compared to the baseline presented here.
- The report included investigation of the current 5 months of monitoring data which has been captured at the proposed project site. It should be noted that this data does not give the full scope of activity and presence throughout all four seasons, and that monitoring is continuing. The findings presented in this report are, therefore, **preliminary and are subject to change, following further on-site assessments made during the respective EIA phase**. The full 12 months of pre-construction monitoring data will be presented and explored in the EIA Report.

1.4 Applicable Legislation, Policies, Treaties and Standards

The following items provide a governance framework and guidelines for the consideration and management of impacts to biodiversity and are applicable to the development of infrastructure, including wind farms, that may result in such impacts:

- The Equator Principles (2013)
- International Finance Corporation Environmental, Health, and Safety Guidelines for Wind Energy (2015)
- Convention on the Conservation of Migratory Species of Wild Animals (1979)
- Convention on Biological Diversity (1993)
- Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)
- National Environmental Management Act, 1998 (NEMA, Act No. 107 of 1998)
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
- National Biodiversity Strategy and Action Plan (2005)
- South African Best Practise Guidelines for Surveying Bats in Wind Energy Facility Developments – Pre-Construction (2020)
- Government Notice No. 320 has been gazetted, therefore a verification report aligned with the requirements have been included in this report (Appendix 1).

2 METHODOLOGY

2.1 Desktop Review

A desktop study of available bat locality data, literature and mapping resources was undertaken to determine the likelihood of bats being present at the proposed project. Literature was also sought to understand the current state of knowledge of wind energy-bats impacts globally. Very little published research on this regard is available for the South African context. Data sources included:

- Academic sources such as research papers and published texts;
- Information on bat activity at other nearby renewable energy developments such as from pre-construction and operational monitoring reports, EIA reports and EMPrs;
- Bat distribution records and maps; and
- A review of the habitats on the site to identify, if possible, habitats, roosts and features which may be associated with bats.

2.2 Field Surveys

The pre-construction monitoring was designed to monitor bat activity across the project area of interest (PAOI), as well as a broader study which may include certain areas which fall outside of the PAOI. A broader study area was used because bats are mobile animals and may cross the wind farm boundary to access resources. The monitoring was undertaken in accordance with South African best practice[1]. Sampling of bat activity took place at 25 locations (Figure 1) using Song Meter SM4 bat detectors (Wildlife Acoustics, Inc.). Ultrasonic microphones were mounted on masts at 12 m ("ground level") at nineteen locations. In addition, ultrasonic microphones were mounted at 12 m, 55 m and 110 m respectively on six meteorological masts ("at height"). All detectors were configured to record every night from 30 minutes before sunset until 30 minutes after sunrise.

The distribution of monitoring locations across the site was determined based on vegetation types, land-use, and topography with the aim to sample bat activity in areas where bat activity was expected to be higher (e.g. near water and buildings, along riparian vegetation) but also in areas where bat activity was expected to be lower (e.g. away from water and buildings, on top or ridges, in open areas with low habitat complexity).

In addition to the acoustic monitoring, potential structures that bats could use as roosts were investigated during the day for the presence or evidence of roosting bats (e.g. guano and culled insect remains, etc.) whenever the Arcus team was on site. These included buildings, rocky outcrops and trees. Potentially sensitive geographical features from GIS databases were also ground-truthed whenever the Arcus team were on site to refine the bat sensitivity buffers. **The buffers presented in this report are considered preliminary and are subject to change, following further on-site assessments during the respective EIA phase.**

2.3 Data Analysis

Bats emit ultrasonic echolocation calls for orientation, navigation and foraging. These calls can be recorded by bat detectors enabling bat species to be identified from various features in their calls (e.g. the frequency of the call). A sequence of bat calls is termed a bat pass, defined as two or more echolocation calls separated from other calls by more than 500 milliseconds (Hayes 1997; Thomas 1988). Quantifying the number of bat passes recorded can be used to quantify the relative abundance of bat species.

Acoustic data from each bat detector were analysed using Kaleidoscope® Pro (Version 5.4.7, Wildlife Acoustics, Inc.). Bat species were automatically identified from their echolocation calls using the embedded echolocation call library in the software. The results were vetted by random or selective (for certain species) checks through manually identifying recordings to verify the results. The total number of files was used as a proxy for the number of bat passes which is a standard approach to quantifying bat activity.

[1] Sowler, S., MacEwan, K., Aronson, J. and Lötter, C., 2020. South African best practice guidelines for pre-construction monitoring of bats at wind energy facilities.

3 BASELINE ENVIRONMENT

3.1 Habitats

The proposed wind farm cluster is spread across the gently sloping flats and planes of the Eastern Upper Karoo and Northern Upper Karoo vegetation types with interspersed hills of Upper Karoo Hardveld in the Nama Karoo ecoregion. The study area is comprised mostly of Eastern Upper Karoo in the south and Northern Upper Karoo in the north, the dominant vegetation of which are microphyllous shrubs, 'white' grasses, dwarf shrubs and low trees. Approximately 14, 000 ha of Upper Karoo Hardveld is found on the steep and rocky slopes of mid-eastern boundary and is interspersed throughout the site, which is comprised mainly of dwarf karoo scrub. The Soyuz 2 site is comprised of the Northern Upper Karoo Vegetation type in the north, Eastern Upper Karoo bisecting the southern portion and isolated Upper Karoo Hardveld koppies and ridges through-out and at the southern boundary. Topography is mostly flat to undulating, barring the steep slopes of the Upper Karoo Hardveld ridges in the south and scattered through-out the site.

The region's climate is harsh and droughts are common. Arcus has conducted work at a potential wind farm site within 100 km of Britstown and are familiar with the area, where bat activity usually peaks in autumn and summer and is expected to be low to medium with low diversity. There are no known bat roosts in the area.

For foraging bats, one of the most important ecological constraints is clutter; objects (e.g. vegetation) that have to be detected and avoided by bats during flight (Schnitzler and Kalko 2001). Clutter presents perceptual and mechanical problems for bats. Perceptually, bats are constrained by their sensory capabilities to find prey amongst clutter (e.g. having an echolocation system adapted to find prey in dense vegetation versus in the open). Mechanically, bats are constrained by their flight ability (e.g. adaptations in wing morphology that enable flight in dense vegetation versus in the open). Habitats can therefore be defined according to clutter conditions. These include uncluttered space (open spaces, high above the ground and far from vegetation), background cluttered space (near the edges of vegetation, in vegetation gaps, and near the ground or water surfaces), and highly cluttered space (very close to surfaces such as leaves or the ground). Habitat complexity is therefore an important consideration for bats because areas that offer a variety of clutter conditions are more likely to support a greater diversity of bat species. The relative uniformity of the landscape, with a limited degree of clutter complexity, will reduce the diversity of species present on the site. Despite this, there is a range of suitable habitat for bats that can be used for roosting, foraging and commuting in the study area.

The availability of roosting space is a critical factor for bats (Kunz and Lumsden 2003) and a major determinant of whether bats will be present in a landscape, as well as the diversity of species that can be expected. There are no confirmed roosts in the study area. Based on unpublished data from the South African Bat Assessment Association, the nearest major bat roost is located ca. 93 km north of the site. There are, however, several potential roosting features on site that may be used by bats. These include buildings and trees (which are mainly associated with the farmsteads) and rocky outcrops, such as those in the south of the site.

A number of bat species can make use of rocky crevices (Monadjem et al. 2010) and others, such as the Cape serotine and Egyptian free-tailed bat, readily make use of buildings as roosts (Monadjem et al. 2010). There do not appear to be any large caves in the study area which suggests that there may not be large colonies of bats however several hundred bats may occupy building roosts in the study area. Investigations of rocky outcrops did not reveal any signs of roosting bats.

Water sources are important for bats as a direct resource for drinking and because these areas tend to attract insects and promote the growth of vegetation (e.g., riparian vegetation). Therefore, besides providing drinking water, bats can also be attracted to water sources as potential foraging and roosting sites (Greif and Siemers 2010; Sirami et al. 2013). There are numerous wetlands, reservoirs and farms dams in the study area that will be attractive to bats. Rivers, and drainage lines will be equally important for foraging and commuting. Some of these water resources are non-perennial because of the arid nature of the site, and therefore only available to bats during some parts of a year. This could then restrict potential impacts to bats to periods when key resources are available. Limited areas of cultivation areas are present near farmsteads which are important foraging areas as some species forage over agricultural fields to hunt insect pests (Noer et al. 2012; Taylor et al. 2011).

