REPORT

Mirny (Kazakhstan) 1GW Wind Farm Project

ESIA Report Chapter 05 - Impact Assessment, Social Components

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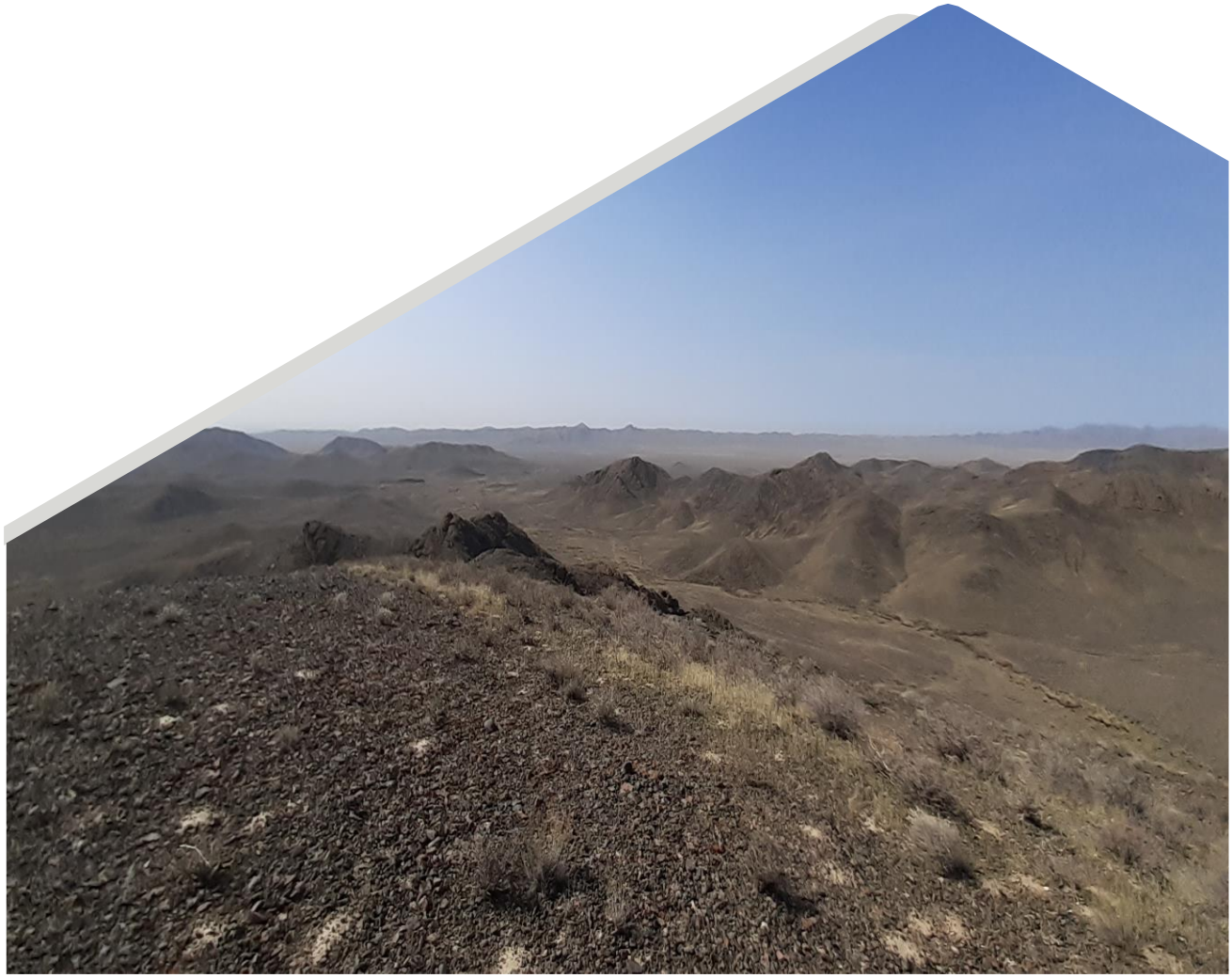

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5.0 IMPACT ASSESSMENT – SOCIAL COMPONENTS

This section presents the results of the impact assessment on social components conducted according to the Impact Assessment ("IA") Methodology described in Chapter 03. For each impact factor identified, an impact assessment is presented for all affected components, along with the related mitigation measures and the residual impacts. The Project is composed of two elements, the WPP and the OHTL. When these generate different impacts on an E&S component, the impact assessment reported below presents them separately.

5.1 Impact Assessment for Construction Phase

5.1.1 Impact Assessment

As described in Chapter 03 of this ESIA ("IA Methodology"), the Project actions carried out during the Construction phase can be primary generators of environmental or social pressures, which are identified as impact factors.

The potential social impacts that may be generated by the identified impact factors during the construction phase are described in the following table.

Table 1: Impact Assessment Social Components - Construction Phase.

Impact Factor	Impact Assessment	Components Affected
Removal/degradation of soil and vegetation	The Project-related roads to be built and/or renovated, the WTGs foundations, crane OHTL pad areas, and the OHTL steel transmission towers and access road areas will require vegetation clearance, topsoil stripping, and levelling. Based on the social baseline, seasonal herders were found using the land for grazing purposes. They are established in temporary structures and they remain in that area together with their livestock few months each year. In this context, the construction works of the WPP, of related access roads and of the OHTL may have impacts on the availability of land for such herders as well as 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. The herders that were interviewed expressed no objections in relocating their activities in other lands where they will be able to find the same conditions for their livestock. However, this will entail a loss of livelihood and economic displacement that will need to be properly addressed through strict mitigation measures. Beside the herders' grazing activities, there is no other impact expected on ecosystem services given that the WPP and related transmission line will be located in a remote area with no other human receptors sufficiently close to the site (closest villages, Kiyakty, Sholpan and Mirny located at approx. 20 kilometres from the site). In terms of landscape and visual quality, vegetation is an element that generally plays an important role in the perception of a landscape. Land clearing and levelling, as well as dumping of excavated material for a WPP can be a cause for the alteration of landscape integrity and disturbance of visual quality in the Project AoI. However, as previously mentioned the Project site is located in a remote area, far from villages or any other human receptors of potential visual impacts; therefore no significant impacts are expected in this regard. As for the construction of the transmission line, it is expected that the impacts will be more limited in magnitude when compared to the construction of the wind farm. This is because the construction activities of the OHTL and its supporting roads will require considerably less excavation and soil disturbance as well as impacts on the landscape and visual perception of the area considered. In addition, several sections of	▪ Ecosystem Services ▪ Landscape and visual quality

Impact Factor	Impact Assessment	Components Affected
	the OHTL will be built close to existing structures, therefore in already affected areas. Therefore, the expected impact is considered minimal.	
Change in the local morphology and topography	The change in local morphology and topography during the construction of a WPP and related OHTL can have significant social impacts on landscape and visual quality, namely affecting the cultural, aesthetic, and economic aspects of local communities. Indeed, construction activities, including earthworks, excavation and the use of large equipment, may disrupt the natural contours of the land and temporarily industrialize a natural landscape. The Mirny Project site will occupy a very large plot with 150 towers to be constructed; however it will be located in a remote area at a distance of more than 20 km from the closest human receptors. Therefore, the impact on landscape and visual quality for the construction phase is expected to be minimal.	▪ Landscape and visual quality
Change in the local hydrology and surface water quality	Project impacts on surface waters may be due to wastewater, stormwater, accidental spills of hazardous substances, and the like. Wastewater, if not properly managed, can introduce several contaminants and pathogens into soil, which could eventually reach surface water bodies and affect the quality of water also used by local communities. In addition, some construction activities (such as excavations, transportation of materials and machinery, among others), if not well planned, may interfere with the small seasonal streams and water springs existing on the Project site, which may cause the disruption of the natural land irrigation and drainage especially during the rainy season. Within the Project AoI, the construction of the OHTL may affect Lake Balkhash and Shu River, while the construction of the WPP may affect few seasonal streams that were found on the Project site. The impact is expected to be minimal considering the application of appropriate measures.	▪ Ecosystem Services
Change in the local hydrogeology and groundwater quality	Around the Project site a few aquifers were identified. They contain fresh and slightly saline groundwater, suitable for construction activities. The groundwater can be drawn from wells and boreholes present within the Project site and additional wells to be drilled during the construction phase. The existing wells are currently used by local herders for grazing purposes. During the baseline phase, it was verified that groundwater is not potable and that the communities in the Project AoI use this water for daily activities but not for drinking purposes. The groundwater will be used within the Project site for construction purposes only. However, considering the overall scarcity of water in the Project AoI, water extraction during construction activities risk to put additional pressure on local water systems. Also, the wells within the Project site won't be accessible to local herders for the whole duration of the construction phase. 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, mitigation measures need to be implemented in order to control and monitor the usage of groundwater during the construction phase.	▪ Ecosystem Services

Impact Factor	Impact Assessment	Components Affected
Emission of dust, particulate matter and gaseous pollutants	Construction activities will generally entail the emission of dust, particulate matter (PM) and gaseous pollutants. Pollutants (such as CO, CO2, NOx, VOCs, among others) will be produced particularly by from the engine of the vehicles and machinery used for construction activities and by the vehicles used for the transport of goods, materials and workers. Emission of dust will occur particularly during site clearance and earth moving operations. It is well established that dust, PM and gaseous pollutants can lead to episodic and chronic health problems in human receptors. Concerning construction work on the WPP site, OHTL site and access roads site, the main receptors impacted by dust, PM and gaseous pollutants may be local herders and their livestock. The herders are a nomadic community that currently use the land for grazing purposes. It is possible that they will keep moving around the Project site also during construction works, under safety measures, therefore they need to be considered as sensitive receptors. However, the application of proper mitigation measures will ensure that the expected impact is limited. Regarding local communities, the closest villages are located at more than 20km from the WPP site, and for what concerns the construction of the OHTL, the closest human receptors will be in the villages of Ulken and Kenes, at a distance OHTL of approximately 500 m to 1km; this means that it is unlikely that they will be impacted by emission of dust, PM and gaseous pollutants. Other impacts potentially generated by the Project could be due to emission of dust PM a gaseous pollutants generated along the roads by the vehicles transporting goods and materials to the Project site. To date the number of vehicles that will be used during the construction is unknown, however it is expected that the transport route will avoid community centres. The additional traffic generated by the Project construction could be significant compared to the current levels of traffic present on the roads, therefore the Project induced traffic, and the consequent emission of dust, PM and pollutants may have impacts on the health of the population living along the roads that will be used for transportation; those will need to be managed through appropriate mitigation measures.	▪ Community Health, Safety and Security
Emission of noise and vibrations	Heavy vehicles and machinery that will be used for construction and transport will generate noise. Some specific activities will be particularly noisy, such as earthworks. The noise associated with the construction of the Project facilities will mainly occur in the following stages: land clearance, concrete and foundation preparation; construction of steel structures; blasting activities for construction purposes and movement of construction machinery. Concerning blasting activities specifically, the impact on communities' health and safety is expected to be minimal considering the high distance between the Project site and the nearest villages. The explosives will be delivered by road through specialized trucks and vans for delivery of blasting material; both the transport of such good and the location, day and time of the explosion are expected to be communicated well in advance to local authorities. Also, the explosive will be stored far away from communities, at the Project site in fenced explosive storage facilities and managed as per the main available international guidelines[1].	▪ Community Health, Safety and Security

[1] Blasting Safety | Mine Safety and Health Administration (MSHA)
Key Regulations for Safe Blasting and Explosives Handling - MSHA Safety Services
Medwin Publisher, Journal of Ecology and Public Resources, *"Blasting Impact on Environment and their Control Measure Techniques in Open Cast Mining"*, June 21, 2022.

