# Biodiversity Action Plan for Namaacha Wind Farm Project, Mozambique

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Front cover photo: Namaacha Wind Farm Area; photo R. Tomé/TBC.

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Signature of Technical Director

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# Executive Summary

This document is the Biodiversity Action Plan (BAP) for the Namaacha Wind Farm Project. According to the Critical Habitat Assessment (CHA) (Appendix 4), three bird species, whose presence has been confirmed in the Project area, qualify for Critical Habitat (CH): the White-backed Vulture (*Gyps africanus*), Martial Eagle (*Polemaetus bellicosus*) and Bateleur (*Terathopius ecaudatus*). A further 21 species (16 birds, three reptiles and two plants) have been identified as priority biodiversity features in this BAP, as they are of stakeholder concern and their presence in the Project area has been confirmed or assumed likely. Additionally, 14 bat species, which show higher susceptibility to collisions, are also considered priority. Following a recent revision of the conservation status of threatened ecosystems in Mozambique, no threatened ecosystems qualify as CH or are likely to be affected by the Project. The Project does not overlap with any Legally Protected and Internationally Recognized Areas (as per IFC PS6 definition), however, it overlaps with the Namaacha Tropical Important Plant Area (TIPA) which holds botanical significance.

The main expected residual impacts of the Project (assuming that all mitigation commitments will be implemented) include:

- Bird and bat collisions with the turbines and the transmission line: annual residual impacts for the 19 CH and priority bird species range from ~0 to 12 individuals. Based on a review of wind farms in South Africa (Aronson 2022), the annual residual impact to all bats may vary between 12-1,824 individuals.
- Habitat loss under the Project footprint and surrounding areas: the Project is estimated to directly affect (100% loss) 85.47 ha of non-critical natural habitat. Residual impacts have been calculated in Quality Hectares (QH) and they consider the 100% direct loss under the Project footprint and additional loss in habitat quality around the Project footprint. Residual loss of non-critical natural habitat is estimated to be 156.23 QH.

The CH-qualifying species, White-backed Vulture, Martial Eagle and Bateleur, require Net Gain (NG), and 16 other priority bird species require No Net Loss (NNL). Offset targets are 1-2 individuals/year for the CH-qualifying birds and range from 1 to 12 for other priority birds. Regarding bats, mitigation, as committed to in the ESIA, should be implemented to ensure that impacts do not exceed the thresholds (MacEwan et al. 2020). No offset action is currently proposed for bats.

Three different offsets are proposed to demonstrate NG and NNL for priority biodiversity on this Project:

- One offset targets the protection and enhancement of non-critical natural habitats affected by the Project. This offset aims to generate > 156.23 QH of non-critical natural habitat through actions such as decreasing grazing pressure, restoring degraded habitats and eradicating non-native flora. The Namaacha Tropical Important Plant Area (TIPA) will be favoured as the implementation area for these actions.
- A second offset aims at reducing threats and increasing habitat quality for, and consequently the breeding success and number of individuals of Martial Eagles and

Bateleurs. Maputo Special Reserve and Namaacha TIPA are the preferred implementation areas for actions such as nest protection and guarding, installation of artificial nesting structures, and habitat restoration and management for increasing the populations of main prey of raptor species.

- Finally, a third offset targeting at reducing mortality by poisoning of White-backed Vultures is proposed to be implemented probably in the Limpopo National Park area. This offset will involve the development of an awareness campaign around the illegality of killing vultures, the supporting to law enforcement, and the supporting of alternative livelihood options to community members engaged in illegal poisoning as an economic activity.

# 1. Introduction

## 1.1 Background

This document is the Biodiversity Action Plan (BAP) for the Namaacha Wind Farm project (the Project), located near Namaacha, in southern Mozambique. The Project is being developed by Central Eléctrica da Namaacha (CEN), a consortium comprised of Globeleq Africa Limited (Globeleq), Source Energia, and Electricidade de Moçambique, E.P (EDM). Globeleq will be the lead member of the consortium responsible for operation. Project alignment with the International Finance Corporation's (IFC's) Performance Standard 6 (PS6) on Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC 2012, 2019) is required to meet Globeleq's corporate standards and the Project lenders' requirements.

## 1.2 Purpose and objectives of the BAP

The purpose and aim of this BAP is to describe a series of actions by which the Project will demonstrate biodiversity Net Gain (NG) for Critical Habitat-qualifying features and No Net Loss (NNL) for Natural Habitat (NH). NNL will also be demonstrated for other priority biodiversity values that do not trigger Critical Habitat (CH). The BAP also sets out the approach for how the mitigation hierarchy will be followed, and the roles and responsibilities for internal staff and external partners.

The objectives of this BAP are to:

- Identify the priority biodiversity values in the Project area that are subject to NNL/NG targets;
- Identify and engage with key stakeholders relevant to the implementation of the BAP;
- Summarise the mitigation measures for implementation during construction and operation phases;
- Estimate residual impacts to priority biodiversity values; and,
- Set out a framework for biodiversity offsets, as well as monitoring and evaluation to enable the Project to demonstrate achievement of the NNL/NG targets.

This BAP has been prepared in-line with IFC PS6 and IFC Guidance Note 6 (IFC 2012, 2019), World Bank Group's Environmental Health and Safety (EHS) Industry General and Sectoral Guidelines on Wind Energy (World Bank Group 2015), Mozambique's National Biodiversity Strategy and Action Plan (https://www.cbd.int/countries/?country=mz) and other international/ national guidance (e.g. IPIECA 2022). The BAP actions are devised in-line with the mitigation hierarchy: i.e., avoid, minimise, restore and offset. Biodiversity offsetting measures are identified and developed following IFC PS6 requirements, and guidance published by the Business and Biodiversity Offsets Programme (BBOP 2012). The Mozambique Directive on Biodiversity Offsets (Ministry of Land and Environment 2022) has been also considered in this BAP.

It is important to note that BAPs are 'living' documents, i.e. intended to be reviewed and updated on a regular basis. Regular review and update will take place as Project implementation

progresses, and as more information becomes available on the status and ecology of priority biodiversity values, the impacts on these values and the effectiveness of mitigation actions. This adaptive management approach will be informed by the Project's Biodiversity Monitoring and Evaluation Plan (BMEP; Appendix 3).

## 1.3 Spatial and temporal scope of the BAP

The spatial (geographical) scope covered by this BAP includes:

- Project Area of Influence, including the full extent of the Overhead Transmission Line (Figure 1)
- Ecologically Appropriate Areas of Analysis (EAAA) for the threatened ecosystems, as defined in the Critical Habitat Assessment (CHA) for this Project (Appendix 4)
- Other areas beyond the EAAAs, which are considered for offset implementation (see Section 8 and Appendix 2)

This BAP includes actions over the proposed lifespan of the Project (i.e., 25 years), with actions ending at different times depending on the priority biodiversity feature and target.

## 1.4 Stakeholder engagement

IFC's PS6 strongly recommends projects to develop partnerships with recognised and credible conservation organisations, academic institutes, biodiversity experts and the relevant government agencies, to seek their advice during the development and implementation of a BAP. This is especially important for projects located in NH and CH, or in legally protected and internationally recognised areas (IFC 2019). Engagement with government, community and any local NGO representatives early and through the Project will help ensure that potential offsets receive broad support and avoid unplanned costs or delays in progress towards NNL or NG. It will also ensure that the Project can learn and incorporate useful elements from other conservation programmes elsewhere in the region.

As part of the Environmental and Social Impact Assessment (ESIA) for the Namaacha Wind Farm Project, a public participation process was conducted in 2019 (Matos, Fonseca & Associados 2022). A first public consultation session was carried out in February, on the basis of a "draft" Environmental Pre-feasibility and Scoping Study (EPDA) and Terms of Reference (ToR), which set out the main issues to be addressed in the ESIA and were disclosed to the public in general, and involved (national and local) stakeholders in particular. The results of this public consultation were taken into account in the preparation of the final EPDA and ToR and which had the favourable opinion of the Ministry of Land, Environment and Rural Development (MITADER). These formed the basis for preparing a draft ESIA report, which was subject to a second public consultation in early December 2019. Importantly, the questions addressed during the public participation process focused mainly on socio-economic concerns, with no specific questions or requirements on biodiversity aspects being raised in any session (Matos, Fonseca & Associados

2022). The ESIA was subsequently approved by the Ministério de Terra e Ambiente (MTA) in 2022.

The Environmental and Social Impact Assessment for the 66 kV Overhead Transmission Line (OHTL) between the Namaacha Wind Farm and the Boane substation also incorporated a wide Public Participation Process (PPP). This was carried out between December 2022, during the Environmental Pre-Feasibility Study and Scope Definition (EPDA) phase, and October 2023, after the disclosure of the draft ESIA, and involved several meetings with the general public as well as national and local stakeholders (Consultec 2023). While the large majority of topics discussed in the PPP sessions focused on socio-economic aspects, some participants raised their concerns about potential deforestation activities associated with the construction and maintenance of the OHTL, as well as about potential impacts on wildlife from increased traffic in new accesses that will be built. These concerns will be addressed through adequate mitigation measure (see Section 6 and Table 11).

To inform the CHA (Appendix 4), consultation was undertaken with a regional expert on flora, habitats and ecosystems (Ibis) through Ibis's role as the Lenders Environmental and Social Advisor for the Project.

For the development of this BAP, several stakeholders were contacted (Table 1), especially those holding responsibility on the designation and management of Protected Areas, those involved in the development and implementation of Mozambique's offset strategy, or those that have in-country experience in developing conservation work and community engagement (Table 1). While some preliminary communication took place remotely, most significant meetings were held during the in-country visit by Globeleq and TBC, between 19th and 22nd March 2024. During the initial meetings, the Namaacha Tropical Important Plant Area (TIPA) (see Section 4.2.7), overlapping the Project, was identified as a likely preferential area to implement offsets (see Appendix 2). Therefore, this area was also visited, and contacts with local stakeholders held, during the in-country visit. Appendix 1 presents summary minutes of the main meetings held during the in-country visit.

*Table 1. Identified Stakeholders potentially relevant to the BAP implementation and engagement status up to April 2024.*

| Stakeholder | Contact | Current engagement status |
|---|---|---|
| Transfrontier Conservation Areas – Southern African Development Community | https://tfcaportal.org/ | Contacted via email on 12/12/2023; no response was obtained |
| ANAC - National Administration for Conservation Areas/Administração Nacional das Áreas de Conservação | https://www.anac.gov.mz/anac/ | Contacted via email on 19/12/2023; no response was obtained |
| Prof. in Department of Biological Sciences, University of Eswatini, regional expert | REDACTED | Contacted via email on 19/12/2023; responded on 25/12/2023 providing contacts of biodiversity experts in Mozambique. |
| WCS Mozambique KBAs and Red Lists Technical Coordinator | REDACTED | Contacted via email in January 2024, took part in several remote meetings to discuss the best approach for developing offsets for the Project, and the importance of Namaacha TIPA. |
| WCS – Wildlife Conservation Society Mozambique; Marine Programme Director | https://mozambique.wcs.org/ | Contacted 28/12/2023, participated in several remote meetings, providing valuable advice and information on Mozambican environmental legislation, and on the national strategy for offsets implementation (which has been developed with significant support by WCS); also facilitated in-country contacts with several other stakeholders and the in-person meeting with BIOFUND. |
| BIOFUND – Biodiversity Conservation Foundation/Fundação para Conservação da Biodiversidade; Director for Innovative Financing | https://www.biofund.org.mz/en/ | Contacted via email on 28/12/2023; an in-person meeting was held in Maputo on 20/02/2024 (Appendix 1). Additional contacts during March and a remote meeting on 12/04/2024 were held to agree on the signing of a Memorandum of Understanding (MoU) establishing a general framework for collaboration and cooperation on selected biodiversity and ecosystem offset measures (see Section 8 and Appendix 2 for details on Biofund |

| Stakeholder | Contact | Current engagement status |
|---|---|---|
| | | role as an offset implementation partner). This MoU has already been signed by both parties. |
| Peace Parks Foundation; Programme Manager: Great Limpopo and Lubombo Transfrontier Conservation Areas; Chief Investment Officer | https://www.peaceparks.org/ | Contacted via email on 28/12/2023, with subsequent communication during February 2024; are interested in collaborating and await a remote meeting to be scheduled. |
| Eswatini National Trust Commission – Administrative Authority Lubombo Biosphere Reserve | https://en.unesco.org/biosphere/africa/lubombo | Contacted via email on 28/12/2023; no response was obtained. |
| DINAB - National Directorate of Environment (part of the Ministry of Land and Environment (MTA)); Technical Advisor for Biodiversity Offsets | https://www.mta.gov.mz/ | Contacted via email on 18/01/2023. Took part in a remote meeting and attended an in-person meeting in Maputo on 20/02/2024 (Appendix 1). |
| IIAM – Institute for Agriculture Research / Instituto de Investigação Agrária de Moçambique | https://iiam.gov.mz/ | Contacted via email on 15/02/2024, with subsequent communication during February; are interested in collaborating and await a remote meeting to be scheduled. |
| Expert ornithologist in Mozambique, MSc. researcher on vultures | REDACTED | Contacted via email on 13/02/2024. In-person meeting held on 19/02/2024 (Appendix 1). Additional contacts during March and April were held to agree on the signing of a MoU establishing a general framework for collaboration and cooperation on selected biodiversity and ecosystem offset measures (see Section 8 and Appendix 2 for details on the role of this ornithologist as an offset implementation partner). This MoU has already been signed by both parties. |

| Stakeholder | Contact | Current engagement status |
|---|---|---|
| VIDA; Projects Coordinator | https://vida.org.pt/en/ | Contacted via email on 16/02/2024. In-person meeting held on 19/02/2024 (Appendix 1). Additional contacts during March and a remote meeting on 05/04/2024 were held to agree on the signing of a MoU establishing a general framework for collaboration and cooperation on selected biodiversity and ecosystem offset measures (see Section 8 and Appendix 2 for details on VIDA role as an offset implementation partner). This MoU has already been signed by both parties. |
| Owner of property in Namaacha TIPA | REDACTED | Contacted via email on 15/02/2024. In-person meeting held on 21/02/2024 (Appendix 1). Additional contacts during March and a remote meeting on 04/04/2024 were held to agree on the signing of a Mo establishing a general framework for collaboration and cooperation on selected biodiversity and ecosystem offset measures (see Appendix 2 for details on the role of this landowner as an offset implementation partner). This MoU has already been signed by both parties. |
| EWT – Endangered Wildlife Trust | https://ewt.org.za/; ewt@ewt.org.za | Contacted via email on 15/03/2024. Additional contacts during April and a meeting on 05/04/2024 were held to discuss the possibility of signing of a MoU for collaboration and cooperation on the implementation of offsets (see Section 8 and Appendix 2 for details on the potential role of EWT as an offset implementation partner). Additional documentation was required by EWT and is being shared by Globeleq at the present date of this report. |
| Expert ornithologist, Natural History Museum of Mozambique | REDACTED | Contacted via email on 13/02/2024; no response was obtained. |
| AWF – African Wildlife Foundation | https://www.awf.org/country/mozambique | Not contacted to date. |

| Stakeholder | Contact | Current engagement status |
|---|---|---|
| Aga Khan Development Network/Foundation | https://the.akdn/en/where-we-work/eastern-africa/mozambique | Not contacted to date. |
| Province of Maputo / District of Namaacha Government; | https://www.pmaputo.gov.mz/ ; https://www.pmaputo.gov.mz/por/content/search?SearchText=Namaacha | Not contacted to date. |
| WWF Moçambique – World Wildlife Fund | https://www.wwf.org.mz/ | Not contacted to date. |

# 2 Project description

The Project is proposed to be developed near the town of Namaacha, 50 km west of Maputo, in southern Mozambique. This location is 2.5 km from the border with South Africa, and 6 km from the border with Eswatini (former Swaziland), in the geomorphological unit Terras Altas of the Libombos Chain Complex (Matos, Fonseca & Associados 2022) (Figure 1). This unit is marked by the Libombos mountain range, which extends in a north-south direction along the border between Mozambique, South Africa and Eswatini. The Project extends along a plateau surface along two ridges, with altitudes between 500 m and 600 m, and the Project wind farm area covers approximately 855 ha (Figure 1, Figure 2) (WSP 2023a).

The 120 MW Project consists of 20 turbines proposed in an approximate "T-shape", comprising a short row of turbines aligned in generally NNE-SSW, and a perpendicular, longer, row of turbines aligned generally E-W (Figure 3). The Project also has associated infrastructure including a series of access roads, on-site cabling, substation and control building and a 66 kV (high-voltage) transmission line connecting the Project to the national grid in Boane, 32 km to the south-east (Figure 1). The transmission line is comprised of two separate lines for redundancy. The 339 m closest to the Boane substation will be buried, but the remainder of the line will be an OHTL. The 5.4 km of the OHTL closest to Boane will be of a monopole design (with both lines running on single poles), whilst the remaining 37 km to the substation at the wind farm will consist of two separate lines running in parallel. There will be a 70 m wide

easement (protection zone) where vegetation is partially-cleared (slashed) with a 5 m wide maintenance road between the two lines in the double line section, and a 50 m wide easement (protection zone) with a 5 m wide maintenance road in the single line section. The OHTL extends over altitudes between 500 m (close to the wind farm) and a minimum of c. 12 m a.s.l. (4 km west of Boane). Full technical specifications of the Project can be found in the various ESIA documents (Matos, Fonseca & Associados 2022; Consultec 2023; WSP 2023a).

