International ESIA for an Integrated Renewable Energy Project

180MW Wind Power and Battery Energy Storage System, Tsogttsetsii soum, Mongolia

Chapter 8 Social Impact Assessment

PREPARED FOR

Net Zero Energy LLC
MCS and URECA

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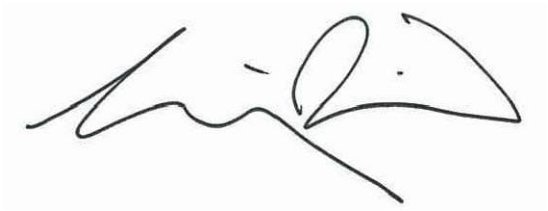
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ACRONYMS AND ABBREVIATIONS

Acronyms	Description
AADT	Annual Average Daily Traffic
[redacted]	[redacted]
AIS	Air Insulated Switchgear
ALARP	As Low As Reasonably Practicable
AoI	Area of Influence
APLIC	Avian Powerline Interaction Committee
BESS	Battery Energy Storage System
BMP	Biodiversity Management Plan
BOD	biochemical oxygen demand
CAF	Central Asian Flyway
CAQMP	Construction Air Quality Management Plan
CCRA	Climate Change Risk Assessment
CD	Community Development
CH	Critical Habitat
CHA	Critical Habitat Assessment
CIA	Cumulative Impact Assessment
CIP	Climate Impact Platform
CITES	Convention on International Trade in Endangered Species
CLO	Community Liaison Officer
CMIP6	Coupled Model Intercomparison Project Phase 6
CMS	Conservation of Migratory Species of Wild Animals
CO	Carbon monoxide
COD	chemical oxygen demand
CR	critically endangered
CRM	Citizen's Representative Meeting
CRM	Collision Risk Model
CSMP	Cold Stress Management Plan
DEIA	Detailed Environmental Impact Assessment

Acronyms	Description
DFID	International Development
DSF	Development Support Fund
E&S	Environmental and Social
EAAA	Ecologically Appropriate Area of Analysis
EAAF	East Asian-Australasian Flyway
EBRD	European Bank for Reconstruction and Development
EC	Electrical Conductivity
EEO	Extent of Occurrence
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EN	Endangered
EPC	Engineering Procurement and Construction
EPRP	Emergency Preparedness and Response Plan
ERM	ERM-Hong Kong, Limited
ESA	European Space Agency
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environment and Social Management System
ETI	Ethical Trading Initiative
FERP	Flood Emergency Response Plan
FFDI	Arthur Forest Fire Danger Index
FGD	focus group discussion
FPIC	Free, Prior and Informed Consent
GBV	Gender-based violence
GCD	Global Climate Database
GHG	Green House Gas
GIIP	good international industry practice
GIS	Geographic Information System
GM	grievance mechanism
GPN	This Good Practice Note
GRM	Grievance Redress Mechanism
HCO	Bicarbonate
HSEQ	Health, Safety, Environment, and Quality

Acronyms	Description
HSMP	Heat Stress Management Plan
HSS	Health, Safety and Security
HSSE	Health, Safety, Security and Environment
HVAC	Heating, Ventilation, and Air Conditioning
IA	Impact Assessment
IAQM	Institute of Air Quality Management
IBA	Important Bird and Biodiversity Areas
IBAT	Integrated Biodiversity Assessment Tool
IFC	International Finance Corporation
ILO	International Labour Organisation
IMAR	Inner Mongolia Autonomous Region
IPA	Important Plant Areas
ISMP	Invasive Species Management Plan
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Areas
KII	Key Informant Interview
LC	Least Concern
LiDAR	Light Detection and Ranging
LLC	Limited Liability Company
LO	Land Officer
LRP	Livelihood Restoration Plan
LVIA	Landscape & Visual Impact Assessment
MCS	Mongolian Consulting Service
MECC	Ministry of Environment and Climate Change
MNS	Mongolian National Standard
MRIA	Mongolian Renewables Industries Association
MRL	Mongolian Red List
MSDS	Material Safety Data Sheet
MW	Mega Watt
MWEA	Mongolian Wind Energy Association
NASA	National Aeronautic Space Administration
NDC	Nationally Determined Contributions
NDC	National Dispatching Centre

Acronyms	Description
NE	Not evaluated
NGO	Non-governmental Organization
NH4+	Ammonium
NO2	Nitrogen dioxide
NO2-	Nitrite
NO3-	Nitrate
NOAA	Atmospheric Association
NPTG	National Power Transmission Grid Company
NPTG	National Power Transmission Grid Company
NREC	The National Renewable Energy Centre
NSR	Noise sensitive receiver
NT	Near threatened
NZE	Net Zero Energy LLC
O&M	Operation and Maintenance
OHL	Overhead Transmission Line
OHS	Occupational Health and Safety
OT	Oyu Tolgoi
PA	protected area
PAD	project affected districts
PAPs	Project Affected Persons
PI, mg/L	Phosphate
PM	Particulate matter
POP	persistent organic pollutants
PPA	Power Purchase Agreement
PPE	Personal protective equipment
PS	Performance Standards
RAP	Resettlement Action Plan
RCIA	Rapid Cumulative Impact Assessment
RCS	Real Case Scenario
RILI	rainfall-induced landslide index
RoW	Right of Way
SCADA	Supervisory Control and Data Acquisition
SNH	Scottish Natural Heritage

Acronyms	Description
SO	Social Officer
SO2	Sulphur dioxide
SO4	Sulphate
SPA	Strictly Protected Area
SRTM	Shuttle Radar Topography Mission
STE	Serrated Trailed Edge
TDS	Total Dissolved Solids
TIP	Trafficking in Persons
TL	Transmission Line
TNC	The Nature Conservancy
TOR	Terms of Reference
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollars
UV	Ultra-violet
VEC	Valued Environmental and Social Components
VP	Vantage Point
VU	Vulnerable
WBG	World Bank Group
WBGT	Wet Bulb Globe Temperature
WCS	Worst Case Scenario
WCS	Wildlife Conservation Society
WHO	World Health Organisation
WPF	Wind Power Farm
WPFW	West Pacific Flyway
WRI	World Resource Institute
WSDI	Warm spell duration index
WTG	Wind Turbine Generator
WWF	World Wide Fund for Nature

8. SOCIAL IMPACT ASSESSMENT

8.1 INTRODUCTION

The following chapter presents the Social Impact Assessment to assess impacts arising from the planned activities of the Project. The scope of the assessment is based on the results of the Scoping Study as presented in *Chapter 5*. A further review of the proposed project activities as presented in the Project Description (*Chapter 3*), the Applicable Standards (*Chapter 2*), and the existing Social Baseline (*Chapter 6*) has also been conducted to support the assessment.

Where potential impacts have been identified as potentially significant, mitigation measures and / or management procedures are recommended to address such impacts. Such measures and / or procedures are further presented in the Environmental and Social Management Plan (ESMP), as presented in *Chapter 11*. Recommendations for Stakeholder Engagement are further presented in *Chapter 12*.

8.2 ASSESSMENT APPROACH AND CRITERIA

The criteria used to define the magnitude and sensitivity are presented in *Table 8-1* and *Table 8-2.*

TABLE 8-1: RECEPTOR SENSITIVITY CRITERIA

Category	Definition
High	Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the Project.
Medium	Some but few areas of vulnerability; but still retaining an ability to at least in part adapt to change brought by the Project.
Low	Minimal vulnerability; consequently with a high ability to adapt to changes brought by the Project and opportunities associated with it.

TABLE 8-2: DEFINITION OF MAGNITUDE

Magnitude	Definition
Large	Change dominates over baseline conditions. Affects the majority of the area or population in the area of influence and/or persists over many years. The impact may be experienced over a regional or national area.
Medium	Clearly evident difference from baseline conditions. Tendency is that impact affects a substantial area or number of people and/or is of medium duration. Frequency may be occasional and impact may potentially be regional in scale.
Small	Perceptible difference from baseline conditions. Tendency is that impact is local, rare and affects a small proportion of receptors and is of a short duration.
Negligible	Change remains within the range commonly experienced within the household or community.

8.3 IMPACTS ON LOCAL ECONOMY AND LIVELIHOOD

8.3.1 SCOPE OF ASSESSMENT

As per the Scoping Study (*Chapter 5*), the following planned activities can have impacts on the area's local economy and livelihood during different phases of the Project:

- Construction Phase:
  - Workforce mobilisation and presence; and
  - Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL.
- Operation Phase:
  - Operation of WTGs and OHL.
- Decommissioning:
  - Dismantling of WTGs, WTGs foundations, Substation and internal cabling.

8.3.2 SUMMARY OF BASELINE CONDITIONS

In Mongolia, herding is a crucial livelihood. In 2022, around 25% of the workforce in Mongolia are engaged in agriculture, forestry, fishing and hunting[1], and livestock makes up around 63% of rural households' assets[2].

A total of 63.1% of Umnugobi's workforce is in livestock production, followed by wholesale and retail sale (8.9%), public administration/government (8.2%), education (4.7%) and mining (4.2%)[3]. Umnugobi aimag's employment rate is 67.5%, higher than the national rate of 56.3%. Male employment is 78.8%, while female employment is 57.6%.

Herders in Bilgeh Bagh, Gavilud Bagh, and Javhlant Bagh and Jargalant bagh constitute 9.3%, 11.2%, 6.4% and 29.4% of their respective populations. FGD with the herder groups in the Project area noted that livestock herding is the major livelihood. Sheep and goats are the main livestock. Besides, horses, camels and cattles are also raised. All of the 19 surveyed household owners reported owning livestock, while 17 owners herd their animals in the Project area. [redacted] Despite livestock raising being the major livelihood, the number of livestock shows a general trend of decrease in Tsogttsetsii, Manlai, Khanbogd soums, and Umnugobi aimag from 2020 to 2024 [4]due to drought and dzud[5].

[1] Mongolia Statistical Yearbook 2022. Available at: https://downloads.1212.mn/XAwDOK2kREX51d_fl68Uw-r1_ye--nOFrsKek_OF.pdf#pdfjs.action=download
[2] World Bank. Available at: https://blogs.worldbank.org/en/eastasiapacific/dzud-a-slow-natural-disaster-kills-livestock-and-livelihoods-in-mongolia
[3] Oyu Tolgoi Project - ESIA
[4] National Statistical Office of Mongolia, www.1212.mn
[5] Mongolia: Dzud Response Plan (Dec 2023 – June 2024). Available at: https://reliefweb.int/report/mongolia/mongolia-dzud-response-plan-dec-2023-june-2024-issued-25-march-2024?_gl=1*4u3t7s*_ga*MjAxODYxODY0LjE3NzQ2MDM1OTc.*_ga_E60ZNX2F68*czE3NzQ2MDM1OTYkbzEkZzAkdDE3NzQ2MDM1OTYkajYwJGwwJGgw

Agricultural activities are limited in Umnugobi aimag[7], and a large part of the region's agricultural efforts revolves around cultivating fodder crops to support the livestock sector. No crops are being cultivated in the project affected baghs.

Besides herding and agriculture, copper, gold and coal mining are prevalent in the Project area, with one member of each household is typically engaged in employment within the mining sector. Khanbogd soum hosts the largest copper and gold deposits in the world at Oyu Tolgoi, and Tsogttsetsii soum has Tavan Tolgoi, one of the world's largest untapped coal deposits.

Based on the household survey data, eight (8) households were identified as vulnerable because they met one or more of the following criteria: household income below Mongolia's national poverty line, presence of an elderly household member, presence of a household member with a disability, or being a single-headed household. Mongolia's official poverty line is based on a minimum consumption expenditure of MNT 418,090 per adult equivalent per month, which is broadly equivalent to approximately MNT 5 million per adult equivalent per year.

Income-related vulnerability was the most common vulnerability factor identified. [redacted]

TABLE 8-3: HOUSEHOLD VULNERABILITY ASSESSMENT

HH ID	HH Size	Reported Household Annual Income (MNT)	Income Below National Poverty Line[8]	Elderly Member (≥65)	Person with Disability	Single-headed HH
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[7] Mongolia: A Country Study: Agriculture. Available at: https://countrystudies.us/mongolia/53.htm
[8] Mongolia's national poverty line is approximately MNT 5.02 million per adult equivalent per year. Available at: https://documents1.worldbank.org/curated/en/099921301062523284/pdf/IDU-262e851f-f6c3-4939-92d1-8206257ce43d.pdf

HH ID	HH Size	Reported Household Annual Income (MNT)	Income Below National Poverty Line[8]	Elderly Member (≥65)	Person with Disability	Single-headed HH
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Further details on baseline conditions related to local economy and livelihood can be found in *Chapter 6*.

8.3.3 ASSESSMENT APPROACH AND CRITERIA

The criteria used to define the magnitude and sensitivity for livelihood can be referred to in *Table 8-1* and *Table 8-2.*

8.3.4 IMPACT ASSESSMENT

8.3.4.1 EXISTING/EMBEDDED MEASURES

The existing measures listed in NZE's Human Resource Management Plan (HRMP) include the following content:

- Workforce Categorisation and Skill Requirements;
- Recruitment and Hiring Procedures;
- Wage Structures and Employment Conditions;
- Training, Upskilling and Capacity Building;
- Subcontractor Human Resource Requirements; and
- Worker Grievance Mechanism.

The existing measures listed in NZE's Labour Management Plan (LMP) include the following content:

- Labor Force Plan;
- Recruitment Management (Including Recruitment and Hiring, Contract, Renumeration and Compensation, Taxes and Insurance, Pay Query Process, Occupational Health and Safety, Leave and Absenteeism, Fitness to Work, Alcohol and Drug Management, Breach of Alcohol and Drug Policy);
- Prohibitions — Child Labour, Forced Labour and Trafficking in Persons;

- Freedom of Association and Labour Rights Dispute Resolution;
- Promotion of Gender Equality and Social Inclusion;
- Termination and Retrenchment; and
- Grievance Redress Mechanism for Workers.

The existing measures listed in NZE's Procurement Plan (PP) include the following content:

- Definition of Local Supplier;
- Procurement Approach: Workers in Temporary Accommodation;
- Local Procurement Preference Principle;
- Indicative Construction Materials Sourcing;
- Local Procurement Categories;
- Procurement Outreach;
- Supplier Qualification;
- Roles and Responsibilities; and
- Monitoring and Reporting.

The existing measures listed in [redacted] bor Management Plan include the following content:

- Labour force plan including Foreign Workers Management, Sub-Contractors' Labor Force Management, and workers' accommodation;
- Recruitment management including employment contract, remuneration and compensation, taxes and insurance, pay query, occupational safety and health, leave and absenteeism, fitness for work, alcohol, and drug management, breach of the alcohol and drug management;
- Guarantees of freedom of association and labour right dispute resolutions;
- Promotion of gender equality and social inclusion;
- Grievance Redress Mechanism;
- Mitigation Measures and Management Controls;
- Training; and
- Monitoring and Reporting.

The existing measures listed in [redacted] Social & Gender Integration Plan include the following:

- Enhance the recruitment opportunities local people from PAD (project affected districts) up to 35%;
- Increase the recruitment of women in the workplace to 30% (where feasible);
- Ensure the employment promotion of people with disabilities up to 4%;
- Provide an internship opportunity for graduates of vocational education institutes;
- Promote local business including women led businesses in the Project area;
- Ensure prohibition of child labour and all types of sexual harassment, and zero tolerance policy against TIP (Trafficking in Persons) including forced labour and labour exploitations;
- Engage relevant stakeholders in the planning and implementation period; and
- Set up a grievance redress mechanism to receive and respond to a grievance from the employees and PAP (Project-Affected People).

8.3.4.2 SIGNIFICANCE OF IMPACTS

Workforce Mobilisation and Presence

The Project is expected to generate positive impacts to the local economy through employment creation and business opportunities during both the construction and operation phases, particularly via local employment and procurement.

At the peak of construction, approximately 250-300 construction workers will be required. Some of the construction activities will involve manual labour and may not require specialized skills, while other tasks will require competencies that are already available within local workforce through experience or training programs developed by the local mining activities, such as driving, construction machine/equipment operation, concreting works and other construction-related works.

According to the NZE Human Resource Management Plan (HRMP), the Project targets 35% of the total construction workforce from residents of the Project-Affected Districts (where feasible) — Bilgeh Bagh, Jargalant Bagh, Gavilud Bagh, and Javhlant Bagh, and the wider soums of Tsogttsetsii, Manlai, and Khanbogd. A detailed breakdown of workforce composition by skill-level and locality is presented in *Table 8-4*. Based on this commitment, the Project is anticipated to create up to approximately 105 employment opportunities for local residents during the 17- month construction period, contributing to additional household income generation[9]. Furthermore, the Project is committed to inclusive employment practices, with target to recruit a minimum of 30% women, where feasible, and 4% persons with disabilities (PwD) within the total construction workforce (where feasible).

TABLE 8-4: INDICATIVE BREAKDOWN OF SKILL LEVEL AND LOCAL VS NON-LOCAL OF THE WORKFORCE

Workforce Category	Criteria	Estimated Share of Total Workforce	Likely Recruitment Source
Unskilled Labour	No prior formal qualification required. Minimum age: 18 years (mandatory, applied to all roles). Basic literacy in Mongolian is desirable. Workers must be physically fit for manual outdoor work in South Gobi conditions. All selected workers must complete and pass the mandatory site induction before commencing work.	~25–30%	Primarily local (PADs and surrounding soums)
Semi-skilled Labour	Prior relevant work experience of a minimum of 6 months — acquired through mining, construction, agriculture, or transport sectors — or completion of a relevant short vocational training programme. A valid driver's licence is required for driving roles. Workers must	~30–35%	Mixed local and national; local residents with mining/construction experience are prioritised

[9] The construction phase takes up to 18 months.

Workforce Category	Criteria	Estimated Share of Total Workforce	Likely Recruitment Source
	demonstrate basic competency in the relevant task area at the time of engagement.		
Skilled / Technically Qualified	Formal vocational qualification (TVET or equivalent), professional certification, or verifiable competency certification relevant to the specific role. For roles involving working at height, lifting operations, or energised electrical systems, role-specific certification is mandatory before commencing that activity, consistent with LMP Section 10 and the WBG EHS Guidelines for Wind Energy (2015).	~25–30%	Primarily national Mongolian labour market; local candidates supported through targeted training where feasible
Professional / Managerial	Relevant tertiary degree and a minimum of five years of demonstrated professional experience in the relevant discipline. Professional registration where required under Mongolian law.	~5–8%	National and international
Foreign Specialist	The Contractor shall document and justify the need for each foreign worker role before recruitment, demonstrating that the required skill is not available in the Mongolian labour market. All foreign workers shall hold valid work permits and visas under the Law on Immigration (2010) before commencing work.	~5% or less	China; limited to roles where Mongolian labour market capacity is demonstrably insufficient

Beyond short-term employment generation, the Project commits under the HRMP to providing skills development and on-the-job technical training in wind energy construction, operations and maintenance to locally recruited workers, with priority given to residents of the affected baghs, This commitment presents valuable opportunities for local capacity building, particularly within the expanding renewable energy sector.

The proposed training program will cover key areas include Safe Operation of Construction Plant and Equipment; Basic Civil Works Techniques; Basic Electrical Safety in Construction; Renewable Energy Project Construction Practices; and Logistics and Materials Handling. On-the-job training will be provided by a designated experienced worker (Trainer) assigned by the Contractor's site management. Each locally recruited worker selected for on-the-job training shall be assigned a Trainer for a defined period of not less than four weeks. The Trainer will

document the training delivered, the skills demonstrated by the trainee, and an assessment of competency at the end of the training period.

With the commitments listed above, locally hired unskilled to semi-skilled workers will likely gain hands-on experience and technical on-the job training that enhance their green skills that are increasingly sought after in today's job market. Given the global shift toward sustainable development and the rising demand for a workforce equipped with environmental and renewable energy expertise, these roles not only provide immediate economic benefits but also strengthen long-term employability. During the operation phase, it is estimated that approximately 34 permanent job opportunities will be provided to maintain operations of WTGs and OHL. The positive impacts are anticipated to be most significant during the construction phase due to the larger scale of activities, but the impacts during the operation phase will last over the long term.

In addition to employment opportunities, the Project will also require goods and services for its construction activities such as construction materials, equipment, and transportation service. In general, the Project is committed to follow the following three principles during the procurement process in the Procurement Plan (PP):

- Local-first preference;
- Camp services: local first with justification requirements; and

Preference for Women-Led and Women-Owned Businesses.

The Project's Procurement Plan (PP) commits to giving preference to sourcing goods and services from businesses registered and operating within the Project's social area of influence, with specific preference given to women-owned enterprises, where quality, capability, and price are comparable.

Services and goods to be sourced locally include construction materials such as sand and aggregates, security services, waste collection and disposal services, and general goods and consumables. These consumables include cleaning materials, PPE consumables, office supplies, as well as light vehicle transport and logistics services within the Project's area of influence (AoI).

NZE confirmed that construction workers will reside in temporary accommodation within the WTG area. The catering contractor shall source locally available food items including meat, dairy products, and dry goods available within the project area suppliers to the maximum extent possible, consistent with the local-first preference principle.

The above-mentioned opportunities are expected to provide additional demand for the existing small and medium local businesses. Based on the above analysis, the Project is expected to have an overall positive impact in terms of employment, procurement and induced job opportunities during the construction phase, and increase the economic conditions of the local population.

[redacted] The Project HRMP committed

[10] National Statistics Office of Mongolia. Available at: https://www.nso.mn/en/statistic/statcate/48171310/table-view/DT_NSO_1900_001V2

that all workers shall be paid at a rate equal to or greater than the applicable Mongolian national minimum wage (792,000 MNT or 220 USD per month according to the 2025 update from the Mongolia Ministry of Family, Labour, and Social Protection[11]), higher than the national poverty line of 418,090 MNT (116 USD) per adult per month. Therefore, it is expected that the job opportunities created by the Project will improve the household income and lift certain households out of the poverty line.

TABLE 8-5: IMPACT ON LOCAL ECONOMY AND LIVELIHOOD FROM WORKFORCE MOBILISATION AND PRESENCE & OPERATION OF WTGS AND OHL

Impact	Impact on infrastructure and services from workers mobilisation and presence				
Nature	Negative	**Positive**	Neutral		
	Impacts from employment opportunities and increased demand for products and services created by the Project will be positive.				
Type	**Direct**	Indirect	Induced		
	The Project will directly increase local employment and economic activities.				
Duration	**Temporary**	Short-term	**Long-term**	Permanent	
	Impact will be temporary for construction phase (approximately 18 months) and long term for operation phase.				
Extent	**Local**	Regional	International		
	The impact is localized in Tsogsttsetsii Soum, Manlai Soum, Khanbogd Soum and surrounding area.				
Scale	Considered small due to the size of the Project and its activities.				
Frequency	Impacts will arise continuously throughout the construction phase and lasting in operation phase.				
Magnitude	**Positive**	Negligible	Small	Medium	Large
	Employment opportunities and increased economic activities created by the Project will have a positive impact.				
Resource/Receptor Sensitivity	Low	Medium	**High**		
	Considering the income level of most of the herding households in the Project area's is below the regional household income level. The receptor sensitivity is considered high.				
Significance	Negligible	Minor	Moderate	Major	
	N/A Impact significance is not assessed since the impact is positive.				

[11] Available at: https://mlsp.gov.mn/eng/content/detail/1828#:~:text=The%20National%20Tripartite%20Committee%20for,into%20account%20several%20key%20factors

Grazing Land Disturbance

As detailed in *Section 8.5.4.2*, the Project will temporarily occupy an area of approximately 130.3 ha during construction phase (see *Table 8-9*). The project will be developed in phases between November 2026 and September 2028, with construction activities sequentially progressing across the wind turbine generator (WTG) area, internal access roads, substation, and overhead transmission line (OHL) corridor. Temporary facilities will be established first (November 2026 to January 2028), followed by staged construction of WTGs, access roads, and the substation throughout 2027 and 2028. An OHL construction phase will occur from June to December 2027. A winter construction break is planned between October 2027 and March 2028.

