



# Biodiversity Management Plan (BMP)

**Scatec 200MW Wind Farm in Egypt**



**Client:**



Regional Center for Renewable Energy and Energy Efficiency  
المركز الإقليمي للطاقة المتجددة وكفاءة الطاقة

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## 1. EXECUTIVE SUMMARY

This document details the construction Biodiversity Management Plan (BMP) for the Scatec Power Wind Energy Project (the Project), Gulf of Suez, Egypt and associated Overhead Transmission Line (OHTL). It also includes outline details of the operational BMP. The Project is seeking to align with IFC Performance Standard 6 (PS6) and EBRD Performance Requirement 6 (PR6).

Being located by the western coastline of the Gulf of Suez, the Project Site and the general study area are located along the Red Sea/Rift Valley flyway, which is one of the most important migration flyways for migratory soaring birds in the world with over 1.5 million soaring birds migrating through it twice a year (Birdlife, 2020). The flyway links the European breeding grounds with the African wintering areas for at least 37 migratory soaring bird species. Regular migration monitoring along the western coast of the Gulf of Suez where the project is located has shown that there is a significant difference in the level of use of the area during migration seasons. Research has shown that this part of the flyway is used by much larger numbers of birds during spring migration in comparison with autumn migration seasons.

The Project area lies within the Gebel El Zeit IBA and accordingly there is a significant association between the terrestrial habitats present within the Project site and the species linked to moving through the IBA. Critical Habitat is triggered for 5 birds species: via IFC PS6 and EBRD PR6 Criterion 2 (threatened species) for Steppe Eagle (*Aquila nipalensis*) and IFC3 and Criteria 2 (migratory and congregatory) White Stork (*Ciconia ciconia*), Black Stork (*Ciconia nigra*), Great White Pelican (*Pelecanus onocrotalus*) and Levant Sparrowhawk (*Accipiter brevipes*),

As part of the Environmental and Social Impact Assessment (ESIA) for the Project, in-flight monitoring assessments were undertaken at the project site during the spring and autumn season 2022. Additionally, a comprehensive literature review was completed.

Habitat on site is broadly Natural Habitat. One reptile, the Egyptian Spiny-tailed lizard (VU), and three migratory bird species Egyptian vulture (*Neophron percnopterus*), Eastern Imperial Eagle (*Aquila heliaca*) and Greater Spotted Eagle (*Clanga clanga*) are considered to be Priority Biodiversity Features.

The Project is committed to achieving a net gain for CH species and at least no net loss for the Egyptian Spiny-tailed Lizard, the priority bird species and Natural Habitat, and to demonstrate this achievement through a robust monitoring and adaptive management program.

## 2. INTRODUCTION

### 2.1 The Report

This document details a Biodiversity Management Plan (BMP) for the construction phase of Scatec Power Wind Farm Project, Gulf of Suez, Egypt. This BMP aims to:

- Protect and conserve biodiversity.
- Promote sustainable management and use of natural resources through the adoption of practices that integrate conservation needs with the Project.

### 2.2 The Project Site and Study Area

The Project is located within the Red Sea Governorate, approximately 290km southeast of the capital city of Cairo (Figure 1). Administratively, the Red Sea Governorate is divided into 7 Cities (also known as Districts), each headed by a Local City Council. The Project site is located within the Ras Ghareb City (or District) and therefore administratively is under the Ras Ghareb City Council.

The closest official (under Ras Ghareb District) community settlements to the Project site include Wadi Dara settlement (located less than 1km to the south) and Ras Ghareb City (located around 35km to the north). Moreover, there is Ras Shukheir area (a complex affiliated with the General Petroleum Company that includes a residential area and services for workers at the Ras Shukheir petroleum site)و, that is located around 8km to the northeast of the Project site. This settlement is used by petroleum companies in the area as housing/accommodation units, offices, and also includes some petroleum facilities.

The Project has a total area of 38km<sup>2</sup> that has been allocated to the Developer by NREA for the development of this Project. It is important to note that the Project area is part of a larger 700km<sup>2</sup> area which is owned by NREA and that is allocated for wind farm developments.

Being located by the western coastline of the Gulf of Suez, the Project site and the general study area are located along the Red Sea/Rift Valley flyway. This is one of the most important migration flyways for migratory soaring birds in the world with over 1.5 million soaring birds migrating through it twice a year (Birdlife, 2020). The flyway links the European breeding grounds with the African wintering areas for at least 37 migratory soaring bird species. Regular migration monitoring along the western coast of the Gulf of Suez where the project is located has shown that there is a significant difference in the level of use of the area during migration seasons. Research has shown that this part of the flyway is used by much larger numbers of birds during spring migration in comparison with autumn migration seasons.

The Project lies partially within the Gebel El Zeit Important Bird area (IBA) which is a narrow, 100-km-long strip of land extending along the Gulf of Suez/Red Sea coast, from Ras Gharib in the north to the bay of Ghubbet El Gemsa in the south. This contains several pools of hyper-saline water and large patches of saltmarsh as well as two large shallow bays with extensive intertidal mud and sandflats (Birdlife, 2023). The IBA and surrounding area is known to be used by over 250,000 migratory soaring birds each year, with many of these birds crossing between the western shore of the Gulf of Suez and the Sinai peninsula on their spring and autumn migrations. A map of the concentrated Rift Valley/Red Sea flyway elements is shown in Figure 2 (N.B. birds migrate across the general area in Spring and Autumn, however concentrated crossing points have been identified at several locations along the coastal areas of Egypt).

As part of the Environmental and Social Impact Assessment (ESIA) for the project, in-flight monitoring assessments were undertaken at the Project site during the spring and autumn season 2022. Additionally, a comprehensive literature review was completed.

A Critical Habitat Assessment has also been completed for the Project. This found that the site was Critical Habitat for five migratory bird species: IFC1 and Criterion 2 (threatened species) Steppe Eagle and IFC3 and Criteria 2 (migratory and congregatory) White Stork, Black Stork, Great White Pelican and Levant Sparrowhawk.

Habitat on site is broadly Natural Habitat. One reptile, the Egyptian Spiny-tailed lizard (VU), and three migratory bird species: Egyptian Vulture, Eastern Imperial Eagle and Greater Spotted Eagle are considered to be Priority Biodiversity Features. Both these species and those that trigger Critical Habitat will be the focus of this BMP document.

