**REPORT**

# Mirny (Kazakhstan) 1GW Wind Farm Project

*Non-Technical Summary*

Submitted to:

**Aktas Energy LLP**

Submitted by:

**WSP ITALIA S.r.l.**

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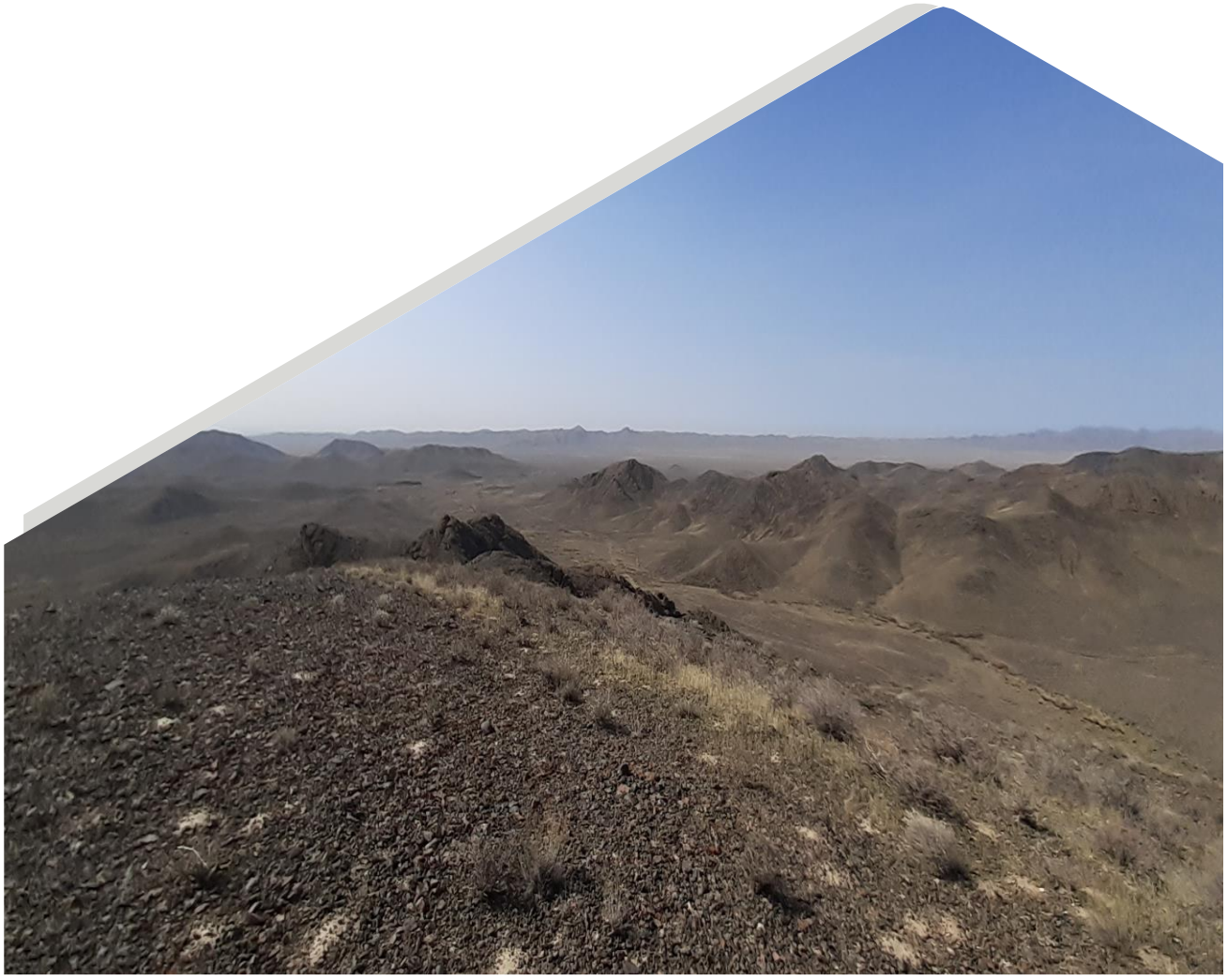

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# List of Acronyms

| | |
|---|---|
| ADB | Asian Development Bank |
| AIIB | Asian Infrastructure Investment Bank |
| AoI | Area of Influence |
| ATMF | Active Turbine Management Framework |
| BESS | Battery Energy Storage System |
| BAP | Biodiversity Action Plan |
| BMP | Biodiversity Management Plan |
| CCRA | Climate Change Risk Assessment |
| CH | Critical Habitat |
| CHA | Critical Habitat Assessment |
| CIA | Cumulative Impact Assessment |
| EAAAs | Ecologically Appropriate Areas of Analysis |
| EBRD | European Bank for Reconstruction and Development |
| EIB | European Investment Bank |
| EPIV | Equator Principles IV |
| E&S | Environmental & Social |
| ESAP | Environmental and Social Action Plan |
| ESBS | Environmental and Social Baseline Study |
| ESIA | Environmental Social Impact Assessment |
| ESMS | Environmental and Social Management System |
| GHG | Green House Gases |
| GW | Gigawatt |
| HRRA | Human Rights Risk Assessment |

| | |
|---|---|
| IBA | Important Bird Areas |
| IFC | International Finance Corporation |
| ILO | International Labour Organization |
| IUCN | International Union for Conservation of Nature |
| LARF | Land Acquisition Resettlement Framework |
| LLP | Limited Liability Partnership |
| KBA | Key Biodiversity Areas |
| KEGOC | Kazakhstan Electricity Grid Operating Company |
| km | Kilometers |
| kV | Kilovolt |
| MH | Megawatt-hours |
| MV | Medium-Voltage |
| NTS | Non-Technical Summary |
| 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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**FIGURES**

# 1.0 INTRODUCTION

This document is the Non-Technical Summary (NTS) of the Environmental and Social Impact Assessment (ESIA) report prepared for the construction and development of the Mirny onshore wind farm of 1 Gigawatt (GW) installed capacity, a Battery Energy Storage System (BESS), the related Overhead Transmission Lines (OHTL) and access roads (the Project). The Project is located in the Jambyl Region, in South-Central Kazakhstan.


**Figure 1: Project location (GoogleEarth Image).**

## 1.1 Context of the Project

In February 2023, the Government of Kazakhstan approved the long-term Strategy for Achieving Carbon Neutrality of the Republic of Kazakhstan until 2060, which sets ambitious net-zero carbon goals for climate action and identifies key technological transformations needed for the country's decarbonization. According to the Strategy, the country has created the necessary conditions for the development of renewable energy sources. By 2030, Kazakhstan plans to increase the share of renewable energy sources in its balance from the current 4.5% to 15%, according to the country's prime minister's declaration. To contribute to this ambitious objective, the Government of Kazakhstan is investing in the development of new renewable energy infrastructure across the country.

The new Mirny WPP falls in this strategy and the electricity to be produced by the Project will be entirely sold to the Financial Settlement Center of Renewable Energy, a public entity owned by the Government of Kazakhstan, for the supply of the national grid. The Project will provide electricity to 1 million people and aims at supporting the regional sustainable growth and contribute to the local employment.

In 2023, TotalEnergies signed an investment agreement with the Government of Kazakhstan for the development of the Project in partnership with the National Wealth Fund Samruk-Kazyna and the National Company KazMunayGas.

## 1.2 Project site selection

The Project will be located, over an area of approximately 682 km². The Project site and proposed OHTL line routes are mainly located within the Moiynkum District of the Jambyl Region of Kazakhstan. A section of OHTL lines toward Shu Substation extends into Shu District. A small portion of OHTL lines toward Yukgres Substation, near Ulken Village, crosses into Jambyl District of Almaty Region (see the figure below).


**Figure 2: Boundaries of the Project Site within Jambyl Region.**

The nearest settlements, the villages of Sholpan, Mirny, and Khantau, are located more than 20 km from the proposed site, which excludes any direct impact on residential areas. The site is located in a semi-desertic zone with corresponding climatic features and wildlife. The site was chosen due to its remoteness, lack of agricultural and industrial use, and favorable wind conditions, which make it ideal for the construction of a wind farm.

Specifically, the site selection was guided by a comprehensive feasibility study that considered both technical and Environmental and Social criteria. One of the most critical factors considered was the wind resource potential. The site needed to offer strong, consistent winds with minimal turbulence, ideally coming from a prevailing direction. A wind measurement campaign conducted in September 2022 confirmed that the chosen area meets these requirements, making it suitable for efficient wind energy generation. Land use was another key consideration, as wind farms require substantial space, not only for turbines but also for associated infrastructure like transmission lines. To minimize disruption to local communities and avoid land acquisition or relocation, the Project was sited on barren and bare low-quality land. This approach helped reduce potential adverse impacts on livelihoods.

Geotechnical conditions were analyzed and the stability and characteristics of the soil, including its bearing capacity, water table levels, and drainage patterns, were assessed to ensure the safe and durable installation of infrastructure. The findings supported the viability of the site from a structural standpoint. Given the region's seismic profile, the risk of earthquakes and other geohazards was evaluated. Although the broader Jambyl

region can experience significant seismic activity, the selected site is located in an area with moderate risk. Nonetheless, the infrastructure has been designed to withstand moderate earthquakes, and geotechnical investigations confirmed low geological risks such as landslides or mudflows.

Environmental sensitivity was addressed through early biodiversity screening and seasonal flora surveys.

During the scoping phase carried out in 2023 and early 2024, three potential sites were identified as suitable for the Project: Site A, Site B, and Site C (see Figure 3). Site B was quickly discarded due to poor wind conditions and its proximity to the Andasay State Nature Sanctuary, which posed significant environmental constraints. This left Sites A and C as the main contenders.

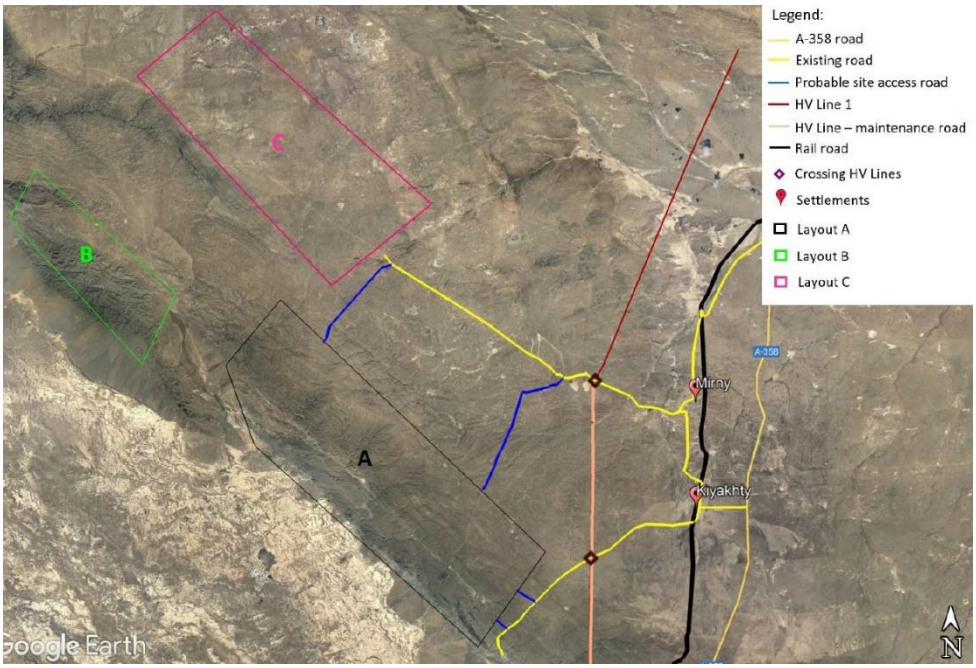


**Figure 3: Initial Project sites layout with the three alternative sites A, B and C**

Site A initially appeared promising because of its excellent wind resource, which is a critical factor for the project's technical and financial viability. However, early biodiversity surveys revealed serious concerns. The site overlapped with the Zhusandala State Reserved Zone (see Figure 4) , a legally protected area, and hosted sensitive species such as the endangered *Regel's tulip*, *Argali* populations, and nesting sites of raptors including *Golden Eagles* and *Saker Falcons*. These findings, combined with challenging terrain, made the original Site A less favorable from an environmental and engineering perspective.