For the WTG area, the maximum temporary impact in any single construction phase is approximately 17.75 ha (June-July 2027), with most phases affecting between 6.6 and 17.75 ha of grazing land. Based on the Household survey findings, the affected households typically graze livestock within an area extending approximately 4km for small ruminants and 10km for large herbivores from seasonal camps, which result in a grazing area of approximately 70,428 hectares and 305,612 hectares respectively. Therefore, these impacts represent only 0.0003% to 0.025% of available grazing areas associated with affected households. Most impacts are assessed as negligible because they occur on uninhabited camps, abandoned structures, or areas with no recorded livestock grazing. Temporary impacts of small magnitude are anticipated for several inhabited winter camps with livestock including [redacted]icularly during the June to October 2027 and July to September 2028 construction periods; however, the duration is generally limited to about one month for each affected household.

The OHL component has approximately 57.23 ha temporarily affected between June and December 2027. Households located within 1 km of the transmission corridor are expected to experience temporary land-use restrictions during construction. Nevertheless, the affected area remains a very small proportion of available grazing land, accounting for only 0.019% to 0.081% of total grazing areas.

The land occupation will disturb herders' grazing area and cause a temporary loss of grazing land for herders during construction period. Based on the baseline information, the livestock are typically grazed within a radius of approximately 4 km for small ruminants and 10 km for large herbivores from seasonal camps. This corresponds to grazing areas of approximately 70,428 ha and 305,612 ha, respectively. While the total temporary disturbance footprint is estimated at 130.3 ha, construction will be undertaken in a phased manner, with works progressing sequentially across individual WTGs, access roads, substation facilities, and OHL sections. Consequently, the maximum area affected at any one time is estimated to be approximately 17.75 ha during June-July 2027, representing only 0.025% of the grazing area used for small ruminants and 0.0058% of the grazing area used for large herbivores.

During operation phase, the permanent Project footprint is estimated at approximately 105.2 ha (*Table 8-9*). This footprint represents 0.15% of the grazing area used by small ruminants and 0.03% of the grazing area used by large herbivores of the 16 affected households.

The affected area therefore represents a very small proportion of the grazing area available to local households. In addition, grazing activities are expected to remain compatible with much of the Project area during operation, with herders and livestock able to move freely around the

Project infrastructure, as shown in *Figure 8-3*. No Project component is located within the footprint of the residential structures, and no physical displacement will be expected from the Project.

Community consultations further indicate that herders maintain a high degree of mobility and regularly adapt grazing routes in response to pasture conditions, weather patterns, and livestock requirements. Alternative pastureland is available both within the wider Project area and, where necessary, in areas located approximately 50-200 km from the Project area. Access to alternative grazing areas is generally coordinated through customary arrangements among herders and local authorities, and conflicts over grazing access are uncommon.

Construction activities may temporarily restrict access to localized grazing areas and affect livestock movement around active work fronts. However, while construction works are concentrated in specific locations during a given period, the majority of the Project area will remain available for grazing. Temporary work areas will be reinstated following completion of construction and returned to their pre-project use.

Based on the assessment, a limited number of households [redacted] and [redacted]re expected to experience temporary restrictions affecting approximately 17.48 ha of grazing land. In accordance with IFC PS5 requirements and the Project's Livelihood Restoration Framework (LRF), these households will be eligible for compensation and livelihood restoration assistance addressing temporary economic displacement. Further details of the LRF are provided in *Section 8.3.4.3.*

Given the small proportion of grazing land affected, the reversible nature of the disturbance, the phased construction schedule, the availability of alternative pasture resources, and the adaptive mobility of local herders, the impact magnitude is assessed as small. Considering that livestock grazing represents a key livelihood activity for affected households, receptor sensitivity is assessed as medium. The resulting significance of temporary construction-phase grazing land loss and access restriction is therefore assessed as minor.

TABLE 8-6: IMPACT ON LOCAL ECONOMY AND LIVELIHOOD FROM LOSS OF GRAZING LAND DURING CONSTRUCTION PHASE

Impact	Impact on local economy and livelihood from construction of Access Road, Internal Roads, WTGs Foundations, Substation, BESS and Control Building, and OHL			
Nature	Negative	Positive	Neutral	
	The construction activities will negatively impact the local livelihood, especially the herding activities.			
Type	Direct	Indirect	Induced	
	Construction work will result in direct impacts on local communities.			
Duration	Temporary	Short-term	Long-term	Permanent
	Impact will be short-term for construction phase (approximately 18 months in phased manner).			
Extent	Local	Regional	International	

Impact	Impact on local economy and livelihood from construction of Access Road, Internal Roads, WTGs Foundations, Substation, BESS and Control Building, and OHL				
	The impact is localized in Bilgeh bagh, Jargalant bagh, Gavilud bagh, Javhlant bagh and surrounding area.				
Scale	Considered small due to the size of the Project and its activities.				
Frequency	Impacts will arise continuously throughout the construction phase.				
Magnitude	Positive	Negligible	Small	Medium	Large
	The impact magnitude is small.				
Resource/Receptor Sensitivity	Low		Medium	High	
	Receptor sensitivity is considered medium as the Project area is using part of the grazing land of the local community.				
Significance	Negligible	Minor	Moderate	Major	
	Impact significance is minor during for livelihood disturbance.				

Operation of WTGs and OHL

The operation of the wind farm and associated OHL is expected to generate long-term positive socioeconomic and environmental benefits at the national and regional levels. The Project supports the Government of Mongolia's clear goals for expanding renewable energy, as outlined in its State Policy on Energy for 2015 to 2030[12]. The country aims to increase the share of renewable energy in its total installed capacity to 20% by 2023 and 30% by 2030. In addition to promoting clean energy, Mongolia is committed to reducing its greenhouse gas emissions by 22.7% by 2030. As of 2020, the energy sector was responsible for 44.78% of the nation's total emissions, and 90% of electricity generation in Mongolia relies on coal[13].

The operation of the wind farm will contribute to reducing reliance on coal and other fossil fuels in Mongolia, thereby lowering greenhouse gas emissions. It will also support the diversification of the national energy mix, enhancing resilience against energy supply disruptions. Overall, the project aligns with Mongolia's goals of promoting renewable energy and reducing greenhouse gas emissions.

Additionally, the newly constructed Project's access road and associated infrastructure may provide indirect benefits to local communities by improving accessibility within the project area and facilitating movements across previously less accessible locations. Improved access may support local economic activities facilitate transportation and enhance connectivity for herders and other land users.

Therefore, the impact significance of the Project operation is assessed as positive.

[12] https://energy.gov.mn/laws/show/id/202
[13] https://www.undp.org/mongolia/blog/mongolias-clean-energy-transition-pathway-sustainable-and-inclusive-development

TABLE 8-7: IMPACT ON LOCAL ECONOMY AND LIVELIHOOD FROM OPERATION OF WTGS AND OHL

Impact	Impact on local economy and livelihood from operation of WTGs and OHL				
Nature	Negative	**Positive**	Neutral		
	The operation of the Project will have a positive impact on local economy and environment as renewable energy will reduce Mongolia's dependency on coal and GHG emissions, contributing to Mongolia's renewable energy goal.				
Type	Direct	**Indirect**	Induced		
	The operation will have indirect benefits on local economy by reducing GHS emissions.				
Duration	Temporary	Short-term	**Long-term**	Permanent	
	Impact will be long-term for operation phase (approximately 20-25 years).				
Extent	Local	**Regional**	International		
	The Project will contribute to the national goal of increasing renewable energy and reducing GHG emission.				
Scale	Considered medium due to the size of the Project and its activities.				
Frequency	Impacts will arise continuously throughout the construction phase.				
Magnitude	**Positive**	Negligible	Small	Medium	Large
	The impact magnitude is positive.				
Resource/Receptor Sensitivity	Low	**Medium**	High		
	Receptor sensitivity is considered medium as the local community has already been largely engaged in the herding activities as main livelihood. Employment from the Project will create alternative livelihood opportunities for the community.				
Significance	Negligible	Minor	Moderate	Major	
	N/A Impact significance is not assessed if the impact is positive.				

8.3.4.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

Employment Opportunities

The significance of impacts is expected to be positive through the implementation of the existing control and mitigation measures. Recommendations are made to potentially further enhance positive impacts from employment opportunities. These additional mitigation, management, and monitoring measures are as follows:

- Implement the Human Resource Management Plan (HRMP) prior to construction, detailing wage structures, hiring procedures, recruitment prioritization for local workers, workforce skill requirements, and opportunities for training and upskilling;

- Ensure that all affected communities have equal access to employment opportunities by actively collaborating with local authorities to disseminate recruitment information;
  - Provide advance notice to local communities regarding job openings before the commencement of construction and operation phases, allowing residents sufficient time to prepare and apply;
  - Utilize multiple recruitment channels to reach a wider audience, including advertisements on Facebook groups, community bulletin boards, education institutions, and local recruitment offices;
  - Ensure that the affected baghs and nearby baghs receive equal access to procurement opportunities for small businesses, relying on close cooperation with local authorities for effective outreach and engagement;
  - Implement a transparent and unbiased recruitment process that is independently verifiable, ensuring it is free from conflicts of interest and fully inclusive of local communities; and
  - Collect feedback from local stakeholders about the recruitment process to make continuous improvements based on community input.
- Proactively communicate the grievance mechanism (GM) to the affected communities and ensure it is easily accessible. Regularly monitor its use to identify common themes and trending issues, using this data to guide improvements in project implementation;
- Provide regular updates to local communities regarding the status and resolution of grievances raised; and
- Collaborate with local authorities to identify and support community development initiatives focused on enhancing local livelihoods.

Disturbance to Livelihood

Although the overall significance of livelihood disturbance impact is minor, additional mitigation measures are suggested to promote livelihood restoration.

- Develop a Livelihood Restoration Plan (LRP) aligning with IFC Performance Standard 5 and national regulations prior to any physical or economic displacement. The LRP should:
  - Conduct comprehensive census and socioeconomic baseline survey of all potentially affected herders to accurately identify household composition, grazing area boundary and patterns, seasonal mobility, livestock numbers, access to critical resources (e.g., wells, minerals), and dependence on the Project area for livelihoods;
  - Conduct interviews with Bagh Governors, Soum Land Officers, Citizens' Representative Meeting members, experienced herders and other knowledgeable community members to identify households that regularly or periodically utilize pasture resources within the Project area but do not own any of the recorded structures;
  - Establish cut-off date and communicate to affected communities as part of the LRP census process;
  - The LRP should confirm that: (i) economic displacement of non-title users, including seasonal pastoralists and customary resource users, is within scope; (ii) eligibility for livelihood restoration does not depend on formal legal title; (iii) negotiated agreements will document informed consent for access restrictions; and (iv) entitlements address

loss of grazing access, mobility disruption, and resource competition regardless of ownership status;

- Conduct vulnerability screening protocol that assess female-headed households; elderly (>65) or child-dependent households; people with disabilities; households below poverty threshold; high dependence on affected pasture/wells; debt burden; and limited mobility/transport access. Vulnerability status should then inform enhanced assistance eligibility and monitoring priority within the LRP;
- Eligibility criteria covering all economically displaced households regardless of title;
- Entitlement matrix by impact type and severity;
- Compensation valuation methodology;
- Livelihood restoration measures for loss of grazing/water access as required by PS5's principle of restoring livelihoods to pre-impact levels or better;
- Vulnerable household provisions;
- Implementation budget and timeline;
- Monitoring indicators and completion criteria; and
- Incorporate a consultation and disclosure process ensuring herders understand the nature of temporary access restrictions, grievance mechanisms, entitlement options, and mitigation commitments.

- Minimisation of the area and during of temporary land occupation (where applicable);
- Construct the Access Road and internal roads along existing dirt roads or previously disturbed land to reduce the need for new land development and minimize the loss of pastureland (where applicable);
- Ensure construction activities avoid critical areas such as herder settlements and wells.
- Optimize the design and layout of project infrastructure (e.g., Substation and OHL) to minimize the area of land permanently occupied by the project;
- Advance notification of construction activities to affected herders and engage with herding communities throughout the construction process to provide project updates, gather feedback, and address concerns; and
- Communicate and implement the grievance mechanism to receive and respond to grievances about disturbance of herders' grazing land.
- Implementation of Traffic Management Measures to accommodate livestock movement; and
- Reinstatement of temporarily disturbed areas following completion of works.

8.3.4.4 RESIDUAL IMPACTS

The residual Project impact to local economy and employment due to workforce mobilization presence and the operation of WTGs and OHL will remain positive with the additional employment and retrenchment management measures.

The residual impact on the local livelihood due to construction activities would be reduced to negligible with the implementation of the above existing embedded/in place measures, as well as the above-recommended additional mitigation and management measures on the disturbance to livelihood.

8.4 IMPACTS ON TRAFFIC AND TRANSPORTATION

8.4.1 SCOPE OF ASSESSMENT

As per the Scoping Study (*Chapter 5*), the following planned activities can have impacts on the area's traffic and transportation:

- Construction Phase:
  - Land preparation (site clearance, excavation and levelling), fencing, and civil works
  - Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL
  - Equipment and material transportation and supply
- Decommissioning:
  - Dismantling of WTGs, WTGs foundations, Substation and internal cabling

8.4.2 SUMMARY OF BASELINE CONDITIONS

The local road network includes the Heavy Duty Coal Transport Road, existing unpaved roads and dirt roads. Dirt roads are wildly used by herder households to travel from their winter camps to the soum to acquire life necessities. However, the expansion of dirt road has led to land degradation and damage to the grassland ecosystem in Mongolia.

There are no public transportation available in the project area. Unregistered taxis and private cars are major means of transportation. During ERM site visit, no severe traffic congestion was observed and the density of traffic is low.

8.4.3 ASSESSMENT APPROACH AND CRITERIA

The criteria used to define the magnitude and sensitivity for traffic and transportation can be referred to in *Table 8-1* and *Table 8-2.*

8.4.4 IMPACT ASSESSMENT

8.4.4.1 EXISTING/EMBEDDED MEASURES

The existing measures listed in NZE's Traffic Management Plan (TMP) include the following:

- Vehicle and Driver Requirements (Vehicle Standards, Driving Hours and Fatigue, Driver Qualifications and Training, Journey Management);
- Speed Limit;
- Management of Oversized and Heavy Loads;
- Dust Management on Project Roads;
- Management of Interactions with Herders, Livestock, and Local Communities;
- Parking and Site Traffic Management;
- Road Maintenance;
- Climate and Seasonal Considerations;
- Incident Reporting and Investigation;
- Community Grievance Mechanism;
- Monitoring and Reporting; and
- Training and Awareness.

The embedded measures listed in the DEIA include:

- Ensure that construction machinery and vehicles only use designated routes and avoid creating multiple access roads.

The existing measures listed in [redacted] Traffic Management Plan include the following:

- Designate a parking area within the site and segregate light and heavy vehicle parking zones;
- Ensure vehicles are parked securely, in a fundamentally stable position, and are not left idling while unattended;
- Design clear pedestrian pathways to minimize potential interactions between vehicles and pedestrians;
- Drivers must obey the posted speed limits and all road signs on and around the site;
- An education program will be initiated to encourage drivers to stay on designated roadways;
- Road markers will be installed at intervals to further demarcate the designated roadway;
- The designated gravel roads will be watered at times of peak vehicle movements, to minimize dust re-suspension;
- Passing lamps are switched on during the daytime in the following cases in order to warn the other road users when transporting heavy, oversize or dangerous materials;
- During transporting material coming out from the vehicle dimension for more than 1 m in length and for more than 0.4 m aside, it is necessary to place identification signs ‘Oversized material’ on the coming-out parts and, if it is dark or the visibility is inadequate, white and red;
- Lights or reflectors in front and rear correspondingly; and
- Ensure the dimensions of the transportation vehicle and the oversized material not exceed the dimension limits along the designated routes, such as bridge, railway, etc.

8.4.4.2 SIGNIFICANCE OF IMPACTS

The temporary increase in heavy duty vehicles during Project construction may result in accidental damage (or fatalities) to livestock, which in turn is a relevant economic loss for the herders. If the Project vehicles travel unruly on the pastureland and expand the dirt roads, it could aggravate the land degradation and further impact herders’ livelihood.

The total fleet of mobile on-road machinery during the construction peak time is 31 units, including concrete mixer trucks, concrete pump vehicles, dump trucks, crane, water tankers, fuel transportation vehicles, worker transportation vehicles, as well as the general supply and logistics vehicles. WTGs components will be transported from the Mongolia-China border crossing at Gashuun Sukhait via the existing Heavy Duty Coal Transport Road and the Project's Access Roads using specialized heavy haulage trucks and trailers. Wind turbine components will be assembled using a crane lift. The estimated maximum Annual Average Daily Traffic (AADT) is up to 440 Heavy Duty Vehicle (HDV) movements and up to 7,600 Light Duty Vehicle (LDV) movements during peak construction activity. As project vehicles will use the existing Heavy Duty Coal Road for transport large WTG components such as nacelles, blades and tower sections, with the road already frequented by heavy coal transport trucks, there is a risk of accidents resulting in human fatalities. However, actual vehicle movements are anticipated to be substantially lower outside peak construction periods and the traffic disturbance will occur

intermittently over a relatively short construction duration of approximately 18 months. On this basic, the magnitude of the impact is assessed as medium. Dirt roads are wildly used by herder households for seasonal movement between winter camps and soum centres to access essential goods and services, therefore the sensitivity of receptors is considered medium. Overall, the significance of the impact on traffic and transportation during construction phase is assessed to be moderate.

During the operational phase, traffic will be limited to routine movements of maintenance vehicles and Project personnel within the Project Site. Maintenance vehicles will primarily use the Project Access Road for initial servicing and routine maintenance activities. It is anticipated that a maximum of five (5) passengers per vehicle and one (1) van/light-duty truck will visit the Project Site per day. Given the low number and infrequent nature of vehicle movements during operations, traffic volume are expected to be minimal. Accordingly, traffic and transportation-related impacts during the operation phase are considered negligible.

TABLE 8-8: IMPACT ON TRAFFIC AND TRANSPORTATION DURING CONSTRUCTION PHASE

Impact	Impact on traffic and transportation during construction phase				
Nature	**Negative**	Positive	Neutral		
	The construction activities and use of construction vehicles will have a negative impact on the local traffic and transportation.				
Type	**Direct**	Indirect	Induced		
	Construction work using local transportation network will result in direct impacts on local communities.				
Duration	Temporary	**Short-term**	Long-term	Permanent	
	Impact will be short-term for construction phase (approximately 18 months).				
Extent	Local	**Regional**	International		
	The traffic will impact the Gobi region as some construction materials will be transported across the China-Mongolia border.				
Scale	Considered small due to the level of traffic generated by the project.				
Frequency	Impacts will arise continuously throughout the construction phase.				
Magnitude	Positive	**Negligible**	Small	**Medium**	Large
	The impact magnitude is medium during construction phase and negligible during operation phase.				
Resource/Receptor Sensitivity	Low	**Medium**	High		
	Receptor sensitivity is considered medium as construction vehicles could cause accidental fatalities of livestock and human beings.				
Significance	**Negligible**	Minor	**Moderate**	Major	
	Impact significance is moderate during construction phase and negligible during operation phase				

8.4.4.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

Given that the impact significance on traffic and transportation during construction phase is predicted to be moderate, the following mitigation measures to control the above-mentioned impacts are recommended:

- Utilize existing earth roads as much as possible for constructing the access road and internal roads to minimize the development of new land and reduce impacts on pastureland; and
- Communicate and implement the grievance mechanism and a compensation scheme for livestock fatalities caused by Project vehicles.
- Implement the existing Traffic Management Plan (TMP) with emphasis on the livestock-specific controls.

8.4.4.4 RESIDUAL IMPACTS

With the implementation of the existing measures outlined in the DEIA and the Traffic Management Plan, as well as the above-recommended additional mitigation and management measures, it is expected that the residual impact significance would be reduced to minor for all impacts related to traffic and transportation during the construction phase.

8.5 IMPACTS ON LAND USE

8.5.1 SCOPE OF ASSESSMENT

As per the Scoping Study (*Chapter 5*), the following planned activities can have impacts on the area's land use:

- Construction Phase:
  - Land preparation (site clearance, excavation and levelling), fencing, and civil works; and
  - Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL.

8.5.2 SUMMARY OF BASELINE CONDITIONS

Land in Mongolia is state-owned. 80% of land in Mongolia consists of arid rangeland, with the rest including forest land (around 11%), arable land (less than 1%), and other types of land (8%) such as urban regions, reserves, and water bodies. 72% of the land in Umnugobi aimag is as grazing land by livestock herders[14]. Herders do not own pasturelands but have customary usage rights, which can be formalized by obtaining certificates. The size and cost of these certificates vary across soums. In Tsogttsetsii soum, the winter camp areas typically range from 2,500 to 3,500 square meters (sq. m), with an annual certificate fee of approximately USD 5 and a service fee of around USD 2.5. In Khanbogd soum, winter camp areas generally cover 1,600 sq. m each. In the meantime, summer pastures are not formally allocated and are considered open for access by any herder, regardless of their winter shelter location or residence origin.

[14] Sheehy, D. et al, "Mongolia: Livestock and Wildlife in the Southern Gobi Region, with Special Attention to Wild Ass", World Bank, 2010.

During the construction phase, approximately 130.3 ha of land (about 0.6 % of the total 20,000 ha of the WESC area) will be temporarily used for WTG construction, internal access road, substation, stockpile and storage area, OHL and OHL access road over a period of 18 months from March 2027 to October 2028 (excluding 4 months of winter break) in a phased manner. During operation phase, approximately 105.2 ha of land will be occupied for 20-25 years.

According to the HH survey in the WTG area, it is estimated that the grazing distance is 4km for small ruminants (sheep and goat) with a total grazing area of 70,428 hectares, and 10km for large herbivores (cattle, horses, and camels) with a total grazing area of 305,612 hectares. Therefore, the project will maximumly use 0.04% to 0.19% of the grazing area during the construction phase, and 0.03% to 0.15% of the grazing area during the operation phase.

8.5.3 ASSESSMENT APPROACH AND CRITERIA

The criteria used to define the magnitude and sensitivity for land use can be referred to referred to in *Table 8-1* and *Table 8-2.*

8.5.4 IMPACT ASSESSMENT

8.5.4.1 EXISTING/EMBEDDED MEASURES

The existing measures in the Project's Livelihood Restoration Plan (LRF) include the following:

- Project-Affected Persons and Categories of Impact;
- Entitlements Framework;
- Implementation Process;
- Grievance Redress Mechanism;
- Monitoring and Reporting;
- Roles and Responsibilities; and
- Budget and Resources.

The existing measures in the Project's Resettlement Action Plan (RAP) include the following:

- Eligibility Framework;
- Compensation and Entitlements;
- Physical Displacement Contingency;
- Consultation and Disclosure;
- Roles and Responsibilities;
- Monitoring and Reporting; and
- Resources.

The existing measures listed in [redacted] Grievance Redress Mechanism Plan include the following:

- When complaints are related to disputes over land or any administrative issues that can be directly solved, the Contractor will cooperate with the Bagh Governor's Office to provide a formal resolution. Bagh Governor's Office may also participate as stakeholders if any information needed.

8.5.4.2 SIGNIFICANCE OF IMPACTS

According to the site visits conducted by EcoTrend in February and June 2025, as well as the ESIA disclosure in September 2026, a total of 32 structures associated with 22 identified owners were identified within the Project area. These structures are located within the WTG footprints and within 1 km of the OHL route (see *Figure 8-1* and *Figure 8-2*). All 22 identified households are considered part of the project-affected households (PAHs) for the purpose of the ESIA.