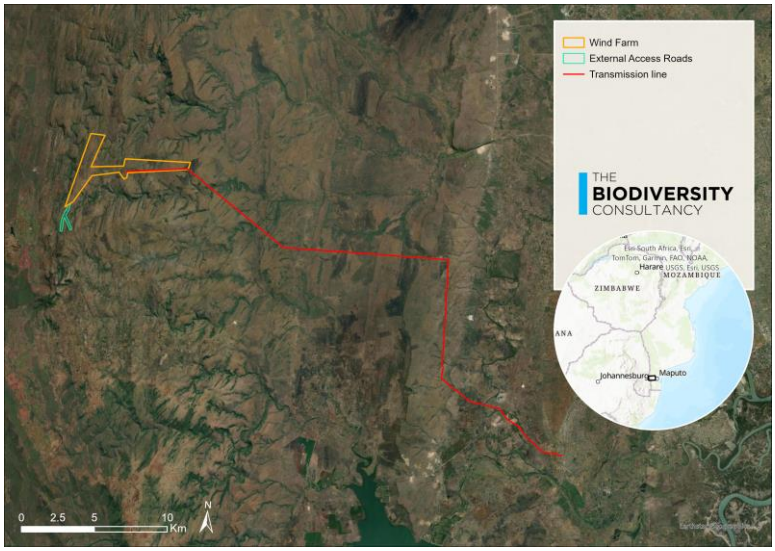


*Figure 1. The location of the planned Project infrastructure, in Mozambique (source: client-provided data).*

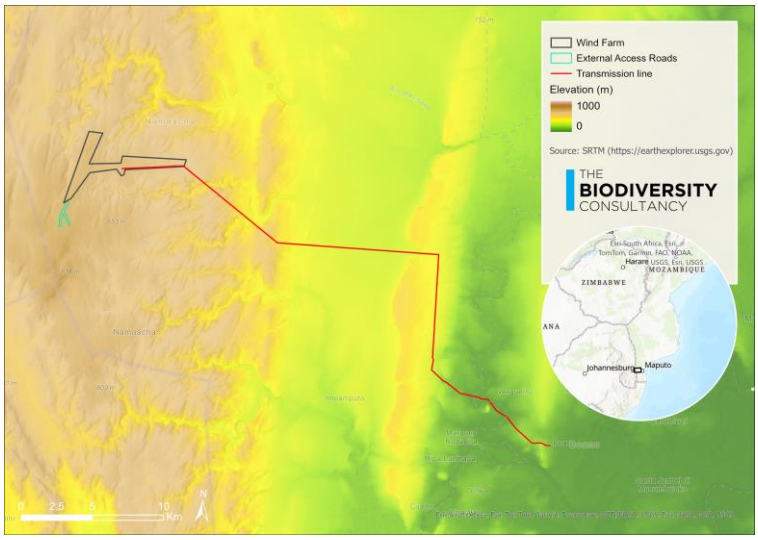


*Figure 2. Topography in the Project area.*

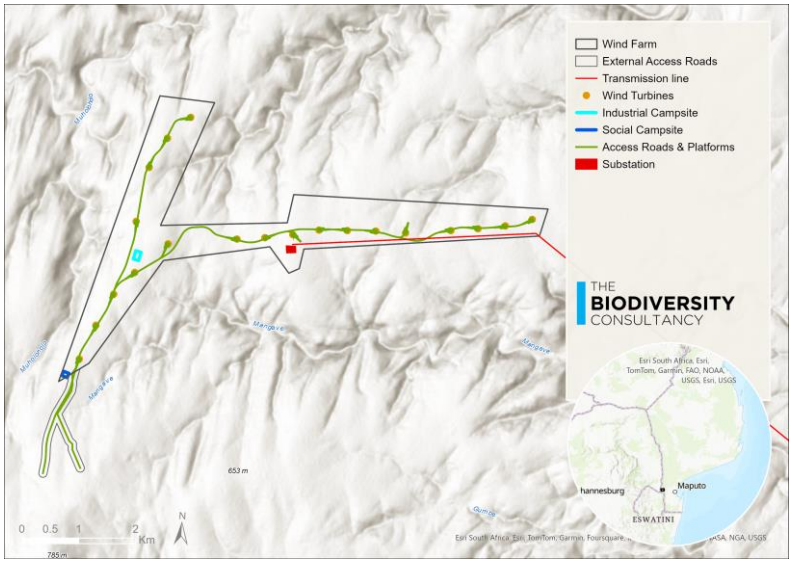


*Figure 3 . Close view of Project layout and location (source: client-provided data).*

# 3 Legislative, regulatory, policy and lender requirements

## 3.1 National legislation

The Mozambique institutions and legislation described in Table 2 below are relevant to this BAP.

*Table 2. National institutions and legislation relevant to the BAP.*

| Institution / Legislation | Description |
|---|---|
| Ministry of Land and Environment (MTA) | Established by Presidential Decree No. 1/2020, of 17 January, MTA is the central authority that plans, coordinates, controls and ensures the execution of policies related to the management of land, forests and wildlife, environment, conservation areas and climate change. |
| MTA's Provincial Environmental Services (SPA) | At the provincial level, MTA is represented by the SPA. EIA applications are managed by MTA through SPA at the provincial level. |
| MTA's National Directorate of Environment (DINAB) | Has responsibility for proposing environmental policies and regulations, promoting sustainable development, controlling and protecting environmental quality and manage and monitor ESIA processes at the national level. |
| National Agency for the Control of Environmental Quality (AQUA) | Was created by Decree 80/2010, of 31 December, amended by Decree 2/2016, of 10 February, and is responsible, among other attributions, to develop and implement strategies for the integrated control of water, air, and soil pollution. |
| National Administration for Conservation Areas (ANAC) | Is responsible for the management of conservation areas |
| National Environmental Policy, Resolution No. 5/95 of 6 December 1995 | This resolution lays the foundation for all environmental legislation, with the main objective is to ensure sustainable development. |
| Environment Law, Law no. 20/97, of 1 October 1997 | This law sets out the legal basis for the proper utilisation and management of the environment for the sustainable development of the country and applies to all public and private activities that directly or indirectly affect the environment.<br>This law also requires an Environmental Management Plan will includes adequate mitigation to minimise the Project's impacts on biodiversity. |

| Institution / Legislation | Description |
|---|---|
| Law on Forests and Wildlife (Law No 10 of 1999 of 07 July) | Establishes the basic rules and principles for the protection, conservation and sustainable use of forest resources and wildlife and requires that no protection area, as defined by this Law, is interfered with by the Project. |
| Regulation of the Forestry and Wildlife Act (Decree No 12/2002) | This regulation applies to the protection, conservation, use, exploitation and production activities of flora and fauna resources. The Proponent shall notify MITADER if a species listed in this regulation is affected or disturbed. |
| Decree No. 25/2008 Regulation for the Control of Invasive Alien Species | This decree prohibits activities involving invasive alien species without prior authorisation, and the National Environmental Authority (MTA) may prohibit any activity which may involve the spread of invasive alien species.<br>The decree suggests that adequate methods must be implemented to control and eradicate invasive alien species. |
| Decree No. 54/2015, of 31 December, which approves the Regulation on the Environmental Impact Assessment Process | Describes the scope and requirements for undertaking an Environmental Impact Assessment. |
| Decree No. 51/2021, of 19 July, which approves the Regulation on Protection, Conservation and Sustainable Use of Avifauna | Establishes e.g., the list of protected bird species, the list of bird species that can be hunted legally, and the possibility of establishing Important Bird Areas, Key Biodiversity Areas and other areas important for congregatory migratory birds, endangered birds or endemic birds, as Protection Areas for Avifauna |
| Ministerial Diploma No. 55/2022 of May 19th – Adoption of the Biodiversity Counterbalances Directive | Establishes the principles, methodologies, requirements and procedures for the correct implementation of Biodiversity Counterbalances, integrated into environmental impact assessment processes if significant residual impacts to key biodiversity areas, critical habitats or threaten species or ecosystems are identified. This Directive came into force already after the completion of the ESIA process for the Project. |
| Ministry of Land and Environment, Ministerial Order No 55/2022. Directive on Biodiversity Offsets. | This Directive establishes the principles, methodologies, requirements and procedures for the proper implementation of Biodiversity Offsets as part of environmental impact assessment procedures. The Directive stipulates that biodiversity offsets must |

| Institution / Legislation | Description |
|---|---|
| | be designed to achieve Net Gain (defined as a minimum 15% increase compared to No Net Loss) where any significant residual negative impacts of the project in its area of direct or indirect influence occur in i) Key Biodiversity Areas, ii) Critical Habitats according to IFC or High Conservation Value Areas according to the Forest Stewardship Council (FSC), and iii) any threatened species or ecosystems. On the other hand, offsets must target No Net Loss where significant residual negative impacts occur on a wider set of biodiversity features (e.g., legally protected species, ecosystems/habitats, which favours conditions for the existence of significant concentrations of migratory and/or congregating species) listed in the Directive. |

## 3.2 Corporate framework and policies

Globeleq holds to a global HSESS (Health, Safety, Environment, Social and Security) policy and high environmental, social and governance (ESG) standards, which are in-line with the IFC Performance Standards, including PS6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (Globeleq 2022).

Potential new projects are screened for environmental risks, including any potential impact on biodiversity. Negative impacts from projects are addressed at local level and the company also looks for opportunities to enhance biodiversity around project sites.

## 3.3 Lender requirements

The Project intends to align with IFC PS6 (IFC 2012, 2019) and other good international industry practice (GIIP) guidance such as the World Bank Group's Environmental Health and Safety Industry General and Sectoral Guidelines on Wind Energy (World Bank Group 2015), and OS6 (Environmental and Social Operational Safeguard 6) in the African Development Bank Group's Integrated Safeguards System (AFDB 2023). Specific PS6 requirements applicable to this BAP are highlighted in the relevant sections of this document. As part of these requirements, NG is required for those biodiversity values for which the Project is in an area of CH. Gains can either be generated via biodiversity offsets (that achieve measurable, additional outcomes) where the Project has impacts to CH-qualifying values or via supporting additional conservation activities that are focused on CH-qualifying values for which the Project has no impact. NNL is required, where feasible, for NH.

# 4 Biodiversity context

The Project is within the *Terras Altas* geomorphological unit of the Libombos Chain Complex, a series of mountain ranges stretching 800 km north-south and ~100 km east-west in north-eastern South Africa, Eswatini and south-western Mozambique. Within this unit, the Project is sited on a plateau of flattened ridges at an altitude of ~500 m in the east to ~600 m in the west. The plateau is crossed by a multitude of deep valleys, which form the tributaries of the Maxongoluluane, Mixumene, Mitesandene, Libunzene and Macuabane rivers. There are two well-defined seasons in the Project area: a warm, high rainfall season between October and April and a cooler, drier season between May and September.

Project components occur in three non-threatened mapped ecosystems: Lebombo Summit Sourveld, Southern Lebombo Bushveld and Western Maputaland Clay Bushveld (Lötter *et al.* 2023). These consist of wooded grasslands with varying height and density of canopy trees: these ecosystems are fully described in Lötter *et al.* (2023). Most of the Project area is likely to be subject to regular wood-cutting, grazing by livestock and be degraded to some extent.

The Project area does not overlap with any Legally Protected Areas or Internationally Recognised Areas. However, the Project (20 wind turbines and c. half of the OHTL extension) overlaps with the Namaacha Tropical Important Plant Area (TIPA)[1], which holds botanical significance due to presence of undisturbed forest patches, as well as the occurrence of succulent species, including *Aloe* and *Euphorbia* species, in rock outcrops. According to Mozambican national environmental authorities, this TIPA is likely to be classified in the future as KBA.

## 4.1 Baseline and monitoring studies

Apart from literature review and expert consultation, flora and fauna surveys have been carried out as part of the EIA for the wind farm (Matos, Fonseca & Associados 2022), with additional bird (AfriAvian Environmental 2023) and bat (Arcus 2023) monitoring being conducted to the level expected by international good practice. Biodiversity surveys were also conducted along the transmission line (Consultec 2023) More recently, a detailed flora and vegetation study was carried out at the wind farm area and along the OHTL (Coombes 2024). A summary of all biodiversity surveys conducted to date in the Project area is presented in Table 3.

[1] https://tipas.kew.org/site/namaacha/

*Table 3. Biodiversity surveys conducted in the Project area.*

| Biodiversity group | Methods | Area | Sampling period | Context (source) |
|---|---|---|---|---|
| Flora and vegetation | • Transects | Wind Farm area | Oct 2018<br>Feb 2019 | Wind Farm EIA (Matos, Fonseca & Associados 2022) |
| Amphibians and reptiles | • Visual inspection and net sampling of water point<br>• Day and night transects | Wind Farm area | Oct 2018<br>Feb 2019 | Wind Farm EIA (Matos, Fonseca & Associados 2022) |
| Birds | • Day Transects<br>• Vantage points<br>• Night transects<br>• Visual inspection of dam | Wind Farm area | Oct 2018-Aug 2019 (every two months) | Wind Farm EIA (Matos, Fonseca & Associados 2022) |
| Non-flying mammals | • Day and night transects | Wind Farm area | Oct 2018<br>Feb 2019 | Wind Farm EIA (Matos, Fonseca & Associados 2022) |
| Bats | • Static acoustic detection with automatic detectors*<br>• Acoustic detection with hand-held detectors<br>• Roost surveys<br>• Mist-netting | Wind Farm area | Oct 2018-Jul 2019*<br>Oct 2018; Feb 2019 | Wind Farm EIA (Matos, Fonseca & Associados 2022) |
| Flora and vegetation | • Transects in sampling plots | OHTL area | Oct-Nov 2022<br>Mar 2023 | OHTL EIA (Consultec 2023) |
| Amphibians and reptiles | • Transects<br>• Targeted searches in suitable microhabitats | OHTL area | Nov 2022<br>Mar 2023 | OHTL EIA (Consultec 2023) |
| Birds | • Transects<br>• Point counts at water bodies and rivers | OHTL area | Nov 2022<br>Mar 2023 | OHTL EIA (Consultec 2023) |
| Non-flying mammals | • Transects<br>• Enquiries to local communities | OHTL area | Nov 2022<br>Mar 2023 | OHTL EIA (Consultec 2023) |
| Bats | • Roost survey<br>• Enquiries to local communities | OHTL area | Nov 2022<br>Mar 2023 | OHTL EIA (Consultec 2023) |
| Bats | • Static acoustic detection with automatic detectors<br>• Acoustic detection with hand-held detectors<br>• Roost surveys | Wind Farm area | Jun 2021–Jun 2022 | Bat Pre-Construction Monitoring (Arcus 2023) |
| Birds | • Vantage points<br>• Car and walk transects | Wind Farm area and control area | Nov 2022<br>Feb-Jun 2023 | Bird Pre-Construction Monitoring (AfriAvian Environmental 2023) |
| Flora and vegetation | • Plotless survey transects | Wind Farm and OHTL areas | March–April 2024 | Flora assessment and vegetation mapping (Coombes 2024) |

## 4.2 Priority biodiversity values

### 4.2.1 Overview

This BAP focuses on habitats and species that require special management measures rather than all biodiversity. The priority species for this BAP are those within at least one of the categories below (elaborated in subsequent sections), and which are likely to be affected by the Project:

- Potential Critical Habitat-qualifying species;
- Species of stakeholder concern; or,
- Species of high sensitivity to collisions with turbines and OHTLs.

The following habitats, ecosystems and designated areas, which are likely to be affected by the project, are also priorities in this BAP:

- Critical and natural habitats; and
- Legally protected areas and internationally protected areas.

Based on the Red List of Ecosystems assessment for Mozambique (Lötter *et al.* 2021) and associated publicly-available data, four threatened ecosystems were initially considered for assessment (Appendix 4). However, during the preparation of the BAP, the conservation status of ecosystems in Mozambique was updated, which resulted in three ecosystems identified within the EAAA previously considered threatened (Lebombo Summit Sourveld, Western Maputaland Bushveld and Subtropical Coastal Saltmarsh) being downgraded to Least Concern, and one ecosystem (Lebombo-KwaZulu Natal Scarp Forest) being downgraded to Vulnerable (Lötter *et al.* 2023; SIBMOZ 2024). Whilst the previous Critical Habitat Assessment (CHA) was not revised to reflect this change (Appendix 4), this BAP version has now incorporated this change, and the threatened ecosystems identified in the previous CHA have been excluded from further consideration as Critical Habitat.

