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By email to: 02/07/2024

- Zaza Bakuradze <zbakuradze@peri.ge>
- Maia Gikoshvili <mgikoshvili@windpower.ge>

Dear Zaza and Maia,

Interpretation of actions to address information needs

To strengthen the Project ornithological baseline and address information needs identified in the *Supplementary Avifauna Analysis and Action Plan* issued by Earth Active on 8th May 2024, JSC Windpower ('the Client') has undertaken a number of actions:

1. Commissioned Spring 2024 field activity and breeding bird surveys, and collision-risk modelling based on an enhanced dataset;
2. Obtained Spring 2022 data; and,
3. Obtained two separate second opinions on the ornithological value of the site.

Earth Active (EA) has produced this briefing note following a review of the additional information available as a result of the above actions. This has been done in combination with the pre-existing Project ornithological information (ESIA, available survey reports, and additional summaries from the lead surveyor) and which together give an overview of the 2021/22 fieldwork.

Results from the Spring 2024 field surveys support the pre-existing Project ornithological information's findings that the site is likely outside key pre-nuptial migratory corridors and the total numbers and flock size of migrating target species are significantly less than those observed at the main or secondary fly-ways within Georgia. This is supported by second expert opinions and assessment within the Spring 2022 survey report.

Subsequently, in the context of IFC Performance Standard 6 and EBRD Performance Requirement 6, EA remains of the opinion that the site is unlikely to present high-risk to birds, and bird impacts could be managed through appropriate mitigation (e.g. site-specific switch-off mechanism and post-collision monitoring).

Further surveys are needed during the post-breeding Autumn period (15th August to 31st October) and pre-breeding Spring period (1st March to 15th April) to cover full migration seasons and account for seasonal variability. Bird numbers recorded do not currently meet EBRD PR6 thresholds for Critical Habitat and additional data will be needed to confirm this. Post-construction monitoring should explore the use of radar technology to inform adaptive management. An Active Turbine Management Plan (ATMP) is recommended to define a switch-off mechanism, with further surveys determining specific parameters which may be retrofitted if necessary.

Yours sincerely,

Jason Hartley (Technical Director, Biodiversity)

1 Overview of additional information

The Spring 2024 survey methodology and collision risk modelling (CRM) have been undertaken in accordance with good practice guidelines[1][2][3], including addressing the specific methodological needs identified in the Supplementary Avifauna Analysis and Action Plan. For example, within the survey methodology:

- Target species are clearly defined,
- Vantage point viewsheds cover all 33 turbine locations,
- Viewsheds are no more than 180 degrees and involve observations at an appropriate distance to allow accurate species identification and altitude estimation.
- Data is collected in a standardised format, and qualifications and experience of surveyors are documented.
- The CRM used is the one provided online by Scottish Natural Heritage and is the industry standard for this purpose.
- The model incorporates bird flight activity data and turbine parameters provided by the Client, and,
- Results have been presented at a range of avoidance rates i.e. 95%, 98% and 99%.

The earlier Spring 2022 data reviewed has been found to have similar deviations from good practice guidance as those identified in the other earlier survey reports (2021/2022). As for these other reports this includes things such as vantage point survey methodology and the timing and duration of survey visits. However, it does provide some useful additional context about birds on site, in particular the presence/absence of breeding bird populations due to the significant number of survey hours undertaken by Dr Abuladze and his team.

Two second opinions have been obtained confirming the original ESIA assessment. Each separate opinion was authored by suitably experienced ornithologists, Mr. Denis Kitel and Mr. Gia Edisherashvili.

Taken together, the additional information provides valuable data and context to the bird baseline, with the Spring 2024 survey information and collision-risk modelling in particular a key resource for characterising the study area from the ornithological point of view.

Further surveys are still required according to NatureScot guidance (see Section 4 Conclusions), and final conclusions only possible once those surveys are complete and a more robust dataset accounting for season-on-season variability is available.

2 Summary of Spring 2024 results

Full details of the Spring 2024 field surveys and collision-risk modelling are presented in two WSP notes: *Bird Collision Risk Modelling: Spring 2024*; and *Ruisi WPP Ornithology Survey Update: May/June 2024*.

During flight activity surveys, 15 target species were recorded across all vantage points in April and May 2024, with 14 species observed flying at collision risk height (CRH) (Table 1 overleaf). There were 174 target species flights in total during the total 84 hours of survey time.

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1 NatureScot pre-application guidance for onshore wind farms
2 Scottish Natural Heritage. Recommended bird survey methods to inform impact assessment of onshore windfarms.
3 Scottish Natural Heritage Guidance Windfarms And Birds: Calculating a theoretical collision risk assuming no avoidance action.