Bats are known to use linear landscape features for commuting routes to get to and from foraging sites, roost sites and to access water sources. Linear landscape elements, such as tree lines and edge habitats, provide protection to bats from predators, shelter from wind, orientation cues as well as foraging habitat (Verboom and Huitema 1997; Verboom 1998). The primary linear landscape features are drainage lines which typically (but not always) are associated with vegetation, providing linear and edge habitats that bats can access. Rivers, tree lines, and other edge habitats might also be used as commuting routes or navigation cues.

3.2 Bat Species

Approximately nine species of bat can potentially occur at the proposed site (African Chiroptera Report 2018; Monadjem et al. 2010). It is possible that more (or fewer) species may be present because the distributions of some bat species in South Africa, particularly rarer species, are poorly known. Analysis of the acoustic monitoring data suggests that at least five species of bat are present (Table 1). Recent taxonomic research suggests that the Egyptian free-tailed bat may be at least two separate species (D. Jacobs, pers. Comm, 2020) but is considered as one for the purposes of this report and until its taxonomic status is clarified further.

Activity was dominated by the Egyptian free-tailed bat and Cape serotine which accounted for 82 % and 17 % of total bat passes respectively. The remaining three species were recorded relatively infrequently.

Table 1: Bat Species List for Britstown Wind Farm Cluster and their Sensitivity

Species	Species Code	# Bat Passes	Conservation Status[2]		Likelihood of Risk
			National	International	
Egyptian free-tailed bat *Tadarida aegyptiaca*	TADAEG	118,234	Least Concern	Least Concern	High
Roberts's flat-headed bat *Sauromys petrophilus*	SAUPET	-	Least Concern	Least Concern	High
Cape serotine *Neoromicia capensis*	NEOCAP	25,345	Least Concern	Least Concern	High
Zulu Pipistrelle Bat *Neoromicia zuluensis*	NEOZUL	117	Least Concern	Least Concern	High
Straw-coloured Fruit Bat *Eidolon helvum*	EIDHEL	-	Least Concern	Near Threatened	High
Long-tailed serotine *Eptesicus hottentotus*	EPTHOT	1,007	Least Concern	Least Concern	Medium
Lesueur's wing-gland bat** *Cistugo lesueuri*	CISLES	15	Least Concern	Least Concern	Medium
Darling's horseshoe bat *Rhinolophus darlingi*	RHIDAR	-	Least Concern	Least Concern	Low
Egyptian slit-faced bat *Nycteris thebaica*	NYCTHE	-	Least Concern	Least Concern	Low

** Endemic to South Africa.

[2] Child, M.F., Roxburgh, L., Do Linh San, E., Raimondo, D., Davies-Mostert, H.T. eds., 2016. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

3.3 Spatio-Temporal Bat Activity Patterns

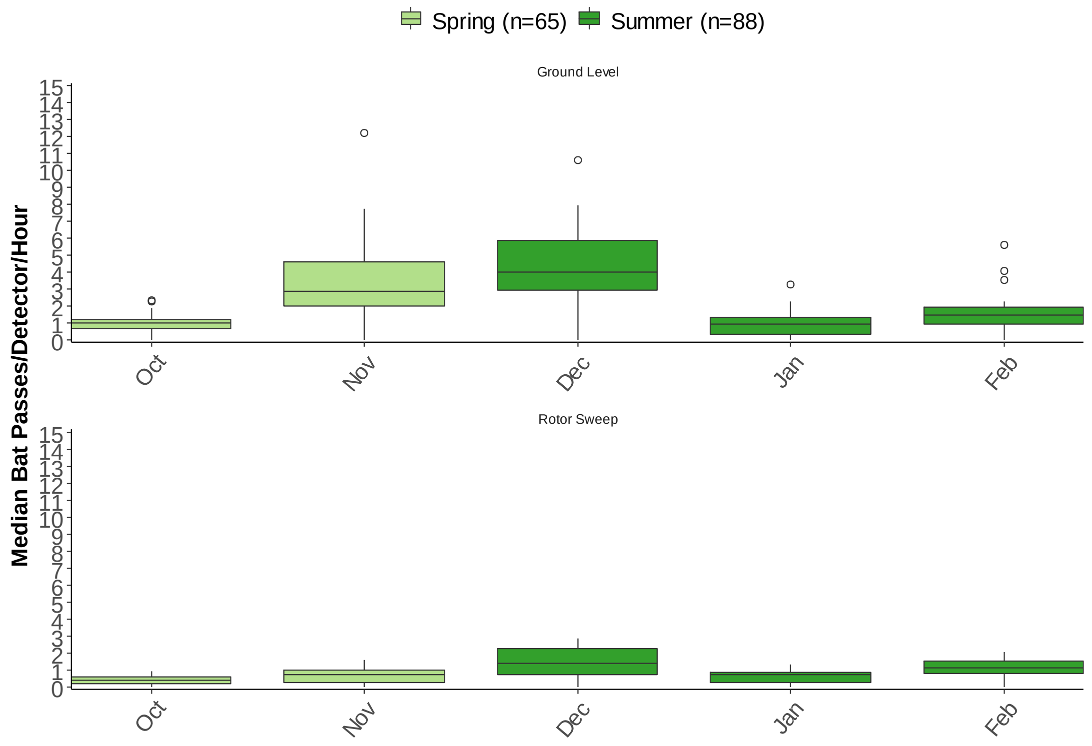
From the preliminary five months of monitoring, a total of 144,718 bat passes recorded across all detectors. Percentage of nights with bat activity ranged from low to high, with bats recorded between 2.7% and 94.4% of sample nights (Table 2). Overall, activity in spring was high at ground level and moderate at rotor sweep (1.97 and 0.35 median passes/hour respectively) and high at both ground level and rotor sweep in summer (1.40 and 0.73 median passes/hour respectively).

At ground level and at overall rotor sweep height (50 m – 110 m) [3], a similar distribution of bat activity was observed over the study period (Graph 1). Activity was lower in October for both height bands, increased into November, peaked in December (with 4.00 median passes/hour observed at ground level and 1.37 median passes/hour at 50 m), decreased into January and increased into February. However, the month where the least amount of activity was observed differed between the height bands, with ground level activity troughing in January (0.91 median passes/hour) and rotor sweep level activity troughing in October (0.35 median passes/hour). Activity distribution within the rotor sweep height band also differed slightly to the overall rotor sweep height, with activity at 100 m troughing in November (0.15 median passes/hour) and reaching a peak in January (0.98 median passes/hour) while activity at 50 m followed a similar pattern to the overall activity at rotor sweep height.

At ground level, activity was moderate in October and January, and high for the rest of the year with respect to the Nama Karoo ecoregion[4] (Table 2). For overall rotor sweep height, activity was high most of the year except for October where it was moderate. Within the rotor sweep height band, activity was moderate at 100 m for October, November and January and high in December and February, while at 50 m activity was high through-out the monitoring period.

[3] MacEwan, K., Sowler, S., Aronson, J. and Lötter, C., 2020. South African best practice guidelines for pre-construction monitoring of bats at wind energy facilities.

[4] MacEwan, K., Sowler, S., Aronson, J. and Lötter, C., 2020. South African best practice guidelines for pre-construction monitoring of bats at wind energy facilities.



Graph 1: Boxplot showing the temporal distribution of median bat passes per detector per hour.