There are no threatened/unique ecosystems that trigger critical habitat in the EAAA. Therefore, ecosystems are not included amongst the priorities in this updated BAP.

### 4.2.2 Potential Critical Habitat-qualifying biodiversity

Areas of "high biodiversity value" are termed Critical Habitat by the IFC. Such a designation is based on the presence and/or quantity of significant types of biodiversity (e.g., threatened species, highly threatened ecosystems) and is independent of the condition of the habitat. The criteria to determine CH are summarised in Table 4. In addition, IFC PS6 gives special attention to certain internationally recognised areas of high biodiversity value.

*Table 4. IFC PS6 Critical Habitat criteria.*

| Criteria | Nature of thresholds | Units |
|---|---|---|
| **Criterion 1 (C1)**: Critically Endangered and Endangered species | Quantitative | Percentages of global and national population sizes combined with – whenever available - minimum numbers of reproductive units [2] |
| **Criterion 2 (C2)**: Restricted-range species | | |
| **Criterion 3 (C3)**: Migratory/congregatory species | | |
| **Criterion 4 (C4)**: Highly threatened and/or unique ecosystems | | Percentage of global extent |
| **Criterion 5 (C5)**: Key Evolutionary Processes | Qualitative | Presence of landscapes with high spatial heterogeneity, environmental gradients and features of demonstrated importance to climate change adaptation |

TBC undertook a separate CHA and the priority species identified in Table 5 are based on that assessment (Appendix 4). Three bird species possibly qualify as CH. These species are 'possibly CH' as the range overlap is close to the threshold, or there is the potential for the EAAA to have a higher proportion of the population than average, and the species' presence has been confirmed in the Project area (Appendix 4). Based on the assumptions made during the CHA (namely assuming a uniform habitat suitability within the EAAA, and that the number of pairs present in the EAAA is similar to that reported from studies in other areas in Africa; Appendix 4), the thresholds for CH would be exceeded and therefore these species are treated as CH in this BAP.

*Table 5. Species assessed as qualifying for Critical Habitat (Appendix 4).*

| Taxa | Scientific name | English name | IUCN Cat. | CH-criteria | Presence in EAAA |
|---|---|---|---|---|---|
| Birds | *Gyps africanus* | White-backed Vulture | CR | C1, C3 | Confirmed – recorded during pre-construction avian surveys. No nests found in Project area; nearest colony is 30-35 km away (AfriAvian Environmental 2023). |
| | *Polemaetus bellicosus* | Martial Eagle | EN | C1 | Confirmed – recorded during pre-construction avian surveys. Observed |

[2] The IUCN KBA Standard uses the following definition for *reproductive unit*: "the minimum number and combination of mature individuals necessary to trigger a successful reproductive event at a site (Eisenberg 1977). Examples of five reproductive units include five pairs, five reproducing females in one harem, and five reproductive individuals of a plant species."

| Taxa | Scientific name | English name | IUCN Cat. | CH-criteria | Presence in EAAA |
|---|---|---|---|---|---|
| | | | | | behaviour indicated a high probability of a nest just north of the Project area (Matos, Fonseca & Associados 2022). |
| | *Terathopius ecaudatus.* | Bateleur | EN | C1 | Confirmed – recorded during pre-construction avian surveys. No nests found in Project area (AfriAvian Environmental 2023). |

### 4.2.3 Species of stakeholder concern

A list of potential species of stakeholder concern was compiled from those species with confirmed, or assumed likely presence[3], in the Project area and which were:

- Identified as priority species during pre-construction avian surveys (AfriAvian Environmental 2023);
- Identified during transmission line alternatives screening walkover (2024);
- Classified by IUCN as CR/EN/VU (that had not triggered CH);
- Listed as CR/EN/VU in national red lists;
- Used for the classification of overlapping/neighbour PAs/IRAs; or,
- With cultural/economic or other interest and that have been flagged by stakeholders.

Following this approach, 22 species were identified as of stakeholder concern (Table 6). While most of these species do not qualify for CH, it is good practice to include such species as priority species in the Project's BAP to ensure that appropriate mitigation measures for these species are developed and applied.

*Table 6. Priority species of stakeholder concern.*

| Taxa | Scientific name | English name | IUCN Cat. | Presence in EAAA |
|---|---|---|---|---|
| Reptiles | *Kinixys natalensis* | KwaZulu-Natal Hinged-back Tortoise | VU | Presence confirmed in the Project area during the ESIA (Matos, Fonseca & Associados 2022). |
| | *Smaug warreni* | Lebombo Dragon Lizard | LC (restricted-range) | Presence not confirmed in Project area during ESIA but has been assessed as potential (Matos, Fonseca & Associados 2022) or probable (for the wider area; WSP 2023) due to suitable habitat and insufficient survey effort to rule out presence. A recent record (2021) is just 3.5 km from the Project area (GBIF). |

[3] This included species for which suitable habitat occurs in the Project area and for which insufficient survey effort has been completed to confirm absence.

| Taxa | Scientific name | English name | IUCN Cat. | Presence in EAAA |
|---|---|---|---|---|
| | *Platysaurus lebomboensis* | Lebombo Flat Lizard | LC (restricted-range) | Presence confirmed in the Project area during the botanical survey (Coombes 2024), that recorded the species in rocky areas within the wind farm area and in one offset area (the private-owned offset option; see Section 8.5). Presence not recorded in Project area during the ESIA surveys (WSP 2023). Two recent records (2022) are 6 km from the Project area (GBIF). |
| Plants | *Barleria lebombonensis* | | EN | This species was not recorded in the botanical survey of the wind farm area and Project OHTL (Coombes 2024). It has been discovered recently in Eswatini (Darbyshire *et al.* 2017). Presence not confirmed in the Project, but considered as highly likely (Ibis/SLR Consulting, pers. comm.), since the habitat in the wind farm location is very similar to that where the species is found. The type locality is about 37 km from the Project OHTL and 41 km from the proposed wind farm location. |
| | *Chyphostemma barbosae* | | Not listed | This species has been previously classified as EN in the national Plant Red List for Mozambique (Izidine & Bandeira 2002).It is not listed on the IUCN Red List (IUCN 2024)and its threat status is not included in a recent review by Darbyshire *et al.* 2019. Although its EOO has not been assessed by the IUCN, the species appears to have a restricted range across Mozambique, Eswatini and South Africa, with an EOO of 4,617 km$^2$ based on records in GBIF (GBIF 2024). Coombes (2024) recorded this species and described it as widely scattered and common through the Project area, but more often confined to rockier outcrops adjacent to river courses. This species does not trigger CH because overlap of global EOO with EAAA is well below the 10% threshold. |
| Birds | *Polyboroides typus* | African Harrier-Hawk | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Aquila spilogaster* | African Hawk Eagle | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Cicconia nigra* | Black Stork | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Lissotis melanogaster* | Black-bellied Korhaan | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Circaetus pectoralis* | Black-chested Snake Eagle | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Elanus caeruleus* | Black-winged Kite | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Circaetus cinereus* | Brown Snake Eagle | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Buteo buteo* | Common Buzzard | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |

| Taxa | Scientific name | English name | IUCN Cat. | Presence in EAAA |
|---|---|---|---|---|
| | *Buteo rufofuscus* | Jackal Buzzard | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Falco biarmicus* | Lanner Falcon | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Falco peregrinus* | Peregrine Falcon | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Scleroptila shelleyi* | Shelley's Francolin | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Anthus brachyurus* | Short-tailed Pipit | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Hieraaetus wahlbergi* | Wahlberg's Eagle | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Stephanoaetus coronatus* | Crowned Eagle | LC | Recorded during pre-construction avian surveys (AfriAvian Environmental 2023). |
| | *Aquila rapax* | Tawny Eagle | VU | Recorded in a single occasion in field surveys conducted at the Project area (Matos, Fonseca & Associados 2022). Occasional records inside the EAAA and seen more frequently close to the EAAA boundaries (eBird) |
| Mammals | *Loxodonta africana* | African Savanna Elephant | EN | Scat observed within the EAAA during T-line alternatives screening walkover. Consultation with local communities and the Mozambique Wildlife Alliance confirmed that elephants occasionally visit the area (particularly in the low-land areas in Namaacha District). These elephants are tracked and are known to come from either Kruger National Park in South Africa or the Maputo Elephant Game Reserve in Mozambique. As the EAAA is not part of the extant range for this species and elephants only visit the EAAA ocassionally, this is not considered a critical habitat trigger for the Project. |

**Commented [GU1]:** MC: I have moved this text to Impacts as it doesn't fit here. I have also amended the text above because we can't use mitigation when discussing CH.

### 4.2.4 Species of high sensitivity to collisions with turbines and OHTLs

Some bird and bat species show higher susceptibility to collisions with wind turbines or the OHTL, and/or any fatalities may have a greater population-level effect due to their small population sizes or slow reproductive rates. The list of priority species in the bird survey report already considered those which are more susceptible to wind energy impacts (AfriAvian Environmental 2023: page 17) and so are considered in the section above: as such, this section considers only bats as the other species group with potentially high sensitivity to collision with turbines and OHTLs.

For bats, priority species were considered as those which are primarily open-air foragers (as defined in Monadjem *et al.* 2010) or fruit-bats, both traits which correspond to high collision risk, or had the highest fatalities in South Africa (Aronson 2022), and that were confirmed from, or potentially occur in, the Project area (Table 7).

*Table 7. Priority bat species for the Project. Species with impact thresholds of zero or one following South African guidelines (MacEwan et al. 2020) are shown in bold.*

| Scientific name | English name | IUCN Cat. | Presence in EAAA and Project area (Arcus 2023) |
|---|---|---|---|
| *Miniopterus natalensis*[4] | Natal Long-fingered Bat | LC | Confirmed presence in the Project area. |
| *Neoromicia capensis* | Cape Bat | LC | Confirmed presence in the Project area. |
| *Neoromicia nana* | Banana Pipistrelle Bat | LC | Confirmed presence in the Project area. |
| *Neoromicia zuluensis* | Zulu Pipistrelle Bat | LC | Confirmed presence in the Project area. |
| ***Eidolon helvum*** | **African Straw-coloured Fruit-bat** | **NT** | **Potential presence in the Project area.** |
| ***Epomophorus crypturus*** | **Peters's Epauletted Fruit Bat** | **LC** | **Potential presence in the Project area.** |
| ***Epomophorus wahlbergi*** | **Wahlberg's Epauletted Fruit Bat** | **LC** | **Potential presence in the Project area.** |
| *Tadarida aegyptiaca* | Egyptian Free-tailed Bat | LC | Confirmed presence in the Project area. |
| *Chaerephon ansorgei* | Ansorge's Wrinkle-lipped Bat | LC | Confirmed presence in the Project area. |
| *Chaerephon pumilus* | Little Free-tailed Bat | LC | Confirmed presence in the Project area. |
| *Mops condylurus* | Angolan Mops Bat | LC | Confirmed presence in the Project area. |
| *Otomops martiensseni* | Large-eared Free-tailed Bat | NT | Confirmed presence in the Project area. |
| ***Scotoecus albofuscus*** | **Light-winged Lesser House Bat** | **DD** | **Confirmed presence in the Project area.** |
| *Taphozous mauritianus* | Mauritian Tomb Bat | LC | Confirmed presence in the Project area. |

### 4.2.5 Critical and natural habitats

There are no habitats qualified as CH in the Project area. CH birds are not used to classify specific (suitable) areas of habitat as critical, due to their wide-ranging movements and high likelihood of occurring over the large majority of the habitats in the Project area and its vicinity. The conservation status of two ecosystems previously identified as triggering CH (Appendix 4) changed during the production of the BAP, with Lebombo Summit Sourveld and Western Maputaland Clay Bushveld ecosystems re-evaluated as Least Concern (Lötter *et al.* 2023). Therefore, this BAP version has been updated to reflect these changes.

Based on field-collected data (Coombes 2024), aerial imagery (Zanaga et al. 2022: imagery from 2021) information from previous field work assessments in the Project area, and expert consultation, the Project is located in an area mostly consisting of NH (NH occupies >90% of the area within a 20 km buffer around the wind farm boundary and a 10 km buffer area around the OHTL route) (Table 8, Figure 4 and Figure 5). Most areas of NH have some level of livestock grazing, however these impacts are unlikely to have disrupted the area's primary ecological

[4] Natal Long-fingered Bat *Miniopterus natalensis* was also flagged as potentially of concern in the Bat Monitoring Study (Arcus 2023, due to the presence of a roost with 14,000 - 16,000 individuals 10.2 km to the south of the Project.

functions or species composition. Likewise, many areas of NH are likely to have some presence of small-scale traditional and subsistence agriculture, with the main agricultural products being corn, cassava, cowpea, peanut, and sweet potato (Matos, Fonseca & Associados 2022, Consultec 2023). Larger areas of Modified Habitat (MH), consisting mostly of more intensive croplands and dwellings, are present near the OHTL substation (Boane area) and to the west of the Project, in South Africa (Figure 4 and Figure 5).

Globeleq commissioned an ecologist to conduct a detailed habitat mapping survey at the wind farm area and along the proposed OHTL routing in February-March 2024 (Coombes 2024). The results of this survey were used to refine habitat classifications and the RIA in this version of the BAP.

Table 8 provides and overview of the habitats present in the BAP study area and their status as either natural or modified habitat. This information is to illustrate the habitats available for the priority species in the wider area. The calculation of the actual habitat losses likely to be caused by the Project is presented in the residual impact assessment below (Section 7).

The habitat calculation was based on ESA World Cover dataset, visually crosschecked with satellite images to confirm the classification. Furthermore, within the project footprint, classes were also ground-truthed by field surveys (Coombes 2024).

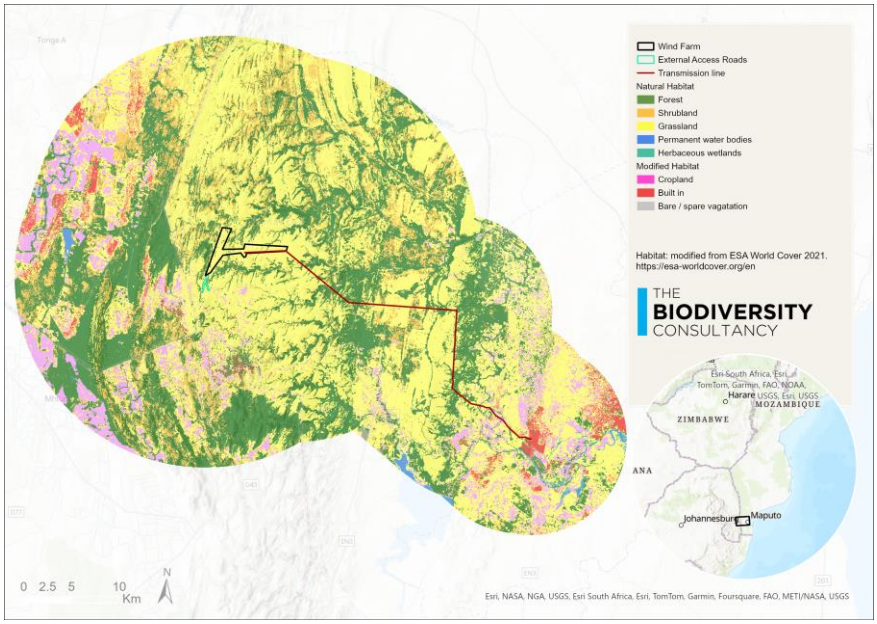


*Figure 4. Map showing land cover (ESA WorldCover 2021) within a 20 km buffer around the wind farm boundary and a 10 km buffer around the OHTL route.*

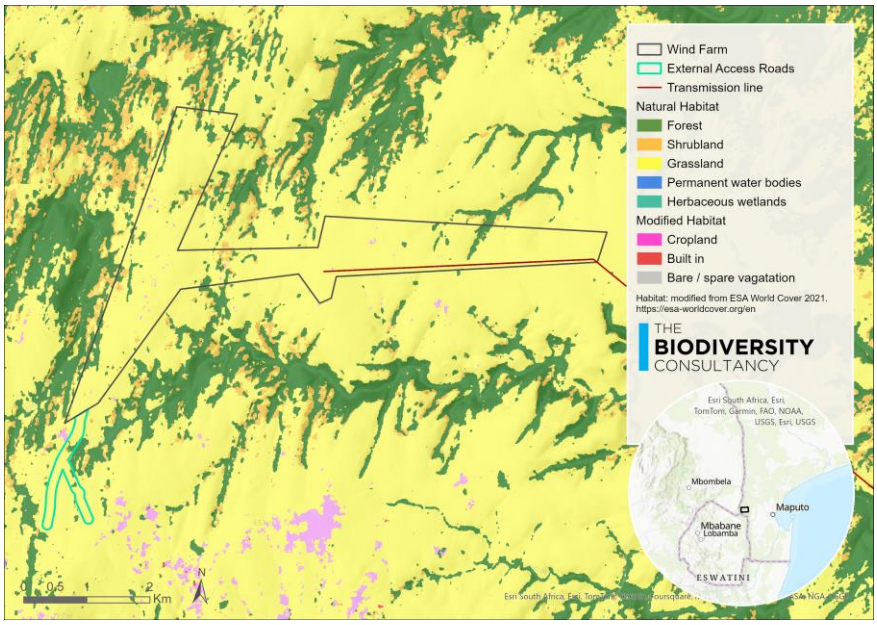


*Figure 5: Land cover (ESA WorldCover 2021) at the closer vicinity of the wind farm.*

