



REPORT

# Mirny (Kazakhstan) 1GW Wind Farm Project

## *Framework Biodiversity Action Plan*

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## List of Acronyms

AoI	Area of Influence
ATMF	Active Turbine Management Framework
BESS	Battery Energy Storage System
BAP	Biodiversity Action Plan
BMP	Biodiversity Management Plan
CH	Critical Habitat
CHA	Critical Habitat Assessment
EAAAs	Ecologically Appropriate Areas of Analysis
EBRD	European Bank for Reconstruction and Development
EPIV	Equator Principles IV
E&S	Environmental & Social
ESIA	Environmental Social Impact Assessment
FII	Fauna and Flora International
IBA	Important Bird Areas
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
LRP	Land Restoration Plan
KBA	Key Biodiversity Areas
km	Kilometers
kV	Kilovolt
MH	Megawatt-hours
MV	Medium-Voltage
OHTL	Overhead Transmission Lines

PBF	Priority Biodiversity Features
PR	Performance Requirements
PS	Performance Standards
WPP	Wind Power Plant
WTGs	Wind Turbine Generators

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## 1.0 INTRODUCTION

This document is the Framework Biodiversity Action Plan (Framework BAP) for the Atkas Energy LLP (the Client) Mirny 1GW Wind Farm Project (the Project) in Kazakhstan. The Project consists of developing an onshore wind farm of 1 Gigawatt (“GW”) installed capacity, combined with Battery Energy Storage System (“BESS”) the related Overhead Transmission Lines (“OHL”) and the necessary additional roads / infrastructure. The Project will be located in Mirny, in the Jambyl region in the South-Central part of Kazakhstan.

The Project plans to align with the International Finance Corporation’s (IFC’s) Performance Standard 6 (PS6) and the European Bank for Reconstruction and Development (EBRD) Performance Requirement 6 (PR6) Biodiversity conservation and sustainable management of living natural resources to meet lenders’ requirements.

This Framework BAP will be further developed into a Biodiversity Action Plan (BAP) together with associated documents referenced herein, including the Rare Species Management Plan.

As required by the ESAP a Biodiversity Committee of relevant independent international and national stakeholders will oversee the implementation and effectiveness of the biodiversity related plans. The BAP will therefore be subject to regular review and update based on consultations with the committee

### 1.1 Critical Habitat and Net Gain

By following the listed Standards, the Project **must** deliver quantifiable net gain for receptors which (1) trigger Critical Habitat classification and (2) are residually impacted after application of the mitigation hierarchy’s earlier steps. Two tulip species meet this criterion: *Tulipa regelii* and *Tulipa biflora*.

There are other biodiversity values for which Critical Habitat has been identified within the Project’s Critical Habitat Assessment (CHA), but for which no measurable residual impacts are expected; these are two fish species associated with Lake Balkhash and its catchment: ship sturgeon *Acipenser nudiiventris* and Severtsov’s loach *Triplophysa sewerzowi*. Both of these species have been included on a precautionary basis, and ongoing work is being undertaken to corroborate their inclusion. Should this be confirmed through ongoing iterations of this Framework BAP, then IFC PS6 requires the project to deliver net gain at a more qualitative level (e.g., through supporting existing conservation initiatives, ongoing conservation research, etc.).

There are three bird species, for which Critical Habitat has not currently been identified, but for which ongoing studies/research has lead to a more precautionary position regarding this status. These are saker falcon *Falco cherrug*, great white pelican *Pelecanus onocrotalus* and great bustard *Otis tarda*. A brief update on the current status of these species is presented below:

#### **Saker falcon**

Saker falcon is globally Red List EN, and also Category I on the Kazakh Red Book. Two pairs were identified outside of the Project Area of Influence (Aol) during surveys in 2023, with one flight recorded across the Project site (and Aol); additionally, a family of birds (including fledged young) were observed incidentally at an existing OHL within the Aol. The current Kazakh population is considered to be in the region of 650 pairs, but in steady decline (as per Karyakin *et al.* 2023<sup>1</sup>). With this in mind, the presence of a minimum two pairs is considered to represent a significant population. With this trend in mind, the presence of a minimum two pairs (c. 3% of the Kazakh population) is considered to be significant as per the thresholds of IFC PS6 criterion 1c, until further information is obtained to corroborate an alternate conclusion. **Saker falcon is therefore now considered to**

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<sup>1</sup> Karyakin I.V., Nikolenko E.G., Shnayder E.P. 2023. Current status of the Saker Falcon in Russia and Kazakhstan. – Raptors Conservation. 2023. S2: 450–458.

**trigger Critical Habitat** for an EAAA that extends for 30km around each confirmed nest site (based on a buffer distance around the nest sites as informed by studies into foraging ranges within steppe habitat).

As with the two fish species discussed above, there are not predicted to be any measurable residual impacts for this species; however, IFC PS6 still requires the project to deliver net gain and this can be achieved at a more qualitative level, i.e. through supporting existing conservation initiatives. Several suitable options exist for this, including provision of artificial nest sites, retro-fitting of powerlines to minimise electrocution risk, and research into current reintroduction programmes for the species.

### **Great white pelican**

Great white pelican is IUCN Red List LC, but Category I on the Kazakh Red Book. A total of seven birds were recorded overflying the Project site during surveys in autumn 2024 (therefore assumed to be part of a migratory population). The current Kazakh population is considered to be in the region of 3000 birds, and stable (as per ACBK, 2021<sup>2</sup>). With this trend in mind, the presence of a seven recorded birds, with no observations during the breeding season, would suggest a very small resident population is present (if at all) within the Project Aol. **Great white pelican is therefore still considered not to trigger Critical Habitat.**

### **Great bustard**

Great bustard is IUCN Red List EN, and also Category I on the Kazakh Red Book. Two single birds were recorded overflying the Project site during surveys in autumn 2023, with no records made of resident birds being present within the Aol (either for breeding or on wintering grounds). The current Kazakh population is considered to be in the region of as few as 150 breeding pairs (Martin *et al.* 2018<sup>3</sup>). While the occurrence of two birds represents a significant proportion of this population estimate, they were observed migrating across the site, with no indication that the airspace being occupied was linked to any terrestrial feature; therefore, no EAAA can be defined and so consideration as Critical Habitat is not appropriate. The species is however considered as a high value receptor within the impact assessment. **Great bustard is therefore still considered not to trigger Critical Habitat.** All of the above is further summarised within Annex 1. A suite of Priority Biodiversity Feature (PBF) species was also identified in the Critical Habitat Assessment, that either occur in low numbers within the Project's area of influence or for which absence cannot be conclusively demonstrated due to survey limitations. Given the low likelihood of significant impact pathways to these PBFs, no species-specific Biodiversity Action Plans are proposed in this plan. Instead, PBFs will be managed through the application of generic biodiversity protection measures, monitoring, and adaptive management, as detailed in Annex 2.

## **2.0 PURPOSE OF THIS FRAMEWORK BAP**

The purpose of this Framework BAP is to outline the series of mitigation options by which the Project should explore and develop to demonstrate 10% biodiversity Net Gain (NG) for the two Critical Habitat-qualifying features, *Tulipa regelii* and *Tulipa biflora*. The BAP also sets out the approach for how the mitigation hierarchy will be followed, and the roles and responsibilities for internal staff and external partners. Framework BAPs are 'live' documents, intended to be reviewed and updated as Project implementation progresses, and as more information becomes available on the status and ecology of the identified tulip species, the impacts on these species from the Project, and the effectiveness of mitigation actions. The BAP will be reviewed by the established Biodiversity Committee.

This evolving BAP needs to be aligned as far as possible with the management objectives of the Zhusandala State Reserved Zone.

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<sup>2</sup> Taken from: <https://www.acbk.kz/article/default/view?id=526>

<sup>3</sup> Martin, T. E., Guerin, R., fages, F., Martineau, A. and Hingrat, Y. 2018. Breeding populations of Great Bustard and Little Bustard in South Kazakhstan province, Republic of Kazakhstan. Sandgrouse 40.

## 2.1 Species for Mitigation

### *Tulipa regelii*

Based on initial field surveys, *Tulipa regelii* exceeds 15 individuals within the construction area and therefore meets the 0.5% population threshold for Critical Habitat of significant importance to Critically Endangered and/or Endangered species under Criterion 2a of PR6 / 1a of PS6.

