Report for the proposed EA Amendment Application for Extension of the EA validity, and EMPr input

For the Springbok Wind Energy Facility (WEF) Northern Cape, South Africa

Compiled by

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For:	Bat Impact Assessment Report for the proposed Amendment of EA Extension and EMPR input for the Springbok Wind Energy Facility (WEF).

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Applicable Legislation

Legislation dealing with biodiversity applies to bats and includes the following:

NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 2004 (ACT 10 OF 2004; Especially sections 2, 56 & 97). The Act calls for the management and conservation of all biological diversity within South Africa. Bats constitute an important component of South African biodiversity and therefore all species receive attention, in addition to those listed as Threatened or Protected.

THE SOUTH AFRICAN BEST PRACTICE GUIDELINES for preconstruction studies recommends sensitivity map buffer rules and mitigation by avoidance. 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 - ed 5*. South African Bat Assessment Association.

THE BAT MORTALITY THRESHOLD GUIDELINES imposes sustainable bat mortality thresholds for operating wind farms, indicating when wind farms need to apply active mitigation measures. 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.

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1 OBJECTIVES AND TERMS OF REFERENCE FOR THE STUDY

- A review of the original 12-months pre-construction bat monitoring EIA study (2016) that was done for the original authorisation and relevant amendments.
- An update of the original specialist input into the EMPr in relation to the proposed amendments, and applicable most recent South African Best Practice Guidelines for Pre-construction Monitoring of Bats at Wind Energy Facilities (MacEwan, et al., Edition 5, 2020), and South African Bat Fatality Threshold Guidelines (MacEwan, et al., Edition 2, October 2018).
- Concluding statements on the proposed amendment.

2 INTRODUCTION

Mulilo Renewable Projects Developments (Pty) Ltd (Mulilo) trading as Mulilo Springbok Wind Power (Pty) Ltd is proposing to amend the Environmental Authorisation (EA) for the Springbok Wind Energy Facility, by extending the EA validity by an additional five (5) years. Extension of the validity of the EA will ensure that the EA remains valid for the undertaking of the authorised activities.

The EA Amendment will be completed in terms of Regulation 30(1)(a) of the Environmental Impact Assessment (EIA) Regulations, 2014, as amended, including the additional studies and public participation required by the DFFE. Condition 1.7 of the First Issue Environmental.

Consequent amendments to extend the validity of the authorisation have been made as follows:

- 12/12/20/1721 – authorised on the 27 June 2014 extending the validity to the 27th of June 2016
- 12/12/20/1721/AM3 – authorised on the 18 May 2016 extending the validity to the 27th of July 2018
- 12/12/20/1721/AM6 – authorised on the 3 August 2018 extending the validity to the 27th of July 2021
- The most recent 12/12/20/1721/AM8 – 28 June 2021 extending the validity to the 27th of January 2023.

The applicant, Mulilo Renewable Projects Developments (Pty) Ltd thus requests that the Competent Authority amends Condition 1.7 of the original EA (Page 4) as amended (DFFE Reference: 12/12/20/1721/1/AM8; dated 28 June 2021) as follows:

"This activity must commence within a period of sixteen (16) years and six (6) months from the date of issue of the authorisation (i.e. the EA lapses on 27 January 2028). If commencement of the activity does not occur within that period, the authorisation lapses and a new application for environmental authorisation must be made in order for the activity to be undertaken."

The 55.5 MW Springbok Wind Energy Facility was originally developed to be built and operated under the government's Renewable Energy Independent Power Producer Programme ("REIPPP"). As the REIPPP has experienced numerous and significant delays in moving forward in the last few years, it has in the past required the project developers to renew the Environmental Authorisation (EA) anticipating that the REIPPP programme would commence again in the near future, which would allow the project to be bid and eventually constructed. In 2021, the project had been assigned to a private off taker, and AM8 was granted to extend the EA beyond 10 years, by an additional 18 months. However, due to recent Eskom grid capacity constraints and the further development and commencement of construction has been suspended to a yet to be determined date.

Nonetheless, the project is still at an advanced stage of development, financing and construction contracting, with vast amounts of monies having been spent to date, including additional environmental specialist work and permitting such as rezoning (an application for which has been submitted). Furthermore, time is required to realize certain EA pre-construction conditions, such as updating the project's Environmental Management Programme (EMPr) and finalising the site layout. These processes are underway.