Table 1: Target species recorded on site during Spring 2024 and results of collision-risk modelling

Species	Latin name	IUCN Red List status	Flights	Individuals	Seconds at CRH	Modelled collisions per year	
						No avoidance	98% avoidance*
Black Kite	*Milvus migrans*	Least Concern	5	9	255	3.65	0.07
Booted Eagle	*Hieraaetus pennatus*	Least Concern	4	5	195	2.63	0.05
Common Buzzard	*Buteo buteo*	Least Concern	27	31	1125	15.39	0.31
Common Kestrel	*Falco tinnunculus*	Least Concern	2	2	105	1.35	0.07
Eastern Imperial Eagle	*Aquila heliaca*	Vulnerable	2	2	660	9.72	0.19
European Honey Buzzard	*Pernis apivorus*	Least Concern	2	2	135	1.88	0.04
Hen Harrier	*Circus cyaneus*	Least Concern	1	1	15	0.20	0.00
Lesser Spotted Eagle	*Clanga pomerina*	Least Concern	18	18	1365	19.33	0.39
Long Legged Buzzard	*Buteo rufinus*	Least Concern	3	3	420	5.94	0.12
Marsh Harrier	*Circus aeruginosus*	Least Concern	8	8	645	8.78	0.44
Peregrine Falcon	*Falco peregrinus*	Least Concern	1	1	30	0.41	0.02
Red Footed Falcon	*Falco vespertinus*	Vulnerable	2	2	315	4.09	0.20
Short Toed Snake Eagle	*Circaetus gallicus*	Least Concern	8	8	330	4.69	0.09
Steppe Eagle	*Aquila nipalensis*	Endangered	1	1	105	1.52	0.03

*With the exception of Falco sp. and Circus aeruginosus which have recommended 95% avoidance rates, NatureScot recommends 98% avoidance rate parameters for soaring raptors

The CRM results for the Spring 2024 dataset indicate that while there is a potential risk of bird collisions with the wind turbines, implementing avoidance measures significantly reduces this risk. The model demonstrates that for all species, with an avoidance rate of 95% following a precautionary approach, the number of predicted collisions is less than 0.44 per year.

During breeding bird surveys, a total of 47 species were recorded, all of which are IUCN least concern and had previously been recorded on the site in Spring 2022. The most numerous species recorded was Eurasian Skylark *Alauda arvensis* with over 10 pairs per km^2. This species' vertical display flights are likely to be within potential collision risk height (i.e. 20-200m).

Explainer: Avoidance rates
Avoidance rates represent the proportion of birds that actively avoid collision with wind turbines. These rates are important for adjusting the raw collision risk estimates (i.e. no avoidance) to reflect the actual likelihood of collisions occurring. Commonly used avoidance rates for large birds like raptors might range from 95% to 99%, according to their physiology and behaviour.

3 Discussion

Nearly all of the recorded target species (14 out of 15 species) were observed flying at collision risk height. As a community, this demonstrates a strong behavioural exposure to collision risk with the future wind turbine generators.

The majority of target species recorded during the Spring 2024 field surveys were local buzzards (35.7% of all recorded flights), and eagles (genera *Aquila*, *Clanga* and *Hieraaetus; 29.8%* of all recorded flights), followed by harriers (10.7% of all recorded flights) and the Short-toed Eagle (9.5% of all recorded flights). The buzzards, harriers and kite species are common and likely to be feeding on grubs and caterpillars supported by agricultural land and the nut and fruit orchards in the north of the site.

The second most numerous recordings on site were Lesser Spotted Eagles. This species is considered of least concern on the IUCN Red List. However, three other species recorded on site, Steppe Eagle *Aquila nipalensis*, Red-footed Falcon *Falco vespertinus* and Eastern Imperial Eagle *Aquila heliaca*, are considered endangered (*A. nipalensis*), and vulnerable (*F. vespertinus* and *A. heliaca*) on the IUCN Red List.

Under Criterion 1 of EBRD Performance Requirement 6 (PR6), Steppe Eagle, Red-footed Falcon and Eastern Imperial Eagle could qualify as Critical Habitat (CH) if the observed numbers are approximately 0.5% of global population. Under Criterion 3 of EBRD PR6 other migratory target species could qualify as CH if the observed numbers are approximately 1% of global population. Currently, numbers recorded during the Spring 2024 field surveys do not reach these thresholds, however, this only covers one migration season partially and so it is not possible to conclude this until further surveys have been completed (see Section 4 Conclusion) and a detailed Critical Habitat Assessment (CHA) is developed.