Impact Factor	Impact Assessment	Components Affected
	However, it is important to further manage such risk through appropriate measures. Considering the distance of the WPP site and of the OHTL site from the closest villages, no impact related to emission of noise and vibrations is expected on communities. Workers and local herders with their livestock will be the main receptors affected by the emission of noise and vibration due to construction activities; the impacts will need to be managed through appropriate mitigation measures especially for what concerns blasting activities.	
Emission of light	Emission of light during the Project's construction activities can be due, among others, to artificial lighting of the construction site and equipment and moving lights during construction activities. Nighttime construction activities may cause sleep disruption, while prolonged light exposure to artificial light can lead to increased stress and potential health concerns. Flashing lights near roads may create traffic hazards by distracting drivers and increasing the risk of accidents. Furthermore, in areas with little to no artificial lighting, excessive light can contribute to significant light pollution. Construction activities will take place only during daytime and no construction works will happen during nighttime at the WPP site nor along the OHTL corridor (North Mirny SS and South Mirny SS) or the access roads. Wind turbine construction sites are required to be lit at night according to FAA[2] obstruction lighting regulations. Furthermore, wind turbines under construction must be lit once they reach 200 feet (61 meters) and the construction phase lights should be "steady burning" with a constant light signal. A red medium intensity obstruction light is used at night. However, no impact is expected on human receptor given the distance of the two closer villages to the Project site. OHTL construction sites are typically lit at night as well to ensure safety and security. Low to no impact on human receptors is expected for the villages that are closer to the OHTL construction sites, namely Ulken and Kenes, The accommodation camp is expected to remain lit during nighttime for security reasons. Local communities could be disturbed from lights during nighttime, however considering their distance from the accommodation camp this is not expected. Beside local communities, the main receptors that could be affected by night lights of the Project site (WPP, OHTL, and also access roads construction) are local herders and their livestock. These receptors are nomadic and seasonal, and they won't be stationary in a precise location nearby the Project site. However, they usually set temporary camps that could be affected by night lights. Communication in advance to any construction activities and sensibilization throught the stakeholder engagement implementation will be key to lower the impact on such receptors.	▪ Community Health, Safety and Security ▪ Landscape and Visual Aspects
Presence of new buildings/infrastructures	During the WPP and OHTL construction, there could be temporary but noticeable impacts on the landscape caused by construction activities, equipment, and new infrastructure pieces. While these impacts are typically short-term, they can significantly alter the appearance of the area and influence public perception. The impact can be due to the large equipment machinery movement, the clearing of vegetation and levelling of land. Also, construction activities	▪ Landscape and Visual Aspects ▪ Community Health, Safety and Security

[2] Obstruction Lighting during Wind Farm Construction | Wind Turbine Lights

Impact Factor	Impact Assessment	Components Affected
	may involve the use of hazardous materials and substances. The same applies to blasting activities that require the use of explosives, which may contain substances that could adversely impact on human health and safety. The Mirny Project is developed at a considerable distance from the closest villages, therefore the nearby communities won't be significantly affected by the presence of new building and infrastructures during the construction phase, however, human health and safety risk remains moderate for what concern the use of hazardous materials and needs to be properly mitigated and managed. While, regarding public access to the site (WPP, OHTL route – right of way 100m buffer - and access roads route), this will be interdicted for the construction period. However considering the broadness of the Project site, it is not expected that all the land will be completely fenced during the whole construction period. Small portions of land where construction works are taking place will be temporarily fenced and access will be denied to unauthorized people for a limited period in order to grant safety and security. A detailed presentation of Project land needs and relevant impacts due to this impact factor are presented in Appendix B. The expected impact is considered minimal with the application of the appropriate mitigation measures.	
Land occupation	The land where the Project site lies is divided in Forest Fund land and Reserve Land. The largest portion of the Project site (particularly the large northeastern part) lies on Forest fund land. There, land has been allocated to privates, under the Kazakh law these are identified as Individual Entrepreneurs ("IE"), who own small pieces of land. Most of the areas are for granite extraction, belonging to ORGSTROY LLP. Among the agricultural land, Moyinkum AGRO LLP stands out with large lands allocated for agricultural purposes in the northwestern part of the requested site. Additionally, land belonging to the individual Ospanbekov Tuleukhan, who has land for farming in the central western boundaries of the Project site, is notably significant. The Project site includes several small plots primarily owned by individuals for farming purposes. Seventeen landowners have been identified in the Project site, so far. Furthermore, there are herders who use land for grazing purposes and have seasonal camps there. Herders have no objection to the Project, nor to the possibility of relocating their livestock and grazing activities. However, the relocation of the herders will cause loss of livelihood and economic displacement that needs to be addressed with appropriate mitigation measures in compliance with EBRD PR5/ IFC PS5 and the Kazakh law. Such impact is likely to affect the herders but might also affect other vulnerable groups more broadly. Among those, impact may be expected particularly on women. In this context, gender risks (gender-based violence and harassment – "GBVH", legal gender barrier, women's economic opportunities, workplace equality and gender gaps) and dedicated mitigation measures have been assessed and discussed under a separate Chapter of this ESIA report ("Chapter 07 – Human Rights Risk Assessment"). A detailed presentation of Project land needs and relevant impacts due to this impact factor are presented in Appendix B. With the application of proper mitigation measures, the impact on land use will be limited.	▪ Land use

Impact Factor	Impact Assessment	Components Affected
Demand for solid waste treatment/disposal	The improper management of solid waste (e.g., its spread or abusive accumulation on the bare soil) may lead to soil and surface water pollution and air quality degradation (due to odor and pollutants' emissions) both onsite and offsite. Hazardous waste, if spread on soil or in surface water bodies, can result in highly pollutive events with consequent threats for workers' and communities' health. To comply with the Project standards, licensed local/national waste company(ies) shall be in charge of collecting all the waste that will not be recycled/reused at the construction site and of transporting it to landfills and treatment plants compliant with the Project requirements and specifications. Currently, it is identified a lack of appropriated solid waste landfills and treatment plants in Mirny vicinities (< 200 km) to treat large part of the waste that will be generated during construction. Therefore, alternatives will need to be found to deal with this waste (such as facilities located further away – regional, national, or even internationally, installing and on-site incineration facility, organic waste composting, etc.) in an appropriate way in order not to put pressure on regional/national facilities with the Project's waste. The WPP site, which will serve as main base, will be provided with a large solid waste temporary accumulation area. The OHTL corridor and the roads construction areas will be provided with minor solid waste accumulation areas and the waste will be periodically transferred from there to the main base. The OHTL and roads waste accumulation areas will undergo the same rules and requirements following strict sanitary requirements. Communities will be less impacted given their distance from the site; however appropriate mitigation measures need to be implemented also to avoid possible controversial effect on local herders that could transit around the Project site with their livestock.	▪ Community Health, Safety and Security
Demand for liquid waste and wastewater treatment/disposal	The Project construction will generate both hazardous and non-hazardous liquid waste. The hazardous liquid waste generated onsite, such as oils, fuels, additives, chemicals and lubricant residues, will be segregated per categories. Such residues will be placed in dedicated containers, placed on secondary containment systems or on paved/waterproofing surfaces, under a roofing to prevent the spread of pollutant runoffs during adverse weather conditions. In this context, the treatment and disposal of liquid waste and wastewater at the Project site is not expected to generate impact on the nearby communities' treatment and disposal facilities.	▪ Community Health, Safety and Security
Energy demand (fuel and electricity)	All Project activities will require energy either produced through the use of electricity. The Project's electricity needs will be supplied through a transmission line drawn from the Kiyakhty SS to a 1250 kW capacity transformer that will be installed at the construction site. No significant impact on the existing infrastructure is identified from the use of electricity from this SS, however the proper management of electricity inputs to the Project, including obtaining any permits for its use, must be performed in order to not overload the system and therefore do not negatively affect other users of the network.	▪ Mobility and Infrastructure
Water Demand	At the Project site existing wells will be used and additional water wells will be drilled to provide water for construction activities, while water trucks will be used for domestic purposes. A temporary water treatment station will be installed onsite to make sure that the well water meets the	▪ ▪ Ecosystem services

Impact Factor	Impact Assessment	Components Affected
	quality standards for construction. Considering the water scarcity characteristic of the Project AoI, water management will be relevant for this Project. If not properly managed, abstractions may put public water systems under pressure, potentially affecting the availability of water for local users.	▪ Community Health, Safety and Security
Workers' influx	The construction phase of the Project will envisage an average of 850 people hired, with peaks of up to 1.700 people, for a total expected construction period 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. Workers will be staying in the accommodation camp that will be built within the Project site; however, even if the camp already envisages few amenities and spaces for leisure, it is possible that some of them will decide to move also to nearby villages. 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 that will be the closest receptors to the Project site; however, this is a localized impact which will last only during the construction phase. 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. This is particularly relevant with regard to Sexually Transmitted Diseases and communicable diseases. In this context, the presence of workers may put additional pressure on local health facilities, already scarce and poorly equipped, with consequences for these services for local communities. In terms of safety, the presence of workers can generate tensions and conflicts with local communities due to interactions between the workforce and the population. These disruptions may affect women and vulnerable groups more than others. Appropriate measures as described below will be able to mitigate the impact from workers' influx. Gender risks mitigation measures are not included in this Chapter. Indeed, gender risks (including gender-based violence and harassment – "GBVH", legal gender barrier, women's economic opportunities, workplace equality and gender gaps) and dedicated mitigation measures have been assessed and discussed under a separate Chapter of this ESIA report ("Chapter 07 – Human Rights Risk Assessment").	▪ Population and Demography ▪ Community Health, Safety and Security ▪ Mobility and Infrastructure
Demand for security management	The management of security of the Project site could pose risks in terms of human rights of workers and local communities' safety and security. Particular attention will be given to tensions that could arise between security personnel and vulnerable groups, such the local herders who perform grazing activities near the site. Also, proper measures will be taken to minimize the risk of GBVH. In this context, dedicated measures related to gender risk have been developed under a separate Chapter of this ESIA report ("Chapter 07 – Human Rights Risk Assessment"). Tensions could also arise between sub-contractors, other stakeholders and security personnel due to actual or perceived Project impacts as well as actual or perceived behaviour of security personnel. Moreover, if the behaviour of the security personnel is perceived threatening by local communities and/or workers to their wellbeing, conflicts may arise. Therefore, appropriate measures will need to be implemented in order to properly manage the risk of conflicts.	▪ Community Health, Safety and Security

Impact Factor	Impact Assessment	Components Affected
Demand for workforce	The construction of the WPP is projected to create both direct and indirect employment opportunities, with an estimated workforce requirement of approximately 2,034 individuals during peak construction periods. Aktas is committed to prioritizing the recruitment of local workers, including both skilled and unskilled roles, targeting a local employment rate of 20% throughout the pre-construction and construction phases. Additionally, the company has set a goal to increase the representation of local women in various skilled positions by 2% per quarter over a one-year period during construction. This commitment is expected to contribute to a reduction in unemployment within nearby communities, enhance the competencies of local employees, and promote the professional growth of vulnerable groups, with particular emphasis on female employment. In this context, both direct and indirect working opportunities will generate positive effects on the income of the workers, especially women employees, and on the overall livelihood conditions of the households, however it should be noted that most of these work opportunities will be of temporary nature. In addition to economic benefits, the Project will also generate an improvement of workers' skills, useful to find future employment opportunities. Also, the demand of workers and the presence of workforce in the area could possibly generate informal economic opportunities linked for example to selling products to workers such as food and small everyday items. Beside the positive impact generated by new economic opportunities, the assessment also includes the potential risks linked to labour and working conditions. This assessment and related mitigation measures have been addressed under a separate Chapter of this ESIA report ("Chapter 07 – Human Rights Risk Assessment").	▪ Economy and Employment
Demand for goods, materials and services (supply chain)	The supply of materials and goods from local supplier will contribute positively to the economic development of the region generating positive socio-economic impacts. Supply of materials and services will also have negative impacts linked to the risk of violation of human rights along the supply chain. This negative impact has been assessed under a separate Chapter of this ESIA report ("Chapter 07 – Human Rights Risk Assessment").	▪ Economy and Employment
Increase of traffic	Logistical challenges are associated to wind energy facilities due to the transportation of oversized or heavy wind turbine components (blades, turbine tower sections, nacelle, and transformers) and cranes to the site. Also, the increased number of construction vehicles traveling to and from the Project site will increase the risk of accident with pedestrians, when and if transiting through cities and villages, and/or other vehicles, which can potentially result in an injury or even loss of life. According to the information available, the main types of vehicles to be used are pick-up vehicles for staff, tipper trucks, excavators, concrete mixers and large trucks transporting blades. Their numbers, frequency on the road and their route are currently unknown but it is expected that the main roads nearby the Project footprint will be impacted and they currently experience low volume of traffic. However, it is expected that the traffic induced by the construction of the Project will be limited on such roads, as well as the impact on the conditions of these roads considering that they are already commonly used by heavy vehicles. Among the goods to be transported to the Project site, it is also included explosive material. The delivery of explosive materials will be made by road and through specialized trucks and vans for delivery of blasting material. Considering the riskiness of this activity, mitigation measures need to be thought carefully in order to avoid as possible any serious accident during the transport.	▪ Community Health, Safety and Security ▪ Mobility and Infrastructure