Desktop review of the Project GIS layout, combined with field verification undertaken during site visits indicates that the current Project footprint does not directly overlap with any identified household structures, winter camps, spring camps, wells, or other residential facilities. Accordingly, no physical displacement, relocation of households, or loss of residential structures is anticipated as a result of Project development.

Nevertheless, the Project is expected to result in economic displacement impacts on households that utilize land within the Project area. Project infrastructure will occupy portions of grazing land during both construction and operation, resulting in temporary and permanent reductions in land available for herding activities. Temporary land loss and disturbance impacts may arise from construction areas, while permanent land loss impacts will be associated with operational infrastructure, including turbine foundations, access roads and other ancillary facilities.

In addition to the resident households identified within the Project Area, interviews with the local herders indicated that occasional customary land users may utilize summer grazing areas during periods of severe weather conditions. Such use is reported to be infrequent and temporary, with customary users generally notifying and obtaining verbal agreement from resident herders prior to accessing the land for grazing purposes. Given the open-access nature of summer pastures, such users do not hold legally recognized tenure rights to specific grazing areas and are therefore not considered eligible for land assets under Mongolian legislation[15]. Nevertheless, should Project activities result in demonstrable impacts on access to grazing resources or livelihood, such impacts will be assessed and managed in accordance with the Project's livelihood restoration commitments and Grievance Redress Mechanism (GRM), which will remain accessible throughout construction and operation.

The ESIA assesses land-use impacts primarily as economic displacement affecting the identified 22 resident herders in the Project area based on available land-use mapping and field verification. Household-specific land take area and any entitlement requirements will be verified through the Livelihood Restoration Plan (LRP) census. However, the ESIA has identified the number of affected households, impact magnitude, duration of temporary and permanent occupation, as well as the temporary, permanent and cumulative land-use impact pathways in the following sections of this Chapter.

[15] Upton, C., "'Custom' and Contestation: Land Reform in Post-Socialist Mongolia", World Development, vol. 37, no. 8, 2009, p. 1405. Available at: https://www.sciencedirect.com/science/article/pii/S0305750X09000552

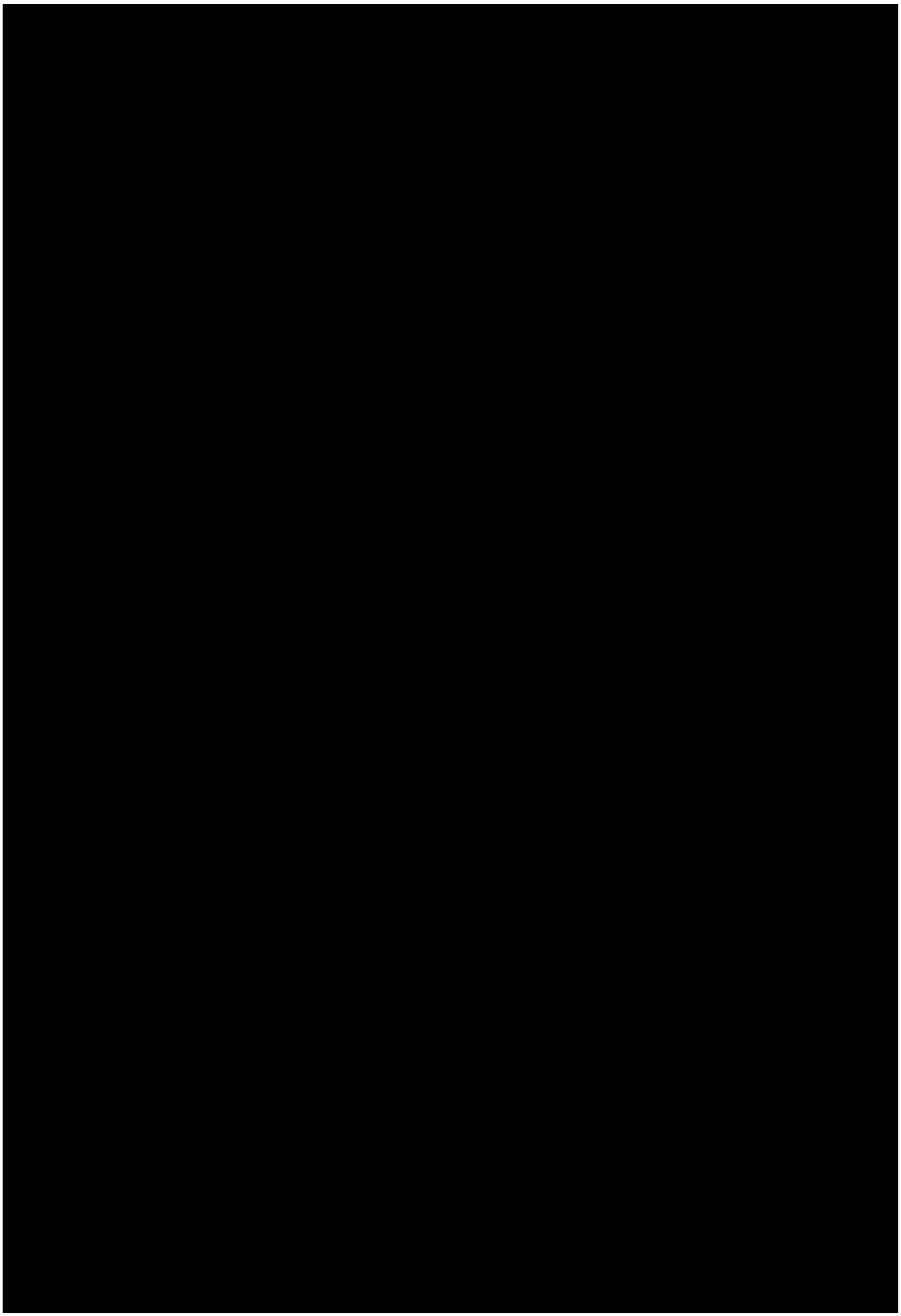


FIGURE 8-1: [redacted]

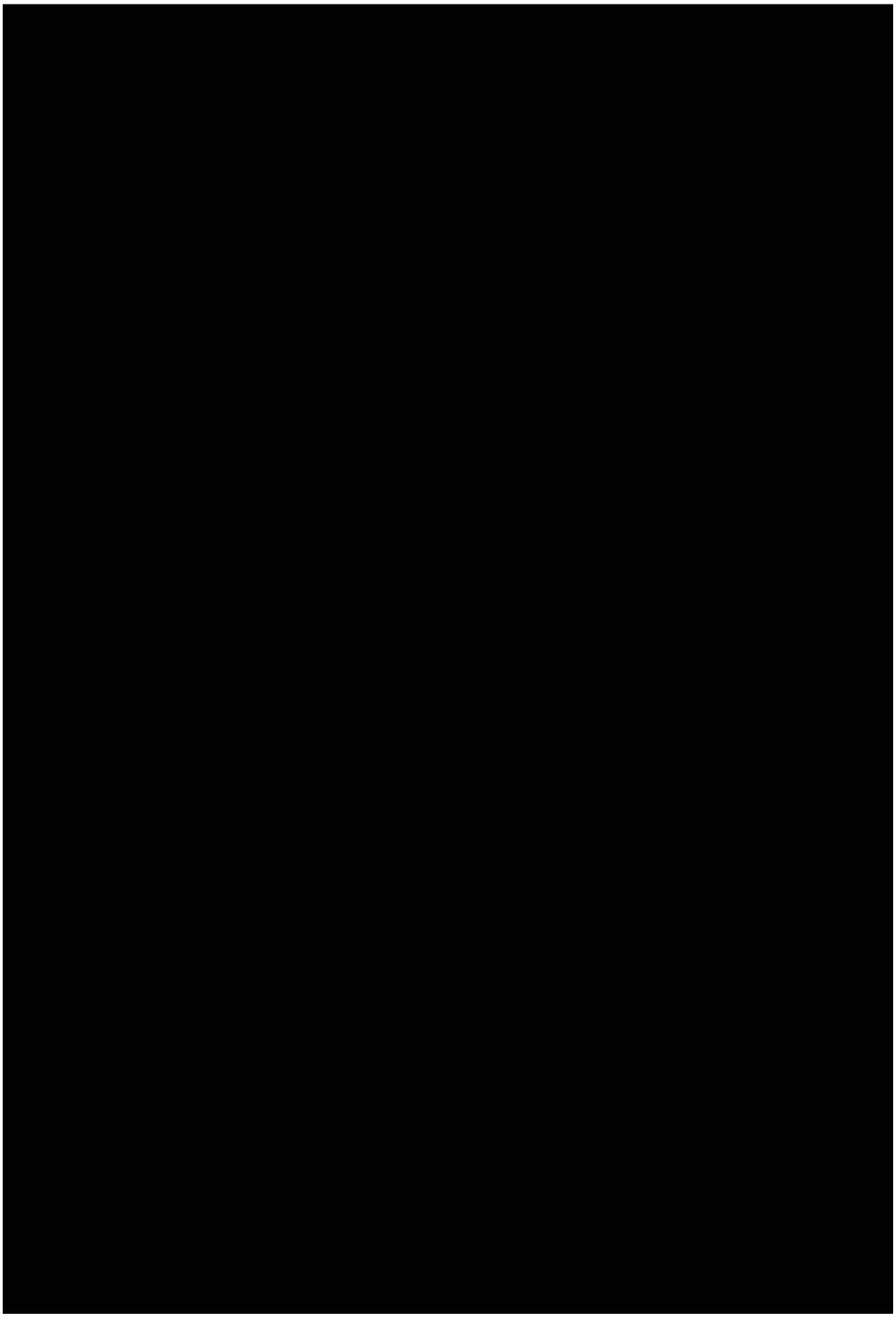


FIGURE 8-2:

Temporary Land Loss

Construction of the 24 WTGs[16] as well as the internal access roads will be undertaken on a phased basis between March and October 2027, as well as between March and October 2028, with each turbine foundation and access road construction active for approximately five (5) to six (6) weeks. Temporary facilities including temporary office and administration facilities, temporary catering and dining infrastructure, residential accommodation facilities, batch plant and fencing will be located within the substation, storage and stockpiling area will be temporarily occupied from November 2026 to January 2028.

As a result, temporary land loss and pasture disturbance will occur progressively rather than simultaneously across the Project area.

During the construction phase, approximately 130.3 ha of land will be temporarily occupied out of the 20,000 ha WESC area. A summary of the area of disturbed land is provided in *Table 8-9*. The phased construction approach is expected to reduce the overall extent of concurrent grazing disruption and allow livestock movements to continue through unaffected areas.

TABLE 8-9: AREA OF DISTURBANCE OF THE PROJECT'S FACILITIES

Facility	Number	Unit area of foundation (m^2)	Disturbed Area (ha)
WTGs	29	330	0.96
60 x 45 m WTG hardstand excluding foundation	29	2,370	6.87
OHL towers	228	400	9.12
Substation and O&M Building	1	49,920	4.99
Access Road to WTG area (30.9 km length, 8 m width) (only upgrades to existing road, no new construction)	1	247,200	24.72
Internal Roads within 29 WTG area (~56.1 km length, 6 m width)	1	336,600	33.66
Access Road to OHL • Step-up Substation to OHTL Access Road ~4 km • Existing Section: 220kV OHTL access road ~33.1 km = 13.24 ha • New Unpaved Section: that follows OHTL ~25.1 km = 10.04 ha	3	16,000	1.6
		132,400	13.24
		100,400	10.04
Subtotal of Permanent Facilities	/	/	105.2
Photo Voltaic / BESS System	1	11,076	1.11
Camp	1	15,222	1.52
Concrete Batching Area	1	15,001	1.50

[16] The Project is planned to include a total of 29 wind turbines. However, based on information provided by the Client on 21 September 2026, the construction schedule currently covers only 24 turbines. It is understood that the remaining five turbines will be developed during a separate phase of the Project.

Facility	Number	Unit area of foundation (m^2)	Disturbed Area (ha)
Laydown Area	1	21,030	2.10
Hardstand Parking Area	1	3,816	0.38
Portable Fuel Station	1	400	0.04
Office Facility	1	1,800	0.18
60 x 150 m WTG excavation, crane hardstand and laydown areas	29	6,300	18.27
Subtotal of Temporary Facilities	/	/	25.1
Total			130.3

As shown in , the project will be developed in phases between November 2026 and September 2028, with construction activities sequentially progressing across the wind turbine generator (WTG) area, internal access roads, substation, and overhead transmission line (OHL) corridor. Temporary facilities will be established first (November 2026 to January 2028), followed by staged construction of WTGs, access roads, and the substation throughout 2027 and 2028. An OHL construction phase will occur from June to December 2027. A winter construction break is planned between October 2027 and March 2028.

For the WTG area, the maximum temporary impact in any single construction phase is approximately 17.75 ha (June-July 2027), with most phases affecting between 6.6 and 17.75 ha of grazing land. Based on the Household survey findings, the affected households typically graze livestock within an area extending approximately 4km for small ruminants and 10km for large herbivores from seasonal camps, which result in a grazing area of approximately 70,428 hectares and 305,612 hectares respectively. Therefore, these impacts represent only 0.0003% to 0.025% of available grazing areas associated with affected households. Most impacts are assessed as negligible because they occur on uninhabited camps, abandoned structures, or areas with no recorded livestock grazing. Temporary impacts of small magnitude are anticipated for several inhabited winter camps with livestock including [redacted] icularly during the June to October 2027 and July to September 2028 construction periods; however, the duration is generally limited to about one month for each affected household.

The OHL component has approximately 57.23 ha temporarily affected between June and December 2027. Households located within 1 km of the transmission corridor are expected to experience temporary land-use restrictions during construction. Nevertheless, the affected area remains a very small proportion of available grazing land, accounting for only 0.019% to 0.081% of total grazing areas.

Overall, the phased approach distributes construction activities over nearly two years, resulting primarily in temporary and localized impacts on grazing land, with the majority of individual household impacts assessed as negligible and only limited periods of small-magnitude impacts anticipated for a number of actively used herder camps.

In accordance with the Project's Livelihood Restoration Framework IFC PS5 requirements for temporary economic displacement, these households will be eligible for compensation and assistance measures to address temporary loss of grazing resources.

The phased construction approach further reduces potential impacts on land use by limiting disturbance to discrete work area at any given time. Construction activities will be localized to specific WTGs, access roads or the substation area during a given month while the majority of grazing land remains accessible for livestock grazing. Herders are therefore expected to retain access to substantial alternative pasture areas within and surrounding the Project area and adapt grazing patterns in response to phase based temporary construction activities. Once construction activities are completed in a particular location, temporary work areas will be reinstated and made available for grazing again.

TABLE 8-10: TEMPORARY LAND LOSS AREA AND IMPACT DURATION

Impact Duration	Construction of Project Components	Impacted Area (ha)	Impact Magnitude	Percentage of the total Grazing Area
WTG Area				
November 2026 – January 2028	Temporary facilities including temporary office and administration facilities, temporary catering and dining infrastructure, residential accommodation facilities, batch plant and fencing inside the substation/storage area	4.08	Based on *Figure 8-1*, construction of temporary facilities is expected to impact [redacted] Based on detailed household information in *Section 6.3.6*, [redacted] is uninhabited and the owner refused to disclose the number of animals they own. No temporary grazing area loss is expected. Therefore, the impact magnitude is expected to be negligible.	0.0013%–0.006%
March – April 2027	WTG 12; Internal Access Road 1 and 4	10.53	Construction of WTG 12 and internal access road 1&4 is expected to impact [redacted] However, considering that [redacted] are not inhabited, and [redacted]s an abandoned stove with the same owner as [redacted]o grazing area loss is expected. Therefore, the impact magnitude for the affected household is considered negligible.	0.0034%–0.015%
April – May 2027	WTG 13,17,18, 22; Internal Access Road 1 and 4	10.44	Construction of WTG 13,17,18, 22 is expected to impact [redacted] [redacted]he	0.0034%–0.015%

Impact Duration	Construction of Project Components	Impacted Area (ha)	Impact Magnitude	Percentage of the total Grazing Area
			impacted household from internal access road 1&4 is the same as the row above. Based on detailed household information in *Section 6.3.6,* [redacted] is a temporary summer camp with no owner and shared usage among the community. [redacted] is an uninhabited temporary summer camp with no animals recorded. Therefore, no grazing area loss is expected and the impact magnitude for the affected household is considered negligible.	
May – June 2027	WTG 23, 24, 14, 15; Internal Access Road 5 and 6; Substation	6.6	Construction of WTG 23,24,14,15, internal access road 5&6 and substation is expected to impact [redacted]nd [redacted] Based on detailed household information in *Section 6.3.6,* [redacted] is a temporary summer camp without owner and shared usage among the community. [redacted] is a piece of rounded stone with no recorded animals being grazed in the Project area. Therefore, no grazing area loss is expected and the impact magnitude for the affected household is considered negligible.	0.0022%–0.009%
June – July 2027	WTG 16, 19, 20, 21, 4; Internal Access Road 2 and 3; Substation	17.75	Construction of WTG 16,19,20,21,4, internal access road 2&3 and substation is expected to impact [redacted] Based on detailed household information in *Section 6.3.6,* [redacted] and [redacted]re inhabited winter camps with	0.0058%–0.025%

Impact Duration	Construction of Project Components	Impacted Area (ha)	Impact Magnitude	Percentage of the total Grazing Area
			animals recorded. Construction activities will cause temporary land loss for these households. However, consider the short duration of the impact (1 month), the impact magnitude is small. [redacted] is an uninhabited livestock fence and [redacted] is an abandoned stove. Therefore, no grazing area loss is expected for [redacted] and the impact magnitude is considered negligible.	
July – August 2027	WTG 3, 2, 1, 10; Internal Access Road 2 and 3; Substation	17.48	Construction of WTG 3,2,1, and 10 is expected to impact [redacted] and [redacted] based on detailed household information in *Section 6.3.6*, [redacted] and [redacted] are inhabited winter camps with recorded animals. Construction activities will cause temporary land loss for these households. However, consider the short duration of the impact (1 month), the impact magnitude is small. [redacted] and [redacted] are uninhabited structures with no animals recorded. Therefore, no grazing area loss is expected for [redacted] and the impact magnitude is considered negligible.	0.0057%–0.025%
August – September 2027	WTG 9, 8, 7, 6; Internal Access Road 2 and 3; Substation	17.48	Construction of WTG 9,8,7, and 6 is expected to impact [redacted] and [redacted] Impact magnitude is expected to be small for [redacted] and negligible for [redacted] as discussed above.	0.0057%–0.025%

Impact Duration	Construction of Project Components	Impacted Area (ha)	Impact Magnitude	Percentage of the total Grazing Area
September – October 2027	WTG 5; Internal Access Road 2 and 3; Substation	14.01	Construction of WTG 5 is expected to impact [redacted] Impact magnitude is expected to be small for [redacted] as discussed above.	0.0046%–0.020%
October 2027 – January 2028	Substation	2.66	Construction of substation is expected to impact [redacted] Impact magnitude is expected to be small for [redacted] as discussed above.	0.0009%–0.004%
October 2027 – March 2028	Winter break for WTG Construction	N/A	N/A	N/A
April – May 2028	WTG 13,12,17	0.81	Construction of WTG 13,12,17 is expected to impact [redacted] Impact magnitude is expected to be negligible for both households as discussed above.	0.0003%–0.001%
May – June 2028	WTG 18,21,22, 23	1.08	Construction of WTG 18,21,22, 23 is expected to impact [redacted] Impact magnitude is expected to be negligible for both households as discussed above.	0.0003%–0.001%
June – July 2028	WTG 24,14,15,16	1.08	Construction of WTG 18,21,22, 23 is expected to impact [redacted] Impact magnitude is expected to be negligible for both households as discussed above.	0.0003%–0.001%
July – August 2028	WTG 19,20,11,4	1.08	Construction of WTG 19,20,11,4 is expected to impact [redacted] Impact magnitude for [redacted] is expected to be small, while Impact magnitude for [redacted] expected to be negligible as discussed above.	0.0003%–0.001%

Impact Duration	Construction of Project Components	Impacted Area (ha)	Impact Magnitude	Percentage of the total Grazing Area
August – September 2028	WTG 3,2,1,10	1.08	Construction of WTG 3,2,1,10 is expected to impact [redacted] Impact magnitude for [redacted] and [redacted] is expected to be small, while Impact magnitude for [redacted] is expected to be negligible as discussed above.	0.0003%–0.001%
September – October 2028	WTG 9,8,7,6,5	1.35	Construction of WTG 9,8,7,6,5 is expected to impact [redacted] and [redacted] mpact magnitude for the three households are expected to be small as discussed above.	0.0004%–0.002%
OHL Area				
June - December 2027	OHL towers and access road	57.23	Based on *Figure 8-2*, [redacted] 27&28, 39, and 40 are located within 1km of the OHL and are expected to experience temporary land loss during construction phase.	0.019%-0.081%

Additionally, engagements with local communities indicate that alternative pastureland is available both within the broader project landscape and, where necessary, in areas located approximately 50-200km north of the Project area. Household surveys and stakeholder consultations demonstrate that local herders in the area maintain a high degree of mobility and adapting their movements in response to pasture availability and drought condition. During periods of drought, herders do not rely on fixed or predetermined alternative grazing areas; instead, some households may travel 50–200 km to access suitable forage for their livestock. Such movement are generally coordinated through communication with neighbouring herders and soums based on customary arrangements or regulatory guidance. Conflicts related to competition over pastureland are reported to be uncommon.

The maximum temporary area unavailable for grazing at any one time is estimated to be approximately 17.75 ha, representing only a negligible proportion of the available grazing resource used by affected households. The phased construction programme further limits impacts by confining construction activities to discrete work fronts, allowing livestock grazing to continue across the vast majority of the Project area throughout the construction period.

Given the very limited extent of grazing land affected, the temporary and phased nature of construction disturbance, the availability of alternative pasture in the immediate vicinity of

fenced construction areas, and the demonstrated adaptive mobility of local herders, the magnitude of impact is assessed as small. The significance of temporary construction-phase grazing land loss and access restriction is therefore assessed as minor, with the residual impact remaining Minor and not significant following implementation of mitigation and livelihood restoration measures.

TABLE 8-11: IMPACT ON LAND USE DURING CONSTRUCTION PHASE

Impact	Impact on land use during construction phase				
Nature	Negative	Positive	Neutral		
	Activities during construction phase such as land preparation (site clearance, excavation and levelling), fencing, and civil works; construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL will negatively impact the land use.				
Type	Direct	Indirect	Induced		
	The Project will directly impact the local land use.				
Duration	Temporary	Short-term	Long-term	Permanent	
	Impact will be short-term for construction phase (approximately 18 months in total in phased manner).				
Extent	Local	Regional	International		
	The impact will be localized across the WTG Area and OHL construction sites, as well as transport routes.				
Scale	The Project scale is expected to be small as it will not significantly reduce land available for herders.				
Frequency	The frequency will be intermittent during construction phase.				
Magnitude	Positive	Negligible	Small	Medium	Large
	The magnitude of Project impact on temporary land loss is considered small as the Project will not significantly reduce land available for herders.				
Resource/Receptor Sensitivity	Low	Medium	High		
	Receptor sensitivity is medium considering herders' dependency on the land resource for grazing.				
Significance	Negligible	Minor	Moderate	Major	
	Overall significance of temporary land loss impact is considered minor.				

Permanent Land Loss

Permanent land-use impacts will commence once Project facilities become operational and will persist for the life of the Project. Based on the mapping in *Figure 8-1* and *Figure 8-2* and household information presented in *Section 6.3.6*, it is anticipated that 16 among the 22 identified land owners will experience permanent land loss of their grazing land as a result of the Project footprint (*Table 8-12)*.