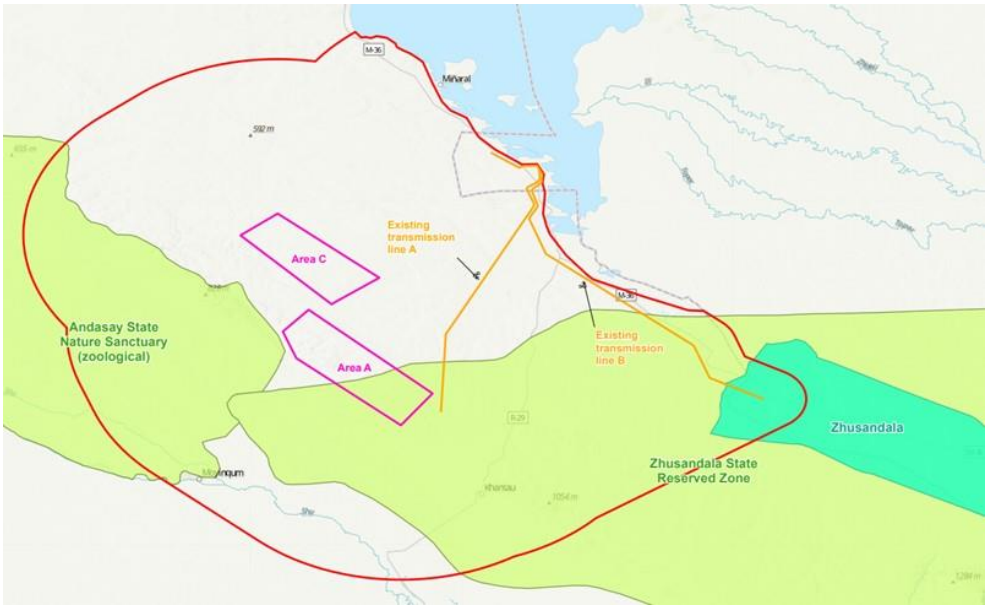


**Figure 4: Internationally recognised and legally protected areas within the Biodiversity Screening Area in 2023 (MottMacDonald, 2023)**

To address these issues, the project team redefined Site A's boundaries, creating what became known as Site A extended. This modification significantly reduced the footprint within the Zhusandala Reserve and relocated turbines away from critical habitats (see Figure 5).

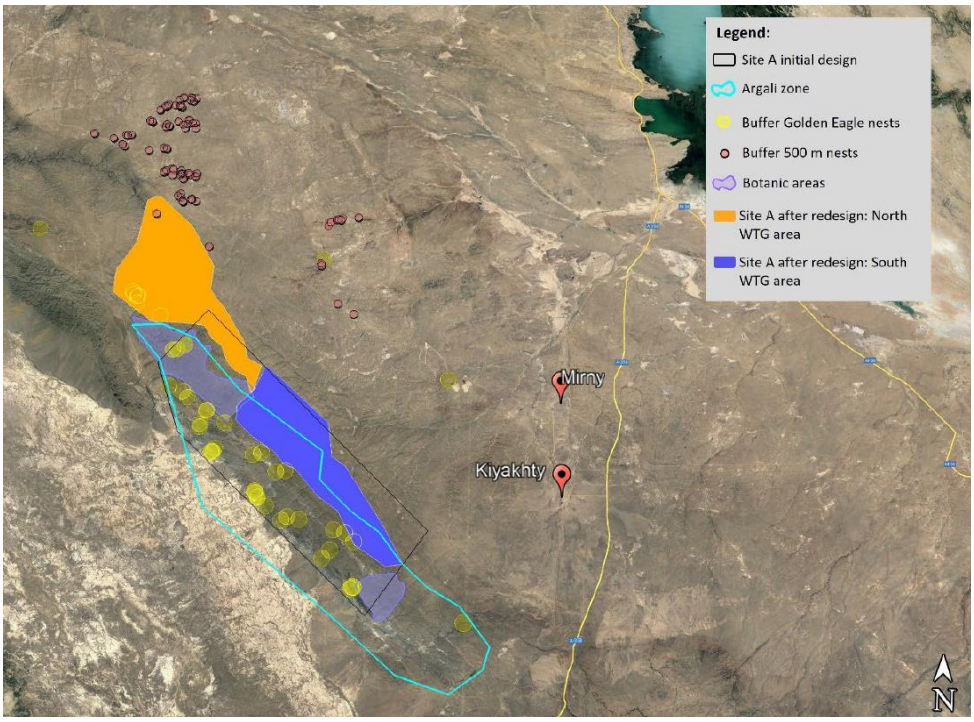


**Figure 5: Boundaries of Site A and Site A extended (shown as "Site A after redesign"). The latter reduces footprint and reduce/avoid effects on fauna and flora and their habitats.**

The extended site offered flatter terrain, improved accessibility, and maintained strong wind conditions. Additional measures were implemented, including signing a Memorandum of Understanding with Okhotzooprom, a state body in Kazakhstan responsible for protecting wildlife, to ensure biodiversity protection

and further boundary adjustments based on advanced studies. The turbine layout was also optimized, reducing the total number from 160 to 154 to minimize collision risks for birds and bats.

Site C, on the other hand, presented the lowest environmental risk. It was farther from sensitive habitats and protected areas, making it the best option for biodiversity conservation. However, its wind resource was significantly weaker, which would have resulted in lower energy generation and compromised the Project's economic feasibility. Despite its environmental advantages, Site C was ultimately rejected because it could not meet the technical and financial requirements of a 1 GW wind farm.

After comprehensive analysis, Site A extended—with its refined boundaries and mitigation measures—was selected as the preferred location. It offered the best balance between minimizing environmental impacts and ensuring technical and financial viability. Even after the Zhusandala Reserve expanded in 2025 to overlap all candidate sites (Figure 6), Site A extended remained the most suitable choice due to its smaller footprint within the protected area and its optimized design.

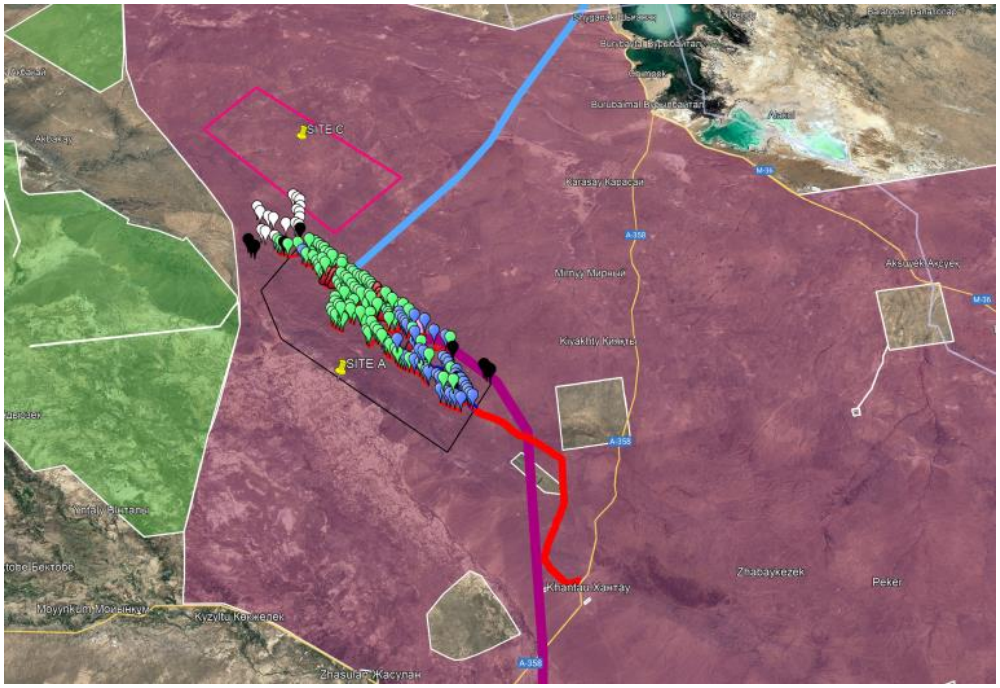


**Figure 6: WTGs alternative sites (Site C - pink; Site A - black; Site A extended - corresponding to the turbine footprint) and OHTL corridors (blue, pink and red lines) in relation to the new boundaries of the Zhusandala State Reserve (in pink)**

Concerning accessibility, the site is near existing paved and unpaved roads connected to the national A-358 highway, which facilitates the transport of heavy machinery and materials. The selection of the site also considered the proximity to grid connectivity. Indeed, the Mirny site benefits from proximity to three substations – Yukgres, Shu and Kiyakhty - that can cost-effectively support the transmission of generated electricity to the national grid.

Similar considerations based on environmental and social sensitivity were done in selecting the final electrical corridors and road selection: the presence of human receptors was considered to avoid negative impacts such as noise or shadow flickers. The site is remote, with the closest nearby residential areas at approximately 20km from the site, apart from occasional shepherds passing through with livestock. These conditions significantly reduce the potential for community disturbance.

## 1.3 Final Site Selection Approval

Because the Zhusandala State Nature is included in the List of Nationally Significant Specially Protected Natural Areas approved by the Government of the Republic of Kazakhstan on 26 September 2017 by Resolution No. 593, the Committee on Forestry and Wildlife of the Ministry of Ecology and Natural Resources was involved in the process of authorizing the Project development. The Memorandum of Understanding, directly requested by the Committee and signed with Ohozoprom, aims to ensure joint work on biodiversity conservation. The Committee finally signed a Letter of Approval on 31 December 2024 (ref. Letter 27-03-08/16781 of 31.12.2024). Finally, the Project has successfully completed the national Environmental Impact Assessment (EIA) process in November 2025[1] which indicates the acceptance of the site selection and selected site by the Kazakh governamental bodies.

## 1.4 Roles and responsibilities

Aktas Energy Limited Liability Partnership (LLP; Aktas) is a company established on October 6, 2020, to implement the construction and operation of the Project. The founder and sole shareholder of Aktas, as of September 2025 (100% stake) is TotalEnergies S.A.

Aktas appointed WSP Italia (WSP) as Environmental & Social (E&S) consultant to prepare the Environmental and Social Baseline Study (ESBS) and the Environmental and Social Impact Assessment (ESIA) for the construction and development the Project. WSP has collected and processed the data for this study with the support of the local consultant Green Operating, based in Astana, Kazakhstan.

Aktas is developing the Project in partnership with the National Wealth Fund “Samruk-Kazyna” and the National Company “KazMunayGas”, which will each own a 20% stake in the Project. The three parties signed a *Memorandum of Understanding* with the Ministry of Energy of the Republic of Kazakhstan in October 2021.

Aktas approached the Lenders Société Générale and European Bank for Reconstruction and Development (EBRD) for financing the Project. The Lenders involved are International and national Financial Institutions; the former have adopted sustainability policies, which imply several environmental and social obligations for the Client, including carrying out the ESIA process according to national and international standards.

The owner of the Project is Aktas, which already has an established headquarters in Astana, Kazakhstan, and the team for managing the Mirny Project has been allocated. Aktas will be subcontracting the construction management to the Construction Management Company TERSK, local Affiliate of Total Energies Renewable.

An EPC Contractor (also referred to as “the Contractor”) and supporting subcontractors will be appointed to execute the required site work.

Overall, TERSK will have a role of regular supervision of the EPC and subcontractors on E&S matters, implementing a strict and daily supervision, control, audit and monitoring on the EPC contractor and subcontractors to ensure their E&S performance is in line with the requirements of the Environmental and Social Management System (ESMS) and the lender applicable standards.

Performance report will be shared with lenders and relevant authorities, complemented by periodic external monitoring and independent audits. This system ensures that the Project maintains effective control of environmental and social risks.

[1] State Environmental Expertise Conclusion for the Environmental Impact Assessment (EIA) of the “Mirny” 1 GW Wind Farm project in Kazakhstan - No. KZ41VVX00423453, dated November 19th 2025.

# 2.0 PROJECT DESCRIPTION

The Mirny Project is a large-scale renewable energy initiative aimed at developing a 1 Gigawatt (GW) onshore wind farm, complemented by a BESS. This ambitious undertaking also includes the construction of OHTLs and the development of both onsite and offsite access roads to support the infrastructure.

The Project envisaged the installation of 150 Wind Turbine Generators (WTGs), which together will provide the full 1 GW of installed capacity. These turbines will be anchored by dedicated foundations and interconnected through an extensive network of underground medium-voltage (MV) cables. Approximately 180 kilometers of trenches will be excavated to lay 35 kilovolt (kV) cables, ensuring efficient transmission of electricity between the turbines.

To enhance grid stability and energy reliability, the Project incorporates a BESS with a capacity of 300/600 Megawatt-hours (MWh) , playing a crucial role in balancing supply and demand. The BESS will be operated by the Kazakhstan Electricity Grid Operating Company (KEGOC).