*Tulipa regelii* is strictly endemic to the arid mountains of Kazakhstan, particularly the Chu-Ili Range and Balkhash-Alakol region, where it grows on slate and shale covered slopes in open areas of shrub and pasture habitats at elevations of approximately 800 - 1100 meters. These regions experience dry summers, cold winters, and nutrient-poor soils, contributing to the species' highly specialised adaptations. The global population is IUCN assessed as between 3,000 and 5,000 mature individuals (note that pre-construction surveys may reveal more species individuals – botanical baseline surveys have noted 1-3 plants per m<sup>2</sup> in some locations but this is unlikely to be homogenous). It is listed as endangered on the IUCN Red List of Threatened Species and is in the Red Book of Kazakhstan (Category II). Its restricted habitat, low population density, and environmental pressures such as habitat disturbance and climate change contribute to its threatened status.

### *Tulipa biflora*

Based on field survey records, *Tulipa biflora* is likely to be in excess of 500 plants within the construction area which would represent a conservative estimate of what 0.5% of the global population would comprise. On this basis the EAAA does qualify as Critical Habitat for this species under Criterion 2c of PR6 / 1c of PS6.

*Tulipa biflora* is known to prefer open hillsides within shrub and pasture habitats and was recorded from across the open wormwood and *Salsola* species shrub habitat across the Project site. The estimated global population is far in excess of 100,000, with over 50,000 mature individuals estimated in Kazakhstan. The species is found in Kazakhstan, Uzbekistan, Kyrgyzstan and Tajikistan, in the western Tien Shan and Pamir-Alai regions. It is declining across its range and susceptible to the effects of climate change.

### *Saker falcon*

There are no residual impacts predicted for saker falcon; however, under the requirements of

## 2.2 Determining Residual Impact to Mitigate

The number of individual species for each species within the impacted Project area is still to be determined. Detailed pre-construction surveys are to be undertaken to map the full extent of these species within the construction footprint, plus detailed analyses of the substrates and soil chemistry of impacted tulip areas. This will determine the impact on species individuals and the number of individuals required to successfully achieve Net Gain measures. Due to the site size, detailed target sampling should be undertaken in non-construction areas, focusing on areas that indicate the current ecological niches required for both species, noting those which will be suitable for the species under future climatic conditions. This will determine suitable areas for developing Net Gain mitigation measures within the Site.

The following loss and net gain targets for the two *Tulipa* species are based on local expertise, field work conducted to date, estimates for the proportion of suitable habitats, the range of species densities provided, an assumption that micro-siting will avoid at least 50% of target species areas, and that the very localised microhabitats of sloped shale / scree is not preferable for turbine engineering:

- *Tulipa regelii* potential loss = 1,000 individuals across the 220 hectares to be impacted by the Project.
- *Tulipa regelii* potential net gain target = 1,100 individuals.
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- *Tulipa biflora* potential loss = 5,000 individuals across the 220 hectares to be impacted by the Project.
- *Tulipa biflora* potential net gain target = 5,500 individuals.

The actual number of species across the estimated area will be largely variably in reflection of their niche microhabitats. The pre-construction surveys will determine the actual area and number of individuals to be lost and to set a net gain target.

Pre-construction surveys will include targeted surveys of areas matching the ecological niche of target species within a 5km buffer around the Project site. Surveys should also include any high-density areas of target species within the Project site that extend beyond the site boundary. Pre-construction surveys will target *Tulipa regelii* and *Tulipa biflora* habitat areas, but all tulip species and other rare/endemic species observed will be recorded and mapped, to inform the Rare Species Management Plan within the overall Biodiversity Management Plan (BMP).

As per the mitigation hierarchy, the primary aim will to be **avoid** impacting either of the species. The current turbine/infrastructure layout has been substantially adjusted to avoid tulip concentrations and other sensitive biodiversity receptors.

## 2.3 The Mitigation Hierarchy

**The mitigation hierarchy is utilised to achieve Net Gain for the Critical Habitat (CH) triggering species and to achieve No Net Loss for PBF species and other significant biodiversity features.**

Natural Habitats lost in the construction footprint will be mitigated for by a mixed approach of in-situ habitat restoration and compensation habitat created or enhanced as an offset at locations outside of the construction footprint. Desirably, the offsets will be established within the Project Site boundary but if this is not possible then in the wider Reserve Zone. This mitigation/compensation approach to natural habitats will be the vehicle whereby much of the No Net Less for Priority Biodiversity Features shall be achieved. So, for example, the restored or offset habitat will provide new (or at least improved) foraging habitat for avian receptors.

- It is taken that all of the habitat directly lost is NATURAL habitat and therefore the restoration and offset will need to be adequate to mitigate for the loss of approximately 220Ha of natural habitat comprising of the following habitat types:
- Xerophytic rocky low mountains
- Outcrops of flat granite slabs
- Saxaul valley forests
- Surface water features
- Sagebrush and sagebrush deserts on gently undulating plains
- Gently sloping solonchak depressions.

NNL to natural habitats will be demonstrated through the Quality hectare approach using a comparison of compositional and structural indicators to measure Project losses and gains.

The proportion of natural habitat that will be mitigated for by restoration vs offset is assessed to be ~70Ha by restoration and 150Ha (pads and other “hard” infrastructure) by offset. The actual hectares and composition of natural habitat types to be restored or offset will be determined as an output of the pre-construction surveys to be undertaken in 2026.

The mitigation hierarchy will be followed throughout the Project implementation, as detailed elsewhere in BMP and Critical Habitat Assessment (CHA). This will include micro-siting, which will remain as the primary action to avoid impacting *Tulipa regellii* and *Tulipa biflora*. For example, Figure 1 indicates that with the currently accepted configuration of wind turbine placement, including consideration of rare plant habitats, the main habitats of Regel's tulip will not be affected. Since the October 2023 screening phase layout, the 57 wind turbine generators that overlapped with the botanic exclusion zone have been removed from the zone. This demonstrates how the mitigation hierarchy is being followed and the likelihood that pre-construction surveys may minimise required net gain targets significantly. Further potential avoidance measures, to be influenced by the pre-construction surveys, include additional micro-siting (adjustments of up to 20m), re-routing access roads, and moving temporary facilities such as camps. The extent to which these measures can be deployed are subject to the following decision-making process: whether land is within the Project footprint, national permitting regimes, whether the design change is technically feasible, and the cost impacts. A full decision register will be maintained to record whether Avoidance has been achieved or where this is not possible the mitigation and compensation that is being pursued instead.

Any predicted residual impact on these species, after pre-construction surveys and micro-siting, will be mitigated through the combined development and implementation of the following measures for Net Gain.

