Uluborlu Solar Power Plant Project Biodiversity Management Plan

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Uluborlu Solar Power Plant Project

Biodiversity Management Plan

0710724

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CONTENTS

1. INTRODUCTION 1
1.1 BACKGROUND 1
1.2 PROJECT DESCRIPTION 1
1.3 PURPOSE AND OBJECTIVES OF THE BMP 2
1.4 STRUCTURE OF THE BMP 3
1.5 APPLICATION AND IMPLEMENTATION 3
1.5.1 General 3
1.5.2 Mitigation Hierarchy 3
1.5.3 Adaptive management approach 4
1.6 REVIEWS AND UPDATES TO THE BMP 6
1.7 Overview of Legislative Requirements 7
1.7.1 International Financing Requirements 7
1.7.2 Good International Industry Practice 8
1.8 Critical Habitat Requirements 8
2. SUMMARY OF BIODIVERSITY BASELINE 9
2.1.1 Ecoregion 9
2.1.2 Protected Areas 9
2.2 HABITAT TYPES 10
2.3 FLORA AND VEGETATION 17
2.4 FAUNA 18
2.5 CRITICAL HABITAT 19
2.6 PBFS 19
3. CONSTRUCTION-PHASE IMPACTS & MITIGATION 21
3.1 TEMPORARY CONSTRUCTION COMPONENTS 21
3.2 CONSTRUCTION PHASE BIODIVERSITY IMPACTS 21
3.3 CONSTRUCTION PHASE BIODIVERSITY MITIGATION AND MANAGEMENT MEASURES 22
3.3.1 Mitigation for Impact 1: Physical Destruction/Disturbance of Vegetation and Habitat 22
3.3.2 Mitigation for Impact 2: Reduced Habitat Connectivity 29
3.3.3 Mitigation for Impact 3: Vehicle Collisions with Fauna 29
3.3.4 Mitigation for Impact 5: Creation of barriers to faunal species movement 30
3.3.5 Mitigation for Impact 6: Introduction/spread of Invasive Alien Plants 31
3.3.6 Mitigation for Impact 7: Water and Soil Pollution 33
3.3.7 Mitigation for Impact 8: Disturbance caused by Noise, Light, Vibration 34
3.3.8 Additional Mitigatıon MeasUres 36
4. OPERATIONAL PHASE BIODIVERSITY IMPACTS & MITIGATION 41
4.1 OPERATIONAL COMPONENTS 41
4.2 OPERATION PHASE BIODIVERSITY IMPACTS 41
4.3 OPERATIONAL PHASE BIODIVERSITY MITIGATION AND MANAGEMENT MEASURES 42
4.3.1 Mitigation for Impact 2: Reduced Habitat Connectivity 42
4.3.2 Mitigation for Impact 3: Vehicle Collisions with Fauna 43
4.3.3 Mitigation for Impact 4: Species Collisions with Solar Panels 44
4.3.4 Mitigation for Impact 5: Creation of barriers to faunal species movement 45

5. BIODIVERSITY MANAGEMENT PLAN 46
5.1 ROLES AND RESPONSIBILITIES 57
5.2 MONITORING ACTIONS 58
5.3 COMPLIANCE AND REVIEW 62
5.4 REPORTING REQUIREMENTS 64
5.5 RECORD KEEPING & DOCUMENT CONTROL 64
6. ANNEXURES 66
6.1 ANNEXURE A. WILDLIFE SHEPHERDING PROTOCOL 66
6.1.1 Purpose 66
6.1.2 Key References 66
6.1.3 wildlife handling and shepherding protocol 66
6.1.4 Useful Equipment 71

LIST OF TABLES

TABLE 1-1 IMPACT MITIGATION HIERARCHY 4
TABLE 1-2 SUMMARY OF EBRD PR6 REQUIREMENTS 7
TABLE 2-1 EUNIS HABITAT TYPES PRESENT IN THE AOL 11
TABLE 3-1 SUMMARY OF CONSTRUCTION-PHASE BIODIVERSITY IMPACTS 22
TABLE 4-1 SUMMARY OF OPERATIONAL PHASE BIODIVERSITY IMPACTS 42
TABLE 5-1 BIODIVERSITY MANAGEMENT PLAN FOR THE CONSTRUCTION PHASE 47
TABLE 5-2 BIODIVERSITY MANAGEMENT PLAN FOR THE OPERATIONAL PHASE 54
TABLE 5-3 ROLES AND RESPONSIBILITIES 57
TABLE 5-4 MONITORING ACTIONS FOR CONSTRUCTION AND OPERATIONAL PHASE 59
TABLE 6-1 TYPICAL SIGNS OF ANIMAL STRESS PER FAUNAL GROUP 68
TABLE 6-2 SUITABLE HANDLING METHODS FAUNAL GROUP 69

LIST OF FIGURES

FIGURE 1-1 PROJECT LAYOUT 2
FIGURE 1-2 THE IMPACT MITIGATION HIERARCHY 4
FIGURE 1-3 DIAGRAM SHOWING THE 'ADAPTIVE MANAGEMENT CYCLE' 5
FIGURE 2-1 PROTECTED AREAS AND INTERNATIONAL RECOGNIZED AREAS IN THE PROXIMITY OF THE PROJECT AOI 10
FIGURE 2-2 HABITAT MAP BASED ON THE EUNIS CLASSIFICATION 12
FIGURE 2-3 PHOTOGRAPH SHOWING THERMOPHILOUS DECIDUOUS WOODLAND ON THE SITE BASED ON THE SITE VISIT IN FEBRUARY 2024. 13
FIGURE 2-4 PHOTOGRAPH SHOWING MAQUIS ON THE SITE BASED ON THE SITE VISIT IN MAY 2024. 14
FIGURE 2-5 PHOTOGRAPH SHOWING PERENNIAL CALCAREOUS GRASSLAND AND BASIC STEPPES ON THE SITE BASED ON THE SITE VISIT IN MAY 2024. 15

FIGURE 2-6 PHOTOGRAPH SHOWING PERENNIAL SPARSELY –OR UN- VEGETATED HABITATS ON MINERAL SUBSTRATES NOT RESULTING FROM RECENT ICE ACTIVITY ON THE SITE BASED ON THE SITE VISIT IN MAY 2024. 16

FIGURE 2-7 PHOTOGRAPH SHOWING PINUS NIGRA WOODLAND ON THE SITE BASED ON THE SITE VISIT IN MAY 2024. 17

ACRONYMS AND ABBREVIATIONS

Abbreviation	Description
AoI	Area of Influence
BMP	Biodiversity Management Plan
CAP	Corrective Action Plan
CHA	Critical Habitat Assessment
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EPC	Environmental, Procurement and Construction (contractor)
ERM	Environmental Resources Management
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMMP	Environmental and Social Management and Monitoring Plan
ESMS	Environmental and Social Management System
E&S	Environmental and Social
GIIP	Good International Industry Practice
H&S	Health and Safety
HSE	Health, Safety and Environment
IAS	Invasive Alien Species
IBA	Important Bird & Biodiversity Areas
IFC	International Finance Corporation
IFI	International Financial Institutions
IUCN	International Union for the Conservation of Nature
KBA	Key Biodiversity Area
KPI	Key Performance Indicator
M&E	Monitoring and Evaluation
MSDS	Material Safety Data Sheet
NG	Net Gain (of biodiversity)
NNL	No Net Loss (of biodiversity)
PBF	Priority Biodiversity Feature
SLIP	Supplementary Lenders Information Package

KEY DEFINITIONS

Protected area:
Legally protected areas meet the IUCN definition: "*A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values*." this includes areas proposed by governments for such designation (IFC, 2012).

Natural habitat:
Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition (IFC, 2012).

Critical habitat:
Areas identified as critical habitat hold the highest tier of irreplaceable (existing in few places) and vulnerable (at high risk of being lost) biodiversity features (EBRD PR6, 2019). Critical habitats are areas with high biodiversity value, including (i) habitat of significant importance to Critically Endangered and/or Endangered11 species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregator species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes (IFC, 2012). The criteria used by the EBRD's PR6 to define critical habitat build on and are closely aligned with those used in IFC PS6.

Invasive alien species:
An invasive species is an organism (plant or animal) that causes ecological or economic harm in a new environment. Invasive species may be alien or exotic (not native or indigenous to the particular area, geography or region).

No Net Loss (of biodiversity):
An approach and goal for a development project, policy, plan or activity in which the impacts on biodiversity it causes are balanced by measures taken to avoid and minimize the impacts, to restore affected areas and finally to offset the residual impacts, so that no loss remains.

No net loss (NNL) is defined by EBRD as "The point at which project-related impacts on priority biodiversity features are reduced by avoidance, minimisation and/or reinstatement measures, and offsetting compensates fully for all significant residual impacts – that is to say, no significant net impacts on biodiversity remain" (EBRD PR6, 2019).

Net Gain (of biodiversity):
An approach and goal for a development project, policy, plan or activity in which the impacts on biodiversity it causes are outweighed by measures taken to avoid and minimize the impacts, to restore affected areas and finally to offset the residual impacts, so that natural environment is left in a measurably better state than it was beforehand.

No net loss (NNL) is defined by EBRD as "*Going beyond "no net loss", through achievement of additional conservation outcomes for the biodiversity features for which critical habitat was designated. Net gains will usually be achieved through the development of a biodiversity offset*" (EBRD PR6, 2019).

(Biodiversity) Offset:
According to EBRD PR6 (2019), a biodiversity offset refers to "*Measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts*" and "*The goal of biodiversity offsets is to achieve "no net loss" and preferably a net gain of biodiversity on the ground*".
Biodiversity offsets should also be considered a last resort in any mitigation package and should only be attempted with input from credible external experts with relevant experience in their design and implementation.

Mitigation hierarchy:
A tool commonly applied in Environmental Impact Assessments (EIAs) which helps to manage biodiversity risk. The hierarchy of controls that begins with avoidance, then considers minimization or reduction of impacts, followed by restoration actions and finally compensation for biodiversity loss (e.g. through offsetting) as a last resort measure only once all other options have been considered/exhausted.

Priority biodiversity features:
This concept replaces the previous definition of natural habitat used previously by EBRD and adopts a criterion-based approach already used for definition of critical habitat. Priority in all EBRD definitions combines consideration of irreplaceability and vulnerability. Priority biodiversity features (PBF) have a high, but not the highest, degree of irreplaceability and/or vulnerability. Although a level below critical habitat in sensitivity, they still require careful consideration during project assessment and impact mitigation (EBRD PR6, 2019).

Rehabilitation:
A management action that aims to restore a certain level of ecosystem functioning in degraded sites, to reverse negative impacts by repairing and replacing the essential or primary ecosystem structures and functions which have been altered or eliminated by disturbance.

Restoration:
The process of reclaiming habitat and ecosystem functions by restoring the lands and waters on which plants and animals depend. Differs from rehabilitation, in that the goal is to restore the ecosystem or habitat to its former state or better.

1. INTRODUCTION

1.1 BACKGROUND

Kavram Enerji Yatırım Üretim ve Ticaret A.Ş. ("Kavram" or "the Client"), a subsidiary of Fiba Yenilenebilir Enerji Holding A.Ş. ("Fiba") is in the stages of planning the development and operation of the Uluborlu Solar Power Plant ("SPP" or "the Project") situated in Isparta Province, Türkiye.

This hybrid project is designed with a total installed capacity of 54.9 MWm / 54.9 Mwe and is located adjacent to the existing Uluborlu Wind Power Plant ("WPP") operated by the Client.

For financing, the Client aims to pursue a Project Finance structure involving the European Bank for Reconstruction and Development (“EBRD”). Compliance with the EBRD Environmental and Social Policy, 2019 and EBRD Performance Requirements (PRs) is mandatory for projects receiving funding from the EBRD.

To adhere to EBRD PRs, the Client engaged Environmental Resources Management (“ERM”) to conduct an Environmental and Social Due Diligence (“ESDD”), including a Supply Chain Due Diligence study for the Project. This aims to identify key environmental and social (“E&S”) sensitivities and ensure the Project's alignment with the EBRD PRs.

ERM's ESDD has revealed some key E&S findings and identified gaps, leading to the preparation of the Project Environmental and Social Action Plan (“ESAP”). ESAP outlines further actions to be undertaken by responsible parties, including timelines and indicators of completion.

In response to the ESAP, the Client has subsequently appointed ERM to assist with supporting the preparation of a Biodiversity Management Plan (“BMP”) specific to the Uluborlu Solar Power Plant. The BMP was informed by the supplementary biodiversity baseline and impact assessment report prepared by ERM as part of the “SLIP” or Supplementary Lenders Information Package developed (ERM, 2024).

1.2 PROJECT DESCRIPTION

Uluborlu Solar Power Plant Project (hereafter “the Project”) has a total installed capacity of 54.9 MWm / 54.9 MWe and is located in Isparta Province, Uluborlu District, İleydağı and Güneykent Villages. The Project will act as an auxiliary source of the existing 61.2 MWm / 60.00 MWe Uluborlu Wind Power Plant Project. In total, the capacity will be 116.1896 MWm / 54.9 MWe.

The Project consists of 3 different polygons which are shown in Figure 1-1 below. In the figure, the blue lines represent the license area, T1-T36 represents the existing wind turbines and GES1-GES3 represents the planned solar power plant areas.

The general layout and main access to the Project area is shown in Figure 1-1. Access to the Project will be carried via already existing roads and no new access roads are planned and no access road improvements have been envisaged as part of the Project.

Internal access roads will be designed and constructed inside the Project area. There will be 3 internal access roads with distances of 400 m (between GES3 and T27), 800 m (between GES1 and GES2) and 1200 m (between GES1 and main road).

There will not be any overhead energy transmission line planned to be established within the scope of the Project. There will only be underground energy transmission lines which will be constructed adjacent to newly planned internal access roads.

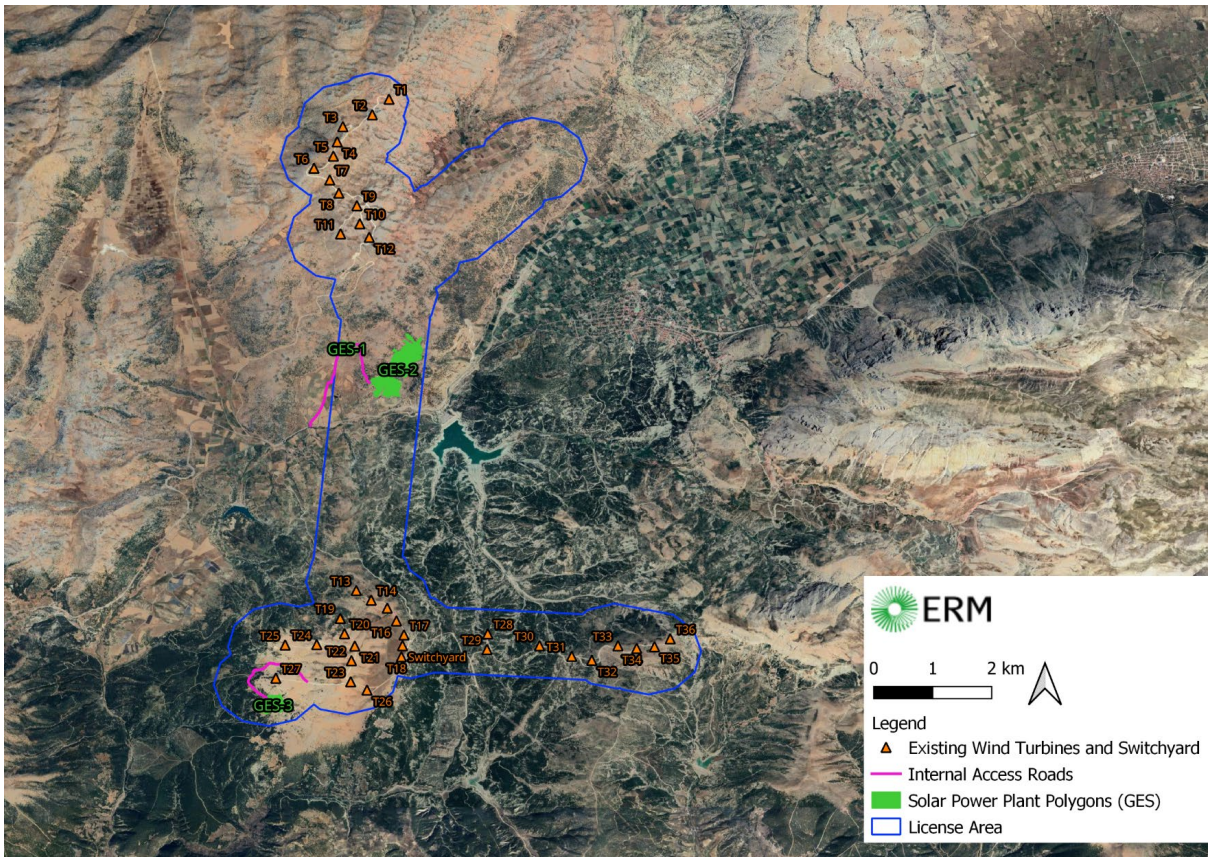


FIGURE 1-1 PROJECT LAYOUT

1.3 PURPOSE AND OBJECTIVES OF THE BMP

This document contains the Biodiversity Management Plan (BMP) for both construction and operational phases (clearly separated in the Plan), and its main purpose is to detail the key biodiversity mitigation and management measures for each project phase, to support a Net Gain (NG) of biodiversity objective for critical habitat and qualifying species, as well as mitigation towards no net loss (NNL) for other Priority Biodiversity Values (PBFs) identified in the supplementary baseline/impact assessment contained in the SLIP by ERM (2024), as per the requirements of EBRD PR6. This is achieved by providing information on the following:

- an overview of the anticipated project impacts on biodiversity (summary information as per the Biodiversity Impact Assessment or BIA by ERM, 2024);
- an overview of how the mitigation hierarchy has been followed in the Project design (as per BIA – ERM, 2024);

- provide clear guidance for the construction and operational phases of the Project in meeting the requirements for managing construction-phase and operational risks and impacts on biodiversity, including compliance with National and International legislative requirements (particularly EBRD PR6), permits and environmental approval, as applicable; and
- ensure consistency across the development Project site in terms of biodiversity management considerations, for the duration of the construction phase and into the Project's operational phase.

1.4 STRUCTURE OF THE BMP

The BMP has been structured as follows:

- **Chapter 1**: Introduction, Application and Implementation, Review and Updating of the BMP, Legislative Requirements, Permits and Environmental Approval
- **Chapter 2**: Summary of site conditions (biodiversity baseline)
- **Chapter 3**: Construction-phase impacts and management measures
- **Chapter 4**: Operational-phase impacts and management measures
- **Chapter 5**: Biodiversity Management Plan (including monitoring)

1.5 APPLICATION AND IMPLEMENTATION

1.5.1 GENERAL

The BMP is applicable to the construction and operational phases (dealt with separately in two separate chapters of this document – Chapters 3 and 4, respectively) of the Project specifically, and the ultimate responsibility for its implementation resides with all appointed Contractors (including any sub-contractors and third-party consultants), the Investor and Project Owner.

As a contractual requirement, the Contractors, sub-contractors & suppliers will be required to demonstrate compliance of their activities against the BMP where applicable for their Scope of Work (SoW).