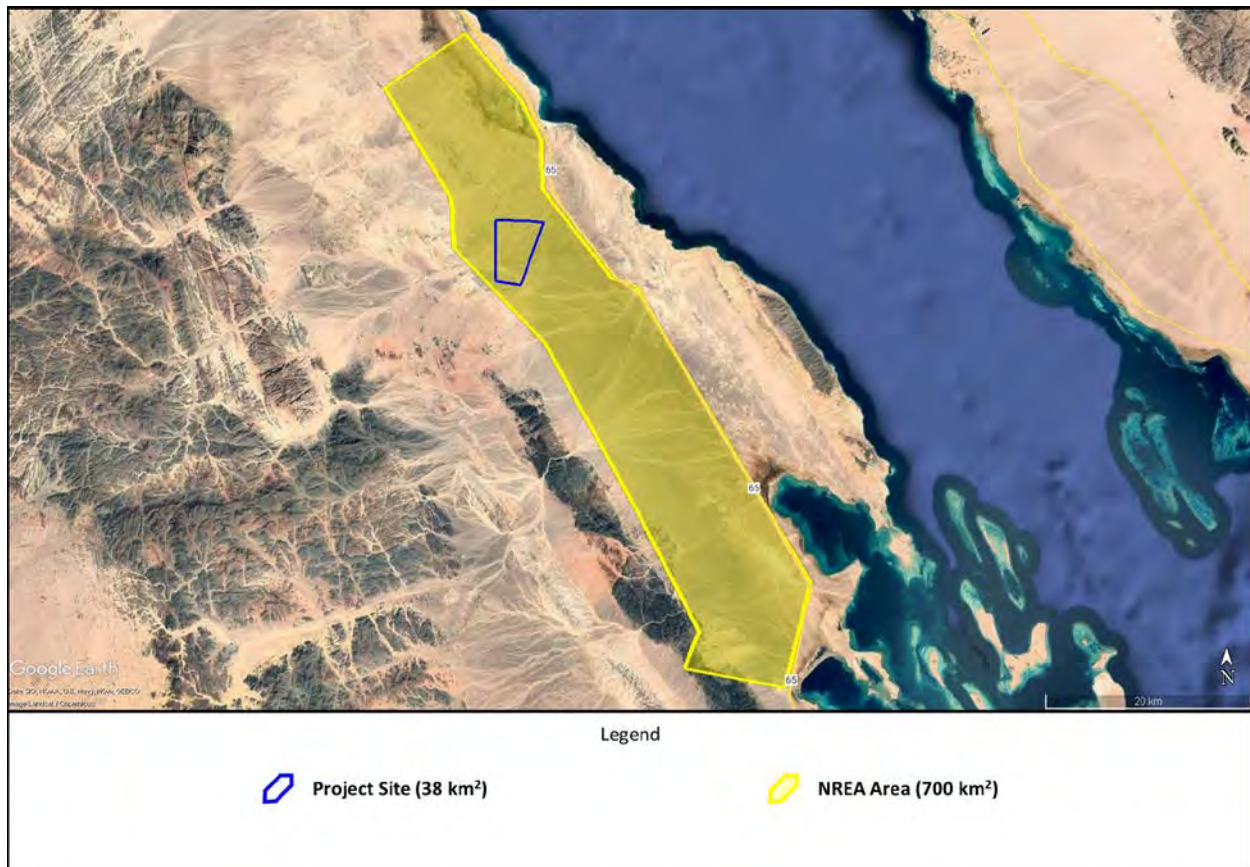


Figure 1: Project Site

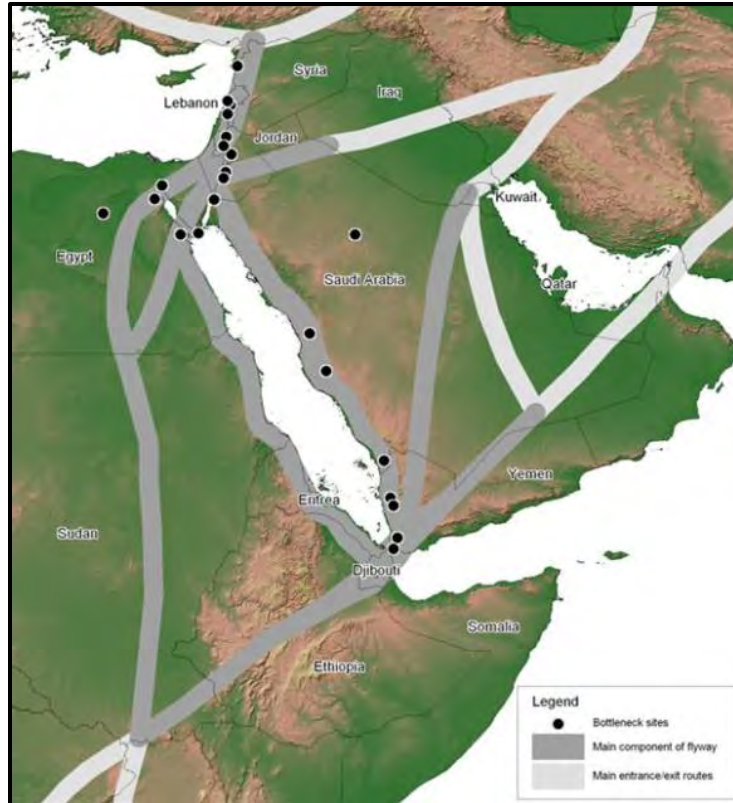


Figure 2: Map of the main elements of the Rift Valley/Red Sea flyway showing key bottleneck sites (Source: BirdLife International)<sup>1</sup>

### 2.3 Lender Standards

Standards for the IFC and EBRD performance standards/requirements are detailed below.

The Lender requirements indicate that protecting and conserving biodiversity, and its ability to change and evolve, is fundamental to sustainable development. The requirements set out in this Performance Standard have been guided by the Convention on Biological Diversity, which defines biodiversity as “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems.” The three principal objectives are:

- To protect and conserve biodiversity;
- To maintain the benefits from ecosystem services; and
- To promote the sustainable management and use of natural resources through the adoption of practices that integrate conservation needs and development priorities.

The overall objective of the Project is to ensure:

- Ecological processes are maintained and are not disrupted;

<sup>1</sup> <http://datazone.birdlife.org/birdlife-is-working-to-mainstream-soaring-bird-conservation-along-the-rift-valley/red-sea-flyway>

- Impacts on fauna and flora species as a result of construction and O&M activities are minimized;
- “No net loss” for any Priority Biodiversity Features / Feature of Significant Biodiversity Value;
- Net Gains for Critical Habitat qualifying species; and
- Ensure no net negative residual impact on other ecological receptors.

Achieving these objectives requires that the mitigation hierarchy is exercised to ensure Project-related impacts are managed through taking appropriate avoidance, minimization and restoration measures before biodiversity offsets are considered to compensate for significant residual impacts.

## 2.4 Purpose and Scope

This BMP details the Project’s biodiversity management initiatives, commitments, and obligations with the aim to safeguard and promote the viability of priority species and habitats associated with the Project. This BMP includes biodiversity mitigation and management measures that will be followed by the Developer and EPC Contractor during the pre-construction and construction phases. Outline mitigation, monitoring and management measures for the operational phase of the Project are detailed below however a separate Operational BMP will be prepared prior to the commissioning of the Project.

Implementation of this BMP will ensure the Project’s alignment with best practice, legislative requirements and the Project’s commitments to biodiversity. It is a dynamic document that will be adapted and updated as and when new information becomes available throughout the lifespan of the Project to ensure its relevancy.

The purpose of this document is to:

- Set out the Project commitments and obligations related to biodiversity, and ensure compliance with relevant legislation, and the overarching requirements of the Project.
- Provide a summary of the baseline biodiversity conditions within the Project site.
- Identify activities that may have an impact on fauna and flora, highlighting the major biodiversity threats.
- Specify management, mitigation and enhancement measures / actions to be implemented for the Project to control impacts affecting the biodiversity within the project’s area of influence.
- Identify roles and responsibilities for the implementation of identified actions.
- Outline training requirements, including awareness raising for workers.
- Specify monitoring and evaluation criteria, including KPIs to demonstrate no-net loss and net gains where applicable.
- Outline reporting requirements to Project stakeholders.