Impact Factor	Impact Assessment	Components Affected
	Another important aspect that has an impact on the traffic system (internal to the Project boundary) on site is the presence of different contractors on site with different activities, trucks and vehicles at the same time. This might expose to several risks for incidents if not properly managed. The implementation of road safety and traffic safety mitigation measures will be relevant to reduce the overall potential impacts generated by additional traffic.	
Improvement of road network	Among the activities of the Project, it is envisaged the construction of about 215 km of new roads and the upgrade of 20 km of existing roads. The road activities are not expected to impact on land use nor resettlement of people and business; however, the final design of the new roads is not available at the time of writing the Impact Assessment, therefore further evaluations will be needed on a later stage. The construction and upgrade of roads will generate a positive impact on local communities which will benefit from improved infrastructure that could also support them in their economic activities.	▪ Land use ▪ Mobility and Infrastructure Economy and Employment
Interference with existing roads/infrastructure/ services	Project construction activities will potentially interfere with local infrastructure, namely water infrastructures and public health, sanitation and educational institutes in the Project AoI. Concerning the latter, depending on the contractors policies, it might be possible that workers decide to move nearby the Project area with their family and that children will be enrolled in the local education system. If not properly managed, the excessive use of public infrastructure may generate a disruption in local public services. In this context appropriate mitigation measures need to be considered.	▪ Mobility and Infrastructure
Damage of cultural resources	During the archaeological survey conducted on May 2024 on the Project site (*Archaeological Expertise No. AES-455 dated 23/05/2024*) recorded a total of 214 archaeological heritage objects (petroglyphs, mounds archaeological complexes and graves). In consideration of this, the wind farm layout has been refined to avoid direct impacts on all known Historical and Cultural Heritage (HCH) sites. During project planning, archaeologists worked closely with the design team to micro-site turbines, access roads, and other project components away from identified heritage locations (buffer of 40 meters around cultural objects). Where clusters of heritage objects were found, the Project shifted infrastructure to maintain a safe distance. For instance, several turbines originally planned on a ridge containing multiple kurgans were relocated to nearby lower terrain with no heritage findings. These redefinitions of the Project site location ensure that no wind turbine or permanent structure will physically occupy or disturb a recorded cultural heritage object. This approach of in-situ preservation through design avoidance is fully aligned with IFC/EBRD requirements to first avoid impacts on cultural heritage wherever feasible. The conclusions of the survey highlighted that none of the findings is deemed to be considered of “national” significance”. However, appropriate mitigation measures need to be put in place to avoid accidental contamination or destruction of such objects. No other archaeological finds nor tangible cultural heritage was found on the site of the WPP and along the OHTL corridor and access roads. However, since the Project site is situated within a region rich in historical significance and cultural landmarks, chance finds are possible. It will be crucial to implement a Chance Finds Procedure during construction to prevent the loss of any undiscovered cultural artifacts. Specific measures, outlined in the Chance Find Procedure, will be implemented in the case such elements are found during the construction	▪ Cultural Heritage

Impact Factor	Impact Assessment	Components Affected
	phase. Also, it is possible that the Project may generate interferences with intangible cultural heritage considering that the Project site serves as a reservoir of intangible cultural heritage ("ICH"). Finally, it is ensured that the Project does not intend to use or commercially benefit from cultural heritage objects found at the Project site during the construction period.	

5.1.2 Mitigation Measures

The mitigation measures listed below reflect the mitigation hierarchy and are proposed for the construction phase. These measures will be implemented in addition to the Project embedded mitigation measures which are a standard procedure applied by the Contractor to achieve compliance with legal requirements and regulations and alignment with GIIP.

ESMPs to be implemented during the Project's construction phase will be prepared in a timely manner before the start of construction activities and will incorporate the mitigation measures presented below. The ESMPs will be part of the ESMS, whose structure and functioning are described under Chapter 12 of this ESIA (Environmental & Social Management System Framework Document).

Based on the impact assessment, the Management Plans to be prepared are included in the following table. However, the MPs mentioned may be not exhaustive and depending on future needs, they can be modified to better adapt to the Project needs, as well as others can also be included.

Table 2: Mitigation Measures Social Components - Construction Phase.

Mitigation hierarchy	Mitigation Measure
Impact factor: Degradation of soil and vegetation	
Avoidance	Avoid the unnecessary removal or degradation of soil and vegetation.
Avoidance	Ensure that vehicle movements are restricted to designated roads to avoid disturbance of lands adjacent to the roads and loss of ecosystem services.
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Restoration	By the end of construction phase, landscaping techniques shall be applied to ameliorate the landscape and visual impacts and also to restore the land impacted by the construction to make it accessible again for herders to conduct grazing activities. The same soil will be reused to guarantee the same conditions
Compensation	Compensate for the loss of vegetation. Where possible, the Contractor will revegetate the affected area and revegetate the Project sites as per design specifications (utilizing native/ autochthonous species) for compensating the loss of vegetation that could affect local livestock.
Impact factor: Change in the local morphology and topography	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Impact factor: Change in the local hydrology and surface water quality	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Impact factor: Change in the local hydrogeology and groundwater quality	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).

Mitigation hierarchy	Mitigation Measure
Restoration	By the end of the construction phase, 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.
Impact factor: Emission of dust and particulate matter and gaseous pollutants	
Avoidance	During their transportation, excavated materials will be covered with nylon canvas to avoid emission of dust and PMs when close to sensitive receptors.
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Minimization	Speed limitations will be applied for vehicles to minimize the emission of dust an PMs when passing through villages and cities if other routes are not possible.
Impact factor: Emission of noise and vibrations	
Avoidance	Ensure that the vehicles use only designated access roads to reduce traffic routing through community areas and avoiding noise disturbance from traffic.
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Minimization	Communicate well in advance to local authorities when explosives are to be delivered at the Project site, day and time when blasting activities are expected to take place and which part of the Project site will be interested in.
Minimization	Develop a *Blasting Management Plan* to include safety protocols for blasting activities.
Impact factor: Emission of light	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Minimization	Communicate in a timely manner to herders the location of enlightened sites, in strict communication with the Municipality and the Government, so that they can decide where to set their camps, minimizing the impact of night lights on such receptors.
Impact factor: Presence of new buildings/infrastructures	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Minimization	Project site will be properly fenced; if fencing of the site is not feasible, a sufficient number of security personnel will be on at site boundaries to ensure that no community members or unauthorized persons enter the site.
Minimization	All sites and fencing will be provided with suitable signage indicating the prohibition to enter to prevent unintentional entry by herders or livestock into hazardous areas. Signs will include pictograms to ensure they are understandable to all persons, including children.
Minimization	Controlled access points for plant workers and decommissioning vehicles will be designated to minimize conflict with grazing routes.
Minimization	A *Hazardous Materials Management Plan* will be prepared and approved before the start of construction activities, to ensure the work is done correctly, safely, and in compliance with all regulations at every stage in order to minimize human health and safety threat.
Restoration	Upon completion of the construction phase, all site elements not required for the subsequent operational phase will be removed and the areas will be restored to their original state.
Impact factor: Land occupation	
Minimization	Establish and implement an external *Grievance Mechanism*
Minimization	Provide timely information to land users on when land access restrictions will be introduced.
Minimization	Provide timely information on the transportation schedule to the landowners whose lands are located along the route.

Mitigation hierarchy	Mitigation Measure
Restoration	After the completion of construction activities, fully reinstate all land not permanently occupied.
Compensation	Since no detailed census or asset evaluation has yet been conducted for the ESIA, but landowners and informal land users have been identified during the social baseline assessment, a Land Acquisition and Resettlement Framework (LARF) will be developed. This framework will define the principles, procedures, and entitlement policies for managing potential physical and/or economic displacement, in accordance with national legislation and international standards, specifically EBRD Performance Requirement 5 and IFC Performance Standard 5. The LARF will also identify gaps between Kazakhstan's national land acquisition processes and these international standards. These gaps will be addressed through a Livelihood Restoration Plan, which will detail specific compensation and livelihood restoration measures for Project affected persons.
Impact Factor: Production of solid waste	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Impact Factor: Production of wastewater	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Impact factor: Energy Demand (fuel and electricity)	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Impact factor: Water Demand	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Impact factor: Workers' influx	
Minimization	Develop and implement an *Influx Management Plan* to address the risks and potential impacts associated with workers' influx due to the in-migration of people from outside of the Project AoI.
Minimization	Develop and implement a *Community Health, Safety and Security Management Plan*. The Plan will identify specific measures to avoid and mitigate to the extent possible impacts to the health, safety and security of local communities and spreading of communicable diseases due to construction activities and to the presence of expatriate or immigrant workers.
Minimization	Hygiene standards will be adopted and implemented within the Project site in order to have the surroundings clean, hence preventing illness and the spread of diseases. Hygiene standards shall encompass basic hygiene, food hygiene, hand hygiene, among others. All employees, contractors and subcontractors shall receive induction related to the standards.
Minimization	Develop and implement an *Occupational Health and Safety Management Plan*. The Plan will identify specific measures to avoid and mitigate to the extent possible impacts to the health, safety and security of workers due to construction activities. The Plan will as well include provisions for and training, as a minimum as follows: - Initial induction; - Regular training on relevant OHS aspects; - Specific training based on Project needs, including among other topics training on expected behaviors and on disciplinary procedures (including dismissal procedures for unacceptable conduct).
Minimization	Contractors and sub-contractors will develop their own Management Plans, following the Project ESMS.
Minimization	Conduct regular consultation and monitoring with communities within the SEP.
Minimization	Develop and implement an external *Grievance Mechanism*.
Minimization	Provide cultural sensitization training for workers regarding engagement with local community.

Mitigation hierarchy	Mitigation Measure
Minimization	Aktas Energy LLP will develop and implement a dedicated strict Code of Conduct for the workers, and make sure that it is reflected in the Contractor Management System, outlining expected behavior with respect to their daily interactions with local residents and users of public amenities.
Minimization	Contractor's workers will be educated on how to behave within the Project neighboring communities where the workforce will be likely to spend its time off.
Minimization	The workers' accommodation camp at the WPP site will be fenced in order to avoid disturbance to seasonal sheperds who perform their grazing activities around the WPP site and to maintain a security control.
Minimization	To minimize the risk of sexual harassment and gender-based violence due to the influx of male workers in the Project AoI, adopt a zero-tolerance policy on the abuse and enforce the local law control and application system in the area.
Minimization	Aktas Energy LLP will ensure that the Contractor will provide health and safety induction for workers and awareness trainings on Sexual Transmission Infections ("STI") and others communicable disease prevention; implement trainings on raising awareness on healthy lifestyles on topics such as – among others- on alcohol, personal and food hygiene, communicable and non- communicable diseases.
Impact factor: Demand for security management	
Avoidance	The references of security workers shall be checked before hiring them. The reference checks shall ensure candidates for security services do not have criminal records or a record of abuse of violation of human rights.
Avoidance	At the entrance of the Project sites, an employee of the subcontractor company shall verify the identity of those who enter document in hand and, if not present in the register, but authorized, the person in charge shall update the register and the list of identity documents.
Avoidance	The Project sites shall be inspected for checking the congruity between the data in the registers and photo lists with the attendance at the construction site.
Minimization	Develop and implement a *Community Health, Safety and Security Management Plan*. The Plan will identify specific measures related to site security management.
Minimization	Security Personnel working at the project site will be trained on the Voluntary Principles on Security and Human Rights and about the use of force and appropriate conduct toward workers and nearby communities.
Minimization	Security personnel will be trained on conflict resolution, crowd management, restraint and cautious exercise of security activity and appropriate use of force.
Minimization	Carry out the stakeholder engagement to ensure that local communities are aware of how to raise a grievance about any security contractor behavior, should this be necessary.
Impact factor: Demand for workforce	
Avoidance	Aktas Energy LLP will ensure that the Contractor will put in place transparent and fair recruitment procedures, that monitor non-discrimination and equal opportunities and that are clearly understandable and accessible to all potential candidates.
Avoidance	Aktas Energy LLP will ensure that the Contractor will comply with national and international laws, conventions and lenders' requirements on labour conditions to be maintained through the life of the Project.
Avoidance	Aktas Energy LLP will ensure that the Contractor will hire workers through recruitment offices and avoid hiring "at the gate" to discourage spontaneous influx of job seekers.
Avoidance	The Contractor will guarantee the wellbeing of service providers, including decent working conditions, adequate salaries, correct working hours and PPE in case they exposed to hazardous construction works at WPP site and OHTL site.
Avoidance	Violating child labour laws through illegal employment of children below the age of 18 years will be forbidden.
Avoidance	Smoking, sparks and open flames will be forbidden near storage or blasting sites.