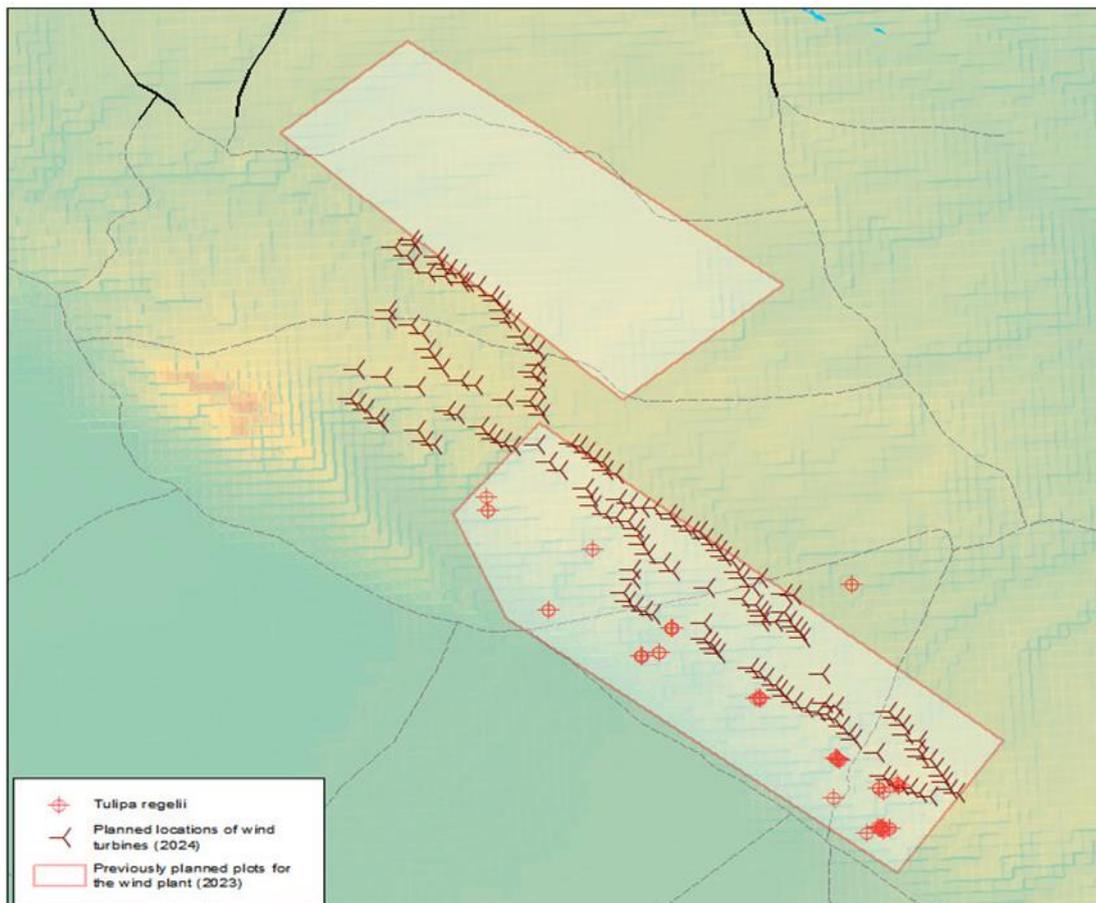


Figure 1. Proposed turbine locations and sites where Regel's tulip has been found (crossed circles).

### 2.3.1 Zhusandala State Reserved Zone

The WPP component of the project is entirely contained within the Zhusandala State Reserved Zone. The Reserved Zone supports grassland (95.65%), shrubland (3.89%) and bare areas (0.4%) as well as 231 species of birds and 56 species of mammals. Of these bird species, one is classified as IUCN Critically Endangered, five are Endangered, and six Vulnerable bird species with one Critically Endangered and two Vulnerable

mammal species also known to be present.

The Zhusandala Reserve total hectareage is 2,787,836 Ha. The total hectareage of the Project Aol is 76,599 Ha. Of this 62,698 Ha of the Aol are within the reserve (82%) and 13,901 Ha (18%) of OHTL are outside the reserve. Therefore 2.25% of the total reserve area is Project Aol. The construction footprint, where there will be direct loss of natural habitat is 220Ha which represents 0.008% of the Reserved Zone.

The Okhotzooptom manage the Reserved Zone and will be responsible for granting permits required to deliver Framework BAP actions. The interaction between the Project and Okhotzooptom is formalised by the vehicle of Memonranda of Understanding already in place and to be developed (the existing MoU might be extended by iteration or further MoUs developed to cover additional agreements reached).

The Okhotzooptom currently focus entirely on mammals – in this case the argali and goitered gazelle. Their remit is providing protection and monitoring these species and conducting an anti-poaching programme. Current monitoring shows an increase in argali numbers – ten years ago the herd was 120 individuals and now it is estimated to be 260. The majority of the herd is found in the south of the zone where water is available. Approximately 1/5<sup>th</sup> of the herd is considered to be active in the Project Aol.

There are 26 field staff currently committed to this task. There are no current breed and release schemes.

## 3.0 MITIGATION MEASURES TO ACHIEVE NET GAIN

### 3.1.1 Undertaking the measures

All possible measures to best achieve Net Gain are presented. These measures have not been attempted for the target species, and there are likely to be success rates in the lower percentiles for measures 1 and 2. Consultation with local experts give an indication that Measure 1 (see below) is the least likely to be successful and the current expectation would be that Measure 2 will be the most likely to contribute to Net Gain achievement. Measures 3-5, which involve scenarios for the use of protective fencing, are currently assessed as being the measures that will be prioritised and most-used to achieve Net Gain. Protected micro-reserves will require close monitoring over a period of years with fixed quadrats being used to measure densities of flowering individuals to quantify net gain.

Measures are to be undertaken within the Project site at as many recipient sites as allowed by ecological conditions, which will be determined by the pre-construction surveys. Permitting to undertake measures within the Project site will be discussed with the Okhotzooptom, who would issue any required permits for the Reserved Area.

Adaptive management of the measures may be necessary. Pre-construction surveys will need to take place in the Spring and early summer of 2026 and there is an immediate need to plan these.

The measures below will generate an increased number of Flowering Individuals (Fis) which lead to a quantifiable Net Gain. Furthermore, these approaches generate additional benefit for the species, which although not quantifiable for measuring net gain, can contribute to improving population and species level knowledge such as improved protocols for in situ protection, population monitoring, in vitro handling and propagation.

### 3.2 Measure 1 – Bulb Translocation Plan

Measure 1 consists of the translocation of *Tulipa biflora* and *regelli* bulbs that occur within the construction footprint to suitable receptor sites in the Project site or surrounding Reserved Zone. Fauna and Flora International have undertaken translocation of similar wild tulip species from ex-situ conservation banks to

replant in-situ in Kyrgyzstan. The Fauna and Flora International Project Team will be contacted as this Framework BAP develops.

The objectives of this translocation plan are to:

- Avoid direct mortality of *Tulipa biflora* and *regelli* individuals within construction areas;
- Maintain local population viability within the Project Site or Reserved Zone;
- Ensure translocation is undertaken using best-practice ecological and horticultural methods; and
- Monitor post-translocation survival and establishment to inform adaptive management reactions.

It is anticipated that translocation will involve adult plants moved as dormant or near-dormant bulbs, which is one of the most appropriate and least damaging life stage for relocation of geophytic tulip species.

Key ecological characteristics relevant to their translocation include:

- seasonal growth (culminating in flowering in the early spring),
- summer dormancy as underground bulbs,
- sensitivity to soil disturbance during active growth,
- dependence on well-drained soils and open habitats with minimal competition.

These traits support a bulb-based translocation outside of the active flowering period.

### 3.2.1 Legislative and Policy Context

The translocation will be undertaken in accordance with:

- Kazakhstan national biodiversity and protected species legislation;
- Reserved Zone management requirements and permitting conditions;
- International best practice guidance for plant translocation and conservation<sup>4</sup>; and
- Commitments outlined in the project Biodiversity Management Plan and associated Environmental and Social Management Plans.

All necessary permits and approvals will be obtained prior to commencement.

### 3.2.2 Baseline surveys and translocation timing

Pre-construction surveys during the flowering season will accurately map plant locations using GPS to calculate translocation numbers and source areas, and to record plant condition, phenological stage, and associated habitat characteristics. Pre-construction surveys need to be carried out in 2026. Local indications are that the 2025/26 winter has been relatively mild and plant growth may be early.

Bulb excavation will be undertaken during dormancy or late senescence (typically through late June and July), when above-ground parts have died back but remain visible. Translocation will not occur during peak flowering (late April / early May, depending on precipitation levels during the winter prior).

### 3.2.3 Receptor Site Selection

Suitable receptor sites within the Project site or Reserved Zone will be selected based on the following criteria:

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<sup>4</sup> <https://iucn-cts.org/project/new-rsg-re-introductions-guidelines-2013/>

- Presence of existing *Tulipa biflora* and *regelli* populations or similar tulip species (these may include sites identified in measures 3 to 5);
- Closely matching microtopography, soil type, and texture, and drainage to source locations;
- Similar topography, aspect, and exposure;
- Low risk of future disturbance (construction, grazing, vehicle access);
- Free from grass/forbs competition; and
- Adequate protection status and long-term conservation security.

Sites will be inspected and approved by a qualified botanist prior to use.

### 3.2.4 Translocation Methodology

#### Bulb Excavation (to be taken before construction begins)

- Excavation will be supervised by an experienced botanist.
- Bulbs will be carefully excavated by hand to avoid damage.
- A soil buffer (donor soil) from around each bulb will be retained for use in replanting where feasible.
- Each bulb will be visually inspected; damaged or diseased bulbs will not be translocated.