*Table 8. Land cover types (ESA WorldCover 2021) classification as Natural Habitat (NH) or Modified Habitat (MH), and their occupation within a 20 km buffer around the wind farm boundary and a 10 km buffer around the OHTL route.*

| Type name | NH/MH | Area in buffer (ha) | % of buffer |
|---|---|---|---|
| Forest | NH | 67,526 | 32.1% |
| Shrubland | NH | 21,625 | 10.3% |
| Grassland | NH | 99,999 | 47.5% |
| Herbaceous wetland | NH | 267 | 0.1% |
| Cropland | MH | 15,994 | 7.6% |
| Built-up | MH | 3,959 | 1.9% |
| Bare / sparse vegetation | MH | 203 | 0.1% |
| Permanent water bodies | MH | 763 | 0.4% |

### 4.2.6 Legally protected and internationally recognised areas

The Project does not overlap with any Legally Protected and Internationally Recognized Areas as per IFC PS6 and IUCN definitions[5] (Figure 6). It is located close to the boundaries of the following designated areas:

- The Lubombo Biosphere Reserve (https://en.unesco.org/biosphere/africa/lubombo) covers an area of 294,020 ha in Eswatini (Figure 6). This reserve covers parts of three biomes, the Lowveld Savannah, the Lubombo Plateau Forest Biomes and the Riparian zone. It is located in a highly endemic zone, especially for plants.
- The Namaacha KBA (https://www.keybiodiversityareas.org/site/factsheet/49182; https://www.keybiodiversityareas.org/site/factsheet/49181) extends over 6,854 ha in Eswatini and 39,626 ha in South Africa (Figure 6). It has been classified based (legacy criteria) on the presence of threatened species of fauna and flora. Furthermore, it holds importance for several plant species that have not yet been globally Red-List-assessed but have been assessed as threatened at the regional / national scale.
- The Hlane - Mlawula Complex KBA (https://www.keybiodiversityareas.org/site/factsheet/6887; https://www.keybiodiversityareas.org/site/factsheet/49180) occupies 31,482 ha in Eswatini and 3,078 ha in South Africa (Figure 6). The legacy criterion for classification of this area was the presence of threatened fauna and flora. Additionally, the KBA holds importance for several plant species that have not yet been globally Red-List-assessed but have been assessed as threatened at the regional / national scale.

Lubombo Transfrontier Conservation Area (LTCA) spans across Mozambique, Eswatini and South Africa (https://www.peaceparks.org/tfcas/lubombo/). It comprises a number of legally protected areas and internationally recognised areas, but it is not classified as a protected area as a whole.

The Project (20 wind turbines and *c.* half of the OHTL extension) overlaps with the Namaacha Tropical Important Plant Area (TIPA)[6], an area that holds botanical significance due to presence of undisturbed forest patches along rocky slopes and rivers, together with the occurrence of succulent species, including *Aloe* and *Euphorbia* species, in rock outcrops. According to Mozambican national environmental authorities, this TIPA is likely to be classified in the future as KBA.

The Namaacha TIPA is targeted as a biodiversity offset implementation area for this Project and further details are provided in Section 8.5. The other designated areas mentioned above are not priorities for the implementation of offsets on this Project because they are located outside Mozambique.

[5] https://www.protectedplanet.net/en

[6] https://tipas.kew.org/site/namaacha/

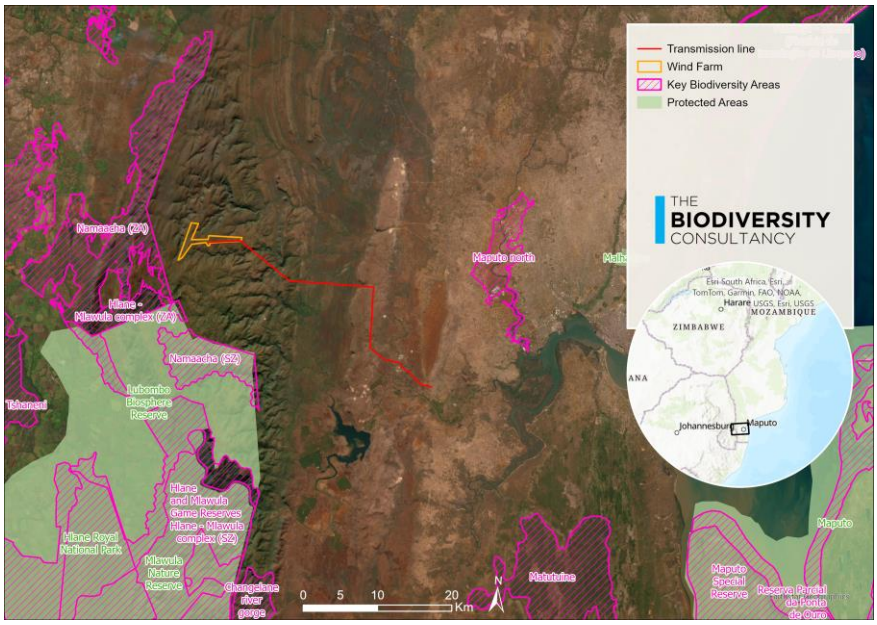


*Figure 6 Protected Areas and other Internationally Recognised Areas of high biodiversity value located in the Project's region.*

# 5 Potential impacts on biodiversity

This section provides an overview of potential biodiversity impacts related to the wind farm and transmission line for the construction and operation phases of the Project. The impacts mentioned below are taken from the relevant Project ESIA and supporting documents (Matos, Fonseca & Associados 2022; AfriAvian Environmental 2023; Consultec 2023; WSP 2023a). Mitigation measures for the predicted impacts are presented in Section 6 and a quantitative residual impact assessment, assuming the successful implementation of the mitigation measures, is presented in Section 7 of this BAP.

## 5.1 Construction impacts

For both the wind farm site and along the transmission line, the primary impact will be the loss of, and degradation to, terrestrial habitats and direct loss of flora and fauna species, from the installation of turbines, transmission line pylons and associated infrastructure (e.g., access roads, hard stands, buildings). These activities will also result in disturbance to more mobile fauna species, and may alter, or be a barrier to, their regular movement patterns (Table 9). Most of these impacts will be permanent; however, all areas of temporary vegetation loss will be restored with native species.

Construction activities may also impact the freshwater habitats as vegetation clearance will result in exposed soil with potential for erosion by runoff and sedimentation. However, these impacts are not considered to be significant.

The primary potential mechanisms for impact to elephants would be 1) direct interaction with the construction team or 2) destruction of habitat that the elephants are dependent on. The Project is designing measures to avoid all potential direct interactions between elephants (i.e. tracking of elephants to know when they are in the area and stop work procedures during construction) and has rerouted to avoid the watering hole within the originally planned corridor where elephant activity was observed. By implementing these two avoidance measures, no significant impacts to elephants are expected by the Project.

*Table 9. Summary of the Project's construction impacts.*

| Impact type | Project activity associated with the potential impact |
|---|---|
| **Wind farm site** | |
| Loss and degradation of terrestrial habitat, plant species and habitat for fauna species | Clearing of vegetation for turbines and buildings.<br>Construction or upgrading of access roads<br>Disposal of excavation and surplus materials |
| Loss of, or disturbance to, fauna species | Clearance of vegetation for project infrastructure, or access to project infrastructure. |
| | Movement of vehicles |
| Barriers to movement for mobile fauna | Construction of turbine hard stands and access roads. |
| **Transmission line** | |
| Loss and degradation of terrestrial habitat, plant species and habitat for fauna species | Clearing and stripping of vegetation within the transmission line corridor.<br>Construction or upgrading of access roads.<br>Disposal of excavation and surplus materials. |
| Loss of, or disturbance to, fauna species | Clearing of vegetation for transmission pylons.<br>Construction or upgrading of access roads.<br>Disposal of excavation and surplus materials. |
| Barriers to movement for mobile fauna | Construction of the transmission line and access roads. |

## 5.2 Operational impacts

### 5.2.1 Wind farm

The main impact of the operational wind farm is the collision of susceptible bird and bats with moving turbine blades. Turbines may also act as a barrier to the normal movements of some bird and bat species.

Vehicle traffic and maintenance activities may cause disturbance to susceptible birds, reptiles and terrestrial mammals, and has the potential to introduce or spread invasive species in the wider area of the Project (Table 10).

### 5.2.2 Transmission line

Once operational, vegetation along the transmission line will require periodic maintenance (e.g., height management) which could both directly affect a range of small bird species, reptiles and terrestrial mammals (through loss of habitat) and alter their normal movement patterns (if suitable habitat is no longer available which would facilitate movement between different areas). Maintenance activities also have the potential to introduce or spread invasive species in the wider area of the Project.

Electrocutions of birds and bats may also occur at transmission pylons, while collisions of birds may occur with wires of the transmission line. The transmission line may also act as a barrier to the normal movements of some bird and bat species (Table 10).

*Table 10. Operational impacts by the Project.*

| Potential Impact | Project activity associated with the potential impact |
|---|---|
| Loss and degradation of terrestrial ecosystems, plant species, fauna habitats and introduction of alien species | Easement maintenance |
| Bird, bat and arboreal mammal collisions and electrocutions | Operation of turbines and energy delivery to the grid through the transmission line |
| Barrier and fragmentation effects for bird and bat movements | Operation of turbines and energy delivery to the grid through the transmission line |

## 5.3 Cumulative impacts

The ESIA for the wind farm determined there were no planned projects that could have cumulative impacts with the Namaacha Power Plant Project' (Section 9.15: Matos, Fonseca & Associados 2022) while the transmission line ESIA did not discuss cumulative impacts (Consultec 2023). The Project is not aware of any other proposed projects along the transmission line route at an advanced planning stage. As this Project is the only wind farm development in the region, the cumulative effects of the Project's predicted impacts are likely to be low and not considered further in this BAP.

# 6 Mitigation strategies

## 6.1 Mitigation hierarchy

The mitigation measures adopted by the Project will follow the mitigation hierarchy: avoid, minimise, restore, and compensate/offset (Figure 7). Avoidance entails 'designing out' an impact or risk (e.g., through relocating a project component, avoiding a harmful activity, employing

alternative technology), preventing their expected impacts on biodiversity. Minimisation reduces the severity of impacts on biodiversity by controlling or limiting the source of that impact. Such actions reduce the likelihood or magnitude of biodiversity impacts, but do not completely prevent them.

Restoration seeks to recreate the original (pre-project) habitat type or to actively enhance the rate of recovery of degraded habitats on the actual Project site, with a focus on areas affected temporarily during construction. Where significant residual impacts remain, compensation/offset actions to achieve an overall NNL for NH, where feasible, and NG for CH-qualifying features will need to be developed.

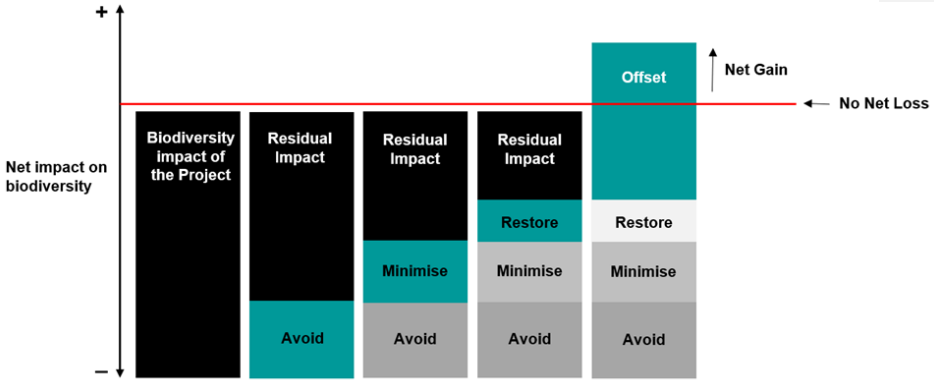


*Figure 7. The Mitigation Hierarchy and delivery of net positive impact on biodiversity.*

## 6.2 Mitigation actions

A range of good-practice mitigation actions were included in the Project's ESIAs (Matos, Fonseca & Associados 2022; Consultec 2023; WSP 2023a) and supplementary documents. Additional measures were provided by Globeleq and TBC where necessary.

The ESIA mitigation actions are detailed in Table 11. In summary:

- In the ESIA of the transmission line, five alternatives were originally considered with the selected option considered as having the lowest biodiversity impact (Table 4.4: Consultec 2023);
- For the wind farm, sensitive biodiversity was identified too late in the project design to fully explore **avoidance** measures; however, potential nesting sites identified in the pre-construction avifauna study (AfriAvian Environmental 2023) were specifically avoided when selecting the resettlement host areas. Most actions are focused on impact **minimisation** through controls on clearance or degradation of vegetation and disturbance of fauna;
- **Restoration** of habitats using native species is required as soon as possible following the end of impacts;

- **Compensation** is not described in the ESIAs[7], however compensation actions to address residual impacts are presented in Section 8 of this BAP.

The mitigation actions summarised above and in Table 11 have been collated from the various ESIA documents (Matos, Fonseca & Associados 2022; Consultec 2023; WSP 2023a). Note that the mitigation measures from the original ESIA and ESMP were updated as part of the ESIA Addendum (WSP 2023a).

[7] Compensation is described in the ESIAs, however only in relation to social impacts – not biodiversity.

*Table 11. Summary of the Project's general mitigation actions planned during construction and operations contained in the ESIAs (Matos, Fonseca & Associados 2022; Consultec 2023; WSP 2023a) and EMP (WSP 2023b).*

| Impact type | Project phase | Mitigation hierarchy | ESIA mitigation action and details | Plan(s) | Responsibility |
|---|---|---|---|---|---|
| **Wind farm site** | | | | | |
| Clearing, stripping and/or vegetation removal | Construction | Minimise | Limit the removal of vegetation to the areas strictly necessary for the execution of the works and preserve the largest number of trees and shrubs. Avoid areas containing rocky habitats, which are marked as 'sensitive areas' in Appendix 1 and Table 5 of Coombes (2024), which contribute to the classification of the Namaacha Important Plant Area by containing large *Euphorbia* spp., *Cyphostemma barbosae,* and concentrations of *Aloe* spp.).Avoid land clearance activities within 500 m of rivers and 200 m of drainage lines.<br>Promote awareness-raising among workers not to harvest or damage plant specimens (particularly *Cyphostemma barbosae,* large *Euphorbia* spp., *Aloe* spp. and large trees) and address the ecological value of flora, vegetation and habitats and train them in environmentally-appropriate procedures to be followed on site.<br>All tree and shrub species that do not affect the execution of the work should be safeguarded. | Construction Environmental Management Plan | Project Environmental Management EPC contractor |
| Clearing, stripping and/or vegetation removal | Construction / Operation | Restore | Implement a landscape restoration plan that includes the use of native species belonging to the vegetation type described in this report.<br>Carry out landscape restoration as soon as possible after the end of the operations on temporarily-impacted land and other areas that have been affected by the work (e.g., construction site area, substation surroundings).<br>Develop maintenance actions in the areas under restoration to ensure that conditions are created for the normal development of natural habitats. | Landscape Restoration Plan | Project Environmental Management EPC contractor |
| Direct impacts to, and disturbance of, fauna | Construction / Operation | Minimise | Concentrate works in time, especially those that cause the greatest disruption and avoid conducting construction activities in the evening (i.e. after 22:00).<br>Plan the timing of the works to minimise impacts on the different species relevant to this area (detail to be provided in the BMP).<br>If the use of explosives is necessary, precutting techniques and the use of micro-retarders should be used, thus attenuating the intensity of the vibrations produced.<br>Train staff and contractors in environmentally-appropriate procedures to be followed on site. | Construction Environmental Management Plan<br>Biodiversity Management Plan (BMP)<br><br>Works Environmental | Project Environmental Management EPC contractor |

**Commented [MS2]:** Very general and vague, which species? Which seasons or what times should we avoid? We won't be able to show compliance with the statement if left as is.

