BAT SITE WALK-THROUGH REPORT FOR THE GREAT KAROO WIND ENERGY FACILITY NEAR SUTHERLAND, NORTHERN CAPE PROVINCE

DEFF REF: 12/12/20/2370/3/AM1, AM2, AM3

On behalf of

SAVANNAH ENVIRONMENTAL (PTY) LTD

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1 INTRODUCTION

Great Karoo Wind Farm (Pty) Ltd (the applicant) received Environmental Authorisation (EA) from the Department of Forestry, Fisheries and the Environment (DFFE) for the construction and operation of the Great Karoo Wind Energy Facility (WEF) (the development) near Sutherland in the Northern Cape Province, (DFFE Ref: 12/12/20/2370/3) on 12 August 2014.

Following advances in technology since the issuing of the EA, the applicant requested that the DFFE amend the project description and layout, access and turbine specifications of the Great Karoo WEF which was authorised on 25 July 2016 (DFFE Ref: 12/12/20/2370/3/AM1). An amendment application to extend the validity period of the EA by two years was authorised on 5 May 2017 (DFFE Ref: 12/12/20/2370/3/AM2). In 2019 the EA was amendment again, due to change in turbine specifications, number of turbines and extending the validity of the EA (DFFE Ref: 12/12/20/2370/3/AM3).

As part of the 2019 EA amendment process, Savannah Environmental Pty (Ltd) (Savannah) were appointed by the applicant to compile the Amendment Application and Assessment for the development, and thus appointed Arcus Consultancy Services (Pty) Ltd (Arcus) to compile a Bat Amendment Report (July, 2019).

A condition of the Environmental Authorisation issued in 2019 is "a bat specialist must assess the final layout and must provide input and recommendation for the placement of turbines". Savannah have appointed Arcus to fulfil this requirement by conducting a site walkthrough and micro siting exercise.

Consequently, this report serves to fulfil this condition by providing feedback on the various observations made by Arcus during the site visit, which includes specialist mapping and design comment based on the site walk-through findings.

1.1 Project Details

The authorised Great Karoo Wind Energy Facility (as assessed in this report) comprises of 36 Wind Turbine Generators (WTG) with a contracted capacity of up to 140 MW. To achieve this, the WTG's that have been selected have rotor diameters of up to 180 m, with their hub heights being up to 150 m. Additional infrastructures include:

- Concrete foundations to support the turbines;
- Cabling between the turbines;
- Laydown areas;
- Internal access roads;
- An on-site substation, workshop, control, administration and security facilities; and
- Temporary construction compound and temporary site offices.
- 132kV overhead powerline to connect the wind farm to the Eskom Hidden Valley Substation.

The development site is located ~50 km south of Sutherland and includes: Farm Kentucky 206 and Portion 1 (Welgemoed) of the farm Wolvenkop 207. The powerline properties includes Portion 1 of the Farm Orangefontein No. 203 and the Farm De Hoop No. 202

2 TERMS OF REFERENCE

The terms of reference for the site walk-through, as agreed on in discussion with Savannah were to:

- Conduct a walk-through of the development over a period of 3-days.
- Confirm the applicability of the buffer distances, as recommended in the addendum report.

- Compile a report which confirms the applicability of mitigation measures recommended in the addendum report based on on-site observations.
- Mapping.
- Statement on the final design layout of the development.

2.1 Assumptions and Limitations

It is emphasised that information, as presented in this report, only has bearing on the development site as indicated on the accompanying maps. This information cannot be applied to any other area, however similar in appearance or any other aspect, without proper investigation by an appropriate bat specialist.

2.2 Relevant Legislation and Guidelines

The following policies and guidelines have informed the methodologies employed during the site visit and walk-through and will ensure the Developer meets all legislative requirements regarding construction and operation of the Great Karoo WEF.

