OPERATIONAL BIRD MONITORING PLAN

100 MW SOLAR PHOTOVOLTAIC FACILITY (KENHARDT PV1) ON THE REMAINING EXTENT OF ONDER RUGZEER FARM 168, NORTH-EAST OF KENHARDT, NORTHERN CAPE PROVINCE

1. Introduction

The operational monitoring at the Solar Energy Facility (SEF) will be conducted in accordance with the latest version of the Solar Best Practice Guidelines (Jenkins, A.R., Ralston-Patton, Smit- Robinson, A.H. 2017. Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern Africa. BirdLife South Africa) hereafter referred to as the Best Practice Guidelines.

2. Aim of operational monitoring

Operational monitoring should assess if there are any changes in the following:

- habitat available to birds in and around the SEF
- abundance and species composition of birds
- movements of priority species
- breeding success of priority species

Most importantly, operational monitoring should highlight if additional mitigation is required to reduce impacts to acceptable levels.

Operational monitoring can be divided into two categories:

- habitat classification
- quantifying bird numbers and movements (replicating baseline data collection)

The objectives of operational monitoring are to:

- determine the actual impacts of the SEF
- assess the significance of measured impacts at the SEF
- determine if additional mitigation is required at the SEF

3. Timing

Operational monitoring should commence within three months of Commercial Operation Date (COD) to ensure that the immediate effects of the facility on resident and passing birds are recorded, before they have time to adjust or habituate to the development. However, it should be borne in mind that it is also important to obtain an understanding of the impacts of the facility as they would be over the lifespan of the facility. Over time the habitat within the SEF may change, birds may become habituated to, or learn to avoid the facility. It is therefore necessary to monitor over a longer period than just an initial one year. Two surveys must be conducted every year in the high season (February to March), preferably after the site has experienced substantial rainfall, and in the dry season (May to October).

4. Duration

The monitoring should run over a period of at least two years. After the first two years of monitoring, the programme must be reviewed to incorporate significant findings that have emerged. If significant displacement impacts (or other impacts e.g. collision mortalities) are observed and mitigation is required, the avifaunal specialist must engage with the owner to discuss potential mitigation measures and the extension of the monitoring beyond the two-year mark. The monitoring should also be extended if the first two years experienced below average rainfall. Should it be necessary to extend the monitoring for the reasons mentioned, it should be conducted for at least another three years to account for climatic variation.

5. Habitat classification

Any observed changes in bird numbers and movements at a SEF may be linked to changes in the available habitat. The avian habitats will be assessed twice a year (i.e. when the surveys are conducted), to record any changes in the baseline conditions.

6. Avifaunal live-bird monitoring and carcass searches

In order to determine if there are any impacts relating to displacement and/or disturbance, all methods used to estimate bird numbers and movements during the original pre-construction baseline monitoring in the EIA phase must be applied as far as is practically possible in the same way to operational work in order to ensure maximum comparability of these two data sets. In the present instance, the following data collection protocol must be implemented:

- On-site surveys must be conducted in the following manner:
    - Four (4) walk transects must be identified by the avifaunal specialist, using the final lay-out plan, totalling 1km each, three (3) within the PV footprint, and one (1) control transect outside the footprint.
    - A suitable monitor must be identified to conduct the monitoring. This can either be the avifaunal specialist his/herself, or it can be a person trained by the avifaunal specialist in the monitoring protocol.
    - The monitor must record all species on both sides of the walk transect. The monitor must stop at regular intervals to scan the environment with binoculars.
    - Each transect must be counted twice during each survey over a period of four days.
    - Transects must be counted early in the morning, and late in the afternoon.
    - The following variables must recorded:
        - Species;

        - Number of birds;
        - Date;
        - Start time and end time;
        - Estimated distance from transect (m);
        - Wind direction;
        - Wind strength (estimated Beaufort scale 1 - 7);
        - Weather (sunny; cloudy; partly cloudy; rain; mist);
        - Temperature (cold; mild; warm; hot);
        - Behaviour (flushed; flying-display; perched; perched-calling; perched-hunting; flying- foraging; flying-commute; foraging on the ground.
- All incidental sightings of priority species in and around the proposed PV development area must recorded.
- The section of the Aries - Nieuwehoop 400kV transmission line running west of the study area must inspected for evidence of breeding raptors on the towers.
- A sample of solar panel rows, as identified by the avifaunal specialist, must be systematically searched for bird carcasses on a weekly basis. The searcher could be a SEF staff member that is permanently based at the facility and reports to the SEF management. If a carcass is discovered, the following must be done:
    - The carcass must be photographed (both front and back) and given a unique ID number, and the following details must be recorded in a register of mortalities:
        - Date found
        - Time found
        - Coordinates
        - Habitat
        - Estimated time since death
        - Carcass condition
    - The carcass must then be stored in a plastic bag with its unique ID number on site in a freezer for subsequent confirmation of species identity by the avifaunal specialist.
    - The Operations Manager must ensure that the mortality register is kept up to date.
- If there are sections where the 33kV cables cannot buried due to technical constraints, a bird-friendly design must be employed after an appropriately qualified and experienced avifaunal specialist have signed-off on the final design.
- All 33kV powerlines must be inspected twice a week for bird carcasses which may be the result of collisions or electrocutions. The searcher could be a SEF staff member that is permanently based at the facility and reports to the SEF management. If a carcass is discovered, the standard procedure for carcass processing should be followed as outlined above.

7. Deliverables

7.1 Annual report

An operational monitoring report will be completed at the end of each year of operational monitoring. As a minimum, the report will attempt to answer the following questions:

- How has the habitat available to birds in and around the SEF changed?
- How has the number birds and species composition changed?
- How have the movements of priority species changed?
- How has the SEF affected priority species' breeding success?

- What are the likely drivers of any changes observed?
- What is the significance of any impacts observed, both locally and regionally?
- What mitigation measures are required to reduce the impacts?

7.2 Progress reports

One progress report must be provided with basic statistics and any issues that need to be red flagged. The progress report must provide a summary of the transect data and any mortality that have been collected to date and must highlight and discuss any concerns that have emerged during the monitoring so far. If need be, suggestions for mitigation should also be included.

8. Summary of tasks

Activity	Year 1	Year 2		Year 3	Year 4	Year 5
Implement carcass surveys	Within three months of Commercial Operation Date (COD)	From day 1	Assess whether further monitoring is required, based on the results of the first two years of monitoring. If so, continue with Years 2 - 5.	From day 1	From day 1	From day 1
Live bird monitoring survey 1 (rainy season)	February to March	February to March		February to March	February to March	February to March
Specialist to produce progress report	Within one month of completing survey 1	Within one month of completing the survey 1		Within one month of completing the survey 1	Within one month of completing the survey 1	Within one month of completing the survey 1
Live bird monitoring survey 2 (dry season)	May to October	May to October		May to October	May to October	May to October
Specialist to produce annual report.	Within two months of the final carcass search for that year	Within two months of the final carcass search for that year		Within two months of the final carcass search for that year	Within two months of the final carcass search for that year	Within two months of the final carcass search for that year

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