This document is considered part of the ESMS that will be implemented during the construction phase of the Project.

The BMP is structured as follows:

- Section 3: Provides an overview of the biodiversity elements within the Project Area.

- Section 4: Presents the key impacts anticipated from each phase of the Project.
- Section 5: Presents the mitigation requirements to be implemented.
- Section 6: Presents monitoring and evaluation measures.
- Section 7: Presents the biodiversity offset measures to be implemented.
- Section 8: Roles and responsibilities related to the plan.

### 3. OVERVIEW OF BIODIVERSITY

#### 3.1 Study Area

##### **3.1.1 Legally Protected Areas**

No national or international designations were identified within the site boundary.

The Project location is not located within any existing or planned natural protectorates, where the closest is around 15-20 km away to include the planned natural protectorate at Wadi Qena as well as Ras Shukheir.

##### **3.1.2 Internationally Recognized Areas**

The nearest designated IRA is the Gebal El Zeit IBA. The Project site is located within this IRA. This is designated as an important migration corridor for soaring migrants, particularly birds of prey and White Storks (*Ciconia ciconia*).

#### 3.2 Habitats, Flora and Terrestrial Fauna

The most recent field survey was undertaken at the Project site during spring and autumn 2022. The focus of the field survey was mainly to identify key habitats and identify any outstanding biodiversity taxa and/or elements that could require specific focus.

The initial field survey mainly included field observations, where the site was examined carefully for the presence of active animals, animal signs and tracks, active burrows, remains or any other vital signs that indicate the activity of animals. The research team focused on areas of high priorities; mainly wadis since they are believed to be the main corridors that animals would use in moving around the site. The team carried out route-transects along the wadis searching for any of the above-mentioned signs of animal presence. Similar approach was followed for the flora survey where the survey focused on sides of wadis and any areas where vegetation was noticed it was recorded.

A survey of the terrestrial areas of the site was undertaken to accurately identify and map burrows and sighting of the Egyptian Spiny-tailed Lizard/Dabb (*Uromastyx aegyptia*) (VU).

No rare or threatened habitats were identified during the surveys, although the Project area is considered largely Natural Habitat, being primarily Hamada Desert, with occasional Wadis. No endemic or higher conservation status plant species were identified in the surveyed area, similarly no endemic or higher conservation status mammal species were identified in that area either. Wide ranging species such as the Striped Hyena (*Hyaena hyaena*) (NT), Nubian Ibex (*Capra nubiana*) (VU) and Dorcas Gazelle (*Gazella dorcas*) (VU) were identified by background data search as having ranges which overlap with the Project Area, however no evidence of these was found during the surveys.

One globally vulnerable reptile species, the Egyptian Spiny-tailed Lizard was found in the Project Area during the surveys. The figure below shows the location of the 7 identified active burrows within the project area and wider records which were recorded during the 2022 surveys.

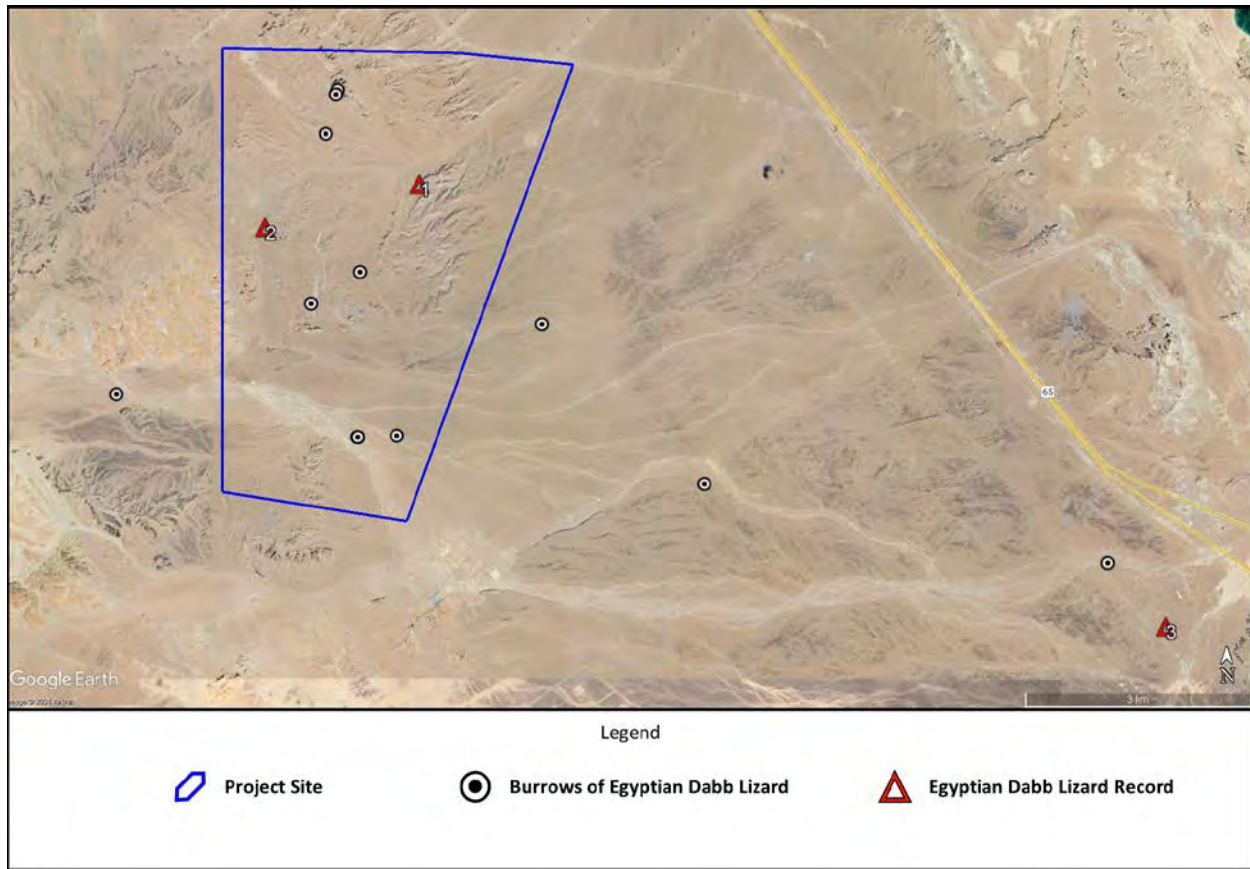


Figure 3: Egyptian Spiny-tailed Lizard Burrows (Circles) within Survey Area

### 3.3 Birds

Vantage point surveys were undertaken at the site in spring and autumn 2022, with seven vantage points selected to cover the entire Project Area. These were surveyed by experienced surveyors, with all flight times, direction and heights recorded on standardized forms. In total the site received over 1,067 hours of monitoring to cover the spring migration in the region.

In spring 2022, a total of 2,856 records belonging to 242,768 birds of twenty-five (25) species were detected in the Project site. In addition, another 2,965 birds remained unidentified.