1.5.2 MITIGATION HIERARCHY

In alignment with GIIP, the protection of natural ecosystems and biodiversity is founded on the application of the 'mitigation hierarchy' (see Table 1-1 and Figure 1-2). To avoid and/or reduce impacts to biodiversity, a proactive approach has been adopted to anticipate and avoid risks and impacts where possible. The typical steps in the mitigation hierarchy include:

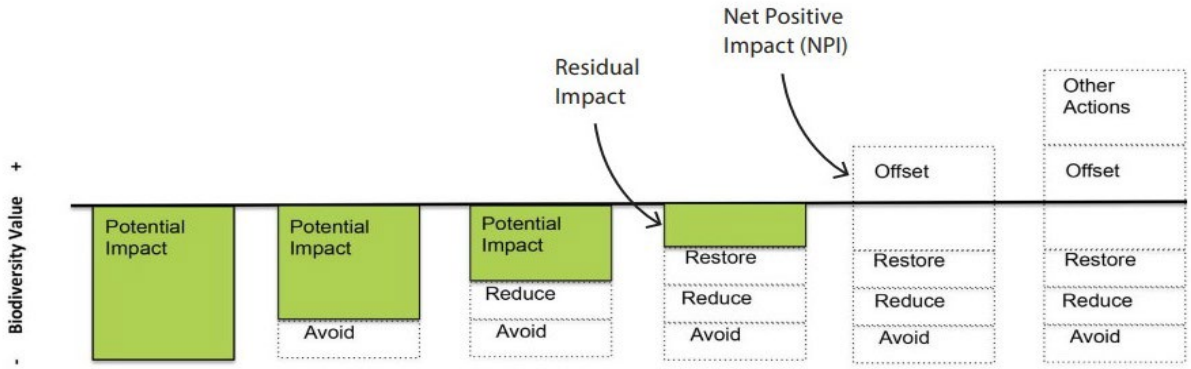
- Identify and anticipate risks of potential adverse impacts, through analysis and stakeholder engagement;
- Avoid potential adverse impacts, applying an alternatives analysis including a no project scenario;
- Minimize or reduce the impacts, for example by reducing the physical footprint of a project through changes in design of civil works;

- Restore or rehabilitate where possible, for example by providing alternative access to water sources that have been cut off by a project; and
- Compensate or offset remaining and unavoidable impacts.

In the case of particularly sensitive ecosystems, where ecological impacts can be severe, the guiding principle should generally be "anticipate and prevent" rather than "assess and repair".

TABLE 1-1 IMPACT MITIGATION HIERARCHY

Measure	Description
Avoidance	Measures taken to prevent irreplaceable loss of biodiversity or associated ecosystem services. Alternatives include site selection, design and scheduling.
Minimisation	Reduce or minimise the duration, intensity and/or extent of any impact that are not feasibly avoidable. Alternatives include physical controls, operational controls and abatement control.
Restoration	Where disturbance to biodiversity or ecosystem services has occurred, remediation may be possible in the form of rehabilitation and restoration. Alternatives include re-establishing habitat types, re-establishing biodiversity values and re-establishing ecosystem services.
Offset	Offset or compensate for any residual impacts that cannot be avoided, minimised, or remedied on site. These include restoration offsets and averted loss offsets.



Source: Hardner *et al*. (2015)

FIGURE 1-2 THE IMPACT MITIGATION HIERARCHY

1.5.3 ADAPTIVE MANAGEMENT APPROACH

The early identification of key issues, challenges, constraints in the implementation of the Biodiversity Management Plan (BMP), failures of critical actions, and changes in environmental conditions through Monitoring and Evaluation (M&E) is essential for adaptive management. This approach enables site-specific solutions to be developed and adjusted based on real-time data. Adaptive management depends on a structured process of collecting data, evaluating results, and responding accordingly to ensure biodiversity outcomes are continually optimized.

In line with EBRD PR6 requirements, adaptive management is particularly valuable due to the complexity of predicting long-term impacts on biodiversity. Mitigation and management measures must remain flexible and responsive to evolving conditions and monitoring results throughout the lifecycle of the project. The adaptive management approach not only allows for the modification of previously planned actions within the BMP but also aims to generate new knowledge that contributes to improved biodiversity management in the future. By integrating these learnings, the approach ensures both the best short-term outcomes based on current knowledge and enhanced long-term conservation strategies (see Figure 1-3, below).

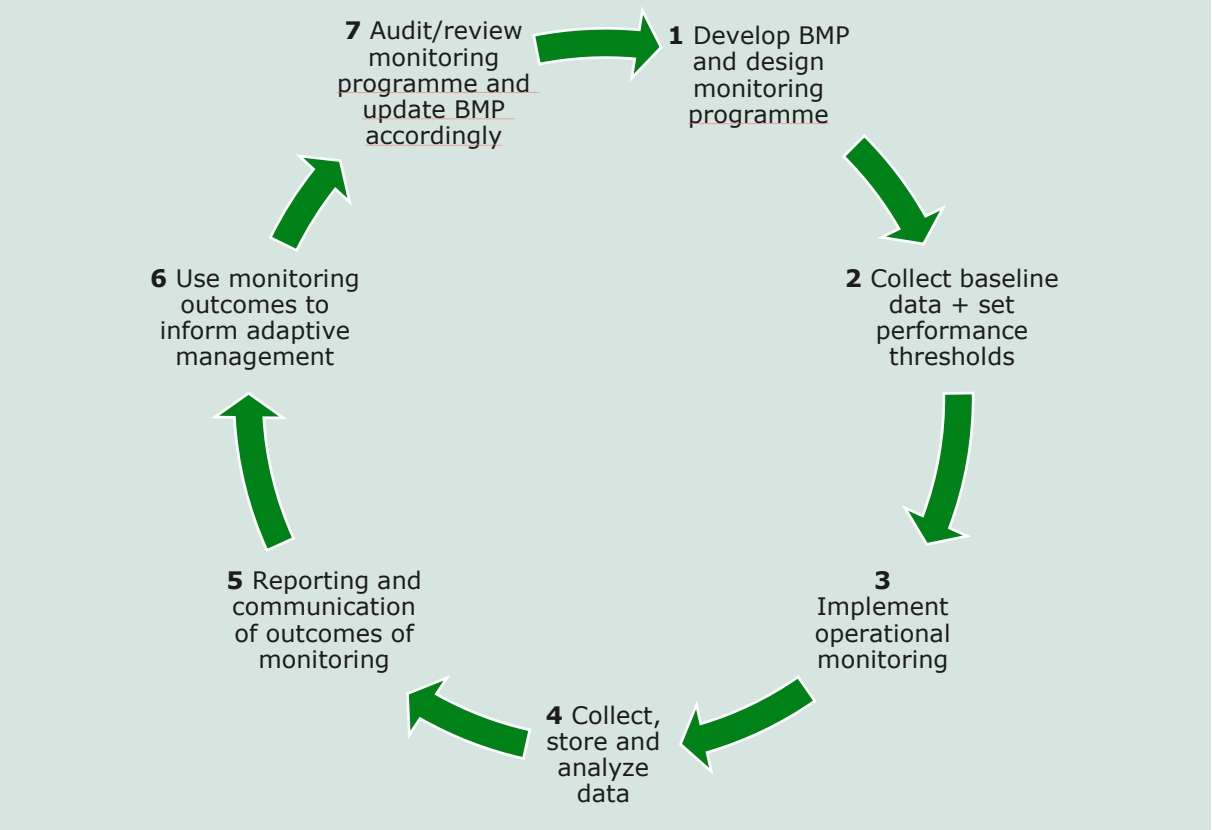


FIGURE 1-3 DIAGRAM SHOWING THE 'ADAPTIVE MANAGEMENT CYCLE'

The following guidelines apply regarding implementing an 'adaptive' approach to biodiversity management:

- **Establish Baselines and Monitoring Protocols**: Establishing baselines and a robust monitoring framework is critical in understanding the biodiversity context and tracking changes over time. This is a core element of EBRD's approach to biodiversity management, ensuring that impacts are measurable and that responses can be adapted.
- **Implement the Precautionary Principle:** The precautionary principle is integral to biodiversity conservation, especially in cases of uncertainty regarding potential impacts. EBRD encourages this approach to avoid irreversible damage to biodiversity and ecosystems, even when data may be incomplete.

- **Engage with Local Communities and Stakeholders**: Stakeholder engagement, including with local communities and experts, is a fundamental part of PR6. It ensures biodiversity management strategies are contextually relevant and that they address both local and global biodiversity concerns, benefiting from local knowledge and support.
- **Continuous Review and Updates Based on Monitoring Results**: The principle of adaptive management involves regularly reviewing and updating biodiversity management plans (BMPs) in response to monitoring results and new information. EBRD emphasizes the need for flexibility in management plans to improve outcomes based on data-driven feedback.
- **Integration with the Broader Environmental and Social Management System (ESMS):** EBRD requires that biodiversity management is not handled in isolation but integrated into the overall Environmental and Social Management System. This ensures that biodiversity considerations are aligned with broader sustainability goals of the project.
- **Regular Reviews and Audits:** Regular reviews and audits of biodiversity management practices are crucial for assessing effectiveness and identifying areas for improvement. EBRD promotes periodic evaluations and adjustments based on these assessments, which are central to adaptive management.

1.6REVIEWS AND UPDATES TO THE BMP

Changes in the Project may occur due to unanticipated situations. Adaptive changes may also occur during the project life cycle (*as mentioned under 1.5.2*). The BMP, and any associated plans/documents, are therefore intended to be 'living documents' that can be refined and modified as situations change.

The BMP will be regularly reviewed and updated after any change in the context in which the Project operates during the construction phase.

Urgent updates in line with the principle of 'adaptive management' can be the responsibility of the E&S Officer (or ECoW: Environmental Clerk of Works, as relevant to the EPC Contractor staff structuring), with support from the E&S Manager, however any material changes to intervention design, the timing of monitoring activities, etc. should be made in consultation with a third-party consultant to ensure accountability.

All changes made to the BMP will be made in the master document and revision numbers and dates provided to track version numbers as part of the Contractor's data and document management system. A summary document should also be produced that summarizes the important changes made to the document for the different version numbers and who authorized these changes.

Note that any fundamental change in the SLIP report conducted by ERM, which represents an ongoing assessment, can result in a material change to the BMP, after the completion of the one-year monitoring period.

1.7 OVERVIEW OF LEGISLATIVE REQUIREMENTS

1.7.1 INTERNATIONAL FINANCING REQUIREMENTS

Since the Project is seeking for international financing, the E&S requirements of relevant financial institutions must be considered throughout the Project development, which require the Project development to adhere to specific E&S requirements which reflect international best practice. The following standards and guidelines detail the performance requirements and mitigation measures that are typically acceptable and considered to represent GIIP:

- EBRD (European Bank for Reconstruction and Development) Performance Requirements (2019);
- EBRD Environmental and Social Policy (2019);
- EBRD Sub-sectoral Environmental and Social Guidelines (various sectors);
- EBRD PR6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- EBRD PR3: Resource Efficiency and Pollution Prevention and Control.

A summary of the key requirements for managing biodiversity and ecosystems, as per EBRD PR6 is presented below in Table 1-2.

TABLE 1-2 SUMMARY OF EBRD PR6 REQUIREMENTS

Aspect of Biodiversity	**EBRD PR6 requirements**
Protected Areas / Internationally Recognized Areas	▪ Development to be legally permitted. ▪ Management plans for protected areas to be reviewed and alignment with any relevant measures. ▪ Consultation with protected areas managers and any affected communities. ▪ Promote and enhance conservation objectives and effective management of the protected area.
Natural Habitat	▪ Manage risks and impacts in accordance with the mitigation hierarchy and GIP. ▪ Adopt a precautionary approach and apply adaptive management practices.
Critical Habitat (CH)	▪ No activities to take place in areas of critical habitat unless: o No other alternatives in habitats of lesser biodiversity value, o Stakeholders are consulted, o Legally permitted, o No measurable adverse impacts on critical habitat features o Project designed to deliver Net Gains (NG) for critical habitat, o No net reduction in population of CR/EN species; o Appropriate long-term biodiversity monitoring and evaluation program integrated into adaptive management program. ▪ Mitigation strategy to be described in a Biodiversity Action Plan (BAP) or Biodiversity Management Plan (BMP) where appropriate.

Aspect of Biodiversity	EBRD PR6 requirements
	▪ As a last resort, biodiversity offsets may be considered.
Priority Biodiversity Features (PBFs)	▪ Demonstrate no alternatives exist. ▪ Stakeholders consulted. ▪ Project permitted legally. ▪ Appropriate mitigation in accordance with the mitigation hierarchy. ▪ Ensure NNL and preferably NG of biodiversity.
Ecosystem Services	▪ Adverse impacts to be avoided. ▪ If unavoidable, measures to minimize impacts and/or restore biodiversity and ecosystem services to be implemented.
Invasive Alien Species (IAS)	▪ No intentional introduction of IAS. ▪ Identify risks, impacts and mitigation options. ▪ Control spread of established IAS.

1.7.2 GOOD INTERNATIONAL INDUSTRY PRACTICE

The Contractor is responsible for ensuring that on-site practices align with the requirements of international standards and good international industry practice (GIIP). Several guidelines related to renewable (solar) energy developments and managing of impacts on biodiversity have been considered in preparing this BMP, and these include:

- 'Good Practices for Biodiversity Inclusive Impact Assessment and Management Planning' (Hardner et al., 2015);
- 'Mitigating biodiversity impacts associated with solar and wind energy development: Guidelines for project developers' (Bennun et al., 2021); and

1.8 CRITICAL HABITAT REQUIREMENTS

Based on the rapid assessment undertaken by ERM as part of the biodiversity baseline and impact assessment (contained in the SLIP, ERM 2024), no critical habitat was identified within the Project study area investigated, however five Priority Biodiversity Features (PBFs) have been determined in accordance with the approach and requirements contained in EBRD PR6. These PBFs include key species and habitat types that require specific management attention towards meeting at least No Net Loss (NNL) and preferably Net Gain (NG) of biodiversity. PBFs include natural habitats and several species of flora and fauna of conservation-importance.

Direct impacts to these PBFs are not anticipated, as the proposed activities are planned to be located outside of the key habitats supporting these features. However, in line with EBRD PR6 requirements, careful consideration is needed to minimize indirect impacts and ensure the protection of these PBFs during the project lifecycle towards meeting a NNL objective for PBF values.

It is recommended that the developer takes proactive steps to ensure that any temporary and permanent infrastructure avoids sensitive areas containing PBFs. Adopting a precautionary approach and following the mitigation hierarchy—prioritizing avoidance, minimization, and, where necessary, rehabilitation—will help prevent significant impacts on these biodiversity features. Regular monitoring should be

conducted to assess the effectiveness of these mitigation measures and adapt management approaches as needed, in line with the BMP.

2. SUMMARY OF BIODIVERSITY BASELINE

A summary of the most important aspects of the biodiversity baseline compiled by ERM as part of the SLIP (2024) has been provided here. For detailed information, the reader is directed to the 'Biodiversity Baseline Assessment' contained in the SLIP (ERM, 2024)

2.1.1 ECOREGION

The Project is located within the ***'Anatolian conifer and deciduous mixed forests'*** ecoregion (ID: PA:18). This transitional ecoregion is located in Western Turkey, spanning various biogeographic zones and showcasing a mix of Mediterranean, Euro-Siberian, and Irano-Turanian flora. While coniferous forests and evergreen trees dominate most areas, certain regions also feature a blend of conifers and broadleaf deciduous trees. The moist environment of these forests fosters a rich undergrowth of mosses, shrubs, and ferns, contributing to high biodiversity levels. Key tree species include coast redwood, Douglas fir, Sitka spruce, and Kauri. The Anatolian conifer and deciduous forests are vital habitats for various bird species, particularly serving as critical habitats for the Dalmatian pelican, black stork, and purple heron.

2.1.2 PROTECTED AREAS

The Project AoI is not located in nationally or internationally recognized protected areas directly, but the 350 m indirect Area of Influence (AoI) overlaps with a very small portion of the Barla Mountain Key Biodiversity Area (KBA) (see map in Figure 2-1).

The Barla Mountain KBA spans 59,400 ha, situated west of Lake Eğirdir and part of the Toros Mountains. This mountainous region, characterized by peaks exceeding 2,000 meters and dominated by limestone, represents a transition zone between the Mediterranean and Central Anatolian Regions, supporting diverse flora and fauna.

The KBA features mixed coniferous forests primarily composed of tall junipers, cedars, and black pines, alongside maquis vegetation with kermes oak. The forest area reaches up to 1,800 meters, with alpine vegetation found at higher elevations. The KBA supports endemic plant species with limited ranges in Turkey. A noteworthy species in this region is *Festuca punctoria*, a grass endemic to the Marmara region, which has not been assessed for threat status by the IUCN. This endemic species of grass native to north-western Turkey is documented in the KBA assessment sheet for the Barla Mountain KBA (https://www.keybiodiversityareas.org/site/factsheet/31612) as 'other species not triggering KBA criteria' however the KBA appears to have been designated for promoting the conservation of species such as *F. punctoria*.

Given that the solar PV Project infrastructure will not overlap with the KBA, such that direct impacts on this endemic plant species are unlikely to occur (the site-level surveys towards the biodiversity baseline assessment also did not confirm this species as present within the development footprint and AoI), therefore impacts to this species and its

management towards meeting KBA objectives are not considered relevant to the Project. The BMP therefore has not considered this species or the KBA further, given the unlikely impacts as discussed.

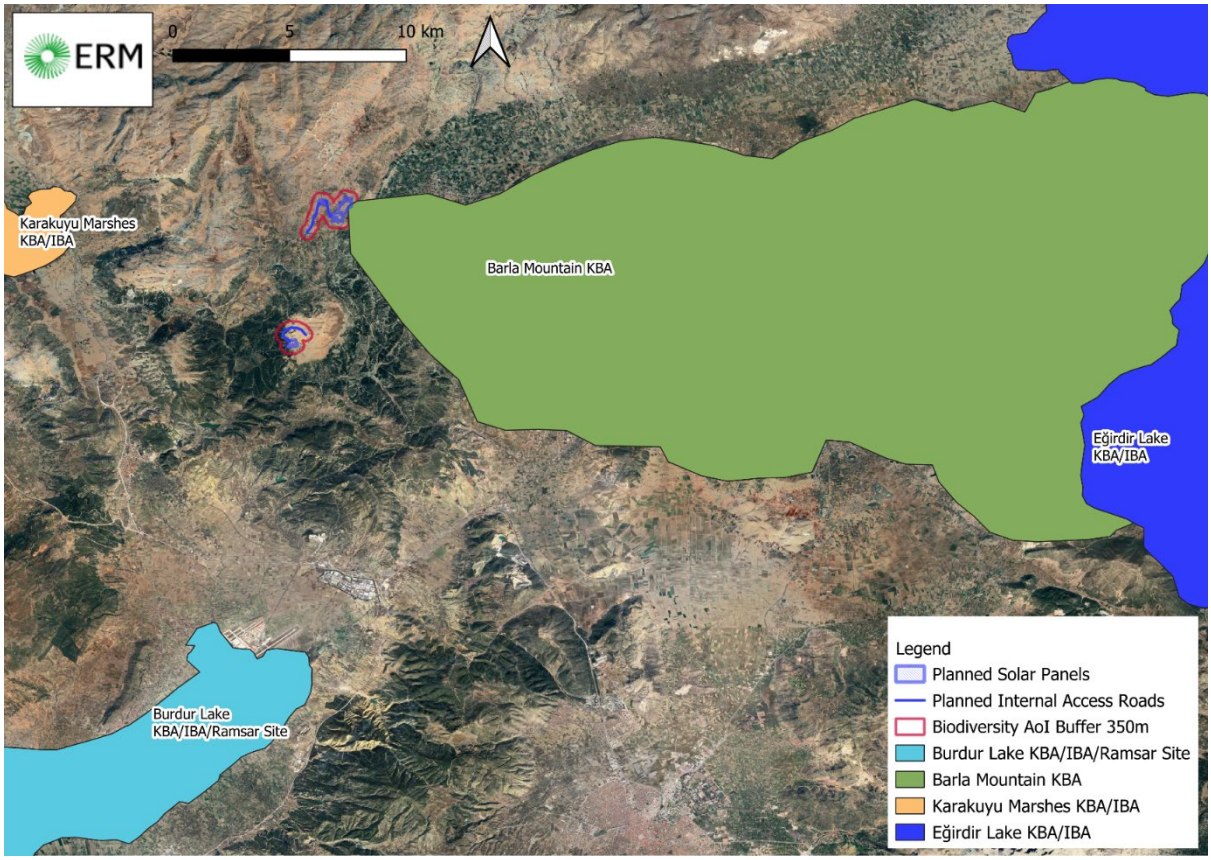


FIGURE 2-1 PROTECTED AREAS AND INTERNATIONAL RECOGNIZED AREAS IN THE PROXIMITY OF THE PROJECT AOI

2.2 HABITAT TYPES

The majority of the habitats present within the AoI are characterized by natural habitats (73.08 %) and in particular **perennial calcareous grassland and basic steppes** and **maquis** (see habitat map in Figure 2-2) (E1.2, 23.42% and F5.2, 22.07% respectively).