Household survey data indicate that the livestock typically graze within the radius of approximately 4km for small ruminants and 10km for large herbivores from seasonal camps, which result in a grazing area ranging from approximately 70,428 hectares for small ruminants to approximately 305,612 hectares for large herbivores. During operation phase, the permanent Project footprint is estimated at approximately 105.2 ha (*Table 8-9*). This footprint represents 0.15% of the grazing area used by small ruminants and 0.03% of the grazing area used by large herbivores.

The affected area therefore represents a very small proportion of the grazing area available to local households. In addition, grazing activities are expected to remain compatible with much of the Project area during operation, with herders and livestock able to move freely around the Project infrastructure, as shown in *Figure 8-3*. No Project component is located within the footprint of the residential structures, and no physical displacement will be expected from the Project.

A total of 16 households will experience permanent economic displacement resulting from the permanent land loss of access to grazing land. In accordance with the Project's Livelihood Restoration Framework (LRF), these households should be eligible for compensation and livelihood restoration measures corresponding to permanent economic displacement. Entitlement may include cash compensation for permanent land-use loss and/or livelihood restoration assistance, consistent with the compensation framework established in LRF. .

Given the very limited proportion of grazing land permanently affected, the continued availability of extensive alternative grazing areas, the mobility of local herders, and the absence of physical displacement, the magnitude of impact is assessed as small. With affected herders considered medium sensitivity receptors, the significance of permanent operational-phase grazing land loss is assessed as negligible.

TABLE 8-12: HOUSEHOLDS EXPERIENCING PERMANENT LOSS

HH Number	Structure Type	Usage Status	Permanent Land Loss
[redacted]	Temporary summer camp without owner	Shared usage among the community	No (no owner)
[redacted]	Temporary summer camp without owner	Shared usage among the community	No (no owner)
[redacted]	Autumn-spring camp	Inhabited	Yes
[redacted]	Livestock fence	Uninhabited and usage pattern not identified due to unavailability of owner	No (no animals grazed in the project area)
[redacted]	Winter camp with livestock shelter, small stone house and big container	Inhabited	Yes
[redacted] (same owner as [redacted] and [redacted]	Winter camp with ger, kiosk, livestock fence and livestock winter shelter	Inhabited	Yes
[redacted] (same owner as [redacted]	Winter camp with ger, kiosk, livestock fence and livestock winter	Inhabited	Yes

HH Number	Structure Type	Usage Status	Permanent Land Loss
	shelter summer house with wheels		
[redacted]	Winter camp with two livestock winter shelter, broken vehicles, and two kiosks	Inhabited	Yes
[redacted] (same owner as [redacted])	Winter camp with ger, kiosk and livestock winter shelter	Inhabited	Yes
[redacted]	Autumn camp with livestock fence	Inhabited	Yes
[redacted]	Winter camp with ger, kiosk, and livestock winter shelter	Inhabited	Yes
[redacted]	Winter camp with two kiosks and livestock winter shelter	Inhabited	No (over 7km from the nearest Project component)
[redacted]	Temporary summer camp without owner	Shared usage among the community	No (no owner)
[redacted]	Spring camp with livestock fence made of machine wheels	Inhabited	Yes
[redacted]	Summer camp with few machines wheels	Uninhabited	Yes
[redacted] (same owner as [redacted])	Winter camp with 2 gers, kiosk, and livestock winter shelter	Inhabited	Yes
[redacted]	Winter camp with ger and livestock winter shelter	Inhabited	Yes
[redacted]	Winter camp with ger, kiosk, and livestock winter shelter	Inhabited	Yes
[redacted]	Winter camp with two kiosks and livestock broken fence	Uninhabited and usage pattern not identified due to unavailability of owner	Yes
[redacted] (same owner as [redacted])	Winter camp with ger and livestock winter shelter	Uninhabited	No (uninhabited and no animals grazed in the project area)
[redacted]	Winter camp with livestock fence made with machine wheels and barn made with stone	Uninhabited	No (uninhabited and no animals grazed in the project area)
[redacted]	Broken fence	Uninhabited	No (uninhabited and same owner as [redacted])
[redacted]	Winter camp with kiosk, remnants of vehicles and broken fence	Uninhabited	No (uninhabited and same owner as [redacted])

HH Number	Structure Type	Usage Status	Permanent Land Loss
[redacted]	Abandoned stove	Uninhabited	No (uninhabited and same owner as [redacted]
[redacted]	A piece of rounded stone	Uninhabited	No (uninhabited and no animals grazed in the project area)
[redacted]	Winter camp with ger, two kiosks, and livestock winter shelter	Inhabited	Yes
[redacted]	Winter camp with ger, kiosk, fence, broken vehicle, and two livestock winter shelter	Inhabited	Yes
[redacted]	Broken livestock fence and broken kiosk	Uninhabited and usage pattern not identified due to unavailability of owner	No (uninhabited)
[redacted]	Bagh centre building, with four house, three gers, livestock winter shelter, livestock stone fence, and water well	Inhabited	Yes
[redacted]	House with two garage, livestock winter shelter, summer house with wheels	Inhabited	Yes
[redacted]	Livestock winter shelter, broken vehicles, livestock fence	Inhabited	Yes
[redacted]	Summer house with wheels, ger, kiosk, livestock winter shelter, livestock fence made with machine wheels	Uninhabited and usage pattern not identified due to unavailability of owner	No (uninhabited)



FIGURE 8-3: ANIMAL GRAZING DURING OPERATION OF THE NEARBY WINDFARM

TABLE 8-13: IMPACT OF PERMENANT LAND LOSS DURING OPERATION PHASE

Impact	Impact on land use during construction phase			
Nature	Negative	Positive	Neutral	
	Operation phase land take of the Project components including WTGs foundations, assess road, substation, and OHL tower will negatively impact the land use.			
Type	Direct	Indirect	Induced	
	The Project will directly impact the local land use.			
Duration	Temporary	Short-term	Long-term	Permanent
	Impact will be permanent for operation phase (20-25 years).			
Extent	Local	Regional	International	
	The impact will be localized across the WTG Area and OHL construction sites, as well as access roads.			
Scale	The Project scale is expected to be small as it will not significantly reduce land available for herders.			
Frequency	The frequency will be continuous during construction phase.			

Impact	Impact on land use during construction phase				
Magnitude	Positive	Negligible	**Small**	Medium	Large
	The magnitude of Project impact on land use is considered small as the Project will not significantly reduce land available for herders.				
Resource/Receptor Sensitivity	**Low**	Medium	High		
	Receptor sensitivity is low considering the high mobility of herders and the availability of similar resources in the immediate adjacent of the Project footprint during operation phase.				
Significance	**Negligible**	Minor	Moderate	Major	
	Overall significance of permanent land loss impact is considered negligible.				

Cumulative Land Fragmentation

The Project, in combination with existing and planned mining, energy and transport developments in the wider Tsogttsetsii area, has the potential to contribute to the cumulative fragmentation of grazing land used by herder households. During operation, Project infrastructure, including WTGs, access roads, OHL towers, and associated facilities, will introduce additional physical features within the landscape that may locally influence livestock movement routes, increases travel distance s between grazing areas and incrementally reduce the connectivity of pasture resources.

However, several factors limit the magnitude of cumulative fragmentation. Grazing land in the region remains largely open-access and are not formally allocated to individual households, allowing herders considerable flexibility to modify grazing patterns in response to changing conditions. Consultation findings indicate that local herders are highly mobile and routinely adapt movements according to pasture quality, water availability, climate variability, and the presence of existing infrastructure. Furthermore, the Project footprint does not overlap with identified household structures, winter camps or wells, and no physical displacement is expected. Livestock movement will remain possible throughout most of the Project area, including around WTGs, along access roads, and beneath the OHL corridor, thereby maintaining connectivity between grazing areas.

Although the Project may contribute incrementally to the cumulative fragmentation of grazing land when considered alongside, other regional developments, the overall reduction in pasture access and movement efficiency is expected to be limited. The primary effect is therefore associated with a minor reduction in grazing efficiency rather than substantive loss of grazing resources or displacement of herder households.

Given the extensive availability of alternative grazing land, the adaptive mobility of local herders, the limited scale of the Project footprint relative to the wider grazing landscape, and the absence of impacts on key livelihood assets, the magnitude of cumulative land fragmentation is assessed as small. Considering the medium sensitivity of herder households due to their dependence on pastoral livelihoods, the impact significance is assessed as minor. Following implementation of the Project's Livelihood Restoration Framework and ongoing stakeholder engagement measures, the residual cumulative land fragmentation impact is assessed as minor.

TABLE 8-14: IMPACT OF CUMULATIVE LAND FRAGMENTATION

Impact	Impact on land use during construction phase				
Nature	Negative	Positive	Neutral		
	Land fragmentation impact from the Project and nearby developments will negatively impact the land use.				
Type	Direct	Indirect	Induced		
	The Project will directly impact the local land use.				
Duration	Temporary	Short-term	Long-term	Permanent	
	Impact will be short-term for operation phase (20-25 years).				
Extent	Local	Regional	International		
	The impact will be localized across the WTG Area and OHL construction sites, as well as access roads.				
Scale	The Project scale is expected to be small as it will not significantly reduce land available for herders.				
Frequency	The frequency will be continuous during construction phase.				
Magnitude	Positive	Negligible	Small	Medium	Large
	The magnitude of Project impact on land use is considered small as the Project will not significantly reduce land available for herders.				
Resource/Receptor Sensitivity	Low	Medium	High		
	Receptor sensitivity is medium considering herders' dependency on the land resource for grazing.				
Significance	Negligible	Minor	Moderate	Major	
	Overall significance of permanent land loss impact is considered minor.				

8.5.4.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

- Develop a LRP based on requirements outlined in Section 8.3.4.3;
- Establish effective communication mechanism and actively communicate with the local community prior to and during the construction phase, in order to inform on Project construction timeline, transportation route and timeline, activities performed during the construction and operation phase of the Project;
- The perimeters of the Project groundwork or active construction site should be fenced and monitored to prevent any trespassing of wildlife, livestock, herders and the Ovoo/Tomb structures within the Project AoI;
- Restore all temporarily disturbed areas following completion of construction activities. Restoration measures will include contouring and stabilisation of disturbed surfaces, backfilling and compacting excavated areas, removal of construction debris and waste, and implementation of appropriate erosion-control measures. Rehabilitation activities will be

designed to reflect local soil conditions and traditional land-use practices, with the objective of returning affected areas to productive pasture.

- Undertake re-vegetation of affected pasture areas using native, drought-resistant grass and plant species typical of Mongolian rangelands. Re-vegetation activities will be implemented in consultation with local herders and relevant soum authorities to ensure compatibility with local grazing practices and ecological conditions.
- Communicate and implement the grievance mechanism to receive and respond to grievances about land use; and
- Ensure that effective communication channels with local stakeholders, such as Facebook groups and bagh/soum meetings, are put in place to address any issues which might arise during the Project operation phase.

8.5.4.4 RESIDUAL IMPACTS

Taking into account the effective implementation of the Livelihood Restoration Plan (LRP) and ongoing stakeholder engagement, residual land use impacts associated with the Project are considered minor.

8.6 IMPACTS ON INFRASTRUCTURE/PUBLIC SERVICES

8.6.1 SCOPE OF ASSESSMENT

As per the Scoping Study (*Chapter 5*), the following planned activities can have impacts on the area's infrastructure and public services during different phases of the Project:

- Construction Phase:
  - Workforce mobilisation and presence;
  - Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL; and
  - Water resource use.
- Decommissioning:
  - Workforce mobilisation and presence;
  - Dismantling of WTGs, WTGs foundations, Substation and internal cabling; and
  - Wastes, emissions and discharges generation, handling, storage and disposal.

8.6.2 SUMMARY OF BASELINE CONDITIONS

The socio-economic conditions of in Tsogttsetsii, Manlai and Khanbogd soum reflect an insufficient network of social infrastructure and public services.

In terms of housing, 30% of households in Tsogttsetsii soum reside in apartments with centralized and independent engineering systems. In Manlai soum, 23% of households reside in apartments with centralized and independent engineering systems. In Khanbogd soum, 19% of households reside in apartments with centralized and independent engineering systems

As for electricity access, 90% of households in Tsogttsetsii soum are connected to the central power system, compared to 82% in Khanbogd soum and only 47% in Manlai soum. In 2020, there were still several households in the three soums that had no access to electricity. As noted during ERM site visits, solar power is widely used among herder households in the

baghs, which takes up 89%. High electricity bills are an important concern of the local households.

Located in Gobi desert, water access continues to be a major challenge for residents of Umnugobi aimag. Only a limited number of households in the three soums are connected to centralized or individual water supply systems. Safe and reliable water access is scarce, particularly in the rural areas. At the bagh level, over half of the households in the affected baghs reported experiencing water shortages. To address these issues, herders often store water in containers or move closer to water sources to ensure their livestock has sufficient water. Some households rely on bottled water for drinking, but in many cases, drinking water and water for livestock are not kept separate, raising potential health concerns.

Waste management systems in the Project area are limited. In Tsogttsetsii soum, the old landfill site has reached full capacity, and solid waste is currently being collected and transported by [redacted]rom the soum centre. Additionally, there is no integrated hazardous waste management system in place.

There are no schools at the bagh level and children go to the respective soum for education. Based on information collected through public data and KII, there are two (2) schools and four (4) kindergartens in Tsogttsetsii soum, but there is a lack of basic provisions such as electricity and drinking water. There is one (1) school and one (1) kindergarten in Manlai soum that have better accessibility.

There are no hospitals at the bagh level, and the healthcare facilities in Tsogttsetsii, Manlai, and Khanbogd Soums are limited. Each soum has only one health institution and no pharmacists. In 2023, the number of hospital beds in the three soums is 45, 12, and 37, respectively, which can be considered insufficient compared to their population[18].

8.6.3 ASSESSMENT APPROACH AND CRITERIA

The criteria used to define the magnitude and sensitivity for local infrastructure and public services can be referred to in *Table 8-1* and *Table 8-2*.

8.6.4 IMPACT ASSESSMENT

8.6.4.1 EXISTING/EMBEDDED MEASURES

The following mitigation measures will be implemented to mitigate the impacts on infrastructure and public services from the Project construction phase:

- Each contractor will generate their own power, typically using diesel generators. A 50 kW diesel generator will be used for construction and assembly purposes; and
- Trash bins, hazardous material storage area and sewage tanks will be set up in the substation.

8.6.4.2 SIGNIFICANCE OF IMPACTS

Workforce Mobilisation and Presence

It is estimated that the Project will employ 250-300 workers during the construction phase and approximately 34 people, with around 17 people working per shift during the operation phase.

[18] National Statistical Office of Mongolia, www.1212.mn

It is assumed that workers will be hosted in an accommodation facility located within the WTG Area in Bilgeh bagh, Tsogttsetsii soum. While this influx may provide some economic benefits to the area, it also poses challenges, particularly regarding local water and electricity resource availability, housing, healthcare and education service availability and waste management.

The presence of transient workers will increase energy and resource consumption, thereby intensifying local water and electricity stress. No housing stress has been expressed by the local community. Although access to schools within Tsogttsetsii soum is reported to be limited, better-resourced educational facilities are available in the nearby Manlai and Khanbogd soums or at the Aimag level. Considering that peak construction will involve approximately 250–300 workers, and that only a portion of them are likely to have school-aged children, the Project is not anticipated to impose any substantial additional demand on local education services. Additionally, the temporary accommodation and offices for these workers will generate waste, which may not be effectively managed due to existing limitations in local waste disposal systems. This could exacerbate pollution and litter around the Project site.

Given that the construction phase will have a duration of approximately 18 months and will affect a limited number of receptors at the local level (primarily nearby households), the magnitude of impacts on infrastructure and public services during the construction phase is assessed as small. However, receptor sensitivity is considered high, reflecting existing constraints in waste management systems, water availability, and limited access to healthcare and education services. Taking these factors into account, the overall significance of impact associated with workforce mobilisation and presence on infrastructure and public services during construction phase is assessed as moderate.

TABLE 8-15: IMPACT ON INFRASTRUCTURE AND SERVICES FROM WORKERS MOBILIZATION AND PRESENCE

Impact	Impact on infrastructure and services from workers mobilisation and presence				
Nature	Negative	Positive	Neutral		
	Temporary workers will use local infrastructure and services and may thus negatively impact the availability, quality and/or price of those services for local communities.				
Type	Direct	Indirect	Induced		
	Project workers using infrastructure and services will result in direct impacts on local communities.				
Duration	Temporary	Short-term	Long-term	Permanent	
	Impact will be short-term for construction phase (approximately 18 months).				
Extent	Local	Regional	International		
	The impact is localized in Bilgeh bagh and surrounding area.				
Scale	Considered medium due to the size of the Project and its activities.				
Frequency	Impacts will arise continuously throughout the construction phase.				
Magnitude	Positive	Negligible	Small	Medium	Large

Impact	Impact on infrastructure and services from workers mobilisation and presence			
	Considering that the impact will remain at local level and span over a short period of 18 months, the impact magnitude is small.			
Resource/Receptor Sensitivity	Low	Medium	High	
	Receptor sensitivity is considered high, as there is a lack of basic resources, waste management system, education and healthcare service in the area.			
Significance	Negligible	Minor	Moderate	Major
	Impact significance is moderate during construction phase.			

Construction of Access Road, Internal Roads, WTGs Foundations, Substation, BESS and Control Building, and OHL

The Project involves the construction of approximately 30.9 km Access Road linking the existing Heavy Duty Coal Transport Road to the Wind Turbine Generator (WTG) Area. Where feasible, the alignment is expected to follow the existing dirt road. In addition, approximately 28-36 km of unpaved internal roads will be developed to connect individual WTGs, the Substation (including the BESS).

WTG foundations will comprise shallow mat-type foundations, each covering 330 m^2 with a depth of around 3 m. Construction of these foundations will involve intensive concreting activities, which require relatively high water and energy consumption. The Substation will occupy approximately 2.7 ha, including a Control Building, an Outdoor Air Insulated Switchgear (AIS), maintenance areas, a hazardous material storage area, sewage tanks, trash bins, a muster point, and a security post. A dedicated BESS will store surplus wind energy. The OHL will span 218 towers (27-51 m tall) made of Grade C steel, with bird diverters included in the design.

Total construction water demand is estimated at approximately 111,873 m^3, with water supplied by off-site providers that have confirmed sufficient capacity to meet Project demand without compromising existing users. Construction activities will also require significant electricity to support heavy machinery and worker facilities. However, electricity demand during construction will be largely met through diesel generators operated by the Project contractor, thereby minimizing reliance on local electricity infrastructure. Considering that construction activities will be temporary, lasting approximately 18 months, and will be localized to the Project area, the magnitude of impacts on infrastructure and public services during the construction phase is assessed as small.

Receptor sensitivity for infrastructure and public services is also considered medium, reflecting the generally limited availability of water and other local resources, while acknowledging that the Project will reply primarily on self-supplied utilities during construction.

Based on the above assessment, the overall significance of impact from construction activities on infrastructure and public services is categorized as moderate during the construction phase.

TABLE 8-16: IMPACT ON INFRASTRUCTURE AND SERVICES FROM CONSTRUCTION OF ACCESS ROAD, INTERNAL ROADS, WTGS FOUNDATIONS, SUBSTATION, BESS AND CONTROL BUILDING, AND OHL

Impact	Impact on infrastructure and services from construction of Access Road, Internal Roads, WTGs Foundations, Substation, BESS and Control Building, and OHL			
Nature	Negative	Positive	Neutral	
	There will be an increased demand on local infrastructure (e.g., water, electricity) during the construction phase, further stretching the constraint resources in the project area.			
Type	Direct	Indirect	Induced	
	Construction work using infrastructure and services will result in direct impacts on local communities.			
Duration	Temporary	Short-term	Long-term	Permanent
	Impact will be short-term for construction phase (approximately 18 months).			
Extent	Local	Regional	International	
	The impact is localized in Bilgeh bagh, Jargalant bagh, Gavilud bagh, Javhlant bagh and surrounding area.			
Scale	Considered medium due to the size of the Project and its activities.			
Frequency	Impacts will arise continuously throughout the construction phase.			
Magnitude	Positive	Negligible	Small	Medium	Large
	Considering that the electricity and water consumption from the Project, the impact magnitude is medium.			
Resource/Receptor Sensitivity	Low	Medium	High	
	Receptor sensitivity in the Project area is assessed as medium considering the limited local resources.			
Significance	Negligible	Minor	Moderate	Major
	Impact significance is minor during construction phase.			

Water Resource Use

During construction, water will be sourced from licensed off-site groundwater suppliers and transported to the site by tanker, rather than abstracted from local water resources within the Project area. As a result, the Project is not expected to reduce the availability of water relied upon by nearby residents or herders for domestic use or livestock watering.

With respect to surface water, there are no permanent surface water bodies within the Project area, and the region's drainage features are predominantly seasonal and dry for most of the year. As construction water will not be sourced from these temporary watercourses, the Project will not affect surface water availability or access for local users. Consequently, the potential

community health and safety impact associated with surface water resource availability is considered negligible.

For groundwater, although local herders are considered highly sensitive receptors due to their reliance on groundwater wells, the Project will not abstract groundwater from the site or surrounding area. Total construction water demand is estimated at approximately 111,873 m³, with water supplied by off-site providers that have confirmed sufficient capacity to meet Project demand without compromising existing users. Given the limited demand relative to the suppliers' available capacity and the absence of on-site groundwater abstraction, the potential for reduced water access, water insecurity, or associated community health and livelihood impacts is considered low. Therefore, the overall community health and safety impact related to water resource availability is assessed as negligible within the Project area and minor for the off-site source areas.

Within the Project AoI, [redacted] was identified during field surveys. However, the well was found to be locked during the site visit and showed no evidence of recent use. According to a local herder, the well owner last accessed the associated structures and the well approximately three years ago. Given its current inactive status, the Project is not expected to restrict access to this well or result in contamination impacts on this specific water source. Considering the absence of anticipated direct impacts on nearby existing wells and local water source, the magnitude of impact on local water resources and associated public services is conservatively assessed as negligible. Due to the limited availability of water resources in the Project area, receptor sensitivity is assessed as high.

Taking into account the combination of moderate impact magnitude and high receptor sensitivity, the overall significance of impact from construction activities on water resources and related public services is assessed as negligible.

TABLE 8-17: IMPACT ON INFRASTRUCTURE AND SERVICES FROM WATER RESOURCE USE

Impact	Impact on infrastructure and services from water use			
Nature	Negative	Positive	Neutral	
	The increased water use from construction and worker accommodation will stretch the water constraint in the project area.			
Type	Direct	Indirect	Induced	
	Water use from the construction work will result in direct impacts on local communities.			
Duration	Temporary	Short-term	Long-term	Permanent
	Impact will be short-term for construction phase (approximately 18 months).			
Extent	Local	Regional	International	
	The impact is localized in Bilgeh bagh, Jargalant bagh, Gavilud bagh, Javhlant bagh and surrounding area.			
Scale	Considered medium due to the size of the Project and its activities.			
Frequency	Impacts will arise continuously throughout the construction phase.			

Impact	Impact on infrastructure and services from water use				
Magnitude	Positive	Negligible	Small	Medium	Large
	Impact magnitude is assessed to be medium during construction.				
Resource/Receptor Sensitivity	Low		Medium		High
	Receptor sensitivity in Bigeh bagh, Jargalant bagh, Gavilud bagh and Javhlant bagh is considered high due to the lack of water resource in the region.				
Significance	Negligible	Minor	Moderate	Major	
	Impact significance is negligible.				

8.6.4.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

The following mitigation measures to control the above-mentioned impacts are recommended:

Water usage

- Implement water-saving practices during construction, such as recycling water for equipment cleaning or dust suppression;
- Communicate and implement the grievance mechanism to document and address water-related complaints.