Mitigation hierarchy	Mitigation Measure
Avoidance	Detonators and explosive materials will be stored separately until use.
Minimization	A *Labour Management Plan* will be prepared to respect labour and working conditions, to provide all workers for non-discrimination and equal opportunities. Ensure that the *Labour Management Plan* is aligned with the requirements of EBRD PR2.
Minimization	Explosives will be handled only by workers who have been properly trained in explosive and blasting management.
Minimization	A strategy for the employment of local workers will be defined. This strategy will be disclosed in line with the provisions included in the SEP to ensure that local communities in the proximity of the sites are informed on employment positions available and methods to express interest. Based on outcomes of this plan, the Client will implement a training programme for the local workforce to enable them to take advantage of the opportunity.
Minimization	Aktas will maintain the commitment of a local employment rate of 20% throughout the pre-construction and construction phases and to increase the representation of local women in various skilled positions by 2% per quarter over a one-year period during construction.
Minimization	Aktas will ensure that the Contractor will adopt and maintain human resources policies and management systems or procedures aligned with the requirements of EBRD PR2. These policies and procedures will have to be clear and accessible to workers, and in the main language(s) spoken by the workforce.
Minimization	Clear and transparent information on wages, benefits and working conditions will be provided to all workers, following local labor legislation.
Impact factor: Demand for goods, materials and services (supply chain)	
Avoidance	All construction raw materials, products and equipment will be exclusively sourced from verified suppliers, which are compliant with minimum environmental and social standards. The Contractor will – throughout the whole construction phase – assess the existence, the adequacy and the effectiveness of the suppliers' environmental and social management systems and processes.
Avoidance	Include in a clause in the supplier contract restricting the use of child labour and forced labour and impose economic penalties in case of occurrence.
Avoidance	The use of suppliers whose activities are associated to high environmental impacts will be avoided. Preference will be given to responsibly sourced raw materials, and to local suppliers.
Avoidance	Soils and aggregates for on-site construction works will be supplied from quarries that are accredited and licensed to conduct their operations, and they will be required to have a quality certificate. The above prevision will be included in the *Supply Chain Management Plan*.
Minimization	A *Supply Chain Management Plan*, following Total Energies policy and procedure will be developed and implemented by Aktas Energy LLP for the Project. The Plan will ensure that contractors and subcontractors along the supply chain will be compliant with EBRD PR2 and national legislation.
Minimization	Conduct regular labour audits to the suppliers of the Project.
Impact factor: Increase of traffic	
Avoidance	Implement working hour limits for drivers and inform drivers periodically on working schedule.
Avoidance	Traffic control measures, including road signs and flag people to warn of dangerous conditions, shall be implemented. Road signs should be implemented especially at critical crossing locations and when transporting abnormal and explosive material.
Avoidance	Provide police escort vehicles for oversized transport and explosive. The escorted convoys will proceed at regulated speeds and they will signaled to residents through sirens and lights,
Avoidance	All trucks and trailers must be inspected before the transportation of abnormal materials or explosive material to avoid malfunctioning.
Avoidance	Abnormal or explosive loads will have to be properly secured and covered to prevent any debris or parts from falling onto public roads.

Mitigation hierarchy	Mitigation Measure
Avoidance	Carefully plan the transport route for oversized material and coordinate with road authorities to choose routes with adequate road width and bridge load capacity.
Avoidance	Engage with local authorities traffic police to communicate the transport schedule of abnormal and explosive materials, and through them inform in advance the affected community of when large convoys will pass.
Avoidance	Explosives are transported only by certified specialized vehicles and crews, kept in secure containers, and never left unattended.
Avoidance	Warning signs shall be properly placed at entrance gates where trucks enter and exit the construction site.
Avoidance	Provide as much as feasible, separate mobilization areas and separate gate access to each contractor to minimize interference and risks generated by traffic on site.
Avoidance	Vehicles will not be allowed on re-vegetated areas, and site traffic shall be limited to prevent unnecessary damage to the natural environment.
Avoidance	The Contractor shall comply with all the applicable laws with regard to road safety and transport.
Avoidance	Diversion routes shall be indicated during construction.
Minimization	Prepare and implement a *Traffic Management Plan*, with indication of the measures that should be followed to reduce impacts and potential risks of accidents generated by Project induced traffic.
Minimization	Develop and implement an awareness raising campaign with local stakeholders regarding the risks related to the movement of heavy vehicles and increased traffic in the area. The main focus of this campaign will be on those communities that are located on the transit routes of goods and materials that need to be transported to the Project site. The campaign will be implemented in coordination with local community groups. Details of this campaign will be presented as part of SEP.
Minimization	The Contractor shall instruct its drivers and equipment operators that vehicles will be expected to comply with all road ordinances, such as speed limits, roadworthiness, load securing and covering.
Minimization	Ensure that on transit routes that go through cities and villages, pedestrians have adequate footpaths along roads.
Minimization	Provide appropriate information to potentially affected local communities prior to the beginning of any works in order to allay fears, complaints or potential risks due to lack of information or awareness about the Project activities.
Minimization	Provide timely information on transportation schedule to the landowners whose lands are located along the route.
Minimization	Schedule the construction materials transportation to coincide with off-peak hours. Especially for the transportation of abnormal material and explosives, consider planning the transport during night-time.
Minimization	Ensure abnormal material and explosives road transportation is conducted with escort vehicles.
Impact factor: Improvement of road network	
Minimization	Carry out regular maintenance of access roads.
Restoration	Improve roads for heavy machinery transportation.
Restoration	Restoration of roads to at least pre-construction level.
Compensation	Compensation of all damages on infrastructure.
Impact factor: Interference with existent roads/infrastructure/services	
Avoidance	All the construction areas should be properly identified to avoid accidents; in addition, organizing community and raising awareness meetings with local affected people will be necessary to inform about the duration of the construction phase.

Mitigation hierarchy	Mitigation Measure
Minimization	Local communities shall be informed about interruptions of roads and infrastructure networks. Within the context of the SEP, inform local authorities, local communities on the progress of activities and in particular on the schedule of activities that will entail closures/limitations of roads and interruption of infrastructure networks; possible changes to limit impacts on local communities will be agreed and implemented.
Minimization	The most suitable transport routes will be selected. When selecting the routes to be used for the transport of materials and products, identify roads that are likely to cause the lowest impacts to local communities in terms of disruption of access and disturbance to population. Plan transportation routes in consultation with local authorities.
Minimization	A zero-accident practice that minimizes dependence on the region's health infrastructure will be promoted.
Minimization	Implement and operate on the construction site the basic sanitation system composed of water supply service, wastewater collection and treatment, and solid waste collection and treatment service.
Minimization	Mechanisms for transporting workers involved at the construction site shall be implemented.
Minimization	Identify the effects generated by the definition of the design of the construction site and accesses, seeking to minimize the effects on the affected population, with emphasis on vulnerable groups through the SEP.
Impact factor: Damage of cultural resources	
Minimization	Prepare a *Chance Find Procedure* for the sites, to be distributed to all workers and suppliers and to be implemented if a finding of cultural (or sentimental) or archaeological elements occurs during the site clearance and/or construction activities. The Chance Find Procedure should involve authorities responsible for archaeological and cultural protection.
Minimization	Develop a *Cultural Heritage Management Plan* to manage and provide continuous monitoring of related tangible and intangible cultural heritage mitigation measures.
Minimization	Mark and fence all sensitive areas before any construction begins. Ensure installing high-visibility fencing, stakes or flagging tape with a 40 meters buffer around each cultural object. Install visible signage identifying the fenced areas as a “Cultural Heritage Protection Zone” and interdict access to this area.
Minimization	Hire a qualified archaeologist on site during all ground-disturbing works in the vicinity of heritage areas, ensuring full-time supervision during active earthworks in culturally sensitive areas. The on-site archaeologist has authority to halt work if an artifact or feature is observed and will coordinate with site managers to avoid any disturbance of such finds.
Minimization	Regarding intangible cultural heritage (ICH), engage with local communities, especially village elders who are custodians of cultural knowledge.
Minimization	Regarding ICH, design the Project access roads and Project activities to avoid or minimize disturbance to culturally significant areas identified through consultations and cultural mapping. This includes respecting seasonal migration routes and pastoral activities.

5.1.3 Impact Value and Residual Impact Value Calculation

This section describes the Impact Values and the Residual Impact Values (after the implementation of the mitigation measures) assessed for each impact factor on each social component.

The description of how the calculations have been completed is reported in the Chapter 03 of this ESIA (”IA Methodology”).

5.1.3.1 Population and Demography

The impact factors that can affect the Population and Demography component within the Project AoI are listed in Table 3.

The Project's overall impact on the Population and Demography component in the construction phase is of negative direction. According to the baseline study performed, the sensitivity of this component is assessed as **medium-high**.

The impact value calculated is **medium** for the impact factor *Workers' influx*. The medium value found for this impact factor is mainly due to the magnitude of workforce that will be involved in the construction activity and the duration of these activities. Even if all the workforces will be based in the Accommodation Camp installed within the WPP site, the impact on local communities could be significant during the workers times-off.

Considering the application of the mitigation measures, the residual impact has been assessed to be **low** for the factor *Workers' influx* showing that the construction phase is not expected to affect relevantly the nearby communities and that mitigation measures can be effective to tackle this impact.

Table 3: Residual impact assessment matrix for Population and Demography during construction.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Workers' influx	Duration:	Medium-long	Medium-high	Reversibility:	Short-mid-term	**Medium**	Medium-high	**Low**
	Frequency:	Highly frequent						
	Geo. Extent:	Global						
	Intensity:	Medium						

5.1.3.2 Economy and Employment

The impact factors that can affect the Economy and Employment component within the Project AoI are listed in Table 4.

The Project's impact on the Economy and Employment component in the construction phase shows **negative** direction for the impact factor *Demand for Goods, Materials and Services (supply chain)* and **positive** direction for the impact factors *Demand of Workforce* and *Improvement of Road Networks*. However, according to the baseline study performed, the overall sensitivity of this component is assessed as **medium-high**.

Focusing on the impact factor with negative direction, the impact value calculated for *Demand for Goods, Materials and Services (supply chain)* is **high**. The high value found for this impact factor is due to potential human rights risks identified along the supply chain. In particular, based on a first screening, some allegations were found on one of the suppliers of the WTGs, SANY Group.

In this context, strict mitigation measures have been defined and with their application the residual impact has been assessed to be **low** for the factor *Demand for Goods, Materials and Services (supply chain)* showing that the measures can be effective to tackle this impact.

Table 4: Residual impact assessment matrix for Economy and Employment during construction (impact with negative direction).

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Demand for goods, materials and services	Duration:	Medium-long	Medium-high	Reversibility:	Short-mid-term	**High**	Medium-high	**Low**
	Frequency:	Highly frequent						
	Geo. Extent:	Global						
	Intensity:	Very high						

The assessment also highlighted two positive impact for this component, namely *Demand of Workforce* and *Improvement of Road Networks* shown in Table 5. Considering the application of the proposed enhancement measures, the Project's overall positive residual impact on this component has been assessed to be **medium** referring to the impact factor *Demand of Workforce* and very high referring to impact factor *Improvement of Road Networks.*

The **medium** residual impact for *Demand of Workforce* depends mainly on the timeframe of the construction phase for which workforce will be needed because due to its medium-long duration it will be enough to slightly improve the economic situation of the Region.

While the **very high** residual impact for *Improvement of Road Networks* depends on the possibility in the long-term for local residents to rely on a new infrastructure that can provide benefits in the future also for the local economic activities through improved means of transportation of goods and services.

Table 5: Residual impact assessment matrix for Economy and Employment during construction (impact with positive direction).

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Demand of Workforce	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium-high	**Medium**
	Frequency:	Highly frequent						
	Geo. Extent:	Global						
	Intensity:	Medium						
Improvement of road networks	Duration:	Long	Medium-high	Reversibility:	Long term	**Very High**	Medium-high	**Very High**
	Frequency:	Continuous						
	Geo. Extent:	Local						
	Intensity:	Medium						

5.1.3.3 Community, Health, Safety and Security

The impact factors that can affect the Community, Health, Safety and Security component within the Project AoI are listed in Table 6.

The Project's overall impact on the Community, Health, Safety and Security component in the construction phase is of negative direction. According to the baseline study performed, the sensitivity of this component is assessed as **medium-high**.

Multiple impact factors may affect the Community, Health, Safety and Security component, as shown in the table below. The impact value calculated is **low** for all the impact factors affecting this component, namely *Emission of dust, particulate matter and gaseous pollutants, Emission of noise and vibrations, Emission of light, Presence of new buildings/infrastructures, Demand for solid waste treatment/disposal, Demand for liquid waste and wastewater treatment/disposal, Workers' influx, Demand for security management* and *Increase of traffic.* While for the impact factor *Water demand* the value calculated is **medium**.

The low value found is mainly due to the remoteness of the Project site and its distance from sensitive human receptors, for what concerns specifically *Emission of dust, particulate matter and gaseous pollutants, Emission of noise and vibrations, Emission of light, Demand for solid waste treatment/disposal, Demand for liquid waste and wastewater treatment/disposal* and due to the temporary duration for *Workers' influx, Demand for security management* and *Increase of traffic*. The medium value found for *Water demand* is mainly due to the water scarcity which affects the region, and the pressure that additional water extraction for construction purposes could put on the infrastructure.

Considering the application of the mitigation measures, the residual impact has been assessed to be **negligible** for the factors *Emission of dust, particulate matter and gaseous pollutants, Emission of noise and vibrations, Emission of light, Presence of new buildings/infrastructures, Demand for solid waste treatment/disposal, Demand for liquid waste, wastewater treatment/disposal, Demand for security management* and *Increase of traffic.*

While the residual impact for *Workers' influx* and *Water demand,* after the application of the mitigation measures has been assessed to be **low**.