The modified habitats present in the AoI (26.92%) are mainly characterized by orchards, recently abandoned arable land and shrub plantations, also vineyards.

The habitat map of the AoI according to EUNIS (European nature information system: https://eunis.eea.europa.eu/habitats.jsp) habitat classification system is available in Figure 2-2and the calculations are presented in Table 2-1. A brief description for each EUNIS natural habitat type identified in the area is reported on below.

TABLE 2-1 EUNIS HABITAT TYPES PRESENT IN THE AOL

EUNIS Code	EUNIS Habitat Type	Total AoI	
		m²	**%**
Natural habitat			
E1.3	Mediterranean xeric grassland	523,363	9.44
F5.2	Maquis	1,223,527	22.07
E1.2	Perennial calcareous grassland and basic steppes	1,298,251	23.42
H5.3	Sparsely or un-vegetated habitats on mineral substrates not resulting from recent ice activity	363,943	6.56
G3.5	*Pinus nigra* woodland	642,893	11.60
	Subtotal	***4,051,977***	**73.08**
Modified habitat			
G1.D	Fruit and nut tree orchards	903,292	16.29
FB.3	Shrub plantations for ornamental purposes or for fruit, than vineyards	186,875	3.37
I1.5	Bare tilled, fallow or recently abandoned arable land	402,289	7.26
	Subtotal	***1,492,456***	**26.92**
Total		*5,544,433*	100

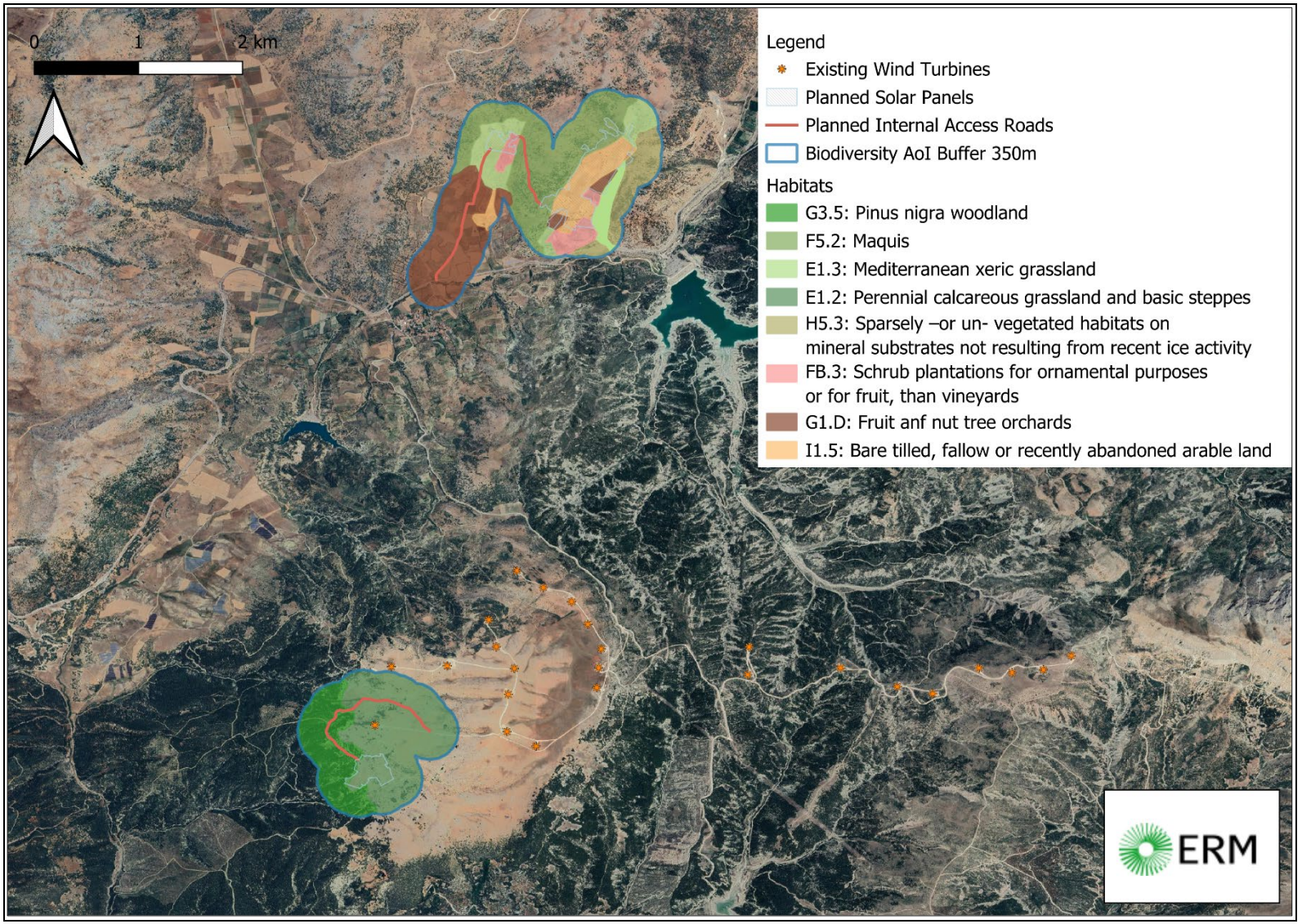


FIGURE 2-2 HABITAT MAP BASED ON THE EUNIS CLASSIFICATION

Mediterranean xeric grassland: *Least Concern in Europe*

EUNIS code: E1.3c (revised code: R1F, revised name: 'Mediterranean closely grazed grassland')

EUNIS Description: Meso- and thermo-Mediterranean xerophile, mostly open, short-grass perennial grasslands rich in therophytes; therophyte communities of oligotrophic soils on base-rich, often calcareous substrates e.g. vegetation of the class [Thero-Brachypodietea]. The species composition varies greatly, according to the particular regional terrain and climate and the impact of traditional pastoralism.

Link to EU Habitats Directive Annex 1: code 6220* - *Pseudo-steppe with grasses and annuals of the Thero-Brachypodietea* (EU priority habitat*)

Link to EU Red List of Ecosystems: RLE1.3a - Mediterranean annual-rich dry grassland (Near Threatened)

The continental mediterranean xeric grassland (E1.3) are characterized by the presence of widespread endemic flora species as *Bolanthus minuartioides, Moltkia aurea, Astragalaus vulneraria, Astragalus karamasicus, Centaurea cariensis* subsp. *longipapposa*.

FIGURE 2-3 PHOTOGRAPH SHOWING THERMOPHILOUS DECIDUOUS WOODLAND ON THE SITE BASED ON THE SITE VISIT IN FEBRUARY 2024.

Maquis: *Least Concern in Europe*

EUNIS code: F5.2 (revised code: S51, revised name: 'Mediterranean maquis and arborescent matorral')

EUNIS Description: Evergreen sclerophyllous or lauriphyllous shrub vegetation, with a more or less closed canopy structure, and with few annuals, some geophytes and often scattered trees, some of which may be in shrub form. Unlike arborescent matorral, maquis is typically dominated by species that do not have the potential to grow into tall trees. In high maquis these may be *Arbutus spp., Erica arborea, Erica scoparia, Juniperus oxycedrus, Phillyrea spp*. In low maquis, *Cistus spp., Erica spp., Genista spp., Lavandula spp*. may predominate.

Link to EU Habitats Directive Annex 1: 5210 - Arborescent matorral with *Juniperus* spp. (not priority habitat)

Link to EU Red List of Ecosystems: F5.1– Mediterranean maquis and arborescent matorral (Least Concern)

This habitat type is the most common natural habitat type in the project area. The dominant species in the habitat is *Quercus coccifera*. Within this habitat, species such as *Euphorbia kotschyana*, *Jasminum fruticans*, *Koeleria cristata*, *Festuca valesiaca*, *Stipa holosericea*, and *Teucrium polium* are distributed. The habitat also hosts widely distributed endemics as *Bolanthus minuartioides*, *Moltkia aurea*, *Astragalus karamasicus*, and *Centaurea cariensis* subsp. *longipapposa*, along with the regional endemic *Astragalus lycaonicus*.

FIGURE 2-4 PHOTOGRAPH SHOWING MAQUIS ON THE SITE BASED ON THE SITE VISIT IN MAY 2024.

Perennial calcareous grassland and basic steppes: *Vulnerable in Europe*

EUNIS code: E1.2 (revised code: R1A, revised name: 'Semi-dry perennial calcareous grassland (meadow steppe)')

EUNIS Description: Perennial grasslands, often nutrient-poor and species-rich, on calcareous and other basic soils of the nemoral and steppe zones and of adjacent parts of the subboreal and submediterranean zones. Includes the calcareous grasslands of central and western Europe, alvar grasslands of the Baltic region, and basic grasslands of the steppe zone. Vegetation communities of *Festuco-Brometea*.

Link to EU Habitats Directive Annex 1: 6210 - Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (not priority habitat type)

Link to EU Red List of Ecosystems: E1.2a – Semi-dry perennial calcareous grassland (Vulnerable)

The location of Solar panel-1 represents one of the natural habitat types in the project area. In this habitat, which is dominated by perennial herbaceous plants and dwarf shrub species, species such as *Festuca valesiaca*, *Thymus sipyleus*, *Bromus tomentellus*, *Astragalus microcephalus*, *Astragalus angustifolius*, and *Stipa holosericea* are dominant. The habitat also contains species such as *Bolanthus minuartioides*, *Astragalus karamasicus*, and *Centaurea cariensis* subsp. *longipapposa*, which are widely distributed endemics. This habitat type is mainly concentrated in the solar panel polygons.

FIGURE 2-5 PHOTOGRAPH SHOWING PERENNIAL CALCAREOUS GRASSLAND AND BASIC STEPPES ON THE SITE BASED ON THE SITE VISIT IN MAY 2024.

Sparsely –or un- vegetated habitats on mineral substrates not resulting from recent ice activity

EUNIS code: H5.3 (revised code: U53, revised name: 'Glacial moraines with very sparse or no vegetation')

EUNIS Description: Accumulations of sand, boulders, stones, rock fragments, pebbles or gravels, unvegetated, occupied by lichens or mosses, or colonized by sparse herbs or shrubs. Included are inland dunes, moraines and drumlins originating from glacial deposition, sandar, eskers and kames resulting from fluvio-glacial deposition, block slopes, block streams and block fields constructed by periglacial depositional processes of downslope mass movement, ancient beach deposits constituted by former coastal constructional processes. Excludes mobile screes (H2) and deposits originating from eruptive volcanic activity (H6).

Link to EU Habitats Directive Annex 1: not applicable

Link to EU Red List of Ecosystems: not applicable

This habitat represents important natural habitat type in the project area, hosting several endemic plant species. It comprises of limestone rock habitats with sparse vegetation. The dominant species in this habitat are *Satureja cuneifolia*, *Thymus sipyleus*, and *Cerastium banaticum*. Within the habitat, the regional endemic *Micromeria cristata* subsp. *xylorrhiza* is present, along with widely distributed endemics such as *Inula anatolica*, *Alkanna areolata* var. *areolata*, *Aubrieta pinardii*, *Hypericum aviculariifolium* subsp. *depilatum* var. *depilatum*, *Centaurea cariensis* subsp. *longipapposa*, and *Salvia cadmica* var. *cadmica*.

FIGURE 2-6 PHOTOGRAPH SHOWING PERENNIAL SPARSELY –OR UN- VEGETATED HABITATS ON MINERAL SUBSTRATES NOT RESULTING FROM RECENT ICE ACTIVITY ON THE SITE BASED ON THE SITE VISIT IN MAY 2024.

Pinus nigra woodland: *Least Concern in Europe*

EUNIS code: G3.5

EUNIS Description: Forests dominated by pines of the *Pinus nigra* (Black pine) group.

Link to EU Habitats Directive Annex 1: not applicable

Link to EU Red List of Ecosystems: G3.4c – Mediterranean montane Pinus sylvestris-Pinus nigra forest (Least Concern)

The dominant species of this habitat, which represents the impact area of the GES-1 project site, is *Pinus nigra*. In the understory of these woodland which have 90% canopy cover, the species *Juniperus oxycedrus*, *Helianthemum nummularium*, *Thymus sipyleus*, *Astragalus plumosus*, *Dactylis glomerata*, and *Astragalus karamasicus* are found.

FIGURE 2-7 PHOTOGRAPH SHOWING PINUS NIGRA WOODLAND ON THE SITE BASED ON THE SITE VISIT IN MAY 2024.

2.3 FLORA AND VEGETATION

In the SLIP report (ERM, 2024) based on literature review and field work conducted by the botanist/flora expert on the 29th of May 2024, 35 flora species were identified as present in the AoI.

According to the National Red List (Turkish Red Data Book of Plants – T-RDB) re-evaluated by the local expert (Prof. Dr. Hayri Duman) based on the latest available information on the species distribution and IUCN 2001 criteria, *Astragalus lycaonicus* and *Micromeria cristata subsp. xylorrhiza* are both classified as Vulnerable (VU) at the national level and are known to

be closely associated with the grassland and maquis and calcareous rock habitats and vegetation communities of the Project AoI. *Astragalus lycaonicus* is also considered as a regionally endemic species and is restricted in terms of its range.

All the other species are considered to be of Least Concern (LC) and are neither endemic nor restricted-range species.

2.4 FAUNA

In the SLIP report (ERM, 2024), fauna field surveys were conducted to define fauna structure of the AoI. In this scope while mammals and herpetofauna groups were investigated during the field survey, EIA report were considered to understand bird species of the Project area.

The findings of baseline studies conducted in the SLIP (ERM, 2024) for the Uluborlu Solar Power Plant identified primarily species of Least Concern (IUCN global/regional threat status) that are local common with sufficiently large population sizes that are generally considered stable. Several species of conservation significance (threatened species, endemics, species listed in the Bern Convention, etc.) were however identified within the study area, and the focus of the management measures and actions contained in the BMP should be on these species in particular. These include:

Birds

- European Turtle Dove *(Streptopelia turtur,* globally VU, IUCN),
- Long-legged Buzzard (*Buteo rufinus*, globally LC, IUCN) (Revised Annex I of Resolution 6 of Bern Convention),
- Short-toed Snake Eagle (*Circaetus gallicus*, globally LC, IUCN) (Revised Annex I of Resolution 6 of Bern Convention),
- Little Egret (*Egretta garzetta*, globally LC, IUCN) (Revised Annex I of Resolution 6 of Bern Convention,)
- White Stork (*Ciconia ciconia*, globally LC, IUCN) (Revised Annex I of Resolution 6 of Bern Convention),
- Common Chaffinch (*Fringilla coelebs*, globally LC, IUCN) (Revised Annex I of Resolution 6 of Bern Convention),
- Red-backed Shrike (*Lanius collurio,* globally LC, IUCN) (Revised Annex I of Resolution 6 of Bern Convention).

Mammals (included bats)

- Schreiber's Bent-winged Bat (*Miniopterus schreibersii,* VU globally, IUCN) (Revised Annex I of Resolution 6 of Bern Convention),
- Greater Mouse-eared Myotis (*Myotis myotis,* LC globally, IUCN) (Revised Annex I of Resolution 6 of Bern Convention),
- Lesser Mouse-eared Myotis (*Myotis blythii,* LC globally, IUCN) (Revised Annex I of Resolution 6 of Bern Convention),
- Lesser Horseshoe Bat (*Rhinolophus hipposideros,* LC globally, IUCN) (Revised Annex I of Resolution 6 of Bern Convention),

- European Marbled Polecat (*Vormela peregusna,* VU globally, IUCN) (Revised Annex I of Resolution 6 of Bern Convention).

Herpetofauna

- Spur-thighed/Common Tortoise (*Testudo graeca*, globally VU, IUCN) (Revised Annex I of Resolution 6 of Bern Convention),
- Grass Snake (*Natrix natrix,* LC globally, IUCN) (Revised Annex I of Resolution 6 of Bern Convention).

2.5 CRITICAL HABITAT

According to critical habitat assessment contained in the SLIP report (ERM, 2024), none of the habitats or species confirmed for the Project study area trigger critical habitat in terms of the EBRD PR6 criteria and thresholds applied. For further information, please refer to the relevant chapter of the SLIP report produced by ERM in 2024 for the Project.

2.6 PBFS

Despite critical habitat not being triggered for the Project, several natural habitats and species of flora/fauna do qualify as Priority Biodiversity Features (PBFs) in terms of the EBRD PR6 requirements, for which special attention should be paid towards the mitigation of impacts to achieve at a minimum No Net Loss (NNL) of biodiversity. These include:

Habitats:

- Mediterranean xeric grassland
- Perennial calcareous grassland and basic steppes
- Pinus nigra woodland

Flora:

- *Astragalus lycaonicus*

Birds:

- *Streptopelia turtur*
- *Buteo rufinus*
- *Circaetus gallicus*
- *Egretta garzetta*
- *Ciconia ciconia*
- *Lanius collurio*

Mammals:

- *Miniopterus schreibersii*
- *Myotis blythii*
- *Myotis myotis*
- *Rhinolophus hipposideros*

- *Vormela peregusna*

Reptiles*:*

- *Testudo graeca*
- *Natrix natrix*

3. CONSTRUCTION-PHASE IMPACTS & MITIGATION

The BMP for the construction-phase addresses the management of potential impacts on biodiversity (includes ecosystems, ecosystem services, habitats and species of flora and fauna) that may occur during the construction of the solar PV plant Project.

3.1 TEMPORARY CONSTRUCTION COMPONENTS

Construction works will involve earthworks, pouring concrete, storage and handling of equipment, and temporary facilities for the construction workforce. Temporary construction components will only be needed during construction and will be reinstated to their original condition upon completion of the construction activities.

These components include:

- Construction works (land/vegetation clearing and stripping, earthworks),
- Any temporary or permanent internal access roads,
- Storage areas,
- Dump area.

3.2 CONSTRUCTION PHASE BIODIVERSITY IMPACTS

Biodiversity impacts, related activities and infrastructure have been conceptualized and discussed in the SLIP (ERM, 2024). *Decommissioning phase impacts are likely be like those of construction phase impacts and have therefore not been assessed separately.*

The key sources of potential biodiversity impacts include the following:

- Pre-construction activities (surveys, setting out of works)
- Construction mobilization activities and earthworks
- Temporary works
- Vegetation clearing, topsoil removal, general construction activities associated with access roads
- Construction workers presence (noise, disturbance)
- Waste management
- Unplanned events such as erosion/sedimentation, flooding, accidental oil/fuel/chemical spills

Impacts associated with the Project are considered to be 'area based' in nature, and relate to the construction and operation of the solar arrays as well as temporary worker camps and equipment laydown areas:

- Biodiversity impacts appear most intimately linked with direct and indirect impacts to both natural habitat and species of plants and animals (birds, reptiles) of conservation importance (PBFs);
- Construction-phase impacts will be more temporary in nature (e.g. temporary areas, noise, vibrations and emissions) and therefore considerably less significant in the long-term.

The SLIP report has identified a total of eight individual biodiversity impacts associated with the construction phase of the project. These impacts were assessed with a focus on biodiversity receptors (habitats, flora, and fauna species) during the construction phase, specifically evaluating the severity of the impact and the associated risks. Impact severity ranged from minor to moderate, with primary concerns focused on habitat disturbance, reduced habitat connectivity, vehicle collisions with fauna species, movement barriers, and pollution and disturbance (dust, noise, light), introduction/spread of invasive alien plants. However, following the application of mitigation measures, residual impacts were generally regarded as 'Low' or 'Minor' across all categories (see Table 3-1 below).

The BMP for construction focuses on those impacts considered to be of Minor – Moderate significance only (insignificant impacts with embedded mitigation measures are excluded as there is no significant need for further management measures – i.e. Dust pollution).