One species in particular accounted for around 60% of the birds recorded – the White stork. Eight (8) species accounted for 99.07% of the birds recorded which include the White Stork, plus the Black Kite, Common Crane, European Honey Buzzard, Levant Sparrowhawk, Great White Pelican, Steppe Buzzard, and Steppe Eagle.

Finally, two (2) species were classified as Vulnerable (VU) according to the IUCN Red List (Eastern Imperial and Greater Spotted eagles), two (2) are Endangered (EN), the Egyptian Vulture and the Steppe Eagle. A fourth one could be considered of special interest being Near Threatened (NT), the Pallid Harrier.

### 3.4 Assessment of Ecological Receptors

#### 3.4.1 Modified and Natural Habitats

The Project area contains largely Natural Habitat, being primarily Hamada Desert, with occasional Wadis. No endemic or higher conservation status plant species were identified in the surveyed area. Approximately 1.15km<sup>2</sup> of Natural Habitat will be impacted during the proposed works.

### 3.4.2 Critical Habitats

Twelve species triggering Critical Habitats were identified during the surveys, and a further nine species of bird were observed flying over the site which qualify as Priority Biodiversity Features, in addition one reptile species qualifying as a PBF has also been confirmed on site. The species and the relevant qualifying criterion are shown in the table below.

**Table 1: Species that trigger CH criteria and species that are considered to be Priority Biodiversity Features**

Taxonomic group	Species	IUCN Red List category
<b>Trigger Critical Habitat</b>		
Bird	Levant Sparrowhawk ( <i>Accipiter brevipes</i> )	LC
	Steppe Eagle ( <i>Aquila nipalensis</i> )	EN
	European Honey Buzzard ( <i>Pernis apivorus</i> )	LC
	Steppe Buzzard ( <i>Buteo buteo vulpinus</i> )	LC
	White Stork ( <i>Ciconia ciconia</i> )	LC
	Black Stork ( <i>Ciconia nigra</i> )	LC
	Common Crane ( <i>Grus grus</i> )	LC
	White Pelican ( <i>Pelecanus onocrotalus</i> )	LC
	Egyptian vulture ( <i>Neophron percnopterus</i> )	EN
	Greater Spotted Eagle ( <i>Clanga clanga</i> )	VU
	Lesser Spotted Eagle ( <i>Clanga pomarina</i> )	LC
	Eastern Imperial Eagle ( <i>Aquila heliaca</i> )	VU
<b>Priority Biodiversity Feature</b>		
Reptile	Spiny-tailed Lizard ( <i>Uromastix aegyptia</i> )	VU
Bird	Black Kite ( <i>Milvus migrans</i> )	LC
	Booted Eagle ( <i>Hieraaetus pennatus</i> )	LC
	Lesser Kestrel ( <i>Falco naumanni</i> )	LC
	Long-Legged Buzzard ( <i>Buteo rufinus</i> )	LC
	Pallid Harrier ( <i>Circus macrourus</i> )	NT
	Red-Footed Falcon ( <i>Falco vespertinus</i> )	NT
	Saker Falcon ( <i>Falco cherrug</i> )	EN
	Sooty Falcon ( <i>Falco concolor</i> )	NT
	Short-Toed Eagle ( <i>Circaetus gallicus</i> )	LC

## 4. IMPACT ASSESSMENT

This section presents the key anticipated impacts during the construction phase of the Project, including the windfarm and associated OHTL.

### 4.1 Priority Biodiversity Features

#### 4.1.1 Ornithology

The construction phase of the Project is expected to include clearance/levelling of land, excavation of turbine foundations, crane pads and building footprints, cable route trenching and the construction of internal roads. Additionally, piling will occur for transmission towers and an OHTL line.

Surveys on site did not identify any important feeding, roosting, stopover or nesting areas within the survey area and as such impacts during construction of the Project are predicted to be of minor/negligible significance at a local level, since no important feeding or nesting areas are being directly impacted but changes on site are considered to be permanent.

#### 4.1.2 Terrestrial

The construction phase of the Project is expected to include clearance/levelling of land, excavation of turbine foundations, crane pads and building footprints, cable route trenching and the construction of internal roads. Additionally, piling will occur for transmission towers and an OHTL line.

Other potential impacts include vehicle collisions, poaching, disturbance, reduced air quality and dust, lighting, noise, littering and pest species.

Surveys have identified a population of Egyptian Spiny-tailed Lizards on site, with 12 burrows found inside the survey area. If work continues unmitigated potential impacts to this species are likely to be high at a local level.

No other sensitive or rare species were found during the surveys so impacts to other species are not anticipated however the general biodiversity section below details the mitigation proposed to prevent harm to all species on site.

### 4.2 Habitats and Flora

Habitats present on the Project site are considered to be largely natural although no plant species of conservation importance or threatened habitats have been identified during the studies. In total the Project footprint will result in the permanent loss of an estimated 1.15 km<sup>2</sup> of Hamada desert. Losses of desert habitat are due to the construction of turbine bases, crane pads, building infrastructure, cable trenching and internal road networks and are considered to be of minor significance at a local level.

## 5. MITIGATION AND MANAGEMENT

### 5.1 Overall Approach to Biodiversity

The Project will seek to proactively address impacts and proposes to use an adaptive management approach (plan-do-check-act-replan) to reduce their potential severity.

The Project will follow the principles of the “mitigation hierarchy” as defined under IFC and EBRD E&S requirements. Those require that measures are taken to avoid creating E&S impacts from the outset of development activities, and where this is not possible, to implement additional measures that would minimize, mitigate, and as a last resort, offset and/or compensate any potential residual adverse impacts.

Management is defined as any actions that correspond to the four elements of the mitigation hierarchy, as described below.

- **Avoidance:** actions taken to fully prevent impacts to biodiversity values, such as changing the spatial design of a project to prevent impacts in specific locations
- **Minimization:** actions taken to reduce the duration, intensity and/or extent of impacts that cannot be completely avoided
- **Rehabilitation/Restoration:** actions taken to return areas to beneficial use and, if possible, assist in the recovery of the ecosystem that has been degraded, damaged, or destroyed
- **Biodiversity Offset:** measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people’s use and cultural values associated with biodiversity.

The measures detailed in this section of the BMP deals with the first three steps in the mitigation hierarchy and any actions are based on impacts identified in the Project’s ESIA.

### 5.2 General – Biodiversity

The measures detailed in this section are designed to avoid or minimize general impacts on the environment and biodiversity. Specific actions in relation to Priority Biodiversity Features are also included which will ensure that there are no-net losses for the qualifying species.

#### Biodiversity Manager

The Developer (or EPC Contractor) is responsible for the appointment of an in-county Biodiversity Manager who will oversee all construction mitigation and monitoring that is detailed in the following sections.

#### Induction and Training

As required within the **ESMS Manuel**, the EPC Contractor will design and deliver to all Project Employees, including subcontractors, mandatory E&S training covering all aspects of this BMP.

Training will be provided through an induction program, toolbox talks, ongoing job specific training, refreshers, and exercise/drills. A copy of the induction-training program shall be submitted to Developer E&S Manager for comment within 7 days of Notice to Proceed. The EPC Contractor shall provide training and attendance records to the Developer E&S Manager, upon request. Only specific topics relevant to biodiversity are included in this document.

