NALA

ENVIRONMENTAL

CONSULTING FIRM

BIRD MONITORING PROGRAMME – RIETRUG WIND ENERGY FACILITY

DECMEBER 2022

Applicant	:	Rietrug Wind Farm (Pty) Ltd
Title	:	BIRD MONITORING PROGRAMME
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BIRD MONITORING PROGRAMME

As per the final avifauna pre-construction walkthrough report, a minimum, post-construction monitoring should be undertaken for the first two years of operation, and then repeated again in Year 5, and again every five years thereafter for the operational life-time of the facility. The exact scope and nature of the post-construction monitoring will be determined on an ongoing basis by the results of the monitoring through a process of adaptive management, therefore the programme below is preliminary and is to updated accordingly.

The primary aims of a long-term monitoring programme would be to:

- Determine the densities of birds resident within the impact area of the wind energy facility before construction of the facility, and afterwards, once the facility, or phases of the facility, become operational.
- Document patterns of bird activity and movements in the vicinity of the proposed wind energy facility before construction, and afterwards, once the facility is operational.
- Monitor patterns of bird activity and movement in relation to weather conditions, time of day and season for at least a full calendar year after the facility is commissioned.
- Register and as far as possible document the circumstances surrounding all avian collisions with the turbines for at least a full calendar year after the facility becomes operational.

Bird density and activity monitoring should focus on rare and/or endemic, potentially disturbance or collision prone species, which occur with some regularity in the area. Ultimately, the study should provide much needed quantitative information on the effects of the facility on the distribution and abundance of birds, and the actual risk it poses to the local avifauna, and serve to inform and improve mitigation measures to reduce this risk. It will also establish a precedent and a template for research and monitoring of avian impacts at possible, future wind energy sites in the region. This programme outline is informed by monitoring studies established in other countries (e.g. Erickson et al. 1999, Scottish National Heritage 2005), but is based substantially on those developed for both the Darling and the Klipheuwel wind power demonstration facilities in South Africa. The bulk of the work involved should be done by an expert ornithologist or under the supervision of such.

1. Monitoring protocols

1.1. Avian densities before and after

A set of at least 10 walk-transect routes, each of at least 1000 m in length, should be established in areas representative of all the avian habitats present within a 10 km radius of the centre of the development site. Each of these should be walked at least once every two months over the six months preceding construction, and at least once every two months over the same calendar period, at least six months after the facility is commissioned. The transects should be walked after 06h00 and before 09h00, and the species, number and perpendicular distance from the transect line of all birds seen should be recorded for subsequent analysis and comparison.

In addition, any cliff-lines within the development area should surveyed for cliff-nesting raptors at least every six months using documented protocols, and all sightings of key species on site should carefully plotted and documented, and the major waterbodies on and close to the development area should be surveyed for wetland species on each visit to the study area, using the standard protocols set out by the CWAC initiative.

1.2. Bird activity monitoring

Monitoring of bird activity in the vicinity of the facility should be done over a 2-3 day period at least every two months for the six months preceding construction, and at least once per quarter for a full calendar year starting at least six months after the facility is commissioned. Each monitoring day should involve:

- Half-day counts of all priority species flying over or past the impact area (see passage rates below)
- Opportunistic surveys of large terrestrial species and raptors seen when travelling around the site.

1.3. Passage rates of priority bird species

Counts of bird traffic over and around the proposed/operational facility should be conducted from suitable vantage points (and a number of these should be selected and used to provide coverage of avian flights in relation to all areas of the site), and extend alternately from dawn to midday, or from midday to dusk, so that the equivalent of four full days of counts is completed each count period. This should provide an adequate (if minimal) sample of bird movements around the facility in relation to a representative cross-section of conditions and times of day, for all seasons of the year.