Table 6: Residual impact assessment matrix for Community, Health, Safety and Security during construction.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Emission of dust, particulate matter and gaseous pollutants	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Low						
Emission of noise and vibrations	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Low						
Emission of light	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Low						
Presence of new buildings/infrastructures	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Continuous						
	Geo. Extent:	Project footprint						
	Intensity:	Medium						
Demand for solid waste treatment/disposal	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Continuous						
	Geo. Extent:	Project footprint						
	Intensity:	Medium						
Demand for liquid waste and wastewater treatment/disposal	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Continuous						
	Geo. Extent:	Project footprint						
	Intensity:	Medium						
Workers' influx	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Low**
	Frequency:	Continuous						
	Geo. Extent:	Global						
	Intensity:	Medium						
Demand for security management	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Continuous						
	Geo. Extent:	Project footprint						
	Intensity:	Medium						
Increase of traffic	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Regional						
	Intensity:	Medium						
Water demand	Duration:	Medium-long	Medium-high	Reversibility:	Short-mid-term	**Medium**	Medium	**Low**
	Frequency:	Highly frequent						
	Geo. Extent:	Local						
	Intensity:	Medium						

5.1.3.4 Mobility and Infrastructures

The impact factors that can affect the Mobility and Infrastructure component within the Project AoI are listed in Table 7.

The Project's impact on the Mobility and Infrastructure component in the construction phase shows **negative** direction for the impact factors *Energy demand, Increase of traffic* and *Interference with roads/ infrastructures/ services* and *Workers' influx* and of **positive** direction for the impact factors *Improvement of Road Networks*. However, according to the baseline study performed, the overall sensitivity of this component is assessed as **medium-high**.

Focusing on the impact factors with negative direction, the impact value calculated for *Energy demand* and *Workers' influx* is **medium**. The medium value found for these impact factors is mainly due for energy not to overload the existing infrastructure of the region and the medium value for workers' influx is due to the high number of workers that will be involved in the construction phase and that will be coming also from outside Kazakhstan.

The impact value calculated for *Increase of traffic* and *Interference with roads/ infrastructures/ services* is **low**. The low value is mainly due to the low frequency and limited duration of events that will cause an increase in traffic and/or interference with roads/ infrastructures/ services.

In this context, the application of mitigation measures led the residual impact to be **low** for the factors *Energy demand* and *Workers' influx* and **negligible** for the factors *Increase of traffic* and *Interference with roads/ infrastructures/ services* showing that the measures can be effective to tackle this impact.

Table 7: Residual impact assessment matrix for Mobility and Infrastructure during construction (impact with negative direction).

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Energy demand (fuel and electricity)	Duration:	Medium-long	Medium-high	Reversibility:	Short-mid-term	**Medium**	Medium	**Low**
	Frequency:	Highly frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Medium						
Increase of traffic	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium-high	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Local						
	Intensity:	Medium						
Interference with roads/infrastructures/services	Duration:	Medium-long	Medium-high	Reversibility:	Short-term	**Low**	Medium-high	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Local						
	Intensity:	Medium						
Workers' influx	Duration:	Medium-long	Medium-high	Reversibility:	Short-mid-term	**Medium**	Medium-high	**Low**
	Frequency:	Highly frequent						
	Geo. Extent:	Global						
	Intensity:	Medium						

The assessment also highlighted a positive impact for this component, namely *Improvement of Road Networks* shown in Table 8. Considering the application of the proposed enhancement measures, the Project's overall positive residual impact on this component has been assessed to be **very high** referring to the impact factor *Improvement of Road Networks.*

The **very high** residual impact for *Improvement of Road Networks* depends on the possibility in the long-term for local residents to rely on a new infrastructure that can provide benefits in the future also for the local economic activities through improved means of transportation of goods and services.

Table 8: Residual impact assessment matrix for Mobility and Infrastructure during construction (impact with positive direction).

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Improvement of road network	Duration:	Medium-long	Medium-high	Reversibility:	Long term	**High**	Medium	**Very High**
	Frequency:	Frequent						
	Geo. Extent:	Local						
	Intensity:	Medium						

5.1.3.5 Landscape and Visual Quality

The impact factors that can affect the Landscape and Visual Quality component within the Project AoI are listed in Table 9.

The Project's overall impact on the Landscape and Visual Quality component in the construction phase is of negative direction. According to the baseline study performed, the sensitivity of this component is assessed as **low**.

Multiple impact factors may affect the Landscape and Visual Quality, as shown in the table below. The impact value calculated is **negligible** for the impact factors *Degradation of soil and vegetation, Change in the local morphology and topography, Emission of light* and *Presence of new buildings/infrastructures.*

The negligible value found for all the factors is mainly due to the remoteness of the Project site and its distance from sensitive human receptors, therefore the impact that these factors can have on nearby communities' perception of the landscape is limited. Considering the application of the mitigation measures, the residual impact has been assessed to remain **negligible** for the four factors.

Table 9: Residual impact assessment matrix for Landscape and Visual Quality during construction.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Removal/degradation of soil and vegetation	Duration:	Medium-long	Low	Reversibility:	Short-mid-term	**Negligible**	Medium	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Low						
Change in the local morphology and topography	Duration:	Medium-long	Low	Reversibility:	Short-mid-term	**Negligible**	Medium	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Low						
Emission of light	Duration:	Medium-long	Low	Reversibility:	Short-term	**Negligible**	Medium	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Low						
Presence of new buildings/infrastructures	Duration:	Medium-long	Low	Reversibility:	Short-mid-term	**Negligible**	Medium	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Low						

5.1.3.6 Ecosystem Services

The impact factors that can affect the Ecosystem Services component within the Project AoI are listed in Table 10.

The Project's overall impact on the Ecosystem Services component in the construction phase is of negative direction. According to the baseline study performed, the sensitivity of this component is assessed as **medium**.

Multiple impact factors may affect the, as shown in the table below. The impact value calculated is **low** for the impact factor *Degradation of soil and vegetation,* **medium** for *Water demand* and **high** for *Change in the local hydrology and surface water quality* and *Change in the local hydrogeology and groundwater quality.*

For the *Degradation of soil and vegetation* impact factor the low value found is due to the potential loss of vegetation on the Project site which is used as livestock feed. For *Water demand* the value is assessed as medium due to the scarcity of water assessed in the region. While for *Change in the local hydrology and surface water quality* and *Change in the local hydrogeology and groundwater quality* impact factors the value has been assessed as high due to the chronic lack of water in the region of interest of the Project and the significant impact the construction activities can have on the reserves of water.

Considering the application of the mitigation measures, the residual impact has been assessed to be **low** for the *Degradation of soil and vegetation* and *Water demand* factors and **medium** for *Change in the local hydrology and surface water quality* and *Change in the local hydrogeology and groundwater quality* factors.

Table 10: Residual impact assessment matrix for Ecosystem Services during construction.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Degradation of soil and vegetation	Duration:	Medium-long	Medium	Reversibility:	Short-mid-term	**Low**	Medium	**Low**
	Frequency:	Frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Medium						
Change in the local hydrology and surface water quality	Duration:	Medium-long	Medium	Reversibility:	Long term	**High**	Medium	**Medium**
	Frequency:	Highly frequent						
	Geo. Extent:	Regional						
	Intensity:	Medium						
Change in the local hydrogeology and groundwater quality	Duration:	Medium-long	Medium	Reversibility:	Long term	**High**	Medium	**Medium**
	Frequency:	Highly frequent						
	Geo. Extent:	Regional						
	Intensity:	Medium						
Water demand	Duration:	Medium-long	Medium	Reversibility:	Short-mid-term	**Medium**	Medium	**Low**
	Frequency:	Highly frequent						
	Geo. Extent:	Local						
	Intensity:	Medium						

5.1.3.7 Land Use

The impact factors that can affect the Land Use and Ownership component within the Project AoI are listed in Table 11. A detailed presentation of Project land needs and relevant impacts is included in Appendix B.

The Project's overall impact on the Land Use and Ownership component in the construction phase is of negative direction. According to the baseline study performed, the sensitivity of this component is assessed as **high**.

The impact factor affecting the Land Use and Ownership component is *Land occupation*, as shown in the table below. The impact value calculated for this impact factor is **high**.

For the *Land occupation* impact factor, the very high value found is due to the economic displacement of landowners and informal land users (eg. Herders) that have the right to use the land where the WPP will take place, therefore the impact on these receptors is significantly high and need to be addressed carefully with appropriate measure. Considering the application of strict mitigation measures, the residual impact has been assessed to be **low** for the *Land occupation* impact factor.

Table 11: Residual impact assessment matrix for Land Use and Ownership during construction.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Land occupation	Duration:	Medium-long	Very high	Reversibility:	Mid term	**High**	High	**Low**
	Frequency:	Continuous						
	Geo. Extent:	Project footprint						
	Intensity:	Medium						

5.1.3.8 Cultural Heritage

The impact factors that can affect the Cultural Heritage component within the Project AoI are listed in Table 12.

The Project's overall impact on the Cultural Heritage component in the construction phase is of negative direction. According to the baseline study performed, the sensitivity of this component is assessed as **Medium-Low.**

The impact factor affecting the Cultural Heritage component is *Damage of cultural resources*, as shown in the table below. The impact value calculated for this impact factor is **Medium**.

For the *Damage of cultural resources* impact factor the medium value found is mainly due to assessment done under the baseline study where few tangible heritage (two archaeological finds) was found on the land in the Project surrounding. During the baseline has been found that the Project AoI serves as a reservoir of intangible cultural heritage (ICH), therefore mitigation measures need to be implemented. Considering the application of the mitigation measures, the residual impact has been assessed to be **low** for the *Damage of cultural resources* impact factor.

Table 12: Residual impact assessment matrix for Cultural Heritage during construction.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Damage of cultural resources	Duration:	Medium-long	Medium-low	Reversibility:	Irreversible	**Medium**	Medium	**Low**
	Frequency:	Sporadic						
	Geo. Extent:	Project footprint						
	Intensity:	Medium						

5.2 Impact Assessment for Operation Phase

5.2.1 Impact Assessment

As described in Chapter 03 of this ESIA ("IA Methodology"), the Project actions carried out during the operational phase will generate impact factors. The potential social impacts that may be generated by the identified impact factors during the operational phase are described in the following table.

Table 13: Impact Assessment Social Components - Operation Phase.

Impact Factor	Impact Assessment	Components Affected
Emission of noise and vibrations	WPP in operation generate noise that may pose risks to human health. A dedicated Noise Modelling Study has been delivered for the Mirny project and it is provided under Appendix A – Noise and Flickering Model . The outcomes of the study show that no direct or cumulative impacts are envisaged on local communities', as there is none in the Project AoI, neither are there other anthropogenic sources of noise or wind energy facilities in the vicinity. The noise measurement results are in compliance with the WBG EHS Guidelines for Wind Energy; IFC General EHS Guidelines: Environmental - Noise Management and Kazakh regulatory noise limit values. The closest receptors that could be impacted by noise emissions of the WPP during operation, are the local herders that use the land for grazing purposes. However, such receptors are nomadic and seasonal, and they won't remain in the same place for long; in this context, a detailed assessment on such receptors is not possible. Apart from the noise emissions, no vibration impact is expected during the operation, due to the nature of the Project.	▪ Community, Health, Safety and Security
Emission of light	The emission of light of a WPP can be associated to the aviation obstruction lights placed at the nacelle and tower lights (installed on the middle of the tower) of most of the turbines. This light will be flashing lights during the day and during the night. Similar flashlight will be positioned on the OHTL pylons, while also the permanent workers accommodation camp will be constantly illuminated during the night. Considering that the WPP and the OHTL will be located in remote and uninhabited areas, it is expected that	▪ Landscape and visual quality

Impact Factor	Impact Assessment	Components Affected
	the lights will generate visible effects, considering that there are no other sources of light in the area. However, the remoteness of the area ensures that no impact will be generated on local communities and on their perception of the landscape, considering the distance between the WPP and the closest villages. The only receptors potentially affected by emission of light are the local herders with their livestock. However, these receptors are nomadic and seasonal and with the application of proper mitigation measures, which may include frequent dialogue and sensibilization activities, the impact on their temporary camps is expected to be limited.	
Emission of shadow flickering	For the Mirny Project, a dedicated assessment of shadow flicker impacts originated from the operation of WTGs was delivered considering the nearest sensitive receptors. The assessment is provided under Appendix A – Noise and Flickering Model. The outcomes of the study show that calculated shadow flicker durations at the nearest sensitive receptors are in compliance with the WBG shadow flicker standards. Therefore, there is no expected impact on nearby communities or other receptors for this component.	▪ Community Health, Safety and Security
Presence of new buildings/infrastructures	Impacts on the landscape caused by a Project are generally of two types: visual obstruction and visual intrusion. Visual obstruction occurs when a new element is introduced which constitutes a total or partial barrier to the perception of elements and landscapes behind. In the specific case of a power line or of a wind farm, this can occur in a very limited way. Visual intrusion, on the other hand, occurs when new element causes a visual disturbance due to its aesthetic perceptive characteristics, regardless of the size of the field of vision it occupies. For this Project, the impact will be mainly due to visual intrusion of OHTL and WPP pylons and towers rather than their visual obstruction effects. Pylons and towers have a slender shape; hence the creation of a barrier effect is limited. In addition, it should be considered that WTGs add to the landscape a dynamic element due to the movement of the rotor, which is something atypical, considering that most elements in a landscape are static. For the Mirny Project, the WPP will be located in a remote area, far from sensitive human receptors, while the OHTL is expected to follow for some parts the same route of an existing OHTL therefore being installed in an already modified environment with limited landscape and visual impacts. Regarding public access to the site, the access to the WTGs will be restricted. In order to avoid safety and security risks for unauthorized people. While for what concerns OHTL route, the right of way will be considered with a 100m buffer. The main impact will be on herders and their livestock, that may come across the OHTL route incurring in a risk of electrocution as well as impact from electromagnetic fields. It is, however, noted that the OHTL will go through existing corridors where other transmission lines are present, so the impacts is expected to be low. Proper mitigation measures will be put in place, therefore the expected impact is considered minimal.	▪ Landscape and Visual Aspects ▪ Community, Health, Safety and Security