#### Handling and Transport

- Bulbs will be kept shaded, cool, and moist (but not wet) during handling.
- Transport time will be minimised, ideally relocating bulbs on the same day as excavation.
- Bulbs will be stored in breathable containers to prevent overheating or fungal growth.

#### Re-Planting

- Bulbs will be replanted with their donor soil at a depth equivalent to the original growing depth (to be recorded at excavation and specimens labelled accordingly).
- Orientation will be maintained where this is identifiable.
- Soil will be gently compacted to remove air pockets.
- Bulbs will be spaced to mimic natural population densities as determined in the construction area Phase II surveys.

#### Post-Translocation Management

- Translocated areas will be clearly marked on Project maps which will be shared with the Project Site and Reserved Zone management.
- No irrigation or fertilisation will be applied unless specifically recommended by the supervising botanist.
- Grazing and trampling will be avoided where possible through coordination with Project Site and Reserved Zone management. For example, through installation of fencing as per Annex 3.

#### Monitoring Program

Monitoring will be conducted for a minimum of ten growing seasons and will include:

- Annual spring surveys to record emergence success, flowering, and plant vigour.
- Comparison of survival and flowering rates with nearby reference populations.
- Photographic records and GPS verification of translocated groups.

#### Adaptive Management

If monitoring indicates poor establishment or high mortality:

- Causes will be investigated (e.g. soil conditions, herbivory, climate).
- Corrective actions may include additional translocations, microhabitat adjustment, or protective measures.
- Lessons learned will be incorporated into future biodiversity management actions.

### Roles and Responsibilities

- **Project Proponent:** Overall implementation and compliance.
- **Qualified Botanist/Ecologist:** Supervision of surveys, translocation, and monitoring.
- **Construction Contractor:** Compliance with exclusion zones and timing requirements.
- **Reserved Zone Authority:** Approval of receptor sites and oversight within protected areas. Guardianship of receptor areas.

### Reporting

Results of translocation and monitoring will be documented in:

- Annual BMFP biodiversity monitoring reports.
- Compliance reports to relevant authorities and lenders.

## 3.3 Measure 2 – Ex-situ Propagation

Note: Consultation with local experts has been undertaken and this has indicated that seed collection, appropriate storage and re-seeding is considered the most likely approach to be successful and the current assumption is that this approach will be prioritised. However, the Project continues to consider all measures might have utility. Whilst the current prognosis is that bulb propagation is unlikely to be successful this assumption is based on very limited examples. It is considered that it would be wasteful not to attempt to propagate any bulb material retrieved from the construction footprint. Furthermore, as the Project develops the expertise and processing in vitro may advance with experience.

Measure 2 consists of the translocation of *Tulipa biflora* and *regelli* bulbs and a selection of seeds that occur within the construction footprint to Almaty and/or Astana Botanic Gardens. Here the seeds and bulbs will be propagated to build up an *ex-situ* conservation bank. Propagation methods will include seed germination, offsets of bulblets, and in-vitro propagation, and will be developed and described in collaboration with the Botanic Institutes. Once established, bulbs will be planted at suitable receptor (donor) sites in the Project site or surrounding Reserved Zone. Fauna and Flora International have undertaken the collection of similar wild tulip species' seeds and bulbs, their *ex-situ* cultivation and growth, and replanting in-situ in Kyrgyzstan. The Fauna and Flora International Project Team will be contacted as this Framework BAP develops, as will Cambridge University Botanic Garden and Royal Botanic Garden, Kew, who have been working in-and-ex-situ with Central Asian wild tulips.

The objectives of this translocation plan are to:

- Avoid direct mortality of *Tulipa biflora* and *regelli* individuals within construction areas;
- Maintain and increase local population viability within the Project Site or Reserved Zone;
- Ensure propagation and translocation is undertaken using best-practice ecological and horticultural methods; and
- Monitor post-translocation survival and establishment to inform adaptive management reactions.

Measure 2 follows much of the same methodology as measure 1 for bulb extraction, translocation, re-planting, and in-situ monitoring, reporting, and adaptive management.

In addition, measure 2 involves seed collection to be followed as below:

- Collection of mature seeds in late spring / early summer before construction begins;
- Seeds will need to be collected at full capsule maturity for propagation success, from at least three different areas per species within the construction footprint for genetic variation. There is no peer-reviewed literature about seed production rates for either of the tulip species. However, literature relating to other wild tulips would suggest a defensible estimate of ~60 to 300 seeds per mature capsule. However, seed numbers will vary seasonally;
- Seeds are to be kept cool and dry until sowing in-situ;
- Seed collection will be undertaken in accordance with Kazakhstan national biodiversity and protected species legislation and commitments outlined in the project Biodiversity Management Framework Plan and associated Environmental and Social Management Plans. All necessary permits and approvals will be obtained prior to collection.

Once seeds and bulbs are at the national Botanic Garden[s]:

- Botanic Garden will develop propagation and cultivation protocols for the two species, adapted from their work on similar species and the available literature;
- Seeds are to be seeded onto a crushed limestone/calcareous grit with very low organic matter content;
- *Tulipa regelii* seeds have deep morphophysiological dormancy and will require cold stratification for about 3-4 months at ~1-5 C;
- Germination may stagger over 2-3 years and success rates, per seed harvest, are likely to be 20-30%;
  - *Tulipa regelii* and *T. biflora* seeds will produce a bulblet in one year, with a growth from bulblet to flowering plant over multiple years (~5 - 8), and bulblet division rates could be <1 offset per season<sup>5</sup>;
  - Bulbs are to be re-planted in-situ with their donor soil.
  - Artificial bulb division is possible and requires fully dormant bulbs and fungicidal biosecurity to avoid bulb infection. On division the split bulbs need to go immediately into mineral substrate.

At the Royal Botanic Gardens, Kew, *Tulipa regelii* has been successfully propagated via the production of bulb offsets<sup>6</sup>. Similar endemic tulip species have also been successfully propagated *ex-situ* in Kazakhstan<sup>7</sup>.

Not only is this a measure that will contribute to achieving Net Gain, it is also a chance to build a conservation bank, deliver capacity building, and species knowledge, particularly as they are liable to increasing external pressures such as habitat loss under future climatic conditions<sup>8</sup>.

### 3.4 Measures 3, 4 and 5 - Introduction

Measures 3 to 5 consist of installing protective fencing to exclude grazing and trampling at key sites, promoting the natural propagation of species individuals and increasing population numbers. Both species propagate via

<sup>5</sup> Botschantzeva, Z. (1982) Tulips: Taxonomy, Morphology, Cytology, Phytogeography and Physiology. Balkema.

<sup>6</sup> 406. *Tulipa regelii*: Liliaceae (2001) [https://www.jstor.org/stable/45065469?read-now=1&oauth\\_data=eyJlbWFpbCI6ImZlZmVudm91dC51OTgwQW9uSWRzIjpbXSwicHJvdmlkZXIiOiJnb29nbGUifQ&seq=4](https://www.jstor.org/stable/45065469?read-now=1&oauth_data=eyJlbWFpbCI6ImZlZmVudm91dC51OTgwQW9uSWRzIjpbXSwicHJvdmlkZXIiOiJnb29nbGUifQ&seq=4)

<sup>7</sup> In Vitro Propagation of Endemic Kazakh Tulips: Effects of Temperature and Growth Regulators (2025) <https://www.mdpi.com/2223-7747/14/19/3014>

<sup>8</sup> Central Asian wild tulip conservation requires a regional approach, especially in the face of climate change (2021) <https://link.springer.com/article/10.1007/s10531-021-02165-z>

bulb multiplication and seed recruitment. Removing recurrent grazing and trampling increases flowering, seed set, and bulb survival, whilst also protecting the soil structure and conditions that seedlings and bulblets need. Fencing is a low-tech intervention to quickly cut disturbance and promote the restoration and proliferation of localised species populations. In highly degraded or historically suitable sites, disturbance reduction can also enable successful seed bank germination. Fauna and Flora International have fenced off plots of 2-3 hectares for in-situ wild tulip conservation in Kyrgyzstan. These plots were successful in improving the condition of wild tulip habitat.

### **3.4.1 Measure 3 – Fencing High-density Areas**

Measure 3 consists of fencing existing high-density areas of species individuals to protect strongholds and encourage successful propagation.