Once in position at the selected count station, the observer should record (preferably on a specially designed data sheet) the date, count number, start-time and conditions at start - extent of cloud cover, temperature, wind velocity and visibility – and proceed with the count. The counts should detail all individuals or flocks of the stipulated priority bird species, all raptors, and any additional species of particular interest or conservation concern, seen flying within 500 m of the envisaged or actual periphery of the facility. Each record should include the following data: time, updated weather assessment, species, number, mode of flight (flapping, gliding, soaring), flight activity (commuting, hunting other), direction of flight, vertical zoning relative to the envisaged or actual turbine string (low – below or within the rotor arc, medium – within c.100 m of the upper rotor arc, high – >100 m above the upper rotor arc), and horizontal zoning relative to the envisaged or actual turbine string (near – through the turbine string or within the outer rotor arc, middle – within c.100 m of the outer rotor arc, distant - >100 m beyond the outer rotor arc) and, for post construction monitoring, notes on any obvious evasive behaviour or flight path changes observed in response to the wind energy facility. The time and weather conditions should again be noted at the end of each count.

2. Avian collisions

Collision monitoring should have two components: (i) experimental assessment of search efficiency and scavenging rates of bird carcasses on the site, and (ii) regular searches of the vicinity of the wind farm for collision casualties.

2.1. Assessing search efficiency and scavenging rates

The value of surveying the area for collision victims only holds if some measure of the accuracy of the survey method is developed. To do this, a sample of suitable bird carcasses (of similar size and colour to the priority species – e.g. Egyptian Goose *Alopochen aegyptiacus*, domestic waterfowl and pigeons) should be obtained and distributed randomly around the site without the knowledge of the surveyor, some time before the site is surveyed. This process should be repeated opportunistically (as and when suitable bird carcasses become available) for the first two months of the monitoring period, with the total number of carcasses not less than 20. The proportion of the carcasses located in surveys will indicate the relative efficiency of the survey method.

Simultaneous to this process, the condition and presence of all the carcasses positioned on the site should be monitored throughout the initial two-month period, to determine the rates at which carcassess are scavenged from the area, or decay to the point that they are no longer obvious to the surveyor. This should provide an indication of scavenge rate that should inform subsequent survey work for collision victims, particularly in terms of the frequency of surveys required to maximise survey efficiency and/or the extent to which estimates of collision frequency should be adjusted to account for scavenge rate. Scavenger numbers and activity in the area

may vary seasonally so, ideally, scavenge and decomposition rates should be measured twice during the monitoring year, once in winter and once in summer.

2.2. Collision victim surveys

The area within a radius of at least 50 m of each of the turbines at the facility should be checked regularly for bird casualties. The frequency of these surveys should be informed by assessments of scavenge and decomposition rates conducted in the initial stages of the monitoring period, but they should be done at least weekly for the first two months of the study. The area around each turbine, or a larger area encompassing the entire facility, should be divided into quadrants, and each should be carefully and methodically searched for any sign of a bird collision incident (carcasses, dismembered body parts, scattered feathers, injured birds). All suspected collision incidents should be comprehensively documented, detailing the precise location (preferably a GPS reading), date and time at which the evidence was found, and the site of the find should be photographed with all the evidence in situ. All physical evidence should then be collected, bagged and carefully labeled, and refrigerated or frozen to await further examination. If any injured birds are recovered, each should be contained in a suitably- sized cardboard box. The local conservation authority should be notified and requested to transport casualties to the nearest reputable veterinary clinic or wild animal/bird rehabilitation centre. In such cases, the immediate area of the recovery should be searched for evidence of impact with the turbine blades, and any such evidence should be fully documented.

In tandem with surveys of the wind farm for collision casualties, sample sections of any new lengths of power line associated with the development should also be surveyed for collision victims using established protocols

Table 1: Avifauna recorded during surveys at the WEF project site and immediate environment in November and December 2021. SCC are shaded.