The electrical infrastructure will be supported by two new substations - one located at North Mirny and the other at South Mirny - each designed to handle 500 kV/35 kV. These substations will be linked by a network of high-capacity transmission lines. Specifically, three 500 kV OHTLs will connect North Mirny to Yukgres substation, South Mirny to Shu substation, and North Mirny to South Mirny. Additionally, a 35 kV line will connect the site to the existing Kiyakhty substation, providing a permanent grid connection for construction activities and ongoing operations and maintenance.

To facilitate movement across the site and ensure logistical efficiency, the Project includes the construction of on-site roads and upgrades to off-site access routes. Reactive power compensating devices will be installed to maintain voltage stability and improve overall grid performance.

Finally, an accommodation camp will be established to house workers and support staff during the construction and operational phases, ensuring a well-managed and sustainable workforce presence on site.

The following figures show the Project layout and components (i.e., WTGs, substations, BESS, construction camp/compound, OHTL and roads).

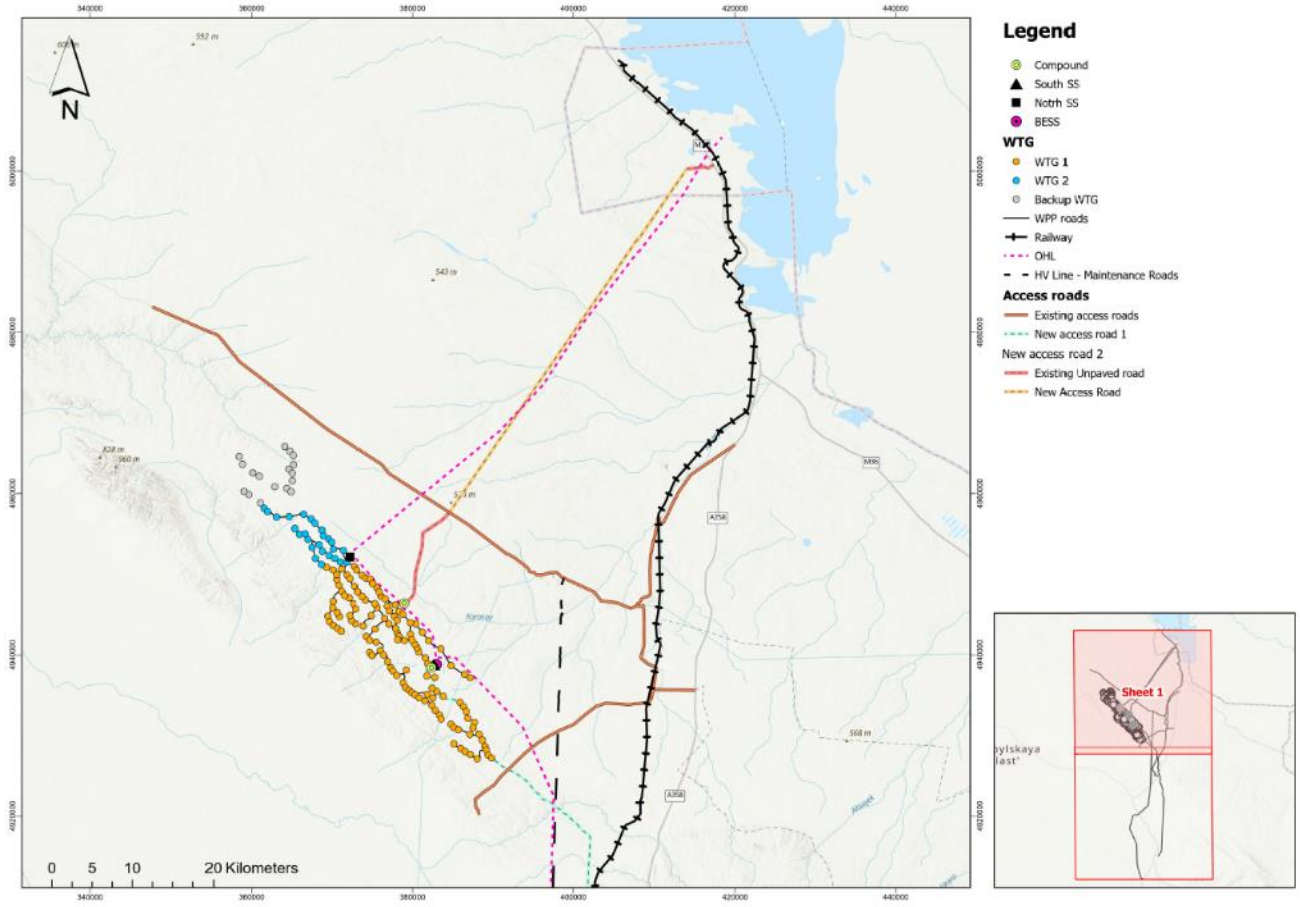


**Figure 7: Project layout and components (Sheet 1)**

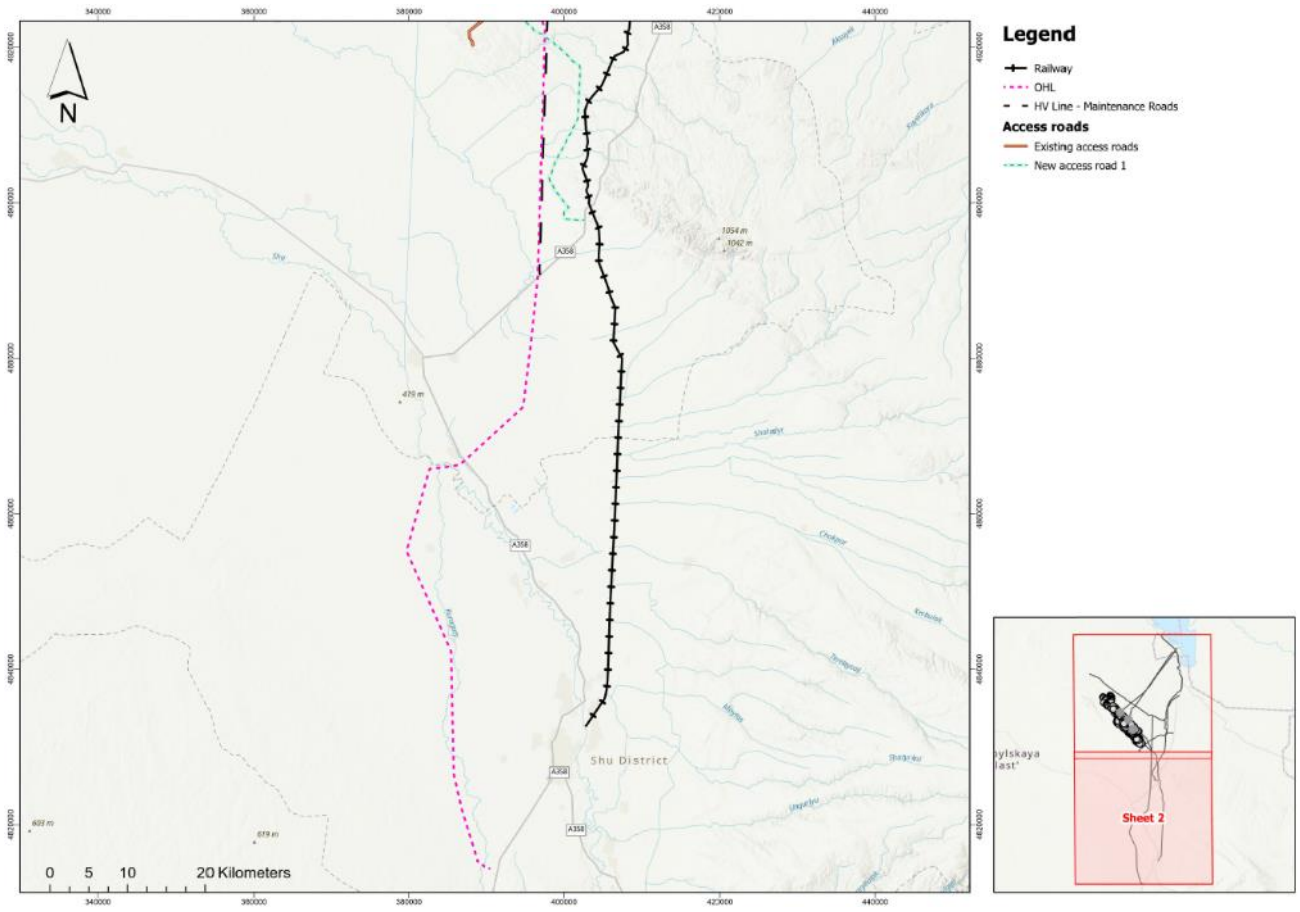


**Figure 8: Project layout and components (Sheet 2)**

Finally, the Mirny Wind Farm is expected to supply renewable electricity to one million people and avoid 3.5 million tons of $CO_2$ emissions annually. Its scale and technical ambition make it the largest wind energy initiative in Kazakhstan to date.

## 2.1 Project Timeline

The Project's pre-construction phase is scheduled to begin in Q1 2026 and will last about six months. By the time this phase starts, land acquisition process should be completed, at least for the plots needed for the initial pre-construction activities. These activities include setting up the construction compound with workers' accommodation camp, designating a plot for the lay-down area, and preparing the land where site clearance and levelling will commence first.

The construction activities for the project are expected to begin in the Q3 2026 and will last for 30 to 36 months. By the start of the construction phase, all necessary services must be in place. These services include, among others, water and waste management, electrical supply, and security.

The Project's operational phase is expected to start in Q4 2028 / Q1 2029 once the power plant will be connected to the national grid. The operational life of a wind power plant is typically 25-30 years; the approximate date for the decommissioning/re-equipment of the facility is 2054.

At the end of the operational phase the Company will assess the necessity of decommissioning or of extension of the life of the WPP by conducting minor and low-cost but frequent repairs.

## 2.2 Project Pre-Construction

Pre - construction activities will begin with the gradual mobilization of personnel, equipment, and machinery, starting with the setup of a temporary camp. Once permits are secured, the contractor will fence key areas - such as substations, the BESS, and access points - while avoiding biodiversity-sensitive zones. Preparatory works will include levelling land for offices, storage, and utilities, followed by topsoil stripping to a depth of 25 - 50 cm. The stripped soil will be stored for reuse, and the site will then be levelled for further development.

Before commencing the actual construction, the Contractor will build a compound that will include the construction camp to accommodate the construction site workers. The workers' camp will be placed in a matter that would prevent any adverse noise impacts. All buildings will be made from prefabricated containers and equipped with necessary engineering and technical equipment, and they will be placed between the two sub-stations. The construction site will host about up to 2,034 workers in average. During the peaks, onsite there will be about 2,007 workers.

The camp construction will be carried out in three stages. Below are provided the maximum capities of the camp per each stage:

- 1st stage for 120 people (completion –First month from initial mobilization);
- 2nd stage for 700 people (completion – After 5th months from initial mobilization); and
- 3rd stage for 2,034 people (completion – After 16th months from initial mobilization).

## 2.3 Project Construction

Following the completion of the Pre-Construction phase, the Contractor will begin the main construction activities. The construction will foresee the following stages:

- Sumps and trenches excavation;
- Crane pads preparation;
- WTG foundations construction;
- BESS foundations construction;
- OHTL installation; and
- Roads construction.

The earthwork will be carried out in accordance with the Project standards detailed in the regulatory framework chapter, and with the Company's requirements and procedures.

Depending on the soil conditions, the works may involve loosening dense or rocky ground using hydraulic hammers or controlled blasting, followed by manual and mechanical excavation. A specialized subcontractor will oversee quality control, conducting tests to verify soil stability and load-bearing capacity. Before excavation begins, the Contractor will secure the site by fencing off key areas - such as the substations and BESS - and establishing controlled access points. Warning signs and perimeter tape will be installed to ensure safety and regulate site entry.

Many services will be needed during the construction phase; these include:

- water supply management;
- waste management;

- electrical Installations and power supply;
- materials management;
- workforce management;
- security management;
- road traffic management; and
- machinery and equipment.

During construction phase new employment opportunities will be created. Local workforce, with a particular focus on women employment, will be highly preferred to work in senior, supervisory, and skilled positions (against available position).

## 2.4 Project operations

Wind plants generally require limited operational activities that mainly include the following:

- commissioning tests;
- normal daily operation;
- maintenance and control.