Results from the Spring 2024 field surveys support the pre-existing Project ornithological information's findings that the site is likely outside key pre-nuptial migratory corridors and the total numbers and flock size of migrating target species are significantly less than those observed at the main or secondary fly-ways within Georgia. This is further supported by the second expert opinions and assessment within the Spring 2022 survey report.

Bird movement across the site can generally be classified as broadfront and those species that were recorded on site were predominantly using the area to gain height. The proposed layout of the wind turbines is across a large area, however, in close proximity to Turbine 1, there is a small rise in elevation. This is where the majority of species were recorded.

4 Conclusion

EA remains of the opinion that the site is unlikely to present high-risk to birds, and bird impacts could be managed through appropriate good practice mitigation (e.g. site-specific switch-off mechanism and post-collision monitoring). We also comment as follows:

- **Further surveys**. In accordance with good practice, and as previously stated in the Supplementary Avifauna Analysis and Action Plan, further monitoring surveys are needed to cover the post-breeding Autumn migration period (15th August to 31st October), and pre-breeding Spring migration period (1st March to 15th April). This is to account for full migration seasons and seasonal variability previously recorded during the ornithological surveys. It is recommended that surveys also cover the wintering period (1st December to 15th February), should this be deemed necessary after the Autumn migration period.

  It is not considered necessary to re-survey in the summer, from desk-based study of the Batumi flyway and based on the pre-existing Project ornithological information, bird numbers are shown to be low and predominantly species of lower conservation concern.

- **Critical Habitat**. The relatively low bird numbers recorded (relative to their global populations) do not meet EBRD PR6 thresholds for CH. However, the data only covers one migration season partially and additional data and a detailed CHA is needed to confirm this.

- **Post-construction monitoring.** In addition to further surveys, post-collision monitoring will be required and should explore the use of radar technology given the site's flat and open topography which indicates this might be a suitable method. Results from such post-construction monitoring should inform an adaptive management approach to mitigation.

- **Switch-off mechanisms.** The Spring 2024 field surveys and CRM suggest that a switch-off mechanism would mitigate bird impacts on site and should be defined in the final Project design, as required by the draft ESAP. These mechanisms have been demonstrated to be highly effective at reducing soaring bird mortality[4] and balancing species conservation with wind energy production[5].

  Switch-off mechanisms are designed to temporarily stop wind turbines at specific locations when birds are at risk of collision, thereby reducing bird mortality. The number of turbines that is stopped on each occasion, as well as shutdown period, may vary from a single turbine to the whole wind farm, depending on the bird numbers and behaviour. After the risk-associated event is over, turbines that have been stopped may be restarted.

  Broadly, there are three categories of mechanism:

  - Human-Based Systems: Relatively low initial cost and flexible deployment, but limited by human error, fatigue, and restricted detection range.
  - Fully Automatic Systems: Provide continuous monitoring and high accuracy but are costly and complex to install, with potential for false positives.
  - Hybrid Systems: Combine the strengths of both human and automatic systems, offering reliability and flexibility, but are resource-intensive and can introduce decision-making delays.

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4 STRIX (2017). Wind turbine shutdown on demand operations and bird migration monitoring in the Gabal el Zayt Wind Farm (200 MW), Egypt. Unpublished report. Portugal.

5 Tomé R, Canário F, Leitão AH, Pires N & Repas M (2017) Radar assisted shutdown on demand ensures zero soaring bird mortality at a wind farm located in a migratory flyway. In: J Köppel (ed.) Wind energy and wildlife interactions. Springer.

Each mechanism uses various technologies and methodologies for detection and response (e.g. curtailment or deterrence). These potential technologies range from camera and radar based systems to human observers at strategic vantage points at agreed times of year (e.g. migration periods), and combinations thereof.

The precise parameters of an appropriate switch-off mechanism should be defined in an Active Turbine Management Plan (ATMP). This should be prepared by suitably qualified experts in time to inform final Project designs (noting that switch-off mechanisms can be retrofitted if necessary). EA's current understanding is designs will not be finalised before December 2024, and so recommend drafting the ATMP over summer, based on Spring 2024 data, and finalising once the results of the Autumn 2024 surveys are available,

After choosing the bird detection and identification methodology, the ATMP should apply an adaptive management approach to account for the results of further surveys in Spring 2025 and to optimize sensor and observer positions, ensuring robust coverage and effective bird detection. To that end, it is possible to retrofit switch-off mechanisms as required, as well as adapting if suitably qualified experts consider post-construction monitoring results to determine bird collision risk is negligible. There are benefits and challenges depending on chosen technologies in the ATMP. Retrofitting benefits include improved detection capabilities and integration with existing turbine operations, but challenges include the need for technical expertise and potential compatibility issues with current infrastructure.

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