All specialists undertook a re-assessment of the potential environmental impacts associated with the project in 2014/2015, and again in 2017/2018, as part of the "Part 2" Application for amendment of the EA processes, the latter which was granted by the Department on 25 June 2018. No significant changes to the receiving environment have occurred since the time of

the issuing of the EA, and, in light of the re-assessments undertaken in 2014/ 2015, and again in 2017/2018, the potential environmental impacts associated with the project and receiving environment are well understood.

The extension of the validity period of the EA is therefore to allow the applicant more time to realize certain EA pre-construction conditions (as outlined above), and to keep the project in a construction ready state so that when Eskom capacity is available the project can be implemented.

Animalia Consultants (Pty) Ltd) completed the 12 months pre-construction bat monitoring for the Springbok WEF in 2016, which included the assessments of impacts as required for the EIA phase.

3 METHODOLOGY

Animalia Consultants (Pty) Ltd) completed the 12-months pre-construction bat monitoring for the Springbok Wind Energy Facility (WEF) in 2016, during which a sensitivity map was compiled. In light of new insights into the impacts and bats and according to more recent sensitivity mapping rules in the South African Best Practice Guidelines for Pre-construction Monitoring of Bats at Wind Energy Facilities (MacEwan, et al., Edition 5, 2020), the current Best Practice Guidelines (MacEwan *et al.*, 2020) requires turbine blade length to be outside the 200m high sensitivity buffers, to allow for no turbine blade length overhang into these buffers (**Figure 4.1**).

The results of passive data collected during the preconstruction study has been considered in assessing the impacts of the proposed amendment. The recommended mitigation measures have been updated according to more recent industry experience.

4 RESULTS

4.1 Sensitivity map

The bat sensitivity map is indicated in **Figure 4.1** below. **The current proposed turbine layout has some turbines intruding into high bat sensitivity buffers by the 80m blade overhang, these are turbines 12, 14, 15, 18 and 23. It is critical that these turbines be microsited prior to construction to have their blade overhang not intrude into the high bat sensitivity buffers.** The significance of each sensitivity category in relation to different components of the wind farm is detailed in **Table 4.1**.