The project site will encompass substations, wind turbine generators (WTGs), a battery energy storage system (BESS), and a compound. The compound will be located in the central northern part of the site to minimize transportation within the area. It will include offices, an accommodation camp, a site infirmary, workshops, storage facilities, and parking lots. In the event of a major emergency, the site will be served by Moyinkum Hospital, located two (2) hours away. Additionally, there will be an onsite clinic staffed with medical personnel.

The workers' accommodation will be placed so to prevent any adverse noise impacts on workers.

During operation, the power plant is expected to generate additional 3.6 billion kWh of "green energy," and an avoidance in carbon dioxide emissions of at least 2 million tons per year.

# 3.0 LEGAL ASPECTS AND COMPLIANCE

The present study was prepared according to Total Energies standards, guidelines for the Wind Sector, several lender E&S standards, and applicable local, national, and international E&S legislation and guidelines adopted by the Republic of Kazakhstan (the Applicable Standards).

Specifically, this study was prepared in accordance with:

- European Bank for Reconstruction and Development (EBRD) E&S Policy and relevant Performance Requirements (PR);
- International Finance Cooperation (IFC) Performance Standards (PS, 2012);
- World Bank Group General EHS Guidelines (2007), Wind farm EHS Guideline and Electric Power
- Equator Principles EP4 (2020);
- European Investment Bank (EIB) E&S Standards;
- Asian Development Banks (ADB) Safeguard Policies;

- The Asian Infrastructure Investment Bank (AIIB) E&S Policy;
- Transmission & Distribution EHS Guidelines (2007);
- International Union for Conservation of Nature (IUCN) guidance on wind projects;
- Other standards and guidelines relevant to the assignment (the Convention on Wetlands, BirdLife International, Eurobats recommendations and best practice guidelines, Good Practice Handbook on the Design of Post-Construction Monitoring of Bird and Bat Fatalities Wind Energy Facilities, Scottish Natural Heritage Guidance Note, etc.);
- International Labor Organization (ILO) conventions signed and ratified by the countries; and
- United Nations Guiding Principles on Business and Human Rights.

# 4.0 ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS

The Applicable standards require that Project proponents identify and manage environmental and social risks and impacts within the Project "Area of Influence" (AoI). The appropriate level of assessment and management of risks and impacts is determined by the degree of control that the proponent is able to exercise over the Project facilities or activities and by the importance of the facilities or activities to the Project's successful operation.

The AoI of Mirny Project has been delineated as a basis for defining the minimum boundaries for baseline data gathering by taking into consideration the spatial extent of the facilities and activities and potential direct, indirect and cumulative impacts of the Project. For physical components (soil, air, water, noise, shadow flicker) and social components (communities, generation of traffic, workforce and security) a 10 km radius around the Project footprint has been identified, while for biodiversity components it was identified a 70 km radius around the Project footprint to assess potential impacts on biodiversity, cumulative impacts.

During the ESIA process, WSP and the local partner Green Operating collected both field data (during appropriate seasonal campaigns in the wet and dry seasons) and secondary information (e.g., publicly available data) to acquire knowledge on the baseline conditions at regional level and in the Project AoI for the physical, biodiversity and social components. The baseline conditions and a summary of the data collected are provided in the following sections.

## 4.1 Baseline conditions – Physical Environment

### *Geology and Geomorphology*

Kazakhstan's geological landscape is remarkably varied due to its location at the junction of several major tectonic units. The western region, part of the stable Turan Plate, includes the Caspian Syneclise, a deep sedimentary basin rich in oil and gas. To the north, the Southern Urals and Mugalzhar Mountains reflect the legacy of the Ural orogeny, with folded terrains and ancient rock formations. Central Kazakhstan is defined by the Kazakh Shield, a mineral-rich area composed of Precambrian and Paleozoic rocks. In the southeast, the geology becomes more dynamic within the Tien Shan Orogenic Zone, where active tectonic forces from the Eurasian and Indian plate collision create seismic activity and dramatic mountain ranges.

The Mirny Project is situated within this Orogenic Zone, specifically in the Shu-Ili Low Hill Terrain. The planned 500 kV transmission lines heading toward the Shu Substation will extend southward into the Turan Plate, crossing the Accumulative and Denudational Plains of the Shu-Sarysu Basin. Based on detailed assessment performed during baseline investigations it resulted that overall the geotechnical conditions present do not pose significant constraints for the construction of project infrastructure.

### *Seismicity*

Southeastern Kazakhstan lies in a seismically active zone due to its position near the Eurasian and Indo-Australian plate boundary, particularly within the Tien Shan Orogenic Belt. The region has a history of strong earthquakes, including the Verny (1887) and Kemin (1911) events, and continues to be monitored by national seismic agencies. In Jambyl Region, most districts face significant seismic risk, with past earthquakes causing widespread damage and displacement. However, the Mirny Project AoI and its transmission lines are located in zones of moderate seismic intensity (magnitude 6-7), suggesting only moderate potential impact from future seismic activity.

### *Natural Hazards*

The Jambyl Region is subject to a variety of natural hazards due to its diverse terrain and climate. Seismic activity remains a consistent concern, particularly near the Tien Shan fault system, though ground acceleration levels are within acceptable limits for the Project's foundation design. Seasonal risks such as landslides and mudflows occur mainly from March to July in the mountainous south, often triggered by snowmelt, heavy rainfall, or seismic events. Winter brings severe snowstorms and blizzards, disrupting infrastructure and transport, while intense rainfall and strong winds from May to September pose additional threats to agriculture and settlements.

Heatwaves and droughts, especially between July and September, significantly affect farming and increase wildfire risks in steppe zones. Flooding is another seasonal hazard, typically occurring from mid-February to May, influenced by snow reserves and river conditions.

In contrast, the Project area, located in the semi-arid steppe zone of Moiynkum District, faces relatively low seismic and mudflow risks due to its sandy soil and limited rainfall. While steep slopes and spring snowmelt present some landslide potential, the arid climate and terrain reduce overall susceptibility. Winter blizzards and strong winds remain a challenge, occasionally damaging infrastructure. Drought-related fires, often linked to land-clearing practices, have caused environmental damage in nearby protected areas. Flooding from mountain runoff can occur locally, but the site's sloping topography helps minimize broader impacts.

### *Metereology and Climate*

The Jambyl Region has a dry, continental climate marked by sharp temperature swings and low annual rainfall, especially across its desert plains. Summers can be extremely hot, while winters bring severe frosts, with temperatures occasionally dropping below -45°C. Precipitation is unevenly distributed, mostly falling in winter and spring, and increases in the mountainous areas. Winds are generally moderate but vary with terrain. The Project AoI, located in the semi-arid Moiynkum District, reflects these conditions, with sandy soils and limited rainfall.

Indeed, the Project AoI experiences a temperate continental climate typical of a semi-arid steppe zone. Temperatures range from -46°C in winter to +47°C in summer, with moderate seasonal averages and a frost-free period lasting around six months. Annual precipitation is low (150–300 mm), mostly concentrated between April and October, while snow cover is shallow and short-lived. Strong winds are common, and long-term climate trends show rising temperatures and declining rainfall, contributing to increasing aridification.

### *Climate Change*

Kazakhstan faces growing vulnerability to climate change, particularly in agriculture, water resources, public health, and socio-economic development. The Project site, located in a cold semi-arid zone, reflects broader national trends of increasing aridity and temperature extremes. Projections indicate that Kazakhstan's warming will exceed global averages, with severe droughts, glacier melt, and intensified mudflows threatening ecosystems and livelihoods—especially among rural and marginalized communities. Without adaptation, crop yields like spring wheat could decline by up to 50%, impacting global food security. National strategies include commitments under the Paris Agreement and various climate reports, though institutional responsibilities have

shifted over time. While no major climate-related events have occurred at the Project site, its rural setting makes it susceptible to water scarcity and extreme weather, underscoring the need for targeted resilience measures.

### *Soil and Land Use*

The Project AoI in the Jambyl Region is characterized by diverse soil types shaped by topography and climate, ranging from fertile alpine soils to arid desert soils. Located within the piedmont desert zone of the Shu-Ili Low Hill Terrain, it features piedmont brown desert soils alongside gray-brown and sierozem varieties, with soil transitions along the proposed transmission line routes reflecting the changing landscape. Ecologically, the area overlaps with the Zhusandala State Reserve Zone and borders the Andasay State Nature Reserve, both of which are protected under national legislation and home to valuable steppe and desert species. Despite a partial reduction in Zhusandala's boundaries in 2019, updated assessments confirm the Project site remains within the reserve, necessitating careful biodiversity planning. The land is also used for seasonal livestock grazing and lies near several mineral deposits, although no active subsoil use areas are found within the Project site.

### *Surface Water*

Kazakhstan faces growing water scarcity, with uneven distribution and heavy reliance on rivers originating abroad. The Project site lies between the Shu-Talas and Balkhash-Alakol basins, both important but limited in usable water. The Project is not expected to have any impact nor interference with Lake Balkhash and the Shu River due to their distance. The Shu-Ili Low Hill Terrain, where the Project is located, has a dry climate and a sparse hydrographic network, with seasonal creeks that flow briefly in spring and dry up by summer.

### *Groundwater*

The Jambyl Region contains significant groundwater reserves, especially in the Shu-Sarysu basin and foothill plains of the Kyrgyz Alatau, where porous and fractured formations support fresh and slightly saline aquifers. However, the Project site lies in a semi-arid zone with shallow, often saline groundwater and limited surface discharge. Sampling from three local wells revealed multiple exceedances of safety standards, including high levels of metals, suspended solids, and microbial contamination. These issues are likely due to industrial activity, lack of wastewater treatment, and natural geological conditions. While the groundwater may be usable for construction, it is unsuitable for drinking without treatment.

### *Ambient Air Quality*

In 2023, the Jambyl Region recorded over 55,000 tons of pollutant emissions from stationary sources, with Taraz city alone contributing more than half. Despite a growing vehicle fleet and widespread use of gas for residential heating, air quality monitoring remains limited, particularly near the Project site, which lacks dedicated stations. The nearest data comes from Shu town, 100 km away, where air quality was rated "low," mainly due to nitrogen dioxide exceedances. The Project site itself is a greenfield area used for livestock grazing, with minimal nearby industrial activity. Emissions in the vicinity stem from small-scale mining, vehicle movement on unpaved roads, and distant facilities like the Akbakay Gold Mining Plant.

### *Ambient Noise*

Noise measurements conducted within the uninhabited Project site in July 2024 confirmed the absence of anthropogenic noise sources. The assessment, carried out by an accredited laboratory under international and national standards, recorded ambient sounds primarily influenced by wind and insect activity, with intermittent and broadband characteristics. Three monitoring points were strategically placed around the site perimeter. Results showed that baseline noise levels fall well below thresholds set by the World Bank's EHS Guidelines, both for industrial environments and nearby residential or seasonal use.

### *Waste Management Practices and Infrastructure*

Waste management in Kazakhstan is governed by a structured legal framework that includes the Environmental Code (2021), specific ministerial orders, and sanitary regulations. These laws establish the responsibilities of waste generators and owners, requiring them to follow a defined waste management hierarchy. This hierarchy prioritizes waste prevention, followed by preparation for reuse, recycling, recovery, and, as a last resort, disposal. Waste prevention includes measures like reducing hazardous substances in products and extending product lifespans. When prevention and reuse are not feasible, recycling and recovery are encouraged, with disposal reserved for non-recyclable waste.

Nearby the Project site, Mirny village hosts a municipal solid waste landfill, even though in poor conditions.

### *Energy Sources*

Kazakhstan's energy system is split into North, South, and West zones, with the North producing most electricity and supplying the South via transmission lines. The Jambyl Region is a leader in renewables, hosting 21 wind, solar, and hydro plants as of 2024, with plans to expand capacity fivefold by 2030. To address a projected 6.2 GW power deficit, the government approved nuclear energy through a 2024 referendum. Ulken village, near the Project site, was selected for the country's first nuclear plant due to its strategic location.

### *Natural Radioactivity and Radiation Study*

During the baseline phase, WSP team identified two decommissioned uranium mines near the Project site, marked by radiation hazard warnings. While typical emissions from such mines include radon and contaminated dust or water, no public data was available on local contamination levels or waste management practices. To assess potential risks, WSP commissioned a radiological survey conducted by IAF-Radioökologie GmbH and WISUTEC. The findings showed minimal radiological activity at the site, indicating no health risk to workers or nearby communities.

