

(Extracted from 'Bat Assessment Report for the proposed Final Layout and updated EMPr approval process for the Mulilo De Aar 2 South Wind Energy Facility (WEF)', 10 November 2022.)

## **1 MITIGATION ACTION PLAN FOR INCLUSION INTO THE EMPr**

This Mitigation Action Plan replaces all previously recommended mitigation measures on the project.

### **1.1 Step 1: Minimisation of light pollution and artificial habitat creation**

During the planning phase for the Mulilo De Aar 2 South 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 282.5m 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.

## **1.2 Step 2: Appointment of bat specialist to conduct operational bat mortality monitoring**

As soon as the De Aar 2 South WEF facility becomes operational, a bat specialist must be appointed to conduct a minimum of 2 years of operational bat mortality monitoring. The methodology of this monitoring must comply with the *South African Good Practice Guidelines for Operational Monitoring for Bats at Wind Energy Facilities - 2<sup>nd</sup> 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.

## **1.3 Step 3: Curtailment to prevent freewheeling**

Based on high bat activity detected during the 12-month preconstruction study, from 1 September to 31 March 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.

## **1.4 Step 4: Additional mitigation by curtailment or acoustic deterrents**

If mitigation steps 1 – 3 are followed, and the bat mortality monitoring study detects bat mortalities that are above the sustainable threshold for the Mulilo De Aar 2 South 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 0.2

bats/10ha/annum for the Nama Karoo ecoregion which occupies the turbine area of influence. The calculated annual acceptable sustainable threshold of bat mortalities for the total De Aar 2 South WEF is indicated in