TABLE 3-1 SUMMARY OF CONSTRUCTION-PHASE BIODIVERSITY IMPACTS

Impact	Biodiversity Receptor	Impact Significance (with embedded mitigation)	Residual impact (after mitigation)
Impact 1: Physical Destruction/Disturbance of Vegetation and Habitat	Habitats	Moderate	Minor
Impact 2: Reduced Habitat Connectivity	Habitats, mammals, herpetofauna (reptiles, amphibians) and birds	Moderate	Minor
Impact 3: Vehicle Collisions with Fauna	Herpetofauna (reptiles, amphibians), and small mammals	Minor	Insignificant
Impact 4: Species Collision with Solar Panels	N/A (operational phase only)	N/A	N/A
Impact 5: Creation of barriers to faunal species movement	Mammals, herpetofauna (reptiles, amphibians)	Minor	Insignificant
Impact 6: Introduction/spread of Invasive Alien Plants	Habitats	Minor	Insignificant
Impact 7: Water and Soil Pollution	Habitats	Minor	Insignificant
Impact 8: Disturbance caused by Noise, Light, Vibration	Mammals, herpetofauna (reptiles, amphibians) and birds	Minor	Insignificant
Impact 9: Dust Pollution	Flora & habitat	Insignificant	None

3.3 CONSTRUCTION PHASE BIODIVERSITY MITIGATION AND MANAGEMENT MEASURES

The biodiversity mitigation and management measures below apply to the construction-phase of the Project and must be implemented as indicated.

3.3.1 MITIGATION FOR IMPACT 1: Physical Destruction/Disturbance of Vegetation and Habitat

The primary potential impact on biodiversity (including species) during construction is likely to arise through the loss of habitat and any disturbance to sensitive species, according to NatureScot (2022).

The physical footprint of the solar farm will be relatively small in scale, being localized and limited to the actual footprint of infrastructure where vegetation will be cleared and converted to artificial surfaces (i.e. panels, access roads, operation buildings) or maintained as agricultural land/pasture. Solar panels will be directly established on following natural habitats:

- Mediterranean xeric grassland (LC, EU priority habitat type also identified as a PBF)
- Perennial calcareous grassland and basic steppes (LC but identified as a PBF)

and modified habitats:

- Bare tilled, fallow or recently abandoned arable land
- Shrub plantations for ornamental purposes or for fruit, than vineyards

Internal access roads will be directly constructed on the following natural habitats:

- Mediterranean xeric grassland medium-high degradation (LC, EU priority habitat type also identified as a PBF)
- Maquis, medium-high degradation (LC)
- Perennial calcareous grassland and basic steppes, low degradation (LC but identified as a PBF)
- *Pinus nigra* woodland low degradation (LC but identified as a PBF)

and modified habitats:

- Fruit and nut tree orchards

The Mediterranean xeric grassland areas are highly degraded due to overgrazing, resulting in a significant loss of their natural characteristics. Consequently, these habitats are no longer representative of primary reference grasslands, which lowers their sensitivity and importance as receptors. Therefore, the anticipated impact of the development on these grasslands is relatively low.

Similarly, the Maquis habitats, which support restricted-range and endemic species such as *Astragalus lycaonicus*, also exhibit medium to high degradation from overgrazing.

In contrast, the *Pinus nigra* woodlands, which have suffered lower levels of degradation and retain much of their natural character despite some fragmentation, present greater concern.

Additionally, sparsely or un-vegetated habitats on mineral substrates, despite their moderate degradation, are important due to the presence of several endemic flora species.

Flora species within the construction areas will be directly impacted by vegetation disturbance during the building phase. Of particular concern are endemic plant species, some of which are listed as Vulnerable (VU) at the national level, particularly those associated with Maquis, un-vegetated habitats on mineral substrates, and perennial calcareous grasslands. Despite their degraded state, these habitats are still considered sensitive to disturbance. The clearing of vegetation will also result in the permanent loss of suitable habitats for fauna species relying on this vegetation for food or shelter. Species with low mobility, such as slow-moving/sedentary reptiles found in Maquis and woodlands, including *Testudo graeca*, may not be able to relocate ahead of construction, making them particularly vulnerable. Additionally, species that rely on hiding strategies to avoid predators could face accidental mortality during construction operations

In alignment with the impact mitigation hierarchy, measures to avoid and then reduce impacts on natural habitat are considered first before other steps of the hierarchy. The following measures are recommended to avoid and minimize impacts on natural habitat where possible:

- Restrict all construction activities including soil stripping, vegetation clearing, earthworks, access road construction, grading, etc. to the footprint of individual facilities only and as per the approved construction plan.
- No clearing or stripping of vegetation and topsoil is to take place unless this has been formally authorized and only for approved areas.
- The extent of areas to be cleared are to be clearly demarcated and marker out on the ground using appropriate flatting material as determined by the site manager.
- Only the vegetation that is necessary to be removed for construction purposes may be cleared, and where possible cut vegetation to ground level (e.g. in grasslands, steppes) instead of stripping areas entirely.
- Conduct pre-construction surveys where Project infrastructure is planned and disturbance of natural habitats is proposed (particularly natural *Pinus nigra* woodlands, steppes/grassland and maquis).
- Establish avoidance and exclusion zones around known PBF reptile habitats to minimise risk of direct impacts. Clearly mark and communicate these zones to construction personnel to ensure compliance.
- Clearing is to be to be carried out in a sequential manner and in a way that directs escaping wildlife away from clearing and into adjacent native vegetation or natural areas on their own without the need for human intervention as far as possible.
- Cleared vegetation may be stockpiled in a manner that facilitates re-spreading or salvaging and does not impede vehicle, livestock or wildlife movement.
- Avoid locating permanent infrastructure as well as temporary construction camps and material/equipment laydown areas within or near identified natural habitat (i.e. woodland and grassland, maquis).
- Use existing access roads or upgrade existing roads wherever possible before considered new access road construction.
- Properly working machinery must be engaged in the process of land preparation and execution of construction works, and the construction site must be secured in accordance with the conditions of the competent authority in turkey.
- Surrounding vegetation and natural *Pinus nigra* woodlands, steppes/grassland and maquis habitat must be protected by employing appropriate barrier fencing and/or other forms of demarcations.
- Implement relevant construction standards to limit the disturbance and erosion potential for soils (e.g. 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' – DEFRA, 2009).
- Measures to prevent erosion from excavated areas and soil stockpiles will be implemented.

- Ensure that topsoil is returned and used in rehabilitation/habitat restoration as close to the site where it was originally removed (i.e. within a distance of 200m or less) and not transported to and used in another location.

Where impacts cannot be avoided and natural grassland/steppe/maquis/woodland habitats will be destroyed or disturbed temporarily or permanently, the following is needed for the natural grassland and woodland habitats being PBFs, for which No Net Loss (NNL) of biodiversity will need to be attained at a minimum, in alignment with the requirements of EBRD PR6:

- For temporary loss due to land take for temporary infrastructure and activities, the strategy for these areas will simply be to restore the habitat to the same type occurring pre-development or better condition where possible (Step 3 of the mitigation hierarchy: restore/rehabilitate);
- Where habitat loss will be permanent (due to permanent infrastructure associated with access roads, solar arrays, etc.), step 4 of the mitigation hierarchy applies, which involves compensating for permanent loss of natural habitat through a habitat replacement/restoration program that can be realised through a traditional habitat offset for example.

Restoration of habitat affected by temporary works:

Upon completion of the construction-phase, temporary works or temporary facilities/infrastructure will be decommissioned and removed as follows:

- Deconstruction and removal of temporary infrastructure and materials from site;
- Removal and disposal of any waste material or contaminated substances and transportation for proper offsite disposal;
- Closing of any temporary excavations or trenches by backfilling the area with the material arising during excavations;
- Landscaping with topsoil as required; and
- Revegetation as required with rapid growing runner grass species (indigenous grass species only are to be used).

General principles for reinstatement of habitats affected by construction activities and where temporary works are removed from the site after construction should be completed are described below:

- It is recommended that progressive rehabilitation/restoration be undertaken for natural habitats temporarily disturbed/affected, such that as works are completed, the affected areas are rehabilitated and restored as necessary.
- Maintain the original soil layering and do not mix topsoil and subsoil layers.
- Reinstate soils in the reverse order (subsoil, then topsoil).
- Ensure that topsoil is returned and used in habitat restoration in the same general area of the site where it was originally removed (i.e. within a distance of 200m) and not transported to and used in another location.

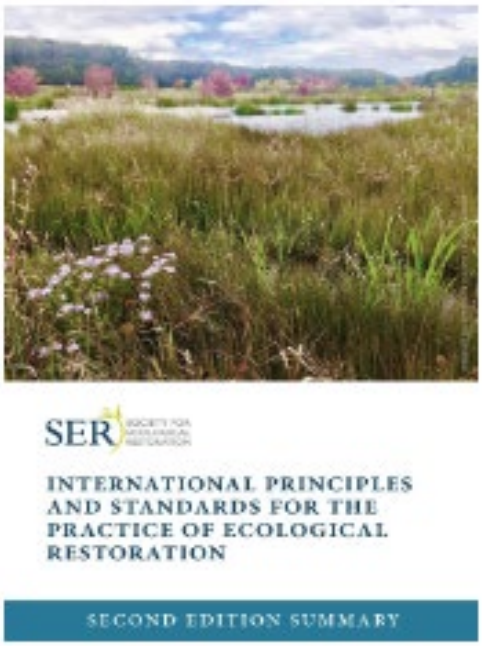
- Soil erosion features will be stabilized via backfilling as appropriate.
- Protect the reinstated bare soil surface with a physical barrier, such as a thin layer of mulch or geotextile/erosion control matting.
- Avoid compaction of soils, for example though excessive vehicle tracking, and rip soils where compacted to allow for vegetation growth.
- Where lands will be returned to agricultural production, no further requirements are recommended beyond soil reinstatement and basic landscaping to return the surface to pre-construction conditions.
- Identify indigenous species for planting and suitable sources for seed and plants as appropriate (preferably using seed of local origin as far as possible, and only supplement with other seed where locally sourced seed is unavailable).
- Identify commercial sources of seed / plants from local nurseries for example.
- Encourage rapid re-vegetation through re-seeding using rapid growing, indigenous runner grasses that will form a secondary grassland habitat (meadow or pasture), with species selection using native/indigenous plants only (no exotic species) and using only a compatible species mix informed by the local soil and climate characteristics.
- Direct seeding by broadcasting seed or hydro-seeding is recommended to immediately stabilize areas that are bare of vegetation cover within 2 months of the completion of works in these areas.
- Care must be taken to utilize appropriate species for revegetating trenches where cables/pipelines have been buried (avoid selecting deep rooting plants/trees for example that could damage buried cables/pipes).
- Temporary fencing or other appropriate barriers are to be erected where necessary to prevent entry to the area implemented in the short to medium term, to prevent livestock overgrazing and allow vegetation re-growth in order to stabilize the soil surface.
- Control invasive and alien plant species that may colonize the reinstated habitat in accordance with the measures in this BMP.

Importantly, where any habitats considered to be natural are cleared or disturbed for any reason (intentional or accidental), an ecologist will need to be appointed to prepare a site-specific habitat restoration plan for these sites. Whilst this is not anticipated, the BMP accounts for any accidental events that could occur.

The Habitat Restoration plan will be developed as construction is being undertaken and will need to be available by the time site restoration for temporary land take becomes necessary (note that progressive restoration/rehabilitation of the site is recommended).

It is recommended that any habitat rehabilitation/restoration be aligned with the SER (Society for Ecological Restoration) '*International principles and standards for the practice of ecological restoration*'), which provides the most comprehensive and robust international framework available to date for ecological restoration projects. These are contained within the publication of the SER (Gann *et al*., 2019) which can be accessed online from the SER website:

https://www.ser.org/page/SERStandards/International-Standards-for-the-Practice-of-Ecological-Restoration.htm



The SER guidelines are intended to support the development of ecological restoration plans, assist implementers with achieving intended goals, while addressing key challenges and navigating trade-offs associated with land management priorities and decisions. The SER establishes eight (8) principles that underpin ecological restoration, which serve as a useful guide when designing restoration plans or strategies that consider biodiversity:

1. Engage stakeholders
2. Draw on many types of knowledge
3. Informed by native reference ecosystems, while consulting environmental change
4. Support ecosystem recovery processes
5. Assessed against clear goals and objectives using measurable indicators
6. Seek the highest level of recovery possible
7. Part of a continuum of restorative activities
8. Gains cumulative value when applied at large scales

Habitat compensation plan for permanent loss:

For permanent habitat loss (i.e. access roads to remain after construction and the solar array areas), step 4 of the mitigation hierarchy applies and compensation for the habitat loss will need to be sought. This is particularly relevant in light of the natural grassland and woodland habitats being PBFs, for which No Net Loss (NNL) of biodiversity will need to be attained at a minimum, in alignment with the requirements of EBRD PR6. To achieve this, it is recommended that a **Habitat Restoration and Compensation Plan** be prepared and implemented post-construction, and the main content and steps are described below:

- **Step 1**: calculate the extent of natural grassland and woodland habitat that will be permanently lost due to development.
  - *Outputs of step 1 – quantum of permanent natural habitat loss.*

- **Step 2**: convert habitat extent to Habitat Hectares based on habitat condition rating to develop restoration/compensation targets
  - *Outputs of step 2 – quantum of habitat loss expressed as habitat hectares (taking into account extent and condition) and targets for restoration*

- **Step 3**: consider options in the area where natural grassland/woodland habitat could be restored or enhanced to meet the compensation targets for the Project.
  - *Outputs of step 3 – assess the potential for sites as receiving areas for restoration and how targets can be met considering habitat extent and condition.*

- **Step 4**: develop a Habitat Restoration Plan/Compensation Strategy that can be implemented together with roles/responsibilities, timeframes, costs, monitoring program, etc.
  - *Outputs of step 4 – detailed Habitat Restoration Plan/Compensation Strategy.*

- **Step 5**: implement the Habitat Restoration Plan/Compensation Strategy.
  - *Outputs of step 5 – implementation.*

- **Step 6**: monitor and evaluate the success of restoration/offset interventions and activities.
  - *Outputs of step 6 – monitoring and evaluation of restoration outcomes, adaptive management/corrective actions identified and implements.*

Note that the restoration/compensation plan for natural habitat must also take into consideration impact 2 below (reduced habitat connectivity) and consider ways to compensate for this (for example by considering the linking of habitats to improve connectivity during restoration planning), and take into consideration PBF species (birds, reptiles) that also require NNL of biodiversity. Additional conservation actions for PBF species of birds and reptiles (for example) could be in the form of the following, which the restoration/compensation plan will need to detail as well:

- Identification and preservation of breeding / nest sites
- Artificial habitat creation
- Woodland, grassland habitat restoration
- Improved land/grazing practices
- Combatting illegal hunting
- Buffer zones around nest sites
- Improved powerline mitigation
- Predator control
- Preventing wildfires
- Pollution control
- Further monitoring and research to establish population trends
- Education and awareness
- Improving food resources through habitat enhancement/creation

3.3.2 MITIGATION FOR IMPACT 2: Reduced Habitat Connectivity

Reduced habitat connectivity will be caused temporarily by the storage and dumping areas during construction, and permanently by the development of access roads and the installation of solar panels. Most of the planned development is within the open grassland habitats, which are patchy and fragmented already. These habitats are likely to be most affected by the development, as the woodland habitat is still largely intact and contiguous and will be avoided largely.

The following measures shall be followed for construction activities to minimize impacts on habitat connectivity:

- Habitat restoration/compensation plan to be developed and implemented (as per Impact 1 above), that takes into account compensating for reduced natural habitat connectivity.
- Any temporary excavations, fences or stockpiles of soil and materials must be removed from site once construction is complete.
- The use of suitable permeable fencing that allows small mammals and herpetofauna to move across the site is recommended.
- Wildlife shepherding protocol (see **Annexure A** of the BMP) to be implemented where construction takes place, to check areas to be worked in prior to construction and remove or shepherd wildlife found on the construction site to safety in adjoining natural habitat (where these animals cannot safely exit the construction site by themselves). When capturing/relocating animals, cover larger animals with a towel or blanket and place in a cardboard box and/or hessian bag, place smaller animals in a cotton bag, tied at the top.
- Minimize the number of new access roads to only those required to provide access and use the existing access road network as far as possible.

3.3.3 MITIGATION FOR IMPACT 3: Vehicle Collisions with Fauna

Construction vehicles accessing and working within the site pose a risk of colliding with species utilizing the habitats and crossing roads between habitats. Some species may be attracted to access roads created as easy corridors to move between areas and these animals are likely to be more at risk. Slower moving and more sedentary species such as reptiles (e.g. tortoises, marbled polecat) are likely to be at a greater risk of being injured or killed by moving vehicles, even at low speeds, particularly as cold-blooded species such as reptiles may utilize roads for sunning themselves. To reduce the risk of collisions with wildlife during construction, the following is to be implemented:

- Use existing access roads or upgrade existing roads wherever possible before considering any new access road construction.
- Restrict vehicles to the use of only authorized access roads.
- Limit vehicle speed on site for construction vehicles and vehicles accessing the site (set speed limit at 30 km/hr).
- Place calming measures such as speed humps for vehicles as necessary.
- Install warning signs along the roads to alert drivers to potential faunal crossings where appropriate.

- Place appropriate limits on the number of vehicle movements to and from the construction site.
- Limit worker/staff and vehicle access to the authorized construction site only.
- Restrict activities to day-time hours where possible when visibility is good and potential fauna collisions with vehicles can be more easily avoided. Where this is not possible, driver awareness training and reduced speed limits on internal roads will be employed.
- To reduce the risk of collision with wildlife resulting in injury/mortality, it is proposed to limit construction works during the breeding season (April-June) for ground-breeding birds.
- Implement the temporary fencing off of ditches, trenches and capping of pipes at nighttime to prevent wildlife movement onto the construction site.
- Any excavations are not to be left open overnight, alternatively they will need to be securely covered or a means of escape for any animals that may become trapped will be provided, such as a wooden board or earthen ramp.
- All open excavations are to be checked for the presence of animals each morning and immediately prior to backfilling of open excavations/trenches.
- Any injured animals are to be transported carefully but efficiently to a local vet for treatment as soon as possible.
- To minimize the mortality of wildlife species, biological surveys (pre-construction surveys) will be conducted to identify and potentially relocate fauna species. These surveys will be carried out by an expert wildlife ecologist in areas where temporary and permanent facilities will be situated, no earlier than 7 days prior to construction. The focus of the survey will be on fauna species with limited mobility, such as mammals and reptiles, which may be unable to move before construction begins. If any of these species are found, they will be captured by the ecologist and relocated to undisturbed but similar sites outside of the construction zone
- Reptiles will be captured and transferred to a suitable receiving site that is no smaller than the capture site, possessing similar habitat characteristics and prey availability, and located away from the construction footprint during the construction phase.

3.3.4 MITIGATION FOR IMPACT 5: Creation of barriers to faunal species movement

Barriers to land-based species (e.g. small mammals, reptiles) associated with temporary facilities and excavations may be created during construction. To manage the risk of fauna becoming trapped or unable to traverse the site between habitats or exit due to the presence of artificial barriers, the following management measures are recommended:

- Avoid placing impermeable fences that could interfere with species movement.
- This excludes any species barriers recommended to prevent reptiles/small mammals from accessing construction areas.
- Any temporary excavations, fences or stockpiles of soil and materials must be removed from the site once construction is complete.
- Reduce the suitability of construction/work areas for key species, such as earthen embankments, bare slopes and temporary topsoil stockpiles, by covering or containing piles of soil, fill, brush, rocks and other loose materials and covering or hydroseeding soil stockpiles and slopes that are to be left temporarily open/exposed for an extended period of time (e.g. exceeding one week).

- Prevent the establishment of active nests during the primary bird nesting season on standing plant and temporary facilities and structures by closing opening and vents and checking equipment before operation.
- Wildlife shepherding protocol (see Annexure A) to be implemented where construction takes place, to check areas to be worked in prior to construction and remove or shepherd wildlife found on the construction site to safety in adjoining natural habitat (where these animals cannot safely exit the construction site by themselves).