## 4.2 Baseline conditions – Social

### *Population and demography*

The Project site is located primarily in Moiynkum District of the Jambyl Region, as described in Section 1.1. Communities in Moiynkum District face limited infrastructure, water scarcity, and weak connectivity. Local governance is managed by village-level akimats, though decision-making and funding remain centralized. Jambyl Region, which includes Moiynkum, has a largely rural population and a diverse economy supported by agriculture, trade, and mining, with well-established transport links.

Moiynkum District itself is composed by 24 settlements and a population of around 32.000. It is agriculturally focused and hosting several mining and industrial operations. Many nearby villages, such as Shyganak, Khantau, and Kiyakty, have been assessed as struggling with access to basic services.

Within the Moiynkum District, Mirny Village was once a prosperous mining hub with over 5.000, supported by mining and equipped with modern amenities and reliable transport infrastructure. Today, the village has declined significantly, with only 674 residents remaining and many facilities underused. The closure of mining operations and consequent increasing youth migration have left the area with limited employment and services.

The baseline investigations identified several vulnerable groups in the Project AoI, including nomadic herders, isolated rural communities, the elderly, persons with disabilities, women, poorer households, and youth. These groups may face disproportionate impacts from land use changes, construction activities, and limited access to compensation or support. During the investigations it was assessed that, as per the IFC Performance Standard 7, no indigenous people are present within the Project AoI.

### *Land use*

The Project AoI spans several land categories defined by Kazakhstan's Land Code, including agricultural, industrial, forest reserve, specially protected natural areas, and reserve lands. A significant portion of the northeastern part of the AoI lies within Forest fund lands, which are governed by strict regulations under the Forest Code. These lands are either state-managed or privately held for afforestation purposes and cannot be sold or mortgaged. Meanwhile, central and southern part of the Project AoI fall under reserve lands, which are unallocated plots managed by district authorities and may be reassigned for various uses, including agriculture and industry, following legal reclassification.

Cadastral data provided by RSE "NPCZem" confirms that Forest fund lands dominate the Project site. Smaller plots within the WPP site are allocated for granite extraction (ORGSTROY LLP), agriculture (Moyinkum AGRO LLP), and individual farming, though many of these lands are currently inactive.

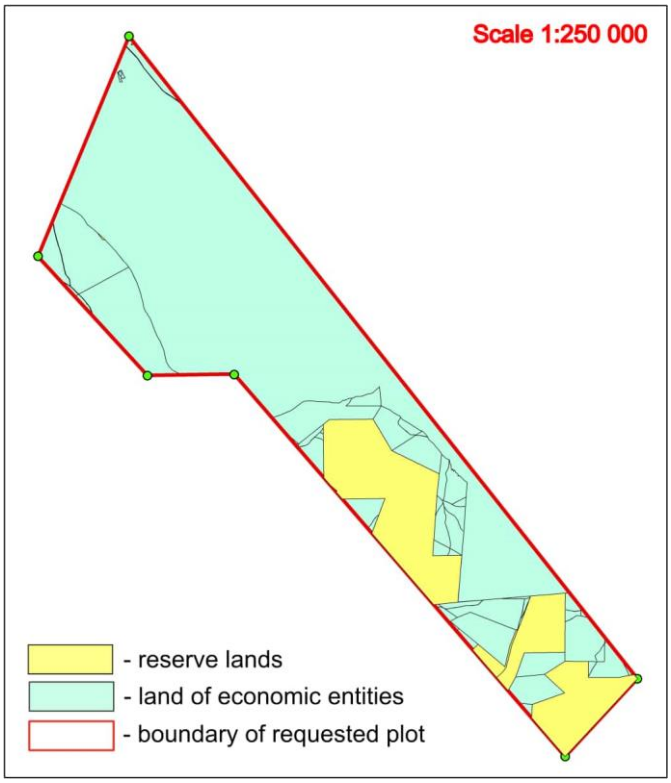


**Figure 9: Land plots within the WPP site.**

Social surveys revealed that local landowners and herders generally support the Project, provided water wells are restored and grazing routes are respected. As of of today the land designated to fall within the Project site is used primarily for grazing, with no active crop cultivation observed.

### *Economy and employment*

Between 2022 and 2024, Kazakhstan's economy showed signs of both resilience and strain. Inflation surged in early 2022, peaking in March, before gradually stabilizing through 2023 and easing slightly in 2024. Despite this moderation, prices - especially for food and utilities - remained high, placing pressure on low-income households. The labour market, however, demonstrated strength, with unemployment falling to 4.7% and poverty rates declining to 8.8%, supported by government initiatives targeting youth and women, and a rise in the minimum wage. Yet, income inequality and regional disparities persist, particularly between urban and rural areas.

At the local level, Moiynkum District reflects broader national trends but also faces distinct challenges. Labour data from 2014 to 2023 shows a steady decline in both the working and employed populations, suggesting outmigration and limited job creation. Youth unemployment has risen, and both wage and self-employment opportunities have diminished, pointing to structural weaknesses in the local economy.

Environmental constraints further complicate livelihoods. Water scarcity has halted crop cultivation near the Project site, shifting economic reliance to cattle grazing and fishing in Lake Balkhash, both increasingly threatened by declining water levels. Livestock farming continues but is unevenly distributed and vulnerable to climate pressures.

Despite these challenges, Moiynkum's industrial sector is growing. The Myn-Aral fish processing plant, along with mining, metallurgy, and construction enterprises, contributes significantly to regional output. The district leads Jambyl Region in industrial production and is set to benefit from new investment projects expected to generate over 850 jobs. National programs such as the "Economy of Simple Things" and the Business Development initiative support this growth, with a focus on improving wages and working conditions.

Mirny Village illustrates the fragile balance of rural economic life. While basic services and small-scale entrepreneurship exist, they are limited and dependent on external demand. Local residents remain heavily reliant on pensions, with few formal employment options beyond the akimat and Orgstroy construction company. Nonetheless, some entrepreneurs are preparing to reopen businesses in anticipation of Project-related activity, reflecting a cautious optimism.

Moiynkum's contribution to foreign trade is modest, focused on natural resource exports and agricultural products. Imports of machinery and consumer goods are vital for sustaining local industries. Overall, the district's economic outlook is shaped by its industrial potential, environmental constraints, and the need for inclusive, targeted development strategies.

### *Education*

Kazakhstan has a strong education system with a 99.8% adult literacy rate and structured pathways from preschool to postgraduate studies. Higher education attainment has grown significantly, with nearly 28% of the population holding university degrees by 2021. Women make up over half of the student population, and gender parity in education is nearly achieved.

In contrast, Mirny Village offers only basic schooling and a kindergarten. For university education, residents must travel to Taraz. Most villagers have secondary vocational education, highlighting limited access to advanced learning opportunities in rural areas.

### *Community health, safety and security*

Kazakhstan's public health system reflects a strong commitment to universal healthcare, supported by free medical services and the Mandatory Social Health Insurance scheme. As of early 2024, the population reached over 20 million, with steady natural growth and declining infant mortality. Healthcare infrastructure includes over 78,000 doctors and 180,000 specialists, serving millions through hospitals and primary care.

In Jambyl Region, life expectancy has risen significantly, though challenges persist. Cardiovascular diseases remain prevalent, while tuberculosis rates and related deaths have declined. Infectious diseases saw a seasonal spike, particularly respiratory infections. Although no confirmed cases of Crimean-Congo haemorrhagic fever were reported, preventive measures and medical training are in place across endemic areas.

Mirny Village offers basic health services through two doctors, a paramedic, and one ambulance. For complex care, residents rely on Moiynkum hospital, highlighting the need for strengthened rural healthcare access.

### *Mobility and Infrastructure*

Mirny, Kiyakty, and Shyganak villages face severe infrastructure challenges. Many buildings are abandoned, and residents struggle to sell homes due to depopulation. Water access is unreliable, delivered infrequently by truck or via low-pressure pipelines from Lake Balkhash, often providing undrinkable water. Sanitation is poor, with residents relying on basic street toilets.

Electricity is available, but southern Kazakhstan suffers from energy shortages due to aging infrastructure and rising demand. Transport options are limited: a single train cart and costly private vehicles connect Mirny to Shu. While national road networks are improving, local mobility, especially for people with disabilities, remains inadequate.

### *Human Right*

Human rights in Mirny Village are constrained by poor living conditions. Residents lack access to clean drinking water, reliable healthcare, and quality education, undermining basic rights to health and development. Economic dependence on limited local jobs restricts freedom of expression, while fear of political scrutiny discourages open dialogue. These challenges reflect broader inequalities in rural Kazakhstan and highlight the need for stronger local support and infrastructure.

### *Civil Society and NGOs*

Public organizations in Jambyl Region support diverse social needs. Women’s associations promote entrepreneurship, while groups like “Zhandanu” and “Nakty Komek” assist people with disabilities. Ethnocultural associations foster interethnic harmony, and youth movements encourage civic engagement. Environmental campaigns such as “Taza Kazakhstan” mobilize communities for ecological action, reflecting strong grassroots involvement in regional development.

### *Cultural Heritage*

Although the proposed wind farm site in Moiynkum District has no known tangible cultural heritage, it lies within a region rich in historical and cultural significance. Nearby landmarks such as the Ayzhigit-Kalpe, Kuralai Sulu, and Binazar Batyr mausoleums reflect deep-rooted Kazakh traditions and spiritual reverence. The Khantau Mountains, with their Bronze Age petroglyphs and burial sites, further underscore the area's archaeological importance.

Given this context, it is essential to conduct formal cultural heritage assessments in line with national legislation and to implement a chance finds procedure during construction. This ensures any undiscovered artifacts are properly documented and preserved.

Beyond physical heritage, the region holds valuable intangible cultural traditions shaped by Kazakh nomadic life, pastoralism, and Islamic values. Village elders play a key role in maintaining these customs and guiding community decisions. Their involvement in project planning is vital to safeguarding local identity and ensuring respectful, inclusive development.

### *Landscape and Visual Quality*

Moiynkum District presents a strikingly varied landscape, ranging from low hills and sandy ridges in the south and west to the elevated terrain near Lake Balkhash in the northeast. In the region, pressures from climate change, overgrazing, and limited water resources threaten soil stability and biodiversity, raising concerns about long-term sustainability for both natural habitats and agricultural livelihoods.

The Project site is predominantly located on the flat-topped Maizharylgan Mountains, with its northern section extending onto the Jambyl Mountain. To the west of the Project site are the Sekseul Dala Steppes, which have an average elevation of around 345 meters. Between the Sekseul Dala Steppes and the Maizharylgan Mountains, there is a significant elevation rise in the Maizharylgan mountains. Maizharylgan mountains reaching heights from 450 to 550 meters. Toward the east, the terrain gradually slopes downward into the Kulanketpes Valley and extends toward the shores of Lake Balkhash.

The vegetation reflects the dry climatic conditions of the region. Dominant plant species include various types of wormwood, camel thorn, marsh grasses, reeds, and shrubs, which thrive across the landscape.

### *Ecosystem Services*

The economy of Moiynkum District is strongly shaped by its rich natural resource base. The area is known for extensive mining and export of valuable minerals, including phosphorites and rare metals. Designated plots support the extraction of a wide range of materials such as black and colored metals, rare earth elements, fluorspar, manganese ores, gold, baryte, and feldspar. These resources play a central role in regional development, attracting industrial activity and contributing to Kazakhstan's broader mineral economy.

### *Facilities and public services*

Moiynkum District maintains essential public services to support safety and community well-being. Civil protection is coordinated by the Department of Emergency Situations, with firefighting brigades stationed in Birlik and Shyganak. For large-scale fires, the Forest and Wildlife Protection Institution collaborates with regional authorities, though the district's vast geography poses challenges for rapid emergency response, especially near the proposed wind farm site.

The nearest Migration Service Center is located in Taraz, limiting local access to emigration and foreign service support. Cultural life in Mirny Village is centered around a community center, though it currently sees little activity. Law enforcement is present through district and village police departments, with low reported crime levels, suggesting a generally safe environment.

## 4.3 Baseline conditions – Biodiversity

Before fieldwork, a literature review, a desktop study and analysis of cartographic materials were conducted. The study resulted in a preliminary list of flora and fauna species potentially present within the Project's AoI, a habitat map of Natural and Modified habitats, identification of protected areas within 70 km from the Project footprint, and an assessment of potential Critical Habitats. Desktop studies were conducted drawing on a wide range of sources, including biodiversity databases, scientific literature, and expert reports.

The study integrates findings from multiple survey campaigns carried out between April 2023 and August 2025. Initial data collection covered both the northern and southern Project AoI, but with the final site now located within the southern zone, the focus shifted accordingly. To ensure completeness, ecological data from areas outside the final site boundary were retained for context. Adjustments to the site layout required additional surveys between September 2024 and August 2025 to fill gaps and align with the final turbine configuration. This approach ensured a robust and site-specific ecological baseline for assessing potential impacts and guiding mitigation.