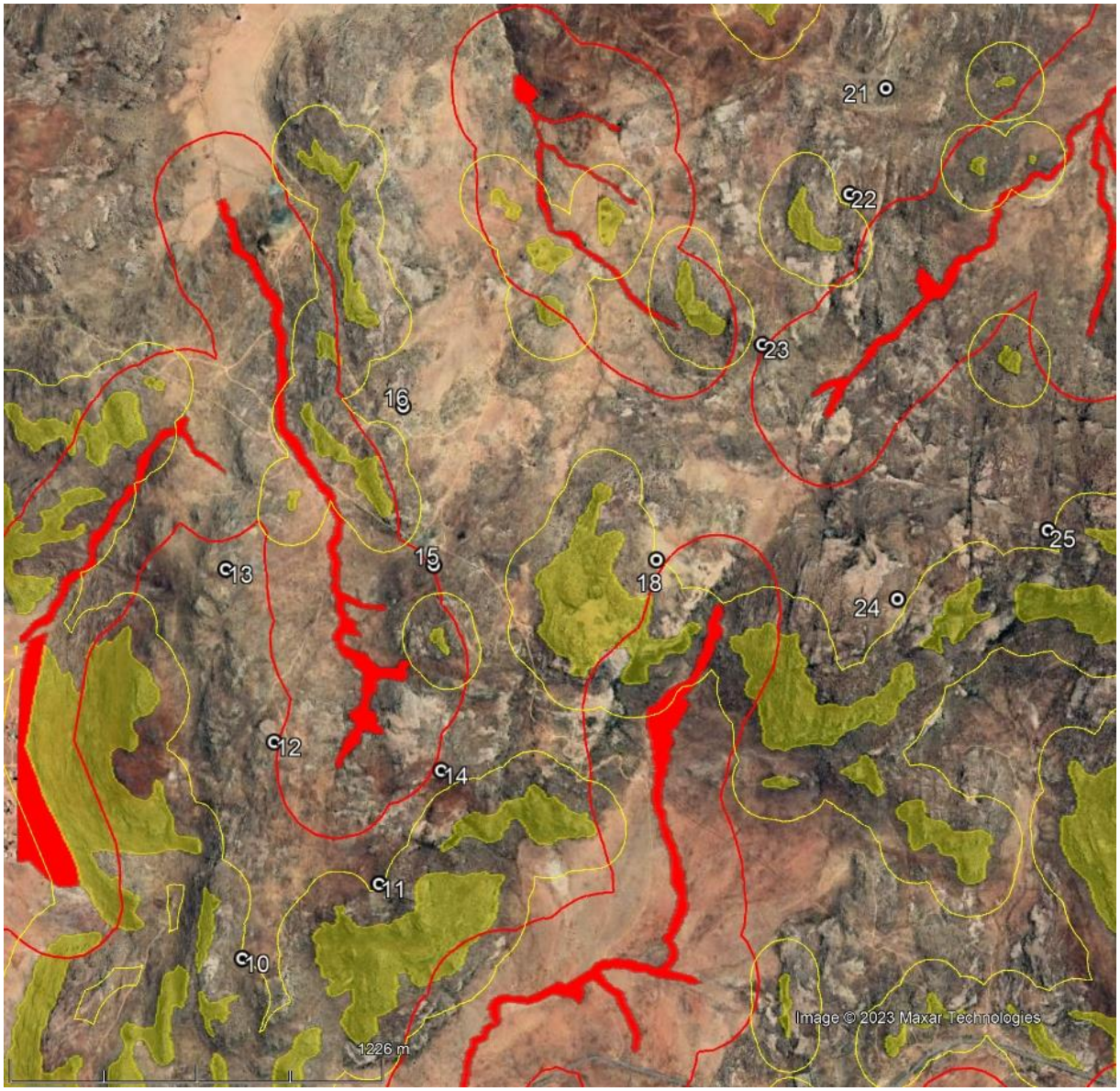

Figure 4.1: Bat sensitivity map in relation to the proposed turbine layout. Shaded red = High bat sensitivity; Red line = 200m High bat sensitivity buffer; Shaded orange = Moderate bat sensitivity; Orange line = 50m Moderate bat sensitivity buffer.

Table 4.1 The significance of sensitivity map categories for each infrastructure component.

Sensitivity	Turbines	Roads and cables	Internal overhead transmission lines	Buildings (including substation, battery storage facility and construction camp/yards)
High Sensitivity	These areas are 'no-go' zones and turbines may not be placed in these areas. Turbine blades (blade overhang) may not intrude into these areas.	Preferably keep to a minimum within these areas where practically feasible.	Allowed inside these areas.	Avoid these areas (no-go areas).
High Sensitivity buffer	These areas are 'no-go' zones and turbines may not be placed in these areas. Turbine blades (blade overhang) may not intrude into these areas.	Allowed inside these areas.	Allowed inside these areas.	Preferably keep to a minimum within these areas where practically feasible.
Moderate Sensitivity	Turbines within these areas may require priority (not excluding all other turbines) during post-construction studies, and in some instances, there is a higher likelihood that mitigation measures may need to be applied to them.	Allowed inside these areas.	Allowed inside these areas.	Allowed inside these areas.
Moderate Sensitivity buffer	Turbines within these areas may require priority (not excluding all other turbines) during post-construction studies, and in some instances, there is a higher likelihood that mitigation measures may need to be applied to them.	Allowed inside these areas.	Allowed inside these areas.	Allowed inside these areas.

5 RECOMMENDED MITIGATION OPTIONS PERTAINING TO THE EMPr

The available options to minimise bat mortalities are discussed in this section. Details on how each option must be implemented are explained in the step-by-step Mitigation Action Plan in Section 6.

5.1 Minimisation of light pollution and artificial habitat creation

A mitigation to consider in the design of the Springbok WEF is to keep artificial lighting to a minimum on the infrastructure (O&M buildings and on wind turbines), while still adhering to safety and security requirements. For example, this can be achieved by having floodlights down-hooded, installing passive motion sensors onto lights around buildings and possibly utilising lights with lighting colours (also referred to as lighting temperatures) that attract fewer insects. Light pollution will impact bat feeding habits and species compositions negatively, by artificially discouraging photophobic (light averse) species and favouring species that readily forage around insect-attracting lights.

Stormwater management should also avoid creating artificial wetlands and open water sources in the turbine zones (less than 280m from any turbine base), as this will increase insect and bat activity around turbines.

The likelihood of bats being killed by moving turbine blades increases significantly when they are attracted to their proximity when it has become an improved foraging airspace due to the presence of artificial light or artificial water sources.

5.2 Curtailment to prevent freewheeling

Freewheeling occurs when the turbine blades are rotating in wind speeds below the generator cut-in speed (also called the **manufacturer's cut-in speed**), thus no electricity is being produced and only some blade momentum is maintained.