Table 2: Median bat passes per hour per microphone per month

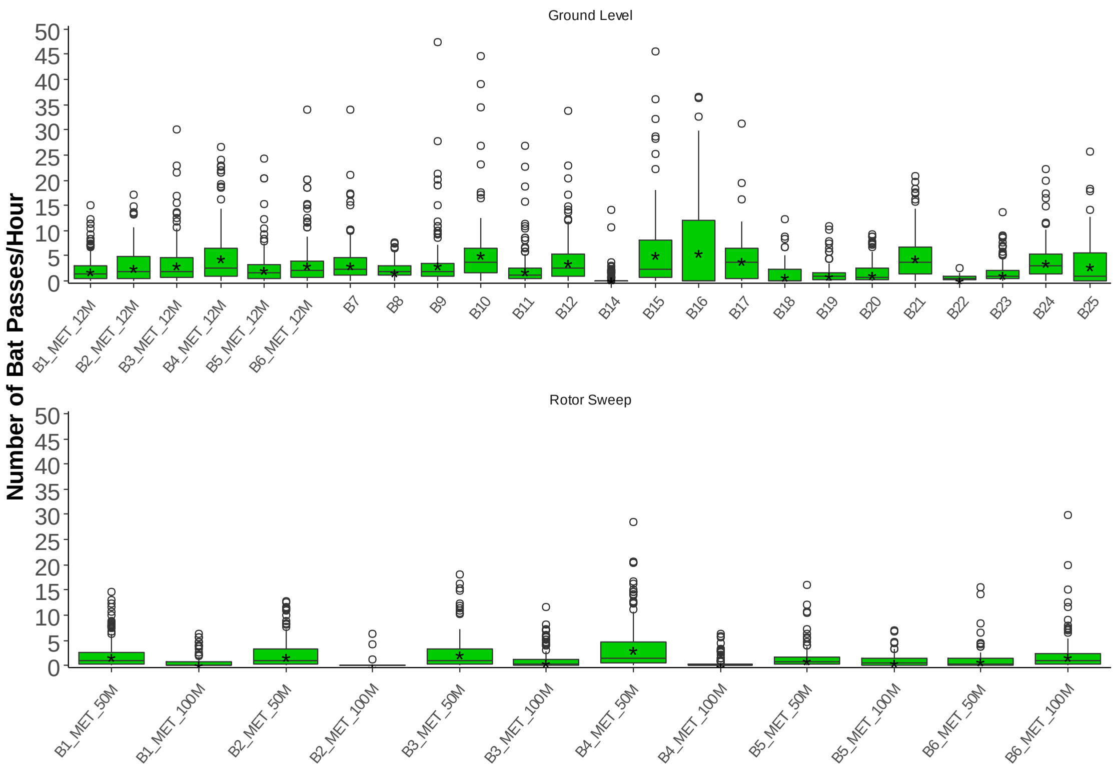
	Oct	Nov	Dec	Jan	Feb
Ground Level	1.00	2.84	4.00	0.91	1.45
Rotor Sweep	0.35	0.68	1.37	0.71	1.12
100m	0.25	0.15	0.51	0.18	0.98
50m	0.60	0.85	1.88	0.85	1.66

* Orange cells indicate Moderate Risk and Red cells indicate High Risk for the Nama Karoo ecoregion.

There were clear differences in how bat activity varied according to height above the ground. Most activity was recorded at 12 m, while at the met masts, the microphone at 50 m recorded more bat activity than those positioned at 100 m. Generally, activity declined with height (Graph 2).

Median bat activity per hour was high at most monitoring locations for ground level and at 50 m rotor sweep height, while evenly distributed between low, moderate and high risk for 100 m rotor sweep height (Graph 2, Table 2). However, short masts B14, B16 and B18 had low median passes per hour while B19, B20, B22 and B23 had moderate median passes per hour. The only 50 m detector that had moderate activity was B6_MET_50M.

Among the met masts, a total of 28,651 bat passes were recorded at height, with 71 % recorded at 50 m and 29 % at 100 m. Of all species of bats that were recorded at 50 m, and 100 m, approximately 97 % of all activity at height was attributed to the Egyptian free-tailed bat.



Graph 2: Boxplot showing the number of bat passes per detector per hour at Rotor Sweep and Ground Level.

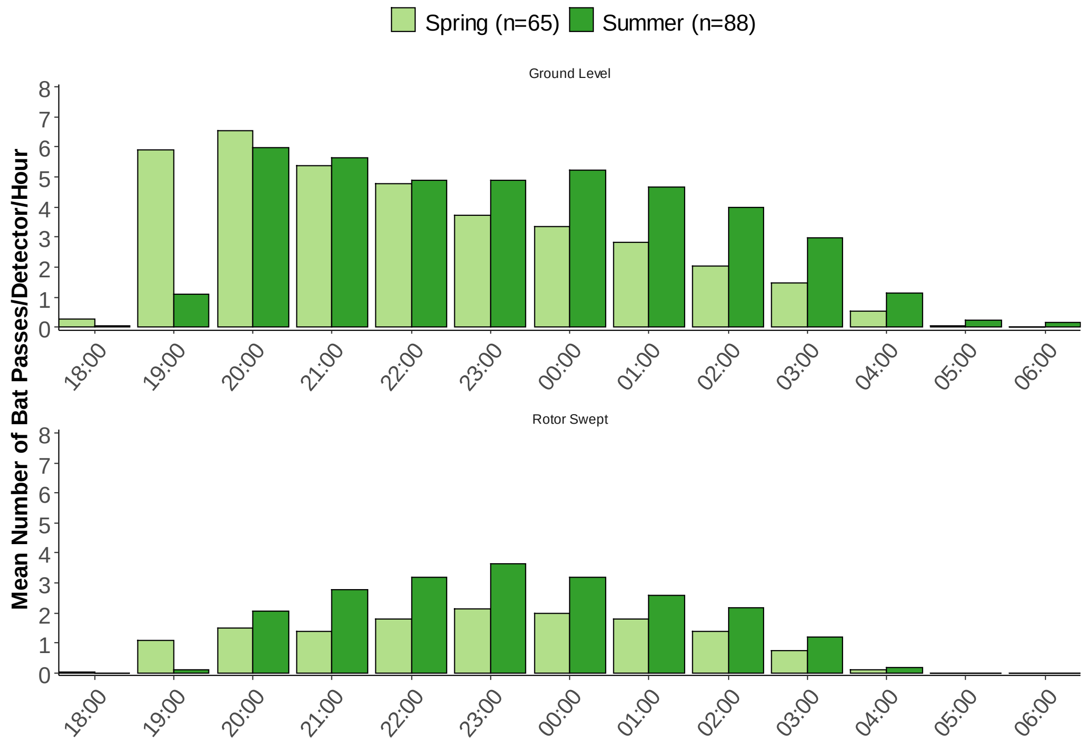
Table 3: Acoustic Monitoring Summary

Detector	Date Installed	# of Sample Nights	% of Sample Nights with Bat Activity	Mean Passes/Night; Median Bat Passes/hour	Total Bat Passes
B1_MET_12M	06/10/2021	141	93.6	27.2; 1.41	3,897
B1_MET_50M	06/10/2021	142	88.0	25.4; 0.94	3,666
B1_MET_100M	06/10/2021	136	67.6	7.9; 0.17	1,103
B2_MET_12M	07/10/2021	141	92.2	35.4; 1.87	5,102
B2_MET_50M	07/10/2021	141	93.6	25.5; 0.97	3,679
B2_MET_100M	07/10/2021	74	2.7	1.8; 0	143
B3_MET_12M	07/10/2021	141	92.2	39; 1.91	5,612
B3_MET_50M	07/10/2021	107	89.7	30; 1.07	3,300
B3_MET_100M	07/10/2021	139	61.9	11.9; 0.26	1,718
B4_MET_12M	12/10/2021	137	91.2	55.4; 2.52	7,973
B4_MET_50M	13/10/2021	137	89.8	41; 1.47	5,907
B4_MET_100M	14/10/2021	133	28.6	5.3; 0	749
B5_MET_12M	08/10/2021	141	92.2	29.6; 1.59	4,268
B5_MET_50M	08/10/2021	141	87.9	16.1; 0.76	2,324
B5_MET_100M	08/10/2021	101	82.2	11.2; 0.6	1,177
B6_MET_12M	08/10/2021	139	94.2	38.9; 2.07	5,608
B6_MET_50M	08/10/2021	106	86.8	13.2; 0.39	1,457
B6_MET_100M	08/10/2021	139	94.2	23.8; 0.98	3,428

Detector	Date Installed	# of Sample Nights	% of Sample Nights with Bat Activity	Mean Passes/Night; Median Bat Passes/hour	Total Bat Passes
B7	12/10/2021	138	94.2	40.3; 2.4	5,847
B8	11/10/2021	139	92.1	24.5; 1.84	3,557
B9	06/10/2021	144	94.4	41; 1.9	5,860
B10	09/10/2021	114	93.9	60.3; 3.72	7,125
B11	09/10/2021	140	92.1	26.5; 1.2	3,820
B12	14/10/2021	135	89.6	43.5; 2.49	6,314
B13	14/10/2021	0	N/A	N/A	N/A
B14	12/10/2021	137	20.4	5.9; 0	849
B15	12/10/2021	137	92.7	62.4; 2.3	8,993
B16	13/10/2021	136	48.5	69.3; 0.12	9,979
B17	13/10/2021	61	85.2	49.9; 3.767	3,496
B18	10/10/2021	47	87.2	28; 0	1,934
B19	13/10/2021	94	84.0	16.7; 0.91	1,720
B20	11/10/2021	137	86.1	18.3; 0.78	2,639
B21	11/10/2021	137	92.7	54.5; 3.74	7,794
B22	13/10/2021	37	89.2	7.6; 0.54	290
B23	13/10/2021	135	88.9	19.7; 1.00	2,830
B24	09/10/2021	139	92.1	45; 3.04	6,486
B25	14/10/2021	98	58.2	37.7; 1.01	4,074

* Green cells indicate Low Risk, Orange cells indicate Moderate Risk and Red cells indicate High Risk for the Nama Karoo ecoregion.