- Chapter 1 of the National Environmental Management Act, 1998 (NEMA) (Act 107 of 1998).
- 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)
- Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009)
- The Equator Principles (2013)
- The Red List of Mammals of South Africa, Swaziland and Lesotho (2016)
- National Biodiversity Strategy and Action Plan (2005)
- South African Best Practice Guidelines for Pre-construction Monitoring of Bats at Wind Energy Facilities - ed 5. South African Bat Assessment Association of June 2020.
- South African Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy Facilities – ed 2. South African Bat Assessment Association of June 2020.

3 REVIEW OF DATA COLLECTED TO DATE

Based on the pre-construction monitoring data captured by Animalia (2014), bat activity at the site was considered low. The most common species on site are the Egyptian Free-tailed bat and Cape Serotine which accounts for approximately 50% and 49% of the bat passes respectively. The Natal long-fingered bat which is a migratory species, occurs in low numbers and only account for approximately 1% of total bat passes. Robert's flat-headed bat was confirmed on site, although there were only 44 bat passes for this species.

Bat activity was generally higher in the valleys compared to the surrounding hills where the turbines are proposed. Bat activity was lower at 50 m compared to ground level and generally had less than one bat pass per night. Spring had the highest bat activity with a peak in October.

Features used to create the sensitivity map includes watercourses, dams and clumps of trees. In terms of buffers, the original assessment (Animalia, 2014) stipulated a 100 m buffer from blade tip to the nearest feature of moderate sensitivity which includes foraging habitat or roosting sites expected to have higher risk of impacting local bats. High sensitivity areas which are critical for resident bat populations with elevated levels of bat activity and greater bat diversity compared to the rest of the site, requires a 500 m buffer to blade tip and are no-go areas and turbines must not be placed in these areas.

No bat activity data is available in the area between the heights of 10 m and 50 m, between 50 m and 80 m, or over 80 m. Despite the available pre-construction monitoring data showing that bat activity at 50 m and 80 m is low, it would be preferential to maximize the distance between the ground and blade tips by using turbines with the shortest possible blades and the highest possible hub height. This would reduce the number of species potentially impacted upon by turbine blades during the operational phase. It would also be preferential to use shorter blades so that they don't intrude into higher airspaces and in so doing reduces the potential impact to high flying species such as free-tailed bats. Despite the low activity at height, increasing evidence suggests that bats actively forage around wind turbines (Cryan et al. 2014; Foo et al. 2017) so the installation of turbines in the landscape may alter bat activity patterns, either by increasing activity at height and/or increasing the diversity of species making use of higher airspaces.

4 PURPOSE AND AIM OF THE SITE VISIT

The aim of the site visit was to conduct a site walk-through and micro-siting process to ground truth important bat features. Further to this the site visit was conducted to ensure that all turbine blades and other infrastructure are positioned outside of their respective bat sensitivity buffers.

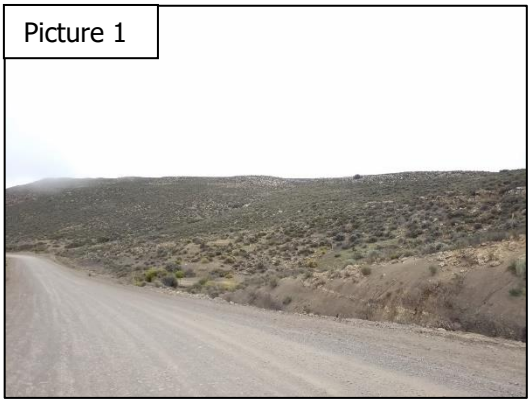
5 METHODOLOGY

The site walk-through visit took place from 27 May to 30 May 2021. Important bat features, sensitivities and final layouts were loaded onto the ArcCollector app to ground truth the features and update the sensitivities accordingly. The positions of the turbines, powerlines, roads, substation and O&M building were prioritised. Additionally, habitats with roosting potential were identified beforehand and inspected for possible bat roosts which included rocky outcrops, cliffs, buildings and trees.