Electricity Usage

- Ensure backup power systems are in place to prevent outages caused by construction-related activities;
- Collaborate with utility providers to monitor grid stability and address any power disruptions immediately; and
- Communicate and implement the grievance mechanism to document and address electricity-related complaints.

Waste Management

- Update the Waste Management Plan and regularly monitor its implementation;
- Promote the use of reusable and recyclable materials during construction;
- Avoid single-use plastics by providing alternatives such as reusable containers or biodegradable materials;
- Set up designated waste segregation points at the construction site for recyclable, hazardous, and general waste;
- Establish temporary waste storage areas that are secure, weatherproof, and away from sensitive locations like water sources or residential areas;
- Identify opportunities to reuse construction debris (e.g., concrete, wood, and metals) in the project or donate reusable materials to local communities; and
- Communicate and implement the grievance mechanism to allow local residents to report any issues related to waste mismanagement.

Education and Health Services

- Offer scholarships or job training programs to local students, preparing them for employment opportunities in the wind energy sector;
- Provide funding or resources to local schools to enhance their capacity;
- Coordinate with local health authorities to develop a response plan for any emergencies that may arise during construction;
- Establish first-aid stations at the construction site to reduce the burden on local health facilities;
- Track the frequency and type of health issues reported by local residents and workers; and
- Designate a community liaison officer to provide regular updates on the project and address concerns.

8.6.4.4 RESIDUAL IMPACTS

With the implementation of the above existing embedded/in place measures, as well as the above-recommended additional mitigation and management measures, it is expected that the residual impact significance for workforce mobilisation and presence would be reduced to minor. Residual impact significance for construction activities will be reduced to negligible. Residual water use impact will remain negligible.

8.7 IMPACTS ON OCCUPATIONAL HEALTH AND SAFETY

8.7.1 SCOPE OF ASSESSMENT

As per the Scoping Study (*Chapter 5*), the following planned activities can have impacts on the area's occupational health and safety during different phases of the Project:

- Construction Phase:
  - Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL;
  - Wastes generation, discharge, handling and disposal during construction;
  - Equipment and material transportation and supply;
  - Operation of associated facilities such as the concrete batching plant, workers' accommodation facility; and
  - Installation of the WTGs, OHL, internal cabling, Substation, BESS and Control Building.
- Operation Phase:
  - Wastes generation, discharge, handling and disposal during operation.
- Decommissioning
  - Workforce mobilisation and presence;
  - Dismantling of WTGs, WTGs foundations, Substation and internal cabling; and
  - Wastes, emissions and discharges generation, handling, storage and disposal.

8.7.2 SUMMARY OF BASELINE CONDITIONS

Construction is considered a high risk sector in terms of Occupational Health and Safety (OHS) in Mongolia. According to the National Statistical Office of Mongolia, there was 93 occupational accidents in Umnugobi aimag in 2023.

Furthermore, limited access to healthcare services and insufficient skills of the health personnel can exacerbate the consequences of occupational risks, highlighting a significant public health concern in the Project area.

8.7.3 ASSESSMENT APPROACH AND CRITERIA

The criteria used to define the magnitude and sensitivity for occupational health and safety can be referred to in *Table 8-1* and *Table 8-2.*

8.7.4 IMPACT ASSESSMENT

8.7.4.1 EXISTING/EMBEDDED MEASURES

The Project Occupational Health and Safety Plan (OHSP) commits to the implementation of structured and mandatory OHS training, delivered prior to commencement of work and refreshed regularly throughout the construction phase, key training components include:

- Site OHS induction — including Project overview; site hazards; emergency procedures; PTW system; right to refuse unsafe work; GRM access for OHS complaints; PPE requirements; toolbox talk schedule;
- Role-specific hazard training — Hazards specific to assigned work activity; HIRA findings; specific controls; SDS for any hazardous substances handled;
- Working at height — Tower climbing; harness inspection and donning; fall arrest systems; rescue techniques; emergency descent;
- Rescue at height – Rescue protocol; lowering system operation; casualty management at height;
- Lifting operations — Crane load charts; lift planning; pre-use inspection; communications; critical lift requirements;
- Electrical safety;
- BESS electrical and thermal runaway;
- Hazardous substance handling;
- Silica and dust hazard;
- Incident reporting and near-miss; and
- Monthly toolbox talks.

The existing measures in the Project's Emergency Preparedness and Response Plan (EPRP) include the following:

- Emergency Classification;
- Responsibilities;
- Emergency Contact;
- Emergency Response Procedures;
- Incident Reporting Procedures;
- Training and Emergency Drills; and
- Monitoring.

The existing measures listed in the Project's DEIA include the following:

- In case of complaints or suggestions from project workers and local residents, promptly receive and resolve them at the appropriate level, ensuring a response;

- Provision of Personal Protective Equipment: Fully equip project workers with personal protective gear, ensure its regular use, and monitor compliance;
- Regular Training: Provide regular training and guidance on health, safety, and accident prevention for all project workers in line with their work schedules, ensuring workplace safety;
- Monitoring of Equipment and Transport: During the construction and operation of the wind power station, continuously monitor the condition of equipment, machinery, and vehicles;
- Carry out maintenance services as needed and ensure safe operation;
- Prevention of Accidents: Provide regular guidance to all workers regarding safety procedures and organize training to prevent accidents;
- Internal Safety Regulations: Develop and enforce internal safety regulations, rules, and instructions, continuously monitoring compliance;
- Maintenance and Equipment Integrity: Ensure the quality and integrity of machinery and equipment, conducting regular maintenance services;
- Work Responsibilities and Expertise: Ensure that workers do not attempt tasks they are not qualified for. They should not perform non-assigned duties and should execute their tasks only after fully understanding instructions from the management;
- Prohibition of Working in Low Light: Strictly prohibit working in dim light or complete darkness;
- Health Checks for New Employees: When hiring new workers, verify their health status and suitability for the job;
- Safety and Protection Training for New Employees: Provide necessary labour protection and safety training for new employees, ensuring they understand the rules to be followed at the project site, personal protection equipment, and measures to prevent accidents;
- Develop Safety Regulations for Construction: Implement safety and labour protection rules for the construction of wind power station infrastructure. Have these rules reviewed and approved by relevant professional organizations (such as environmental and health control bodies);
- Fire Safety and Electrical Connections: Choose fire-resistant materials for construction and ensure proper electrical connections following technology standards. Plan and prepare for fire extinguishing measures in advance;
- Contingency Plans for Emergencies: Prepare a detailed contingency plan for possible accidents, specifying who is responsible for each task, and organize a rapid-response team to address emergencies;
- Safety Notices and Warnings: Post safety warnings, notices, and signs at necessary locations, clearly visible to workers and the public. Inform the public about ongoing construction activities;
- Safe Work Conditions and Regular Safety Training: Continuously provide clear information about construction processes, safety procedures, and worker protection, ensuring they have the proper protective clothing and equipment (e.g., goggles, ear protection, etc.);
- Fire Hazard Prevention: Keep flammable materials away from lighting equipment and heating sources;

- Electrical Tool Safety: Avoid operating hand-held electrical tools at high voltages. Regularly train workers on safe handling and maintenance of electrical tools and keep an accident register;
- Fall Protection During Construction: Implement fall protection measures and ensure that no objects fall from buildings, creating hazards for passersby. Install proper protective barriers around the construction site;
- Training on Hazard Awareness: Ensure that all workers understand potential hazards during construction, regularly conduct safety training, and proactively plan and prepare for accident prevention and mitigation; and
- Maintain readiness to manage the consequences of accidents.

8.7.4.2 SIGNIFICANCE OF IMPACTS

It is estimated that the Project will employ 250-300 workers during the construction phase and approximately 34 during the operation phase.

The WBG EHS Guidelines for Wind Energy (2015) and WBG EHS Guidelines for Electric Power Transmission and Distribution (2007) indicated the following key OHS risks related to wind farm projects:

- Working at height;
- Working in remote locations;
- Lifting operations;
- Live power lines;
- Electric and magnetic fields; and
- Exposure to chemicals.

Construction workers may be exposed to various hazards materials such as chemicals, dust, and emissions from construction equipment, which have the potential to result in respiratory issues, skin irritation, and other health problems. Workers involved in transporting and handling materials are at risk of accidents and injuries from handling heavy loads.

In addition, the remote desert setting exposes workers to severe thermal stress, seasonal sandstorms, limited visibility, and communication challenges. The site's isolation increases medical evacuation time and necessitates enhanced emergency response planning, heat-stress management, real-time weather monitoring, and strengthened remote-work protocols to ensure worker safety under these harsh operating conditions.

Furthermore, concentration of several workers in the accommodation facility will create a point source of wastewater and domestic waste. Without proper management, this can result in impacts on the groundwater quality and unhygienic conditions for the workers. The workers' accommodation facility will require water to operate showers, laundry, toilets, and kitchen. If the water is sourced locally through wells, this may deplete the groundwater resources if the withdrawal rate exceeds the recharge rate. Aggregating several workers in a secluded area and use of common spaces like toilets and canteen may spread communicable diseases. To mitigate the impact of occupational health and safety, the Project Occupational Health and Safety Plan (OHSP) commits to the implementation of structured and mandatory OHS training as listed in *Section 8.7.4.1*.

Taking into account the scale and temporary nature of construction activities, the impact magnitude for occupational health and safety during the construction phase is assessed as medium. The sensitivity of the receptor (construction workers) is conservatively considered medium, reflecting exposure to elevated OHS risks associated with working at height, remote locations, lifting operations, live electrical components, electromagnetic fields, and exposure to chemicals etc. Accordingly, the overall significance of occupational health and safety impacts during construction phase is assessed as moderate. During the operation phase, OHS risks remain present due to activities such as turbine maintenance at height, electrical switching, access to remote sites, and BESS-related electrical and thermal hazards. However, these activities occur at a much lower frequency and are conducted by trained and competent personnel under established safety management systems. As a result, the magnitude of OHS impacts during operation is assessed as small, while receptor sensitivity remains medium. The overall significance of occupational health and safety impacts during the operation phase is therefore assessed as minor.

TABLE 8-18: IMPACTS ON OCCUPATIONAL HEALTH AND SAFETY

Impact	Impact on occupational health and safety				
Nature	Negative	Positive	Neutral		
	The impact on workforce health and safety from Project activities will be negative, as workers may incur injuries or fatalities.				
Type	Direct	Indirect	Induced		
	The impact results from a direct interaction between workers and the Project's activities.				
Duration	Temporary	Short-term	Long-term	Permanent	
	Impact will be short-term for construction phase (approximately 18 months) and long term for operation phase (approximately 20-25 years).				
Extent	Local	Regional	International		
	The impact is localized in the WTG and OHL site.				
Scale	Considered small due to the numbers of employments.				
Frequency	Impacts will arise continuously throughout the pre-construction and construction phase.				
Magnitude	Positive	Negligible	Small	Medium	Large
	Magnitude is assessed to be medium during construction phase and small during operation phase.				
Resource/Receptor Sensitivity	Low	Medium	High		
	Receptor sensitivity is medium during both construction and operation phase.				
Significance	Negligible	Minor	Moderate	Major	
	Overall significance of impact is considered moderate during construction phase and minor during operation phase.				

8.7.4.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

The Project will implement and continuously monitor the existing Occupational Health and Safety Plan (OHSP). Although the significance of OHS impacts is considered as moderate during the construction phase and minor during the operation phase, assuming existing control and mitigation measures are effectively implemented, additional good international industry practice (GIIP) OHS measures are recommended to further reduce residual risks. The following mitigation measures shall be implemented according to the World Bank Group WBG EHS Guidelines for Wind Energy and relevant cross-sectoral EHS Guidelines [19]:

Working at Height

- Use work equipment or other methods to prevent a fall from occurring when working at height;
- Ensure all structures are designed and built to the appropriate standards and have the appropriate means of working-at-height systems fitted;
- Suitable exclusion zones should be established and maintained underneath any working at height activities, where possible, to protect workers from falling objects;
- Ensure all employees working at height are trained and competent in the use of all working at height and rescue systems in place;
- Provide workers with a suitable work-positioning device; also ensure the connectors on positioning systems are compatible with the tower components to which they are attached;
- Ensure that hoisting equipment is properly rated and maintained and that hoist operators are properly trained;
- When working at height, all tools and equipment should be fitted with a lanyard, where possible, and capture netting should be used if practicable;
- Signs and other obstructions should be removed from poles or structures prior to undertaking work;
- An approved tool bag should be used for raising or lowering tools or materials to workers on elevated structures;
- Avoid conducting tower installation or maintenance work during poor weather conditions and especially where there is a risk of lightning strikes; and
- Implement the Emergency Preparedness and Response Plan (EPRP) to rescue operatives should they become stranded or incapacitated while at height.

Working at Remote Location

- Suitable communication equipment available for the workers;
- The training and competence of personnel working remotely and the readiness of all necessary safety equipment in the location;
- Supervision by competent personnel empowered to make decisions based on events and conditions at the work location;
- Provide means for managers to track the exact location of the workers;

[20] The existing heavy duty coal transport road connects the Tavan Tolgoi coal mine to the Mongolia-China border crossing at Gashun Sukhait. The existing heavy duty coal transport road also connects to the country's main road network for transportation from Ulaanbaatar. Road transportation from Ulaanbaatar would require passage through the town of Tsogttesii.

- Provision of suitably qualified first aid-trained workers; and
- Frequent trainings and knowledge sharing regarding to personal hygiene and communicable diseases.

Lifting Operations

- Ensure all relevant information is known about the load, e.g., the size, weight, method of slinging, and attachment points;
- Ensure all lifting equipment (including load attachment points) is suitable, capable of supporting the load, in good condition, and in receipt of any statutory inspections required;
- Ensure all supervisors, equipment operators, and slingers are trained and competent in the lifting equipment and intended lifting techniques;
- Where possible, exclusion zones are to be established and maintained in order to prevent any unauthorized access to lifting areas;
- When lifting large loads, ensure weather conditions are favourable for the task;
- Safe operating parameters of heavy lifting equipment should not be exceeded at any time; and
- A planning meeting between all parties involved in the lift should be carried out and should include: the details of the lift, the roles of each party involved in the lift, and the methods used to communicate instructions among the parties.

Extreme Temperature Exposure

- Implement heat-stress and cold-stress management measures, including work-rest cycles, mandatory hydration protocols, shaded rest shelters, temperature-triggered task suspension, and real-time monitoring of worker condition by trained supervisors.

High Wind Conditions & Sudden Weather Changes

- Establish wind-speed thresholds for stopping work at height, crane operations, and blade/tower handling;
- Integrate real-time meteorological monitoring and early-warning alerts; and
- Require immediate evacuation to safe shelters when sudden weather fronts approach.

Sandstorms and Dust Exposure

- Use weather-forecasting tools and visual monitoring to trigger pre-storm shutdowns; and
- Provide sealed shelters, goggles, dust-rated PPE (e.g., P2/P3 masks), and ensure workers have clear procedures for halting outdoor activities and maintaining visibility during severe dust events.

Isolation and Delayed Emergency Response

- Strengthen remote-work protocols including mandatory check-in systems, pre-positioned medical kits/AEDs, and a detailed OHS plan with confirmed evacuation routes and response times.

Wildlife Encounters

- Conduct site-specific wildlife awareness training, enforce avoidance protocols (no feeding, no approach), maintain clean camps to minimize attractants, and establish emergency procedures for venomous/injurious wildlife encounters.

8.7.4.4 RESIDUAL IMPACTS

With the implementation of the existing control measures, together with the-recommended additional mitigation and management measures outline above, it is anticipated that the residual OHS impacts would be further reduced. Accordingly, the residual impact significance for all OHS-related impacts is expected to be reduced from moderate to minor during construction phase and minor to negligible during operation or remain minor where risks cannot be fully eliminated.

8.8 IMPACTS ON COMMUNITY, HEALTH, SAFETY AND SECURITY

8.8.1 SCOPE OF ASSESSMENT

As per the Scoping Study (*Chapter 5*), the following planned activities can have impacts on the area's community, health, safety and security during different phases of the Project:

- Construction Phase:
  - Workforce mobilisation and presence;
  - Wastes generation, discharge, handling and disposal during construction; and
  - Equipment and material transportation and supply.
- Operation Phase:
  - Wastes generation, discharge, handling and disposal during operation.
- Decommissioning:
  - Workforce mobilisation and presence.

8.8.2 SUMMARY OF BASELINE CONDITIONS

Healthcare facilities in the Project area are limited. Each of the Tsogttsetsii, Manlai, and Khanbogd soums has only one hospital, with 45, 12, and 37 beds, respectively, and there are no hospitals at the bagh level. The main challenges to accessing healthcare for the local community include a shortage of healthcare personnel, insufficient skills among existing staff, long distances to hospitals, and poor hospital infrastructure.

[redacted]

In Manlai soum, cancer and internal diseases are the most common health issues, whereas respiratory and joint diseases are relatively widespread among residents of Khanbogd soum.

Gender-based violence (GBV) is prevalent in Mongolia. [redacted]

8.8.3 ASSESSMENT APPROACH AND CRITERIA

The criteria used to define the magnitude and sensitivity for community health, safety and security can be referred to in *Table 8-1* and *Table 8-2.*

8.8.4 IMPACT ASSESSMENT

8.8.4.1 EXISTING/EMBEDDED MEASURES

According to NZE's Grievance Redress Mechanism Plan (GRMP), grievance related to GBV will be managed, monitored and reported following the approaches below as listed in the GRMP:

- Survivor-centred approach: the Social Officer (GBV focal point) shall approach all GBV complaints by prioritising the safety, dignity, and wishes of the survivor above all other considerations, including the investigation of the alleged perpetrator;
- Do no harm: the CLO shall not share identifying information about a GBV complainant with any other person without the complainant's explicit written consent. Under no circumstances shall a GBV complainant's identity be disclosed to the alleged perpetrator, to the Contractor's management, or to community leaders without consent;
- Separate register: all GBV and sexual harassment complaints shall be recorded in the GBV Complaint Sub-Register, maintained separately from the main Grievance Register and accessible only to the Social Officer (GBV focal point) and NZE's Environmental and Social Team;
- Referral to support services: the CLO shall, with the survivor's consent, provide information about and facilitate referral to available support services — health care through the on-site Medical Officer or the Tsogttsetsii Soum Hospital, legal advice, and psychosocial support where available;
- Disciplinary action: where a GBV or sexual harassment complaint is confirmed through investigation, the alleged perpetrator shall be subject to immediate disciplinary action under the LMP Code of Conduct, up to and including dismissal. Where a criminal offence has occurred, NZE shall refer the matter to Mongolian law enforcement authorities with the survivor's consent; and
- No mediation for GBV: GBV and sexual harassment complaints shall not be referred to mediation between the complainant and the alleged perpetrator. Resolution in these cases is through disciplinary action and, where applicable, criminal referral.

The existing measures in the Project's Community Health, Safety And Security Management Plan (CHSSMP) include the following:

- Traffic Safety and Transportation Management;
- Workforce Influx and Community Health;
- Emergency Preparedness and Community Response;
- Security Management;
- Roles and Responsibilities; and
- Monitoring and Reporting.

The existing measures in the Project's Security Service Procedure (SSP) include the following:

- Security Organization;
- Personnel Requirement and Vetting;
- Checkpoint and Access Control Operation;
- Use of Force;
- Community Interface;
- Incident Reporting and Records,
- Prohibited Conduct; and
- Special Objects and Camera Monitoring.

The existing measures related to CHSS listed in the Project DEIA include the following:

- Avoid creating multiple tracks/paths, place road signs and markings;
- Construction activities shall be completed within the shortest practicable timeframe. Nighttime construction is prohibited unless operationally necessary, in which case it shall be subject to prior approval and carried out in accordance with applicable noise and safety requirements;
- Install “line marking” devices;
- Establish waste collection points;
- Separate hazardous waste and scrap metal for recycling and deliver to recycling facilities; and
- Install reserve or replacement sanitary facilities.

The existing measures listed in [redacted] Waste Management Plan include the following:

- Develop and implement a proper 3R’s Waste Management Plan, which align with Plan-Do-Check-Act cycle (PDCA) strategy;
- Segregate recyclable waste and transport it to the waste recycling plants;
- Provide instructions to workers on waste segregation and EHS;
- Hire a competent licensed private contractor for collecting and transporting construction waste from the site to an approved landfill;
- Ensure that all types of waste are transported and disposed of by professional licensed companies;
- Employ a licensed private contractor for transporting and disposing of liquid and solid waste from Worker’s Camps, including temporary facilities;
- Prohibit illegal fly-dumping of any solid and liquid waste on land and surface water bodies;
- Prohibit any waste collection, storage and transportation within hygienic zones; and
- Record generated wastewater to prevent illegal discharge.

Specific measures for Hazardous Waste and Material:

- Develop and implement Spill Response Plan, including spill registration, immediate removal, and reporting;

- Store hazardous waste and materials safely and accessible to authorized personnel only, and locked when not in use;
- Register hazardous materials and accompany them with Material Safety Data Sheet (MSDS) at all times;
- Regularly maintain all machinery and vehicles on site;
- Do not store hazardous materials for more than 180 days on-site; and
- Store in facilities lined with two layers of heavy high-density polyurethane plastic to secure enclosed waste from water incursion or human intervention.

The existing measures listed in [redacted] Traffic Management Plan include the following:

- Designate a parking area within the site and segregate light and heavy vehicle parking zones;
- Ensure vehicles are parked securely, in a fundamentally stable position, and are not left idling while unattended;
- Design clear pedestrian pathways to minimize potential interactions between vehicles and pedestrians;
- Drivers must obey the posted speed limits and all road signs on and around the site;
- An education program will be initiated to encourage drivers to stay on designated roadways;
- Road markers will be installed at intervals to further demarcate the designated roadway;
- The designated gravel roads will be watered at times of peak vehicle movements, to minimize dust re-suspension;
- Passing lamps are switched on during the daytime in the following cases in order to warn the other road users when transporting heavy, oversize or dangerous materials;
- During transporting of material coming out from the vehicle dimension for more than 1 m in length and for more than 0.4 m aside, it is necessary to place identification signs ‘Oversized material’ on the coming-out parts and, if it is dark or the visibility is inadequate, white and red;
- Lights or reflectors in front and rear correspondingly; and
- Ensure the dimensions of the transportation vehicle and the oversized material not exceed the dimension limits along the designated routes, such as bridge, railway, etc.

8.8.4.2 SIGNIFICANCE OF IMPACTS

Workforce Mobilisation and Presence during Construction Phase

The mobilization of a workforce during both the construction and operational phases can affect the health and safety of local communities. An influx of workers may put pressure on local health services, which may negatively impact the availability, quality and the price of those services for local communities considering the limited existing healthcare resources.

During the construction phase, the maximum of approximately 250-300 workers will be accommodated in a designated workers’ camp facility located within the WTG Area. As workers will primarily reside in managed, on-site accommodation with controlled access,

interactions with surrounding communities are expected to be limited. According to the Project Labor Management Plan (LMP), the accommodation facility will provide centralized catering, adequate sanitation facilities, waste management systems, and occupational health and safety protocols. These measures are expected to reduce the likelihood of uncontrolled worker movement, overcrowding of public spaces, and direct exposure to nearby households. During the operation phase, it is expected that periodic maintenance and monitoring will be carried out by a small team of technicians and engineers who visit the site as needed. Therefore, no large or permanent onsite workforce is expected during the operational period.

In addition, health screening and routine health monitoring of workers will be implemented, which will further reduce the risk of communicable disease transmission beyond the workforce. Accordingly, the presence of construction workers is not anticipated to result in a significant increase in the spread of communicable diseases within nearby communities.