At ground level in spring, activity commenced at 18:00, increased rapidly to peak at 20:00 and thereafter decreased gradually until sunrise, while at rotor sweep height activity in spring commenced at 19:00, increased gradually to peak at 23:00, then decreased until sunrise (Graph 3). Similarly in summer, ground level activity commenced at 18:00 and rose rapidly to peak at 20:00 and decreased until sunrise, however with a slight increase between 00:00 and 1:00. Activity in summer at rotor sweep height also showed the same temporal distribution as spring, however summer had higher activity. Overall, spring had higher activity at ground level in summer while the opposite is true for rotor sweep height.



Graph 3: Bar graph showing the mean number of bat passes per detector per hour at Ground Level and Rotor Sweep.

3.4 Discussion

The key findings from the first five months of pre-construction monitoring are that bat overall activity was moderate to high for most of the study period across the site at both ground level and rotor sweep for the Nama Karoo. Activity was particularly high at all heights in December and February. Thus, based on the data available, bats are at greatest risk to wind energy impacts during specific parts of summer and spring. However, risk levels vary across height, species, location, a night, and meteorological conditions, and this reveals a clearer picture of risk. These findings are only based on five months of pre-construction monitoring (during spring and summer). The overall impact of the WEF project on the current bat population (diversity and abundance) will only be determined once the full monitoring cycle has concluded (to include autumn and winter).

Bats were most active at ground level across almost every month (except for February at 50 m) and in both seasons while activity decreased with increasing height. Despite this, and because the risk for bats increases at the rotor sweep height band, the relatively high bat activity at 50 m throughout the monitoring period indicates a high risk to bats at this height for this site. At 100 m however, activity was observed to be medium risk at the site for the monitoring period.

Despite the high bat activity observed in summer and spring, number of passes changed with respect to time of night. At ground level, activity tended to peak earlier in the evening in spring while remaining relatively constant through-out the night in summer. Activity at rotor sweep height however, followed the same pattern for both spring and summer where activity gradually increased to peak in the middle of the night (23:00-00:00).

Species diversity is typical for arid regions in South Africa (Cooper-Bohannon et al. 2016) and is also consistent with respect to other projects in the area, where the Egyptian free-tailed bat was the most recorded species, followed by the Cape serotine. Several other bat species that are also susceptible to wind energy impacts are present in the study area. This includes three high risk species (Egyptian free-tailed bat, Cape serotine, and Zulu pipistrelle bat) and two medium risk species; including the Long-tailed serotine and Lesueur's wing-gland bat. Fatality records of the Egyptian free-tailed bat and Cape serotine specifically are known from operating wind farms across parts of South Africa (Doty and Martin 2012; Aronson et al. 2013; MacEwan 2016). All of these species have a Red List conservation status of least concern, however wind energy is an emerging impact which may not be fully considered yet by the Red List of Mammals of South Africa and IUCN Red List.

The Egyptian free-tailed bat accounted for 82 % of the total bat activity during the sample period and 97 % of rotor sweep height activity. This species is classified as high risk to wind energy development because its foraging ecology allows for activity in open areas, high above the ground where it may encounter wind turbine blades. At the met masts, activity at 100 m accounted for 14 % of activity, compared to 36 % at 50 m, and 50 % at 12 m, suggesting that free-tailed bats, at least based on the sampling period so far, may have reduced chances of encountering wind turbine blades because more of their activity is nearer ground level, below the rotor swept zone.

Within the Soyuz 2 boundary, bat activity at B7 (near a rocky ridge), B8 (near buildings and wetlands), B9 (near a rocky ridge and drainage line), B10 (near multiple important bat features), and B5_MET (in a rocky ridge corridor within 1 km of a farmhouse and cropland) were similar and high for Nama Karoo for all heights (Figure 2, Table 3). This data suggests that these topographies would have high sensitivity and that activity is evenly spread throughout this WEF site.

Due to the high activity observed from the data so far, measures to avoid risks to bats will be needed. Mitigation options that must be incorporated into the project to minimise the potentially higher risk during spring and summer can be categorised into avoidance and minimisation techniques. Avoidance includes buffering key habitats and considering turbine design so that potential interactions between bats and wind turbines are spatially limited as much as possible. Minimisation relates to mitigating residual impacts to bats primarily through various forms of curtailment[5] or by using ultrasonic deterrents.

4 EVALUATION OF SITE RISK

4.1 Risk to Bats and Mitigation Recommendations

WEFs have the potential to impact bats directly through collisions and barotrauma resulting in mortality (Horn et al. 2008; Rollins et al. 2012), and indirectly through the modification of habitats (Kunz et al. 2007b). Direct impacts pose the greatest risk to bats and, in the context of the project, habitat loss and displacement should not pose a significant risk (unless a large roost is discovered on site and bats are reluctant to leave this roost if disturbed) because the development footprint (i.e. turbines, roads) is small compared to the size of the project study area.

Direct impacts to bats will be limited to species that make use of the airspace in the rotor-swept zone of the wind turbines. Of the five species of bat that were recorded on site, three exhibit behaviour that may bring them into contact with wind turbine blades and they are potentially at risk of negative impacts if not properly mitigated, although the magnitude of these impacts is unknown at this stage.

Based on the preliminary 5 months of monitoring data, avoidance mitigation techniques have been incorporated by buffering key habitat features for bats. These include roosts (rocky crevices, trees and buildings), foraging resources (trees, drainage areas, and aquatic

[5] Curtailment – the act restricting normal operation of a wind turbine by slowing or stopping blade rotation for a period of time.

habitat) and commuting resources (drainage areas). The sensitivity of each buffer was determined relative to the different infrastructure elements incorporated into the project. Buildings, wetlands, farm dams and rocky crevices (including ridges) have all been buffered by 200 m, as per best practise guidelines (Figure 2). Drainage lines have been buffered by 100 m. All buffers are no-go for turbines to blade tip, **these may change as the monitoring continues and more ground truthing conducted on site**. As it stands, there are 9 turbines in highly sensitive areas in the current layout for Soyuz 2 WEF. Searches have been conducted in the accessible areas in the lower slopes and roosting potential ranged from negligible to moderate. No bat roosts have been found on site to date.

While these buffers may be effective in helping to avoid interactions between clutter-edge bats and wind turbines, the open-air bats, particularly the Egyptian free-tailed bat, were more active proportionately at rotor sweep height compared to ground level. An additional mitigation that could be used to avoid impacts to bats is the choice of wind turbine technology. Evidence of a relationship between turbine size and bat fatality is equivocal. Some evidence suggests that larger turbines kill more bats (Baerwald and Barclay 2009), or that as the distance between the blade tips and the ground increases, bat fatality decreases (Georgiakakis et al. 2012). However, other studies have found no evidence that turbine height or the number of turbines influences bat mortality (Berthinussen et al. 2014; Thompson et al. 2017). Some species in South Africa that are not adapted for flight at height have suffered mortality from wind turbines (e.g. the Cape serotine), suggesting that some bats may be killed in the lower edge of the rotor swept zone. The data presented in this report corroborates this as higher activity was seen at 12 m when compared to that recorded at height. However, overall activity at 50 m on site is also relatively high for the Nama Karoo ecoregion. Therefore, using taller towers and limiting the rotor diameter so that the minimum distance between the blades and the ground is maximised, and preferably higher than 50 m, could help to mitigate some impacts and reduce the likelihood of reaching threshold bat fatalities as turbines with a lower ground clearance run the risk of reaching the fatality thresholds sooner.

Blade feathering must be implemented as soon as operation begins (as this mitigation has no impact on energy production) and an operational bat monitoring study must also be carried out according to the latest South African Bat Assessment Association (SABAA) bat operational monitoring guidelines and an appropriately qualified bat specialist as soon as turbines become operational.

4.2 Cumulative Impacts

At least 5 onshore wind facilities and onshore wind/solar PV combined facilities are being considered according to the DFFE Renewable Energy database (Q4 2021) in this cumulative 50 km region.

Cumulative impacts on bats could increase as new facilities are constructed (Kunz et al. 2007b) but are difficult to accurately predict or assess without baseline data on bat population size and demographics (Arnett et al. 2011; Kunz et al. 2007b) and these data are lacking for many South African bat species. It is possible that cumulative impacts could be mitigated with the appropriate measures applied to wind farm design and operation. Cumulative impacts could result in declines in populations of even those species of bats currently listed as Least Concern, if they happen to be more susceptible to mortality from wind turbines (e.g. high-flying open air foragers such as free-tailed and fruit bats) even if the appropriate mitigation measures are applied. Further research into the populations and behaviour of South African bats, both in areas with and without wind turbines, is needed to better inform future assessments of the cumulative effects of WEFs on bats.