All personnel and visitors shall have completed the Project's induction before having access to the Project Site and/or commencement of a task or any other works on the Project Site.

Training and inductions will include a specific section in relation to biodiversity and the measures that have been put in place to avoid and / or minimize impacts to biodiversity as well as mitigation measures and habitat re-instatement and enhancements. A summary of the controls relating to biodiversity is included below and these measures are in place in order to avoid and minimize direct impacts within the project site as well as indirect impacts to the wider landscape and Protected Areas (e.g., IBA/KBA).

#### Pollution Control

The **Waste Management Plan** must identify pollution control measures to be applied across the whole of the site and for the off-site disposal of wastes. These measures will avoid or minimize impacts on habitats and biodiversity.

To avoid contamination, hydrocarbons will be stored in a secured bunds to be located on impermeable surfaces with controlled drainage away from natural water courses. Bunds will be sufficient to contain 110% of the volume of liquids to be stored within. They will also be fully contained to stop contamination of rainwater run-off. In addition, refueling of vehicles and machinery will only occur in designated areas.

All hazardous materials must be correctly stored to limit chances of contamination of the area. Generally, it would be advisable to use biodegradable hydraulic oils, where possible.

#### Speed Limits and Driving Limits within the Project Site

The **Traffic and Transport Management Plan** must require that all driving be permitted on formal site roads and off-road driving is prohibited, unless it is driving within a works area (e.g. moving equipment or infrastructure around the site or for maintenance operations). Site wide speed limits and limits of driving are to be strictly enforced by the EPC Contractor in order to avoid / minimize the impacts of driving and vehicles on biodiversity. Speed limits should be set to 20 km/h on on-site roads / tracks and at 10 km/h in off-road areas. Enforcement of speed limits and limits of driving will minimize impacts on habitats, flora, birds, mammals, reptiles and amphibians on site through the prevention of killing and injuring and reducing the likelihood of erosion and degradation of the habitats.

All site workers should adhere to national speed limits when driving to and from site.

#### Hunting / Collection of Animals and Plants

The worker code of conduct within the **Labor and Working Conditions Management Plan** must include the ban on hunting and or collection of animals and plants from the Project Area to be strictly enforced and this will avoid and minimize any construction related impacts on biodiversity features within the Project Area, especially Egyptian Spiny-tailed Lizards since hunting/collection are considered some of the major threats to this species. All contractors and site staff will be reminded that this ban is also effective within areas outside of the Project area (e.g. within the wider landscape and nearby Protected Areas) and

any training should also include details of any relevant national legislation protecting rare and endangered species as well as any national schemes (e.g. to reduce impact of trade in species).

#### Invasive Species

Measures regarding the control of invasive species will be fully implemented to avoid the introduction and spread of invasive species within the Project area or the wider landscape and nearby Protected Areas. In order to control / limit the spread or introduction of invasive species the following will be completed:

- Any material that is imported into the site will be sourced responsibly by the contractor
- Continual survey of the site and any laydown areas, including soil storage areas, for the presence of non-native or invasive species and recording and reporting if any are observed
- Training of contractors / site staff as part of the induction process

#### Site Cleanliness and Control of Pest Species (e.g. Rats)

The **Waste Management** Plan must state that the site, including all offices and workers buildings are to be kept free of rubbish and litter, including food waste, as these might attract pest species and/or scavenging birds. All waste will be placed into appropriate bins and containers which will be appropriately sealed (e.g. lids or covers) to prevent pest species entering. In all cases priority will be for the use of mechanical control measures for pest species such as setting of live traps. Passive methods of control, such as chemical poisoning with baits or glue traps will only be used if there are no other feasible alternatives due to the potential to harm non-target species found within, and outside of, the Project area. Finally, if pest species are caught, they will be humanely killed and if any non-target species are caught will be released, unharmed, away from site buildings.

### 5.3 Pre and During Construction Phases

#### **5.3.1 Habitats and Flora**

No sensitive habitats or species of plant were identified during the surveys but the site is situated within largely Natural Habitat and therefore habitat loss for Project infrastructure will be kept to a minimum. All areas of Natural Habitat being removed will be measured and recorded prior to work taking place so that a quantitative assessment of habitat loss can be completed.

Following construction an area of 1.15 km<sup>2</sup> will be enhanced using appropriate, native planting in suitable parts of the Project area such as boundaries, this will ensure that no net loss of habitat as a result of the works. Any areas of additional planting will be monitored as part of the biodiversity monitoring program and any species which do not establish will be replaced.

All site workers will undertake a Project induction before working on site. The induction will include a comprehensive biodiversity element where the baseline ecological value and sensitivity of the site will be discussed.

Prior to construction works, working areas will be subject to a botanical walkover survey to identify areas of non-native or invasive species. Any specimens will be clearly marked, and the area avoided and if this is not possible the specimen will be removed and disposed of. Working areas will be clearly demarked (using temporary fencing (e.g. orange netting attached to wooden posts)) so that site workers fully understand the working area. Encroachment into areas outside of agreed working areas will be prohibited and working areas will be subject to regular check by the EPC Ecologist to check enforcement of working areas.

On completion of phased construction works the EPC Contractor will be responsible for habitat rehabilitation works in all areas that have been subject to temporary disturbance.. A Habitat Restoration Plan including a habitat metric is described below.

Habitat condition assessment surveys will be carried out based on methodologies adapted from published methodologies (Sopotlieva et al 2018<sup>2</sup>). Broadly the aim is to:

- Survey the extent and condition of the habitats to be impacted at the outset of works;
- Assess the total habitat loss based on aggregating the scores/area for all different areas being impacted;
- Ensure during rehabilitation that the total habitat restoration effort meets an increased total habitat score

Surveys will need to include control plots within parts of the project area that will not be impacted by the works.

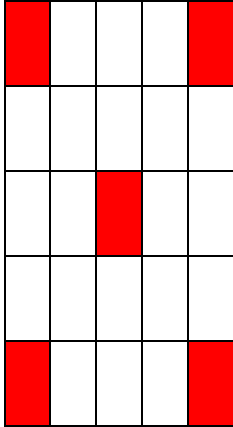
All of the pre-clearance habitat survey work will be undertaken within desert habitat, which is largely contiguous. However, there are some finer spatial habitat changes, for example within wadis. Plant species richness will be determined as a result of the detailed quadrat surveys and the final scoring within the metric may be updated to reflect this most representatively.

Surveys will include quadrat (2m x 2m) surveys across all areas and will be completed within the pre-commencement surveys. Exact locations for quadrat survey will be finalised during the survey to ensure representative locations are chosen. The quadrats will be oriented with their sides aligned north-south and a GPS location will be taken in the south-eastern corner of the quadrat to ensure repeatability. Photos of the quadrats will also be taken.

At each location for quadrat survey, five 2x2m quadrats will be undertaken in a grid pattern as shown below.