**Commented [GU3R2]:** TBC to include some info in the BMP.

| Impact type | Project phase | Mitigation hierarchy | ESIA mitigation action and details | Plan(s) | Responsibility |
|---|---|---|---|---|---|
| | | | Car traffic at low speed (below pre-defined speed limit) in Project roads/accesses to reduce the likelihood of road kills of fauna. | Monitoring Plan | |
| Collision of bird and bat priority biodiversity values | Operation | Minimise | Lighting of wind turbines should be reduced to the minimum recommended for aviation safety;<br>If there is considerable mortality of sensitive bat species, or very considerable mortality of other species, more direct mortality risk minimisation measures should be assessed, such as the use of acoustic deterrents to ward off chiropterans.<br>All wind turbines are to be subjected to standard blade feathering (up to 3.5 m/s) during spring and summer from the date of project inception. This should be implemented throughout the lifespan of the project, with specific parameters (seasonality and wind speed) being updated throughout the course of an operational bat monitoring campaign, as more fatality and acoustic data becomes available.<br>For any turbines located within the high sensitivity buffer areas (See Figure 4 of the ESIA Addendum), suitable minimisation techniques (i.e. curtailment or ultrasonic deterrents) are to be implemented from the start of operation, in accordance with the parameters defined in Table 24 of the ESIA Addendum.<br>If unacceptable impacts to megabats are identified through ongoing monitoring, then curtailment (following the parameters detailed in the ESIA Addendum (WSP 2023a) should be implemented.<br>Implement an Automated Shut-down-on-Demand system for turbines using a camera system such as Identiflight®. This should be implemented for the Red Listed species as a minimum.<br>If estimated collision rates indicate unacceptable mortality levels of priority bird species, the Automated Shut-down-on-Demand system should be expanded to include these species as well.<br>Should a mortality of a Red List species be recorded, an observer led shutdown on demand (SDoD) programme should be considered in addition to the Automated Shutdown-on-Demand programme.<br>All wind turbines must have one blade painted according to a local civil aviation authority approved pattern<br>Livestock carcass management programme to be implemented. | Bird and Bat Adaptive Management Plan | Project Environmental Management |
| **Transmission line** | | | | | |
| Degradation of wetlands and riverine systems | Construction | Avoid/Minimise | Prioritise locating transmission pylons away from riverbanks, wetlands, and floodplains. | Biodiversity Management Plan | Project Environmental Management |

**Commented [MS4]:** If we leave this in, we'll need more details as to what it entails and what the purpose is

**Commented [MS5R4]:** We don't want to be killing/removing prey from the wind farm. That comes with a whole suite of new impacts

**Commented [GU6R4]:** MC: Managing prey availability would be difficult to implement on a large project like this. Agree with deleting this.

| Impact type | Project phase | Mitigation hierarchy | ESIA mitigation action and details | Plan(s) | Responsibility |
|---|---|---|---|---|---|
| | | | Riverbeds will not be modified beyond the strictly necessary to complete a particular work. The affected areas will be rehabilitated to the original profile and with native vegetation.<br>All pylons will be located at least 30 m from the nearest water source to avoid polluting the waters and to reduce the flow of sediments.<br>All refuelling and servicing of equipment should take place in demarcated areas, away from rivers, wetlands, and waterbodies. Refuelling and servicing of equipment must take place on an impermeable surface, and a spill kit must be available where the servicing or refuelling takes place to prevent contaminants from entering wetlands or riverine systems.<br>Forbid movement of heavy machinery in wetlands, riverbanks, riverbeds, and waterbodies as far as practically possible. Where it can't be avoided, the project HSE manager must provide case by case guidance to the EPC on how best to avoid damage, record any damage caused and ensure it is rehabilitated completely before construction is completed.<br>All vehicles and equipment should be well-maintained per manufacturers' guidance.<br>Limit the movement of machines and vehicles to within work areas. Forbid any disturbance outside site boundaries. | Construction Environmental Management Plan<br><br>Emergency Response Plan<br><br>Waste Management Plan | EPC contractor |
| Direct loss of vegetation | Construction | Avoid/Minimise | Strictly limit the clearing of vegetation to the required areas, with particular emphasis on this measure in areas of natural habitat, and forbid vegetation control outside the designated maintenance boundary.<br>Prioritise siting of construction lay-down areas and borrow pits outside of areas of natural habitat.<br>High sensitivity biodiversity areas will be mapped in advance of any ground clearance and vegetation clearance activities will be monitored.<br>Whenever possible new and temporary access should be created based on existing access points/routes. | Biodiversity Management Plan<br><br>Construction Environmental Management Plan | Project Environmental Management<br><br>EPC contractor |
| Direct loss of vegetation | Construction | Restore | Rehabilitate temporary work areas as soon as practical (i.e., once work is concluded in each segment), to reduce the duration of the impact.<br>Only use native species for rehabilitation works. | Biodiversity Management Plan<br><br>Landscape Restoration Plan | Project Environmental Management<br><br>EPC contractor |

| Impact type | Project phase | Mitigation hierarchy | ESIA mitigation action and details | Plan(s) | Responsibility |
|---|---|---|---|---|---|
| Direct and indirect impacts to fauna | Construction | Avoid/Minimise | Vegetation clearing areas will be scouted in advance of construction and vegetation removal activities by a suitably trained professional with the aim of locating animals or roosting and nesting sites close to the construction area. (See the additional requirements regarding pre-construction surveys in any identified avifauna 'hot spots') If any animal or nesting sites with eggs or chicks/juveniles are identified they will be removed and relocated. In instances where animals and birds have not vacated a specific construction area and the construction can't be postponed, the project will use an air horn to frighten animals from the area in order to avoid injury or fatalities during vegetation clearance.<br>Limit machinery and vehicles speed limit to 30km/h to reduce the risk of collisions with animals, and place signs along access roads informing speed limits and possible animal presence.<br>Limit non-Project vehicle entrance and circulation along the Right of Way (RoW), as much as possible, through the placement of signage.<br>During induction sessions inform workers about the importance of biodiversity and commitment of the project to it, in order to avoid running over animals on purpose.<br>Restrict construction works to the daytime hours, limiting illumination in the construction areas as much as practical.<br>All garbage should be secured in sealed containers overnight to avoid attracting nocturnal carnivores and other opportunistic species to site.<br>Where practical, avoid construction works between April and September (corresponding to the expected main breeding of priority raptor species in the region) in the westernmost third of the transmission line route, as well as where the route crosses ridges or deep valleys in the remaining sections, to avoid significant disturbance of suitable habitats during the breeding period. | Biodiversity Management Plan<br><br>Construction Environmental Management Plan | Project Environmental Management<br><br>EPC contractor |
| Loss of fauna habitat | Construction | Avoid/Minimise | Vegetation clearing, topsoil removal, and earthmoving activities should be minimised as much as practical and limited to the strictly needed areas.<br>Avoid locating towers and access roads in wetlands and riverbeds and on banks.<br>Ensure tree and shrub species, whose height is limited to 4 m, are allowed to re-establish in the RoW, by providing a list of such species to vegetation clearing/ control contractors and ensuring they are trained on the identification of such species. | Biodiversity Management Plan<br><br>Construction Environmental Management Plan | Project Environmental Management<br><br>EPC contractor |

**Commented [MS7]:** I think we need to double check the feasibility of this, especially the latter. Especially if we start with many groups at various places.

**Commented [GU8R7]:** MC: Removed the first part as there are no large water bodies of importance to birds. Amended the second paragraph.

| Impact type | Project phase | Mitigation hierarchy | ESIA mitigation action and details | Plan(s) | Responsibility |
|---|---|---|---|---|---|
| Introduction/spread of invasive species | Construction | Avoid/ Minimise | Forbid vegetation disturbance outside the set boundaries for each construction site.<br>Limit vegetation clearance to the construction footprint. Avoid clearing any further vegetation in the project boundary as far as possible.<br>Restrict people and vehicle movements outside project accesses, especially in natural habitat areas.<br>Limit non-Project vehicles entrance in the construction area to avoid invasive and ruderal species dispersion.<br>Whenever possible, new and temporary access points should be created based in existent access points/routes | Biodiversity Management Plan<br><br>Construction Environmental Management Plan | EPC contractor |
| Impacts on elephants | Construction | Avoid/ Minimise | Further engagement with district government and/ or elephant specialists working in the area (prior to any construction) in order to determine frequency of elephant movement in the area of the watering hole (e.g. how many days a month would they be encountered) and the seasonality of the movements (what months of the year they are present). Also consult with Mandevo community leaders to determine if (and if so when) the watering hole dries up each year. Using these data, schedule construction near the watering hole when elephants are not be expected to present in the area.<br><br>Ensure that clearing of vegetation and construction of pylons takes place when elephants are not expected to be within the construction area (based on tracking information from NGOs).<br><br>Training of staff on the Endangered status of these animals and restrictions on harm to these animals, e.g. no shooting.<br><br>Stop work measures if elephants approach an active construction area. | Biodiversity Management Plan<br><br>Construction Environmental Management Plan | Project Environmental Management<br><br>EPC contractor |
| Collision of avian priority biodiversity values | Construction<br>Operation | Minimise | Bird flight diverters should be installed on all the overhead line sections for the full span length according to the applicable International Best Practice standards at the time.<br>Underground cabling should be used as much as is practically possible, to minimise risk of powerline collisions. | Bird and Bat Adaptive Management Plan | EPC contractor |
| Electrocution of avian priority biodiversity values | Construction<br>Operation | Minimise | Install anti-landing devices in pylons close to wetlands, rivers, and waterbodies, to avoid birds nesting.<br>If the use of overhead lines is unavoidable due to technical reasons, the Avifaunal Specialist must be consulted timeously to ensure that a raptor | Bird and Bat Adaptive Management Plan | Project Environmental Management |

**Commented [MS9]:** This need to move to the design/construction phase. Too late to look at this in operations

**Commented [GU10R9]:** MC: I've added the construction phase in the 2nd column (both phases are in this table). I think operation phase should stay here because follow up of the implementation of this measure is needed.

| Impact type | Project phase | Mitigation hierarchy | ESIA mitigation action and details | Plan(s) | Responsibility |
|---|---|---|---|---|---|
| | | | friendly pole design is used, and that appropriate mitigation is implemented pro-actively for complicated pole structures. | | EPC contractor |

**Commented [MS11]:** Again - it too late if we do this action in operations. During operations we can only monitor and add additional mitigation if we pick up issues. Design is already done at this stage

**Commented [GU12R11]:** MC: I've added the construction phase in the 2nd column (both phases are in this table). I think operation phase should stay here because follow up of the implementation of this measure is needed.

# 7 Residual impact assessment

## 7.1 Scope of this assessment

The residual impacts were estimated for the Project components, which are described in Section 2 and illustrated in Figure 2.

This residual impact assessment focuses on priority biodiversity values likely to be affected by the Project, as these values are subject to NG and NNL requirements under IFC PS6. Priority biodiversity values are presented in Section 4.2 above.

The scope of this assessment includes the main direct impacts of the Project, which include:

- Bird and bat collisions with the turbines and the transmission line;
- Habitat loss under the project footprint;
- Habitat disturbance from noise, dust and vibrations; and,
- Fragmentation of habitat.

The indirect impacts of the Project on biodiversity from increased numbers of people in the area working on the Project or attracted to the area in search of work are addressed through awareness raising, training and education programmes for both the Project workers and the local communities (see Additional actions to support conservation, Section 8.5.5 of the BAP).

The Project is located in a landscape with existing land use activities including villages, roads, development activities, and agriculture. Despite the likely ongoing background declines to biodiversity, a static baseline has been used in the quantification of residual impacts; this is considered to be a precautionary approach.

To address the impacts summarised in Section 5 above, the Project has committed to implementing mitigation measures as described in the ESIA and summarised in Section 6 and Table 11 of the BAP. These mitigation measures include avoidance, minimisation and on site-restoration, which have been taken into consideration when assessing the residual impacts of the Project. This residual impact assessment assumes that all those mitigation commitments will be implemented.

This residual impact assessment makes the following broad assumptions about the scale of impacts, and responses of priority biodiversity values to these impacts:

- This assessment is based on the Project design described in the ESIA, the .kmz files provided by Globeleq on 12 December 2023, updated wind farm footprint .kmz files provided by Globeleq on 20 June 2024, and updated transmission line .kmz files provided by Globeleq on 27 September 2024 and 4 October 2024. Any modifications to infrastructure design may change the residual impacts predicted in this BAP, and modifications should be reflected in future versions of the BAP;

**Commented [MS13]:** This statement is alarming - the scope is definitely defined. Temporary components are restored and permanent ones are not.

**Commented [GU14R13]:** MC: I've removed this because is incorrect. We have considered the restoration of temporary components (batching plant, underground line) and assumed some reduction in quality (not extent) after restoration.

- This assessment does not take into account cumulative impacts (see Section 5.3 for more details); and
- This assessment assumes that all impact avoidance and minimisation actions as outlined in the ESIA are implemented as planned.

## 7.2 Birds

Impacts to birds will primarily result from collisions with turbines and from collisions with, or electrocutions on, the transmission line connecting the Project to the grid. Nineteen species of birds have been identified as either potentially CH-qualifying or priority biodiversity values in this BAP (Section 4). Where possible, species with common biological attributes or responses to the Project have been assessed for residual impacts using the same approach, as outlined below (also see Table 12).

For most species, the impact of most relevance will be collision with turbine blades (see Table 11) and residual impacts have been calculated assuming that all mitigation measures are implemented (e.g., camera-based automated shut-down-on-demand; Table 11) and show some effectiveness (for a discussion on the likely variation in effectiveness associated to different types of mitigation see TBC 2023a). Two approaches were used to calculate residual impacts, depending on whether, in the Project area, the species is:

- Wide-ranging, migratory or nomadic (e.g., vultures, raptors and some storks). Individuals of these species move over vast areas, and so there is the potential for a large proportion of the population to interact with the wind farm and for most flights to be of different individuals; or,
- Resident (primarily raptors, bustards and southern ground hornbill). These species hold permanent territories in the Project area and most flights will represent a very small number of individuals.

For wide-ranging, migratory or nomadic species with sufficient activity within the area of interest, fatalities can be estimated through a collision risk modelling approach by knowing the passage rates of the species (i.e. flights per hour within the wind farm, ideally collected through field surveys on site), the technical specifications of the wind farm and species' basic biological attributes. These parameters can be entered into a collision risk model (e.g. the 'Band' model: (Scottish Natural Heritage 2000) to derive an annual fatality estimate. When there is very low, or no, activity for a species recorded within the Project area, a collision risk approach is not relevant, and residual impacts can be assumed to be 'much less than 1' (see TBC 2023a for a detailed description of the approach taken for the Project).

For resident species, most observed flights will be of territorial individuals, and so the number of fatalities will be related to the number of individuals present rather than passage rates as most

flights will be of the same resident individuals. Under a worst-case scenario[8], both individuals of all resident pairs are assumed to, within the first year, eventually collide with turbine blades or abandon their territories due to disturbance[9]. The first operational year impact for a resident species from the Project can then be estimated as twice the number of territories present (if information from field surveys is available), or by calculating the maximum number of territories that could fit within the Project area[10]. Fatalities during subsequent years of operation then represent wandering individuals that enter the wind farm from other areas, as either immatures exploring beyond their natal territory, or as adults looking for breeding territories. For these individuals, the number of individuals moving through the Project area will likely scale with the number of preconstruction territories of each species in the Project area (as the presence of a greater number of territories implies better habitat to attract roaming individuals). Ongoing annual fatalities are assumed to approximate the number of preconstruction territories of resident species (see Cordeiro *et al.* 2012 for an example of this with common kestrel, while this is also the case at the Kipeto wind farm: TBC unpublished data).

For electrocutions on the transmission line, it is assumed that the proposed mitigation (see Section 6) will reduce the likelihood of electrocution to ~0 for all species. Most collision with the transmission line is a low risk for almost all avian priority biodiversity values, and the proposed mitigation (see Section 6) will further reduce impacts by 50% for these species (Bernardino *et al.* 2019). Only one avian priority biodiversity value is at high risk of collision with the transmission line: the Buff-bellied Bustard *Lissotis melanogaster* and BFDs are known to not reduce collision rates among bustards (Shaw *et al.* 2021). It is also not possible to estimate collision fatalities on transmission lines from pre-construction activity monitoring (and this information was also not collected for this species along the transmission line). For this species, the fatality estimate was based on reported *per km* rates from the related Karoo Korhaan *Heterotetrax vigorsii* in South Africa. A fatality rate of 0.05-0.37 individuals/km/year (95% confidence intervals) were estimated for that species (Shaw et al. 2018), which when adjusted for the 32 km of transmission line for Project is an estimated annual fatality of 2-12 individuals/year.

For two species, Shelley's Francolin and Short-tailed Pipit, collisions with turbines or transmission lines are unlikely, and the largest impact is likely to be habitat loss during

[8] These values present worst case scenarios. The proportion of the Project area over which activity occurs affects the likelihood of the worst case scenario occurring but does not change the value of the worst case scenario (i.e. the more turbines over which a species' range overlaps, the greater the likelihood that the worst case scenario will occur, but the worst case remains the same).

[9] It is also possible that resident species will modify their territory to avoid areas with turbines, in which case no fatalities would result (e.g. Nishibayashi *et al.* 2022).

[10] For simplicity, the death of any dependent chicks as a result of the death of one or both territorial adults is not considered here as (i) this scenario would only be realised for a small portion of the year, (ii) not all resident species will breed every year and (iii) including this factor portrays a much higher precision than the likely reality, especially given the level of assumptions that have been made for other components required to estimate fatalities from the project.

construction. For these species, NH has been used as a proxy to estimate the impacts from the Project (described in Section 7.4).