Impact Factor	Impact Assessment	Components Affected
	Finally, in icing conditions, ice may accumulate on the rotor blades of wind turbines and then, due to centrifugal force, detach from the blades and be thrown around, which can be hazardous. The impact of ice throwing is significant and can endanger nearby structures and personnel. In particular, considering the location of the WPP, the main receptors impacted may be WPP's personnel, nomadic herders and their livestock which could be around the WTGs for grazing purposes. In this context, proper measures need to be applied to mitigate this risk. A detailed presentation of Project land needs and relevant impacts due to this impact factor are presented in Appendix B.	
Presence of artefacts and artificial works	Since no detailed census or asset evaluation has yet been conducted for the ESIA, but landowners and informal land users have been identified during the social baseline assessment, a Land Acquisition and Resettlement Framework (LARF) will be developed. This framework will define the principles, procedures, and entitlement policies for managing potential physical and/or economic displacement, in accordance with national legislation and international standards, specifically EBRD Performance Requirement 5 and IFC Performance Standard 5. The LARF will also identify gaps between Kazakhstan's national land acquisition processes and these international standards. These gaps will be addressed through a Livelihood Restoration Plan, which will detail specific compensation and livelihood restoration measures for Project affected persons. A detailed presentation of Project land needs and relevant impacts due to this impact factor are presented in Appendix B.	▪ Land use
Demand for waste disposal and wastewater treatment	When compared to the construction phase, the Project operational phase will generate limited waste, a consequence of the limited O&M activities and a smaller workforce. In addition, operational waste will largely comprise non-hazardous waste (such as recyclable waste as paper, tin cans, plastic, cartons, rubber, and glass; and non-recyclable such as food residues and other organic wastes). Project operations will generate limited hazardous solid waste, such as electrical waste, general clean-up materials and solvents, used chemical containers, contaminated soil from potential spills and leaks of hazardous materials, and other miscellaneous wastes. Despite limited, this type of waste can cause significant adverse impacts on human health and the environment if inadequately managed. In relation to the OHTL, no significant waste is anticipated to be generated during operations, therefore this impact factor will not be quantitatively assessed for the operational phase; however, mitigation measures are still recommended to further minimize any possible impacts from solid waste. The use of inadequate facilities and procedures for the storage, collection, transfer, treatment/recycling and/or disposal of all streams of O&M waste pose a significant risk of contamination of the environment, such as soils, groundwater and surface water, with effects on human health and sensitive biological receptors. Wastewater generated from operational activities at the wind farm site(s) will include:	▪ Community, Health, Safety and Security

Impact Factor	Impact Assessment	Components Affected
	- Sanitary/domestic wastewater from O&M personnel (from toilets and kitchen); - Oily wastes and oily water (from the collection of spills/leaks from transformer maintenance) – expected in very small quantities; - Hazardous liquid waste (if any) such as fuels, chemicals, paints, lubricants, solvents, waste oil, hydraulic fluid, resins, waste solvents and thinners, etc. Inadequate segregation, storage, transfer and final disposal of wastewater pose a risk of accidental release of toxic substances into the environment and contamination of soil, groundwater and surface water, which can generate significant impacts on human health.	
Energy demand (fuel and electricity)	During operations, auxiliary power supply will be required to operate plant infrastructure such as: the inverters control circuit, the transformer magnetization circuit, the BESS HVAC systems, and the office (air conditioning, lights, computers, server, lighting, etc.). Power will be generated onsite (however, details on the final power supply for operations is not defined at this point). In that case, no impacts are expected in relation to electricity needs for operations and no impacts are expected on the local energy network.	▪ Mobility and Infrastructure
Water demand	Water consumption in the operational phase of wind power is negligible. However, water will still be needed for activities such as: - the daily functioning of the office's bathrooms and kitchen; - domestic cleaning purposes; - eventual landscaping; - eventual dust control; - for the firefighting stations. The water source for operation activities (technical water) is still unclear at this stage, but it will most likely be sourced from water well(s) combined with water treatment equipment. However, the water wells used for the construction phase might not be enough to provide groundwater for the whole duration of the operation phase. Other strategies are being considered, and additional groundwater studies are being carried out to acquire more certainty related to groundwater availability for operations. As for drinking water, it might be supplied by water well(s), depending on the quality of the water. Alternatively, bottled water will be delivered to the site as well as trucks delivering potable water to the site. Considering the persistent water scarcity affecting the region, the application of appropriate mitigation measures will be fundamental to limit the impact that the WPP maintenance could have on the local infrastructure, even if limited compared to the construction phase.	▪ Ecosystem services ▪ Community Health, Safety and Security
Workers' influx	Compared to the construction phase, the influx of operation workers on the local population will be much limited. It is expected that during operations, permanent employees on site will be approximately 20 workers including supervisors, administrative personnel and maintenance	▪ Population and Demography ▪ Community, Health, Safety and Security ▪ Mobility and Infrastructure

Impact Factor	Impact Assessment	Components Affected
	personnel. Moreover, there will be workers dedicated to cleaning. Even if more limited in magnitude than during construction, operation workers' influx could bring an increase in communicable diseases leading to a burden of local health services. More interactions between persons can increase the risk of disease transmission, especially if proper public health measures are not in place, potentially leading to outbreaks of communicable diseases. t Gender risks mitigation measures are not included in this Chapter. Indeed, gender risks (including gender-based violence and harassment – "GBVH", legal gender barrier, women's economic opportunities, workplace equality and gender gaps) and dedicated mitigation measures have been assessed and discussed under a separate Chapter of this ESIA report ("Chapter 07 – Human Rights Risk Assessment").	
Demand for security management	It is expected that during the operational phase on site there will be full-time security personnel in charge of: ▪ anti-theft alarms and devices management; ▪ entry and exit control systems management; ▪ project site perimeter control; ▪ gates locking and opening. As during construction, the management of security of Project operations could pose risks for workers' human rights and local communities' safety and security. Particular attention will be given to tensions that could arise between security personnel and vulnerable groups, such the local herders who perform grazing activities nearby the site. Also, proper measures will be taken to minimize the risk of GBVH. In this context, dedicated measures related to gender risk have been developed under a separate Chapter of this ESIA report ("Chapter 07 – Human Rights Risk Assessment"). Tensions between community members and security personnel may arise due to actual or perceived Project impacts as well as actual or perceived behaviour of security personnel. Moreover, if the behaviour of the security personnel is perceived threatening by local communities and/or workers to their wellbeing, conflicts may arise. Considering the distance of the WPP site from local communities, it is unlikely that social tension may arise during this phase of the Project. However, it is important to implement measures that require security personnel to maintain social harmony,	▪ Community, Health, Safety and Security
Demand for workforce	Hiring of local workers will be the preferred strategy, depending on the availability of suitable qualifications. There will be up to 200 permanent workers, with a duration of around 25-30 years. This will generate a positive impact on the WPP's closest communities even if for a limited number of workers. Beside the positive impact generated by new economic opportunities, the assessment also include the potential risks	▪ Economy and Employment

Impact Factor	Impact Assessment	Components Affected
	linked to labour and working conditions. This assessment and related mitigation measures have been addressed under a separate Chapter of this ESIA report ("Chapter 07 – Human Rights Risk Assessment").	
Demand for raw materials and goods (supply chain)	Compared to the construction phase, the demand for materials goods and services will be much more limited, which will in turn generate more limited effects on the local economy. During the operation phase the main services required will be the ones for day-to-day maintenance of the WPP, OHTL and related facilities, as well as cleaning activities of the operation camp.	▪ Economy and Employment
Increase of traffic	Operational traffic will be limited. Indeed, the traffic will be predominantly generated by operation and maintenance activities which will be periodical and will be delivered by a few vehicles at a time. The impact on this component is therefore expected to be low and will be further reduced with the application of appropriate dedicated mitigation measures, as per the tables below.	▪ Community Health, Safety and Security ▪ Mobility and Infrastructure
Provision of electricity to the national grid	The development of electricity from the Mirny WPP will support the Kazakh Government in achieving the objective stated under its *Strategy Kazakhstan 2050: A New Political Course of the Established State* ("Strategy 2050")[3], which states the country aims at having renewable energies accounting for the 50% of its national energy mix. Renewable energy production (in this case wind power) is preferable to that from fossil fuels, because it produces fewer emissions of pollutants and greenhouse gases, with obvious spin-offs in terms of air quality and therefore benefits for health and the environment, in line with international objectives to decarbonise the energy sector.	▪ Mobility and Infrastructure
Creation of synergies with local educational institute	The development of a wind farm gives the opportunity for synergies with local educational institutes. During the operational phase these activities can have multiple positive impacts on both the technological and socio-economic levels. These collaborations can pave the way for advanced research projects on wind energy, with the aim of improving operational efficiency, developing innovative technologies for turbine maintenance, or monitoring the social and environmental impact of the wind farm. Particularly, the city of Taraz hosts three different Universities, M. Kh. Dulati Taraz State University, Zhambyl Hydromelioration and Construction Institute, Zhambyl Technological Institute of Light & Food Industry. Currently there are no specific courses on energy transition and renewable energy; therefore, the Project could stimulate the opening of new courses related to energy transition, creating the basis for collaborations with local academic institutes and research centres of the region. Local universities and	▪ Education

[3] Address by the President of the Republic of Kazakhstan, Leader of the Nation, N.Nazarbayev "Strategy Kazakhstan-2050": new political course of the established state"

Impact Factor	Impact Assessment	Components Affected
	research centres could become partners in the collection and analysis of park performance data, contributing to a better understanding of local wind dynamics and technical aspects of energy production. From an educational perspective, these synergies can offer students opportunities for field training, internships, or dissertations focusing on technical, environmental and social issues related to wind energy. This contributes not only to the formation of specialised skills in the area, but also to the creation of a skilled workforce that can be employed both locally and in other renewable energy sectors. These collaborations can also boost the local economy, as the presence of a wind farm connected to academic institutions can attract investment in research and development and stimulate the creation of new jobs in the renewable energy and technology sector.	

5.2.2 Mitigation Measures

The mitigation measures listed below reflect the mitigation hierarchy and are proposed for the operation phase. These measures will be implemented in addition to the Project mitigation measures which are a standard procedure applied by the Project Operator to achieve compliance with legal requirements and regulations and alignment with good industry practice (GIIP).

Environmental and Social Management Plans (ESMPs) to be implemented during the Project's operational phase will be prepared in a timely manner before the start of operations and will incorporate the mitigation measures presented below. The ESMPs will be part of the Project Environmental and Social Management System, whose structure and functioning is described in the "Environmental & Social Management System" Framework Document, that will be also prepared.

Based on the impact assessment, the Management Plans to be prepared are included in the following table. However, the MPs mentioned may be not exhaustive and depending on future needs, they can be modified to better adapt to the Project needs, as well as others can also be included.

Table 14: Mitigation Measures Physical Components - Operation Phase.

Mitigation hierarchy	Mitigation Measure
Impact factor: Emission of noise and vibrations	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Impact factor: Emission of light	
Minimization	Communicate in a timely manner to herders the location of enlightened sites so that they can decide where to set their camps, minimizing the impact of night lights on such receptors.
Impact factor: Presence of new buildings/infrastructures	
Minimization	Define the position of the WTGs and of the OHTL trying to favor as much as possible the integration of the infrastructure with the environment, reducing the effect of the contrast of the structures with the natural landscape.
Minimization	At the Project design stage, siting turbines at safe distances from dwellings, public paths, or other vulnerable locations based on turbine height, rotor diameter, and ice throw risk modeling to minimize hazards.
Minimization	Apply clear warning signals on the risk of ice throw.