### *Habitat mapping*

Two biodiversity surveys were conducted by ACBK Centre for Conservation Biology LLP; the first was undertaken between April 2023 and May 2024 and the second between September 2024 and August 2025. Below is presented a summary of the results of the surveys:

- April 2023 – May 2024: high density of argali sheep and nesting of rare species of birds of prey - the golden eagle and saker falcon, have been found on the Project site, thus requiring a review of the design of the WPP and the positioning of the wind towers in order reduce harm to such species.
- September 2024 – August 2025: field surveys identified key vegetation associations and rare species, notably the cenosis-forming Salsola arbusculiformis and several tulip species, including Tulipa alberti and Tulipa biflora, both listed in Kazakhstan's Red Book. Sensitive habitats were found near planned infrastructure sites, such as the turanga grove near the 35 kV line, which requires strict protection due to its limited distribution. The southern and northern substation sites, as well as the camp site, support ephemeral-rich communities and turf grasses, with notable floral diversity and seasonal displays like the peacock poppy.

### *Protected Areas*

The Project AoI overlaps totally with protected areas. Turbines' footprint is entirely included in the Zhusandala State Reserved Zone and close to Andasay State Nature Sanctuary (ref Project site selection – section1.2), both rich in biodiversity and home to threatened species. The Pribalkash Nature Sanctuary lies further east, preserving parts of the Ile River Delta.

Internationally, the area is linked to several Key Biodiversity Areas (KBAs) and Important Bird Areas (IBAs), including Zhusandala IBA, Topar Lake System, and the Ili River Delta Ramsar site. These zones support rare flora and fauna and are vital for migratory birds and wetland ecosystems. Their proximity underscores the need for careful environmental planning.

### *Natural and Modified Habitats*

The Project site lies within the Central Asian northern desert ecoregion, featuring dry plains, low mountains, and resilient vegetation adapted to harsh conditions. Located in Moiynkum District, Zhambyl Region, the southern Project area includes herbaceous habitats, saxual thickets, and canyon-like valleys, with minimal modification and light grazing.

Field surveys in 2023 identified five habitat types, including rocky low mountains and sagebrush deserts. Sentinel-2 data shows a mix of natural and modified land cover, rangeland, cropland, bare ground, and seasonal water bodies. The area's fragile ecosystem is sensitive to climate change, overgrazing, and water scarcity, requiring careful management.

### *Flora*

Botanical surveys conducted in 2023 and 2025 across the Mirny Project AoI revealed a rich and diverse flora, with 238 plant species recorded. While most are classified as Least Concern, several tulip species - including Regel's tulip (Tulipa regelii), Albert's tulip (Tulipa alberti), and Biflora tulip (Tulipa biflora) - are listed as rare or endangered in Kazakhstan's Red Book. These were found mainly on rocky slopes and hilltops, with Albert's tulip notably abundant near the southern substation.

Vegetation across the site is dominated by wormwood and boyalych complexes, saxaul forests, and ephemeral species, with distinct plant communities adapted to stony, saline, or general soil types. The surveys also identified sensitive zones near planned infrastructure, such as substations and the camp site, where rare flora may be at risk due to soil clearance. Notably, a small grove of Euphrates poplar (Populus diversifolia), a relict species, was found near the eastern end of the transmission line corridor.

These findings underscore the ecological value of the area and the need for targeted mitigation to protect rare and endemic plant species during project development.

### *Birds and Bats*

The avifaunal assessment for the Mirny Project AoI, conducted between 2023 and 2025, revealed a rich diversity of bird species, including 253 identified via IBAT and 173 observed directly. Among these, several are globally threatened, with 31 listed in Kazakhstan's Red Data Book. The southern part of the Project site is particularly important for breeding and migratory birds, including houbara bustards, raptors, and waterbirds.

Surveys confirmed nesting by species such as golden eagle, long-legged buzzard, and saker falcon, with numerous active and old nests recorded. Migration studies revealed high-density flight corridors shaped by topography and proximity to Lake Balkhash and the Chu River. Autumn 2024 and spring 2025 surveys documented significant raptor migration, including steppe eagles, harriers, and vultures, with dominant flight directions southwest in autumn and northeast in spring. Despite reduced counts in 2025 due to missing March data, migration corridors remained consistent year-to-year, indicating quasi-stable patterns.

Waterbird migration was also prominent, with pelicans, swans, gulls, and terns observed flying between major wetlands. Local movements mirrored the regional geography, with flight altitudes ranging from 50 m to over 1 km. Other notable species included cranes, sandgrouse, and desert-adapted passerines.

Surveys along the overhead transmission route confirmed similar species presence as at the wind turbine sites, including wintering golden eagles and white-tailed eagles.

Collision risk modelling, based on multi-season observations, focused on 13 priority species such as golden eagle, steppe eagle, and black kite. These results informed turbine siting and mitigation planning, ensuring that both flight density and collision risk were considered in line with international best practice.

Regarding bats, bat surveys across the Mirny Project AoI identified six species, including David's myotis and parti-coloured bat, with most classified as Least Concern. Some species are sensitive to wind turbines, especially migratory bats. Rocky outcrops and temporary water bodies offer roosting and foraging habitats, though overall bat diversity is low due to arid conditions.

Thousands of ultrasonic recordings were collected using detectors, including mast-mounted units. Additional surveys in July 2025 were conducted to reflect updated turbine locations.

### *Herptile and freshwater species*

Herpetofauna and freshwater surveys in the Mirny Project AoI highlight both ecological value and environmental stress. The Vulnerable steppe tortoise and desert-adapted green toad were frequently observed, while most other reptile and amphibian species are Least Concern.

Wetlands and lakes fund within the Project AoI host diverse fish communities, with Lake Akkol showing the highest richest species. However, water scarcity and human pressure have degraded other water bodies, especially Lake Karakol and Akzhaikyn. Alien species and the loss of the endemic Chui ostrolučka reflect broader ecological decline. Restoring fish stocks is vital for biodiversity, migratory birds, and local food security.

### *Mammals*

Mammal monitoring in the Mirny Project AoI has confirmed a rich and ecologically varied community, with 64 species identified, including several conservation concern. Notably, the argali and goitered gazelle—both listed in Kazakhstan's Red Book—were observed in the southern part of the Project AoI. Argali were present year-round, with breeding confirmed through sightings of females with lambs, though 2025 counts declined, likely due to reduced survey effort and rising human activity. Goitered gazelles, while not captured on camera, were confirmed through field signs and appear to use the area seasonally, migrating during winter.

Rodent species further illustrate the Project AoI ecological diversity. The greater gerbil forms dense, complex colonies in loamy soils, while the Libyan gerbil occupies clay-gravel habitats in scattered settlements. Tamarisk gerbils were found in moist lowlands with dense vegetation, and the common vole, more widespread than previously thought, thrives in gravelly loam soils and serves as a key prey species for raptors. These findings highlight the need for careful land-use planning and ongoing monitoring to protect sensitive habitats and support biodiversity across the Project landscape.

#### *Invertebrates*

Invertebrate biodiversity in southeastern Kazakhstan is vast but under-researched, with many rare and endemic species. Five main desert and steppe complexes host distinct faunal communities shaped by microclimate and vegetation. Field studies identified typical species across these habitats, including beetles, spiders, molluscs, and aquatic insects. Finally, the species diversity of invertebrates at the Project site has been evaluated as limited in species richness and insignificant in numbers.

#### *Ecosystem Services and Invesive Species*

Ecosystem services, as defined by IFC Guidance Note 6, encompass the various benefits people and businesses derive from nature, including provisioning (e.g. food, water), regulating (e.g. climate, erosion control), cultural (e.g. aesthetic, spiritual), and supporting services (e.g. nutrient cycling). These are further classified into two categories: Type I services, which may be impacted by the project and affect local communities, and Type II services, which the project directly relies on for its operations.

In the context of the Mirny Project, Type II services are limited, as wind farms typically do not depend heavily on ecosystem inputs. However, water use during all Project phases and the role of vegetation and soil in stabilizing infrastructure are relevant and considered critical to project success. Type I services are more numerous and include those that may be adversely affected by the project, such as grazing resources for nomadic herders, wildlife habitats (especially for birds), water and soil quality, aesthetic values, and health-related concerns like noise. These findings highlight the importance of integrating ecosystem service considerations into project planning to safeguard both environmental integrity and community well-being.

Surveys in the Mirny Project AoI confirmed that all recorded flora and fauna are native, with no alien invasive species detected.

### 4.3.1 Critical Habitat Assessment

The Critical Habitat Assessment (CHA) was conducted for the Mirny Wind Farm Project in Kazakhstan, in line with IFC Performance Standard 6 and EBRD Performance Requirement 6. Its purpose was to determine whether the Project footprint or surrounding areas qualify as Critical Habitat (CH) or contain Priority Biodiversity Features (PBFs), based on internationally recognized criteria.

To support this analysis, Ecologically Appropriate Areas of Analysis (EAAAs) were defined for different species and species groups, including Red Book flora, migratory mammals, and freshwater species. These areas were delineated based on species distribution, ecological connectivity, and habitat requirements.

As a results four (4) species of flora and fauna have been identified as triggering Critical Habitat (CH) as follows:

- Tulipa regelli,
- Tulipa biflora,
- Severtsoy's loach,
- Ship Sturgeon.

In terms of Priority Biodiversity Features, eighteen (18) have been identified, mainly comprising birds (and in particular migratory species), migratory and resident mammals and a single reptile species. Additionally, the Project site overlaps with or lies near several protected zones, such as the Zhusandala State Reserved Zone and the Andasay State Nature Reserve, reinforcing the presence of PBFs.

# 5.0 STAKEHOLDER CONSULTATION

In accordance with international requirements, an effective Stakeholder Engagement process was conducted with affected communities and, where relevant, other stakeholders since the very beginning of the Scoping stage.

The Stakeholder Engagement process has been ongoing since the beginning of the ESIA process. The Stakeholder Engagement has been conducted through two main activities, meetings and consultations with representative stakeholders and surveys with samples of stakeholders for the collection of baseline information. These sessions aimed at collecting primary data and foster dialogue with key stakeholders, including national and local authorities, community-based organisations, and residents.

The engagement focused on understanding the environmental and socio-economic context, assessing potential Project impacts, and identifying vulnerable or influential stakeholders. Communities were selected based on their proximity to the project site, land ownership or usage rights, and levels of vulnerability. The meetings also provided a platform for stakeholders to raise concerns, clarify perceived versus actual impacts, and contribute to shaping future mitigation and communication strategies.

Below is a list of the major points discussed during the consultations among all stakeholders:

- Biodiversity concerns: Protect species like argali and golden eagles; propose habitat restoration and bird-safe turbine measures.
- Environmental planning: Call for an Environmental Action Plan with focus on migration monitoring and habitat compensation.
- Land and governance: Clarify land status and hunting activities; forest fund overlap noted.
- Community feedback: Mostly positive, with interest in jobs and infrastructure; concerns include water scarcity, health impacts, and mobile coverage.
- Support conditions: Residents and landowners support the Project if environmental impacts are minimal and land/water conditions are restored.

The results of these Stakeholder Engagement activities have been considered when defining the impact assessment and identifying the mitigation measures. The engagement will continue in the future Project phases and will be based on the results of the previous activities.

# 6.0 SUMMARY OF PROJECT ENVIRONMENTAL AND SOCIAL IMPACTS

The impact assessment conducted according to the Project standards included the identification, assessment, and quantification of the potential direct and indirect, positive and negative environmental (i.e., physical and biological) and social impacts associated with the Project, as well as risk of accidents, if any identified.

For the positive impacts identified, the ESIA reports the measures to be implemented for enhancing the positive effects of the Project on the local communities and the economy. For the adverse impacts identified, the ESIA defines relevant mitigation measures to avoid, or where avoidance is not possible, minimize, mitigate or compensate the adverse impacts (as per the mitigation hierarchy). The mitigation measures have fed the

Environmental and Social Management Plans, part of the Project Environmental and Social Management System.