Since bat activity tends to be negatively correlated with wind speed, it means that high numbers of bats are likely to be flying and impacted on in low wind speeds where

freewheeling may occur. If turbine blades are feathered below the generator cut-in speed to prevent freewheeling, it can result in a very significant reduction of bat mortalities with minimal energy production loss.

5.3 Curtailment that increases the cut-in speed

The activity levels of South African bats generally decrease in weather conditions with increased wind speeds. However, in scenarios where above sustainable numbers of bats are being killed, and these bats fly in wind speeds above the turbine manufacturer's cut-in speed, the turbine's computer control system (referred to as the Supervisory Control and Data Acquisitions or SCADA system) can be programmed to a cut-in speed higher than the manufacturer's set speed. The new cut-in speed will then be referred to as the **mitigation cut-in speed** and can be determined from studying the relationship between long term (12-month) bat activity patterns on site and wind speed. This sustainable threshold of bat mortalities will be calculated according to the *South African Bat Fatality Threshold Guidelines* (MacEwan, *et al.*, Edition 2, October 2018).

Turbines are curtailed in this manner by means of blade feathering, to render the blades motionless in wind speeds below the mitigation cut-in speed.

5.4 Acoustic bat deterrents

This technology is developed well enough to be implemented on site and may be recommended during operational monitoring, if mortality data indicate bat mortalities above the sustainable threshold for the wind farm. This threshold will be calculated according to the *South African Bat Fatality Threshold Guidelines* (MacEwan, *et al.*, Edition 2, October 2018). Initial experiments with this technology on wind farms in South Africa are yielding positive results that may indicate the effectiveness of the devices in the correct scenarios.

Current data on the South African trials is still limited to a small sample set, and the technology will not necessarily be effective in all mitigation scenarios and for all bat species.

Therefore, it should be considered on a case-by-case basis, and it is highly recommended that adequate monitoring continues concurrently, to assess the effectiveness of the devices in reducing bat mortalities.

6 MITIGATION ACTION PLAN FOR INCLUSION INTO THE EMPr

6.1 Step 1: Minimisation of light pollution and artificial habitat creation (refer to Section 5.1)

During the planning phase for the Springbok WEF it must become mandatory to only use lights with low sensitivity motion sensors that switch off automatically when no persons are nearby, to prevent the creation of regular insect gathering pools, where practically possible without compromising security requirements. This applies to the turbine bases (if applicable) and other infrastructure/buildings. Aviation lights should remain as required by aviation regulations. Floodlights should be down-hooded and where possible, lights with a colour (lighting temperature) that attract less insects should be used. This mitigation step is a simple and cost-effective strategy to effectively decrease the chances of bat mortality on site.

Bi-annual visits to the facility at night must be conducted for the operational lifetime of the facility by operational staff of the facility, to assess the lighting setup and whether the passive motion sensors are functioning correctly. The bat specialist conducting the operational bat mortality monitoring must conduct at least one visit to site during nighttime to assess the placement and setup of outside lights on the facility. When lights are replaced and maintenance on lights is conducted, this Mitigation Action Plan must be consulted.

The storm water drainage plan must avoid creations of artificial ponds/open water sources or wetlands in turbine zones (less than 280m from any turbine base), as these will increase insect activity and therefore bat activity in the area. This can result in turbines that were previously assessed as having a low risk to be financially and biologically costly high-risk turbines.

6.2 Step 2: Appointment of bat specialist to conduct operational bat mortality monitoring

As soon as the WEF facility becomes operational, a bat specialist must be appointed to conduct a minimum of 2 years of operational bat mortality monitoring. This specialist must be appointed before the facility becomes operational, so the operational monitoring can start at the same time as the commercial operation date of the facility. The methodology of this monitoring must comply with the *South African Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy Facilities - 2nd Edition June 2020* (Aronson *et al.* 2020), or any newer version of the applicable guidelines that may be in force at the start of operation of the facility.

The results of the bat mortality study may be used to develop mitigation measures focused on specific problematic turbines. The results of the operational monitoring must be made available, on request, to other bat specialists conducting operational and preconstruction monitoring on WEF's in South Africa.

6.3 Step 3: Curtailment to prevent freewheeling (refer to Section 5.2)

Based on high bat activity detected during the 12-month preconstruction study, from 1 August to 30 April every night for the lifetime of the facility, curtailment must be applied to all turbines by ninety-degree feathering of blades below the **manufacturer's cut-in speed**, so it is exactly parallel to the wind direction and minimises freewheeling blade rotation as much as possible without locking the blades. This can significantly lower probability of bat mortalities. Influence on productivity is minimal since no power is generated below the manufacture's cut-in speed.