Nevertheless, the presence of a predominantly male workforce may raise concerns related to gender-based violence (GBV), especially when GBV is commonly experienced by women in Mongolia, and that Khanbodg soum already exhibits a male-skewed population structure associated with employment in the mining sector. However, there is an established GBV reporting pathways available for GBV cases at the aimag and soum level, which involves hotline, engagement of local police and social workers if needed. Besides, the Project Grievance Redress Mechanism Plan (GRMP) committed that GBV and sexual harassment complaints, either from community members or workers, are subject to heightened confidentiality that will only be made accessible to accessible the NZE Social Officer and NZE's Environmental and Social Team, following the GBV grievance redress process listed in *Section 8.8.4.1*.

All GBV will be registered, investigated and reported by personnel who are trained and authorised to perform such functions. According to the Project HRMP, training on anti-discrimination, anti-harassment, and GBV prevention will be conducted for all workers and supervisors at the induction with annual refresher training by NZE Social Officer or NGO partner. Considering the established GBV referral pathways at the aimag, soum and Project level, and the existing measures to mitigate GBV impact, it is not expected that the worker influx will significantly increase the GBV risk in the Project area.

Given the existing social dynamics and history of such incidents, the community's sensitivity to health, safety, and security (HSS) risks is considered medium. However, since the primary labour force for construction will come from local workers hired by a local construction company and given the controlled accommodation arrangements and mitigation measures in place, the magnitude of impact associated with workforce mobilisation is assessed as small during the construction phase.

Overall, the significance of impacts related to workforce mobilization on community HSS is assessed as minor.

TABLE 8-19: IMPACT ON COMMUNITY HSS FROM WORKERS MOBILIZATION AND PRESENCE

Impact	Impact on community HSS from workers mobilisation and presence		
Nature	Negative	Positive	Neutral

Impact	Impact on community HSS from workers mobilisation and presence			
	Temporary workers will use local health services, raise concerns for GBV and communicable diseases.			
Type	Direct	Indirect	Induced	
	Project workers influx will result in direct impacts on the health, safety and security of the local communities.			
Duration	Temporary	Short-term	Long-term	Permanent
	Impact will be short-term for construction phase (approximately 18 months).			
Extent	Local	Regional	International	
	The impact is localized in Bilgeh bagh and surrounding area.			
Scale	Considered medium due to the size of the Project and its activities.			
Frequency	Impacts will arise continuously throughout the construction phase.			
Magnitude	Positive	Negligible	Small	Medium	Large
	Considering that the Project will employee mostly local workers, the impact magnitude is small.			
Resource/Receptor Sensitivity	Low	Medium	High	
	Receptor sensitivity of community HSS is considered medium.			
Significance	Negligible	Minor	Moderate	Major
	The size of the Project and planned workforce are expected to have a minor impact on the community in the host baghs.			

Equipment and Material Transportation and Supply during Construction Phase

Increased traffic through construction related vehicles may disturb the herders' existing lifestyle. Based on field observation during the site visits, the traffic volume along the main road is relatively low. However, community activities were observed in some of the road segments and dirt roads. Livestock from local communities were also seen along the local roads.

In addition, the transportation of raw material and heavy equipment of large volume will potentially increase accidents, noise and air pollution, and cause road deterioration. The WTG equipment, cranes and their accompanying components need to be transported with special heavy haulage trucks and trailers. The WTGs will be transported from the Mongolia-China border via the existing heavy duty coal transport road[20] and access road. Therefore, the impact magnitude of transporting 29 WTGs on community HSS is estimated to be medium. The receptor sensitivity towards equipment and material transportation and supply is considered to

[20] The existing heavy duty coal transport road connects the Tavan Tolgoi coal mine to the Mongolia-China border crossing at Gashun Sukhait. The existing heavy duty coal transport road also connects to the country's main road network for transportation from Ulaanbaatar. Road transportation from Ulaanbaatar would require passage through the town of Tsogttesii.

be medium due to the presence of livestock on local roads. The overall significance of the impact is assessed as moderate during the construction phase.

TABLE 8-20: IMPACT ON COMMUNITY HSS FROM EQUIPMENT AND MATERIAL TRANSPORTATION AND SUPPLY

Impact	Impact on community HSS from equipment and material transportation and supply				
Nature	**Negative**	Positive	Neutral		
	Transportation of equipment and materials during the construction phase may generate traffic-related impacts, such as increased accidents, noise, air pollution and road deterioration.				
Type	**Direct**	Indirect	Induced		
	The impact of Project activities related to traffic management and transportation of equipment will directly affect community health and safety.				
Duration	**Temporary**	Short-term	Long-term	Permanent	
	Impact will be temporary for construction phase and occasional during operation phase.				
Extent	**Local**	Regional	International		
	The impact is localized among the communities of the Project AoI.				
Scale	Considered small due to the size of the Project and its activities.				
Frequency	Impacts will arise continuously throughout the construction phase.				
Magnitude	Positive	Negligible	Small	**Medium**	Large
	Considering transporting heavy and oversized components may cause congestion and road deterioration, the impact magnitude is medium.				
Resource/Receptor Sensitivity	Low	**Medium**	High		
	Receptor sensitivity of community HSS is considered medium.				
Significance	Negligible	Minor	**Moderate**	Major	
	The size of the Project and planned transportation during construction are expected to have a moderate impact on the community in the host baghs.				

Health Impacts from Project Construction Activities

The construction phase of the Project has the potential to negatively impact human health of the communities residing near the construction sites. These impacts are primarily associated with land preparation, transportation of materials, and installation of wind turbine generators (WTGs). Land preparation and groundwork will involve the use of heavy machinery such as excavators. Similarly, the transport and installation of WTG components will require specialized vehicles. These activities could generate environmental stressors such as noise, vibration, dust, and increased traffic.

Fugitive dust, PM_{10} and $PM_{2.5}$ generated from the land preparation and transportation may impact the air quality and potentially cause respiratory issues. In addition to health impacts, fugitive dust can cause nuisance effects, including the soiling of surfaces and reduced visibility, which may affect both residential areas and road safety.

Noise and vibration during the construction phase will primarily result from the operation of heavy machinery, transportation of oversized components, and material handling activities. However, these sources are intermittent and will not produce constant noise throughout the entire construction period. Further analysis of air quality and noise impacts, along with proposed mitigation measures, is provided in *Chapter 7*.

Considering that there is only one (1) unoccupied/abandoned winter camp located in the AoI of the WTG, and eight (8) herder structures within 1 km from the OHL route. The impact magnitude of the planned Project activities is assessed to be small. There. However, access to health services is very limited among herders and direct or indirect health impacts from the Project may still be moderately significant. As such, receptor sensitivity is assessed to be medium. The overall impact significance is assessed to be minor.

TABLE 8-21: IMPACT ON COMMUNITY HSS FROM PROJECT CONSTRUCTION ACTIVITIES

Impact	Impact on community HSS from project construction activities				
Nature	Negative	Positive	Neutral		
	The construction activities could generate environmental stressors such as noise, vibration, dust, and increased traffic which will negatively impact community health and safety.				
Type	Direct	Indirect	Induced		
	The impact of Project construction activities will indirectly affect community health and safety through deterioration of air quality and increased noise level.				
Duration	Temporary	Short-term	Long-term	Permanent	
	Impact will be short-term for construction phase (approximately 18 months).				
Extent	Local	Regional	International		
	The impact is localized among the communities of the Project AoI.				
Scale	Considered small due to the size of the Project and its activities.				
Frequency	Impacts will arise continuously throughout the construction phase.				
Magnitude	Positive	Negligible	Small	Medium	Large
	Considering planned Project activities as well as the number of workers anticipated to work during the construction and operation phases, the impact magnitude is assessed to be small.				
Resource/Receptor Sensitivity	Low	Medium	High		
	Receptor sensitivity towards health impact of the Project is considered medium.				
Significance	Negligible	Minor	Moderate	Major	

Impact	Impact on community HSS from project construction activities
	The construction activities are expected to have a minor impact on the community health and safety in the host baghs.

Wastes Generation, Discharge, Handling and Disposal during Construction and Operation

Waste during Project construction and operation will consist of domestic waste generated by Project's workers, non-hazardous and recyclable waste from office activities, replaced mechanical/electrical parts during repair and maintenance activities, some minor empty chemical containers, contaminated wastes, rags, changed machinery oils and lubricants and welding electrodes. If not managed properly, the waste can contaminate local environments and create health hazards.

Given the local community's challenges in waste management due to lack of infrastructure, their sensitivity to waste management issues is considered medium. The magnitude of the impact is assessed as small. Consequently, the significance of the impact on community HSS from wastes generation, discharge, handling and disposal is minor during the construction phase.

TABLE 8-22: IMPACT ON COMMUNITY HSS FROM WASTES GENERATION, DISCHARGE, HANDLING AND DISPOSAL

Impact	Impact on community HSS from wastes generation, discharge, handling and disposal				
Nature	Negative	Positive	Neutral		
	Project activities may result in waste production which can cause negative impacts on community health if not managed properly.				
Type	Direct	Indirect	Induced		
	The impact of Project activities related to waste management will directly affect community health.				
Duration	Temporary	Short-term	Long-term	Permanent	
	Impact will be short-term for construction phase and long-term during operation phase.				
Extent	Local	Regional	International		
	The impact is localized among the communities of the Project AoI.				
Scale	Considered small due to the size of the Project and its activities.				
Frequency	Impacts will arise occasionally during the construction and operation phase.				
Magnitude	Positive	Negligible	Small	Medium	Large
	The magnitude is considered small during construction phase due to existing waste disposal measures.				
	Low	Medium	High		

Impact	Impact on community HSS from wastes generation, discharge, handling and disposal			
Resource/Receptor Sensitivity	Receptor sensitivity towards wastes generation, discharge, handling and disposal is considered medium.			
Significance	Negligible	Minor	Moderate	Major
	The size of the Project and waste generation are expected to have a minor impact on the community in the host baghs.			

Security Personnel Engagement

The presence of security personnel for the Project may result in both positive and adverse implications for community health and safety. Positively, adequately trained and properly managed security personnel can help prevent unauthorized access, theft, vandalism, and accidents within the project area, thereby contributing to improve safety for both workers and surrounding communities. However, if not appropriately managed, the presence of security forces may rise community concerns related to perceived intimidation, restriction on access to traditional land uses (e.g., herding routes and grazing areas), or the potential for conflicts arising from misunderstandings or culturally insensitive behaviour. These risks may be heightened in areas where security personnel interact frequently with local herders and households.

To mitigate these potential impacts, NZE has developed a Security Service Procedure that outlines the requirements for security personnel selection and vetting, checkpoint and access control operations, use of force, community interface, incident reporting and records, prohibited conduct as well as special objects and camera monitoring. Based on the above, the receptor sensitivity is relation to Project security personnel engagement is assessed as medium. Given the comprehensive and robust security service procedures in place, the magnitude of impact is assessed as small. Accordingly, the overall residual impact significance associated with security personnel engagement is considered minor.

TABLE 8-23: IMPACT ON COMMUNITY HSS FROM SECURITY PERSONNEL ENGAGEMENT

Impact	Impact on community HSS from Security Personnel Engagement			
Nature	Negative	Positive	Neutral	
	The presence of security personnel for the Project can have both positive and adverse impact for community health and safety.			
Type	Direct	Indirect	Induced	
	The impact of Project activities related to waste management will directly affect community safety.			
Duration	Temporary	Short-term	Long-term	Permanent
	Impact will be short-term for construction phase and long-term during operation phase.			
Extent	Local	Regional	International	
	The impact is localized among the communities of the Project AoI.			

Impact	Impact on community HSS from Security Personnel Engagement				
Scale	Considered small due to the size of the Project and its activities.				
Frequency	Impacts will arise occasionally during the construction and operation phase.				
Magnitude	Positive	Negligible	Small	Medium	Large
	The magnitude is considered small during construction phase due to existing security management procedures.				
Resource/Receptor Sensitivity	Low		Medium	High	
	Receptor sensitivity towards security personnel presence is considered medium.				
Significance	Negligible	Minor	Moderate	Major	
	The engagement of security personnel is expected to have a minor impact on the community safety.				

8.8.4.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

The following additional mitigation measures are proposed.

Workforce Mobilisation and Presence during Construction Phase

- Provide adequate worker accommodation and associated amenities, in line with applicable standards and good international industry practice, to minimise pressure on local housing, water supply, sanitation, and other community infrastructure;
- Undertake health screening to assess fitness and health to work including compulsory medical examinations for Project workers and contractors to ensure they are fit for working;
- Implement vaccination programs and monitor the prevalence of communicable diseases detected through the annual workers' medical check-up;
- Establish and implement a project policy on healthy lifestyle and regularly socialize among the workforces. Socialize it as part of inductions and training on the Project's Code of Conduct (CoC) particularly in relation to interaction with the locals;
- The CoC shall explicitly prohibit all forms of Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH). The CoC shall be communicated to all workers, include a signed acknowledgment by each worker and be supported by clearly defined disciplinary measures for non-compliance. The CoC shall also reference applicable worker and community grievance mechanisms, including confidential channels for reporting GBV/SEA-related concerns;
- All workers shall receive regular training on GBV prevention and Code of Conduct to reinforce expected standard of behaviour, promote awareness of prohibited conduct, and ensure understanding of confidential, survivor-centred grievance and reporting mechanisms, including escalation procedures and protection against retaliation;
- Communicate, implement and maintain a project-level grievance mechanism that is accessible to all community groups (and workers), enabling the timely reporting of concerns, including health, safety, security, and conduct-related issues. All grievances shall

be recorded, investigated, and addressed in a transparent and timely manner, in accordance with established procedures;

- Monitor changes in community health conditions, as reported by soum-level health facilities, to identify any Project-related trends or emerging risks and enable adaptive management where necessary; and
- Implement a Community Health, Safety and Security Management Plan that promotes a zero tolerance approach to inappropriate worker behaviour, including GBV, SEA/SH, and other forms of misconduct, and defines roles, responsibilities, monitoring arrangements, and corrective actions.

Equipment and Material Transportation and Supply During Construction Phase

- Regular monitoring of the implementation of Traffic Management Plan to ensure compliance; and
- Conduct community traffic awareness campaign at the Bagh level, informing herders and local residents about transportation schedules, heavy-vehicle movements, and blind-spot risks around large haulers.

Health Impacts from Project Construction Activities

- Use water sprays and dust barriers at construction sites;
- Limit diesel machinery and switch to electric equipment where possible;
- Changes to the health baseline according to soum hospitals should be monitored. Should any significant increased number of respiratory illnesses be identified caused by this Project, a community health assistance program will be implemented;
- Implement the mitigation for air and noise listed in *Section 7.1* and *7.3;* and
- Communicate and implement mechanisms for local communities to voice health concerns related to project activities, ensuring a timely response from project management.

Wastes Generation, Discharge, Handling and Disposal during Construction and Operation

The embedded measures in NZE's Waste Management Plan and additional waste mitigation measures proposed in *Chapter 7* are considered sufficient. Regular monitoring of the implementation of embedded measures should be conducted to ensure compliance.

Security Personnel Engagement

The existing mitigation measures outlined in NZE's Community Health, Safety and Security Management Plan (CHSSMP) together with Security Service Procedure (SSP) are considered sufficient to address potential risk. These measures aim to ensure that security arrangements are implemented in a manner that avoids or minimises risks to community safety and human rights. Ongoing monitoring and review of implementation will be essential to ensure continued compliance with PS4 and good international industry practice.

8.8.4.4 RESIDUAL IMPACT

With the implementation of the above existing controls, as well as the above-recommended additional mitigation and management measures, it is expected that the residual impact

significance would be reduced from minor to negligible for all impacts related to community HSS.

8.9 IMPACTS ON CULTURAL HERITAGE

8.9.1 SCOPE OF ASSESSMENT

As per the Scoping Study (*Chapter 5*), the following planned activities can have impacts on the area's cultural heritage during different phases of the Project:

- Construction Phase:
  - Land preparation (site clearance, excavation and levelling), fencing, and civil works; and
  - Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL.

8.9.2 SUMMARY OF BASELINE CONDITIONS

An archaeological survey was carried out by Mongolian Academy of Sciences in August 2024 in the Bilgeh bagh. As a result of the exploration, no historical and cultural relics were discovered above the surface of the earth in Bilgeh bagh, Tsogttsetsii soum. *Table 8-24* lists the cultural heritage identified in Tsogsttsetsii, Manlai and Khanbogd soum from the desktop screening and site visit. The identified Ovoo by ERM is located outside of the general AoI. According to the cultural heritage office of Manlai soum, the tomb within the AoI of the TL is not listed in the official List of Historical and Cultural Heritage Sites. Community members noted that the tomb had been subject to illegal excavation approximately five years ago.

TABLE 8-24: LIST OF CULTURAL HERITAGE IN TSOGSTTSETSII SOUM, MANLAI SOUM AND KHANBOGD SOUM

Soum	Cultural Heritage	Distance to Project Site
Tsogttsetsii soum	[redacted]	[redacted]
	Ruins of Shireet Monastery	22km from the WTG
	Ruins of the Demchig monastery	24 km from the OHL
	Tsogtsol monastery	56 km from the OHL

Soum	Cultural Heritage	Distance to Project Site
	Tsagaan Tolgoi Monastery	36 km from the OHL
	Ereet Monastery	32 km from the OHL
	Javkhlant Mountain	17 km from the OHL
Manlai soum	Shar Tsav (tourist area)	100 km southeast of Manlai soum
	[redacted]	[redacted]

8.9.3 ASSESSMENT APPROACH AND CRITERIA

The criteria used to define the magnitude and sensitivity for cultural heritage can be referred to in *Table 8-1* and *Table 8-2.*

8.9.4 IMPACT ASSESSMENT

8.9.4.1 EXISTING/EMBEDDED MEASURES

The existing measures in the Project's Chance Find Procedure (CFP) include the following:

- Key Chance Find Risks;
- Chance Find Response Procedure;
- Specific Provisions for Human Remains; and
- Community and Stakeholder Engagement;

The controls committed in the DEIA to be implemented for the Project will include the following:

- Ensure compliance with relevant articles from the Mongolian Law on Cultural Heritage (2014) and report on any findings uncovered during the construction phase to the relevant authorities.

8.9.4.2 SIGNIFICANCE OF IMPACTS

The cultural heritage items identified in Tsogttsetsii soum and Khanbogd soum are located more than 1 km away from the key Project facilities. Given the Project's defined social AoI is 500 m, all identified cultural heritage sites in Tsogttsetsii and Khanbogd soums are located beyond 500m from any key Project facility as shown in *Table 8-24*. These sites are therefore well outside the area where direct or indirect construction-related impacts such as vibration, noise, dust, or access disturbance would reasonably be expected, consistent with the impact avoidance principles set out under IFC Performance Standard 8 (PS8) on Cultural Heritage.

While Ovoos are considered tangible cultural heritage with landscape-level cultural and spiritual significance, the Project infrastructure does not encroach upon their visual catchment or functional use areas. The nearest Ovoos are located [redacted] which lies outside the wind turbine construction AoI of 500 m. Accordingly, no physical, visual, or functional impacts on ovoos are anticipated, and no direct interaction with these known heritage features is expected during Project implementation.

Within the Project's General Area of Influence (500 m), one tomb was identified [redacted] Information provided by the cultural heritage office of Manlai Soum indicates that the tomb is not included in the official list of Historical and Cultural Heritage Sites and is not deemed as culturally significant. Consulted community members reported that the tomb has previously been disturbed and looted and is not considered to hold cultural, spiritual, or historical significance. No households claimed custodianship of the tomb or reported visiting the site, leaving offerings, observing avoidance practices, or associating it with seasonal activities, rituals, or traditional customs. Furthermore, no specific beliefs, cultural practices, or notification procedures were identified in relation to the site. Based on these findings, the tomb is not considered to have cultural heritage significance, and no impacts that would trigger the requirements of IFC PS 8 on Cultural Heritage are anticipated.

Considering that that potential impacts on cultural heritage would be site-specific, and that construction activities related to the OHL will be temporary, the magnitude of impact is assessed as small. Receptor sensitivity is assessed as low as there is no structure with cultural significance within the Project AoI. Overall, following application of the mitigation hierarchy under IFC PS8, residual impacts on cultural heritage are assessed as negligible.

TABLE 8-25: IMPACT ON CULTURAL HERITAGE

Impact	Impact on Cultural Heritage from Project Construction Activities				
Nature	**Negative**	Positive	Neutral		
	Excavation and vibration from the Project construction activities can cause negative impacts on cultural heritage.				
Type	**Direct**	Indirect	Induced		
	The impacts relate to direct loss or damage of cultural heritage as result of Project activities.				
Duration	Temporary	**Short-term**	Long-term	Permanent	
	The impacts will be short-term over the construction phase.				
Extent	**Local**	Regional	International		
	The impact will be localized across the Project Site, Access Road, internal road, and any additional area used during the construction period.				
Scale	Considered small due to the size of the Project and its activities.				
Frequency	Impacts could arise during the construction phase.				
Magnitude	Positive	Negligible	**Small**	Medium	Large
	The magnitude is considered small.				
Resource/Receptor Sensitivity	**Low**	Medium	High		
	Receptor sensitivity of cultural heritage is considered low considering the tomb is located within the Project AoI and its cultural significance is unverified.				
Significance	**Negligible**	Minor	Moderate	Major	

Impact	Impact on Cultural Heritage from Project Construction Activities
	Impact significance is negligible.

8.9.4.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

Although no archaeological sites were identified during the exploration and research activities, it does not eliminate the possibility of historical and cultural relics being preserved underground. Therefore, additional measures are recommended to manage any features of archaeological or cultural significance that may be encountered on the Project Site during construction:

- Exercise caution during site clearance, excavation, grading, and the drilling of water wells to minimize the risk of disturbing any buried archaeological or cultural artifacts;
- Prior to the commencement of construction activities in the vicinity of culturally significant sites, including ovoos, undertake consultation with relevant local authorities, cultural heritage representatives, and affected communities to determine whether any rituals, ceremonies, cultural protocols, or notification procedures are required. Where such requirements are identified, they shall be documented and incorporated as binding commitments within the construction contractor's E&S management requirements. Contractors shall implement the agreed measures before and/or during construction, as appropriate, and maintain records demonstrating compliance. In cases where no specific protocols are identified through consultation, this outcome should be documented. Construction personnel should also be briefed on the cultural significance of ovoos and required conduct in their vicinity to ensure respectful engagement with local customs and traditions;
- In the event that any historical or cultural relics or artifacts are uncovered, immediately halt all activities in the affected area and notify a qualified professional organization, such as an archaeological or cultural heritage authority, for proper assessment and guidance;
- Implement a Chance Find Procedure to manage any previously unidentified archaeological, historical or culturally significance features encountered within the Project Aite during construction. The procedure shall be consistent with IFC Performance Standard 8 and include, at a minimum:
  - Clear procedure for documentation, record keeping and verification of chance finds by qualified cultural heritage specialists or relevant authorities;
  - Defined chain of custody protocols for movable cultural heritage items to ensure their protection, secure handling, and appropriate transfer to the competent authority;
  - Explicit criteria and decision making process for temporary suspension of construction activities, where necessary, to allow for timely assessment, protection, and resolution of issues related to the find, in coordination with the relevant cultural heritage authorities;
  - Establish buffer zone around identified archaeological sites by consulting the local cultural heritage authority or qualified cultural heritage specialist. No construction or ground-disturbing activities should be undertaken within the buffer zone unless agreed in advance with the relevant authorities;

- Carry out engagement during the development phase with a specialist when detailed construction sites locations are available; and
- Record complaints under the grievance mechanism process and follow up by identifying the causes and taking appropriate measures when receiving the complaint to mitigate the disturbance.