Objective: Safeguard core populations to convert suppressed reproductive potential into measurable increases in individuals.

During pre-construction surveys, specialised botanists will target areas predicted to have good conditions for species beyond the construction footprint and identify areas with higher densities of species individuals. Targeting areas with higher density of species individuals provides a greater potential number of individuals for natural propagation, increasing species numbers. Fences surrounding the high-density areas will be installed and maintained to create micro reserves as per Annex 3: technical specification for fencing.

This measure will also support long-term protection of a potential seed collection resource and propagation resource for research and any necessary adaptive management measures or future projects.

### **3.4.2 Measure 4 – Fencing Low-Density Areas for Restoration**

Measure 4 consists of fencing ecologically suitable but disturbed low-density areas to restore habitats and encourage increased successful propagation.

Objective: Recover degraded tulip habitat where individuals are present at low density; allow populations to expand and coalesce to achieve measures increases in individuals.

During pre-construction surveys, specialised botanists will identify areas with ecologically suitable conditions for the tulip species (e.g. soil texture, slope, moisture regime), but where tulip species are present in low density due to disturbance signals (e.g. grazing, trampling, tracks). Increases to species numbers will be encouraged by natural restoration of conditions and reduced disturbance pressures on successful propagation. Fences surrounding the ecologically suitable but low-density areas will be installed and maintained to create micro reserves as per Annex 3: technical specification for fencing.

These sites will also be prospective candidates for the installation of species individuals propagated ex-situ, as described in measure 2.

### **3.4.3 Measure 5 – Fencing Seed Bank Areas**

Measure 5 consists of fencing areas that are ecologically suitable and historically occupied (known or supposed) by species individuals but are currently unoccupied due to high levels of disturbance.

Objective: Enable expression of the soil seed bank to re-establish populations where heavy grazing or trampling has suppressed bulbs.

During pre-construction surveys, specialised botanists will identify areas currently unoccupied by the target species due to current or past site disruption (e.g. grazing, trampling, tracks), but which express high niche suitability (e.g. soil texture, slope, moisture regime) and/or local ecological knowledge or records suggest historic species presence.

This approach is contingent on seed bank presence and viability. Seed bank testing, by taking small soil cores of prospective sites to ex-situ germination trials, could be undertaken to scope for prospective sites.

Development of individuals from seed will be a slower process than bulblet multiplication. These sites will also be prospective candidates for the installation of species individuals propagated ex-situ, as described in measure 2.

### 3.5 Monitoring and indicators for measures

For the in-situ delivery of measures 1 to 5, specialised botanists will count, map, and report on the number of species individuals annually during the flowering season (late April to early May, depending on prior winter precipitation levels). Local rangers will undertake periodic maintenance checks on fencing and to monitor any potential third-party impacts or presence of trampling. A Biodiversity Monitoring and Evaluation Programme is to be developed after recipient sites have been identified by pre-construction surveys and further arrangements have been made with delivery partners.

A 10% net gain in number of species individuals is the key performance indicator (KPI) for net gain. *Tulipa regellii* and *T. biflora* seeds will produce a bulblet in one year, with a growth from bulblet to flowering plant over multiple years (~5 - 8), and bulblet division rates could be <1 offset per season<sup>9</sup>. The measures and associated monitoring and management will therefore be long-term over the operational lifetime of the Project (~30 years) and until Net Gain is achieved. This includes ex-situ propagation and in-situ planting and maintenance. For measure 5, germination plots (permanent microplots) to detect low-density recruitment should also contribute to initial KPI monitoring.

If monitoring indicates that additional species individuals are required for Net Gain, the Project should engage the surrounding Reserved Zone management and authorities (beyond the Project site) on implementing measures 3 to 5 at corresponding suitable locations within the Reserved Zone.

### 3.6 Climatic Migration Corridors

Even Central Asian tulips least affected by climate change are predicted to lose more than half their current habitat by 2050 due to ecological niches evaporating faster than wild tulip populations can naturally migrate to higher altitudes<sup>10</sup>. For measures 1 to 5, during pre-construction surveys, specialised botanists should seek and prioritise in-situ areas that could provide connected gradients from current ranges to higher, cooler microsites. This will be intended to establish and protect sites that could act as climate corridors to support altitudinal migration of populations under future climatic conditions.

Additionally, regional opportunity mapping to identify suitable habitat conditions (under future climatic conditions) for tulip introduction should be done for the target relict tulip species (and more broadly for other wild tulip species under imminent threat of climatic changes). This will not contribute to current quantifiable net gain targets, but it should be a component of the overall long-term strategy.

### 3.7 Livelihood Restoration

Development of a Livelihood Restoration Plan (LRP) for the Project is in process. The purpose of this plan is to ensure landowners and user including herders, receive appropriate compensation, assistance and of livelihood restoration where they lose land or access to land. The LRP will account for any restrictions or impacts on land or livelihood caused by the biodiversity mitigation or offset measures outlined in this document.

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<sup>9</sup> Botschantzeva, Z. (1982) Tulips: Taxonomy, Morphology, Cytology, Phytogeography and Physiology. Balkema.

<sup>10</sup> Central Asian wild tulip conservation requires a regional approach, especially in the face of climate change (2021) <https://link.springer.com/article/10.1007/s10531-021-02165-z>

Additionally, Fauna and Flora International (FFI) have been working to successfully deploy sustainable pasture management plans for wild tulip conservation in neighbouring regions of Kyrgyzstan and lessons learned will be sought and used to inform Project approaches.<sup>11</sup>

### 3.8 Costs and Responsibilities

Costs are to be provided for the following:

- Fencing installation (CapEx and OpEx) and removal using existing contractors – amount required and associated costs to be determined by identification of target mitigation sites during pre-construction surveys;
- Maintenance of fencing – annual local salary for x2-3 rangers;
- Retained botanist fees – annual local salary for x2 specialist botanists; and
- Bulb propagation and translocation works – annual local salary for x2 researcher at the Almaty and/or Astana Botanical Institute.

Actual costs to be provided after the pre-construction surveys and discussions with the in-country delivery partners (Botanic Institutes), which will determine the scope and area of works required.

Almaty and/or Astana Botanical Institute and an in-country specialist botanist are to be responsible for translocation and ex-situ propagation. Further consultation and support is to be sought from the following institutes as the measures are developed:

- Ministry of Ecology and natural resources of the Republic of Kazakhstan;
- Association for the Conservation of Biodiversity of Kazakhstan (ACBK);
- PO Okhotzooptom;
- Specialist NGO and research teams such as Fauna & Flora International, Cambridge University Botanic Garden, and Royal Botanic Gardens, Kew.; and
- Other local and regional (Central Asia) institutes working on *Tulipa* conservation, propagation, and reintroduction.

After consultation, the live BAP will be updated with outcomes, including relevant details of existing programmes and lessons learnt.

**All measures outlined in this Framework BAP should be developed and deployed to deliver measurable species net gain for *Tulipa regelii* and *Tulipa biflora* and long-term monitoring and adaptive management.**

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<sup>11</sup> Securing wild tulips and pastoral communities in the Kyrgyz mountains <https://www.darwininitiative.org.uk/project/DAR26020>

## Signature Page

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**APPENDIX A**

**Baseline and Conservation  
Context**

The Critical Habitat Assessment (CHA) has identified two fish species that are screened in primarily on a precautionary basis due to limited and uncertain baseline data: the ship sturgeon *Acipenser nudiiventris* and Severtsov's loach *Triplophysa sewerzowi*. Both species are believed to still occur within Lake Balkhash and potentially within associated tributaries, although current information on their distribution, abundance, and population trends within the Project's wider area of influence is scant.

The precautionary screening reflects data limitations rather than confirmed presence within the immediate Project footprint or evidence of population-level sensitivity to the Project.

### Assessment of Project Interactions and Risk Pathways

The Project does not involve in-lake works: abstraction, discharges, or physical modification of aquatic habitats. The only Project component in proximity to Lake Balkhash is the overhead power line (OHL) extending to a substation located on the south-western edge of the lake. This infrastructure does not interact directly with aquatic environments present and does not create plausible pathways for habitat loss, barrier effects, hydrological change, or direct disturbance to fish populations

Potential indirect risks are limited to accidental pollution during construction activities near the lake shoreline. With the application of standard good international industry practice (GIIP) for pollution prevention and control, such risks are considered low and not significant.