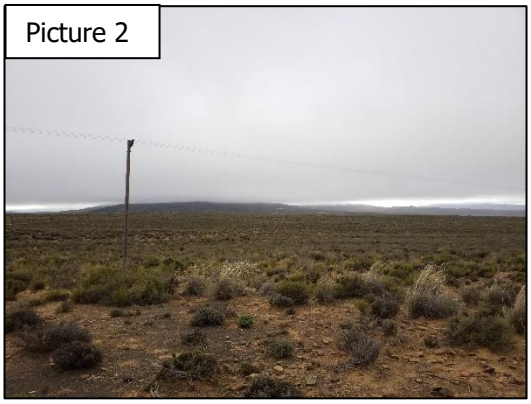
6 ON-SITE OBSERVATIONS

The powerline corridor (Figure 1) is mostly located on undulating hills above with the last section going down into a valley with low roosting potential for bats (Picture 1-2). The site is characterised by hills and valleys, the turbines are proposed for the top of hills (Picture 3-4) where bat activity is expected to be low. Where drainage lines cross rocky outcrops and result in cliffs, might be suitable roosting habitat for bats. Although no bats were found roosting here, it is still considered to be of medium sensitivity (Picture 3). The valleys offer more suitable foraging habitat for bats especially around watercourses (Picture 3, 5-6). The bat sensitive areas are mostly around drainage lines with established riparian vegetation, water points and cliffs (Figure 1).

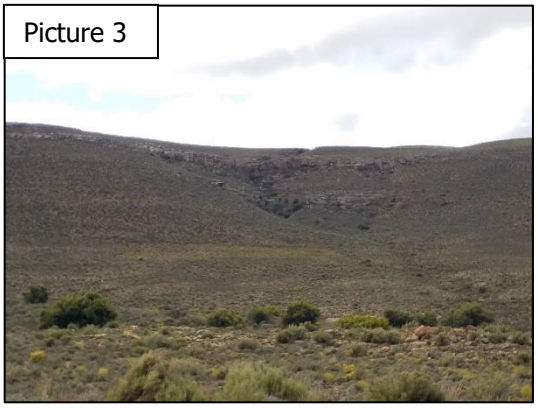
Picture 1



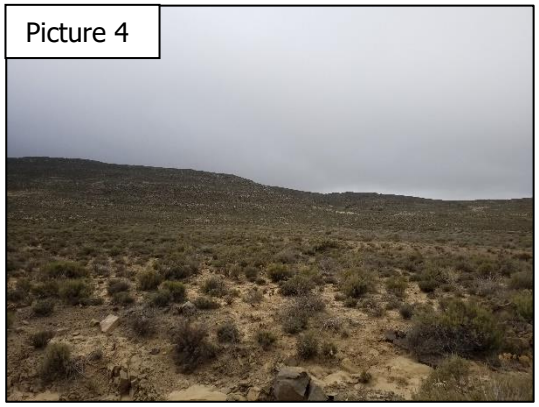
Picture 2



Picture 3



Picture 4



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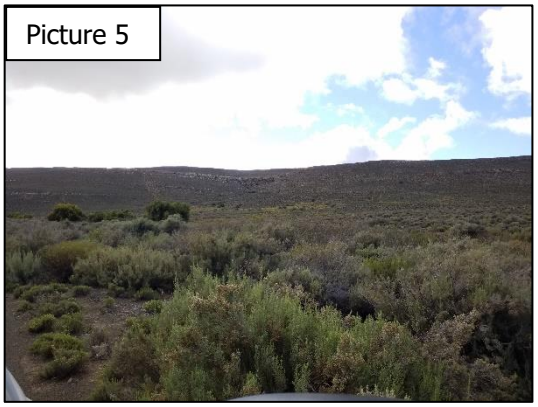
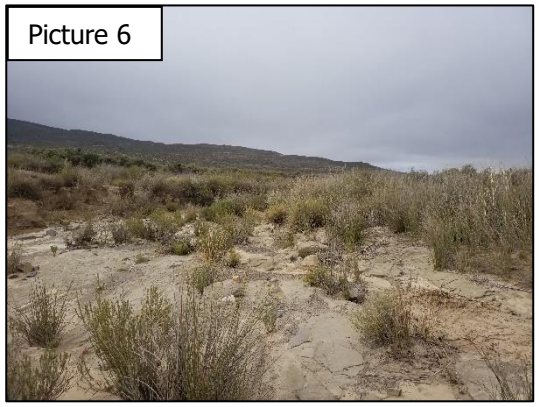