3.3.5 MITIGATION FOR IMPACT 6: Introduction/spread of Invasive Alien Plants

The disturbance created by vegetation clearing and earthworks may create suitable conditions for IAPs (Invasive Alien Plants) and weeds to become established and possibly spread into adjacent habitats. IAPs can have far reaching detrimental effects on native biota and are widely accepted as being a leading cause of biodiversity loss.

Invasive Alien Species (IAS) will be managed to prevent the introduction or spread of any invasive and/or alien plants within the footprint of the works and any adjacent disturbance or semi-natural / natural areas where IAS may have spread due to construction activities:

- At the bottom of the excavated area for each solar array and access roads, a flat surface must be formed in order to control the spread of invasive plant species present in a wider area (by mowing, grazing, tamping, etc.);
- An IAS survey will be carried out by a suitably experienced and qualified botanist or ecologist appointed following completion of construction activities to identify particularly problematic invasive and alien plant species and areas where these have colonised habitats as a result of any disturbance created through construction activities, and who will advise on final control measures and actions;
- The following steps are to be followed in general:

  Step 1: Identify IAS and locations, size classes, densities and control/eradication requirements
  Step 2: Decide on applicable method of removal/control with rationale provided
  Step 3: Finalise and demarcate IAS control areas and agree on clearing/control plan
  Step 4: Ensure relevant equipment and PPE is provided
  Step 5: Selected applicable herbicide(s) where relevant
  Step 6: Training of staff if required
  Step 7: Implement IAS control with adequate supervision
  Step 9: Monitor to inform follow-up control requirements

- The following PPE (Personal Protective Equipment) is recommended for IAS control teams:
  - Long overalls
  - Eye protection (safety googles/glasses)
  - Protective gloves
  - Safety boots
  - Sun protection hats/caps
  - Bush knives, machetes, saws, axes, chainsaws, etc.
  - Registered herbicides and diesel carrier

- Paintbrushes, spray jets to apply herbicide
- Drinking water

- There are various means of controlling IAS and generally an integrated control is recommended for implementation (manual and chemical control);
- The suitability of control methods[1] will need to be evaluated as this depends on several factors, including practical constraints, economic constraints and applicability of methods for particular species of IAS;
- Note that most methods of control (including herbicide use) are best applied in the growing season (spring to summer: April-September);
- Care must be taken with regards to the choice of herbicide to ensure that no additional impact and loss of indigenous plant or animal species occurs due to the herbicide used;
- Either water or diesel can be used as a "carrier" for certain herbicides, however water is the generally preferred carrier, because diesel is expensive and can have very negative impacts on the natural environment (diesel should never be used for foliar applications due to its very negative impact on the environment);
- Mixing ratios for herbicide quoted by the manufacturer are tested for optimum results and it is important that these ratios be adhered to;
- Herbicide should always be applied immediately after the selected mechanical control method (e.g., after frilling, ringbarking, cut stumping or strip- barking);
- Always store herbicides in the original container together with the relevant MSDS and in secure storage areas out of reach of children and animals;
- Footprint areas within natural habitat must be kept as small as possible when removing invasive/alien plant species;
- IAS removal must be undertaken in a stepwise manner according to the following general protocol:
    - Mark out what needs to be cleared in a day for the number of people in the team, depending on the density and method;

[1] The suitability of control methods depends on a number of factors, including practical constraints, economic constraints and applicability of methods for particular species of IAS. Selection of the appropriate methods of control should be based on the following criteria:

- **Species to be controlled**: herbicides are registered for specific species
- **Size/age of target plants**:
    - **For seedlings**: hand-pulling or hoeing and foliar applications of herbicides for dense stands
    - **For saplings**: hand-pulling or hoeing, foliar applications of herbicides for dense stands, basal stem treatments and cut stump treatments recommended.
    - **For mature trees**: ring barking, frilling, basal stem treatments and cut stump treatments recommended.
- **Density of stands:** Overall applications of herbicide can be made to dense stands of seedlings or saplings. Where dense stands of large trees are present, treatment of standing trees may be appropriate to obviate the problem of disposing felled trees.
- **Accessibility of terrain**: In inaccessible areas, methods that rely on the minimum amount of transportation of equipment and chemical should be given preference
- **Environmental considerations**: Riparian/wetland areas require a careful approach to treatment/control. Only herbicides approved for use in wetland/riparian areas are to be considered. Washing of equipment or disposal of any chemical substances is prohibited in or near areas where there is a potential risk of contamination of wetlands/riparian areas.
- **Disposal of dead vegetation**: Where possible, utilizable wood should be removed after tree felling. This is also the case for trees that could cause the blockage of water courses. Brushwood should be spread rather than stacked to limit soil damage in instances where burning is planned.
- **Cost of application**: the cost application and re-treatment should be taken into consideration when selecting methods/herbicides, etc.

- Ensure that all individuals of an IAS are removed at the same time to reduce re-infestation potential;
- The dominant alien invasive species should be tackled first;
- Attempt to tackle one vegetation structural type at a time in a systematic manner (e.g., start with open grassland areas and then move into woodland);
- Start removing the target IAS in the least affected areas and work towards the heavier plant infestations that need to be targeted;
- Areas requiring follow-up treatment will take precedence over areas which still require initial clearing;
- Send slashers through the area first and remove all the small, thin plants by hand where necessary;
- Keep the team working in a line with the daily tasks pegged out;
- Cut target plants as low to ground as possible and apply herbicide to all cut surfaces and exposed roots;
- A dye must be applied to all cut stumps after herbicide application in order to mark which stumps have been treated and which have not;
- For dense alien plant infestations, exposed areas may need to be re-seeded with an indigenous grass mix to stabilise the soil and to assist in reducing alien regrowth; and
- The cut brush material should be stacked in an open area away from dry vegetation (stacks will either be burnt, shredded and / or mulched onsite).

- Adequate follow-up control is usually required to target seedlings, root suckers and coppice growth, particularly for dense infestations of alien plants characterized by rapid growth/reproduction and follow-up work will need to be undertaken on a 3-to-6-month basis, depending on the rate of re-growth assessed through monitoring;
- It is critically important that regular monitoring of clearing operations and alien plant levels post-control be undertaken as this will inform further efforts required to control the spread and densities of alien plants on the property, as well as informing whether current methods of control require review and which areas need to be prioritised for alien control going forward:
  - A record of progress is to be maintained, including simple records of daily operations (e.g., site number, date cleared, status of site – initial, follow-up, amount of herbicide used, etc.);
  - Georeferenced digital photographs to be taken before and after work is undertaken and maintained in a central database;
  - A visual survey is to be taken annually to document progress and inform changes required to the approach to clearing and to identify which areas still require further work (an assessor with knowledge of alien vegetation will need to visually assess the situation in the field).

3.3.6 MITIGATION FOR IMPACT 7: Water and Soil Pollution

Fuels, oils and other chemical substances required by construction crews operating at the site will be liable to potential accidental spillage, and even improper disposal, unless this is carefully managed. Management shall therefore comprise the following:

- Disposing of waste into the environment is to be strictly prohibited. Waste products are to be transported to registered waste facilities only for proper disposal.
- Waste generated during the construction works (concrete, metal, plastics, cables, etc.) must be collected and submitted to collectors for each type of waste separately.
- Establish a secured designated fuel and chemical storage area, with an impervious cover and sufficient containment volume for the storage of all chemicals.
- Restrict refueling of vehicles or equipment to impermeable hard-standing areas with strict spill controls.
- Always use drip trays when temporarily storing or handling fuels or when servicing/repairing vehicles on site.
- Employ best practice measures in handling and storing fuels, oils and chemicals liable to spillage.
- Develop procedures for emergency/spill response and for the storage and handling of fuels, construction materials and wastes.
- Emergency spill kits to be provided and training on how to use these.
- Clean-up any spills immediately.
- Remediate any soils or habitats where spills take place.
- Inform the relevant authorities as soon as any significant or major spill event takes place.
- Check hoses and valves regularly for leaks ensure they are turned off and securely locked when not in use.
- Make sure to have recipients that can collect fuels in case of leaks as well as a minimum of 3 kg of environmentally friendly substances able to absorb fuel and other spills.
- Conduct regular inspections of construction vehicles to identify and repair leaks or damaged fuel/lubricant lines.
- Place diesel pumps and similar items on drip trays to collect minor spillages. Check trays regularly and remove any accumulated oil.

3.3.7 MITIGATION FOR IMPACT 8: Disturbance caused by Noise, Light, Vibration

General nuisance and disturbance are a common by-product of construction activities, including that associated with increased noise / vibrations from heavy construction machinery and artificial light. The displacement of fauna during construction is considered to be mostly associated to noise (for birds and non-volant mammals) and vibrations (herpetofauna). Following disturbance management measures shall be followed for construction activities:

- Temporary working areas will be as small as practicable, and areas chosen for the storage of materials will avoid areas of high visual impact.
- The construction site will only be floodlit when necessary for health and safety, and during night works (which will be reduced as far as possible), to reduce the impacts of

temporary lighting on nocturnal species. Implement buffer zones or exclusion areas around important bird nesting or animal foraging sites to minimize disturbance[2].

- In order to protect the existing species of bats, it is necessary to reduce the intensity of construction works in the period from dusk to dawn (in the period April-October), when the activity of bats is at its highest. During this period, artificial lighting should be restricted only to the construction works zone, with the possibility of encasing the floodlights by protective lids in order to prevent the diffusion of light.
- In order to reduce the levels of noise, equipment which is not being used must be turned off.
- The Contractor shall monitor and keep in proper working condition all installed equipment, devices and work resources.
- Staff and visitors must be warned not to disturb birds, especially during the nesting period where nests occur on the site or surrounds.
- Minimize extended human presence near nesting birds (for example nest sites or nests identified during pre-construction surveys) during construction and protect sensitive habitat areas adjacent to work areas with temporary barriers or fencing to limit human foot-traffic. Implement the temporary fencing off of ditches, trenches and capping of pipes at night-time to prevent wildlife movement onto the construction site.
- Place information signs along the road in order to inform people of noise disturbance during working hours.
- Monitoring noise and vibration levels regularly to ensure compliance with regulatory standards. Implement construction practices that minimize noise and vibration disturbance, such as scheduling activities outside sensitive bird breeding periods or using noise barriers.
- Limit construction activities to day-time hours to limit impacts to any nocturnal species as far as possible, otherwise limit night-time activities to only essential works so as to reduce disturbance.
- Maintain vehicles and equipment in good working condition.
- Use noise minimizing technology where possible.
- Aim lights away from any adjacent sensitive habitats. Use of directional lighting to reduce light spill and prevent light increases in adjacent sensitive habitats such as bushes and wooded habitats.
- Use low intensity lights where possible.

[2] Preventative buffer zone widths recommended to mitigate displacement/disturbance effects of noise/visual disturbance during construction are as follows:

- For nesting/breeding birds (those identified during the baseline breeding bird surveys), a conservative buffer distance of 200-500m is recommended (aligned with Tolvanen et al., 2023 and NatureScot, 2022);
- For small mammals, a buffer distance of 250m is recommended (aligned with Kwon et al., 2018 and Kopucki & Mróz, 2016);
- For herpetofauna, a general buffer distance of 250m is recommended (aligned with Kwon et al., 2018).

- Use appropriate lighting that minimizes ecological and physiological effects on wildlife and also limits attraction of insects e.g. use of long-wavelength (warm white, orange, red and infra-red) light instead of short-wavelength (UV, cool white, blue and green LEDs)[3].
- Collect and remove waste products and litter from work areas that could attract wildlife to these areas (*see also 'Pest Control' measures in 3.3.8.3).*

3.3.8 ADDITIONAL MITIGATION MEASURES

3.3.8.1 WORKER CONDUCT

Enforce good conduct by construction workers, including prohibition of hunting, trapping, fishing, and general disturbance, destruction/damage or harassment of wild animals, through a formal training programme.

A site-wide prohibition on illegal activities such as hunting of wildlife or collecting of natural animal/plant species is to be enforced and discussed with construction workers, with appropriate penalties / disciplinary actions in place for such illegal activities.

Included shall be forbidding personnel from disposing of food scraps into the environment, to avoid attracting wildlife to the site (*see also 'Pest Control' measures in section 3.3.8.3*).

3.3.8.2 PRE- CONSTRUCTION WILDLIFE SEARCHES

Pre-construction surveys/searches will take place in accordance with the methodology below. Note that this does not require that any new formal fauna surveys be undertaken (such as herpetofauna, mammals and bird surveys, etc.) but simply that the area be walked and scanned for any signs of wildlife activity prior to construction commencing.

- Searches and pre-stressing activities are to be carried out by teams that have undergone necessary training in sensitively carrying out faunal searches and wildlife flushing exercises, ideally with a team standing in a line with a distance of 3-5m apart and moving progressively through the vegetation to check for animals and nesting activity.
- Preferably allow fauna to leave the area and relocate themselves to adjacent habitat without the need for further intervention.
- If no active nests, roosts or burrows/dens are present, vegetation clearing should be completed within a few days of the initial wildlife checks / inspections.
- Site clearing activities should begin at disturbed areas and proceeding in the direction of more natural areas, with the goal to ensure that any wildlife within the workspace can retreat into the retained natural areas outside of the construction zone without having to cross any cleared lands.
- Avoid or minimize disturbing or removing cover objects, such as downed trees, rotting stumps, brush piles, stone piles and leaf litter until these have been checked for animal activity, these can then be removed and relocated to similar suitable adjacent habitat outside of the construction zone.
- **Herpetofauna:** Where encountered, reptiles and amphibians will be collected prior to construction and moved to a suitable natural habitat outside of the construction area by

[3] According to the research of Longcore et al. (2018), filtered yellow-green and amber LEDs are recommended and predicted to have lower ecological and physiological effects on wildlife (compared with high pressure sodium lamps, while blue-rich lighting would have greater effect). Also, as a general rule insects are more sensitive or attracted to short-wavelength (UV, cool white, blue and green LEDs) than long-wavelength light which is recommended (warm white, orange, red and infra-red).

suitably trained and experience staff, far enough away from the construction zone to limit the chance of them immediately re-entering the construction area.

- **Bird Nests:**
  - As a general preventative measure to protect breeding birds, works are to be suspended during the key breeding period for conservation-important bird species and those identified as Priority Biodiversity Features (PBFs).
  - This is unless recent data confirming the breeding locations of species has been collected and it can be shown that avoidance can be achieved by applying suitable ecological buffers specific to the species. For the breeding bird species identified during baseline surveys, a conservative buffer distance of 200 – 500m is suggested (aligned with Tolvanen et al., 2023 and NatureScot, 2022), however this will need to be reviewed on a case-by-case basis by the biodiversity specialist/ECoW with further advice from an ornithologist obtained at this point as necessary.
  - Where bird nests / nesting birds are encountered during faunal searches of trees/shrubs and for any ground-nesting birds these locations are to be noted on a map or using a GPS, construction will need to be halted temporarily in this area, an ornithologist must be consulted with regards to measures to next steps, only after which construction may resume in this area.
  - Do not disturb, destroy, or remove active nests, including ground nesting birds, during the nesting season (typically spring/early summer) where these are identified within the development footprint/construction zone.
  - do not collect, capture, relocate, or transport birds, eggs, young, or active nests under any circumstance.
- **Bat Roosts:** Where roosting bats are encountered during pre-construction surveys, works near to these sites (i.e. within 500m) are to be suspended and a bat expert consulted to assess the situation and advise on further necessary actions to protect roost sites. Bat species are not to be disturbed, handled, removed or relocated by construction staff under any circumstance.
  - Roost sites to be noted on a map or using a GPS,
  - construction will need to be halted temporarily in this area,
  - a bat specialist will need to be consulted to assess the situation and advise on next steps before construction can resume in this area,
  - bats are not to be disturbed, handled/removed or relocated by construction staff,
  - felled trees with evidence of roosting bats (i.e., with suitable cavities showing signs of occupation such as droppings, feeding remains, grease markings), including those which could not be inspected prior to clearing, will be left in situ on the ground for a period of at least 24 hours to allow any bats to vacate the area,
- Alternative roosting and resting sites for birds/bats may need to be provided on a case-by-case basis where nesting/roosting species may be disturbed or removed and need to be relocated and this may include the construction of bat/bird friendly structure such as bat/bird boxes and artificial perching sites in adjacent habitat outside of the construction

(exact requirements and approach to be advised by a wildlife ecologist during pre-construction surveys).
- Ensure that wildlife flushing, and rescue procedures are not conducted during an extensive dry period (i.e., drought) as this could be particularly detrimental to certain wildlife and lead to mortality, especially if there is no nearby suitable habitat.
- Avoid clearing activities during the breeding season of key species where possible, as this could disrupt the reproductive success of species populations.
- Any injured animals are to be transported carefully but efficiently to a local vet for treatment as soon as possible.
- After removal of the individuals from the construction zone, the area that will be disturbed adjacent to any natural habitats during construction and at project specific locations should be fenced off appropriately to exclude re-entry by wildlife.
- A post-clearing report from the ecologist must be compiled that records the details of key actions taken and details of the species, sex, age, general health and numbers removed/relocated, the date, the relocation areas selected and estimated effectiveness and success of rescue and relocation efforts as well as any complications and further recommendations.

3.3.8.3 PEST CONTROL

Construction sites can become centres for wildlife considered pests, due to human activity and the presence of food and waste products generated at construction compounds in particular. The purpose of this procedure is to identify, eliminate or manage pests through appropriate baiting, trapping, spraying and monitoring.

Key areas and pest types

The key areas where pests can become problematic and require control are likely to include:
- Offices;
- Carparks;
- Gardens;
- Courtyards;
- Kitchen and eating areas;
- Ablution facilities / toilets; and
- Waste disposal facilities (bins).

Common pest types may include:
- Rodents (rats and mice);
- Feral cats, dogs;
- Insects (ants, cockroaches, ants, wasps, bees);
- Snakes; and
- Certain birds that frequent waste sites.

Preventing infestations

The following procedure applies to preventing pests or infestations:
- Use of animal proof bins at waste storage sites;
- Proper storage and disposal of organic and inorganic waste as per the Resource Efficiency, Pollution Prevention and Control Plan;

- Kitchens and food storage areas to be equipped with lockable doors and cabinets;
- Store food and organic waste (food waste) in areas where these are not likely to attract pests;
- Remove or cover all exposed or unpackaged food items;
- Ensure good housekeeping is undertaken on a daily basis to ensure a clean work compound so as to reduce the risk of pest/insect infestations.

Controlling pests

The following procedure applies to controlling pests:

- Monthly site inspections to be undertaken and findings noted in a Pest Control Logbook;
- Incident reporting to be undertaken in the case of particularly severe infestations or incidents involving dangerous wildlife;
- Eliminate pests such as rodents and insects through baiting;
- Spraying is considered appropriate for wasps / wasp nests;
- Trapping of mammals, reptiles or snakes must be undertaken by external specialists;
- Only carry out pest control procedures that will not put employees or the general public at risk and undertake controls preferably after hours to avoid employee contact;
- Notify employees of any pest control (baiting, spraying, trapping) activities before these take place and preferably limit access to areas during the administering of controls;
- Staff to be made aware of the dangers of any spraying or baiting controls that could be poisonous or detrimental to health;
- Suitable PPE (Personal Protective Equipment) to be worn during control activities;
- Only use pest control measures that will not result in fire or combustion;
- Maintain an up-to-date register of MSDSs (Material Safety Data Sheets);
- Pest control chemicals, bait, etc. to be stored in suitable containers or storage areas under strict access control;
- Only qualified persons to administer pest controls as necessary and in line with national legislation;
- Pest Control Log to record the frequency and dose of all pest control substances;
- Always follow and adhere to pesticide and/or insecticide manufacturer’s directions and instructions;
- Use tamper-proof bait stations and secure these if required;
- Bait types that are not liable to spill are to be preferred;
- Place bait stations in locations that minimise access risk to employees;
- Persons suffering from respiratory problems, allergies or other conditions, who may be aggravated by the treatment material, may need to take additional precautions before re-entry to the treated areas where pesticides or insecticides and sprayed and this may require seeking professional advice;
- Exterior spraying should only be carried out under suitable weather conditions and low usage periods;
- Remove bait stations if not in use; and
- Wash down any working surfaces that may have been exposed through overhead or space treatments.