On this basis, the Project is not expected to result in adverse impacts to *A. nudiiventris* or *T. sewerzowi*, nor to contribute to population-level effects.

### Mitigation and Management Measures

In line with the mitigation hierarchy and proportionality principles of EBRD PR6, no species-specific biodiversity actions are required for these fish species. The following measures will be implemented as part of standard Project environmental management:

- Implementation of robust pollution prevention and control measures during construction, particularly for activities undertaken in proximity to Lake Balkhash.
- Management of fuels, oils, and hazardous substances to prevent spills, including secondary containment and emergency spill response procedures.
- Control of sediment runoff and surface water contamination through appropriate drainage, storage, and housekeeping measures.
- Workforce training, at induction and continuing as necessary, on environmental protection requirements relevant to working near aquatic environments.

These measures are expected to effectively avoid indirect impacts to aquatic habitats and associated fish species.

### Residual Impacts and PR6 Alignment

With the implementation of the above measures, residual impacts to *Acipenser nudiiventris* and *Triplophysa sewerzowi* are assessed as negligible. The approach is consistent with EBRD PR6 requirements for precautionary screening, impact avoidance, and the application of GIIP where biodiversity features are present but impact pathways are limited or absent.

**No additional monitoring or offset measures are proposed or required under the Framework Biodiversity Action Plan for these species.**

**APPENDIX B**

**Priority Biodiversity Features:  
Biodiversity Actions Framework**

The Critical Habitat Assessment (CHA) has identified a suite of Priority Biodiversity Feature (PBF) species that either occur in low numbers within the Project's area of influence or for which absence cannot be conclusively demonstrated due to survey limitations. These PBFs include avifauna, mammals, and reptiles of conservation concern. Identified PBFs are:

- 1) Asian houbara
- 2) Barbary falcon
- 3) Black-bellied sandgrouse
- 4) Broad-billed sandpiper
- 5) Common pochard
- 6) Curlew sandpiper
- 7) Eastern imperial eagle
- 8) Egyptian vulture
- 9) European turtle dove
- 10) Great bustard
- 11) Great white pelican
- 12) Greater spotted eagle
- 13) Grey plover
- 14) Little bustard
- 15) Pallas's fish eagle
- 16) Peregrine falcon
- 17) Pin-tailed sandgrouse
- 18) Saker falcon
- 19) Sociable lapwing
- 20) Steppe eagle
- 21) White-headed duck
- 22) White stork
- 23) Yellow-eyed pigeon
- 24) European free-tailed bat
- 25) Goitered gazelle
- 26) Kulan
- 27) Marbled polecat

- 28) Saiga
- 29) Steppe tortoise
- 30) Argali, although screened out as a CHA trigger and PBF, this species is considered a flagship species and biodiversity actions have been developed for it which are set out in the disclosed BMP and the pre-construction survey programme.
- 31) Other Tulip Species and rare/endemic plant species, although screened out as CHA triggers or PBFs, these plant species are also considered as flagship species and as significant biodiversity features. They will be searched for and recorded in pre-construction surveys and the Rare Plant Species Management Plan to be developed in the next iteration of the BMP provides the vehicle for their conservation.

In accordance with EBRD Performance Requirement 6, the Project adopts a precautionary, risk-based, and proportionate approach to the management of PBF species. The Project design has prioritised avoidance of key habitats and migration corridors, and Project components are expected to result in limited habitat loss, fragmentation, or population-level impacts to seven PBF species.

PBFs will be managed through the application of generic biodiversity protection measures, including:

- Implementation of Good International Industry Practice (GIIP) during construction and operation;
- Strict control of vehicle movements, workforce conduct, and off-road driving;
- Management of disturbance (noise, lighting, and human presence) through standard environmental controls; and
- Use of ecological supervision and pre-construction checks where works occur in potentially sensitive habitats.

Additionally, a range of specific biodiversity actions have been developed and will continue to be developed for PBFs in the Biodiversity Management Plan and Active Turbine Management Plan. These are summarised for each PBF in this Appendix. This framework-level approach is considered appropriate to ensure avoidance of significant adverse impacts to Priority Biodiversity Features while maintaining proportionality and compliance with EBRD PR6. It allows for adaptive management measures to be employed in the Project cycle where residual risks have not been eliminated by established biodiversity actions.

### **Monitoring Commitment**

Monitoring of PBFs will be undertaken on a proportionate and risk-based basis through routine ecological supervision, pre-construction checks in potentially sensitive habitats, and incident reporting procedures during construction and operation. Monitoring results will be reviewed to confirm the effectiveness of mitigation measures and to inform adaptive management where required.

### **Adaptive Management Trigger**

Should a PBF species be recorded within or in close proximity to active work areas, or should evidence emerge of an unanticipated interaction between Project activities and PBF habitats or behaviours, the Project will implement adaptive management measures. These may include temporary modification of works, site-specific avoidance measures, or targeted mitigation, as advised by a qualified ecologist. Any such measures will be proportionate to the level of risk identified and consistent with Good International Industry Practice.

Appendix B: Priority Biodiversity Features (PBFs): Biodiversity Actions Framework

Common Name	Scientific Name	Present on Ground	Present in Airspace	Population Estimate in EAAA	Pre-Construction Surveys	Construction Monitoring	Operational Monitoring	GIIP	Transport MGT	CEMP Disturbance Protection Measures	Curtailment (as per Active Turbine Mangement Plan-ATMP)	BMP Actions (+BIO21-BIO28)	Other	Notes	Residual Risk After Biodiversity Actions - Current Assessment	Sign Post to Mitigation	Residual Impact Verification Method and Indicator(s)	Offsets and Net Gain Options
Asian houbara	<i>Chlamydotis macqueenii</i>	Y	Y	<10	March - June 2026	2 Years	As per ATMP	Y	Y	Y	Is Protective	BIO04 BIO02 BIO08 BIO09 BIO12	CRM Reserve Action Plan	Highly vulnerable to collision because of ocular arrangement	Yes - OHL collision risk	BMP ATMP Future Species Action Plan	Construction and Operation Ornithological Surveys Fatality Moitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation areas for Natural Habitat losses Bird Diverters on Project OHLs Retrofits of Diverters to existing power line infrastructure Vegetation management near to infrastructure to avoid development of attractive habitat Use of bundled conductors Reduced span widths
Barbary Falcon	<i>Falco peregrinus pelegrinoides</i>	N	Y	<5	February - July 2026	2 Years	As per ATMP	Y	N	Y	Is Protective	BIO04 BIO08 BIO12	CRM		N	BMP ATMP	Construction and Operation Ornithological Surveys Fatality Moitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation areas for Natural Habitat losses Establish offsite nesting buffer zones/micro-reserves Artificial nest platforms on cliff faces
Black Bellied Sandgrouse	<i>Pterocles orientalis</i>	Y	Y	<10	March - June 2026	2 Years	As per ATMP	Y	Y	Y	Is Protective	BIO04 BIO02 BIO08 BIO09 BIO12	CRM	Nests typically associated with vegetated areas	N	BMP ATMP	Construction and Operation Ornithological Surveys Fatality Moitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation areas for Natural Habitat losses Scrub Creation Support to Anti-poaching Measures OHL Bird Diverters and retrofits to existing network
Common Pochard	<i>Aythya ferina</i>	N	Y	<10	No	2 Years	As per ATMP	Y	N	N	Is Protective	BIO04 BIO08 BIO12	CRM		N	BMP ATMP	Construction and Operation Ornithological Surveys Fatality Moitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Restore degraded reedbeds/emergent vegetation areas Secure new legal protections for wetlands in the hydrological basin
Curlew Sandpiper	<i>Calidris ferruginea</i>	N	Y	<10	No	2 Years	As per ATMP	Y	N	N	Is Protective	BIO04 BIO08 BIO12	CRM		N	BMP ATMP	Construction and Operation Ornithological Surveys Fatality Moitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation Areas for Natural Habitat Losses
Eastern Imperial Eagle	<i>Aquila heliaca</i>	N	Y	<5	February - July 2026	2 Years	As per ATMP	Y	N	N	Is Protective	BIO04 BIO08 BIO12	CRM		N	BMP ATMP	Construction and Operation Ornithological Surveys Fatality Moitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation Areas for Natural Habitat Losses Artificial Nest Platforms Support to anti-poaching programmes OHL Bird Diverters