For all avian priority biodiversity values, a robust Post-Construction Fatality Monitoring Program (PCFM) is required, as presented in the ESIA Addendum (WSP 2023). This monitoring will incorporate the approach detailed in the PCFM Good-practice Handbook (IFC *et al.* 2023). Importantly, monitoring must cover both the turbines and transmission line, and should be expected to occur for at least the first three years of operations. PCFM will also allow the Project to validate the impacts predicted in the document, re-evaluate the magnitude and/or coverage of any conservation actions, evaluate the effectiveness of proposed mitigation and contribute to the adaptive management process.

*Table 12. Residual impacts, calculation approach and justification, and recommended offset targets for bird priority biodiversity values (offset targets for each bird species set to be at least double the predicted maximum losses – see Section 7.2). For migratory species, the main period of occurrence in the area is shown in the Movement status column (eBird data). Potential Critical Habitat-qualifying features, which require a Net Gain (NG) are shown in bold. All other features have a No Net Loss (NNL) target. QH – Quality Hectares (see section 7.4.2).*

| Species/Habitat | Impact pathway | Movement status | RIA approach | Residual impacts (Year 1/Year 2+) | Project target | Offset target/year | Justification[11] |
|---|---|---|---|---|---|---|---|
| **White-backed Vulture (*Gyps africanus*)** | **Collision with turbines** | **Wide-ranging** | **Activity-based** | **~0/~0** | **NG** | **1-2** | **Fatalities estimated in TBC** (2023a)**, based on field survey information.** |
| **Martial Eagle (*Polemaetus bellicosus*)** | **Collision with turbines** | **Resident** | **Territory-based** | **<2/<1** | **NG** | **1-2** | **Fatalities estimated in TBC** (2023a)**, based on field survey information.** |
| **Bateleur (*Terathopius ecaudatus*)** | **Collision with turbines** | **Resident** | **Territory-based** | **1/<1** | **NG** | **1** | **Fatalities estimated in TBC** (2023a)**, based on field survey information.** |
| African Harrier-Hawk *Polyboroides typus* | Collision with turbines | Resident | Territory-based | <2 / <1 | NNL | 1 | Very few records during field surveys, and so it is unlikely that the Project overlaps with more than one territory of this species. |
| African Hawk Eagle *Aquila spilogaster* | Collision with turbines | Resident | Territory-based | <2/<1 | NNL | 1 | Based on the location and levels of activity recorded during avian surveys and inter-nest distances of 4.7 km (Hustler & Howells 1988), one territory is likely to be present. |
| Black Stork *Cicconia nigra* | Collision with turbines and transmission line | Migrant | Activity-based | 1-3 | NNL | 3 | Collision risk modelling used (i.e. Band 2012), with relevant species information sourced from EoIDist and BirdID websites. |
| Black-bellied Bustard/Korhaan *Lissotis melanogaster* | Collision with transmission line | Resident | Distance-based | 2-12/2-12 | NNL | 12 | Collision estimates based on the per km rates reported in South Africa for Karoo Korhaan *Heterotetrax vigorsii* of 0.05-0.37/km/year (Shaw *et al.* 2018) and a transmission line length of 32 km. This approach assumes that all habitat along the transmission line is suitable for this |

[11] Information used in the justification is from the various Project reports (Matos, Fonseca & Associados 2022; AfriAvian Environmental 2023; WSP 2023a) unless stated otherwise.

| Species/Habitat | Impact pathway | Movement status | RIA approach | Residual impacts (Year 1/Year 2+) | Project target | Offset target/year | Justification[11] |
|---|---|---|---|---|---|---|---|
| | | | | | | | species., that both species occur at similar densities and are similarly susceptible to collisions. |
| Black-chested Snake Eagle *Circaetus pectoralis* | Collision with turbines | Resident | Territory-based | 6 / 3 | NNL | 3 | Based on high levels of activity across the site recorded during avian surveys, and a density of 5.8 km$^2$ per pair for the closely related Short-toed Snake-eagle in Macedonia (Velevsky & Grubač n.d.), a maximum of three territories are likely to be present. |
| Black-winged Kite *Elanus caerulus* | Collision with turbines | Resident | Territory-based | ~0 / ~0 | NNL | 1 | Very few records during field surveys, and so it is unlikely that the Project overlaps with any territories of this species. |
| Common Buzzard *Buteo buteo* | Collision with turbines | Migrant | Activity-based | 1-4 | NNL | 4 | Collision risk modelling used (i.e. Band 2012), with relevant species information sourced from EoIDist and RSPB websites. |
| Jackal Buzzard *Buteo rufofuscus* | Collision with turbines | Resident | Territory-based | 2/1 | NNL | 2 | Commonly recorded on field surveys, and observation locations suggest the project overlaps with two territories. |
| Lanner Falcon *Falco biarmicus* | Collision with turbines | Resident | Territory-based | ~0 / ~0 | NNL | 1 | Very few records during field surveys, and so it is unlikely that the Project overlaps with any territories of this species. |
| Peregrine Falcon *Falco peregrinus* | Collision with turbines | Resident | Territory-based | ~0 / ~0 | NNL | 1 | Very few records during field surveys, and so it is unlikely that the Project overlaps with any territories of this species. |
| Shelley's Francolin *Scleroptila shelleyi* | Habitat loss | Resident | Habitat-based | 15.16 QH | NNL | 15.16 QH | Likely to occur throughout the project area based on observations on transects. Habitat as proxy (in this case open forest; see section 7.4.2 and Table 15) suggested as an appropriate method for tracking losses and gains for this species, supported by PCFM to determine if fatalities occur. |
| Short-tailed Pipit *Anthus brachyurus* | Habitat loss | Resident | Habitat-based | 56.49 QH | NNL | 56.49 QH | Only one record from transects within the Project area, although easily overlooked. Habitat |

| Species/Habitat | Impact pathway | Movement status | RIA approach | Residual impacts (Year 1/Year 2+) | Project target | Offset target/year | Justification[11] |
|---|---|---|---|---|---|---|---|
| | | | | | | | as proxy (in this case dry and moist savanna; see section 7.4.2 and Table 15) suggested as an appropriate method for tracking losses and gains for this species, supported by PCFM to determine if fatalities occur. |
| Walhberg's Eagle (*Hieraaetus wahlbergi)* | Collision with turbines | Migrant, but territorial during breeding - likely at site (Aug-Apr) | Territory-based | <2/<1 | NNL | 1 | Territories elsewhere in Africa have been estimated at 12-16 km$^2$ (Meyberg *et al.* 1995) and so two territories are possible within the Project area. This is supported by activity data, which shows flights of this species across the whole Project area. |
| Crowned Eagle *Stephanoaetus coronatus* | Collision with turbines | Resident | Territory-based | 1/<1 | NNL | 1 | Fatalities estimated in TBC (2023a), based on field survey information. |
| Tawny Eagle *Aquila rapax* | Collision with turbines | Resident | Territory-based | <1/<1 | NNL | 1 | Confirmed as present in the ESIA, but not recorded during bird surveys. Likely to be sufficiently rare that, considering the Project's mitigation and likely level of avoidance behaviour, <1 death/year is reasonable. |

## 7.3 Bats

The correlation between bat activity and fatality rates at operational wind farms is poorly understood, and there is currently no proven method to estimate fatality rates for any bat species from preconstruction activity data (e.g. Solick *et al.* 2020). There is good information on bat fatalities at wind farms in South Africa, and while not directly applicable to the project site, does provide some indication of the bat fatalities which could be caused by the Project. A review of 25 wind farms in South Africa (Aronson 2022) reported an annual fatality rate for all bats of 213 (114-489) bats/facility/year (mean, lower and upper 95% confidence interval) and 2.8 bats/MW/year[12]. Applying the same ratio to the confidence bounds as to the mean value gives an upper and lower estimate of 1.5-6.4 bats/MW/year, and applying this value range to the Project, the annual residual impact to all bats is likely to fall within the range of 180-768. It is also important to highlight that individual wind farms had extremely different annual bat fatality rates: as low as 0.1 bats/MW/year and as high as 15.2 bats/MW/year. If these rates were considered as a 'best' and 'worst' case scenario, it is possible that the Project could have an annual residual impact to all bats of 12-1,824 bats. This calculation assumes that the data above was derived from wind farms in South Africa that applied comparable mitigation measures to those that will be implemented in Namaacha Project (e.g., seasonal blade feathering; Table 11).

Bat fatalities at the Project will not be equally distributed across all bat taxa present due to differences in abundance and behaviour, although all priority species potentially occur or have been recorded in the Project area during pre-construction surveys (Arcus 2023). If the fatality patterns from South Africa are repeated at the Project, most fatalities will be of *Tadarida aegyptiaca*, *Neoromicia capensis* and *Miniopterus natalensis*: these three species are predicted to be present in the Project area and represented 97% of the carcasses that could be identified to species in South Africa (Table 7: Aronson 2022).

## 7.4 Habitats

### 7.4.1 Methodology

The direct footprint of all infrastructure components of the Project (Figure 1) was based on the design provided by Globeleq in a .kmz files. The impact to terrestrial habitat (critical and natural) was calculated by overlaying the Project footprint layer with the land-cover/habitat map. This map used the detailed forest classifications from the ESA Worldcover 2021 dataset (resolution of 10 m) and was refined using the results of Coombes (2024). The wind farm area footprint was updated with .kmz files provided by Globeleq on 20 June 2024, and the transmission line footprint was updated with .kmz files provided by Globeleq on 27 September 2024 and 4 October 2024 (Figure 8 and Figure 9).

[12] The per MW values from South Africa are very similar to those reported from the United States, where median bat fatalities at 271 facilities were estimated at 3.0 (1.47-7.72) bats/MW/year (AWWI 2020)..

If there are further alterations to the Project design the residual impacts on habitats may need to be updated in the future.

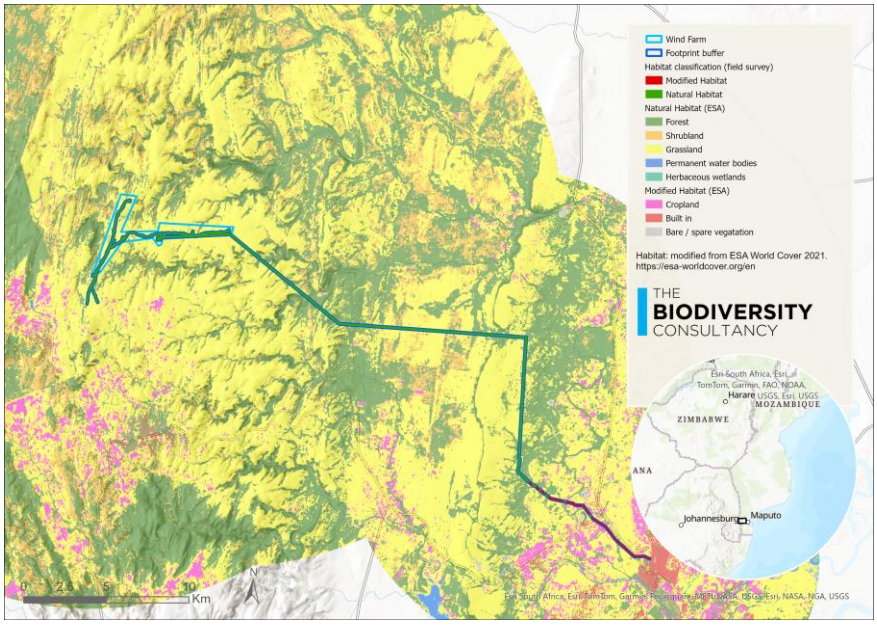


*Figure 8. Map showing land cover (ESA WorldCover 2021) within a 20 km buffer around the wind farm boundary and a 10 km buffer around the OHTL route and the habitat classification results from field work conducted in the Project Area of Influence (Coombes 2024).*

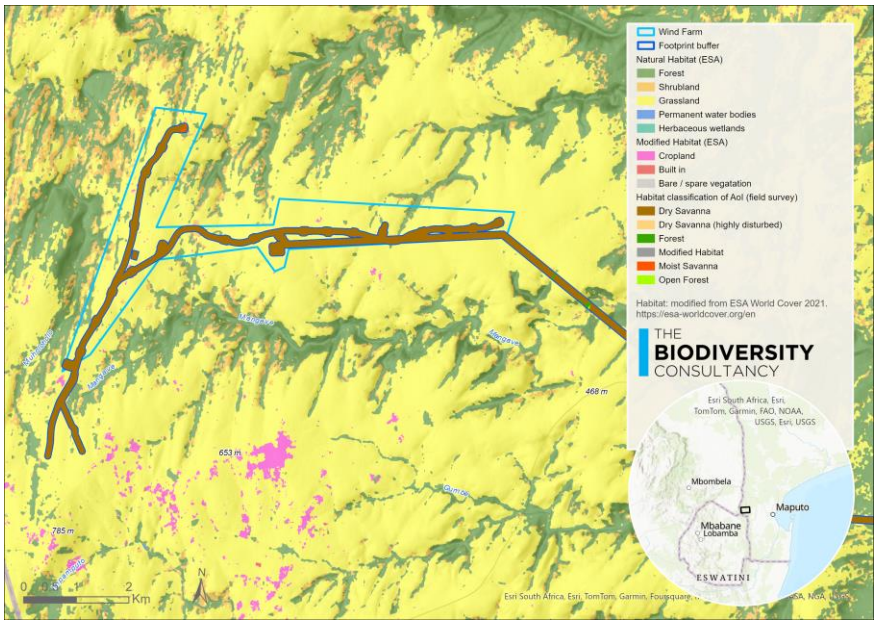


*Figure 9: Land cover (ESA WorldCover 2021) and results from habitat classification from field work (Coombes 2024) at the closer vicinity of the wind farm.*

A section of the transmission line will be a double line and the rest a single line. There will be a 70 m wide strip of partially-cleared (slashed) vegetation, with a 5 m wide maintenance road between the two lines in the double line section, and a 50 m wide strip of partially-cleared (slashed) vegetation, with a 5 m wide maintenance road in the single line section. For the purpose of this residual impact assessment, the reduction in habitat extent and quality was considered to include the Project components presented in Table 13.

The additional loss in habitat quality in the 50 m buffer around Project components was included to account for the construction impacts that spread outside the Project footprint, including: dust and nitrogen deposition on vegetation around the Project footprint during construction, disturbance to animal species through noise and artificial lighting during construction and operation.

*Table 13. Summary of expected reduction in habitat extent and quality*

| Project Component | 100% Reduction in extent and quality | 50% Reduction in quality | 25% Reduction in quality |
|---|---|---|---|
| Around Wind Farm Site | 30 m radius area (2,826 $m^2$) around each turbine (x 20). This includes the crane pads used during construction.<br><br>10 m wide internal and external access roads<br><br>Substation (40 000 $m^2$) used during construction and operation<br><br>Offices and construction camp (9 000 $m^2$) used during construction and operation | Batching plant (14 000 $m^2$) – to be restored after construction | 50 m buffer around the footprint of site roads & platforms<br><br>50 m buffer around the footprint of each turbine<br><br>50 m buffer around the footprint of the substation, offices and construction camp |
| Around T-Line Route<br><br>(pylon locations are unknown at this stage) | Buried line section: None (339 m length)<br><br>Single line section: 5 m width directly under the line (5.4 km length)<br><br>Parallel line section: 5 m width for access road (37.0 km length)<br><br>Parallel line section: 5 m width directly under each line | Single line section: 25 m either side of the line (5.4 km length)<br><br>Parallel line section: 70 m wide protection zone (37.0 km length) | Single line section: 25 - 50 m either side of the line (5.4 km length)<br><br>Parallel line section: 25 m either side of the protection zone (37.0 km length) |

**Commented [MS15]:** The area around the turbines IS the crane pad aka hard stand. We are thus counting this area twice.

**Commented [GU16R15]:** MC: the actual habitat calculations in Table 15 are correct - we didn't double count. I've removed the crane pads line from this table and mentioned the overlap above.

Habitat 'area × condition' metrics or quality hectares (QH), is a common and widely accepted means to account for habitat complexity through a standardised approach (e.g., Parkes *et al.* 2003; Temple *et al.* 2012). In this metric, a theoretical "benchmark" habitat is considered the highest quality, at 100% condition. A degraded habitat is then considered at a lower percent condition. For example:

- 10 ha of highest possible condition habitat (100% quality) = 10 × 1 = 10 QH
- 10 ha of degraded habitat at 50% quality = 10 × 0.5 = 5 QH
- 10 ha of highly degraded habitat at 25% quality = 10 × 0.25 = 2.5 QH

This Residual Impact Assessment (RIA) includes a calculation of QH for NH (not classified as critical) likely to be affected by the Project. Following the revision of the conservation status of threatened ecosystems in Mozambique (Lötter *et al.* 2023), there is no CH within the Project area. There are no critical MHs on this Project, and MHs that are not CH fall outside the scope of this RIA as NG or NNL are not required under IFC PS6.