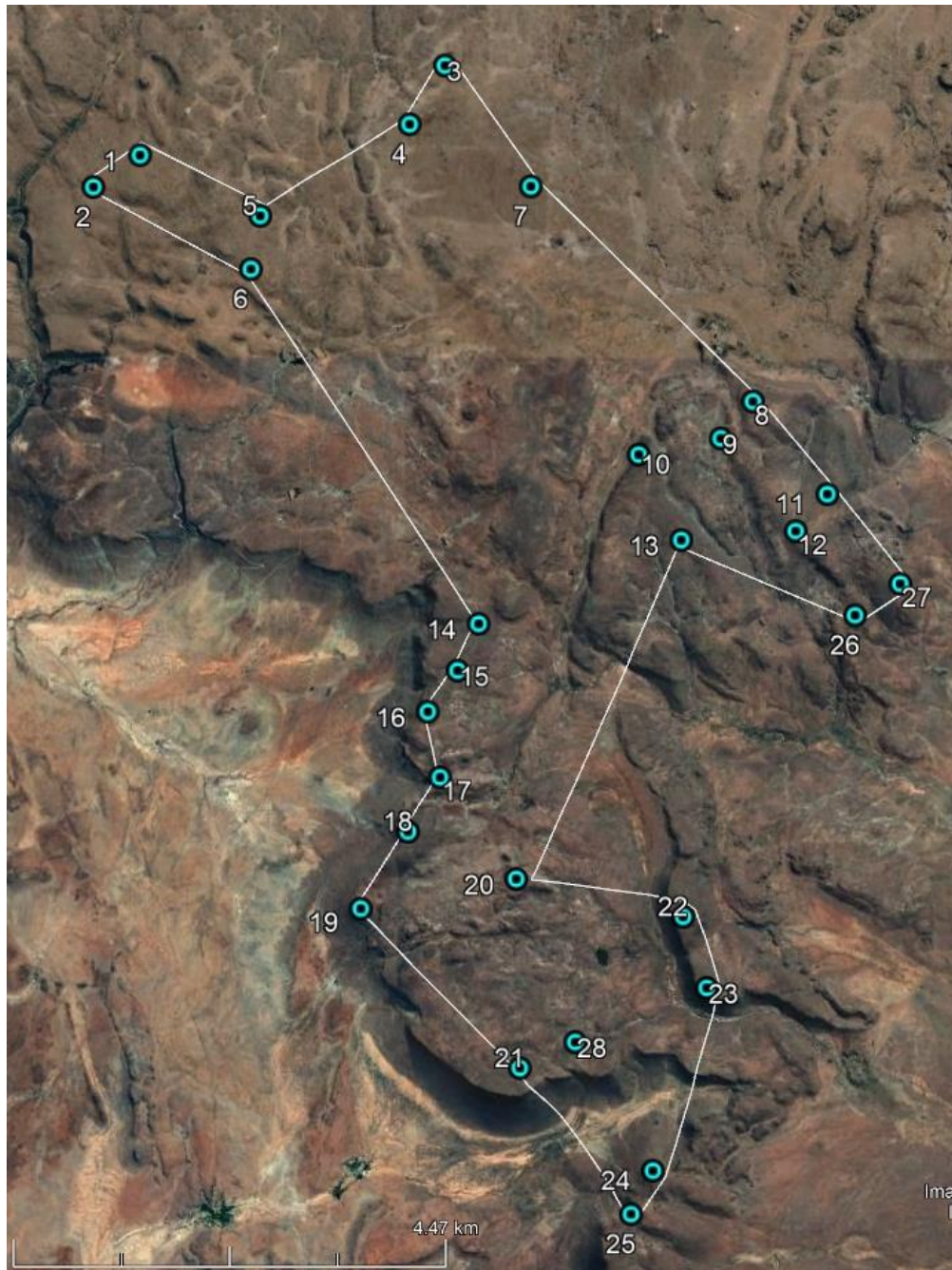
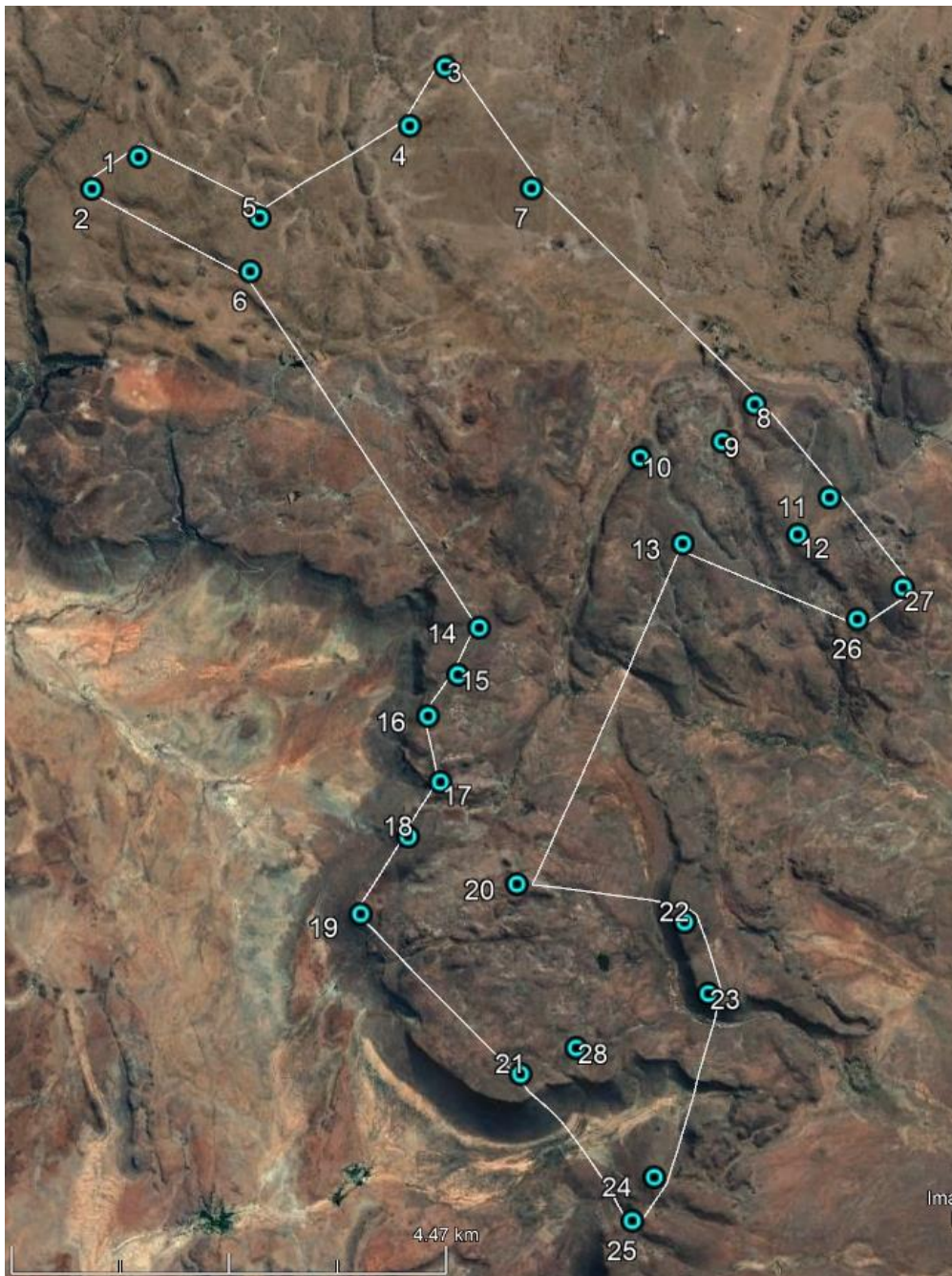


Figure 6.1: The turbine area of influence used to calculate the area applicable to the acceptable bat mortality thresholds.

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 authorised De Aar 2 South WEF.

	Area of influence of wind turbines (hectares)	Acceptable annual mortality of bats
De Aar 2 South WEF (Nama Karoo)	3097	$0.2 \times (3097/10)$ $= 0.2 \times 309.7$ $= \underline{62 \text{ bats}}$

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

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 the months of September to March, 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.

### **1.5 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 as possible. For the duration of the lifetime of the facility, the impacts on bats must be audited/monitored by reliable methods of carcass searching and/or electronic devices capable of automatically counting bat mortalities. Such auditing should occur every 5 years (after the end of the initial 2-year operational study) for all turbines on site, and continuously for turbines where mitigations discussed in Step 4 are implemented.