8.9.4.4 RESIDUAL IMPACTS

With the implementation of the existing controls, together with-the recommended additional mitigation measures described above, potential adverse impacts on cultural heritage are expected to be effectively avoided or minimised in accordance with the IFC PS8 mitigation hierarchy. Consequently, the residual impact significance is anticipated to be reduced from minor to negligible.

8.10 SHADOW FLICKER IMPACT ASSESSMENT

8.10.1 SCOPE OF ASSESSMENT

Shadow flicker is defined as a change in light intensity caused by shadows cast from moving blades during wind turbine operation. Within wind farms, shadow flickers can affect surrounding communities; therefore, this section assesses and addresses this impact. The likelihood and duration of shadow flicker depend on several factors, including:

- The direction and distance of the receptor relative to the turbine (the further the observer is from the turbine, the less noticeable the effect);
- Turbine height and rotor diameter;
- Time of day and time of year, linked to climatological conditions;
- Wind direction, which affects turbine orientation;
- General weather conditions (e.g., cloud cover, fog, and humidity reduce shadow flickers as they reduce turbine visibility);
- Window characteristics (e.g., window orientation, coverings, and materials); and
- Topography and the presence of natural or built barriers (e.g., vegetation, buildings);

Shadow flickers generally occur under clear-sky conditions when the sun is low on the horizon (sunrise or sunset). Due to changes in sun elevation throughout the year and local topographic variation, each location experiences the phenomenon differently, and specific receptors may be affected during different times of the day or year.

The theoretical number of hours of shadow flicker at a given location can be calculated using modelling software (SHADOW module in windPRO 3.5), incorporating sun path, topography, and turbine rotor and hub height parameters.

When assessing shadow flicker impacts, both worst-case and real-case scenarios are considered:

- Worst Case Scenario (WCS): Assumes maximum possible duration of shadow flicker, with continuous clear skies, continuous turbine operation, and the rotor always oriented perpendicular to the line between the turbine and the sun; and

- Real Case Scenario (RCS): Estimates expected duration by incorporating average sunshine probabilities and regional wind statistics, including non-operational periods (e.g., low or high wind speeds).

8.10.2 SUMMARY OF BASELINE CONDITIONS

8.10.2.1 TOPOGRAPHY AND LANDSCAPE

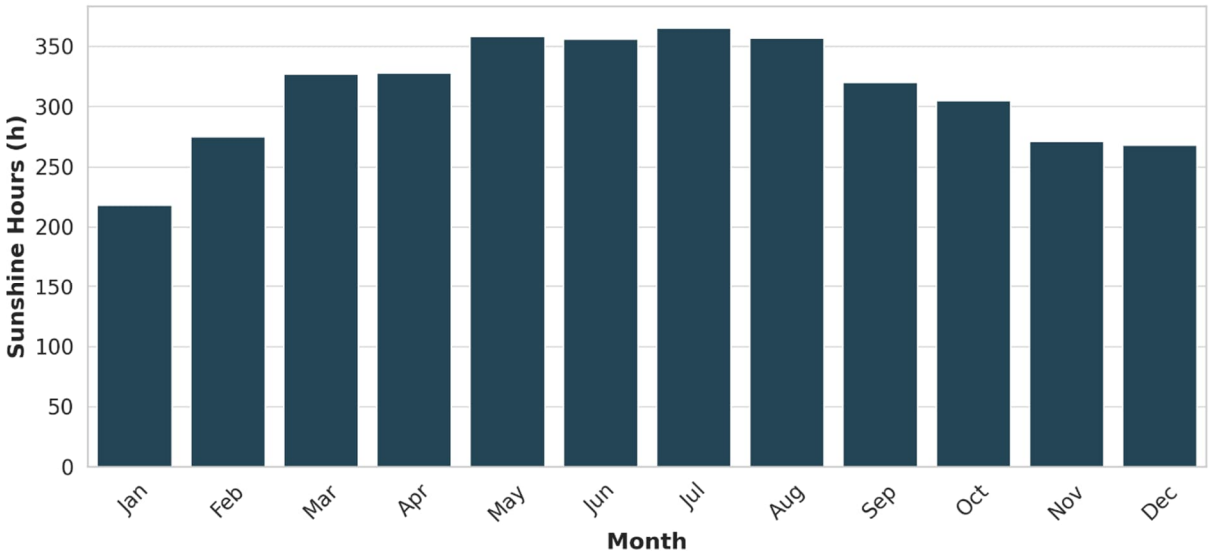
The terrain within the land lease located and its surrounding areas contain areas of hill ranges in the central areas with expanses of gently undulating and relatively flat land (refer to *Section 6.1.2*) and has limited vegetation cover including absence of trees.

8.10.2.2 SUN HOUR

The sunshine duration in South Gobi (Ömnögovĭ) Province, Mongolia follows a distinct seasonal cycle, with sunlight hours gradually increasing from winter through to the peak of summer. During January, the area receives approximately 218 hours of direct sunlight. This amount steadily increases across February and March, reaching around 327 hours by the end of the first quarter.

As spring progresses, sunshine continues to increase, with 328 hours in April and 358 hours in May. The sunniest period occurs during summer, particularly in July, when sunshine duration peaks at 365 hours.

Following this summer high, sunshine begins to gradually decrease through autumn. While August still provides ample light at 357 hours, the decline becomes more noticeable in September (320 hours) and October (305 hours). By November and December, the daylight will reduce further to 271 and 268 hours, respectively.



Source: Nomad Season[21]

FIGURE 8-4: AVERAGE MONTHLY SUN HOUR

[21] Ömnögovĭ Climate. https://nomadseason.com/climate/mongolia/omnogovi.html. Accessed 21 November 2025.

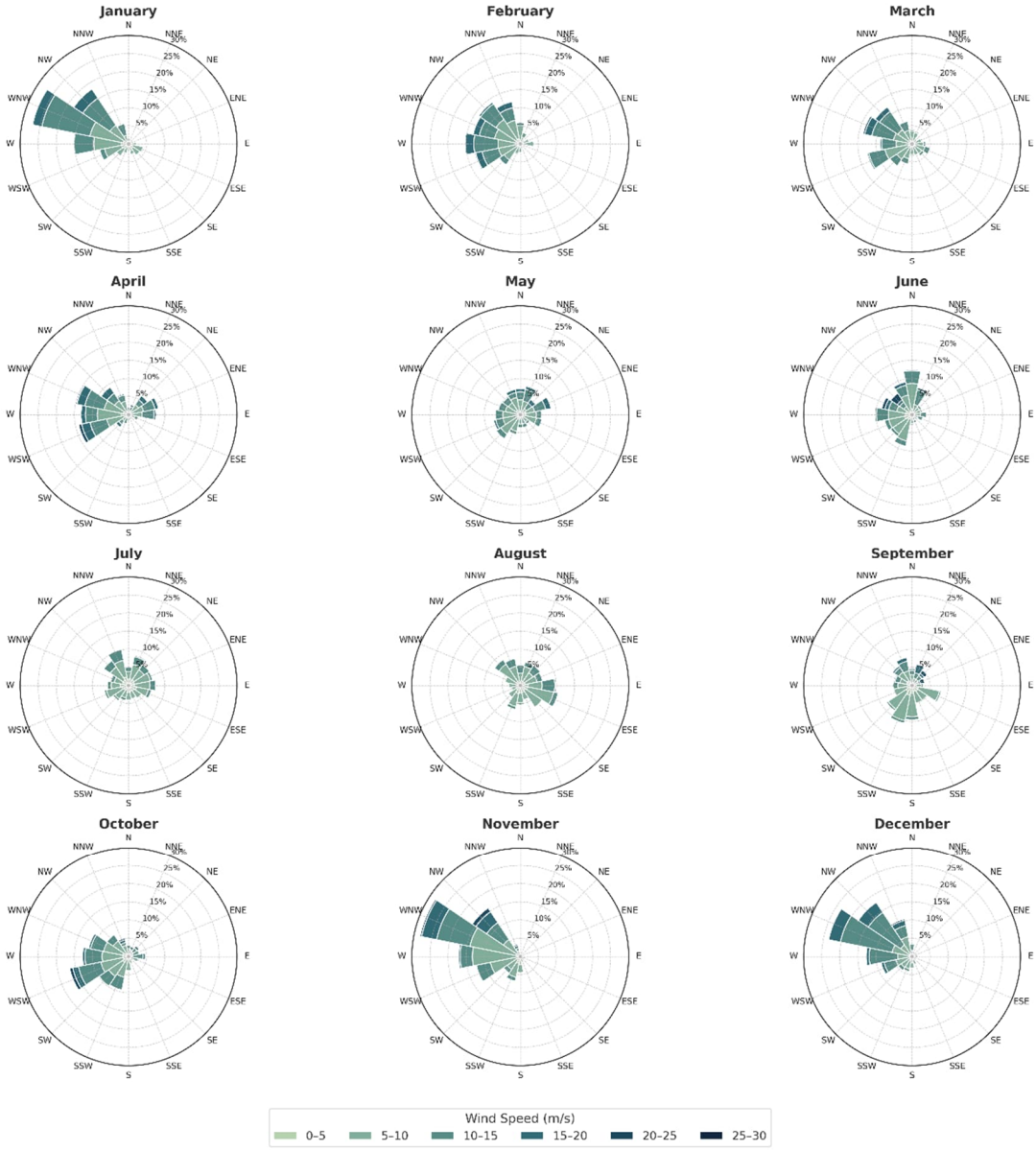
8.10.2.3 WIND REGIME

According to the monitoring data in period of 2024-2025 located within the Project area (see *Figure 8-5*), the local wind climate shows a seasonal cycle, both in terms of prevailing direction and wind speed intensity. During the winter months particularly in January, November, and December, the region experiences its most intense wind activity. These months are dominated by strong northwestern winds (ranging from NNW to WNW), with wind speeds frequently reaching 20-25 m/s and occasionally even peaking in the 25-30 m/s range. This persistent wind flow is characteristic of Mongolia's harsh winter season and reflects the exposure of the Gobi Desert steppe to regional atmospheric dynamics.

As winter gives way to spring, wind intensity begins to slightly decrease. March still shows relatively strong winds from the north and northwest, though speeds tend to fall more consistently within the 10-20 m/s range. In April and May, wind directions diversify, spreading across north to east sectors. Wind speeds also become more moderate, commonly ranging from 10-15 m/s.

The summer months (June, July, and August) represent the calmest part of the year in terms of wind. Wind speeds typically fall between 5-15 m/s, with very few occurrences of higher intensity gusts. Directionally, the wind is more evenly distributed, often coming from a mix of eastern and southern quadrants. These lighter, more variable winds coincide with peak sunshine periods and relatively stable weather conditions in the region.

As the calendar turns to autumn, wind activity starts to intensify once more. September shows increasing wind frequencies, with moderate speeds and directional variability. By October, however, the pattern begins to resemble the winter wind regime again. Wind speeds climb into the 15-20 m/s range, particularly from the WNW and NNW.



Source: NZE Lidar, 2025

FIGURE 8-5: AVERAGE MONTHLY WIND SPEED AND FREQUENCY

8.10.2.4 SHADOW FLICKER RECEPTORS

Within the shadow flicker AOI[22] which is defined as ten times rotor diameters (1,820 meters from WTGs) (*Figure 8-6*), eleven temporary herder camps were identified on the AoI including:

- Temporary herder camps: [redacted]Autumn-spring camp), [redacted]inter camp), [redacted]ter camp); and

[22] Department of Energy and Climate Change. *"Update of UK Shadow Flicker Evidence Base"*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48052/1416-update-uk-shadow-flicker-evidence-base.pdf. Accessed on 20 November 2025.

- Temporary herder camps (unoccupied): [redacted]summer camp), [redacted]ummer camp), [redacted] (round stone), [redacted]summer camp), [redacted]inter camp), [redacted]ter camp), [redacted] (winter camp), and [redacted]winter camp).

It may be noted that unoccupied [redacted]s excluded as a sensitive receiver because the owner (from [redacted]nformed they would not reside there and may only build a fence for livestock at this location at some time in the future.

The residence of herders was observed to comprise traditional Gers which are round windowless canvas with one door opening and with openable flap on the roof top that allows in light. Herders also engage in domestic activities outside the Ger.

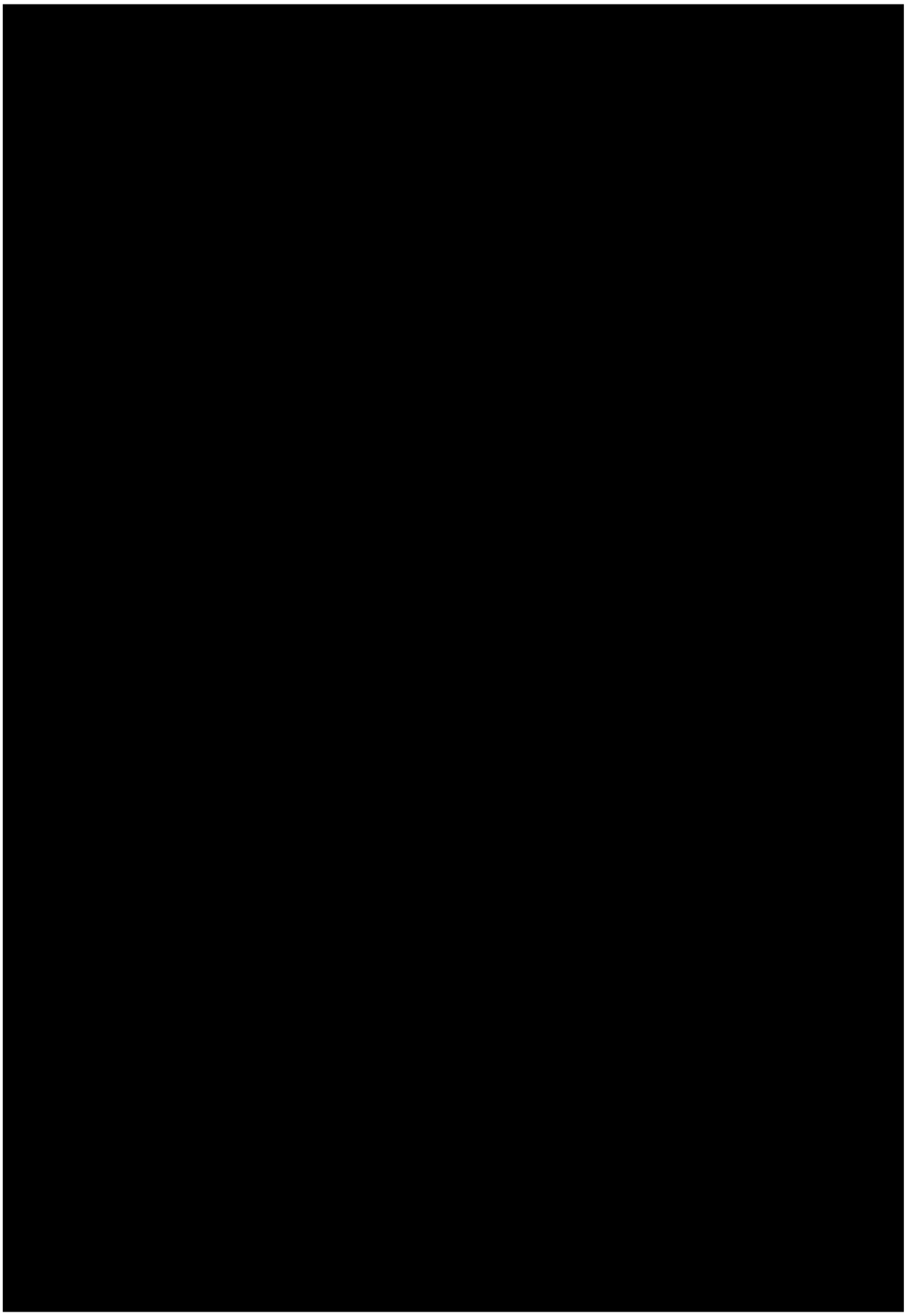


FIGURE 8-6: [redacted]

8.10.3 ASSESSMENT APPROACH AND CRITERIA

8.10.3.1 ASSESSMENT APPROACH

The baseline conditions are summarized and represented in *Section 8.10.2* to describe general characteristics of the project area according to the meteorological baseline which is presented in *Chapter 6 – Environmental Baseline*. In addition, there are some assumptions for shadow flicker theory that should be stated prior to modelling. In particular:

- The monthly average sun hours range from 218 to 365 hours[23]. July attains the highest sun hours of 365 hours;
- The wind turbines have considered the wind speed between 3 m/s (designed cut-in wind speed) and 25 m/s (designed cut-out wind speed) during the operation, annual wind rose, and wind frequency data (see *Figure 8-5*). Approximately 95.2% of the valid wind speed falls within the range of 3 to 25 m/s. It is assumed that the wind turbines operate about 95.2% of the time of the year;
- The blades of the wind turbines which are perpendicular with northwest and southeast orientation have been considered based on the predominant wind direction available from the wind mast data (see *Figure 8-5*), which could result in maximum possible size circular/ elliptical;
- The sun can be represented as a single point; and
- Flickers are ignored if sun is less than 3° above horizon due to atmospheric diffusion/ low radiation/ sheltering.

8.10.3.2 CRITERIA OF ASSESSMENT

In August 2015, the World Bank Group published the Environmental, Health and Safety (EHS) Guidelines for Wind Energy. These are technical reference documents containing examples of good industry practice.

The definition adopted in the EHS guidelines states that shadow flicker occurs when the sun passes behind the wind turbine and casts a shadow. As the rotor blades rotate, shadows pass over the same point causing an effect termed shadow flicker. Shadow flickers may become a problem when potentially sensitive receptors (for instance, residential properties, workplaces, educational and/or healthcare spaces/facilities) are located nearby or have a specific orientation to the wind energy facility.

Key points identified in the guidelines include:

- Shadow flickers occur when the sun passes behind the wind turbine and casts a shadow. As the rotor blades rotate, shadows pass over the same point causing an effect termed shadow flicker. Shadow flickers may become a problem when potentially sensitive receptors (e.g., residential properties, workplaces, learning and/or health care spaces/facilities) are located nearby, or have a specific orientation to the wind energy facility;
- Potential shadow flicker issues are likely to be more important in higher latitudes, where the sun is lower in the sky and therefore casts longer shadow that will extend the radius within which potentially significant shadow flicker impact will be experienced;

[23] Ömnögovĭ Climate. https://nomadseason.com/climate/mongolia/omnogovi.html. Accessed 21 November 2025.

- In case of the possibilities of modifying the wind turbines' locations where neighbouring receptors experience low shadow flicker effects, it is recommended that the predicted duration of shadow flickering effects experienced at a sensitive receptor should not exceed 30 hours per year and 30 minutes per day on the worst affected days, based on worst-case scenario; and
- Recommended preventative and mitigation measures to avoid substantial shadow flicker impacts include systematizing wind turbines' arrangement appropriately, when feasible, to avoid shadow flicker being experienced or to meet duration limits of shadow casting continuously on the shadow sensitive receptor, as set out in the paragraph above, or scheduling wind turbines to shut down at intervals where shadow flicker limits are exceeded.

8.10.4 MODELLING DEVELOPMENT

This assessment was performed by windPRO 3.5 – a computer software which is widely used by the wind industry. The software package includes a Shadow Flicker Module (SHADOW) that calculates the frequencies and the intervals in which a specific neighbouring receptor or area will be affected by one or more wind turbines.

Two scenarios have been considered and modelled: Worst Case Scenario (maximum potential risk) and Real Case Scenario. The calculations of worst and real case scenarios will be based on the following key assumptions:

- Worst Case Scenario (WCS):
  - The presence of physical barriers is not considered;
  - Natural vegetation screening is not included;
  - Cloudiness, humidity is not considered;
  - The sun is shining all day, from sunrise to sunset;
  - Local topography has been obtained from NASADEM;
  - Rotor is always in operation and refrained from turning off during low winds or high winds; and
  - Shadow receptors are modelled using the "green house" mode (where all windows are perpendicular to all WTGs), meaning that shadow flicker effect to each receptor at all directions (visibility 360 degrees).
- Real Case Scenario (RCS): is designed by considering planned turbines, the calculations are based on a more realistic situation where available dataset of sun shining probability and average wind direction which are provided by the Project Owner is applied. However, it should be noted that real case scenario still ignores other relevant conditions (for instance, vegetation cover, window characteristics) of the local settings that will theoretically lead to an overestimation of the shadow flickering occurrence.

All scenarios have been carried out with a chronological resolution of 1 minute (if shadow flicker is predicted to occur in any 1-minute period, the model records this as 1 minute of shadow flicker). Independent of the selected scenario, the model calculates output according to the principles presented in *Figure 8-7*.

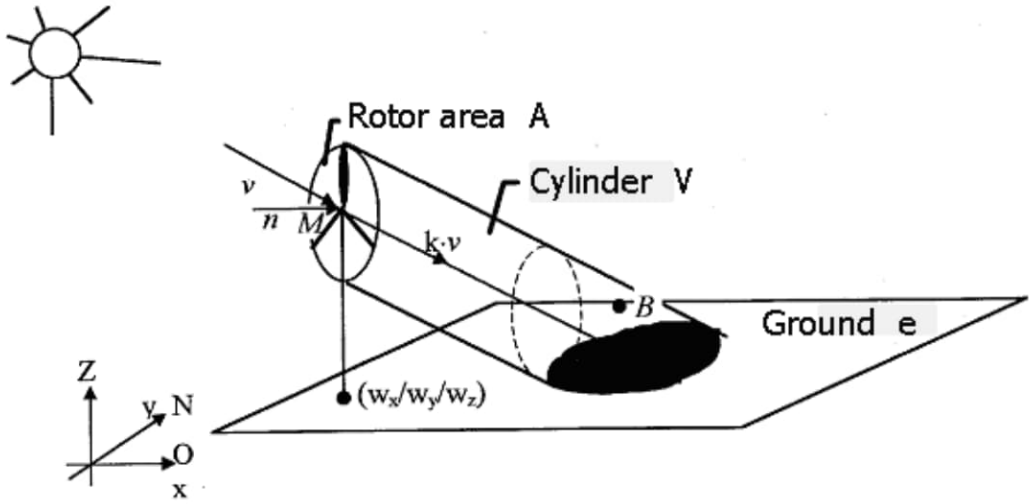


FIGURE 8-7: SHADOW FLICKERING THEORY

All receptors in both scenarios, assuming dwellings/groups of dwellings, within Shadow Flickering AoI of Project's WTGs have been modelled taking into account the following characteristics:

- Single building. Therefore, shadow flicker has been calculated at a height of 1 m (equivalent to the ground floor windows);
- Slope of the window have been set to 90°; and
- The identified receptors are simulated as fixed points with the 360° viewpoint which represented an unrealistic scenario as real windows would only face a particular direction[24].

8.10.4.1 WORST CASE SCENARIO

The assumptions have been mentioned in the first bullet of *Section 8.10.4* for the modelling setting of the Worst-Case Scenario.

[24] Worst Case Scenario in windPRO 3.5 software based on EHS Guidelines for Wind Energy

8.10.4.2 REAL CASE SCENARIO

The following assumptions have been considered in the modelling setting for Real Case Scenario:

- Local data of average daily sunshine hours is derived from Nomad Season – a meteorological public source mentioned in *Section 8.10.2*. Detailed average daily sunshine hours are presented in *Table 8-26*;
- Local topography has been obtained from QGIS 3.42.0 using Shuttle Radar Topography Mission (SRTM);
- No cloud cover or any other meteorological conditions that could potentially reduce visibility and the sunlight have been assumed;
- Receptors modelled using “green house” mode (where all windows are perpendicular to all WTGs);
- No existing physical barriers have been considered (for instance, trees, or buildings);
- Rotors are always rotating; and
- The probability distribution of wind direction according to data recorded at the Project’s measurement tower at the height of 110 m from 2024 to 2025. Detailed wind direction frequency is presented in *Table 8-27*.