Habitat quality assessments in the Project area were undertaken by Coombes (2024). The habitat condition categories and scores are presented in Table 14.

The RIA in the present BAP version has been updated using the refined (ground-truthed) scores of habitat quality by Coombes (2024).

*Table 14. Habitat condition categories, characteristics and scores (TBC unpublished).*

| Condition categorisation | Characteristics | Habitat condition scores |
|---|---|---|
| Intact natural habitat | Unmodified habitat. Floristic composition in natural state. Native wildlife well represented. Negligible sign of human disturbance. | 1 |
| Largely intact natural habitat | Floristic and faunal composition mostly native, primary structure slightly disturbed and with minor signs of human disturbance. | 0.8 |
| Disturbed natural habitat | Primary structure altered. Floristic and faunal composition mostly native, with some allochthonous/alien component. Evidence of some human disturbance. | 0.6 |
| Highly disturbed natural habitat | Primary structure heavily altered. Floristic and faunal composition includes substantial allochthonous/alien component. Evidence of significant human disturbance. | 0.4 |
| Modified habitat | Anthropogenic area, e.g., human settlements, agricultural crops, tree plantations | 0.2 |

### 7.4.2 Results

The Project is estimated to directly affect (100% loss) 85.47 ha of NHs that are not classified as critical (Table 15). The loss of MHs (there is no critical MH on this Project) is not presented in the residual impact assessment as this habitat category is not a priority in this BAP, and there are no IFC PS6 requirements to demonstrate NG or NNL for these habitats.

Quality scores for all habitat types affected by the Project were estimated using the approach described in Section 7.4.1. Residual impacts to NH are estimated to be 156.23 Quality Hectares (QH) (Table 15).

The loss/reduction in habitat quality (100%, 50% and 25%) figures provided in Table 15 are explained in Table 13 and Section 7.4.1. Habitat quality scores are explained in Table 14. A detailed breakdown of Project impacts on Natural Habitat is provided in Appendix 5.

Based on the information from Coombes (2024), the majority of natural habitats in the Project area are considered to be 'disturbed' (i.e. degraded) and were assigned a score of 0.6 by Coombes (2024). In disturbed NH with a quality score of 0.6, a 50% reduction in quality as a result of the Project is therefore reflected in a quality score of 0.3, and a 25% reduction in quality uses a quality score of 0.15.

Coombes (2024) mapped OHTL areas closer to Boane as 'agromosaic' or 'disturbed agromosaic' vegetation. This vegetation consisted of scattered large indigenous trees within areas of current croplands, abandoned fields colonized by regenerating disturbance-tolerant native grass and shrub species and with scattered large trees, and small patches of less disturbed natural vegetation dominated by native tree and shrub species. Coombes (2024) assigned the entire area mapped as 'agromosaic' a score of 0.4, accounting for the highly disturbed natural vegetation in the area. However, it is apparent from recent satellite imagery that this area contains areas of NH (less disturbed natural vegetation dominated by native tree and shrub species) within a broader area of MH (current agricultural land or abandoned fields). As such, areas of highly disturbed NH have been delineated within this larger area of MH, using observations by Coombes (2024) and recent (2023) publicly available satellite imagery (Google Earth), to provide a finer scale delineation of vegetation types than provided in the mapping of Coombes (2024). Areas of NH in this area are assigned a quality score of 0.4 in line with the assessment of Coombes (2024).

Areas of MH were assigned a quality score of 0.2 (Coombes 2024) and are not required to be offset.

Biodiversity offset targets to deliver an overall NNL in biodiversity are indicated in Section 8.4.2.

*Table 15. Summary of residual impacts to natural terrestrial habitats (non-critical). For description of different levels of habitat quality loss associated with the various Project components refer to Table 13.*

| Habitat types | Expected 100% loss in extent & quality | | | Expected 50% loss in quality | | | Expected 25% loss in quality | | | Total residual impact |
|---|---|---|---|---|---|---|---|---|---|---|
| | Area (ha) | Quality | QH | Area (ha) | Quality | QH | Area (ha) | Quality | QH | (QH) |
| Forest | 1.40 | 0.6 | 0.84 | 5.27 | 0.3 | 1.58 | 5.00 | 0.15 | 0.75 | 3.17 |
| Open Forest | 1.80 | 0.6 | 1.08 | 6.65 | 0.3 | 1.99 | 5.76 | 0.15 | 0.86 | 3.94 |
| Savanna - Dry | 80.87 | 0.6 | 48.52 | 173.01 | 0.3 | 51.90 | 309.51 | 0.15 | 46.43 | 146.85 |
| Savanna - Moist | 0.97 | 0.6 | 0.58 | 2.31 | 0.3 | 0.69 | 2.73 | 0.15 | 0.41 | 1.69 |
| Savanna – Dry (highly disturbed) | 0.43 | 0.4 | 0.17 | 1.45 | 0.2 | 0.29 | 1.25 | 0.1 | 0.12 | 0.59 |
| **Total** | **85.47** | **n/a** | **51.20** | **188.69** | **n/a** | **56.46** | **324.25** | **n/a** | **48.58** | **156.23** |

## 7.5 Legally protected and internationally recognised areas

There are no legally protected or internationally recognised areas overlapping with the Project area and therefore no residual impacts are anticipated from the Project.

Given the distance between the Project and the internationally recognised areas presented in Section 4.2.7, and assuming the mitigation summarised in Section 6 is implemented, any residual impacts of the Project on these designated areas are unlikely. Project's impacts on the bird qualifying values of these internationally recognised areas are assessed using a species-based approach in Section 7.2 above.

# 8 Offset strategy

## 8.1 Offset approach

Biodiversity offsets and/or other forms of compensation are required to ensure overall NG of CH and NNL for NH, in line with IFC PS6 and Mozambique national requirements (Ministry of Land and Environment 2022).

Offsets should be used as the last resource in the mitigation hierarchy, if significant residuals impacts remain after the previous steps (avoidance, minimisation, restoration) have been implemented (e.g. CSBI & TBC 2015). Offsets can include off-site habitat restoration and actions that increase a species' survival or productivity (restoration offsets), and/or measures to stop the ongoing degradation and loss of biodiversity in existing designated sites or sites proposed for designation (averted loss offsets). Additional conservation actions and other support enabling conservation are also considered in this BAP.

The identification and development of offset actions in this BAP follows IFC Guidance Note 6 and recognised GIIP (e.g. BBOP 2012; CSBI & TBC 2015; IPIECA 2022). The offsets are targeted to priority biodiversity values with residual impacts (see Section 7).

## 8.2 Offset principles

The offset actions developed in this BAP follow good practice (BBOP 2012; ICMM & IUCN 2013; Ledec & Johnson 2016, Ledec & Johnson 2016), including the ten BBOP offset principles for achieving NNL/NG (BBOP 2012):

- Adherence to the mitigation hierarchy: A biodiversity offset is a commitment to compensate for significant residual adverse impacts on biodiversity identified after appropriate avoidance, minimisation and on-site rehabilitation measures have been taken according to the mitigation hierarchy;
- Limits to what can be offset: There are situations where residual impacts cannot be fully compensated for by a biodiversity offset because of the irreplaceability or vulnerability of the biodiversity affected;
- Landscape Context: A biodiversity offset should be designed and implemented in a landscape context to achieve the expected measurable conservation outcomes taking into account available information on the full range of biological, social and cultural values of biodiversity and supporting an ecosystem approach;
- NNL: A biodiversity offset should be designed and implemented to achieve *in situ*, measurable conservation outcomes that can reasonably be expected to result in NNL and preferably a NG of biodiversity;
- Additional conservation outcomes: A biodiversity offset should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. Offset design and implementation should avoid displacing activities harmful to biodiversity to other locations;
- Stakeholder participation: In areas affected by the project and by the biodiversity offset, the effective participation of stakeholders should be ensured in decision-making about biodiversity offsets, including their evaluation, selection, design, implementation and monitoring;
- Equity: A biodiversity offset should be designed and implemented in an equitable manner, which means the sharing among stakeholders of the rights and responsibilities, risks and rewards associated with a project and offset in a fair and balanced way, respecting legal and customary arrangements. Special consideration should be given to respecting both internationally and nationally recognised rights of indigenous peoples and local communities;
- Long-term outcomes: The design and implementation of a biodiversity offset should be based on an adaptive management approach, incorporating monitoring and evaluation, with the objective of securing outcomes that last at least as long as the project's impacts and preferably in perpetuity;
- Transparency: The design and implementation of a biodiversity offset, and communication of its results to the public, should be undertaken in a transparent and timely manner; and,
- Science and traditional knowledge: The design and implementation of a biodiversity offset should be a documented process informed by sound science, including an appropriate consideration of traditional knowledge.

## 8.3 Offset governance

Biodiversity offsets are more likely to be feasible in contexts with clear institutional arrangements, good governance and management responsibility, including a high level of stakeholder involvement throughout. This provides a good basis for long-lasting implementation conservation actions. Important design principles for establishing this type of management system approach are:

- Use existing governance structures wherever feasible;
- Ensure any new structures that are created are appropriate to the scale and stakeholders involved;
- Develop downward as well as upward accountability (implementation and financial) for all management structures; and,
- Ensure there is sufficient capacity and technical assistance within the governance and management structures to function efficiently.

## 8.4 Offset requirements and targets

### 8.4.1 Species-based approach

#### *8.4.1.1 Birds*

Estimated annual residual impacts for bird priority biodiversity values vary from ~0 to 12 individuals per species per year (Table 12). PS6 requires offsets for significant impacts, however as the significance of the estimated impacts has not been determined for any species, each species' residual impact as estimated in this BAP is assumed as the initial target value for any offset actions to meet a NNL or NG target (i.e. the full extent of impacts must be compensated). In addition, Mozambique national legislation defines a NG in biodiversity as "…that which exceeds the result of No Net Loss by at least 15%" (Ministry of Land and Environment 2022). For CH-qualifying species, which have a NG requirement, the initial target value for offsets should be adjusted by 15% to ensure that the national requirement are met – this applies to White-backed Vulture, Bateleur and Martial Eagle. For all other species, there is sufficient uncertainty in the pre-construction fatality estimates that an additional gain of 15% does not result in a material increase in the offset targets of any species.

Almost all species' impacts are predicted as 'less than' a certain value: for these species, the NNL / NG target has been rounded up to the next full integer. This conservative approach ensures that gains are likely to:

- Exceed the 15% improvement required by national legislation for Critical Habitat-qualifying species (Ministry of Land and Environment 2022); and
- Ease the demonstration of the Project's position relative to its commitments, as all impacts will be in full integers.

#### *8.4.1.2 Bats*

For bats, the annual fatality estimate is 12-1,824 individuals of all bat species collectively (Section 7.3) while a bat mortality threshold of 228 Least Concern insectivorous bats has been calculated for the Project (Arcus 2023) using the South African guidelines (MacEwan *et al.* 2020). The South African guidelines also have an impact threshold of zero or one for some species or species-groups (see Table 3 of MacEwan *et al.* 2020): species with these thresholds known to be present in the Project area are highlighted in bold in Table 7. Mitigation, in the form of curtailment or acoustic deterrents, as committed to in the ESIA, would be implemented to ensure that impacts do not exceed the relevant thresholds for any species or species-groups. Should PCFM show that fatalities exceed the relevant threshold, additional curtailment would be implemented and exceedance would possibly need to be compensated through offset actions to meet a NNL target for this species-group. Following this approach, no offset action is currently proposed for bats, however this may be required in the future.

Robust monitoring of both impacts and gains from offset actions will be required so the Project can demonstrate that it is meeting its commitment for all species. The investment in offset actions would need to increase if annual impacts exceed the predicted gains from the offset actions.

### 8.4.2 Habitats

The residual impacts of the Project to habitats were calculated in Section 7.4.2, with total habitat impacts for the Project shown in Table 15 and Table 16. Impacts to Natural Habitat were previously estimated using available land and habitat cover layers. This BAP version presents updated residual impacts using the results of the habitat ground-truthing and condition mapping (Coombes 2024) and an updated wind farm area footprint provided in .kmz files on 20 June 2024.

In summary, the habitat offset target for this Project is:

- >156.23 QH of non-critical natural habitat (including forest, open forest, dry savanna and moist savanna) to demonstrate NNL (Table 16. Summary of residual impacts and offset targets for habitats.).
-

Table 16. Summary of residual impacts and offset targets for habitats.

| Habitat types | Total residual impact (QH) | Offset objective | Offset target (QH) |
|---|---|---|---|
| **Natural habitats (non-critical)** | | | |
| Forest | 3.17 | NNL | >3.17 |
| Open Forest | 3.94 | NNL | >3.94 |

| Habitat types | Total residual impact (QH) | Offset objective | Offset target (QH) |
|---|---|---|---|
| Savanna - Dry | 146.85 | NNL | >146.85 |
| Savanna - Moist | 1.69 | NNL | >1.69 |
| Savanna - Dry (highly disturbed) | 0.59 | NNL | >0.59 |
| **Total** | **156.23** | **NNL** | **>156.23** |

## 8.5 Proposed offsets

Three main offsets have been identified as initially feasible in consultation with Globeleq, lenders and key stakeholders. These offsets have the potential to deliver the required gains so that the Project meets its NG and NNL commitments for all CH-qualifying features and priority biodiversity respectively. These offsets are summarised below, while more detailed information on the feasibility of each is included in Appendix 2 of this report.

According to the Mozambique Directive on Biodiversity Offsets (Ministry of Land and Environment 2022) biodiversity offsets must be implemented in one of the following areas:

- Conservation areas: a) which present levels of biodiversity degradation and whose financing is not sufficient to achieve the respective conservation objectives; b) which are under considerable human pressure and which require improved conservation conditions or territorial extension in order to attain or increase their conservation objectives; and,
- Areas of importance for biodiversity outside conservation areas: Key Biodiversity Areas, Ramsar Areas, Forest Reserves or other types of nationally or locally important ecological areas that are considered important areas for biodiversity.

This consideration, along with other specifications of the Directive on Biodiversity Offsets, have been considered when developing the three offsets outlined below. Appropriate monitoring will be implemented for each offset to be able to demonstrate the effect of actions described below and to quantify the gains to target and other relevant species form the actions – these are not described below, but are briefly listed in Appendix 2 and will be further expanded in the Project's Biodiversity Monitoring and Evaluation Plan.

### Offset 1: Protecting and enhancing the natural habitats within the Namaacha TIPA

This offset action has been specifically developed to meet NNL requirements for NH impacted by the Project. Secondary gains to the KwaZulu-Natal Hinged-back Tortoise, Lebombo Dragon Lizard, Lebombo Flat Lizard, several priority bird and bat species, and possibly *Barleria lebombonensis* and *Cyphostemma barbosae*, are also expected as a result of increased quality of their habitats, and consequent higher breeding and survival rates.

Two potential offset areas have been identified within the Namaacha Tropical Important Plant Area (TIPA)[13]:

- A 2,300 ha parcel of land ~2 km to the northwest of the Project which is currently used to raise cattle and goats, however substantial parts of the property seem to present well-preserved habitat patches, maintaining an increased diversity of plants, including succulents and trees. The landholder has made some efforts to farm sustainably, and is open to additional conservation activities if they can be shown to produce sufficient revenue; and,
- A community-owned area of land ~14 km northeast of the Project, currently used for cattle grazing and small agricultural plots. However there are still patches of very well-preserved NH, showing a very high diversity of native plants.

The two areas mentioned above comprise seemingly similar habitats and ecosystems (or likely in better conservation condition) to those found in the Namaacha Wind Farm area and along the Project's OHTLs.

The 2,300 ha parcel of land contains Southern Lebombo Bushveld savannah vegetation (Coombes 2024). The vegetation is natural habitat with a likely quality of 0.8 based on the description of the vegetation by Coombes (2024). Relative to the proposed community-owned offset and the Project area, this proposed offset area has a higher diversity of plant and animal species, larger trees, and is apparently protected from most human disturbance and subsistence hunting (Coombes 2024). The Lebombo flat lizard was recorded in this proposed offset area.

The community-owned offset contains savannah vegetation adjoining small, linear areas of forest, on low hills at the base of the Lebombo Mountains. The species composition and landscape context suggest this area is an ecotone between Southern Lebombo Bushveld and Western Maputaland Clay Bushveld. The vegetation is natural habitat and was assigned a quality score of 0.8 by Coombes (2024). However, Coombes (2024) observed evidence of tree harvesting for charcoal, inferred by the lower density of larger trees and the frequently coppiced regrowth of many trees in the area (Coombes 2024). The presence of some human disturbance suggests that a quality of 0.8 is an overly high assessment. Instead, the quality score of this habitat is assessed as being 0.6 (Table 14).