Species	Taxonomic name	Global Red Data status IUCN	Regional Red Data status SA
African Pipit	*Anthus cinnamomeus*		
African Red-eyed Bulbul	*Pycnonotus nigricans*		
African Rock Pipit	*Anthus crenatus*	LC	NT
Alpine Swift	*Tachymarptis melba*		
Barn Swallow	*Hirundo rustica*		
Black Harrier	*Circus maurus*	EN	EN
Black-eared Sparrow-Lark	*Eremopterix australis*		
Black-headed Canary	*Serinus alario*		
Blacksmith Lapwing	*Vanellus armatus*		
Bokmakierie	*Telophorus zeylonus*		
Cape Bunting	*Emberiza capensis*		
Cape Clapper Lark	*Mirafra apiata*		
Cape Eagle-Owl	*Bubo capensis*		
Cape Penduline Tit	*Anthoscopus minutus*		
Cape Sparrow	*Passer melanurus*		
Cape Turtle Dove	*Streptopelia capicola*		
Cape Wagtail	*Motacilla capensis*		
Capped Wheatear	*Oenanthe pileata*		
Cinnamon-breasted Warbler	*Euryptila subcinnamomea*		
Common Starling	*Sturnus vulgaris*		
Common Waxbill	*Estrilda astrild*		
Crowned Lapwing	*Vanellus coronatus*		
Egyptian Goose	*Alopochen aegyptiaca*		
Fairy Flycatcher	*Stenostira scita*		
Familiar Chat	*Oenanthe familiaris*		
Greater Kestrel	*Falco rupicoloides*		
Greater Striped Swallow	*Cecropis cucullata*		
Grey Tit	*Melaniparus afer*		
Grey-backed Cisticola	*Cisticola subruficapilla*		
Grey-winged Francolin	*Scleroptila afra*		
Ground Woodpecker	*Geocolaptes olivaceus*		
Hadeda	*Bostrychia hagedash*		
House Sparrow	*Passer domesticus*		
Jackal Buzzard	*Buteo rufofuscus*		
Karoo Chat	*Emarginata schlegelii*		
Karoo Eremomela	*Eremomela gregalis*		
Karoo Korhaan	*Eupodotis vigorsii*		
Karoo Lark	*Calendulauda albescens*		
Karoo Long-billed Lark	*Certhilauda subcoronata*		
Karoo Prinia	*Prinia maculosa*		
Karoo Scrub Robin	*Cercotrichas coryphoeus*		
Large-billed Lark	*Galerida magnirostris*		
Lark-like Bunting	*Emberiza impetuani*		
Layard's Tit-Babbler	*Sylvia layardi*		
Little Swift	*Apus affinis*		
Long-billed Crombec	*Sylvietta rufescens*		

Species	Taxonomic name	Global Red Data status IUCN	Regional Red Data status SA
Ludwig's Bustard	*Neotis ludwigii*	EN	EN
Malachite Sunbird	*Nectarinia famosa*		
Mountain Wheatear	*Myrmecocichla monticola*		
Namaqua Dove	*Oena capensis*		
Namaqua Sandgrouse	*Pterocles namaqua*		
Nicholson's Pipit	*Anthus nicholsoni*		
Pale Chanting Goshawk	*Melierax canorus*		
Pale-winged Starling	*Onychognathus nabouroup*		
Pied Crow	*Corvus albus*		
Pied Starling	*Lamprotornis bicolor*		
Red-capped Lark	*Calandrella cinerea*		
Red-winged Starling	*Onychognathus morio*		
Rock Dove	*Columba livia*		
Rock Kestrel	*Falco rupicolus*		
Rock Martin	*Ptyonoprogne fuligula*		
Ruff	*Calidris pugnax*		
Rufous-eared Warbler	*Malcorus pectoralis*		
Sickle-winged Chat	*Emarginata sinuata*		
South African Shelduck	*Tadorna cana*		
Southern Fiscal	*Lanius collaris*		
Southern Masked Weaver	*Ploceus velatus*		
Speckled Pigeon	*Columba guinea*		
Spike-heeled Lark	*Chersomanes albofasciata*		
Unidentified	*Unidentified*		
Verreaux's Eagle	*Aquila verreauxii*	VU	LC
White-backed Mousebird	*Colius colius*		
White-necked Raven	*Corvus albicollis*		
White-rumped Swift	*Apus caffer*		
White-throated Canary	*Crithagra albogularis*		
White-throated Swallow	*Hirundo albigularis*		
Yellow Canary	*Crithagra flaviventris*		
Yellow-bellied Eremomela	*Eremomela icteropygialis*		