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<sup>2</sup> Sopotlieva et al 2018 Ecosystem condition assessment of semi-natural grasslands outside the Natura 2000 network in Bulgaria, using vegetation data. TUEXENIA 38:385-404



10x10m survey plots will be undertaken at each separate works location. Where habitats change at a survey location a plot will be required for each habitat (*eg* one in desert, one in wadi). Effort in each work location will include:

- WTG bases. One plot and one control plot adjacent in untouched land per base.
- Along roads (likely to be permanent habitat loss) and along tracks (temporary loss). One plot approximately every 1 km along the road. In addition a 'control' plot will be completed every third plot.
- Along the OHTL routes where there will be some permanent habitat loss at tower locations and temporary loss/damage along route. A quadrat location will be recorded approximately every 1 km.
- Substation and other permanent infrastructure within the windfarm work areas where there will be permanent habitat loss quadrats will be recorded at 4 per hectare with one control plot corresponding in adjacent untouched land.
- Within the windfarm work areas where there will be temporary habitat loss quadrats will be recorded at 4 per hectare with one control plot corresponding in adjacent untouched land.
- Other areas – sometimes areas outside of the above are impacted by contractors working outside of the correct proposed areas. If this occurs work should be conducted in these areas to ensure that the overall impact on habitat is kept up to date and restoration can be all encompassing going forward.

Table 2 shows what will be recorded during each quadrat survey and how each quadrat will be scored in order to determine the condition of the habitat area surveyed. The parameter scores for each of the five 2m x 2m quadrats will be averaged to give a final score for wider 10m x 10m quadrat.

Table 2. Metric for the Calculation of Habitat Condition

Parameter	Unit	Approach	Score 1 (Very Poor)	Score 2 (Poor)	Score 3 (Moderate)	Score 4 (Good)	Score 5 (Very Good)
Plant Species Richness	Number of species per sample plot area	Observation	≥0	≥2	≥4	≥6	≥8
Vegetation Cover	% (full number) per habitat type	Estimation based on Observation (quadrat)	≥0%	≥10%	≥25	≥50	≥75
Abundance of native weeds and alien species	% of native weed/alien cover within the vegetation present (i.e. a % of plants coverage excluding bare ground)	Estimation based on Observation (quadrat)	≥50	26-49	6-25	1-5	0
Visible damage from human activities, as vehicles, geological exploration, fire, evidence of domestic livestock (grazing, paths, manure, clearings), etc	% (full number)	Estimation based on Observation (quadrat)	≥50	26-49	6-25	1-5	0

For all parameters whole numbers will be used and will be rounded up, or down to the closest whole number.

<sup>2</sup>Where vegetation cover is less than 10% a score of 0 will be applied to cover of Parameter 3. This is to avoid artificially inflating habitat condition scores for quadrats that are poorly vegetated. Where takyr are present as long as there is no sign of anthropogenic damage, they will be considered to be good / very good condition.

The Metric maximum score is 20 (e.g. 4 x Score of 5).

Once the survey is completed the total score for each quadrat will be determined by adding up the scores for that quadrat (quadrat score). Once determined the Habitat Condition Score for that area is calculated by dividing the Quadrat Score by the Maximum Score (e.g. Quadrat Score of 20 = Habitat Condition Score of 1 (20 / 20), Quadrat Score of 15 = Habitat Condition Score of 0.75 (15 / 20)). Habitat Condition Rating and corresponding Habitat Condition Scores are shown in the table below.

### *Habitat Condition Rating and corresponding Habitat Condition Scores*

Habitat	Condition Rating	Condition Score
	Very Poor	0.15 - 0.24
	Poor	0.25 – 0.46
	Moderate	0.47 – 0.64
	Good	0.65 – 0.82
	Very good	0.83 - 1

### *Habitat Restoration and Offsetting*

Habitat restoration will be completed in areas of the Project AoI that have been damaged by Project related construction activities and habitats will be rehabilitated to their former condition or better.

Additional habitat off-setting areas within the WF AoI will be identified during the pre-commencement survey where necessary. The area of land that will need to be restored will be determined following confirmation by the EPC Contractor of working areas for the WF and OHTL Projects (e.g. confirmation of area sizes of permanently lost habitat). Areas of habitat subject to off-setting will be improved through a process of re-grading earth, including filling in and re-profiling existing rutted tracks.

To utilise this metric in the field to provide information for habitat restoration / offsetting, habitat hectares (HH) would be calculated from the total amount of habitat loss (ha) multiplied by the condition of the habitat (e.g. 100ha of good condition habitat is  $100 \times 0.8 = 80\text{HH}$ ).

Following the restoration it should be ensured that the Habitat Hectares are greater than at the outset of the project.

#### **5.3.2 Mammals**

Wide ranging species such as the Striped Hyena (*Hyaena hyaena*) (NT), Nubian Ibex (*Capra nubiana*) (VU) and Dorcas Gazelle (*Gazella dorcas*) (VU) were identified as having ranges which overlap with the Project area, although no evidence of these species has been found during the surveys.

If any large mammals are seen during the construction process, the construction manager will be informed and photographs will be taken if possible for identification. This ongoing monitoring will be undertaken and the results of the monitoring will be included in seasonal reporting and this BMP document updated accordingly

Site-wide lighting is not being implemented so any lighting impacts during operation will be very limited. Night-time working is not anticipated and will certainly not be a regular occurrence. Where lighting is required within worker compounds, site offices etc. ensure that any lighting is shielded and protected to reduce light-spill and glare. Low intensity lighting should also be used, where possible, to further reduce light spill. For external security lights PIR trigger units should be used and these should be timed to automatically switch off after five minutes. Turbines will not be lit and any aviation lights will be shielded

to minimise visibility from ground level to reduce the attractiveness of lights to night flying insects which in turn could attract bats. Lighting above turbine doors will be PIR controlled and timed so that it switches off automatically after five minutes. Again this measure will be implemented to reduce night-flying invertebrates in proximity to turbines.

### **5.3.3 Birds**

Immediately prior to construction, a walk-over survey will be undertaken of all working areas to check for the presence of ground nesting birds which would be at risk from construction related impacts. Surveys will be completed by an appropriately qualified ornithologist and surveys will be undertaken in the hours after sunrise (up to 10:00). The surveyors will aim to identify behavior indicative of breeding activity (e.g. carrying food / nesting material / fecal sacs, presence of nests, eggs or chicks (both nidifugous and nidicolous).

Where nests are found they will be recorded in full and their locations mapped, with the data transferred to Excel master sheets and Google Earth. Mapping will then be circulated to the project team along with details of a works exclusion zone. Exclusion zones will be dependent on the species of bird nesting along with its conservation status and be agreed with the qualified ornithologist and Biodiversity Manager.

Mitigation during construction will include timing work to remove suitable nesting habitat outside of the most sensitive times of year for ground nesting species, and for all clearance work within this time period to be done under the supervision of an on-site ecologist.

Impacts to migratory soaring birds through the construction period for either turbine or OHTL tower construction are considered to be unlikely based on surveys to date and none of these species having been recorded landing or interacting with the ground during their migration.

### **5.3.4 Reptiles**

Pre-construction surveys for sensitive species (i.e. those qualifying Priority Biodiversity Features) of herpetofauna have taken place. The locations of known/active burrows used by Egyptian Spiny-tailed Lizard have been marked throughout the Project area.