Egyptian Vulture	<i>Neophron percnopterus</i>	N	Y	<5	February - July 2026	2 Years	As per ATMP	Y	N	N	Is Protective	BIO04 BIO08 BIO12	CRM	Presence not determined in baseline	N	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation Areas for Natural Habitat Losses Support to anti-poaching programmes
European Turtle Dove	<i>Streptopelia turtur</i>	Y	Y	<5	No	2 Years	As per ATMP	Y	Y	Y	Is Protective	BIO04 BIO02 BIO08 BIO09 BIO12	CRM	Presence not determined in baseline	N	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation Areas for Natural Habitat Losses
Great Bustard	<i>Otis tarda</i>	Y	Y	<10	March - June 2026	2 Years	As per ATMP	Y	Y	Y	Is Protective	BIO04 BIO02 BIO08 BIO09 BIO12	CRM		Yes - CH Status to be reassessed after construction monitoring	BMP ATMP Future Species Action Plan	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation areas for Natural Habitat losses Bird Diverters on Project OHLs Retrofits of Diverters to existing power line infrastructure Vegetation management near to infrastructure to avoid development of attractive habitat Use of bundled conductors Reduced span widths
Great White Pelican	<i>Pelecanus onocrotalus</i>	N	Y	<20	No	2 Years	As per ATMP	Y	N	N	Is Protective	BIO04 BIO08 BIO12	CRM		Yes - CH Status to be reassessed after construction monitoring	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation areas for Natural Habitat losses Bird Diverters on Project OHLs Retrofits of Diverters/insulators to existing power line infrastructure
Greater Spotted Eagle	<i>Clanga clanga</i>	N	Y	<5	February - July 2026	2 Years	As per ATMP	Y	N	N	Is Protective	BIO04 BIO08 BIO12	CRM			BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation Areas for Natural Habitat Losses Artificial Nest Platforms Support to anti-poaching programmes OHL Bird Diverters
Grey Plover	<i>Pluvialis squatarola</i>	N	Y	<5	No	2 Years	As per ATMP	Y	N	N	Is Protective	BIO04 BIO08 BIO12	CRM	Presence not determined in baseline	N	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation Areas for Natural Habitat Losses

Little Bustard	<i>Tetrax tetrax</i>	Y	Y	<5	March - June 2026	2 Years	As per ATMP	Y	Y	Y	Is Protective	BIO04 BIO02 BIO08 BIO09 BIO12	CRM		N	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation areas for Natural Habitat losses Bird Diverters on Project OHLs Retrofits of Diverters to existing power line infrastructure Vegetation management near to infrastructure to avoid development of attractive habitat Use of bundled conductors Reduced span widths
Pallas's Fish Eagle	<i>Haliaeetus leucoryphus</i>	N	Y	<5	February - July 2026	2 Years	As per ATMP	Y	N	N	Is Protective	BIO04 BIO08 BIO12	CRM	Presence not determined in baseline	N	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation Areas for Natural Habitat Losses Artificial Nest Platforms Support to anti-poaching programmes OHL Bird Diverters
Peregrine Falcon	<i>Falco peregrinus</i>	N	Y	<5	February - July 2026	2 Years	As per ATMP	Y	N	N	Is Protective	BIO04 BIO08 BIO12	CRM	Presence not determined in baseline	N	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation Areas for Natural Habitat Losses Artificial Nest Platforms Support to anti-poaching programmes OHL Bird Diverters
Pin-tailed Sandgrouse	<i>Pterocles alchata</i>	Y	Y	<10	March - June 2026	2 Years	As per ATMP	Y	Y	Y	Is Protective	BIO04 BIO02 BIO08 BIO09 BIO12	CRM	Unvegetated Ground	N	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation Areas for Natural Habitat Losses
Saker Falcon	<i>Falco cherrug</i>	Y	Y	<5	February - July 2026	2 Years	As per ATMP	Y	Y	Y	Is Protective	BIO04 BIO02 BIO08	CRM Artificial Nest Platforms Project Contributions to B&R Scheme	Yes - CH Status to be reassessed after construction monitoring	BMP ATMP Future Biodiversity Action Plan	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b>	Compensation Areas for Natural Habitat Losses Artificial Nest Platforms Support to anti-poaching programmes Enforcement of nesting buffer zones Support to breed and release programmes Bird Diverters on Project OHL and retrofit of Diverters/insulation on to existing network	
Sociable Lapwing	<i>Vanellus gregarius</i>	TBD	Y	<10	March - June 2026	2 Years	As per ATMP	Y	Y	Y	Is Protective	BIO04 BIO02 BIO08 BIO09 BIO12	CRM	Yes - TBD whether only migratory	BMP ATMP Future Biodiversity Action Plan	Construction and Operation Ornithological Surveys - Fatality Monitoring Collision/Damage Reports - <b>Species Observations - Carcass Retrievals No. of SDoD Events</b> <b>Confirmation of Ground Nesting</b>	Compensation areas for Natural Habitat losses Bird Diverters on Project OHLs Retrofits of Diverters to existing power line infrastructure Vegetation management near to infrastructure to avoid development of attractive habitat Use of bundled conductors Reduced span widths	

Steppe Eagle	<i>Aquila nipalensis</i>	Y	Y	<5	February - July 2026	2 Years	As per ATMP	Y	Y	Y	Is Protective	BIO04 BIO02 BIO08 BIO09 BIO12	CRM Artificial Nest Platforms		N	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Moitoring Collision/Damage Reports - <b>Species</b> <b>Observations -</b> <b>Carcass Retrievals</b> <b>No. of SDoD</b> <b>Events</b>	Compensation Areas for Natural Habitat Losses Artificial Nest Platforms Support to anti- poaching programmes OHL Bird Diverters
White-headed Duck	<i>Oxyura leucocephala</i>	N	Y	<5	No	2 Years	As per ATMP	Y	N	N	Is Protective	BIO04 BIO08 BIO12	CRM	Presence not determined in baseline	N	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Moitoring Collision/Damage Reports - <b>Species</b> <b>Observations -</b> <b>Carcass Retrievals</b> <b>No. of SDoD</b> <b>Events</b>	Restore degraded/ reedbeds/emerge nt vegetation areas Secure new legal protections for wetlands in the hydrological basin Wetland extensions
White Stork	<i>Ciconia ciconia asiatica</i>	N	Y	<5	No	2 Years	As per ATMP	Y	N	N	Is Protective	BIO04 BIO08 BIO12	CRM	Presence not determined in baseline	N	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Moitoring Collision/Damage Reports - <b>Species</b> <b>Observations -</b> <b>Carcass Retrievals</b> <b>No. of SDoD</b> <b>Events</b>	Compensation Areas for Natural Habitat Losses Bird Diverters on Project OHL and retrofits to existing power network adjacent to Lake Balkash
Yellow-eyed Pigeon	<i>Columba eversmanni</i>	Y	Y	<5	March - June 2026	2 Years	As per ATMP	Y	Y	Y	Is Protective	BIO04 BIO02 BIO08 BIO09 BIO12	CRM	Presence not determined in baseline	N	BMP ATMP	Construction and Operation Ornithological Surveys - Fatality Moitoring Collision/Damage Reports - <b>Species</b> <b>Observations -</b> <b>Carcass Retrievals</b> <b>No. of SDoD</b> <b>Events</b>	Compensation Areas for Natural Habitat Losses
European Free-tailed Bat	<i>Tadarida teniotis</i>	N	Y	<5	15th April - 31st May 1st August to 30th September	2 Years	As per ATMP	Y	N	N	Is Protective	BIO13b BIO08	Bat Activity Model	Presence not determined in baseline	N	BMP ATMP	Construction and operation acoustic monitoring Fatality monitoring <b>Species Detections</b> <b>Carcass Retrievals</b> <b>Roost</b> <b>Identifications</b>	Compensation Areas for Natural Habitat Losses Creation of watering stations (nb synergy with ungulates) Support to key migratory pathway research and regional bat conservation initiatives
Goitered Gazelle	<i>Gazella subgutturosa</i>	Y	N	<100	Spring 2026	2 Years		Y	Y	Y		BIO13 BIO01 BIO08 BIO11	Habitat Enhancements		Yes -continued displacement risk	BMP Future Species Action Plan	Preconstruction surveys including searches for pregnant females and calving areas Construction and Operation Surveys using camera traps Ranger monitoring GPS/UAV tracking Animal Encounter Reports <b>Species</b> <b>Detections Calving</b> <b>Areas</b>	Compensation Areas for Natural Habitat Losses Watering Point Creation Transport Management Plan Calving Area Enhancements Support to ranger monitoring Support to anti- poaching initiatives
Kulan	<i>Equus hemionus ssp. kulan</i>	N	N	Not Present										Not Present	N			
Marbled Polecat	<i>Vormela peregusna</i>	Y	N	<5		2 Years		Y	Y	Y		BIO08 BIO11		Presence not determined in baseline but difficult to ID in the field	N	BMP	Construction and operation monitoring by camera traps <b>Species Detections</b>	Compensation Areas for Natural Habitat Losses.
Saiga	<i>Saiga tatarica</i>	N	N	Not Present										Not Present	N			