6.4 Step 4: Additional mitigation by curtailment or acoustic deterrents (refer to Sections 5.3 and 5.4)

If mitigation steps 1 – 3 are followed, and the bat mortality monitoring study detects bat mortalities that are above the sustainable threshold for the WEF, then additional mitigation will need to be implemented to bring bat mortalities to or below the sustainable threshold. According to the *South African Bat Fatality Threshold Guidelines* (MacEwan, *et al.*, Edition 2, October 2018), this threshold is calculated by considering the hectare size of the WEF area of turbine influence and the value of 2% of bats/10ha/year for the ecoregions that the WEF is located in, to give an annual number of sustainable bat mortalities that is acceptable for the WEF. The area of turbine influence of a wind farm is dictated by the turbine layout and is a tight fitting polygon around the turbine layout (**Figure 6.1**). In this version of the guidelines the acceptable sustainable threshold is calculated as 0.04 bats/10ha/annum for the Succulent Karoo ecoregion which occupies the turbine area of influence. The calculated annual

acceptable sustainable threshold of bat mortalities for the WEF is indicated in

Figure 6.1: The turbine area of influence used to calculate the area applicable to the acceptable bat mortality thresholds.

Table 6.2 below. The threshold is based on values adjusted for biases such as searcher efficiency and carcass persistence. Note that a newer version of the Threshold Guidelines or another similar applicable document may be adopted during the operation of the WEF.

Figure 6.1: The turbine area of influence used to calculate the area applicable to the acceptable bat mortality thresholds.

Table 6.2: The sustainable acceptable mortality thresholds of the Springbok WEF.

	Area of influence of wind turbines (hectares)	**Acceptable annual mortality of bats (adjusted values for biases such as searcher efficiency and carcass persistence)**
Springbok WEF	362	0.04 x (362/10) = 0.04 x 36.2 = **<u>2 bats</u>**

Such additional mitigation measures may be to curtail problematic turbines according to the **mitigation cut-in speed** (Section 5.3), and/or to utilise acoustic deterrents on problematic

turbines (Section **Error! Reference source not found.**). If the turbine layout is amended, the calculation in **Table 6.1** needs to be revised.

Preliminarily, it is advised that any additional mitigation measures that may be required be applied during 1 September to 30 April and must be applied to any turbines or group of turbines identified as causing the wind farm's mortalities to be above the sustainable threshold levels. This time period is based on high bat activity months as detected during the 12-month preconstruction study.

The bat specialist conducting the operational bat monitoring may recommend other time periods for additional mitigation, based on robust mortality data. If required, the bat specialist may make use of climatic data to allow for an active and adaptable mitigation schedule.

6.5 Step 5: Auditing of bat mortalities for the lifetime of the facility

During the implementation of mitigation Steps 1 – 4, it is crucial for the facility to determine and monitor bat mortalities in order to implement, maintain and adapt mitigations as efficiently and economically as possible. For the duration of the lifetime of the facility, the impacts on bats must be monitored continuously by reliable methods of carcass searching and/or electronic devices capable of automatically counting bat mortalities. The effects of mitigations and results of continuous carcass monitoring should be reported on every 5 years (after the end of the initial 2-year operational study) for all turbines on site.

7 CONCLUSION

Animalia Consultants (Pty) Ltd) completed the 12 months pre-construction bat monitoring for the Springbok (WEF) in 2016.

In light of new insights into the impacts and bats and according to more recent sensitivity mapping rules in the South African Best Practice Guidelines for Pre-construction Monitoring of Bats at Wind Energy Facilities (MacEwan, et al., Edition 5, 2020), the current Best Practice Guidelines (MacEwan *et al.*, 2020) requires turbine blade length to be outside the 200m high sensitivity buffers, to allow for no turbine blade length overhang into these buffers.

The bat sensitivity map is indicated in **Figure 4.1** below. **The current proposed turbine layout has some turbines intruding into high bat sensitivity buffers by the 80m blade overhang, these are turbines 12, 14, 15, 18 and 23. It is critical that these turbines be microsited prior to construction to have their blade overhang not intrude into the high bat sensitivity buffers.**

The receiving environment has not changed significantly, and the impact ratings obtained in the initial assessment and or subsequent amendments remain valid.

In summary, the proposed amendment of extending the EA validity is acceptable from a bat sensitivity perspective if all conditions of the EA are adhered to, an operational bat impact monitoring study is conducted for a minimum of 2 years, and this Mitigation Action Plan is adhered to and included into the EMPr.

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