TABLE 8-26: AVERAGE DAILY SUN HOURS IN SOUTH GOBI PROVINCE

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7.03	9.82	10.55	10.93	11.55	11.87	11.77	11.52	10.67	9.84	9.03	8.65

Source: Nomad Season[25]

TABLE 8-27: WIND DIRECTION FREQUENCY IN 16 SECTORS

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
5.73%	4.61%	3.92%	3.77%	4.41%	4.75%	4.00%	2.71%	3.06%	5.23%	6.08%	7.51%	10.51%	11.84%	12.64%	9.24%	100%
502	404	343	330	387	416	350	237	268	458	532	658	921	1037	1107	809	8,760

Source: NZE Lidar, 2025

It should be noted that even the assessment performed with such assumptions is leading to an overestimation in terms of real annual number of hours of shadow flicker at a specific location mainly because the following local conditions have not been included:

[25] Ömnögovĭ Climate. https://nomadseason.com/climate/mongolia/omnogovi.html. Accessed 21 November 2025.

- The occurrence of cloud cover has the potential to significantly reduce the number of shadow flickering hours that the observer can experience;
- The presence of aerosols in the atmosphere has the ability to influence the flickering duration as the length of the shadow cast by a WTG depends on the angle of direct sunlight hits, which is strictly determined by the amount of fine solid particles/liquid droplets in between the observer and the rotor; and
- The analysis has not considered the presence of vegetation or any other physical barriers around a receptor that is able to block the view (at least partially) of the turbine.

8.10.4.3 MODELLING SETTINGS AS PER SCENARIOS

The following table is reporting the modelling settings adopted per each scenario. However, it should be noted that the performed calculations did not consider the actual location and orientation of windows of the possible affected houses/dwellings, or the screening effects associated with existing, site-specific conditions and obstacles like other buildings, leading to potential of over-estimating the duration of occurrences when shadow flicker might be experienced at a specific location.

TABLE 8-28: WINDPRO SHADOW MODULE INPUTS (IN BOLD THE DIFFERENCES BETWEEN WCS AND RCS)

	Worst Case Scenario	Real Case Scenario
Wind Turbine location	The model is conducted using a 30-WTG layout, which includes one turbine (T23) (See *Figure 8-2*) that is not part of the final 29-WTG Project layout applied throughout the ESIA. This approach uses the most conservative modelling scenario based on the initial layout, the model accounts for the maximum possible shadow-flicker influence on receptors.	
Rotor diameter and hub height	• Model: [redacted] • Rotor diameter: [redacted] • Hub height: [redacted]	
Wind Turbine Operation	Rotors are always rotating	
Wind Turbine Visibility	A WTG will be visible if it is visible from any part of the receiver window (greenhouse mode)	
Window stories dimensions	1m height / 1m large / 1m from the ground floor	
Cloudiness	Not considered	
Physical barriers (i.e. vegetation)		
Minimum sun height over horizon for influence	3°	
Day step for calculation	1 day	
Time step for calculation	1-minute	
Shining period	The sun is always shining all day, from sunrise to sunset	The sun is shining as per available local sunshine data (see *Table 8-26*)
Rotor direction	Rotor always faces the receptor	Rotor direction varies according to the monitoring wind direction (see *Table 8-27*)
Height contour	SRTM	
Eye Height	1.5 m	

8.10.4.4 MODELLING RESULTS

The predicted shadow flicker durations at selected receptors in both WCS and RCS are summarized as follows:

- Only two (2) out of 11 modelled sensitive receptors within the shadow flicker AOI [redacted] and [redacted] both summer camps - all found unoccupied during site visits) experience measurable shadow flicker (values in black and bold) under both scenarios;
- Potential for shadow flickers at all other HHs according to the WCS meets IFC guidelines. It should be noted that this applies to [redacted] where the model indicated under 30 hours of shadow flicker per year; and
- Under the RCS, potential for shadow flickers at all HHs meets IFC guidelines.

The following maps present the distribution of areas where flickering is calculated according to both scenarios (from

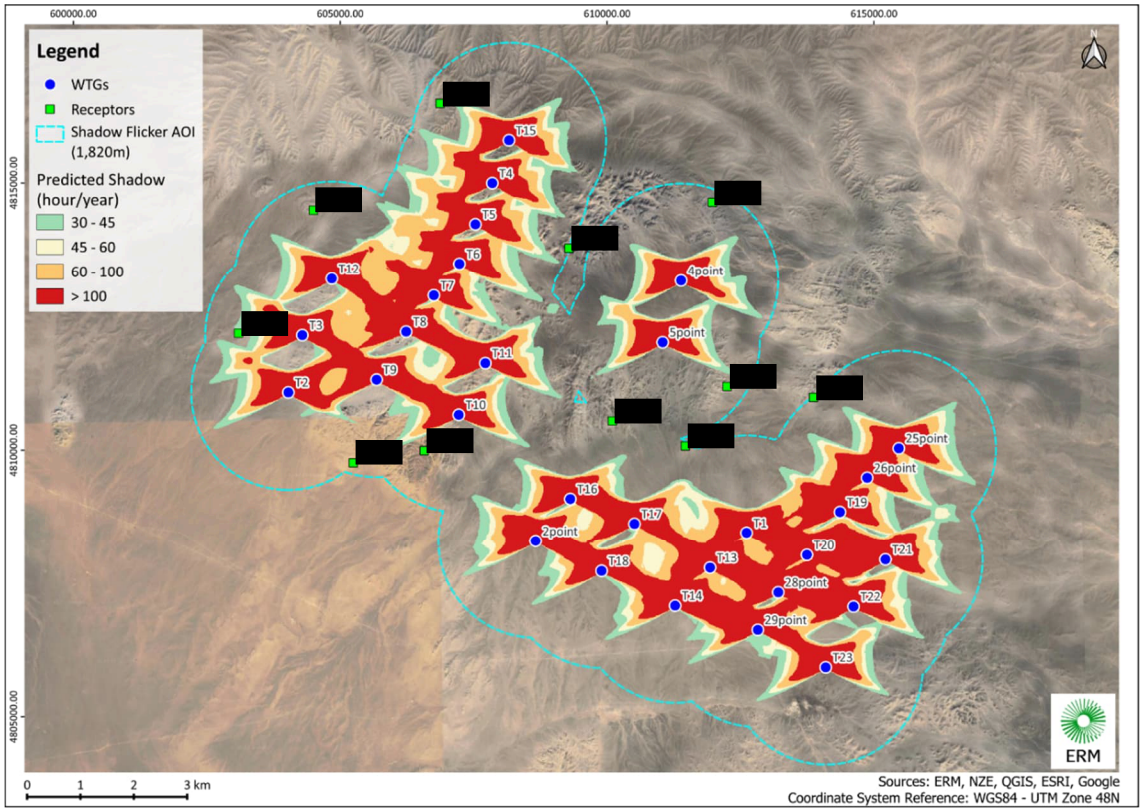


Figure 8-8 to *Figure 8-10*). Detailed main result for all receptors is presented in *Annex C – Detailed Results from windPRO*.

TABLE 8-29: SUMMARY OF PREDICTED SHADOW FLICKER IN BOTH SCENARIOS

Receptor	Easting[26] (m)	Northing (m)	Elevation (mASL[27])	WCS Shadow Duration (hour/ year)	WCS Shadow Duration (minute/ day)	RCS Shadow Duration (hour/ year)
[redacted]	[redacted]	[redacted]	1,442	0.0	0	0.0

[26] Referenced Coordinate System: WGS 1984 – UTM Zone 48N
[27] mASL: meter above sea level

Receptor	Easting[26] (m)	Northing (m)	Elevation (mASL[27])	WCS Shadow Duration (hour/ year)	WCS Shadow Duration (minute/ day)	RCS Shadow Duration (hour/ year)
[redacted]	[redacted]	[redacted]	1,445	27.3	35	15.5
[redacted]	[redacted]	[redacted]	1,480	0.0	0	0.0
[redacted]	[redacted]	[redacted]	1,525	14.0	27	8.6
[redacted]	[redacted]	[redacted]	1,498	0.0	0	0.0
[redacted]	[redacted]	[redacted]	1,444	6.6	16	3.8
[redacted]	[redacted]	[redacted]	1,468	0.0	0	0.0
[redacted]	[redacted]	[redacted]	1,456	0.0	0	0.0
[redacted]	[redacted]	[redacted]	1,475	0.0	0	0.0
[redacted]	[redacted]	[redacted]	1,537	8.1	21	4.6
[redacted]	[redacted]	[redacted]	1,472	0.0	0	0.0

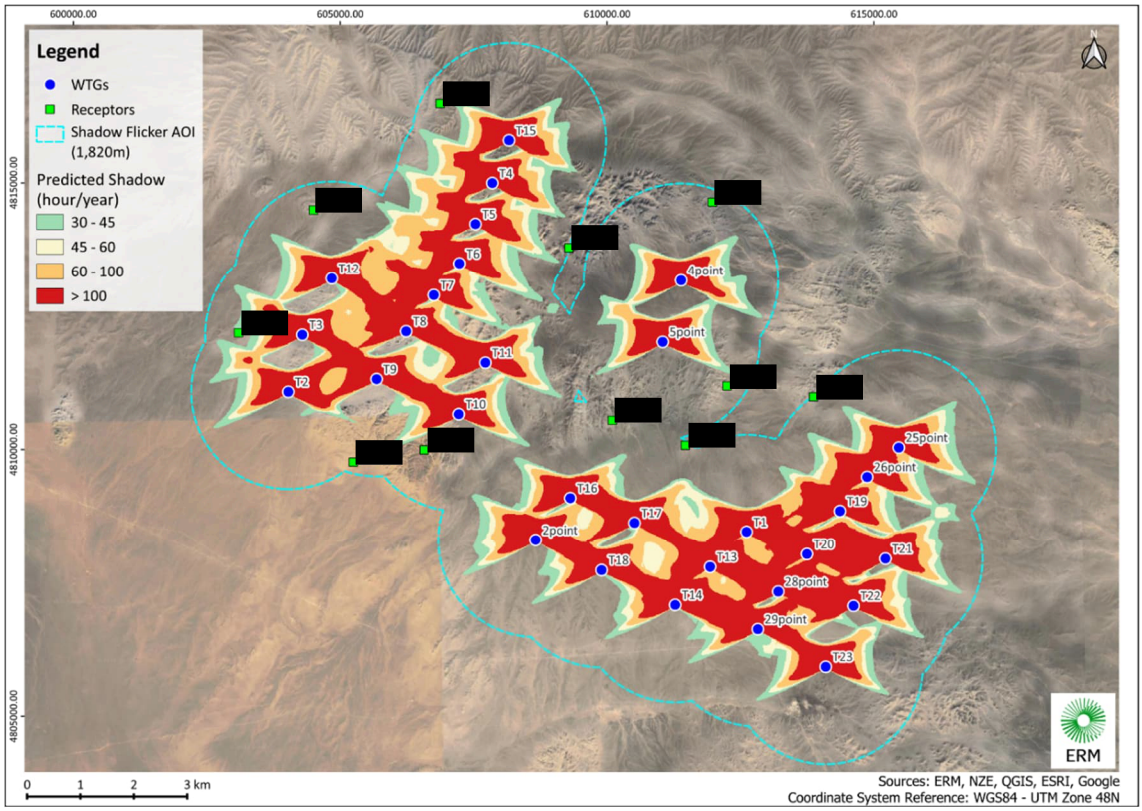


FIGURE 8-8: WCS PREDICTED SHADOW FLICKER (HOUR/YEAR)

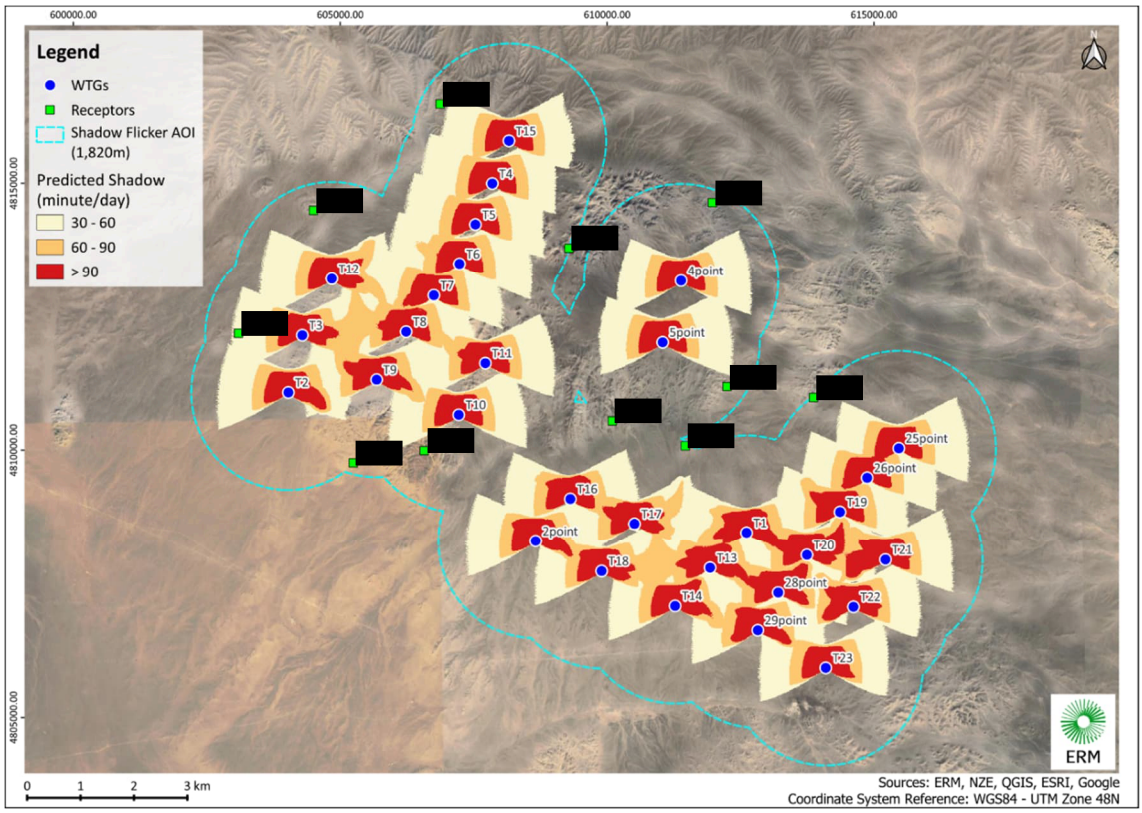


FIGURE 8-9: WCS PREDICTED SHADOW FLICKER (MINUTES/DAY)

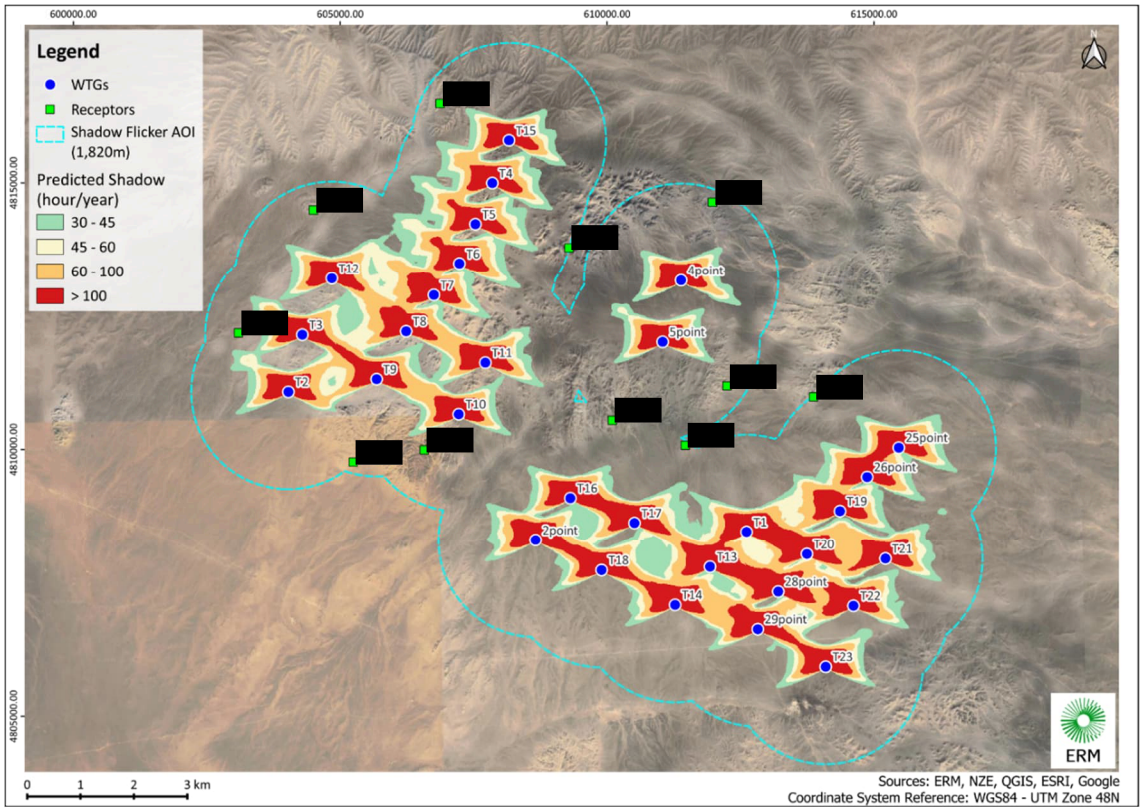


FIGURE 8-10: RCS PREDICTED SHADOW FLICKER (HOUR/YEAR)

8.10.5 IMPACT ASSESSMENT

8.10.5.1 EXISTING/EMBEDDED MEASURES

Based on a review of information received from the Project Proponent, no embedded controls were identified.

8.10.5.2 SIGNIFICANCE OF IMPACTS

Shadow flicker occurs when the rotating blades of a wind turbine cause a flicker effect at times when the sun is low in the sky, typically around sunrise and sunset. This phenomenon most affects sensitive receptors indoors, such as in residential dwellings, where flicker can distract occupants engaged in visually focused activities such as studying or watching television.

Most identified receptors are temporary herder camps, and those observed comprise traditional windowless Gers with a single door opening and a small roof flap. As these structures do not have windows that allow flickers to enter the interior living space, the sensitivity of receptor is considered low for indoor activities.

Under both WCS and RCS, only four (4) out of 11 receptors within the 1,820 m AOI show measurable shadow flicker, namely [redacted]summer camp), [redacted]ummer camp), [redacted]ter camp) and [redacted]winter camp). Of these, only [redacted]xceeds IFC thresholds, and this occurs only under the WCS, with a predicted 35 minutes per day, while the annual duration remains 27.3 hours per year, below the IFC annual threshold. Under the RCS, exposure at [redacted]educes to 15.5 hours per year, which is below the IFC annual threshold, while all other receptors remain below both IFC thresholds under both scenarios. As measurable shadow flicker is

limited to a small number of receptors and only one receptor shows an exceedance under the conservative WCS only, the impact magnitude is therefore considered negligible.

Given the considered impact magnitude and sensitivity of receptor, overall significance of shadow flicker impact is assessed as negligible.

TABLE 8-30: IMPACT ON PUBLIC HEALTH FROM SHADOW FLICKER DURING OPERATION PHASE

Impact	Impact on public health from shadow flicker from WTG Operation				
Nature	Negative	Positive	Neutral		
	Disturbance of shadow flickers is considered negative				
Type	Direct	Indirect	Induced		
	Shadow flickers occur when the rotating blades of a wind turbine directly cause a flicker effect when the sun is low in the sky				
Duration	Temporary	Short-term	Long-term	Permanent	
	The impact duration is long-term during the operation phase				
Extent	Local	Regional	International		
	The impact is localized in surrounding area.				
Scale	Impacts are within the Project Site				
Frequency	Intermittent over the operation period (~20 years)				
Magnitude	Positive	Negligible	Small	Medium	Large
	The impact magnitude is negligible as there is no exceedance compared to IFC thresholds identified across modelling receptors according to the WCS				
Resource/Receptor Sensitivity	Low	Medium	High		
	Most identified receptors are temporary herder camps, and those are windowless Gers with a single door opening and a small roof flap				
Significance	Negligible	Minor	Moderate	Major	
	Impact significance is negligible during operation phase				

8.10.5.3 PROPOSED MITIGATION MEASURES

Of note is that shadow flicker is considered an environmental “nuisance”, rather than medical risk, as there is insufficient evidence to indicate that shadow flicker causes health problem. Thus, Grievance Monitoring and Reporting are proposed to implement a process to assess the real occurrence of the shadow flickering at identified receptors to reduce the phenomena. In case of dwellings experienced shadow flickers, a detailed grievance mechanism should be available, and the local community must be aware of the availability of grievance mechanism to submit their complaints regarding nuisances related to shadow flickers from WTGs. All complaints, investigations, and mitigation actions will be documented as part of the Project’s environmental management system.

8.10.5.4 MONITORING AND AUDITING

Periodically monitoring based on the grievance mechanism and reporting needs to be performed. In case dwellings experience flickering shadow issues, a detailed grievance mechanism shall be communicated to the local community who must be aware of how to use it to submit their complaints regarding nuisances related to shadow flickers from turbines. The Project Owner can perform close monitoring through engagements with local stakeholders that could be affected throughout the operational phase where there are possibilities to face the flickering shadow issues.

8.10.5.5 RESIDUAL IMPACTS

Residual impact following proposed mitigation measures in *Section 8.10.5.3* is still considered negligible.

8.11 SUMMARY OF SOCIAL IMPACTS

Following a scoping exercise, this Chapter was focused on the interaction between Project activities and various resources/receptors that could result in significant impacts. *Table 8-31* below presents the outcomes of the comprehensive assessment of identified impacts as a result of the various phases of the proposed Project and summarize the social impacts.

TABLE 8-31: SUMMARY OF SOCIAL IMPACTS

Aspect	Significance of Impact	Significance of Residual Impact
Impacts on local economy and livelihood		
Construction Phase • Workforce mobilisation and presence. • Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL.	Positive	Positive
	Moderate	Minor
Operation Phase • Operation of WTGs and OHL.	Positive	Positive
Impact on traffic and transportation		
Construction Phase: • Land preparation (site clearance, excavation and levelling), fencing, and civil works • Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL • Equipment and material transportation and supply	Moderate	Minor
Impact on land use		
Construction Phase • Land preparation (site clearance, excavation and levelling), fencing, and civil works • Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL.	Negligible	Negligible
Impacts on infrastructure/public services		
Construction Phase • Workforce mobilisation and presence.	Moderate	Minor

Aspect	Significance of Impact	Significance of Residual Impact
• Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL.	Moderate	Minor
• Water resource use	Negligible	Negligible
Impacts on occupational health and safety		
Construction Phase • Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL. • Wastes generation, discharge, handling and disposal during construction. • Equipment and material transportation and supply • Operation of associated facilities such as the concrete batching plant, workers' accommodation facility • Installation of the WTGs, OHL, internal cabling, Substation, BESS and Control Building	Minor	Negligible
Operation Phase • Wastes generation, discharge, handling and disposal during operation	Negligible	Negligible
Impacts on community, health, safety and security		
Construction Phase • Workforce mobilization and presence	Minor	Negligible
• Equipment and material transportation and supply	Moderate	Negligible
• Health Impacts from Project Construction Activities	Minor	Negligible
• Wastes generation, discharge, handling and disposal during construction.	Minor	Negligible
Operation Phase	Minor	Negligible

Aspect	Significance of Impact	Significance of Residual Impact
• Wastes generation, discharge, handling and disposal during operation		
Impacts on cultural heritage		
Construction Phase: • Land preparation (site clearance, excavation and levelling), fencing, and civil works • Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL	Minor	Negligible
Impacts on shadow flicker		
Operation of wind turbines during operation phase	Minor	Minor

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