Steppe Tortoise	<i>Testudo horsfieldii</i>	Y	N	100s	March - June 2026	2 Years		Y	Y	Y		BIO05 BIO06 BIO08 BIO11	Local Translocation Programme to remove from Construction footprint	N	BMP	Local Construction Translocation out of footprint. Mark and Release Construction and Operation Surveys including burrow searches and transects <b>Species Detections</b> <b>Burrows Detections</b>	Compensation Areas for Natural Habitat Losses Burrow Creation Transport Management Plan
Natural Habitats - permanently removed	Xerophytic rocky low mountains Outcrops of flat granite slabs Saxaul valley forests Surface water features Sagebrush and sagebrush deserts on gently undulating plains Gently sloping solonchak depressions	Y	N	~150Ha	apr-26	2 Years	Monitoring to continue until>NNL/NG is demonstrated								BAP		Offset habitat enhancement/creation
Natural Habitats - temporarily removed	Xerophytic rocky low mountains Outcrops of flat granite slabs Saxaul valley forests Surface water features Sagebrush and sagebrush deserts on gently undulating plains Gently sloping solonchak depressions	Y	N	~70Ha	apr-26	2 Years	Monitoring to continue until>NNL/NG is demonstrated								BAP		Restoration
Other Tulip Species - not PBF but SBVs under IFC standards	Saxaul valley forests	Y	N	100s	March - June 2026	2 Years		Y	Y	Y			Translocation Programme to remove from Construction footprint		BMP Rare Plant Species Management Plan		Translocation Programme
Argali - not PBF but included as "flagship species"	Surface water features	Y	N	<25	Spring 2026	2 Years		Y	Y	Y		BIO13 BIO01 BIO08 BIO11	Habitat Enhancements	Yes - continued displacement risk	BMP Future Species Action Plan	Preconstruction surveys including searches for pregnant females and calving areas Construction and Operation Surveys using camera traps Ranger monitoring GPS/UAV tracking <b>Species Detections</b> <b>Calving Areas</b>	Compensation Areas for Natural Habitat Losses Watering Point Creation Transport Management Plan Calving Area Enhancements Support to ranger monitoring Support to anti-poaching initiatives

**APPENDIX C**

**Technical Specification –  
Protective Fencing for Tulipa sp.  
Micro-Reserves**

## Purpose and Performance Objective

Protective fencing may be installed around identified *Tulipa* species micro-reserves to avoid and minimise adverse impacts from livestock grazing, trampling, unauthorised access, and vehicle incursion and to contribute to No Net Loss and Net Gain. The fencing design prioritises long-term durability, minimal soil disturbance, and compatibility with steppe and semi-desert ecological conditions, while remaining dismantlable at decommissioning.

## Applicability

This specification applies to:

- Confirmed or precautionary locations of wild *Tulipa* sp. populations (including individual plants, clusters, or small habitat patches)
- Semi-desert and steppe habitats characterised by extreme temperature variation, strong winds, erosive soils, and limited maintenance access

## Fence Type

WSP recommend a low-height exclusion fence constructed of hot-dip galvanized steel mesh mounted on galvanized steel posts.

***Barbed wire, plastic mesh, PVC-coated fencing, or temporary fencing materials shall not be used in this environment.***

## Recommended Fence Dimensions

- Overall height above ground: 900 – 1,100 mm
- Ground interface: Mesh installed flush to ground level; burial of mesh to be avoided within *Tulipa* rooting zones as determined by the retained botanist.
- Fence alignment: Installed to follow micro-topography and avoid direct contact with *Tulipa* plants or bulbs. Final lines to be confirmed with the botanist before installation.

## Recommended Mesh Specification

- **Material:** Welded or woven galvanized steel wire mesh
- **Wire diameter:** ≥ 2.5–3.0 mm
- **Mesh aperture:** Approx. 100 × 50 mm (rectangular or equivalent)
- **Corrosion** **protection:**  
Hot-dip galvanized *after fabrication*, minimum zinc coating 275 g/m<sup>2</sup> (≥300 g/m<sup>2</sup> preferred) for survivability in local conditions.

The mesh shall be sufficiently rigid to withstand wind loading while allowing airflow to reduce drag forces.

## Recommended Posts

- Primary posts: Galvanized steel T-posts or equivalent
- Post length: 1.8–2.0 m
- Embedment depth: 600–700 mm
- Post spacing:
  - Standard: 3.0 m

- Reduced to 2.0–2.5 m in sandy or wind-exposed areas
- Corner / gate posts: Galvanized steel box-section posts, concreted where necessary

*Timber posts shall not be used.*

### Recommendations for Foundations and Installation

- Posts shall be **driven or hand-installed** wherever feasible.
- Concrete foundations shall be limited to:
  - Corners
  - Gates
  - High-strain sections
- Excavation within the fenced area shall be avoided.
- All works shall be supervised by the retained botanist or their suitably trained environmental specialist when installation is within known *Tulipa* habitat.

### Wildlife-Sensitive Design Parameters

- No barbed wire to be used.
- No electrification.
- Fence height intentionally limited to reduce landscape fragmentation.
- Where grazing pressure allows, a **controlled bottom gap (up to 100 mm)** may be incorporated to allow passage of small fauna, subject to ecologist's approval.

### Durability and Design Life

The fence shall be designed for:

- Minimum service life: 20–30 years
- Resistance to:
  - Extreme temperature fluctuations
  - High UV exposure
  - Wind fatigue
  - Frost heave and soil movement

### Maintenance

- Inspection frequency: At least annually, and after extreme weather events
- Maintenance scope: Localised repair of mesh, posts, or fixings as required
- Full fence replacement is not anticipated under normal conditions.

### Alignment with EBRD PR6 Mitigation Hierarchy

#### Avoidance

- Micro-reserves are delineated to avoid direct disturbance to *Tulipa* plants and bulbs.

- Fence installation methods avoid trenching, soil stripping, or compaction within *Tulipa* rooting zones.

#### **Minimisation**

- Low-height, permeable fencing minimises:
  - Visual intrusion
  - Wind loading
  - Habitat fragmentation
- Construction footprint restricted to the fence line only.

#### **Restoration / Rehabilitation**

- Any minor disturbance adjacent to fence posts shall be stabilised using local substrate and natural recolonisation.
- No seeding or planting within fenced *Tulipa* habitat unless specifically recommended by the retained botanist.

#### **Offsets**

- Offsets are not anticipated for those *Tulipa* populations protected through avoidance and minimisation; fencing is intended as a preventive, long-term conservation measure consistent with PR6 expectations for Priority Biodiversity Features/Critical Habitat trigger-species

### **Adaptive Management Trigger**

If evidence of continued grazing, trampling, plant damage, or fence failure is recorded within a fenced micro-reserve, the fencing design, extent, or maintenance regime shall be reviewed and upgraded in consultation with the retained botanist.

### **Monitoring Commitment**

The condition of fenced *Tulipa* micro-reserves shall be included in routine biodiversity monitoring, recording including:

- Assessment of fence integrity
- Any signs of access or disturbance
- *Tulipa* presence, flowering, and recruitment (where seasonally observable)

Monitoring results shall inform adaptive management and be reported in accordance within the Biodiversity Action Plan.

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