Proposed actions within either/both of these offset areas would involve a combination of activities targeted at reducing or stopping current threats to the ecosystem (averted loss), as well as rehabilitation of degraded areas, including:

- Identification and mapping of key areas suitable for targeted action;
- Removal of non-native invasive plant species;
- Restoration of areas with degraded habitat;
- Fencing or protection or restoration areas;

[13] The Namaacha TIPA represents an area of importance for biodiversity outside the existing Conservation Areas, and in-country stakeholders indicated that the area is likely be designated as a Key Biodiversity Area in the near future. As such, the two areas identified meet the requirements of the Mozambique decree for the location of offsets.

- Development of a socio-economic plan for the provision of alternative livelihoods and income for the landholder and/or to local communities to reduce cattle grazing, wood cutting, agriculture and anthropogenic fire pressures;
- Development of education and awareness raising campaigns among local communities to reduce anthropogenic pressure on the ecosystems; and,
- Support the development and implementation of a Management Plan for the offset areas.

Potential national implementation partners for the action have been identified as a landowner holding the DUAT licence for one of the areas, Biofund (Foundation for the Conservation of Biodiversity), VIDA (a community-focused NGO), IIAM (Institute of Agriculture Research, part of the Ministry of Agriculture and Rural Development), while key national-level stakeholders would be MTA (Ministry of Land and Environment), DINAB (MTA's National Directorate of Environment) and ANAC (MTA's National Administration for Conservation Areas).

A gradual increase in habitat quality is expected during the implementation of the activities listed above. Gains in NH will be predicted over a fixed time period (minimum 25 years), with a default value of 0.029 (2.9%) of habitat condition increment per year resulting from the restoration actions (see (Jones *et al.* 2019)) and future gains subject to a time discount rate (2% by default; Drupp *et al.,* 2018; Dunford, 2018).

The total target area for the offset is calculated using this formula $L/(c*T*D^{T})$, in which:

- L = loss in QH = 156.23
- c = annual increase in habitat quality from restoration = 0.029
- T = time to target condition (years) = 25
- D = (1 – 0.02 discount rate) = 0.98

Therefore, ***the target area for this offset will be >357.10 ha***. This can be one single area or several distinct areas, and offset area(s) will be clearly mapped so that the offset can be monitored in the long-term.

### Offset 2: Reducing threats and increasing habitat quality for Martial Eagles and Bateleurs

This offset action has been specifically developed to deliver a NG for two CH-qualifying raptors: Martial Eagle and Bateleur. The offset actions comprising habitat enhancement, nest site protection, reduction of anthropogenic threats (e.g., direct persecution or impacts from power lines) and an increase in food and nest-site resources will also provide gains for other priority raptor species and Shelley's Francolin.

Both target species are widely distributed in southern Africa, including across the Project area, where they inhabit a broad range of woodland and savannah ecosystems. Threats to both species include direct persecution (shooting and trapping by farmers, poisoning, nest disturbance), electrocution and collisions on power lines and habitat loss and degradation.

Two areas have been identified as appropriate sites for the implementation of actions under this offset:

- Within the Namaacha TIPA at sufficient distance from the wind farm. While there is no information on the abundance of these two target species across this area, both are confirmedly present in the northeastern section of the TIPA (Cornell 2023), which also comprises other areas of suitable habitat; or,
- The existing Maputo Special Reserve, an existing Conservation Area, ~40 km southeast of the Project, where both species are regularly recorded (Cornell 2023).

Proposed actions within either/both of these offset areas would target the reduction of current threats to the species' survival and improving their habitat quality and/or breeding success, including:

- Identification and mapping of existing territories of Martial Eagle and Bateleur, and of vacant areas with seemingly favourable habitat;
- Protection of nests during the breeding period to avoid poaching or disturbance;
- Provision of anti-predator nest platforms (artificial nests);
- Development of education and awareness raising campaigns among local communities to reduce direct persecution, poisoning and cutting of nesting trees;
- Training and financial/logistic support of rangers/guards from the Conservation Area and/or local community;
- Implementation of minimization measures in mortality hotspots along transmission infrastructure (e.g., retrofitting or installation of bird-friendly structures);
- Habitat management directed at the enhancement of ecological suitability for their main prey species (especially hares, guineafowl, and small antelopes).
- Support the development and implementation of a Management Plan for the offset areas.

Potential national implementation partners for this offset have been identified as Biofund (Foundation for the Conservation of Biodiversity), VIDA (a community-focused NGO), IIAM (Institute of Agriculture Research, part of the Ministry of Agriculture and Rural Development), EWT (Endangered Wildlife Trust) and a national researcher with expertise in Mozambican raptors and vultures, while key national-level stakeholders would be MTA (Ministry of Land and Environment), DINAB (MTA's National Directorate of Environment) and ANAC (MTA's National Administration for Conservation Areas).

### Offset 3: Reducing mortality by poisoning of White-backed Vultures

This offset action has been specifically developed to deliver a NG for the CH-qualifying White-backed Vulture, and will also provide secondary gains for other priority raptors and other vultures.

White-backed Vultures inhabit a variety of savannah, woodland and arid areas in sub-saharan Africa, and in Mozambique, the species occurs across the country, however records are highly concentrated in protected areas, likely due to prey availability and reduced disturbance. The

main threats to the species in southern Africa are direct hunting, persecution and poisoning for use in cultural practices, with the loss of habitat for conversion to agro-pastoral systems and loss of wild ungulates leading to a reduced availability of carrion.

While these threats are likely to be present at many sites across Mozambique, the Limpopo National Park has been identified as a priority location for this action due to the high number of White-backed Vulture records in the area. The Maputo Special Reserve may also be a secondary option, especially if this site is chosen for offset two, although White-backed Vultures have not been recently reported from this area.

Proposed actions within the offset area would be a combination of community-based activities encouraging the reduction in intensity or cessation of current threats, awareness-raising of the plight of vultures and support to alternative livelihood options for community members currently involved in poisoning/poaching, including:

- Establishment of a baseline situation on existing illegal poisoning and killing of vultures for subsistence use or commercial trade, through focused interviews with community households, regular visits to markets in the offset wider area, and interviews of market stallholders, vendors and law enforcement agencies or Conservation Area staff;
- Interviews with community members, and other relevant organisations, to understand the motivations behind poisoning and explore alternatives to poisoning;
- Development and roll-out of an awareness campaign around the illegality of killing vultures;
- Support to law enforcement agencies and/or conservation area staff to implement relevant laws; and,
- Support programs to community members to provide alternative medicinal or livelihood options.

Potential national implementation partners for the action have been identified as Biofund (Foundation for the Conservation of Biodiversity), VIDA (a community-focused NGO), the Peace Parks Foundation, EWT (Endangered Wildlife Trust) and a national researcher with expertise in Mozambican raptors and vultures, while key national-level stakeholders would be MTA (Ministry of Land and Environment), DINAB (MTA's National Directorate of Environment), ANAC (MTA's National Administration for Conservation Areas) and relevant government agencies responsible for social/community programs and law enforcement.

## 8.6 Additional actions to support conservation

In addition to mitigation and offsets, it is good international industry practice for development projects to support conservation actions to contribute to the knowledge and enhancement of biodiversity in the country. These actions can cover a wide range of positive biodiversity interventions, or provide supporting information to inform future conservation actions, and are not intended to provide measurable gains that can be set against significant impacts.

To further the understanding of biodiversity relevant to the Project's impacts, the Project will fund a local/ national NGO or academic institution to undertake a program of long-term scientific research on biodiversity and/or biodiversity monitoring. This program will focus on some of the priority species listed in Section 4 of this BAP, while data deficient species listed in the CHA (Appendix 4) will be also considered in this programme. The output from the research and monitoring program will increase knowledge of those priority species at national level and will help to understand population trends and threats, which in turn will inform the establishment and implementation of conservation programmes. The data from this research and monitoring will be shared widely and published, which will contribute to the national and global knowledge and databases on biodiversity. Where existing monitoring programs are being undertaken in the wider area for Project priority species, the Project will also consider support to those programs.

The Project will also conduct an education and awareness programme in the Namaacha area, focused on the importance of preserving the existing biodiversity, and the resulting socio-economic benefits for the local community, with the goal of reducing potential indirect impacts from an increased number of local and non-local people in the area.

## 8.7 Road map for BAP update and offset development

This section includes a 'road map' of next steps needed to finalise the BAP and to further develop the feasibility study for the offsets listed above.

### 8.7.1 Additional biodiversity surveys at the Project site

No additional biodiversity surveys are planned.

### 8.7.2 Update of BAP

During the implementation of the Project, the BAP should be updated regularly to incorporate:

- Changes in the Project design;
- Significant findings from the biodiversity monitoring;
- Recorded fatalities for each priority bird or bat species at the wind farm and along the transmission line; and,
- Progress with the offset implementation and gains achieved.

### 8.7.3 Detailed offset investigations

This BAP presents three offsets which would collectively deliver the Project's NG or NNL commitment for all CH-qualifying and priority species. These actions are necessarily high-level, and if agreed as suitable between the Project and the lenders, would require detailed investigations, the results of which would form the Biodiversity Offset Management Plan (see below) for the Project. For each action, investigations should:

- Confirm the location of, and area to be covered by, the offset;

- Determine in detail the actions that will occur to deliver the required gains for target features;
- Describe the monitoring required to demonstrate the level of gains achieved by the action;
- Confirm the implementing party/parties, any other relevant organisations and the governance structure of the action; and,
- Estimate costs, and identify any other support required, to effectively implement the actions and required monitoring.

For the final set of agreed actions, Globeleq and the implementing agency(ies) should agree on:

- The scope of support – i.e., level of funding, time period, responsibilities; and,
- A set of financial and management indicators to demonstrate that the action is functioning as intended and likely to deliver the assumed gain.

### 8.7.4 Biodiversity Offset Management Plan

Following final agreement on offset actions, a Biodiversity Offset Management Plan (BOMP) will be prepared to describe the specific activities of implementing, managing and monitoring the offsets. The BOMP is a requirement for projects implementing offsets according to the Mozambique Directive on Biodiversity Offsets (Ministry of Land and Environment 2022).

The BOMP should ideally be produced and offset implementation should start prior to the start of construction. However, as construction of this Project is planned to start soon after financial close, and offsets are long-term actions outside the Project affected area, the development of the BOMP may need to continue after the start of construction. The BOMP will include the management of all final and feasible offsets and additional conservation actions. The BOMP will have specific objectives and actions, with targets, indicators and responsibilities for each action.

### 8.7.5 Biodiversity Management Plan

A Biodiversity Management Plan (BMP) is a practical document detailing all mitigation measures to be implemented during the pre-construction, construction and operational phases. The Project will develop a BMP to provide a description of the mitigation measures, the implementation schedule, the responsible party, and the key performance indicator to verify their implementation. Mitigation measures will be aligned with those presented in the ESIA/ESMP documents and identify additional measures required for NH and/or CH-qualifying features and to align with good international industry practice. When the Projects develops a BMP, the long list of non-CH priority bird and bat species (Table 6 and Table 7) will be reviewed and finalised, taking account of the vulnerability and irreplaceability of each species population, as well as the expected impacts of the Project.

### 8.7.6 Biodiversity monitoring and evaluation

A framework BMEP is included in Appendix 3.

# 9 Biodiversity Monitoring and Evaluation Plan Framework

This Biodiversity Monitoring and Evaluation Plan (BMEP) Framework sets out the framework, indicators and approaches the Project should use to track changes in biodiversity across the construction and operation phases of the Project, and to evaluate whether the requirements of PS6 are fulfilled. The BMEP framework for the Namaacha Project is presented in Appendix 3.

The monitoring and evaluation in offset areas is not included in the present BMEP Framework because exact implementation areas and final associated offset actions have not been defined yet. Likewise, the framework does not include detailed monitoring protocols for methodologies that will also need to be developed in the future.

Monitoring and Evaluation activities will be undertaken throughout the whole operational life of the Project (25 years) for some features and for a shorter duration for other features. The shorter monitoring duration for some features takes into consideration the fact that most operational impacts are expected in the first years of operation. In case no significant changes are detected in that period then it is not proportionate to continue the monitoring for the entire life of the project. Should significant changes be detected during the periodic evaluations or at the end of the planned monitoring period, then monitoring may need to be extended. The frequency of monitoring will also vary depending on the priority biodiversity feature being monitored. The monitoring duration and frequency of the distinct monitoring activities is also presented in Appendix 3.

# 10 BAP Implementation

## 10.1 Roles and responsibilities

The principal roles and responsibilities for the implementation of this BAP are outlined below. As the Project moves towards operation, additional plans may be required to operationalise the commitments made in this BAP. The responsibilities for the offset actions (Section 8) will be specified in the updated OFS and BOMP.

The Project Company's Environmental Manager will have overall responsibility for 1) coordinating the implementation of the BAP; 2) coordinate subsequent BAP updates after the Final BAP; and 3) communicate the BAP requirements to all relevant Project personnel and contractors. The Operations Manager will ensure that all parties comply with the requirements set out in this BAP, and will approve sufficient resources for the implementation of the BAP.

The biodiversity mitigation measures described in the ESIA and summarised in Section 6 of this BAP will be integrated and detailed into the Construction Environmental Management Plan to be developed and implemented by the EPC Contractor. The Environmental Manager of the EPC Contractor will be responsible for the implementation of the construction and site-related mitigation measures, and they will report to the Project Company's Environmental Manager.

The key to a successful BAP is the continuous monitoring of its actions and evaluation of their effectiveness in meeting the BAP objectives. The Project Company will employ a suitably qualified biodiversity specialist to monitor whether the specific actions in the BAP are being implemented and highlight requirements for adaptive management. The actual biodiversity monitoring in the offset areas will be detailed in future versions of the BMEP and BAP, which will be developed once the offset actions are sufficiently advanced.

Several external partners have already been identified by the Project for the offset implementation (Appendix 2). For the offset actions targeting the protection and rehabilitation of threatened ecosystems (see Offset 1 in Appendix 2, for details), the Project will collaborate with Biofund (Foundation for the Conservation of Biodiversity). Biofund is a private, not-for-profit Mozambican institution with public utility status, with wide experience in managing financial resources for biodiversity conservation in the country, and that works closely with the Mozambican environmental authorities. They will be supporting the Project with the coordination and supervision of all offset actions in the area.

Commented [MS17]: Is this confirmed? It looks like we loosened the language earlier in the doc

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Annual reports on the BAP implementation will be prepared and made available to regulatory bodies and financing parties, and where appropriate to research institutes and nature conservation NGOs.

The Project will also consider sharing biodiversity data, such as those collected during surveys with the Global Biodiversity Information Facility (as recommended by Equator Principles 4).

## 10.2 Budget considerations

The actual budget will be developed separately by Globeleq. Table 17 includes a list of the main cost categories for the biodiversity studies and implementation of plans.

*Table 17. Cost categories for offset studies and implementation.*

| Cost category | Comments |
|---|---|
| Biodiversity mitigation measures during construction | The costs for biodiversity mitigation measures will be included in the EPC Contract. These measures are described in the ESIA and other documents and summarised in Section 6 of this BAP. The EPC Contractor will detail these mitigation measures in a Construction Environmental Management Plan. |
| Additional surveys | Additional surveys (see Section 8.7.1). |
| Offset Feasibility Study (OFS) | The OFS is included in the current TBC contract, and forms Appendix 2 of this document. |

| Cost category | Comments |
|---|---|
| BAP updates | The current TBC contract covers four BAP versions, including a Final BAP. However, some additional updates are likely to be required in the future (see Section 8.7.2 above). |
| Biodiversity Offset Management Plan (BOMP) | The BOMP costs will be estimated after the offset actions have been confirmed. |
| Offset implementation | These costs will be estimated once the offset actions have been confirmed. |

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# Appendix 1 Summary minutes of in-country meetings

# Appendix 2: Offset feasibility study

# Appendix 3: Biodiversity Management and Evaluation Plan (BMEP) framework

# Appendix 4: Critical Habitat Assessment

**NOTE:** This assessment was conducted in March 2024. Since this time, three key changes have occurred that are worth noting:

- The transmission line route has changed (see Figure 1 of the BAP compared to Figure 1 of the CHA). This route variation has not resulted in any changes in affected habitat types or species.
- The conservation status of the three ecosystems identified in the CHA were downgraded to Least Concern (Lembombo Summit Sourveld, Western Maputaland Bushveld, and Subtropical Coastal Saltmarsh) and a further ecosystem was downgraded to Vulnerable (Lebombo-KwaZulu Natal Scarp Forest). This means that there are now no threatened/ unique ecosystems that trigger critical habitat in the EAAA.
- It was identified the African savanna elephants are occasional visitors to the EAAA (particularly in the low-land areas in Namaacha District). These elephants are tracked and are known to come from either Kruger National Park in South Africa or the Maputo Elephant Game Reserve in Mozambique. As the EAAA is not part of the extant range for this species and the Project will implement measures to avoid direct impacts on elephants, this is not considered a critical habitat trigger for the Project.

As the BAP supersedes the CHA, these changes have been incorporated into the BAP only and the previous CHA is included herein for informational purposes noting these key changes since it was issued.

# Appendix 5: Residual Impact Assessment breakdown and map series