## 6.1 Positive impacts

The Project main objective will be to support the country towards a green energy transition. Also positive impacts will be perceived locally, thanks to the construction of modern renewable energy infrastructure and new opportunities for attracting investments for developing the surroundings (e.g., industries, manufacturing and logistics companies, hospitals, educational buildings). Specifically, the main positive impacts of the Project are:

- **Increase in employment rates.** A boost in the local job market is expected. The wind power plant will create temporary jobs, both directly through construction and indirectly via support services like catering and security, and permanent jobs during operation. These roles will boost household incomes and improve skills for future employment. The presence of workers may also encourage informal local trade, benefiting the wider community;
- **Improvement of road network.** The road network will be improved to connect the power plant to the national road network. Better roads will benefit the local communities as they will support their economic activities. The road network amelioration is also expected to mitigate the increased traffic that will be generated by the Project construction.
- **Provision of electricity to the national grid:** The Mirny WPP contributes directly to Kazakhstan's Strategy 2050, which targets a 50% share of renewables in the national energy mix. By generating clean electricity, the Project supports the country's transition away from fossil fuels, helping reduce greenhouse gas emissions and air pollutants. This shift not only aligns with global decarbonisation goals but also brings tangible benefits for public health and environmental quality;
- **Creation of synergies with local educational system.** The construction of the Mirny wind farm offers a chance to collaborate with local educational institutions, encouraging new courses and research in the renewable energy domain. These partnerships could improve technical knowledge, provide student training, and build a skilled local workforce. They may also attract investment and boost the regional economy.

## 6.2 Adverse impacts and mitigation measures

Adverse impacts on the social, biological and physical components were identified for both the Project construction and operation phases. The main adverse impacts and risks associated with the Project are:

- **Change in local hydrogeology, surface water and groundwater quality:** Rainfall and construction at the WPP and OHTL sites may lead to water pollution and disruption of seasonal streams due to excavation and blasting activities if not properly managed. Risks include runoff carrying pollutants, accidental spills, and improper waste handling. Groundwater could also be affected, especially shallow aquifers. In order to mitigate this impact dedicated measures have been identified; these include the development of a dedicated Water Management Plan, the installation of drainage systems and monitoring and reporting of groundwater levels during all Project phases among others. During operation, impacts are expected to be minimal, with measures in place to prevent contamination from wastewater or surface runoff.
- **Emissions of greenhouse gasses (GHG):** Construction activities will generate greenhouse gas emissions mainly from heavy machinery, transport, and material use, especially cement. While the Project's emissions are small compared to national levels, they still contribute to climate impact. To mitigate such impact, proper mitigation measures have been identified, including the development of Air Quality Management Plan and regular periodical maintenance emission control systems of construction equipment and machinery. During the operation phase the GHG emissions will be limited to the maintenance and cleaning activities.

- **Dust and particulate matter emission:** During construction, air quality is mainly affected by short-term dust and particulate emissions from excavation, material transport, loading, unloading, roadwork, and waste stacking. These emissions are temporary, as particles settle quickly and community exposure is limited. However, workers' health may be at risk due to inhalation of fine dust from materials like cement, concrete, silica, and wood, which contain sulphates and silicates linked to respiratory issues. In desert or arid areas, natural conditions and strong winds can further raise dust levels and increase health risks for workers. Adequate mitigation measures have been identified, including the development of Air Quality Management Plan and the use of appropriate personal protective equipment ("PPE") from all workers exposed to the dust emission. During operation, emission of dust and particulate matter has been considered negligible and not further investigated.

- **Generation of solid waste and of wastewater**. The construction of the Project is expected to generate significant volumes of solid and liquid waste, including hazardous materials. Due to the lack of adequate waste treatment facilities near Mirny, the Project will rely on a combination of on-site recycling, composting, and emissions-free incineration, as well as transport to compliant regional facilities ensuring strict adherence to the Waste & Hazardous Materials Management Plan. During operations, waste generation will be much lower, mostly non-hazardous, but still requiring proper management. Wastewater from construction will include domestic sewage, equipment wash water, and stormwater runoff. Since no public sewage system exists in the area, a closed-cycle treatment system is planned.

- **Noise emission:** During the construction phase, noise and vibrations are expected primarily from heavy machinery, material transport, blasting activities and road construction. Due to the segmented and temporary nature of these activities and their location away from sensitive receptors, impact are expected to be limited. At site level, workers will be adequately trained and equipped of Personal Protective Equipments, machineries and equipments will be correctly maintained to minimize emissions. In any case noise and vibrations level will be monitored along the overall construction period. Operational noise will mainly originate from the wind turbines, with mechanical and aerodynamic sources contributing to overall sound levels. Modeling indicates that cumulative noise at the nearest sensitive receptors remains within applicable national and Lenders' limits. Noise impacts on herders may vary depending on proximity, therefore stakeholder engagement will be conducted to inform them of potential noise levels near the Wind turbines. Other infrastructure components (BESS, OHTL, Offices and Sub-station) are expected to generate a negligible level of noise and vibration. The Project is committed to carry out a monitoring program during the operational phase also through the implementation of the grievance mechanism.

- **Soil:** During the construction phase, the removal and degradation of the soil will be related to the construction or renovation of roads and excavation which require vegetation clearance, topsoil stripping and levelling. This change of soil structure may be particularly susceptible to accelerate erosion, potentially increasing sediment runoff and affecting nearby watercourses. The implementation of the established Soil Management Plan and the associated mitigation measures, namely the temporary stabilisation of the disturbed surfaces, proper drainage channels and progressive revegetation will help reduce the likelihood of destabilisation during heavy rain events. No direct impacts are expected during operation.

- **Impacts on flora and fauna:** The construction phase of the Project will significantly alter the natural environment through vegetation clearance, topsoil removal, and infrastructure development across areas rich in shrubland and herbaceous cover, including species of conservation concern. These activities will result in habitat loss, fragmentation, and degradation, particularly affecting species with limited mobility or those dependent on concealment and nesting sites. Beyond physical disruption, construction will generate dust, particulate matter, and gaseous emissions that impair plant functions and pose health risks to fauna. Noise and vibrations from machinery may further disturb wildlife, leading to temporary displacement and reduced biodiversity. Improper waste and water management could contaminate local resources or reduce

water availability, compounding stress on ecosystems. Road construction, in particular, threatens habitat connectivity, potentially restricting wildlife movement. Additional indirect impacts include the spread of invasive species and air quality deterioration, all contributing to broader habitat degradation within and around the Project site.

- For **birds**, surveys identified 36 species flying at potential collision height, with 13 species assessed for collision risk modeling, including Steppe Eagle (Endangered) and Black-bellied Sandgrouse (Endangered in Europe). Although the site is not located on a major migratory flyway, collision risk during operation remains a concern, particularly for soaring raptors. Estimated mortality over the project's lifetime is low but significant for species of conservation concern. Mitigation measures include turbine micro-siting, seasonal work restrictions, and advanced technology such as Shutdown on Demand systems (e.g., Identiflight) during both Spring and Autumn bird migration periods, whose content is preliminarily defined in the Framework Active Turbine Management Plan (ATFC - part of this disclosure package) and will be further refined along the Project construction period. Additional measures like blade painting and carcass removal will further reduce risks. For overhead transmission lines, bird diverters will be installed to minimize collision and electrocution hazards.
- **Bats** were recorded in low numbers due to the site's arid conditions, but operational risks such as turbine collisions and habitat disturbance persist. Mitigation will involve curtailment during peak activity seasons, lighting design to reduce attraction, and vegetation control near turbines to limit foraging opportunities.
- The Project area supports diverse **natural habitats**, including xerophytic rocky low mountains and saxaul forests, and triggers critical habitat for two tulip species (*Tulipa regelii* and *Tulipa biflora*). Habitat loss is estimated at over 5,000 hectares, with high significance for these species. A Rare Plants Management Plan will guide seed and bulb collection, propagation, and restoration, complemented by offsetting measures to achieve no net loss and net gain for critical species.
- Among **large mammals**, *Argali* (Near Threatened) and *Goitered Gazelle* (Vulnerable) face risks from habitat loss, disturbance, and increased poaching due to improved access roads. Mitigation includes strict road access control, anti-poaching measures in collaboration with Okhotzooprom, and long-term monitoring through radiotracking. Habitat restoration and offsetting within the Zhusandala Reserve will further support conservation goals.
- For **herpetofauna**, notably the *Steppe Tortoise* (Vulnerable), and rare invertebrates, impacts include direct mortality and habitat fragmentation during construction. Seasonal timing of works, pre-clearance surveys, and translocation protocols will be implemented, alongside habitat restoration and post-construction monitoring.
- Although **freshwater species** such as *Ship Sturgeon* and *Severtsoy's Loach* were not recorded during surveys, precautionary measures will address potential risks from OHTL and substation works near Lake Balkhash. Water management plans and pollution control will prevent sedimentation and contamination.

Overall, the Project adopts a comprehensive approach combining avoidance, minimization, restoration, and offsetting. Key plans include a Biodiversity Action Plan (a Framework is currently under development and will be disclosed during disclosure period), Biodiversity Management Plan (part of this package for disclosure), Rare Plants Management Plan, and species-specific mitigation strategies. Long-term monitoring, adaptive management, and cooperation with local authorities will ensure residual impacts are reduced to low or negligible significance, aligning with international standards and supporting Kazakhstan's biodiversity conservation objectives.

- **Supply chain management:** The construction of the Project envisages a very long supply chain. It is important to consider the risks associated with the core suppliers (providers of Wind Turbines and BESS) separated from the other components and materials needed for construction purposes. Wind Turbines will come from two providers having both their facilities in China. In this context, the risk of human rights violations along the supply chain has been considered high. In order to face this impact, a detailed analysis has been conducted under human rights risk assessment and proper mitigation measures have been identified. A detailed Supply Chain Labour and Working Conditions assessment has been conducted to the two main suppliers. No red flags on social compliance performance and risks management were identified that would constitute forced labour or child labour among the audited sites. The supply chain management for the sourcing of all construction raw materials, products and equipment as well as operational services will follow the Company Procurement Strategy with the development and adoption of a dedicated Supply Management Plan to ensure the control and the verification of all suppliers.
- **Land use:** The Project requires a significant amount of land for its development: 105 land plots for a total of 20,000 hectares (tentative number at the time of writing) are expected to be impacted. As the Project is a Public-Private Partnership, according to the national relevant laws, the Government of Kazakhstan could retain the legal right to expropriate land for state needs. However, negotiated land acquisition has been the preferred approach. The land occupied by the Project site is occasionally used by seasonal herders for grazing purposes and even if they expressed no objection to relocating, this will result in economic displacement that needs to be properly addressed in line with EBRD PR5. In compliance with international standards, WSP has developed Land Acquisition and Resettlement Framework (LARF), part of this disclosure package, which presents the gap analysis between the Kazakh regulation compared to the Lenders' requirements and pose the basis for a Livelihood Restoration Plan (LRP) in order to mitigate the impact of the economic displacement for the herders.
- **Access to ecosystem services:** The construction works will limit access to the land and consequently generate impacts on different ecosystem services, such as the loss of vegetation and limited access to water wells, potentially reducing income and livelihoods for communities relying on grazing in the Project site. This will be only a temporary impact, considering that once construction in a given segment is complete, herders can return to access the land as before. However, proper mitigation measures have been defined to address such impact, in particular, all water wells affected by construction activities on the Project's AoI will have to be restored in order to allow their usage to local herders for grazing activities and land will be restored and revegetated where possible. During operation, impacts on ecosystem services are considered negligible.
- **Cultural Heritage:** During construction, the Project will have an impact on the cultural heritage given the presence of some mounds, archaeological complexes and graves. To prevent impacts, the Wind Power Plan and the OHTL corridor were designed to avoid all known cultural heritage sites, maintaining a minimum buffer of 40 meters around each object. Chance finds remain possible, and a Chance Finding Procedure will be implemented to manage any accidental discovery, in coordination with relevant authorities. A Cultural Heritage Management Plan has been developed to provide continuous monitoring and management of tangible and intangible cultural heritage, including engagement with local communities and relevant authorities. No direct impacts are expected during operation.
- **Workers' Influx:** during construction, it is expected a peak of approximately 2.000 workers ranging from 30 to 36 months. Workers will be hired both from within the local community, from Kazakhstan more broadly and worldwide, namely from China. The arrival of foreign workers may have sociological implications, such as upsetting the prevailing social harmony, causing adverse social disequilibrium and disharmony among the foreign and local residents. Such conflicts may have a negative impact on local communities and especially on more vulnerable people and the herders. Beside the social harmony, the exceptional influx of

workers could increase the possibility of the spread of communicable diseases due to the larger number of people and interactions between workers and the local population. No direct impacts are expected during operation.