Prior to the start of construction suitable sites for the release of relocated Egyptian Spiny-tailed Lizards will be identified and mapped. Other windfarms within the area have had success with their translocation projects and therefore this is considered to be a suitable mitigation strategy. A suitable translocation receptor site must:

- Be within 10 km of the Project site.
- Contain appropriate vegetation (both for food and cover).
- Have suitable soil types to allow animals to dig and create new burrows.
- Not already be close to carrying capacity for this species.

In order to ensure that the receptor area is suitable for Egyptian Spiny-tailed Lizards, a translocation plan will be produced prior to any work to more specifically detail the plan for lizard translocation on this project. This should include detail on the receptor site baseline as well as the practical steps to be followed to ensure safe capture and handling of lizards (including involvement of veterinary specialist on the site).

Capture and movement of Spiny-tailed Lizards will only be completed as a last resort. All works will be completed at least 50 m from active burrows. Locations where burrows are present between 50 and 100 m of construction will be monitored throughout the construction period and if significant negative impacts (i.e., abandonment of burrows or increased mortality) are observed the remaining burrows in closest proximity will be excavated and the animals translocated to holding areas in accordance with the below protocols for the duration of the construction window in that location.

Detailed design for the final layout will take into account the results of the pre-construction surveys and Project infrastructure will be sited to avoid the identified burrows to the greatest extent possible. Where this is not possible, or where fresh burrows are identified at the commencement of clearance works, these burrows will be excavated by hand and the animals captured and translocated, details of this are provided below.

Prior to work in an area containing Spiny-tailed Lizard burrows any remaining burrows within 50m of proposed works will be re-checked by the Ecologist using an endoscope and if empty dug out and destroyed. If any animal is found back in the working areas the burrow will be dug out carefully by hand and the animal captured and placed in a secure box before taking to a cool location ready for translocation to the receptor site. Once the lizard is removed from the burrow the hole will be collapsed and made unsuitable for future use.

If areas suitable for translocation exist within the Project Area these will be prioritized as this minimizes the impacts of transporting animals away from the Project site.

Studies have shown that soft releasing Spiny-tailed Lizards leads to a better survival rate than simply releasing the animals into a new site<sup>3</sup> so any animal which is translocated will be soft-released into an individual mesh enclosure within an area of suitable habitat. The pen will measure at least 2m x 2m and be covered to provide shade and prevent attack from above. A “starter hole” will be dug using a 20 cm auger to a depth of approximately 30 cm to provide some initial shelter. Supplementary feeding will also be undertaken and after a period of seven days the enclosure will be removed to allow the lizards to move and forage naturally.

After the relocation period, a report will be prepared which will include the following information:

- Survey dates and timing of capture and release
- Weather conditions during survey and relocation effort
- Location of captured individuals
- Number of captured individuals during each relocation effort
- Number of juveniles, mature males and mature females
- Release sites used for relocation of each effort
- Number of males and females released at each site

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<sup>3</sup> Translocation trial of spiny-tailed lizard or dhub in Dubai, UAE. Soorae, P. S. (ed.) (2018). Global Reintroduction Perspectives: 2018. Case studies from around the globe. IUCN/SSC Reintroduction Specialist Group, Gland, Switzerland and Environment Agency, Abu Dhabi, UAE. xiv + 286pp [https://iucn-ctsg.org/wp-content/uploads/publications/14\\_2018\\_Spiny-tailed\\_Lizard\\_UAE.pdf](https://iucn-ctsg.org/wp-content/uploads/publications/14_2018_Spiny-tailed_Lizard_UAE.pdf)

- Number of mortalities during relocation effort

#### 5.4 Operational Phase

##### 5.4.1 Operational Management Plan

Mitigation and monitoring measures to be applied by the Operator will include:

- Implement proper management measures to prevent damage to the biodiversity of the site. This could include establishing a proper code of conduct and awareness raising / training of personnel and good housekeeping which include the following:
  - Prohibit hunting of any wildlife at any time and under any condition by workers onsite;
  - Ensure proper storage, collection, and disposal of waste streams generated as discussed in detail above; and
  - Restrict activities to allocated areas only, including movement of workers and vehicles to allocated roads within the site and prohibit off-roading to minimize disturbances.

##### 5.4.2 Avifauna Monitoring and On-Demand Turbine Shutdown

Monitoring during the operation of the wind farm will be completed in order to inform the actual impact caused by the wind farm on resident and migratory birds. The monitoring will be undertaken with the primary objective of collision avoidance but also secondary for migration monitoring behavior.

Monitoring must take place during the spring migration season (from late February until mid-May) and autumn migration season (from mid-August till mid-November). Throughout these periods, monitoring must take place continuously on a daily basis with full site coverage using vantage points and experienced surveyors.

Shutdown on demand will take place ensuring the following principles are followed:

- All of the turbines and a buffer area will be covered by constant observation.
- The buffer will ensure that enough time is available for WTG to be shut down when birds approach.
- Should shut down on demand be observer led:
  - Observers will work in pairs and in shifts to ensure a vigilant effort from observers.
  - Observers will communicate both with shut down operatives and other observers to ensure effective practices.
- Shut down protocol will undertake discussion with other operatives in the region to discuss best practice for the location
- The Project Aol is flat or gently undulating and as such turbines will be more obvious to birds migrating over the site than within hilly terrain. In order to increase visibility of the turbines, and thus increase natural avoidance behavior a single blade will be painted black from the tip to halfway up the blade. This measure will reduce motion blur and increase the visibility of the moving turbine to birds.

Depending on the detailed findings of the follow-up in-flight monitoring, a detailed protocol will be prepared for the Shutdown On-demand, including a comparison between the various available options. Also, based on the accumulated findings of the assessments of the various seasons, the highest areas of sensitivity would be identified and key species of concern will be further identified so that they can be considered during the shutdown on-demand procedures.

#### 5.4.3 *Avi-Fauna Carcass Search during Operation*

During the operation phase, Post Construction Fatality Monitoring will be undertaken, with carcass searches surveys covering each turbine across the entire wind farm. The carcass search will demonstrate the effectiveness of mitigation measures such as turbine shut down and allow an estimation of the annual number of bird and bat deaths caused by the turbine.

Operational monitoring will be completed through the first 3 years of operation, with scope to continue depending upon results during the first three years, to monitor actual levels of mortality. Post construction fatality monitoring will be completed at all of the turbines and the program of post construction monitoring will include carcass searching, searcher efficiency trials and carcass persistence trials. The results of the post-construction fatality monitoring will be used to inform a GenEst Analysis. Such effort will be in line with the Post-construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries – Good Practice Handbook and Decision Support Tool (2023).

An adaptive management strategy will be developed, and additional mitigation will be undertaken if the results of the post-construction fatality monitoring indicate higher than predicted mortality, especially in relation to species of elevated conservation concern. A chance find procedure will be implemented and any carcasses seen by site workers will be reported to the Biodiversity Manager so that they can investigate. In addition, any prey species carcasses found on on-site (e.g. on roads) will be removed to reduce the likelihood of scavenging birds landing within the Project site.