4.3 Residual Impacts

Curtailment and using deterrents are the remaining mitigation measures to reduce residual impacts during operation and must be continuously refined and adapted based on incoming bat fatality data during the operational phase of the WEF. They can be used to mitigate residual impacts to high-flying species such as the Egyptian free-tailed bat, or other species that are impacted upon. Given the relatively high bat activity recorded at times in parts of the study area, these techniques may be needed during the operation phase depending on bat fatality. Both mitigation measures are known to reduce bat fatality (Arnett and May 2016; Arnett et al. 2011; Hayes et al. 2019; Romano et al. 2019; Weaver et al. 2020).

Curtailment techniques that can be considered are raising the cut-in speed and, if needed, shutting down turbines. Alternative options include using a smart curtailment approach. Smart curtailment analyses bat activity and meteorological data to make near real-time curtailment decisions when bats are detected in an area and can reduce the curtailment time required to reduce impacts to bats (Hayes et al. 2019). The exact choice will depend on the scale of the impact, and this must be evaluated against threshold levels (MacEwan et al. 2018).

Because so little is known about migration routes, fecundity rates and population numbers of bats in South Africa the fatality threshold is an ongoing discussion but is usually influenced by natural mortality of bat species, density dependent factors, activity levels per ecoregion, percent loss to natural declines and size of the site. Research suggests above 2% additional losses to bat populations from anthropogenic pressures in a particular ecoregion, bat populations start to decline. These losses can be calculated according to The South African Bat Assessment Association fatality threshold guidelines. Thresholds calculated for the Soyuz 2 WEF equate to an estimate of 760 bat fatalities[6] per least concern insectivorous bat species or family per annum. Should this value be exceeded, curtailment or deterrents must be applied. In addition, if one fatality for various conservation important species occurs during a 12-month period, these mitigation measures will also need to be applied (refer to MacEwan et al. 2020 for species list). The probability that a conservation important species will trigger mitigation is low since none have been recorded at the site thus far. The threshold calculations must be done at a minimum of once a quarter (i.e. not only after the first year of operational monitoring) and by an appropriate bat specialist so that mitigation can be applied as quickly as possible should thresholds be reached.

If curtailment or deterrents are needed based on threshold values being exceeded, their use would be confined to specific periods of the year and under specific meteorological conditions. A curtailment plan for the Soyuz 2 WEF will be created using the full year of bat monitoring and meteorological data once the study has concluded and will be included in the final environmental impact assessment report.

5 PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT

Only five months of pre-construction data have been collected, analysed and included in this report. **As such, these findings are <u>preliminary and subject to change, following further on-site assessments made during the projects' respective EIA phase</u>**. Such on-site assessments will be conducted to refine bat constraint recommendations for the WEF layout and included in the final Bat Impact Assessment Report. Once the full year of monitoring has been conducted, all data (inclusive of acoustic recording data and on-site field observations) will be analysed and included in the Environmental Impact Assessment, where the potential impacts will be assessed based on the methodology provided by the Environmental Assessment Practitioner (EAP), CES. A significance rating and impact assessment will be determined for each impact and

[6] Assuming an area of influence of 37,998 hectares, and a threshold of 0.20 bats per hectare for the Nama Karoo ecoregion.

mitigation measures provided where appropriate. For each impact, the significance will be determined by identifying the status, extent, duration, consequence, probability of occurrence, and reversibility of the impact (as well as the irreplaceability of resource loss) in the absence of any mitigation ('without mitigation'). Mitigation measures will be identified and the significance will be re-rated, assuming the effective implementation of the mitigation ('with mitigation'). Any comments received during the scoping phase will be addressed and incorporated into the EIA Report.

Cumulative impacts will be assessed as the incremental impact of the proposed activity on the baseline, when added to the impacts of other past, present or reasonably foreseeable future activities in 50 km radius.

The outcome of the EIA study will be a description of bat activity at the proposed project, an evaluation of potential risks/impacts to bats (including cumulative impacts), and design mitigation measures to reduce impacts, including an environmental management plan for the project.

6 CONCLUSION

Bat activity at the proposed Soyuz 2 WEF was generally high in summer and spring for the Nama Karoo ecoregion. However, there is lack of structural complexity in the habitat, lack of evidence of roosts and typically low species diversity for the area. Only five months of monitoring data has been collected thus far, and a full year is needed to determine overall site sensitivity.

Free-tailed bats and Cape serotine bats are likely to face the highest risk of impacts due to their prevalence. Sensitive design and mitigation will be needed to reduce risk to these bats. Sensitive areas including those used by bats for foraging, roosting and commuting should be avoided for turbine placement (Figure 2). The choice of turbine design, specifically, the hub height and rotor diameter, should be carefully chosen to reduce potential interactions between bats and turbine blades. The hub-height should be maximized with the lowest possible blade length and should, ideally, not be lower than 50 m, as turbines with a lower ground clearance run the risk of reaching the fatality thresholds sooner.

Blade feathering[7], curtailment and deterrents are the remaining mitigation measures to reduce residual impacts during operation and must be continuously refined and adapted based on incoming bat fatality data. Blade feathering must be implemented as soon as operation begins.

The preliminary data suggests that there could be a risk to bats posed by wind energy development at the site, particularly in spring and summer. However, the full year of monitoring data is needed to adequately assess the risk to bats associated with the Britstown Wind Farm Cluster (and Soyuz 2 WEF). As such, the **results in this report are considered preliminary and subject to change, following further on-site assessments made during the projects' respective EIA phase**. This full impact assessment will be included in the final Bat Impact Assessment Report and all conclusions will be made. Despite this, and provided the above considerations are met, development of wind energy at the proposed Soyuz 2 is compatible with bat conservation and the application process can proceed to the EIA phase.

[7] Blade feathering includes facing the turbines into the wind below generation cut in speed, preventing the blades from turning unnecessarily.

7 REFERENCES

ACR, 2020. African Chiroptera Report 2020. AfricanBats NPC, Pretoria. i-xvi + 1-8028 pp.

Adams, A. M., M. K. Jantzen, R. M. Hamilton, and M. B. Fenton. 2012. Do you hear what I hear? Implications of detector selection for acoustic monitoring of bats. Methods in Ecology and Evolution 3:992-998.

Arnett, E.B., Hein, C.D., Schirmacher, M.R., Baker, M., Huso, M.M.P., Szewczak., J.M., 2011. Evaluating the effectiveness of an ultrasonic acoustic deterrent for reducing bat fatalities at wind turbines. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.

Arnett, E. B. and R. F. May. 2016. Mitigating Wind Energy Impacts on Wildlife: Approaches for Multiple Taxa. Human–Wildlife Interactions: Vol. 10: Iss. 1, Article 5.

Aronson, J.B., Thomas, A.J., Jordaan, S.L., 2013. Bat fatality at a wind energy facility in the Western Cape, South Africa. African Bat Conservation News 31, 9-12.

Cooper-Bohannon, R., Rebelo, H., Jones, G., Cotterill, F., Monadjem, A., Schoeman, M.C., Taylor, P., Park, K., 2016. Predicting bat distributions and diversity hotspots in southern Africa. Hystrix 27, 47-57.

Doty, A.C., Martin, A.P., 2012. Assessment of bat and avian mortality at a pilot wind turbine at Coega, Port Elizabeth, Eastern Cape, South Africa. New Zealand Journal of Zoology, 1-6.

Hayes, J.P., 1997. Temporal Variation in Activity of Bats and the Design of Echolocation-Monitoring Studies. Journal of Mammalogy 78, 514-524.

Hayes, M., L. Hooton, K. Gilland, C. Grandgent, R. Smith, S. Lindsay, J. Collins, S. Schumacher, P. Rabie, J. Gruver, and J. Goodrich-Mahoney. 2019. A smart curtailment approach for reducing bat fatalities and curtailment time at wind energy facilities. Ecological Applications.

Kunz, T.H., Arnett, E.B., Cooper, B.M., Erickson, W.P., Larkin, R.P., Mabee, T., Morrison, M.L., Strickland, M.D., Szewczak, J.M., 2007. Assessing impacts of wind-energy development on nocturnally active birds and bats: A guidance document. The Journal of Wildlife Management 71, 2449-2486.

MacEwan, K., 2016. Fruit bats and wind turbine fatalities in South Africa. African Bat Conservation News 42.