- **Increase of traffic:** Construction activities will pose logistical challenges due to transporting oversized turbine components, cranes, and equipment. Increased construction traffic raises accident risks with pedestrians and vehicles, especially when passing through populated areas and especially on herders and livestocks when passing near the Project site.. Main roads near the site, currently with low traffic volumes but accustomed to heavy vehicles, will likely experience some impact, though expected to be limited. Transportation will also involve explosive materials delivered by specialized vehicles, requiring stringent safety measures to prevent accidents. Mitigation measures during construction envisages the adoption of a Traffic Management Plan and a Blasting Management Plan. During operation, the impact generated by the traffic of the Project is evaluated as considerably low, since the only traffic towards the Project site will be generated mainly by workers and maintenance activities.
- **Landscape and visual impact:** Construction can temporarily change the landscape through machinery movement, vegetation removal, and land leveling. These short-term effects often alter the area's appearance and affect public perception. During operation the Project's main impact will be visual, due to the presence of pylons, towers, and moving wind turbines. However, for the Mirny Project, the wind farm is located in a remote area and much of the transmission line follows existing routes, reducing additional visual and landscape impacts. Mitigation measures for construction and operation have been defined to favor as much as possible the integration of the infrastructure with the environment.

With the application of established mitigation measures, as described above, for both construction and operation phase, the residual impact calculated, has been generally lowered compared to the initial risk while the remaining assessed impacts have been considered negligible.

## 6.3 Human Rights Risks

The Project entails human rights risks and impacts that could potentially cause affect local communities and workers. The following main human rights have been identified as potentially at higher risk for the Project.

- **Supply Chain Risks:** The Project will rely on a range of goods and equipment for installing wind turbines, overhead lines, and road infrastructure, with some materials sourced internationally, primarily from China were the risk of human rights violations and poor labour working conditions are often assessed. Also, the Project entails the sourcing of raw materials such as cobalt, rare earths, and metals which often involves risks of labor violations.
- **Labour Rights Risks:** Given the elevated labour and civic space risks in Kazakhstan, the Project is initially considered high-risk in these areas. However, with the implementation of targeted mitigation measures—such as developing Project-specific policies and Management Plans aligned with international standards like the IFC Performance Standards, Equator Principles IV, and OECD guidelines—these risks can be effectively reduced to acceptable levels. This approach reflects the Project's commitment to responsible and rights-based practices.
- **Land Rights and Community Rights:** The construction of the Wind Power Plant (WPP) will directly affect landowners currently engaged in grazing activities, raising concerns about their rights to land ownership and self-determination. In line with IFC Performance Standard 5, this will involve conducting social surveys, a census, and an asset inventory of Project Affected People (PAPs) to inform a Livelihood Restoration Plan (LRP).

A robust environmental and social management system, including a set of policies (human resources, procurements and human rights), a dedicated Code of Conduct, and a set of social management plans (labour, community, health&safety and security, occupational, Health&Safety, Supply chain) has been established to ensure that mitigation measures identified within the ESIA are systematically implemented and monitored.

## 6.4 Climate Change Risks

### 6.4.1 Climate Change Risk Assessment

The Climate Change Risk Assessment (CCRA) for the Mirny Wind Farm Project was developed in accordance with international standards, including the Equator Principles IV, ISO 14091, and IFC guidelines. As a Category A project, the assessment focuses on physical climate risks that could affect infrastructure, operations, and surrounding ecosystems over the Project's lifecycle.

The CCRA methodology evaluates climate-related hazards - such as extreme heat, drought, flooding, storms, and wildfires - using historical data, current conditions, and future projections. It considers exposure, sensitivity, adaptive capacity, and vulnerability across key Project components, including turbines, substations, transmission lines, and access roads. Risks are assessed under multiple climate scenarios (optimistic, intermediate, and pessimistic) and timeframes to ensure long-term resilience.

Historical climate data for the Jambyl Region show a consistent rise in temperatures since 1950, with extreme seasonal variations and increasing heatwaves. Precipitation patterns are highly variable, with arid conditions dominating the plains and more rainfall in mountainous areas. These climatic features pose challenges for infrastructure durability, water availability, and operational safety.

The assessment identifies strong wind, hail, and extreme temperatures as particularly relevant hazards for the Project site. Adaptive measures, such as robust engineering design, climate-resilient materials, and emergency response planning, are recommended to mitigate these risks. The Project's contribution to renewable energy and its alignment with Kazakhstan's climate commitments position it as a strategic step toward national decarbonization and climate resilience.

## 6.5 Cumulative Impacts

The Cumulative Impact Assessment (CIA) has been conducted in line with international good practice as outlined in IFC Good Practice Handbook on CIA (IFC, 2013). The CIA has been undertaken and reported as an independent and objective process.

In common with most cumulative assessments, the CIA has faced challenges in several areas in terms of the reliability of predicting cumulative impacts and stakeholder engagement. Further challenges are likely where mitigation measures are partly or wholly outside Project's control. In general, the difficulties encountered were due to lack or limited information on sources of cumulative impacts.

This CIA identified the relevant and potential major development projects in the Project's AoIs and applied a systematic methodology to assessment of cumulative impacts in relation to the Project construction and operation activities.

The potential occurrence of cumulative effects has been considered as being possible during construction and operations. The CIA found there are currently a few projects that are considered reasonably planned for the near future. The major development projects are the Nuclear Power Plant in Ulken, the Gold Mine in Mynaral and the Korcem Cement Plant in Korday district: the currently available information indicates that most of them will be developed according to similar timeline of the Project with a potential for interactions and for the generation of cumulative effects.

This CIA has determined that cumulative impacts will primarily be related to waste management, water demand, economy and employment, with a limited Project's contribution.

The main concern is due to the Nuclear Power Plant in Ulken, which could be perceived as antagonistic to the project itself, moreover in an area where the presence of industries and infrastructure is currently quite limited.

The Client is committed to manage its Project following the highest ES standards as well as to make sure that dialogues are opened with the owners and developers of the surrounding projects.

## 6.6 Unplanned events

Unplanned events are not expected to occur during the Project's normal construction and operational phase activities but are considered possible, although they are unlikely. Possible unplanned events that may occur in the construction phase are considered to include worksite accidents, traffic accidents, spills and leaks of fuel, oils or other hazardous materials, fires and explosions, damage to third-party assets, spread of infectious diseases, security-related risks such as thefts and natural hazards.

These events represent a potential risk during construction although they may occur also during Project's operations. The likelihood of these events is considered to be low or very low. During the operation phase, additional unplanned events may include blade throw, and turbine collapse, cyberattacks and transmission line snapping, and transmission tower/pylon collapse.

To mitigate such potential risks, measures have been included under a dedicated Emergency Preparedness and Response Plan, envisaging the identification of emergency scenarios, accurate response planning and roles and responsibilities of site personnel.

# 7.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

An Environmental and Social Management System Framework Document (ESMS FD) has been developed for the Project to provide a tool for implementing all the mitigation measures identified during the impact assessment and ensuring the environmental and social performance of the Project. Such ESMS FD has been developed according to the Project standards and regulations, with the commitments undertaken in the impact assessment. The management system incorporates the following elements:

- Environmental, Social, Health and Safety Policies;
- A process for identification and assessment of environmental and social risks and impacts;
- Procedure to manage any Project change that may result in additional or different impacts and risks;
- Environmental and Social Management Plans;
- Roles and Responsibilities for implementing the ESMS;
- Training and awareness procedures to implement the Environmental and Social Management System and manage Project impacts and risks;
- Stakeholder Engagement Process;
- Emergency Preparedness and Response Plan and procedure to respond to unplanned and non-routinary events that may generate emergencies; and
- Environmental and Social Management System audit, monitoring, review, and performance reporting for ensuring and keeping the highest performance possible.

At present, only the ESMS FD has been developed, and a comprehensive Environmental and Social Management Plan (ESMP) covering all Project phases, construction and operation, will be prepared at a later stage. A set of Project-specific construction ESMPs has been developed and is currently in place. The detailed list is provided in the following table.

**Table 1: List of developed ESMPs for construction**

| Plan name | |
|---|---|
| Waste & Hazardous Materials Management Plan | |
| Water Management Plan | |
| Air Emissions Management Plan | |
| Resource Efficiency Management Plan | |
| Soil Management Plan | |
| Emergency Preparedness and Response Plan | |
| Blasting Management Plan | |
| Biodiversity Management Plan | |
| Biodiversity Action Plan | |
| Rare Plants Management Plan | |
| Stakeholder Engagement Plan | |
| Cultural Heritage Management Plan and Chance Finding Procedure | |
| Influx Management Plan | |
| Labor Management Plan | |
| Community Health and Safety & Security Management Plan | |
| Occupational Health and Safety Management Plan | |
| Traffic Management Plan | |
| Supply-chain Management Plan | |
| Land Acquisition Resettlement Framework | |
| Livelihood Restoration Plan | |

For the operational phase, a detailed list of mitigation measures has already been identified, as a result of the ESIA process and included in a commitment register. These will be further refined and transferred to the specific operational ESMPs to be developed six months before the start of operations, while the Decommissioning Plan will be developed six months before the start of decommissioning activities.

The Project's Environmental and Social performance will be continuously monitored and supervised through contractor oversight, internal audits and systelatic collection of environmental and social monitoring data. The Project E&S team will verify correct implementation of all management plans, ensure contractor compliance and maintain a corrective action progress to address any non-conformities. Performance report will be shared with lenders and relevant authorities, complemented by periodic external monitoring and independent audits. This system ensures that the Project maintains effective control of environmental and social risks.

Further details on the ESMS and ESMPs can be found under the ESMS FD which is publicly available as part of the ESIA disclosure package.

# 8.0 ENVIRONMENTAL AND SOCIAL ACTION PLAN (ESAP)

An Environmental and Social Action Plan has been developed for the Project in consultation with the Lenders. The ESAP outlines the Key actions, mitigation measures and management improvements that the Project will implement to meet the required Environmental and Social Standards throughout the Project life-cycle. The ESAP serves as a binding framework that defines specific responsibilities, timelines and performance indicators to ensure effective implementation during construction, commissioning and operation. Progress against the ESAP will be routinely monitoried and reported to the Lenders to demonstrate ongoing compliance and continuous improvement in the Project's Environmental and Social Performance.

# 9.0 ESIA DISCLOSURE PROCESS

Mirny Project disclosure in late December 2025, meeting EBRD Environmental and Social Policy (2019), PR 10, and IFC PS1 requirements. All main environmental and social documents will be public for 60 days, allowing stakeholders to review and comment, if needed. The disclosure ESIA Package includes the following documents:

- **Environmental and Social Impact Assessment**;
  - Environmental and Social Baseline Study (ESBS),
  - Impact Assessment Study (ESIA);
- **Management Plans Frameworks:**
  - Environmental and Social Management System (ESMS) Framework,
  - Land Acquisition and Resettlement Framework (LARF),
  - Biodiversity Management Plan (BMP),
  - Active Turbine Management Framework (ATMF);
- **Stakeholder Engagement Plan (SEP)**;
- **Non-Technical Summary (NTS)**; and
- **Environmental and Social Action Plan (ESAP)**.

SEP, NTS, ESMPs Framework and ESAP are published in English, Kazakh, and Russian on the Project website (https://www.mirny.kz/).

ESIA is published in English and Russian on the Project website (https://www.mirny.kz/).

Hard copies of the ESIA package will be available at local points like municipal offices and community centers in Mirny, Moyinkum, Chu, and Ulken. Public notices through newspapers, boards, and social media will invite stakeholders to consultation meetings. A disclosure meeting is planned for February 2026 in Mirny, with logistics in place for participants from all mentioned communities. Meetings will be culturally sensitive and inclusive for vulnerable groups. All feedback will be documented, showing how input influenced Project's decisions.

During the disclosure period, the Project's Communication Manager will handle website Q&As, coordinating with the Environmental and Social team, while the Community Liaison Officer will manage grievances. A QR code will allow easy grievance submissions via ads and newspapers. Disclosure and annual updates will continue throughout the project, with the grievance mechanism always accessible for concerns.

The channels provided in this document for submitting suggestions and complaints do not replace or limit the right of applicants to seek other judicial or extrajudicial remedies.

The company "Aktas Energy" undertakes to consider all requests and complaints fairly and within the established timeframes.

Queries and grieveances throughout the whole disclosure period can be submitted through the following channels:

- **QR code:** scan the QR code provided in flyers that will be available in all villages interested by the disclosue as well as on the Project's website
- **Online:** https://www.mirny.kz/
- **By email:** grievances.mirny@totalenergies.com
- **CLO phone number:** +7 701 985 4180

# Signature Page

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