Picture 6



7 RECOMMENDATIONS AND CONCLUSION

The original high sensitivity (No Go) buffers suggested by the pre-construction monitoring report was 500 m and the medium sensitivity buffers were 100 m. These buffers are to blade tip. To get the distance to the turbine base, to assist with placement of the turbines, the following formula was used, as per the turbine amendment bat report (Mitchell-Jones and Carlin 2014):

$$b = \sqrt{(bd + bl)^2 - (hh - fh)^2}$$

Where: bd = buffer distance, bl = blade length, hh = hub height and fh = feature height (zero in this instance)

Based on the current turbine dimensions with a hub height of 150 m and a rotor diameter of 180 m, the bat sensitivity buffers are 571 m and 117 m to turbine base respectively. The

observations made on site confirm that the buffers are sufficient, and no turbine blades are located within bat high sensitivity buffers and adheres to the updated sensitivity map. Even though the current dimensions are acceptable, if the dimensions were to change in the future, a bat specialist should be consulted to make sure that no turbine blades are within any bat sensitivity buffers. Additionally, no turbines are located within medium sensitivity buffers (Figure 1). These buffers are not applicable to the construction of powerlines, access roads and buildings.

The updated layout adheres to the current delineated site-specific bat sensitivity areas. Conditions 13.2 and 49 of the EA requires a generic 150 m and 100 m buffer respectively between watercourses, ridge edges and the turbine/construction activities. The delineated site-specific bat sensitivity areas are more accurate and more appropriate for the site compared to generic 150 m/100 m buffers. In light of this, Arcus is of the opinion that potential impacts to bats would be best managed and mitigated by adhering to the site-specific bat sensitivity areas, and therefore Condition 13.2 and 49 are now replaced by these updated buffers. As per the mitigation measures stipulated in this report and which have been included in the updated EMPr, any potential formal layout amendment process, in future, is to include inputs from a suitably qualified bat specialist, in order to review/reassess and potentially recalculate appropriate bat sensitivity buffers.

All mitigation measures and findings proposed by Animalia (2014) and in the addendum report (Arcus 2019) remain valid and the impact of turbines on bats remains low after mitigation. The current turbine positions as assessed in the site walk through and presented in this report are acceptable and approved from a bat perspective.