MacEwan, K., Aronson, J., Richardson, E., Taylor, P., Coverdale, B., Jacobs, D., Leeuwner, L., Marais, W., Richards, L. 2018. South African Bat Fatality Threshold Guidelines – ed 2. South African Bat Assessment Association.

MacEwan, K., Aronson, J., Richardson, E., Taylor, P., Coverdale, B., Jacobs, D., Leeuwner, L., Marais, W., Richards, L. 2020. South African Bat Fatality Threshold Guidelines: Edition 3. Published by the South African Bat Assessment Association.

Monadjem, A., Taylor, P.J., Cotterill, F.P.D., Schoeman, M.C., 2010. Bats of Southern and Central Africa: A Biogeographic and Taxonomic Synthesis. Wits University Press, Johannesburg.

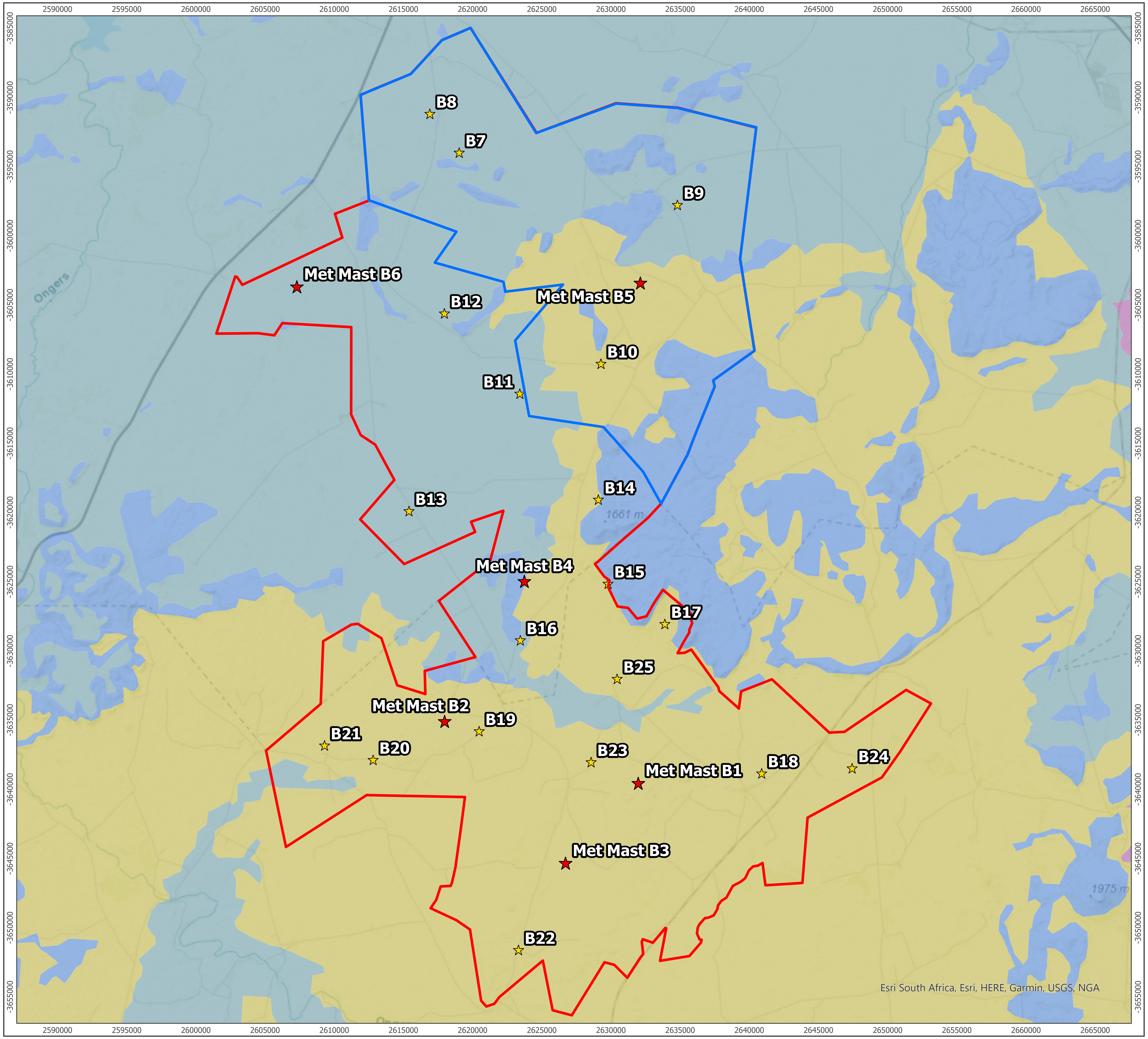
Mucina, L. and M. C. Rutherford. 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Romano, W. B., J. R. Skalski, R. L. Townsend, K. W. Kinzie, K. D. Coppinger, and M. F. Miller. 2019. Evaluation of an acoustic deterrent to reduce bat mortalities at an Illinois wind farm. Wildlife Society Bulletin 43:608-618.

Thomas, D.W., 1988. The distribution of bats in different ages of Douglas-Fir forests. The Journal of Wildlife Management 52, 619-626.

Weaver, S. P., C. D. Hein, T. R. Simpson, J. W. Evans, and I. Castro-Arellano. 2020. Ultrasonic acoustic deterrents significantly reduce bat fatalities at wind turbines. Global Ecology and Conservation:e01099.

Figures



ARCUS

Britstown Study Area	
Soyuz 2 Site Boundary	
Short Masts	
MET Masts	
Vegetation Type	
Besemkaree Koppies Shrubland	
Eastern Upper Karoo	
Northern Upper Karoo	
Upper Karoo Hardeveld	