Special controls

Certain species of animals that may be considered pests (e.g., snakes, frogs, field mice, certain birds, bees) should not be killed or injured as these could be important species from a biodiversity conservation perspective and could be potentially poisonous/dangerous if handled. Rather, the following should be done:

- In the instance that such species are encountered, they should be directed away from the construction site by carefully moving these to the nearest natural habitat or making noise to scare these animals away from the site;
- Certain wildlife could also be potentially poisonous/dangerous (e.g., snakes) and it is recommended that a qualified professional be called to remove these animals if they continue to persist at the site;
- If large numbers of bees or beehives/colonies are encountered, a bee specialist will be approached to undertake bee removal.

4. OPERATIONAL PHASE BIODIVERSITY IMPACTS & MITIGATION

The BMP for the operational phase of the project will address the management of potential impacts on biodiversity (namely to species and habitats) that may occur during the operation and maintenance of the solar power plan project.

4.1 OPERATIONAL COMPONENTS

Operationally, the BMP shall apply to the following components of the Project:

- Operation and maintenance of the solar panels;
- Maintenance of access roads.

4.2 OPERATION PHASE BIODIVERSITY IMPACTS

Biodiversity impacts, related activities and infrastructure have been conceptualized and discussed in the SLIP (ERM, 2024). *Decommissioning phase impacts are likely be like those of* construction *phase impacts and have therefore not been assessed separately.*

While the impact significance varies across different biodiversity receptors, the inherent risk is generally regarded as low, with the exception of specific concerns for certain species and habitats. For instance, impacts on habitats such as physical destruction and disturbance of vegetation are assessed as insignificant, with no residual impact after mitigation. However, for issues such as reduced habitat connectivity, the impact significance is moderate, and the residual impact is reduced to minor following mitigation (see Table 4-1 below).

Other impacts, such as vehicle collisions with herpetofauna and small mammals, have minor significance initially, but are reduced to insignificant after mitigation. Similarly, the risk of bird species colliding with solar panels is minor but becomes insignificant once mitigation measures are applied. The project also identifies potential minor impacts due to the creation of barriers to faunal movement and disturbance caused by noise, light, and vibration, all of which are mitigated to an insignificant level.

This assessment underlines the importance of ongoing monitoring and adaptive management to ensure that the residual impacts remain low and that biodiversity receptors are protected throughout the project lifecycle.

The BMP for operation focuses on those impacts considered to be of Minor – Moderate significance only, including:

- Impact 2: Reduced Habitat Connectivity
- Impact 3: Vehicle Collisions with Fauna
- Impact 4: Species Collision with Solar Panels
- Impact 5: Creation of barriers to faunal species movement

Insignificant impacts with embedded mitigation measures or those consider N/A (not applicable) are excluded as there is no significant need for further management measures.

TABLE 4-1 SUMMARY OF OPERATIONAL PHASE BIODIVERSITY IMPACTS

Impact	Biodiversity Receptor	Impact Significance (with embedded mitigation)	Residual impact (after mitigation)
Impact 1: Physical Destruction/Disturbance of Vegetation and Habitat	Habitats	Insignificant	None
Impact 2: Reduced Habitat Connectivity	Habitats, mammals, herpetofauna (reptiles, amphibians) and birds	Moderate	Minor
Impact 3: Vehicle Collisions with Fauna	Herpetofauna (reptiles, amphibians), and small mammals	Minor	Insignificant
Impact 4: Species Collision with Solar Panels	Threatened bird species	Minor	Insignificant
Impact 5: Creation of barriers to faunal species movement	Mammals, herpetofauna (reptiles, amphibians)	Minor	Insignificant
Impact 6: Introduction/spread of Invasive Alien Plants	N/A	N/A	N/A
Impact 7: Water and Soil Pollution	N/A	N/A	N/A
Impact 8: Disturbance caused by Noise, Light, Vibration	Mammals, herpetofauna (reptiles, amphibians) and birds	Insignificant	None
Impact 9: Dust Pollution	N/A	N/A	N/A

To avoid and/or reduce impacts to biodiversity, a proactive approach has been adopted to anticipate and avoid risks and impacts where possible. The typical steps in the mitigation hierarchy include:

- Identify and anticipate risks of potential adverse impacts, through analysis and stakeholder engagement;
- Avoid potential adverse impacts, applying an alternative analysis;
- Minimize or reduce the impacts, for example by reducing the physical footprint of a project;
- Restore or rehabilitate where possible, for example by providing alternative access to water sources that have been cut off by a project; and
- Compensate or offset remaining and unavoidable impacts.

4.3 OPERATIONAL PHASE BIODIVERSITY MITIGATION AND MANAGEMENT MEASURES

The biodiversity mitigation and management measures in Table 4-1apply to the operational phase of the Project and must be implemented as indicated.

4.3.1 MITIGATION FOR IMPACT 2: Reduced Habitat Connectivity

Habitat connectivity shall be managed during the operational phase as follows:

- Compensate for reductions in habitat connectivity through the habitat restoration/compensation plan (covered under the construction phase BMP.
- Implement appropriate monitoring, maintenance and aftercare of natural woodland/grassland habitats restored as part of the habitat restoration/compensation plan (covered under the construction phase BMP).
- Ensure that no new impermeable fences are implemented at the site.
- Maintain the integrity of impermeable fences.
- No new access roads to be developed.
- Access controls to be implemented to limit access to areas of high biodiversity sensitivity (natural grassland/woodland habitat) outside of the operational facilities.
- No additional clearance of vegetation and habitat to be permitted beyond that approved during the construction phase.
- Utilize lighting systems that minimize visual disturbance, including the use of low-intensity lights.
- Opt for lighting systems and light configurations that minimize light pollution and avoid attracting insects.
- Direct lighting downwards and away from nearby sensitive natural habitats.
- Minimize artificial lighting during any night-time maintenance operations.

4.3.2 MITIGATION FOR IMPACT 3: Vehicle Collisions with Fauna

During the operational phase, regular operating staff and vehicles may encounter wildlife, however this is expected to be infrequent based on limited vehicular activity anticipated during operation. Collisions with wildlife are expected to be rare. That being said, the following measures should be implemented for the operational site, with a focus on access roads:

- Restrict operational and maintenance crew vehicles to the use of only authorised access roads.
- Limit vehicle speed on non-paved and internal access roads to the site (set speed limit at 30 km/hr).
- Restrict maintenance activities as far as possible to day-time hours when visibility is good to reduce risk of vehicle collisions with wildlife.
- Install warning signs along the internal roads to alert drivers to potential faunal crossings where appropriate.
- To prevent impacts on any ground breeding birds that may try and establish themselves at the operational site, prevent them from breeding in the relevant areas in the first place. Suitable visual deterrents, such as colored ribbons attached to poles/sticks that move in the wind, may be used to scare ground-breeding birds before the start of the breeding period.
- Prevent the establishment of active nests during the primary bird nesting season on facilities and structures by closing openings and vents and checking vehicles and maintenance equipment before operation.
- Examine heavy equipment and plant stored on site before use in site maintenance, particularly after rainfall events when reptile and amphibian movements occur more often, to ensure use will not harm individuals that might be seeking temporary refuge under vehicles for example.

- Any injured animals are to be transported carefully but efficiently to a local vet for treatment as soon as possible.
- Avoid attracting animals to the site by minimizing lighting as far as possible, discouraging dumping of any food waste apart from through approved means. Collect and remove waste products and litter that could attract wildlife to these areas.

4.3.3 MITIGATION FOR IMPACT 4: Species Collisions with Solar Panels

Solar panels reflect horizontal polarized light which might be mistaken as water bodies to the perception of volant fauna (waterbirds in particular) and could result in collisions as they attempt to land on the solar panels. Waterbirds that potentially migrate over the Project area, may be at risk of injury due to collision with the panels, although mortalities are likely to be rare based on the available literature on the subject:

- The nature and magnitude of impacts to volant populations are generally related to the following three primary project-specific factors: location, size, and technology (Walston et al., 2016);
- Solar developments that have large footprints, locating in close proximity to sensitive habitats (e.g., wetlands, riparian vegetation, congregation spots) will pose a greater risk of bird and bat collisions with project structures (Lovich & Ennen, 2011; Walston et al., 2016);
- Information to quantify the mortality rates of bird and bat collision with solar developments has been very sparse in the literature (Kosciuch et al., 2020[4]);
- Bird morality due to solar farms in general is considered significantly lower than other infrastructure such as wind farms and glass windows in buildings, or the numbers of birds killed annually by domestic cats (Bennun et al. 2021, Bao Nguyen pers. comm., Tu Vuong pers. comm.); and
- Overall, the collision rate of volant fauna with solar developments are largely inconclusive and not currently well-understood.

The impacts of collisions are unlikely to be significant compared to the population sizes of the bird species in the Project area, which were found to be typically common resident and widespread species of raptors and passerines, with few/no true waterbirds recorded. The habitats in the Project area also do not provide suitable site for the congregation, feeding or breeding activities of avian species. Hence, magnitude of effect will therefore be 'small' and the overall significance of impact is likely to be relatively minor.

Despite the minor risk posed to aquatic bird species, there are several measures recommended to further manage this risk:

[4] The most comprehensive estimation of bird collision/mortality due to solar farms was provided by Smallwood (2022), who reviewed reports of fatality monitoring from 1982 to 2018 at 14 solar projects in California, the United States. Average bird fatality rate at PV projects was measured to be about 11.6 fatalities/MW/year and bat to be 0.06 fatalities/MW/year. The monitoring results of 14 solar developments showed that while it was more obvious that CSP plants kill more birds and bats than PV plants, there are no clear patterns in the relationship between the locations / habitats where the projects are located, size of the projects and the mortality rates. Most birds killed at solar projects were small-bodied, passerine birds (63% were less than 100g and only 22% were at least as large as rock pigeons), whereas water-dependent bird species (e.g., waterfowl) that have been considered vulnerable to PV array fatality due to the lake effects only represented about 11.2% of all fatalities (Kosciuch et al. 2020; Smallwood 2022).

- To avoid attracting prey species, vegetation within the solar farm should be cleared regularly and maintained as relatively short cover in order to discourage burrowing animals and other prey for birds.
- Collect and remove waste products and litter that could attract wildlife to the solar farm.
- Monitoring would be required to better understand behaviour and potential impacts on avifauna to inform suitable mitigation for the operational phase. It is recommended that an adaptive management and monitoring plan be prepared, with annual bat/bird carcass monitoring to take place (for at least the first year of solar farm operation), to determine whether and where additional mitigation may be necessary (such as the use of various type of deterrents, including visual, acoustic and chemosensory deterrents).

4.3.4 MITIGATION FOR IMPACT 5: Creation of barriers to faunal species movement

The solar farm will not pose a significant barrier to the movement and mobility of volant species such as birds and bats, however any fencing of the site may restrict the movement of low-flying species and especially small mammals and reptiles. Given the limited extent of the project, with most of the conservation important species concentrated within nearby Protected Areas outside of the development footprint, it is unlikely that Project will have any appreciable negative influence or population-level effect on species movement (magnitude of effect will therefore be 'small'). Still, it is important to consider key PBF animal species which have been found during the baseline surveys inside the development site (*Testudo graeca and Vormela peregusna*). In this respect, the following is recommended:

- Ensure that no new impermeable fences are implemented at the site.
- Maintain the integrity of impermeable fences.
- If operational monitoring results show that any site fences present a physical barrier to faunal movements, consider measures to improve permeability of fencing, such as the use of tunnels for tortoises and polecats, or replacement of fencing in strategic positions using other materials with appropriate spacing for example.
- Investigate opportunities to conserve, better manage or create suitable alternative habitats or enhancement of existing ones to support displaced species where applicable. This will be informed by operational phase monitoring of species.
- Implement the wildlife shepherding protocol (see **Annexure A** of the BMP) where species are trapped within the site and cannot easily escape by themselves.

5. BIODIVERSITY MANAGEMENT PLAN

The management and mitigation measures/actions identified in Chapter 4 for addressing impacts during the construction and operational phases, in accordance with the mitigation hierarchy, are detailed in Table 5-1 and 5-2, respectively). For each measure/action listed, the BMP tables provide the following information:

- **Item:** The identification code (ID) for the management measure/action;
- **Mitigation Measures:** A description of the management measure/action;
- **Timeline and Frequency:** The timing and frequency for implementing the measure/action;
- **KPI (Key Performance Indicator):** A quantitative compliance indicator or qualitative acceptance criteria used to assess the effectiveness of the management measure/action;
- **Responsibility:** The individual or team responsible for implementing the management measure/action.

TABLE 5-1 BIODIVERSITY MANAGEMENT PLAN FOR THE CONSTRUCTION PHASE

Impact	Management/Mitigation Measures	Mitigation Type	KPI	Timeline and frequency	Responsibility
Impact 1: Physical Destruction/Disturbance of Vegetation and Habitat	**Restrict activities to construction footprints** • Restrict all construction activities including soil stripping, vegetation clearing, earthworks, access road construction, grading, etc. to the footprint of individual facilities only and as per the approved construction plan. • Surrounding vegetation and natural grassland/steppe/woodland habitat must be protected by employing appropriate barrier fencing and/or other forms of demarcations. • No clearing or stripping of vegetation and topsoil is to take place unless this has been formally authorized and only for approved areas. • Only the vegetation that is necessary to be removed for construction purposes may be cleared, and where possible cut vegetation to ground level (e.g. in grasslands, steppes) instead of stripping areas entirely. • Establish avoidance and exclusion zones around known PBF reptile and mammal habitats to minimise risk of direct impacts. Clearly mark and communicate these zones to construction personnel to ensure compliance. • Avoid locating permanent infrastructure as well as temporary construction camps and material/equipment laydown areas within or near identified natural habitat (i.e. grassland, calcareous grassland and basic steppes, woodland) • Use existing access roads or upgrade existing roads wherever possible before considering new access road construction. • Properly working machinery must be engaged in the process of land preparation and execution of construction works, and the construction site must be secured in accordance with the conditions of the competent authority in Türkiye.	Avoid	All activities are restricted to the approved construction areas. Avoidance zones are established where necessary to protect PBF species.	During construction	All employees and contractors HSE and Sustainability Manager
	Manage vegetation clearance • The extent of areas to be cleared are to be clearly demarcated and marker out on the ground using appropriate flatting material as determined by the site manager.	Minimise	Vegetation removal limited to essential areas only. Existing roads prioritized for use.	During construction	All employees and contractors HSE and Sustainability Manager

Impact	Management/Mitigation Measures	Mitigation Type	KPI	Timeline and frequency	Responsibility
	• Clearing is to be to be carried out in a sequential manner and in a way that directs escaping wildlife away from clearing and into adjacent native vegetation or natural areas on their own without the need for human intervention as far as possible. • Cleared vegetation may be stockpiled in a manner that facilitates re-spreading or salvaging and does not impede vehicle, livestock or wildlife movement.				
	Soil and erosion management • Implement relevant construction standards to limit the disturbance and erosion potential for soils (e.g. 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' – DEFRA, 2009). • Measures to prevent erosion from excavated areas and soil stockpiles will be implemented. • Ensure that topsoil is returned and used in rehabilitation/habitat restoration as close to the site where it was originally removed (i.e. within a distance of 200 m or less) and not transported to and used in another location.	Minimise	Soil erosion is prevented. Topsoil is retained and used for restoration.	During construction	All employees and contractors HSE and Sustainability Manager
	Wildlife pre-construction surveys • Conduct pre-construction surveys where Project infrastructure is planned and disturbance of natural habitats is proposed (particularly natural grassland, steppe and woodland).	Avoid / Minimise	Pre-construction surveys completed; wildlife safely relocated.	Pre-construction	Biodiversity Specialist HSE and Sustainability Manager
	Restoration of habitats temporarily disturbed • Undertake progressive rehabilitation/restoration for natural habitats temporarily disturbed/affected, such that as works are completed, the affected areas are rehabilitated and restored as necessary. • Maintain the original soil layering and do not mix topsoil and subsoil layers. • Reinstate soils in the reverse order (subsoil, then topsoil). • Ensure that topsoil is returned and used in habitat restoration in the same general area of the site where it was originally removed (i.e. within a distance of 200 m) and not transported to and used in another location.	Restore	Habitat restoration plan implemented to specification.	Post-construction	All employees and contractors Biodiversity Specialist HSE and Sustainability Manager

Impact	Management/Mitigation Measures	Mitigation Type	KPI	Timeline and frequency	Responsibility
	• Soil erosion features will be stabilised via backfilling as appropriate. • Protect the reinstated bare soil surface with a physical barrier, such as a thin layer of mulch or geotextile/erosion control matting. • Avoid compaction of soils, for example though excessive vehicle tracking, and rip soils where compacted to allow for vegetation growth. • Where lands will be returned to agricultural production, no further requirements are recommended beyond soil reinstatement and basic landscaping to return the surface to pre-construction conditions. • Identify indigenous species for planting and suitable sources for seed and plants as appropriate (preferably using seed of local origin as far as possible, and only supplement with other seed where locally sourced seed is unavailable). • Identify commercial sources of seed / plants from local nurseries for example. • Encourage rapid re-vegetation through re-seeding using rapid growing, indigenous runner grasses that will form a secondary grassland habitat (meadow or pasture), with species selection using native/indigenous plants only (no exotic species) and using only a compatible species mix informed by the local soil and climate characteristics. • Direct seeding by broadcasting seed or hydro-seeding is recommended to immediately stabilise areas that are bare of vegetation cover within 2 months of the completion of works in these areas. • Care must be taken to utilise appropriate species for revegetating trenches where cables/pipelines have been buried (avoid selecting deep rooting plants/trees for example that could damage buried cables/pipes). • Temporary fencing or other appropriate barriers are to be erected where necessary to prevent entry to the area implemented in the short to medium term, to prevent livestock overgrazing and allow vegetation re-growth in order to stabilise the soil surface. • Control invasive and alien plant species that may colonise the reinstated habitat in accordance with the measures in this BMP.				