#### Monitoring Program

Receptor	Impact	Mitigation / Monitoring	Frequency
Habitats	Destruction of habitats because of site maintenance works	Clearly defined working areas, working on existing tracks / roads where possible, pre-works checks for flora species of conservation concern	Daily monitoring by EPC contractor site staff and fortnightly checks by biodiversity manager.
Habitats	Habitat loss or temporary habitat loss	All temporary working areas to be re-habilitated post-construction, any topsoil to be spread out and left to regenerate.	Mitigation and monitoring to be further detailed within the Habitat Restoration Plan
Habitats and Flora	Invasive Species	During routine maintenance, any invasive flora species should be identified and removed.	Any invasive species noted and construction manager informed. Habitat monitoring to be further detailed within the Habitat Restoration Plan. Likely to be a minimum of bi-annually.

Receptor	Impact	Mitigation / Monitoring	Frequency
Terrestrial Fauna (e.g., breeding birds / reptiles)	Killing and injury	<p>Site wide speed limits (20kmph) to be enforced during operations phase. Pre-works checks of maintenance areas.</p> <p>Prohibition of hunting on site, including collection of live animals or plants.</p>	<p>Prior to any site maintenance works</p> <p>Any identified breaches to this will result in dismissal and individual to be reported to the relevant authorities.</p> <p>Any reptiles or any large mammals seen on site should be reported to the biodiversity manager.</p>
Egyptian Spiny Tailed Lizard	-	Translocation if necessary prior to construction	<p>Survey and monitoring in line with Translocation Plan and as per the BAP.</p> <p>Burrows / lizards within the vicinity of works that are not translocated should be monitored at least weekly.</p>
Ornithology	Collision with turbines and OHTL – soaring birds.	<p>Shut down on demand of the turbines</p> <p>Carcass Searches</p> <p>BFDs (Firefly and big orange balls) to be installed along the entire length of the OHTL at construction, replace any non-operational BFDs bi-annually.</p>	Monitoring will be undertaken in line with the BAP and will include daily monitoring surveys for 10 – 12 hours each day, between one hour after sunrise and one hour before sunset.
Bats	Collision with turbines	Carcass Searches	Carcass monitoring for bats will be adaptively monitored by post construction fatality monitoring to international best practice. Methods will be followed in accordance with the Post-construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries – Good Practice Handbook and Decision Support Tool (2023).

## 6. ROLES AND RESPONSIBILITIES

### 6.1 Developer

Measures have been included in this BMP to ensure that the construction of the Project does not result in short, medium or long-term negative impacts on site wide ecological receptors, including those considered to be Priority Biodiversity Features.

The Developer is responsible for ensuring that the measures set out in this BMP / BMEP are completed in full and this will be achieved by ensuring that the EPC Contractor discharges their responsibility to conserve and enhance the ecological receptors found on the site, including Priority Biodiversity Features. This will ultimately be under the responsibility of the Developer E&S Manager.

### 6.2 Biodiversity Manager

The Developer (or EPC Contractor) shall appoint an appropriately qualified and experienced Biodiversity Manager whose overall responsibility will be to oversee the implementation of the BMP during the construction of both the windfarm and OHTL.

The Biodiversity Manager will be the custodian of this BMP, checking the Project performance against its requirements as well as triggers for additional actions. The BMP will be updated periodically as required depending on the results of the surveys and if necessary additional works may be required in line with the monitoring requirement / targets.

The Biodiversity Manager will be present on-site during periods when construction activities pose significant risk to priority species. The Biodiversity Manager should be granted the authority to issue permit to work and to stop works, if deemed necessary.

The Developer and EPC Contractor are required to support the Biodiversity Manager and provide him/her with the necessary resources, including personnel, in order that they can fulfil their responsibilities.

The Biodiversity Manager should be well trained in the practical elements of protected and sensitive species including handling of species that they may have to move and the recognition of sensitive habitats and plant species; he/she should also have a working understanding of wider environmental issues and the construction/engineering process. If these skills are difficult to obtain in country, then training exercises from international ecologists to 'upskill' the Biodiversity Manager may be required.

The key responsibilities of the Biodiversity Manager, include but are not limited to:

#### Document Management & Review

- Maintain the BMP and update as and when required.
- Draft biodiversity protocols and method statements, including biosecurity protocols, construction of hibernacula etc.
- Review and approve Contractor method statements to ensure biodiversity risks have been appropriately considered and that adequate management measures are specified.
- Liaise with EPC Contractor to ensure biodiversity is considered within the 'permit to work' systems.

### On-site Activity

- Conduct walkthrough (rapid assessment) surveys immediately prior to works commencing in an area to identify features such as sensitive locations and species including the presence of Egyptian Spiny-tailed Lizard burrows and bird nesting areas along with other sensitive ecological receptors.
- This is required for all construction activities that pose risk to local biodiversity, such as site clearance, trenching, piling etc.
- Supervise the site clearance works and provide advice to the workforce when required. If clearance work is taking place in multiple locations at any one time the Biodiversity Manager may require additional assistance, if this is the case additional field ecologists may be drafted in to help cover the sites fully.

### Training and Worker Awareness

- Provide worker awareness and training sessions on the requirements of the BMP, the need for the protection of local fauna, and the code of conduct that forbids poaching or deliberate killing of animals.
- Contribute to the production of an ecology section for the site wide induction which all new staff will have to complete prior to completing works on the site. This information should include details on the ecology of the site as well as identification charts for species found on the site.
- Prepare and deliver biodiversity management and control measures as part of the Toolbox Talks (TBT), which should include protocols for recording of incidental sightings as well as any road casualties.
- Organize and train personnel on animal rescue and relocation protocol.

### Checking and Reporting

- Monitor and report on compliance against the BMP through the production of bi-annual ecology reports throughout the construction phase. These reports should contain the following:
  - Results of Pre-works surveys;
  - Results of bi-monthly checks of the perimeter fencing and constructed PV panels;
  - Details of chance-find events reported by onsite staff; and
  - Presence of any newly identified Priority Biodiversity Features or Valued Ecological Receptors.
- Conduct daily checks of the site during construction, such as working areas for cleaning operations and ensuring the requirements of the BMP are followed and prepare daily field notes.
- Monitor works and ensure that any species discovered are moved away from the work areas.
- Maintain a species database and update weekly based on site observations.
- Undertake biodiversity monitoring, data analysis and reporting throughout construction and operation phase of the project.
- Submit all data and related assessments in a timely manner and ensure that findings from the field are reported back to relevant stakeholders at regular intervals (full reports to be provided at least

every quarter, carcass monitoring reports for example will be provided on a more regular basis e.g. monthly).

- Report any issues of non-compliance or incidents that require immediate action to the Developer E&S Manager.
- Prepare and publish an annual ecology report to include the results of all of the on-site surveys completed. An annual ecology report should be produced after each of the annual monitoring programs.
- Submit all data to the Global Biodiversity Information Facility and eBird.

### 6.3 Site Workers

All site workers should be made aware of the ecological receptors present in the Project area and all measures contained within this document will be included in the site induction. All workers are to be informed of their responsibility to the environment including but not limited to:

- Protection of all ecological receptors. Staff to be informed of discipline procedures for failure to comply to this.
- Adherence to site wide speed limits and informed that they will be enforced by site security staff.
- Reporting any spills of fuel, lubricants or other potentially polluting materials.
- Good housekeeping and disposal of all waste in accordance with site-wide policies, which should include recycling as much waste material as possible.
- Chance find reporting in accordance with the BMP.