Mitigation hierarchy	Mitigation Measure
Minimization	Apply clear warning signals on the risk of electrocution near the OHTL route, including the indication of 100m safety distance from the transmission line.
Minimization	Apply clear warning signals indicating high-voltage line and the presence of electromagnetic fields.
Avoidance	Lock turbine access doors to restrict unauthorized entry into turbines and associated structures in order to avoid safety and security risks.
Impact factor: Demand for waste disposal and wastewater treatment	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Impact factor: Energy demand (fuel and electricity)	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Impact factor: Water demand	
Minimization	Apply the same mitigation measures identified for this impact factor and described for the physical components and the construction phase (Chapter 04 – IA Physical).
Impact factor: Workers' influx	
Avoidance	Epidemiological studies shall be carried out in the Project populations to track new infections.
Avoidance	Perform health screenings of workers periodically throughout their employment/contract.
Avoidance	Provide health and safety induction for workers, in addition to awareness trainings on STIs and others communicable disease prevention; Implement trainings on raising awareness on healthy lifestyles on topics such as – among others – on alcohol, personal and food hygiene, communicable and non-communicable diseases.
Minimization	The Operator will implement a *Code of Conduct* that shall be followed by workers, outlining expected behavior with respect particularly to their daily interactions with local residents. The code of conduct will be provided to employees at the hiring stage and will be covered during induction training.
Minimization	The Operator shall adopt and implement a *Communicable Disease Outbreak Management Plan*, aiming to respond to the spread of communicable disease in the WPP. The plan will provide a general framework for preparedness planning, response and recovery in dealing with an outbreak of a communicable disease. Roles and responsibilities of personnel will be outlined in the plan. All employees shall receive induction in relation to the plan.
Minimization	Develop and implement an *Hygiene Management Plan.*
Minimization	The Operator shall have in place a guideline for Hygiene Standards to be adopted and implemented within the Project site in order to have the surroundings clean, hence preventing illness and the spread of diseases. The Hygiene Standards shall encompass basic hygiene, food hygiene, hand hygiene, among others. All employees shall receive induction related to the standards.
Minimization	The Operation Camp will have to be equipped with an infirmary with a competent nurse or personnel trained to assist workers in case of infectious disease and any health issues that may arise.
Impact factor: Demand for security management	
Avoidance	The references of security workers shall be checked before hiring them. The reference checks shall ensure candidates for security services do not have criminal records or a record of abuse of violation of human rights.
Minimization	Develop and implement the *Community, Health and safety and Security Management Plan.*
Minimization	Security Personnel will be trained on the Voluntary Principles on Security and Human Rights and about the use of force and appropriate conduct toward workers and nearby communities.
Minimization	Security personnel will be trained on conflict resolution, crowd management, restraint and cautious exercise of security activity and appropriate use of force.
Impact factor: Demand for workforce	

Mitigation hierarchy	Mitigation Measure
Avoidance	Ensure that the Operator will comply with national and international laws, conventions and lenders' requirements on labour conditions to be maintained through the life of the Project.
Avoidance	Ensure that the Operator will put in place transparent and fair recruitment procedures, that monitor non-discrimination and equal opportunities and that are clearly understandable and accessible to all potential candidates.
Avoidance	Ensure that workers are hired through recruitment offices avoid hiring "at the gate" to discourage spontaneous influx of job seekers.
Avoidance	The Operator will guarantee the wellbeing of service providers, including decent working conditions, adequate salaries, correct working hours and PPE in case they exposed to hazardous construction works.
Avoidance	Violating child labour laws through illegal employment of children below the age of 18 years will be forbidden.
Minimization	Develop and implement the *Labor Management Plan* to respect labour and working conditions, to provide all workers for non-discrimination and equal opportunities and ensure that the *Labour Management Plan* is aligned with the requirements of EBRD PR2.
Minimization	A strategy for the employment of local workers will be defined. This strategy will be disclosed in line with the provisions included in the SEP to ensure that local communities in the proximity of the sites are informed on employment positions available and methods to express interest. Based on outcomes of this plan, the Client will implement a training programme for the local workforce to enable them to take advantage of the opportunity.
Minimization	Ensure that the Operator will adopt and maintain human resources policies and management systems or procedures aligned with the requirements of EBRD PR2. These policies and procedures will have to be clear and accessible to workers, and in the main language(s) spoken by the workforce.
Minimization	Clear and transparent information on wages, benefits and working conditions will be provided to all workers, following local labor legislation.
Impact factor: Demand for raw materials and goods (supply chain)	
Minimization	Identify goods and services that can be procured locally and set targets for local procurement in consultation with relevant local development agencies.
Impact factor: Increase of traffic	
Avoidance	Maintain the access roads newly constructed or restored in good conditions and allow the nearby communities their usage.
Minimization	Develop and implement the *Traffic Management Plan.*
Minimization	Ensure that safe traffic control signs are in place.
Minimization	Vehicle checks must be done inside the Project site or at verified safe locations, not along the roads.
Minimization	The Operator shall comply with all applicable laws regarding road safety and transport, such as speed limits, traffic conditions and cargo securing and covering.

5.2.3 Impact Value and Residual Impact Value Calculation

This section describes the impact value and the residual impact values (after the implementation of mitigation measures) found for each impact factor on each social component. The description of how calculations have been performed can be found in Chapter 03 of this ESIA ("IA Methodology").

5.2.3.1 Population and Demography

The impact factors that can affect the Population and Demography component within the Project AoI are listed in Table 15.

The Project's overall impact on the Population and Demography component in the operation phase is of negative direction. According to the baseline study performed, the sensitivity of this component is assessed as **medium-high**.

The impact value calculated is **low** for the impact factor *Workers' inlfux*. The low value found for this impact factor is mainly due to the limited number of workers that will be involved in the operational phase, even if for a long period of time..

Considering the application of the mitigation measures, the residual impact has been assessed to be **negligible** for the factor *Workers' inlfux* showing that the operation phase is not expected to affect relevantly the nearby communities and that mitigation measures can be effective to tackle this impact.

Table 15: Residual impact assessment matrix for Population and Demography during operation.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Workers' inlfux	Duration:	Long	Medium-high	Reversibility:	Short-term	**Low**	Medium-high	**Negligible**
	Frequency:	Continuous						
	Geo. Extent:	Local						
	Intensity:	Low						

5.2.3.2 Economy and Employment

The impact factors that can affect the Economy and Employment component within the Project AoI are listed in Table 16

The Project's impact on the Economy and Employment component in the operation phase shows **positive** direction for the impact factors *Demand for Goods, Materials and Services (supply chain)* and *Demand of Workforce*. According to the baseline study performed, the overall sensitivity of this component is assessed as **medium-high**.

Considering the application of the proposed enhancement measures, the Project's overall positive residual impact on this component has been assessed to be **low** referring to the impact factors *Demand of Workforce* and *Demand for Goods, Materials and Services (supply chain).*

The **low** residual impact for *Demand of Workforce* depends on the limited number of workers, potentially local, that will be employed in the WPP maintenance and operation, therefore not being able to significantly affect the local economic development. The low residual impact for *Demand for Goods, Materials and Services (supply chain)* in due to the limited amount of resources that the operator will need to supply during the operational phase.

Table 16: Residual impact assessment matrix for Economy and Employment during operation (impact with positive direction).

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Demand for Goods, Materials and Services (supply chain)	Duration:	Long	Medium-high	Reversibility:	Short-term	**Low**	Medium-high	**Low**
	Frequency:	Frequent						
	Geo. Extent:	Regional						
	Intensity:	Medium						
Demand of Workforce	Duration:	Long	Medium-high	Reversibility:	Short-term	**Low**	Medium-high	**Low**
	Frequency:	Frequent						
	Geo. Extent:	Regional						
	Intensity:	Medium						

5.2.3.3 Community, Health, Safety and Security

The impact factors that can affect the Community, Health, Safety and Security component within the Project AoI are listed in Table 17.

The Project's overall impact on the Community, Health, Safety and Security component in the operation phase is of negative direction. According to the baseline study performed, the sensitivity of this component is assessed as **medium-high**.

Multiple impact factors may affect the Community, Health, Safety and Security component, as shown in the table below. The impact value calculated is **low** for the impact factors *Emission of noise and vibrations*, *Emission of shadow flickering, Presence of new buildings/infrastructures* and *Demand for waste disposal and wastewater treatment*. While the impact value has been assessed as **medium** for the impact factors *Workers' influx, Demand for security management*, *Increase of traffic* and *Water demand*.

For the impact factors *Emission of noise and vibrations*, *Emission of shadow flickering, Presence of new buildings/infrastructures* and *Demand for waste disposal and wastewater treatment* the low value found is mainly due to the remoteness of the Project site and its distance from sensitive human receptors, therefore the impact that these factors can have on nearby communities is limited. Considering the application of the mitigation measures, the residual impact has been assessed to be **negligible** for the four factors.

For the impact factors *Workers' influx, Demand for security management*, *Increase of traffic* and *Water demand* the impact value is assessed as medium mainly due to the long duration during which the events will take place. However, considering the application of the mitigation measures, the residual impact has been assessed to be **low** for the four factors.

Table 17: Residual impact assessment matrix for Community, Health, Safety and Security during operation.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Emission of noise and vibration	Duration:	Long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Low						
Emission of shadow flickering	Duration:	Long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Negligible						
Presence of new buildings/infrastructures	Duration:	Long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Moderately frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Low						
Demand for waste disposal and wastewater treatment	Duration:	Long	Medium-high	Reversibility:	Short-term	**Low**	Medium	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Project footprint						
	Intensity:	Low						
Workers' influx	Duration:	Long	Medium-high	Reversibility:	Short-mid-term	**Medium**	Medium	**Low**
	Frequency:	Moderately frequent						
	Geo. Extent:	Regional						
	Intensity:	Medium						
Demand for security management	Duration:	Long	Medium-high	Reversibility:	Short-mid-term	**Medium**	Medium	**Low**
	Frequency:	Moderately frequent						
	Geo. Extent:	Regional						
	Intensity:	Medium						
Increase of traffic	Duration:	Long	Medium-high	Reversibility:	Short-mid-term	**Medium**	Medium	**Low**
	Frequency:	Moderately frequent						
	Geo. Extent:	Local						
	Intensity:	Medium						
Water demand	Duration:	Long	Medium-high	Reversibility:	Short-mid-term	**Medium**	Medium	**Low**
	Frequency:	Moderately frequent						
	Geo. Extent:	Local						
	Intensity:	Low						

5.2.3.4 Mobility and Infrastructure

The impact factors that can affect the Mobility and Infrastructure component within the Project AoI are listed in Table 18.

The Project's impact on the Mobility and Infrastructure component in the operation phase shows **negative** direction for the impact factors *Energy demand (fuel and electricity)*, *Workers' influx* and *Increase of Traffic*, and it shows **positive** direction for the impact factor Provision of electricity to the national grid.. According to the baseline study performed, the overall sensitivity of this component is assessed as **medium-high**.

The impact value calculated for *Energy demand (fuel and electricity)* is **medium**. The medium value found for these impact factors is mainly due for energy not to overload the existing infrastructure of the region. The demand for energy will be much limited compared to the construction phase, however its duration will be much longer, consequently leading to the medium impact value.

The impact value calculated for *Workers' influx* and *Increase of Traffic* is **low**. The low value is due to the limited workforce that will be needed to run the WPP during the operation phase and consequently to the traffic that this phase will generate in the region.

In this context, the application of mitigation measures has led the residual impact to be **low** for the factor *Energy demand (fuel and electricity)* and to be **negligible** for the factors *Workers' Influx* and *Increase of traffic* showing that the measures can be effective to tackle this impact.

Table 18: Residual impact assessment matrix for Mobility and Infrastructure during operation (impact with negative direction).

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Energy demand (fuel and electricity)	Duration:	Long	Medium-high	Reversibility:	Short-mid-term	**Medium**	Medium	**Low**
	Frequency:	Continuous						
	Geo. Extent:	Local						
	Intensity:	Low						
Workers' influx	Duration:	Long	Medium-high	Reversibility:	Short-term	**Low**	Medium-high	**Negligible**
	Frequency:	Frequent						
	Geo. Extent:	Local						
	Intensity:	Low						
Increase of traffic	Duration:	Long	Medium-high	Reversibility:	Short-term	**Low**	Medium-high	**Negligible**
	Frequency:	Moderately frequent						
	Geo. Extent:	Local						
	Intensity:	Low						

The assessment also highlighted a positive impact for this component, namely *Provision of electricity to the national grid* shown in Table 19. Considering the application of the proposed enhancement measures, the Project's overall positive residual impact on this component has been assessed to be **medium**.

The **medium** residual impact for *Provision of electricity to the national grid* depends on the improvement of the country's energy mix also thank to the new Mirny WPP that will allow Kazakhstan to increment the share of renewable energy produced.

Table 19: Residual impact assessment matrix for Mobility and Infrastructure during operation (impact with positive direction).

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Provision of electricity to the national grid	Duration:	Long	Medium-high	Reversibility:	Short-term	**Low**	Medium-high	**Medium**
	Frequency:	Continuous						
	Geo. Extent:	Regional						
	Intensity:	Medium						

5.2.3.5 Landscape and Visual Quality

The impact factors that can affect the Landscape and Visual Quality component within the Project AoI are listed in Table 20.

The Project's overall impact on the Landscape and Visual Quality component in the operation phase is of negative direction. According to the baseline study performed, the sensitivity of this component is assessed as **low**.