Impact	Management/Mitigation Measures	Mitigation Type	KPI	Timeline and frequency	Responsibility
	Habitat restoration/compensation for habitats permanently destroyed • Develop and implement a habitat restoration/compensation plan for of PBF qualifying habitats: Mediterranean xeric grassland, Perennial calcareous grassland and basic steppes, *Pinus nigra* woodland, towards meeting NNL of biodiversity. • Monitor success of restoration activities and manage adapatively as needed.	Restore / Compensate	Habitat compensation/restoration plan developed and implemented to specification.	Post-construction	Biodiversity Specialist HSE and Sustainability Manager All contractor and subcontractors
	Monitoring of *Astragalus lycaonicus* • This species will not be directly impacted by the project. However, it is located within the project's area of influence and may be indirectly affected. Ongoing monitoring to ensure its continued viability will suffice to meet conservation objectives.	Minimise	Monitoring of protected/threatened plant species implemented. No reduction in flora populations.	During construction, post-construction	All employees and contractors Biodiversity Specialist HSE and Sustainability Manager
Impact 2: Reduced Habitat Connectivity **AND** **Impact 5: Creation of Barriers to Faunal Movement**	**Habitat restoration/compensation for habitats permanently destroyed** • Habitat restoration/compensation plan to be developed and implemented (as per Impact 1 above), that takes into account compensating for reduced natural habitat connectivity.	Restore / Compensate	Habitat compensation/restoration plan developed and implemented to specification.	Post-construction	Biodiversity Specialist HSE and Sustainability Manager All contractor and subcontractors
	Wildlife-friendly fencing and barrier prevention • Install permeable fencing to allow for unimpeded small mammals and herpetofauna movement. • Avoid placing impermeable fences, except temporarily to protect reptiles/small mammals from entering construction areas. • Reduce the suitability of construction/work areas for key species, such as earthen embankments, bare slopes and temporary topsoil stockpiles, by covering or containing piles of soil, fill, brush, rocks and other loose materials and	Minimise	Permeable fencing installed. No unnecessary barriers installed. Temporary facilities removed after	Pre-construction, during construction	All employees and contractors HSE and Sustainability Manager

Impact	Management/Mitigation Measures	Mitigation Type	KPI	Timeline and frequency	Responsibility
	covering or hydroseeding soil stockpiles and slopes that are to be left temporarily open/exposed for an extended period of time (e.g. exceeding one week). • Prevent the establishment of active nests during the primary bird nesting season on standing plant and temporary facilities and structures by closing opening and vents and checking equipment before operation. • Any temporary excavations, fences or stockpiles of soil and materials must be removed from site once construction is complete.		construction is completed. Wildlife controls implemented.		
	Wildlife shepherding protocol • Wildlife shepherding protocol (see **Annexure A**) to be implemented where construction takes place, to check areas to be worked in prior to construction and remove or shepherd wildlife found on the construction site to safety in adjoining natural habitat (where these animals cannot safely exit the construction site by themselves).	Avoid / Minimise	Wildlife shepherding protocol implemented when necessary.	Pre-construction and during construction	All employees and contractors Biodiversity Specialist HSE and Sustainability Manager
Impact 3: Vehicle Collisions with Fauna	**Vehicle speed controls** • Limit vehicle speed on site for construction vehicles and vehicles accessing the site (set speed limit at 30 km/hr). • Place calming measures such as speed humps for vehicles as necessary. • Install warning signs along the roads to alert drivers to potential faunal crossings where appropriate.	Avoid / Minimise	Speed limits enforced. Traffic calming measures in place. No collisions with wildlife.	Pre-construction, during construction and operation	All employees and contractors HSE and Sustainability Manager
	Worker conduct and wildlife controls • Train workers on good conduct and enforce regulations to prevent hunting, trapping, or disturbing wildlife. • Implement the temporary fencing off of ditches, trenches and capping of pipes at nighttime to prevent wildlife movement onto the construction site. • Any excavations are not to be left open overnight, alternatively they will need to be securely covered or a means of escape for any animals that may become trapped will be provided, such as a wooden board or earthen ramp. • All open excavations are to be checked for the presence of animals each morning and immediately prior to backfilling of open excavations/trenches.	Avoid / Minimise	No incidents of wildlife harassment or illegal hunting, etc. Training / education programs implemented. Onsite wildlife controls implemented.	Pre-construction, during construction and operation	All employees and contractors HSE and Sustainability Manager

Impact	Management/Mitigation Measures	Mitigation Type	KPI	Timeline and frequency	Responsibility
	• Any injured animals are to be transported carefully but efficiently to a local vet for treatment as soon as possible.				
	Restricted vehicle movement and activity • Limit worker/staff and vehicle access to the authorized construction site only. • Place appropriate limits on the number of vehicle movements to and from the construction site. • Use existing access roads or upgrade existing roads wherever possible before considering any new access road construction. • Restrict vehicles to the use of only authorized access roads. • Restrict activities to day-time hours where possible when visibility is good and potential fauna collisions with vehicles can be more easily avoided • To reduce the risk of collision with wildlife resulting in injury/mortality, it is proposed to limit construction works during the breeding season for ground-breeding birds.	Avoid / Minimise	No unauthorized vehicle movements. Construction activities restricted as far as possible.	Pre-construction, during construction and operation	All employees and contractors HSE and Sustainability Manager
Impact 6: Introduction/Spread of Invasive Alien Plants (IAP)	**IAP management and monitoring plan** • Develop and implement an Invasive Alien Plant (IAP) control plan, including seasonal monitoring and control/eradication as necessary (informed by monitoring).	Minimise / Restore	IAP monitoring and management plan and program in place. Invasive species monitored and removed as necessary.	Pre-construction, during construction	All employees and contractors Biodiversity Specialist HSE and Sustainability Manager
Impact 7: Water and Soil Pollution	**Spill prevention and waste management** • Spill prevention plan and equipment in place, with training. • Secure chemical storage areas, implement spill response plans, and manage waste properly and according to national regulations.	Avoid / Minimise	No spills. Proper chemical/fuel storage implemented. Waste properly managed and disposed of.	Pre-construction, during construction	All employees and contractors HSE and Sustainability Manager
	Regular inspections and emergency response training • Conduct regular equipment inspections for leaks and ensure personnel are trained for spill responses.		Regular inspections carried out. Training completed.	Pre-construction,	All employees and contractors

Impact	Management/Mitigation Measures	Mitigation Type	KPI	Timeline and frequency	Responsibility
			No major spills reported.	during construction	HSE and Sustainability Manager
Impact 8: Disturbance Caused by Noise, Light, Vibration	**Controls on visual/light and noise disturbance** • Maintain temporary working areas as small as practicable and areas chosen for the storage of materials to avoid areas of high visual impact. • The construction site will only be floodlit when necessary for health and safety, and during night works. • Night works to be reduced as far as possible. • Implement buffer zones or exclusion areas around important bird nesting or animal foraging sites to minimize disturbance. • Reduce the intensity of construction works in the period from dusk to dawn (in the period April-October), when the activity of bats is at its highest. During this period, artificial lighting should be restricted only to the construction works zone, with the possibility of encasing the floodlights by protective lids in order to prevent the diffusion of light. • In order to reduce the levels of noise, equipment which is not being used must be turned off. • Staff and visitors must be warned not to disturb birds, especially during the nesting period where nests occur on the site or surrounds. • Minimize extended human presence near nesting birds (for example nest sites or nests identified during pre-construction surveys) during construction and protect sensitive habitat areas adjacent to work areas with temporary barriers or fencing to limit human foot-traffic. • Implement the temporary fencing off of ditches, trenches and capping of pipes at night-time to prevent wildlife movement onto the construction site. • Place information signs along the road in order to inform people of noise disturbance during working hours. • Monitoring noise and vibration levels regularly to ensure compliance with regulatory standards. • Implement construction practices that minimize noise and vibration disturbance, such as scheduling activities outside sensitive bird breeding periods or using noise barriers.	Avoid / Minimise	Wildlife controls in place. Noise controls implemented. Lighting controls implemented. Construction period restrictions implemented Noise levels monitored.	Pre-construction, during construction	All employees and contractors HSE and Sustainability Manager

Impact	Management/Mitigation Measures	Mitigation Type	KPI	Timeline and frequency	Responsibility
	• Monitor and keep in proper working condition all installed equipment, devices and work resources. • Use noise minimizing technology where possible. • Aim lights away from any adjacent sensitive habitats. Use of directional lighting to reduce light spill and prevent light increases in adjacent sensitive habitats such as bushes and wooded habitats. • Use low intensity lights where possible. • Use appropriate lighting that minimizes ecological and physiological effects on wildlife and also limits attraction of insects e.g. use of long-wavelength (warm white, orange, red and infra-red) light instead of short-wavelength (UV, cool white, blue and green LEDs). • Collect and remove waste products and litter from work areas that could attract wildlife to these areas (*see 'Pest Control' measures in 3.3.8.3).*				

TABLE 5-2 BIODIVERSITY MANAGEMENT PLAN FOR THE OPERATIONAL PHASE

Impact	Management/Mitigation Measures	Mitigation Type	KPI	Timeline and frequency	Responsibility
Impact 2: Reduced Habitat Connectivity **AND** **Impact 5: Creation of Barriers to Faunal Movement**	**Habitat restoration/compensation for habitats permanently destroyed** • Habitat restoration/compensation plan to be developed and implemented (as per Impact 1 for the construction BMP), that takes into account compensating for reduced natural habitat connectivity. • Implement appropriate monitoring, maintenance and aftercare of natural woodland/grassland habitats restored as part of the habitat restoration/compensation plan (covered under the construction phase BMP).	Restore / Compensate	Habitat compensation/restoration plan developed and implemented to specification. Monitoring and maintenance undertaken for restored habitats.	Post-construction Operation	Operator / Owner
	Wildlife-friendly fencing and barrier prevention • Ensure that no new impermeable fences are implemented at the site. • Maintain the integrity of impermeable fences.	Minimise	Permeable fencing installed and maintained.	Operation	Operator / Owner

Impact	Management/Mitigation Measures	Mitigation Type	KPI	Timeline and frequency	Responsibility
	• If operational monitoring results show that any site fences present a physical barrier to faunal movements, consider measures to improve permeability of fencing, such as the use of tunnels for tortoises, or replacement of fencing in strategic positions using other materials with appropriate spacing.		No unnecessary barriers installed.		
	Wildlife controls • Access controls to be implemented to limit access to areas of high biodiversity sensitivity (natural grassland/woodland habitat) outside of the operational facilities. • No additional clearance of vegetation and habitat to be permitted beyond that approved during the construction phase. • Utilize lighting systems that minimize visual disturbance, including the use of low-intensity lights. • Opt for lighting systems and light configurations that minimize light pollution and avoid attracting insects. • Direct lighting downwards and away from nearby sensitive natural habitats. • Minimize artificial lighting during any night-time maintenance operations.	Avoid / Minimise	Access controls implemented. Restrictions on additional activities. Appropriate lighting design.	Operation	Operator / Owner
	Wildlife shepherding protocol • Wildlife shepherding protocol (see **Annexure A**) implemented where animals found on the site cannot safely exit the site by themselves.	Minimise	Wildlife shepherding protocol implemented when necessary.	Operation	Biodiversity Specialist Operator / Owner
Impact 3: Vehicle Collisions with Fauna	**Vehicle speed controls** • Limit vehicle speed on site for construction vehicles and vehicles accessing the site (set speed limit at 30 km/hr). • Install warning signs along the internal roads to alert drivers to potential faunal crossings where appropriate. • Any injured animals are to be transported carefully but efficiently to a local vet for treatment as soon as possible.	Avoid / Minimise	Speed limits enforced. Traffic calming measures in place. No collisions with wildlife.	Operation	Operator / Owner
	Worker conduct and wildlife controls • To prevent impacts on any ground breeding birds that may try and establish themselves at the operational site, prevent them from breeding in the relevant areas in the	Avoid / Minimise	No incidents of wildlife harassment or illegal hunting, etc.	Pre-construction, during construction	Operator / Owner

Impact	Management/Mitigation Measures	Mitigation Type	KPI	Timeline and frequency	Responsibility
	first place. Suitable visual deterrents, such as colored ribbons attached to poles/sticks that move in the wind, may be used to scare ground-breeding birds before the start of the breeding period. • Prevent the establishment of active nests during the primary bird nesting season on facilities and structures by closing openings and vents and checking vehicles and maintenance equipment before operation. • Examine heavy equipment and plant stored on site before use in site maintenance, particularly after rainfall events when reptile and amphibian movements occur more often, to ensure use will not harm individuals that might be seeking temporary refuge under vehicles for example. • Avoid attracting animals to the site by minimizing lighting as far as possible, discouraging dumping of any food waste apart from through approved means. Collect and remove waste products and litter that could attract wildlife to these areas.		Training / education programs implemented. Onsite wildlife controls implemented.	and operation	
Impact 4: Species Collision with Solar Panels	**Reduce risk of solar panel collisions for waterbirds** • To avoid attracting prey species, vegetation within the solar farm should be cleared regularly and maintained as relatively short cover in order to discourage burrowing animals and other prey for birds. • Collect and remove waste products and litter that could attract wildlife to the solar farm. • Monitoring would be required to better understand behaviour and potential impacts on avifauna to inform suitable mitigation for the operational phase. It is recommended that an adaptive management and monitoring plan be prepared, with annual bat/bird carcass monitoring to take place (for at least the first year of solar farm operation), to determine whether and where additional mitigation may be necessary (such as the use of various type of deterrents, including visual, acoustic and chemosensory deterrents).	Minimise	Vegetation maintenance to limit cover. Waste/litter control. Monitoring.	Operation	Biodiversity Specialist Operator / Owner

5.1 ROLES AND RESPONSIBILITIES

The ultimate responsibility for implementing the construction and operation phase BMP rests with the developer, however specific technical tasks and measures will be delegated to the Contractor and subcontractors / independent experts likely to be involved in BMP implementation and monitoring.

Key roles and responsibilities are as follows:

TABLE 5-3 ROLES AND RESPONSIBILITIES

Role	Overall responsibilities	Specific responsibilities
General Manager /Deputy General Manager	• Management will ensure sufficient and qualified resources are allocated on an ongoing basis to achieve effective implementation of actions, measures and monitoring activities under Fiba's responsibility. • This will include the selection of specialized contractor(s) for specific tasks to be carried out as part of the implementation of this Management Plan such as (but not limited to) biodiversity management surveys, monitoring activities and data analysis and reporting.	• Final approval of this Management Plan and subcontractors' • plans/procedures for the Project. • Taking appropriate actions to address major Non-Conformities • based on monitoring reports, performance monitoring reports and on Fiba Renewables Energy HSE and Sustainability Manager proposed approach.
HSE and Sustainability Director /Manager	• Ensuring that this Plan is up to date and appropriate to the nature and scale of the • Project and ensuring that this Management Plan is implemented effectively. • Collecting, organizing and reviewing monitoring data and performance • monitoring reports provided by the specialized contractor(s) and providing summary results of such reports to Management, to stakeholders and to the Lenders.	• Ensuring that action/measures and monitoring activities directly under • Fiba responsibilities are carried out timely and adequately according to this Management Plan requirements. • Addressing Non-Conformities through the definition of Preventive/Corrective actions proposing to Management, if necessary, amendments and/or updates to this Management Plan and issuing plan revisions. • Bringing major Non-Conformities immediately to the attention of • Management.

Role	Overall responsibilities	Specific responsibilities
All contractor and subcontractors	• Effective execution of the specific tasks assigned in conformity with this • Management Plan and with contractual arrangements. • Respect of EHS requirements included in the ESMS. • • Agree with the timing and logistics of the monitoring activities.	• Provide relevant monitoring data and monitoring reports to as • indicated in this plan. • May propose changes and integrations to the monitoring • activities included in the Management Plan. The proposed changes shall be evaluated and approved by HSE and Sustainability Manager and by Management.
All employees and contractors	• Comply with environmental management requirements. • • Report any activities which are causing unnecessary biodiversity issues.	• Give evidence that the relevant mitigation measures identified in the • current biodiversity management plan are being properly considered, implemented and monitored during execution of the works.
Biodiversity Specialist	• Consult with on an ad hoc basis, as required, to assist with implementing key measures of the BMP	• Support with implementing plans and programs according to the BMP; • Assist with developing supporting plans and protocols; • Onsite training on implementation of the BMP and supporting plans and protocols; • Adhoc support onsite or remotely via phone/email as necessary.

5.2 MONITORING ACTIONS

The following table outlines the monitoring activities identified for biodiversity (BIO) management during both the construction and operation phases. The purpose of these monitoring activities is to ensure that residual impacts are controlled and that the mitigation measures/actions have been effective.

For each monitoring activity listed, the table provides:

- **Item:** The identification code (ID) for the monitoring activity;
- **Monitoring Activity:** A description of the monitoring activity;
- **Timeline and Frequency:** The timing and frequency of the monitoring activity;
- **KPI (Key Performance Indicator**): Regulatory limit values or qualitative acceptance criteria to be met;
- **Responsibility:** The person or team responsible for conducting the monitoring activity;
- **Status:** The current progress of the monitoring activities.

TABLE 5-4 MONITORING ACTIONS FOR CONSTRUCTION AND OPERATIONAL PHASE

Monitoring Reference Number	KPI (with target)	Metric	Timing	Frequency	Monitoring measure	Responsibility
PRE-CONSTRUCTION MONITORING						
BMP-1	All (100%) of pre-construction wildlife surveys have been completed prior to construction works commencing.	Number of surveys complete compared to required number	Before construction	Once-off	• Pre-construction survey reports • Audit	All contractor and subcontractors HSE and Sustainability Manager
BMP-2	All (100%) of temporary works are demarcated and established in appropriate areas as per the site plan.	Percentage of work areas demarcated prior to construction	Before construction	Once-off	• Site inspection (visual assessment) • Audit	All contractor and subcontractors HSE and Sustainability Manager
BMP-3	Training requirements have been identified and a training schedule is kept current.	Training schedule available or not	Before construction / During construction	Prior to commencing work on site	• Audit • Training needs assessment and training matrix	All contractor and subcontractors HSE and Sustainability Manager
CONSTRUCTION MONITORING						
BMP-4	All (100%) of employees accessing the site have received the necessary induction and generic training (and any specialized training) as required.	Percentage of employees having received training	During construction	Prior to commencing work on site	• Audit • Induction / training register	All contractor and subcontractors HSE and Sustainability Manager
BMP-5	The spread and introduction of IAS on the construction site has been actively controlled.	Extent or percentage cover of the site by IAS	During construction	Weekly	• Site inspection (visual assessment) • IAS survey and report	All contractor and subcontractors HSE and Sustainability Manager
BMP-6	100% avoidance of adjacent natural habitats outside of the construction zone.	Extent (area) of natural habitats	During construction	Daily	• Site inspection (visual assessment) • Audit	All contractor and subcontractors HSE and Sustainability Manager

Monitoring Reference Number	KPI (with target)	Metric	Timing	Frequency	Monitoring measure	Responsibility
BMP-7	No stripping / clearing (zero %) of natural vegetation (e.g., woodland / forest / grassland/steppe) takes place outside of the authorized construction footprint.	Extent (area) of natural vegetation	During construction	Daily	• Site inspection (visual assessment) • Audit	All contractor and subcontractors HSE and Sustainability Manager
BMP-8	Zero spill / contamination incidents.	Number of incidents reported	During construction	Daily	• Site inspection • Audit	All contractor and subcontractors HSE and Sustainability Manager
BMP-9	Zero incidents of non-compliance.	Number of incidents reported	During construction	Daily	• Audit • Non-compliance register	All contractor and subcontractors HSE and Sustainability Manager
BMP-10	All (100%) of stockpile areas agreed in advance of works within approved areas only.	Number of stockpiles within agreed locations	During construction	Weekly	• Site inspection (visual assessment) • Photographic evidence • Stockpiles map	All contractor and subcontractors HSE and Sustainability Manager
BMP-11	No uncontrolled surface runoff or soil erosion.	Number of erosion incidents Extent of soil erosion	During construction	Daily	• Site inspection (visual assessment) • Photographic evidence • Incident reporting	All contractor and subcontractors HSE and Sustainability Manager
BMP-12	Rehabilitation and/or restoration plan(s) prepared prior to completion of works.	Plan prepared	Prior to completion of construction works	Once-off	• Rehabilitation/restoration plan(s) • Audit	All contractor and subcontractors HSE and Sustainability Manager
POST-CONSTRUCTION MONITORING						
BMP-13	100% of temporary works have been decommissioned, removed and these areas closed once construction has been completed.	Extent (area) of temporary works	After completion of works	Once-off	• Site inspection (visual assessment) • Photographic evidence • Audit	All contractor and subcontractors HSE and Sustainability Manager

Monitoring Reference Number	KPI (with target)	Metric	Timing	Frequency	Monitoring measure	Responsibility
BMP-14	Post-construction habitat reinstatement completed to a suitable standard (e.g., surfaces stable with no evidence of erosion, >90% vegetation cover achieved and maintained).	Percentage vegetation cover	Within 2 months of completion of works	Once-off	• Site inspection (visual assessment) • Photographic evidence • Habitat/vegetation survey and mapping • Audit	All contractor and subcontractors HSE and Sustainability Manager
BMP-15	100% native plants used in recultivation / revegetation (unless areas are returned to agricultural production).	Percentage or number of native vs exotic plants	Within 2 months of completion of works	Once-off	• Site inspection (visual assessment) • Photographic evidence • Species list • Audit	All contractor and subcontractors HSE and Sustainability Manager
OPERATIONAL MONITORING						
BMMP-16	100% avoidance of adjacent natural habitats outside of the maintained area.	Extent (area) of natural habitats	During maintenance activities	Once-off	• Site inspection (visual assessment)	Operator
BMMP-17	Monitor avian and bat collision incidents near solar panels.	Post-construction fatality monitoring based on surveys	During operation	Monthly	• Annual monitoring report • Audit	Operator
BMMP-18	Annual monitoring report for birds and bats compiled as per the ABBMP requirements.	Monitoring report available or not	During operation	Annually	• Annual monitoring report	Operator
BMMP-19	Appropriate adaptive management implemented as required and informed by operational monitoring.	Adaptive management actions register available or not Number of adaptive management actions implemented	During operation	Monthly Annually	• Annual monitoring report • Records of actions • Site inspection (visual assessment) • Audit	Operator

5.3COMPLIANCE AND REVIEW

5.3.1.1 SITE INSPECTIONS

The E&S Officer will be responsible for the implementation of an appropriate routine inspection and monitoring programme during the construction phase, to ensure works are being carried out in accordance with the BMP and to identify and implement any corrective actions or possible improvements as necessary.