1:265,000 Scale @ A3

0 5 10 km

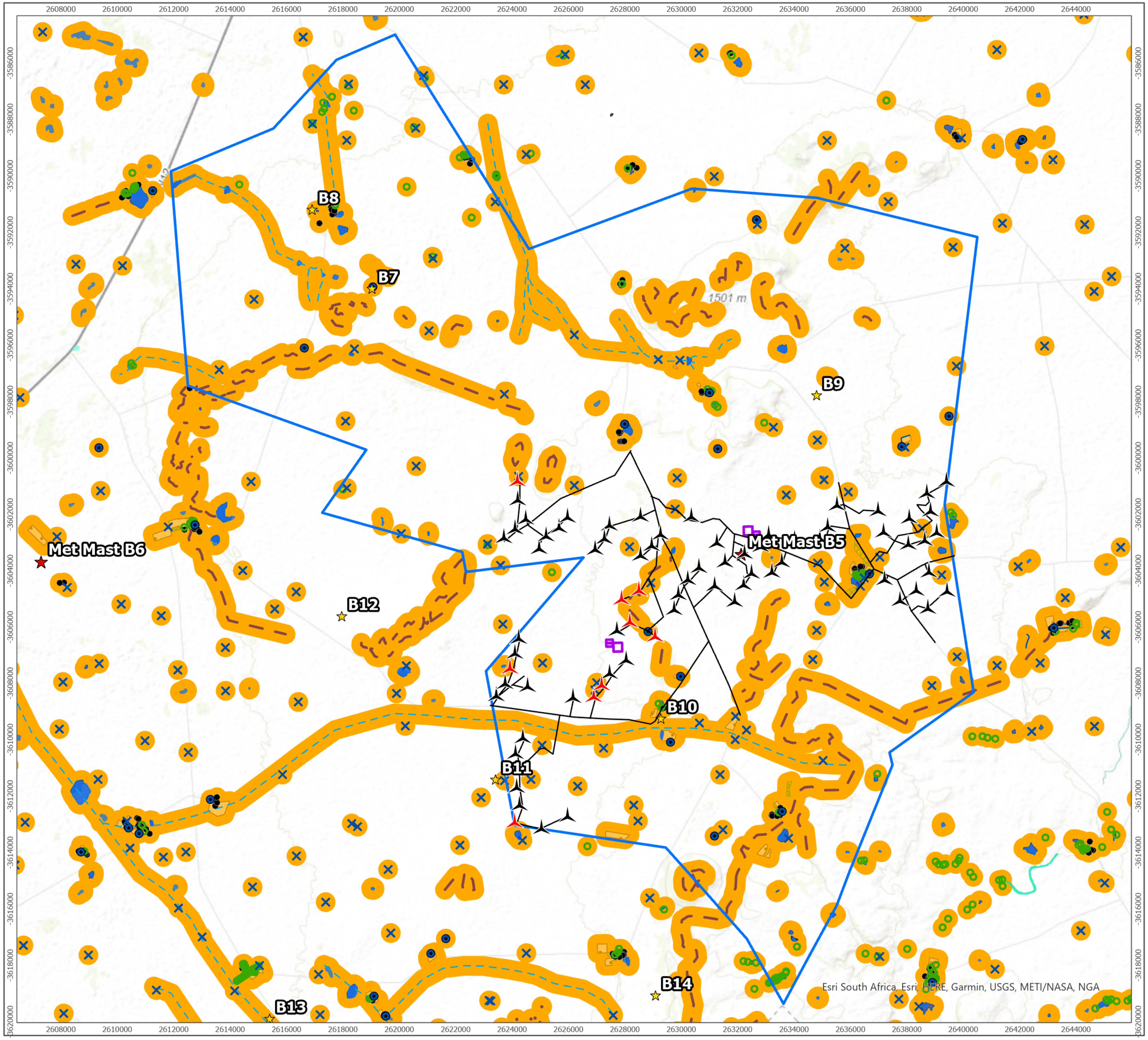
NORTH

Produced By: MH	Ref: 4331-GIS-004
Checked By: MB	Date: 8/3/2022

Site Location Map
Figure 1

Britstown WEF Cluster
Soyuz 2 WEF
Scoping Report

G:\Projects\4331 Britstown WEF Bat Monitoring\4331 Britstown WEF Bat Monitoring_Update.aprx\4331-GIS-004 Fig 1 Soyuz 2 Site Location Map



ARCUS

Soyuz 2 Site Boundary
Proposed Turbines
Proposed Turbine Within Buffer
Roads
Associated Infrastructure
Preliminary High Sensitivity Area

Monitoring Locations
Short Masts
MET Masts

Important Bat Feature
House
Tree
Water Reservoir
Wind Pump
Furrow
Non-Perennial River Centre line
Rocky Outcrop
NFEPA Wetlands
NBA Artificial Wetlands
Dam
Non-Perennial River
Non-perennial pan
Cultivated Land
Orchard / Vineyard

1:130,000 Scale @ A3

0 2.5 5 km

NORTH

Produced By: MH	Ref: 4331-GIS-005
Checked By: MB	Date: 8/24/2022

Preliminary Bat Constraints Map
Figure 2

Britstown WEF Cluster
Soyuz 2 WEF
Scoping Report

G:\Projects\4331 Britstown WEF Bat Monitoring\4331 Britstown WEF Bat Monitoring_Update.aprx\4331-GIS-005 Fig 2 Soyuz 2 Site Bat Constraints Map

Appendix 1: Site Sensitivity Verification Report

BAT SITE SENSITIVITY VERIFICATION REPORT

for the

PROPOSED SOYUZ 2 WIND ENERGY FACILITY, NORTHERN CAPE PROVINCE.

Introduction

The National Gazette, No. 43110 of 20 March, 2020: "National Environmental Management Act (107/1998) 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 Act ('the Regulations'), when applying for Environmental Authorisation" includes the requirement that a Site Sensitivity Verification must be produced. The outcome of the Initial Site Sensitivity must be provided in a report format which:

a) Confirms or disputes the current use of the land and environmental sensitivity as identified by the national web based environmental screening tool;

b) Contains a motivation and evidence of either the verified or different use of the land and environmental sensitivity; and

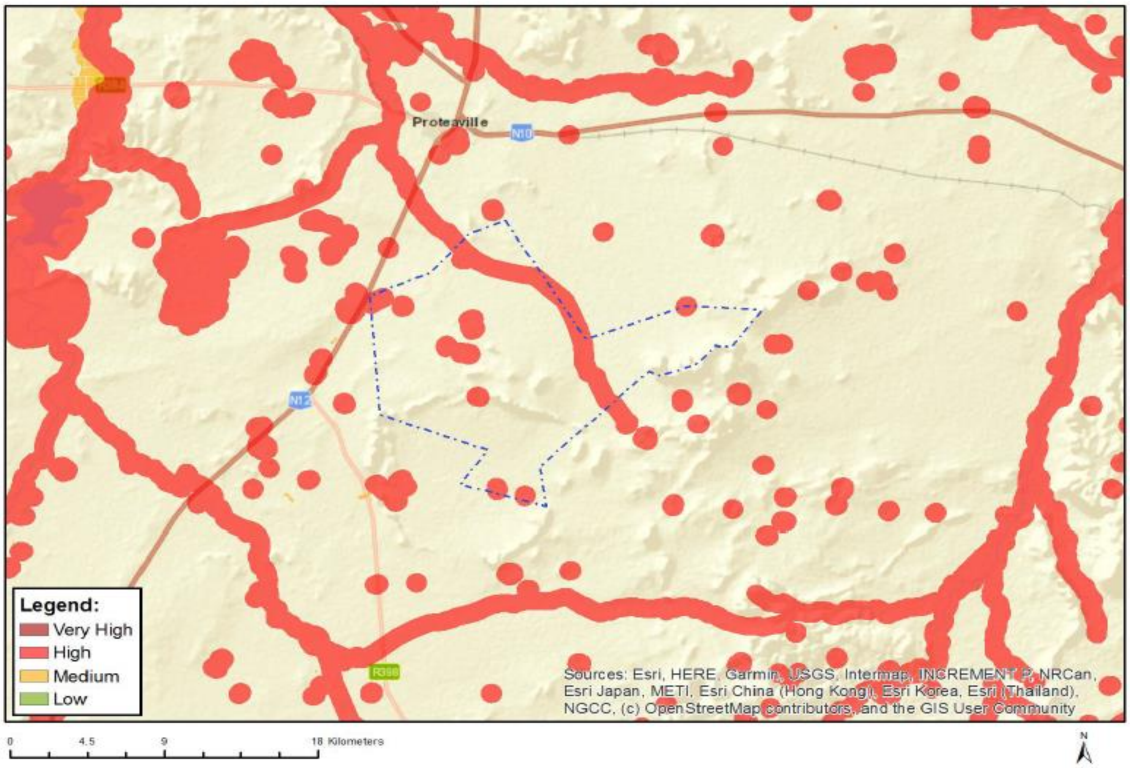
c) Is submitted together with the relevant reports prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

This initial site sensitivity report is produced to consider only the bats theme and to address the requirements of a) to c) above.

Initial Site Verification

Based on the DFFE Screening Tool, the Soyuz 2 WEF development footprint contains areas of high and medium sensitivity as it is within 500 m of a river or wetland features and croplands (Figure 1).

MAP OF RELATIVE BATS (WIND) THEME SENSITIVITY



MAP OF RELATIVE BATS (WIND) THEME SENSITIVITY

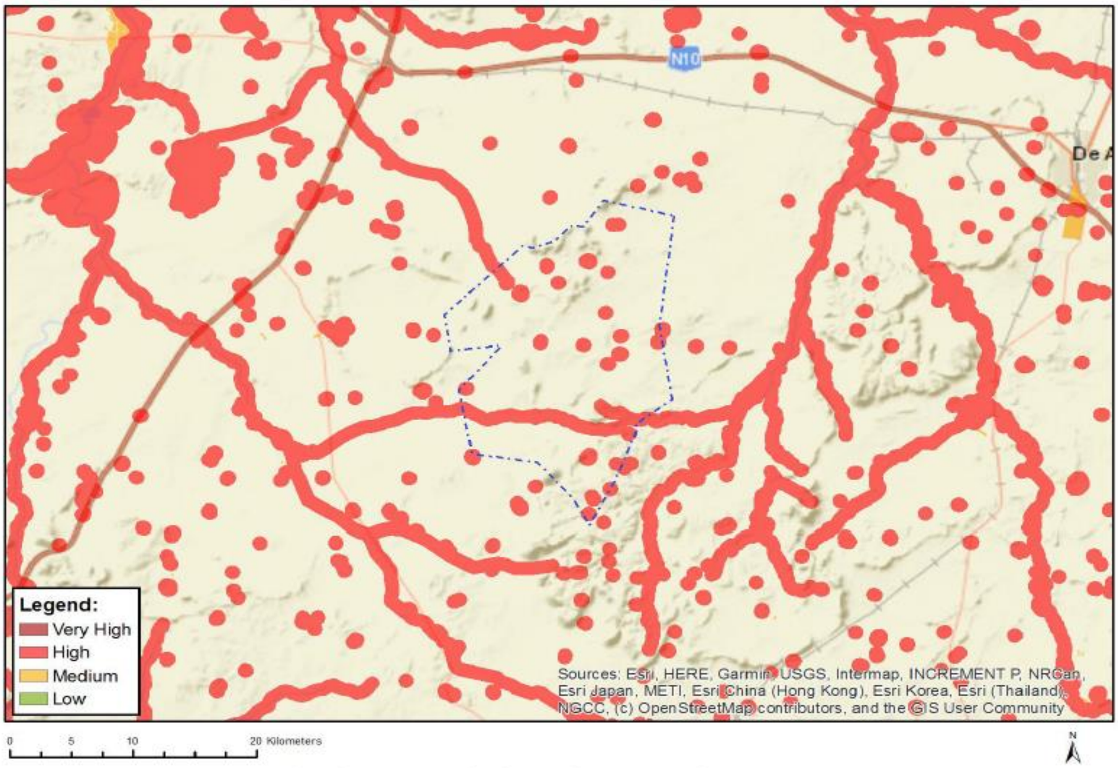


Figure 1: DFFE Screening Tool outcome for the bats (wind) theme Soyuz 2 WEF

The baseline environment for bats at the proposed development site was defined by conducting a desktop study of available bat locality data, literature and mapping resources for the proposed Soyuz 2 Wind Energy Facility. This information was examined to determine the potential location and abundance of bats, including their potential habitats which may be sensitive to the Soyuz 2 WEF development.