The impact value calculated is **negligible** for the impact factors *Presence of new buildings/infrastructures* and *Emission of light.* The negligible value found for both the factors is mainly due to the remoteness of the Project site and its distance from sensitive human receptors, therefore the impact that these factors can have on nearby communities' is limited. Considering the application of the mitigation measures, the residual impact has been assessed to be **negligible** for both *Presence of new buildings/infrastructures* and *Emission of light* factors.

Table 20: Residual impact assessment matrix for Landscape and Visual Quality during operation.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Presence of new buildings/ infrastructure	Duration:	Long	Low	Reversibility:	Short-mid-term	**Negligible**	Medium	**Negligible**
	Frequency:	Continuous						
	Geo. Extent:	Project footprint						
	Intensity:	Low						
Emission of light	Duration:	Long	Low	Reversibility:	Short-term	**Negligible**	Medium	**Negligible**
	Frequency:	Continuous						
	Geo. Extent:	Project footprint						
	Intensity:	Low						

5.2.3.6 Land Use

The impact factors that can affect the Land Use component within the Project AoI are listed in Table 21.

The Project's overall impact on the Land Use and Ownership component in the operation phase is of **negative** direction. According to the baseline study performed, the sensitivity of this component is assessed as **very high**.

The impact factor affecting the Land Use component is *Presence of artefacts and artificial works*, as shown in the table below. The impact value calculated for this impact factor is **high**. For the *Presence of artefacts and artificial works* impact factor the high value found is due to the economic displacement of herders that have the right to use the land where the WPP will take place, the impact on these receptors remains significant also under the operation phase due to their inability to use the land (approx. 43.000 hectares) that will be occupied by the WTGs for the whole life of the WPP until decommissioning. The impact needs to be addressed carefully with the appropriate mitigation measures identified. Considering the application of strict mitigation measures, the residual impact has been assessed to be **low** for the *Presence of artefacts and artificial works* impact factor.

Table 21: Residual impact assessment matrix for Land Use and Ownership during operation.

Impact Factor	Impact Factor Features		Component Sensitivity	Impact Features		Impact Value	Mitigation effectiveness	Residual impact value
Presence of artefacts and artificial works	Duration:	Long	Very high	Reversibility:	Short-mid-term	**High**	Medium-high	**Low**
	Frequency:	Continuous						
	Geo. Extent:	Project footprint						
	Intensity:	Medium						

5.2.3.7 Education

The Education component is not impacted by operation activities; therefore the residual impact evaluation was performed.

5.3 Impact Assessment for Decommissioning Phase

5.3.1 Impact Assessment

During decommissioning of the WPP site, the dismantling and removal of turbines and related infrastructure from the site will take place. Impacts on the social environment may occur, such as noise emissions, air emissions, waste generation, influx of workers and increase of traffic. These potential impacts require mitigations to avoid negative effects on the local social environment, including also biological sensitive receptors, as per the IFC EHS Guidelines for Wind Energy[4].

[4] final-aug-2015-wind-energy-ehs-guideline.pdf

Chapter 03 of this ESIA ("IA Methodology") describes the Project actions carried out during the decommissioning phase that can generate environmental and/or social pressures, which are identified as impact factors. The potential social impacts that may be generated by these impact factors are described in the following table.

Table 22: Impact Assessment Social Components - Decommissioning Phase.

Impact Factor	Impact Assessment	Components Affected
Presence of new buildings/infrastructure	In the decommissioning phase, the wind farm will be removed from service with the dismantling of all above-ground infrastructure (e.g., substations, wires, buildings, fencing, and access roads) and of all/most of below-ground infrastructure (e.g., foundation and wiring). Following the removal, Aktas Energy LLP will conduct the equipment and machinery disassembly into components for final disposal or possibly for reuse, recycle or refurbishment. After decommissioning, the access roads will be kept, while the area – once the structures are removed – will be restored. Public access to the decommissioning site will remain interdicted during the whole process. However, considering the broadness of the WPP site, it is not expected that all the land will be completely fenced during the whole decommissioning period. Small portions of land where decommissioning works are taking place will be temporarily fenced and access will be denied to unauthorized people for a limited period in order to grant safety and security. The expected impact is considered minimal with the application of the appropriate mitigation measures. The visual impacts in the decommissioning phase associated with turbines will have the same impact significance as the operation phase. In time, as the turbines are dismantled, the visual effect of the turbines will decrease. Once the decommissioning work is complete, the visual impact will disappear completely.	▪ Landscape and Visual Aspects ▪ Community, Health, Safety and Security
Workers' influx	When compared to the operation phase, a significant increase in the influx of of workers is expected for the decommissioning phase, even if for a limited period of time. To date, the number of workers at the Project site for the dismantling of the WPP is still unknown, however appropriate mitigation measures need to be applied in order to limit the sociological implication such as upsetting the prevailing social harmony, causing adverse social disequilibrium and disharmony among the foreign and local residents, as it was already the case under the construction phase. The increased influx of workers may also imply the possibility of spreading of communicable diseases due to the increased presence of people and interactions between workers and the local population. This is particularly relevant with regard to Sexually Transmitted Diseases and communicable diseases. To limit these impacts, mitigation measures are provided in the table below. Gender risks mitigation measures are not included in this Chapter. Indeed, gender risks (including gender-based violence and harassment – "GBVH", legal gender barrier, women's economic opportunities, workplace equality and gender gaps) and dedicated mitigation measures have been assessed and discussed under a separate Chapter of this ESIA report ("Chapter 07 – Human Rights Risk Assessment").	▪ Population and Demography ▪ Community, Health, Safety and Security
Demand for security management	Security workforce will be required until the decommissioning process is completed. Still to be defined how many security workers will be employed for this phase of the Project. Even if the impact of their presence could be limited, appropriate measures need to be implemented in order to limit the risk of human	▪ Community, Health, Safety and Security

Impact Factor	Impact Assessment	Components Affected
	rights violations on workers and local communities' as well as potential tensions between community members, sub-contractors and other stakeholders and security personnel.	
Demand for workforce	Wind projects generate a demand for workforce across all project phases, including decommissioning. Particularly the decommissioning requires skilled personnel for design, project management, transportation and power plant dismantling. To date, it is still unknown the number of workers that will be involved in the decommissioning phase Workers could be hired locally, at country level or from outside Kazakhstan. These employment opportunities, even if temporary, are expected to generate a positive impact on local communities. Beside the positive impact generated by new economic opportunities, the assessment also includes the potential risks linked to labour and working conditions. This assessment and related mitigation measures have been addressed under a separate Chapter of this ESIA report ("Chapter 07 – Human Rights Risk Assessment").	▪ Economy and Employment
Increase of traffic	Traffic is not expected to reach the levels of the construction phase; still, the decommissioning phase will entail the transportation of oversize and heavy components, which will generate vehicle traffic that could affect both the workers' and the local communities' health and safety if not planned accurately. Decommissioning traffic, even if more limited, will require management through the same mitigation measures envisaged for the construction phase.	▪ Community, Health, Safety and Security

5.3.2 Mitigation Measures

The mitigation measures listed below reflect the mitigation hierarchy and are proposed for the decommissioning phase. These measures will be implemented in addition to the Project mitigation measures which are a standard procedure applied by the Project Operator (in addition to other required parties such as local authorities and/or dismantling company) to achieve compliance with legal requirements and regulations and alignment with GIIP.

The appropriate *Decommissioning Management Plan* to be applied during the Project's decommissioning phase must be prepared in a timely manner before the start of decommissioning activities. The overarching document ESMS Framework will also be prepared.

Based on the impact assessment, the mitigation measures to be included in the *Decommissioning Management Plan* are listed in the following table. However, the following mitigation measures may be not exhaustive and depending on future needs, they can be modified to better adapt to the Project needs, as well as others can also be included.

Table 23: Mitigation Measures Social Components - Decommissioning Phase.

Mitigation hierarchy	Mitigation Measure
Impact factor: Presence of new buildings/infrastructure	
Mitigation	Plan a gradual removal of turbines to reduce abrupt landscape changes.
Mitigation	Regularly update stakeholders and local communities about timelines and processes of the decommissioning phase and restoration process.
Minimization	Project site will be properly fenced; if fencing of the site is not feasible, a sufficient number of security personnel will be on at site boundaries to ensure that no community members or unauthorized persons enter the site.

Mitigation hierarchy	Mitigation Measure
Minimization	All sites and fencing will be provided with suitable signage indicating the prohibition to enter to prevent unintentional entry by herders or livestock into hazardous areas. Signs will include pictograms, to ensure they are understandable to all persons, including children.
Minimization	Controlled access points for plant workers and decommissioning vehicles will be designated to minimize conflict with grazing routes.
Restoration	Replant native vegetation and restore the landscape to pre-WPP conditions.
Impact factor: Workers' influx	
Minimization	Provide cultural sensitization training for workers regarding engagement with local community.
Minimization	Implement a strict Code of Conduct for the workers, and make sure that it is reflected in the Contractor Management System, outlining expected behavior with respect to their daily interactions with local residents and users of public amenities.
Minimization	Contractor's workers will be educated on how to behave with Project neighboring communities where the workforce will be likely to spend its time off.
Minimization	Ensure that the Contractor will establish effective interactions and integration of foreign workers and local hiring's on the Project.
Minimization	To minimize the risk of sexual harassment and gender-based violence due to the influx of male workers in the Project AoI, sensibilize communities, adopt a zero-tolerance policy on the abuse and enforce the local law control and application system in the area.
Minimization	Ensure that the Contractor will provide health and safety induction for workers and awareness trainings on Sexual Transmission Infections and others communicable disease prevention; implement trainings on raising awareness on healthy lifestyles on topics such as – among others- on alcohol, personal and food hygiene, communicable and non- communicable diseases.
Minimization	Ensure that the Contractor will perform a health screening of all workers prior to beginning of dismantling work and on a periodic basis.
Impact factor: Demand for security management	
Avoidance	The references of security workers shall be checked before hiring them. The reference checks shall ensure candidates for security services do not have criminal records or a record of abuse of violation of human rights.
Minimization	Security Personnel will be trained on the Voluntary Principles on Security and Human Rights and about the use of force and appropriate conduct toward workers and nearby communities.
Impact factor: Demand for workforce	
Avoidance	Ensure that the Contractor will put in place transparent and fair recruitment procedures, that monitor non-discrimination and equal opportunities and that are clearly understandable and accessible to all potential candidates.
Avoidance	Ensure that the Contractor will comply with national and international laws, conventions and lenders' requirements on labour conditions to be maintained through the life of the Project.
Avoidance	Ensure that the Contractor will hire workers through recruitment offices and avoid hiring "at the gate" to discourage spontaneous influx of job seekers.
Avoidance	The Contractor will guarantee the wellbeing of service providers, including decent working conditions, adequate salaries, correct working hours and PPE in case they exposed to hazardous construction works.
Avoidance	Violating child labour laws through illegal employment of children below the age of 18 years will be forbidden.
Minimization	A strategy for the employment of local workers for decommissioning phase will be defined. This strategy will be disclosed in line with the provisions included in the SEP to ensure that local communities in the proximity of the sites are informed on employment positions available and methods to express interest. Based on outcomes of this plan, the Client will implement a

Mitigation hierarchy	Mitigation Measure
	training programme for the local workforce to enable them to take advantage of the opportunity.
Minimization	Ensure that the Contractor will adopt and maintain human resources policies and management systems or procedures aligned with the requirements of EBRD PR2. These policies and procedures will have to be clear and accessible to workers, and in the main language(s) spoken by the workforce.
Minimization	Provide to all workers clear and transparent information on wages, benefits and working conditions , following local labor legislation.
Impact factor: Increase of traffic	
Avoidance	Implement working hour limits for drivers and inform drivers periodically on working schedule.
Avoidance	Traffic control measures, including road signs and flag persons to warn of dangerous conditions shall be implemented.
Avoidance	The Contractor shall comply with all the applicable laws with regard to road safety and transport.
Minimization	Develop and implement an awareness raising campaign with local stakeholders regarding the risks related to the movement of heavy vehicles and increased traffic in the area during the decommissioning phase. The main focus of this campaign will be on those communities that are located on the transit routes of goods and materials that need to be transported from the Project site. The campaign will be implemented in coordination with local community groups.
Minimization	The Contractor shall instruct its drivers and equipment operators that vehicles will be expected to comply with all road ordinances, such as speed limits, roadworthiness, load securing and covering.
Minimization	Ensure that on transit routes that go through cities and villages, pedestrians have adequate footpaths along roads.
Minimization	Provide appropriate information to potentially affected local communities prior to the beginning of any dismantling work in order to allay fears, complaints or potential risks due to lack of information or awareness about the Project activities.
Minimization	Provide timely information on transportation schedule to the landowners whose lands are located along the route.
Minimization	Schedule the materials transportation to coincide with off-peak hours.
Minimization	Ensure load material road transportation is conducted with escort vehicles.

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