Routine inspections will be carried out on a daily and weekly basis by the E&S Officer accompanied by the Site Manager, to ensure all controls to prevent environmental impacts are in place, relevant to the construction activities taking place at the time. This will ensure that the works are undertaken in compliance with the BMP and any subsequent updates to this document.

A written record of inspections will be maintained or available on-site during the construction phase. The following periodic inspection regime will be implemented:

- Daily general visual inspections of construction activities by the E&S Officer or a suitably qualified and competent person as delegated by the E&S Officer;
- Daily inspection checks will be completed on all plant and equipment by the Contractors / Subcontractors;
- Monthly site inspections by the E&S Officer during the construction phase; and
- Quarterly site inspections by the E&S Officer after construction for a period of one year following the completion of the construction phase.

5.3.1.2 ENVIRONMENTAL COMPLIANCE

The following definitions shall apply in relation to the classification of Environmental Occurrences during construction phase:

Environmental Near Miss: An occurrence which if not controlled or due to its nature could lead to an Environmental Incident.

Environmental Incident: Any occurrence which has potential, due to its scale and nature, to migrate from source and have an environmental impact beyond the site boundary.

Environmental Non-Compliance: Non-fulfilment of a requirement and includes any deviations from established procedures, programs and other arrangements related to the EMP.

5.3.1.3 AUDITING

Both the Client and the E&S Officer will be required to demonstrate how the requirements of the BMP are being complied with during construction, as part of a construction phase auditing programme.
In terms of audits, the internal environmental site audits performed during the construction (monthly basis) shall include biodiversity aspects, with a key focus on monitoring the KPIs in *section 5*, specifically. The following shall be undertaken:

- Internal monthly audits and bi-monthly external audits for the construction;
- Pre-prepared audit protocols will be used that reflect the specific requirements of the BMP;
- Audits shall include the in-field inspection findings and review of project documentation;

- Conduct interviews with project Stakeholders and any interested/affected parties, as appropriate;
- These will be performed to determine the underlying causes of non-compliance;
- Audits will be carried out by contractor staff or alternatively by external persons acting on their behalf;
- An independent, impartial and objective approach is to be adopted;
- Conducted at planned intervals (monthly frequency) to determine whether the BMP is being properly implemented and maintained;
- The results of the audits will be communicated regularly to Project management personnel; and
- A monthly audit report will be prepared and distributed;
- A Corrective Action Plan will be prepared following the audits with corrective actions as per the Corrective Action Procedure (below).

A final close-out audit will be undertaken within one month of completion of all construction activities and works, including decommissioning and closure of temporary works and camp sites, etc. Any remaining non-compliance issues will need to be documented and addressed within a period of one month (unless otherwise stated in the corrective action plan – see procedure below).

5.3.1.4 CORRECTIVE AND PREVENTIVE ACTION PROCEDURE

A corrective action is implemented to rectify an environmental non-compliance problem identified through site inspection, incident reporting, complaints reporting and auditing procedures, and will be implemented by the Construction Manager, as advised by the E&S Officer.

A Corrective Action Notice will be used to communicate the details of the action required to the main contractor who will then be tasked with developing and implementing a Corrective Action Plan.

A Corrective Action Plan (CAP) must be prepared which details the non-compliance issue, the location and corrective measures that will be taken to minimize the impact and prevent it from occurring again. Included in the CAP will be individual corrective actions, responsibilities, key resources and timeframes for implementing key actions to resolve issues of non-compliance, as well as any required maintenance, monitoring and follow-up. Once actions have been completed and closed, this will need to be reflected immediately in the revised CAP.

Examples of non-compliance may include but are not necessarily limited to the following:

- Failure to respect the constraint areas defined in the BMP for the Project Area;
- Breach of an environmental standard;
- Breach of the Measures proposed to minimize on-site impacts on fauna;
- Commencement of works without an approved risk assessment and method statement that covers environmental issues;
- No review of risk assessment and method statements following any significant changes in activities or site conditions;
- Works or activities taking place without relevant and valid permits or licenses;
- Failure to comply with chemical storage and/or handling requirements;
- Un-containable or uncontrollable spills of fuels or chemicals;

- Works being carried out that are outside the scope defined within the Biodiversity Management Plan.

In the case of severe non-compliance or repeated incidences of non-compliance, The Client has the right to stop all works until necessary corrective actions are taken by the EPC Contractor.

The CAP will be maintained onsite at all times and will be provided to external auditors upon request.

5.4 REPORTING REQUIREMENTS

The following reporting requirements apply for the EPC Contractor:

- Incident reporting;
- Emergency response reporting;
- Records of annual emergency response training exercises;
- Biannual reports on KPIs and performance trends;
- Monthly reports of relevant training activities completed and attendance registers to be maintained;
- Daily/Weekly/Monthly reports of site inspection activities;
- Audit reports;
- Inspection logs and status of non-compliances.

5.5 RECORD KEEPING & DOCUMENT CONTROL

A record-keeping system shall be used to control all records and documents so that they are:

- Easy to retrieve and identify and are maintained in an orderly fashion;
- Current, accurate, legible, and dated, and that the dates should include revision dates when appropriate;
- Relevant/applicable and satisfy regulatory and/or legislative requirements; and
- Retained for a specified time period – Retention of records may be regulated by legislative or regulatory policies;

Records are to be kept of all required activities and incidents, which must be readily available for inspection at any time and which are to include the following:

- All permits and licenses;
- Register of relevant environmental legislation;
- Register of relevant environmental consents;
- All incidents reported;
- Internal and external audit reports and corrective action plans;
- Site inspection reports;
- Monitoring reports;
- Records of successful and unsuccessful implementation of mitigation measures;
- Site inductions;
- Training records;
- Tool box meetings and other training records of attendance;
- MSDS (Material Safety Data Sheets).

The construction BMP will be regularly reviewed and updated by the E&S Officer after any change in the context in which the Project operates during the construction phase.

Urgent updates in line with the principle of 'adaptive management' can be the responsibility of the E&S Officer, however any material changes to intervention design, the timing of monitoring activities, etc. should be made in consultation with a third-party consultant to ensure accountability.

Any and all changes made to the BMP will be made in the master document and revision numbers and dates provided to track version numbers as part of the EPC Contractor's data and document management system. A summary document should also be produced that summarizes the important changes made to the document for the different version numbers and who authorized these changes.

A copy of the documents / folders shall be kept at the Site offices for the duration of the works and will be available at all times for review.

6. ANNEXURES

6.1 ANNEXURE A. WILDLIFE SHEPHERDING PROTOCOL

6.1.1 PURPOSE

The main purpose of this protocol is to assist with the handling and shepherding of wildlife that may interact with the construction site during the construction phase of the solar power plant project. There are many situations where it may be necessary to restrain and handle wildlife by hand and many species of animals are capable of inflicting serious injury to themselves or those handling them, therefore it is of the utmost importance that handlers be familiar with the correct handling and restraint techniques during the transfer of animals away from the construction site, where necessary.

6.1.2 KEY REFERENCES

This protocol has been based largely on the following documents:

- Ottawa, 2015. *Protocol for wildlife protection during construction.* August 2015. Available online at: Protocol for Wildlife Protection during Construction (ottawa.ca)
- WCS, 2021. *Guidelines for the safe handling of wildlife and wildlife products during counter-wildlife trafficking enforcement operations in Asia*. January 2021. Available online at: Microsoft Word - Enforcement operations wildlife safety guidelines_20.11.2021.docx (cites.org)
- WWF, 2021. *Translocations and animal handling.* September 2021. Available online at: network_standard_en_translocations_animal_handling_vsep2021.pdf (panda.org)
- CH2M Hill Engineers Inc., 2017. *Wildlife Handling Guidelines.* December 2017. Available online at: wildlife_handling_guidelines.pdf (ca.gov)
- Department of Biodiversity, Conservation and Attractions, 2017. *Standard Operating Procedure: Hand restraint of wildlife*. Government of Western Australia. Version 1.1. October 2017. Available online at: SOP - SCB for TSSC (dpaw.wa.gov.au)

6.1.3 WILDLIFE HANDLING AND SHEPHERDING PROTOCOL

6.1.3.1 GENERAL GUIDELINES ON WILDLIFE ENCOUNTERS

- Do not harm any wildlife.
- Stop work immediately if any protected species are seen in or near the work site. Take a photograph, if possible, to confirm the sighting, and contact the E&S Officer (biologist/ecologist).
- Make sure to maintain a safe distance from the animal and encourage it to move away from the work area with loud noises, arm waving, clapping, or a push broom. Contact the E&S Officer or a veterinarian for assistance if needed.
- Construction staff should refrain from handling or attempting to contain wildlife unless the animal is in immediate danger or injured and cannot be rescued by trained personnel.
- However, it is probable that wildlife will be encountered during the construction process at some stage. After dark, the wildlife may come back to the area in search of the habitat that once existed. By managing the site correctly, it will lessen the likelihood of

wild animals re-entering, and daily checks of the site before commencing any activity will reduce the possibility of injury to any creatures that have strayed in during the night.

- Animals should always be approached in a calm and quiet manner.
- If an animal is entrapped, measures shall be taken to free the animal if feasible or work with construction crews to free the animal while complying with Project safety regulations, and released a safe distance away from the Project into appropriate habitat.

6.1.3.2 HANDLING WILDLIFE

- If the animal cannot be easily freed, or the animal is too large or dangerous for monitors to handle, construction staff shall contact and work with animal control or other qualified party to obtain assistance for the animal as soon as possible.
- Entrapped and/or released wildlife shall be documented in daily monitoring reports.
- Hand restraint is stressful for animals and so it is essential that handling time is kept to a minimum. Animals should be transferred into holding bags as soon as possible.
- The handler must know where and how to grasp the animal. When restraining an animal by hand, the force applied and technique should be appropriate for the species in question. The animal needs to be grasped firmly enough to prevent struggling, but gently enough to avoid the risk of suffocation or damaging limbs.
- Handling animals does not always go as planned so it is necessary to be sensitive, responsive and adaptable. Prolonged, stressful restraint should not be performed and signs of stress should be considered (see Table 5-1). Other forms of restraint (e.g. anaesthesia) may then become be more suitable to help prevent injury to the animal and handler.
- When capturing/relocating animals, cover larger animals with a towel or blanket and place in a cardboard box and/or hessian bag, place smaller animals in a cotton bag, tied at the top.
- After removal of the individuals from the construction zone, the area that will be disturbed adjacent to natural habitats during construction and at project specific locations should be fenced off appropriately to exclude re-entry by wildlife.
- Where encountered, reptiles and amphibians will be collected prior to construction and moved to a suitable natural habitat outside of the construction area by suitably trained and experience staff, far enough away from the construction zone to limit the chance of them immediately re-entering the construction area.
- When provoked, snakes typically will seek refuge or attempt to flee, only resorting to defending themselves when they have no other option. If a snake is found in the work area, it should be gently herded out to a safe location. Species considered to be dangerous or poisonous/venomous (such as snakes) are to be handled by experienced and trained professionals only.

TABLE 6-1 TYPICAL SIGNS OF ANIMAL STRESS PER FAUNAL GROUP

Animal Group	Signs of Stress
Birds	• Vocalisation • Excessive struggling • Defecation • Increase in heart rate • Panting/heat stress
Reptiles and Amphibians	• Excessive struggling • Gaping of the mouth • "Swimming" in the air (turtles/tortoises) • Panting/heat stress • Self-biting
Mammals	• Vocalization • Clenching of teeth • Self-biting • Attempts to escape • Increase in heart rate • Panting/heat stress • Animal is limp or closes its eyes • Aggression • Urination/defecation • Excessive struggling • Cyanosis (bluing) of the nose and/or lips
Macropods	• Vocalisation • Attempts to escape • Teeth grinding • Excessive licking • Increase in heart rate • Panting/heat stress • Excessive salivating

Source: Department of Biodiversity, Conservation and Attractions (2017)

- Where encountered, reptiles and amphibians will be collected prior to construction and moved to a suitable natural habitat outside of the construction area by suitably trained and experience staff, far enough away from the construction zone to limit the chance of them immediately re-entering the construction area.
- When provoked, snakes typically will seek refuge or attempt to flee, only resorting to defending themselves when they have no other option. If a snake is found in the work area, it should be gently herded out to a safe location. Species considered to be dangerous or poisonous/venomous (such as snakes) are to be handled by experienced and trained professionals only.
- Assess the animal to determine the most suitable hand restraint method (see Table 5-2). Determining the most suitable hand restraint method for a species will depend on a number of factors.
- A post-clearing report from the ecologist must be compiled that records the details of key actions taken and details of the species, sex, age, general health and numbers removed/relocated, the date, the relocation areas selected and estimated effectiveness and success of rescue and relocation efforts as well as any complications and further recommendations.

TABLE 6-2 SUITABLE HANDLING METHODS FAUNAL GROUP

Animal Group	One-handed hold	Two-handed hold	Three-finger hold	Pistol grip	Tail grab	Scruffing	Cupping	Ringers hold	Reverse ringers hold
Birds	✓(small)	✓(medium to large)	✓	X	X	X	✓(small)	✓(small)	✓(small)
Amphibians	✓	✓	X	X	X	X	✓	X	X
Snakes	X	✓	✓	X	✓	X	X	X	X
Lizards	✓ (small to medium)	✓	✓(small to medium)	X	✓(large)	X	✓(small)	X	X
Crocodiles	X	✓	X	X	✓	X	X	X	X
Turtles	X	✓	X	X	X	X	X	X	X
Bats	✓(small)	✓(medium to large)	✓	X	X	X	✓(small)	X	X
Macropods	X	✓	✓(small to medium)	✓(small to medium)	✓	X	X	X	X
Rodents	✓(small)	✓	✓(small to medium)	X	X	✓(small, 2nd hand to support with large)	✓(small)	✓(small)	X
Mammals	✓(small to medium)	✓(small to medium)	✓(small to medium)	✓(small to medium)	✓(medium to large)	X	✓(small)	✓(small)	X

Source: Department of Biodiversity, Conservation and Attractions (2017)

Approved methods to be used include:

One-handed hold, which is suitable for small birds, amphibians, small to medium lizards, small bats, small rodents and small mammals. It involves the whole animal being restrained in a single hand, using the thumb and index finger to restrain the head.

Two-handed hold, which is most suitable for any medium-sized animal. Both hands are used to hold the animal, usually one to restrain the head and the other to support the body and control the legs/tail. The head is held away from the body, and particularly the face, of the handler.

Three-finger hold, suitable for small to medium mammals, reptiles and birds. It is used to restrain the head of an animal and can be useful for poisonous/venomous snakes for example. The thumb and middle finger are placed on either side of the head and the index finger placed on top of the head.

Pistol grip, is a variation of the three finger hold and is suitable for small to medium mammals and is useful for pacifying agitated animals. The ring and little fingers are placed under the chin, with the middle and index finger going over the head to cover the eyes and the thumb going behind the head to restrict head movement. This is best done while the animal is still in the bag and then exposing the head once the animal is restrained. For smaller animals, just the index finger over the head is adequate to cover the eyes.

Tail grab, suitable for macropods, snakes (caution is required with certain venomous and large muscular snakes), large lizards (with caution to avoid tails breaking off) and medium/large mammals. It involves grabbing the base of the tail where it is thick and muscular and lifting the animal off the ground directing the legs away from the handler. The animal can then be placed into an appropriate handling bag.The animal should not be restrained in this manner for extended periods of time without supporting the body. Care should be taken to minimise the risk of spinal injury when using this technique. DO NOT use this hold for rodents as it may cause detachment of the tail sheath.

Scruffing, is suitable for small to medium rodents and small mammals. Using the thumb and index finger, the loose skin on the scruff of the neck is grasped. For medium sized animals the other hand is required to support the body. This technique is not suitable for species with delicate skin.

Cupping, is suitable for most small birds, amphibians, small to medium lizards, small bats and small rodents. It involves the whole animal being enclosed in one or two hands. Not suitable for species that may bite, sting or scratch hands.

Ringers hold, is suitable for small birds and can also be used on small rodents and mammals. This is generally a one-handed bird restraint method which involves the animal being caged in the fingers with the head protruding between the thumb and index finger or between the index finger and middle finger. The non-dominant hand is usually used to hold the animal.

Reverse ringers hold, is suitable for small birds, but only for those that do not have sharp beaks as the head is not properly restrained. It is a one-handed bird restraint method in which the bird is grasped with its back and closed wings against the palm of the hand, with the head facing downward towards the handler's wrist.

6.1.3.3 AVOIDING INJUDRY AND DISEASE

- Injuries caused by animals, either domestic or wild, can lead to severe infections and can even spread diseases.
- It is essential to receive medical care right away if you have been attacked or harmed by a wild or domesticated animal.
- Many animals have defence mechanisms or delicate structures which need to be considered when handling them. Some guidance on avoiding injuries:
- Skin: Skin is an important organ. Damage to the skin of an animal leaves it susceptible to possible bleeding and infection. Some species such as the secrete a toxic substance from their skin whilst other amphibians have very delicate skin that is permeable enough to allow the absorption of chemicals therefore clean, moist hands are required when handling.
- Tail: The tail of some reptiles can cause injury if not restrained. A defence mechanism of some reptiles (e.g. skinks, geckoes) is tail autonomy which involves the dropping and later regrowing of the tail. The loss of the tail in some species results in a loss of the animal's fat reserves and therefore decreases their chance of survival. Some rodents have fragile tails that can be broken or the skin sheath removed if roughly handled or handled by the tail.
- Feathers: Damage to, severe loss or disruption of the feathers may impact the bird after release and reduce the ability to fly as well as its ability to regulate its temperature.
- Teeth/Beak: Any animal with teeth and/or the ability to open its mouth widely is capable of inflicting a bite. Many species will try and bite to defend themselves and it is therefore important to have control of the head at all times.
- Wings: Some species of bird have wings which they may use as defence (e.g. swans, pelicans) and if a handler is hit, injury can result.
- Talons/Claws: For species whose claws/talons are their main defence (e.g. birds of prey), it is important to have control of these first.
- Legs: Some species utilise their powerful legs in response to being handled. Legs cannot only cause injury to the handler but also to the animal if not controlled properly. For example macropods can traumatise their spines if allowed to kick out with their hind

legs while being held by the tail. Some species such as storks and waders have long delicate legs which will require careful handling.

- Venom glands: Some species are venomous and use their venom to protect themselves (e.g. venomous snakes, toads, invertebrates).
- Always carry a first aid kit in your vehicle and be aware of your own safety and the safety of others as well as the animals when handling.
- Maintaining hygiene is very important and precautions must be taken to prevent the risk of cross infection between animals and from animals to humans. Sick or injured animals require higher hygiene considerations due to the possibility of zoonosis.
- Personnel must take precautions to minimise the risk of disease transmission to protect themselves, their families and the public”
- All materials and equipment used in the capture, holding transport and manipulation of animals must be cleaned and maintained in a way that minimises the assessed risk of disease transmission.
- Contaminated equipment must be disinfected between animals and between locations where the equipment is used.
- All dead animals will be handled only while wearing gloves.

6.1.4 USEFUL EQUIPMENT

Useful equipment for wildlife encounters:

- Work gloves;
- Other personal protection equipment (PPE) may include:
    - Long sleeve clothing: to reduce the risk of cuts and scratches to the arms and legs
    - Goggles/face mask/safety glasses: to protect eyes from animals with long beaks or animals which secrete substances
    - Gloves (leather): can be useful for animals with sharp claws, teeth and spines or venom glands. Their use is a personal choice as they can decrease tactile sensation.
    - If the animal is venomous, additional PPE is required for removal
- Push broom for gently redirecting small mammals, reptiles, or amphibians;
- Clean (uncontaminated) towels or blankets and containers such as plastic boxes, cat carriers, and a large bin or garbage can for capturing and transporting injured or orphaned wildlife.

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