Outcome of the Initial Site Verification

After the selected resources were mapped, they were aggregated to produce a preliminary constraints map for the development, under the assumption that areas where resources are concentrated would be more important for bats. The site has been visited three times between October 2021 and April 2022 to confirm the existence and suitability of such resource areas. Once confirmed, these constraints were aggregated into the preliminary constraints map (Figure 2).

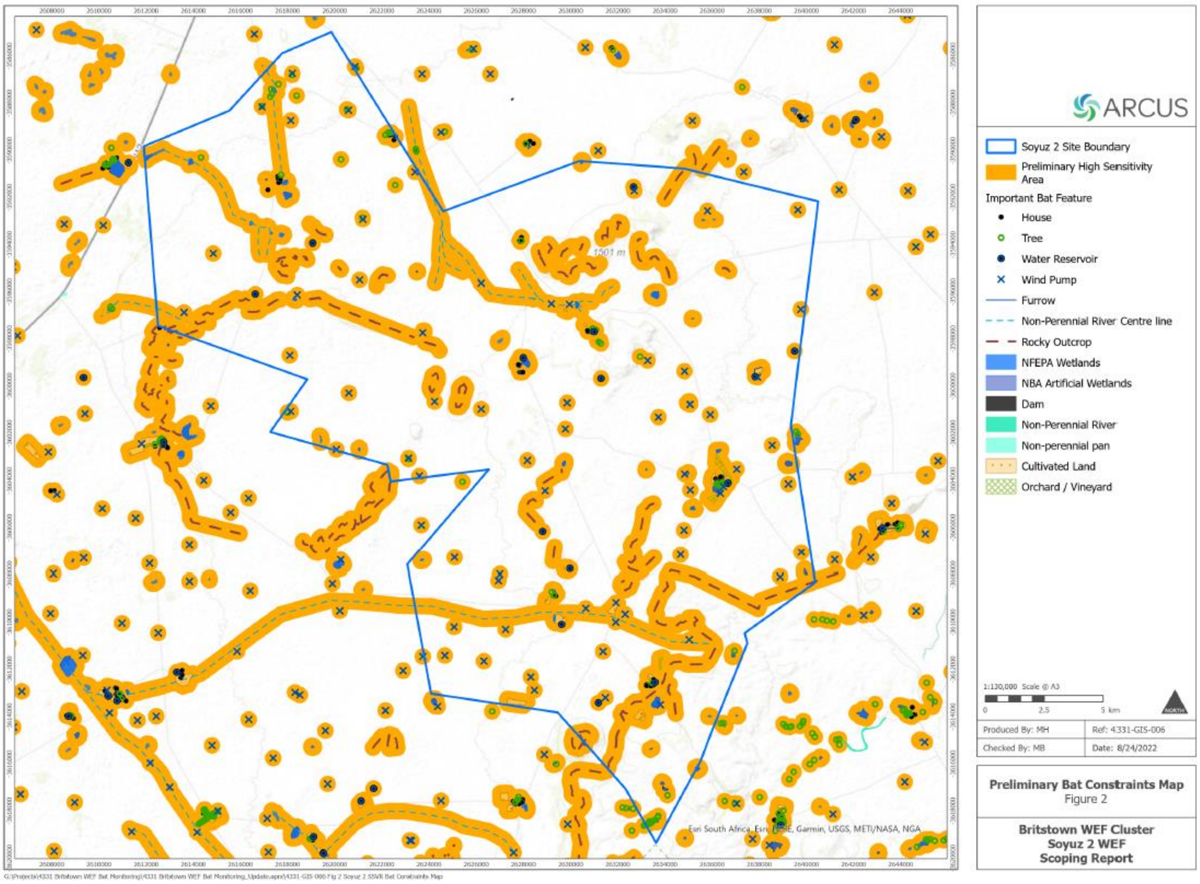


Figure 2: Initial Site Sensitivity Constraints Map

The methodology, as described above, which was used to determine the sensitivity of identified features, confirmed the presence of high sensitivity areas (as identified by the screening tool), but the range of these areas do not have the same extent and have subsequently been reassessed and refined into a **preliminary constraints map – subject to change following further on-site assessments**. Some drainage lines were deemed unessential for bats and some water features were absent while some were present. Rocky outcrops were also noted and added as a high sensitivity feature. As such, the site can be confirmed as medium sensitivity, with areas of high sensitivity for the local bat community.

In conclusion, the DFFE Screening Tool identified a similar overall sensitivity rating within the development footprint, namely, medium-high with areas of high, medium and low sensitivity. The high sensitivity areas, in the specialist's opinion, should be considered as No-Go for turbine infrastructure, with the remainder of the site being defined as having a medium to low sensitivity for bats. **This is based on the current iteration of site sensitivities and could be subject to change**.

The above environmental sensitivity ratings will be taken forward, refined and considered in the bat impact assessment report. Appropriate layout and development restrictions will be implemented, as required.

Appendix 2: Specialist Declaration and CV

CURRICULUM VITAE

Craig Campbell *(Pr. Sci. Nat – Ecological Sciences)*

Ecologist

Email: craigc@arcusconsulting.co.za

Specialisms

- Bird and Bat baseline assessments
- Field Research
- Project Management
- Reporting and GIS analysis

Summary of Experience

Craig is an Ecologist at Arcus. He graduated with a Degree in Conservation Ecology from Stellenbosch University, South Africa. He is registered as a Professional Natural Scientist, in the field of Ecological Sciences (SACNASP). Since 2013, Craig has had extensive experience in ecological baseline studies, biodiversity monitoring surveys and due diligence on several renewable energy and other projects in South Africa, Mozambique, Portugal and Turkey. He has a sound background in management and ecology, and also focusses on project design & layout, GIS mapping, report compilation and stakeholder engagement.

Professional History

- Mar 2021 to present - Ecologist, Arcus Consultancy Services, Cape Town
- Aug 2017 to Mar 2021 – National Manager & Senior Ecologist, Bioinsight, Cape Town
- Nov 2013 to Aug 2017 – Ecologist, Bioinsight, Cape Town

Qualifications

University of Stellenbosch

2009-2013 BSc (hons) Conservation Ecology

2008-2009 Certificate in Aquaculture Production Management

Project Experience

<u>Pre-Construction Monitoring and/or Impact Assessment</u>

- Kudusberg Wind Energy Facility
- Sere Wind Energy Facility
- Boulders Wind Energy Facility
- Vredendal Wind Energy Facility
- Juno Wind Energy Facility
- Hartebeest Wind Energy Facility
- Rondekop Wind Energy Facility
- Noblesfontein 2 & 3 Wind Energy Facilities
- Haga Haga Wind Energy Facility
- Somerset East Wind Energy Facility
- Spitskop West Wind Energy Facility
- Witsand Wind Energy Facility
- Gouda 2 Wind Energy Facility
- Stormberg Wind Energy Facility
- Kruispad, Doornfontein and Heuningklip Photovoltaic Solar Energy Facilities
- Chelsea Photovoltaic Solar Energy Facility
- Springhaas Photovoltaic Solar Energy Facilities
- Kappa-Sterrekus Powerline Corridor Alignments
- Namaacha Wind Farm, Mozambique

<u>Operational Monitoring – Wind Energy Facility</u>

- Noblesfontein Wind Energy Facility
- Sere Wind Energy Facility
- Nxuba Wind Energy Facility
- West Coast 1 Wind Energy Facility

<u>Due Diligence</u>

- Bird monitoring at Kiyikoy Wind Energy Facility, Turkey