8 REFERENCES

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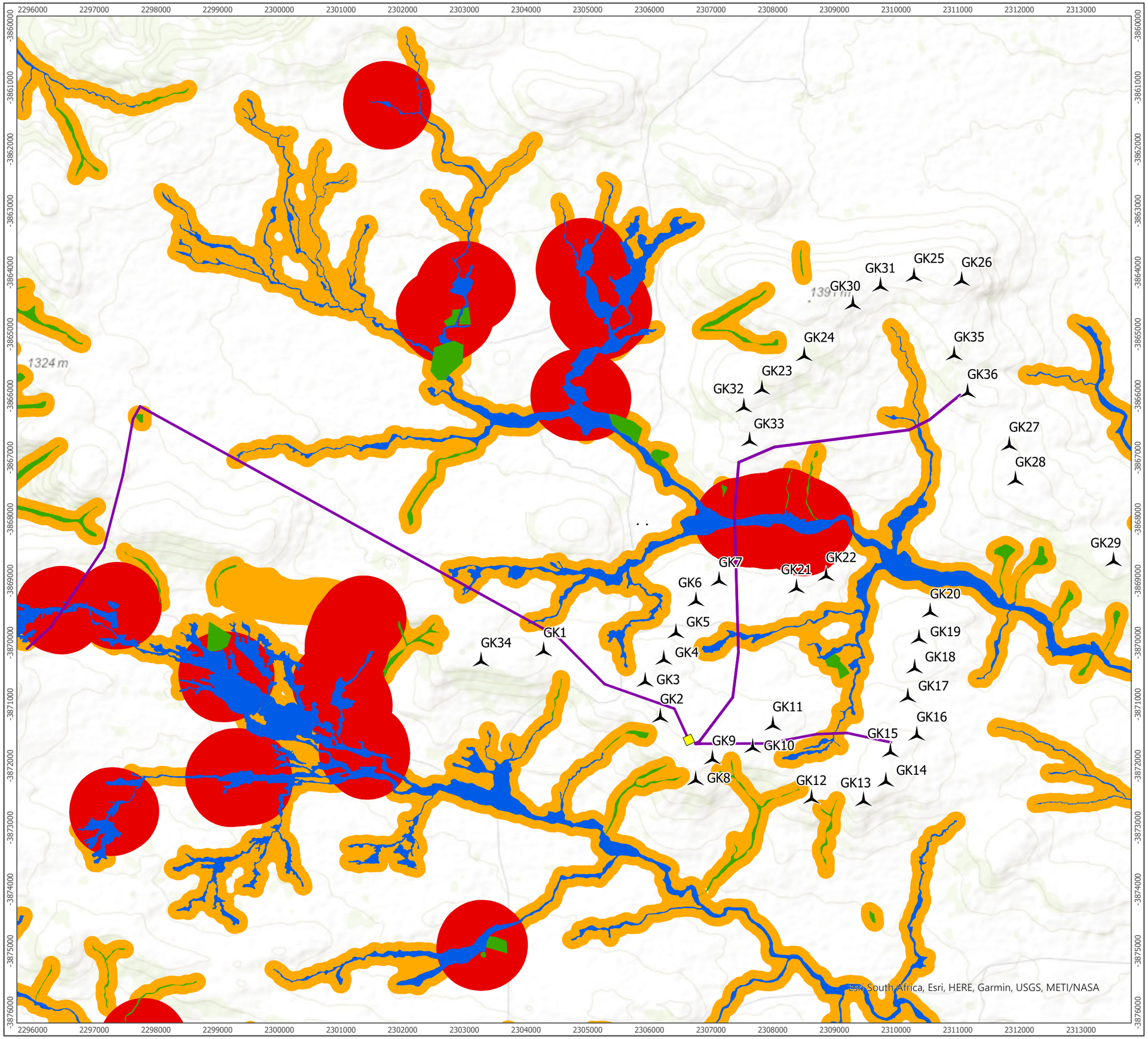
9 FIGURES

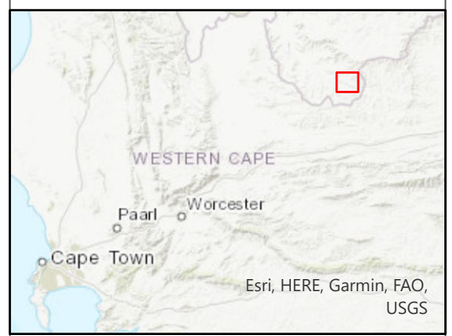


ARCUS

- Proposed Turbines
- OHPL
- Substation
- Moderate Bat Sensitivity Area (For Turbines)
- High Bat Sensitivity Area (For Turbines)

Important Bat Features

- Drainage Lines
- Other Sensitive Bat Habitat



1:59 431 Scale @ A3

0 1 2 km

NORTH

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Bat Sensitivity Map
Figure 1

Great Karoo WEF
Bat Site Walk-through Report

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