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Mongolia: Choir-Sainshand Transmission Line

Environmental and Social Impact Assessment (ESIA) Report

June 2021

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Client signoff

Client	EBRD
Project	Mongolia: Choir-Sainshand Transmission Line
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Abbreviations

Abbreviation	Description
ADB	Asian Development Bank
AoI	Area of Influence
BSRDG	Baganuur and South-Eastern Region Power Distribution Grid
CDEP	Countercyclical Development Expenditure Program
CES	Central Energy System
CHP	Combined Heat and Power
CR	Critically Endangered
CRETG	Central Regional Transmission Grid
CRKhs	Citizens Representative Khurals
DEIA	Detailed EIA
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EMF	Electromagnetic field
EN	Endangered
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESIA	Environmental Social Impact Assessment
ESMMP	Environmental and Social Mitigation and Management Plan
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy
EU	European Union
FHC	Family Health Centres
FS	Feasibility Study
GDP	Gross Domestic Product
GEIA	General Environmental Impact Assessment
GHG	Greenhouse Gas
GIP	Good International Practice
GMO	Genetically Modified Organisms
GPS	Global Positioning System
H&S	Health and Safety
HGV	Heavy Goods Vehicle
HHS	Household Survey
IBA	Important Bird Area
ICNIRP	International Commission on Non-Ionising Radiation Protection
IFC	International Finance Corporation
ILO	International Labour Organization
IOM	International Organization for Migration
IRIM	Independent Research Institute of Mongolia
ISO	International Organization for Standardization
IUCN	International Union of Conservation of Nature
JSC	Joint Stock Company
KIIs	Key Informant Interviews
LARF	Land Acquisition and Resettlement Framework
LDP	Land Disturbance Permit
LRF	Livelihoods Restoration Framework

Abbreviation	Description
MET	Ministry of Environment and Tourism
MNS	Mongolian National Standard
MNT	Mongolian Tughrik
MNUMS	Mongolian National University of Medical Science
MoU	Memorandum of Understanding
MRAM	Mineral Resources Authority of Mongolia
NBFI	Non-Bank Financial Institutions
NDC	National Dispatching Centre
NGO	Non-Governmental Organization
NIR	Non-Ionizing Radiation
NPTG	National Power Transmission Grid
NSO	National Statistics Office
NT	Near Threatened
NTS	Non-Technical Summary
O&M	Operation and Maintenance
OECD	Organisation for Economic Co-operation and Development
OHS	Occupational Health and Safety
OHTL	Overhead transmission line
PHC	Public Health Centres
PIU	Project Implementation Unit
PRs	Performance Requirements
PV	Photovoltaic
PWD	People with Disabilities
RAP	Resettlement Action Plan
RCP	Representative Concentration Pathway
RDTC	Regional Diagnostic and Treatment Centres
RoW	Right of Way
SDC	Swiss Agency for Development and Cooperation
SEA	Sustainability East Asia LLC
SEP	Stakeholder Engagement Plan
SIGI	Social Institutions and Gender Index
SNH	Scottish Natural Heritage
SHC	Soum Health Centres
SMEs	Small and Medium Enterprises
TDS	Total Dissolved Solids
TVET	Technical-Vocational Educational Institutions
UN	United Nations
UNESCO	United Nations Education, Scientific and Cultural Organisation
UNFCC	United Nations Framework on Climate Change
VHC	Village Health Centre
VP	Vantage Point
VRE	Variable Renewable Energy
VU	Vulnerable
WHO	World Health Organisation
WWF	Worldwide Fund for Nature
Measurements and chemical symbols	
AC	Alternating Current
A/m	Amperes per metre

Abbreviation	Description
Al	Aluminium
Ag	Silver
As	Arsenic
Ba	Barium
Be	Berryllium
Bi	Bismoth
$C_{20}H_{12}$	Benzo-a-pyrene
Ca	Calcium
Cd	Cadmium
Ce	Cerium
Cl	Chloride
cm	Centimetre
Cr	Chormium
Co	Carbon
CO	Carbon Monoxide
Cs	Caesium
Cu	Copper
dB(A)	A-weighted Decibel
DC	Direct Current
Dy	Dysprosium
ELV	Exposure limit value
Er	Erbium
Eu	Europium
Fe	Iron
g	grams
Gd	Gadolinium
Ga	Gallium
GHz	Gigahertz
Ha	Hectares
Hf	Hafnium
Hg	Mercury
Ho	Holmium
Hz	Hertz
In	Indium
K	Potassium
km	Kilometre
kV	Kilovolt
kW	Kilowatt
La	Lanthanum
Ly	Lutetium
Mn	Manganese
Mg	Magnesium
masl	Metres above sea level
Mg	Milligrams
mm	Millimetre
Mo	Molybdenum
m/s	Metre per second
mT	millitesla

Abbreviation	Description
MV	Megavolt
MVA	Mega volt ampere
MW	Megawatts
Na	Sodium
Nb	Columbium
Nd	Neodymium
NH4	Ammonium
Ni	Nickel
NO2	Nitrogen dioxide
NO3	Nitrate
O_3	Ozone
P	Phosphate
Pb	Lead
PM	Particulate Matter
Pr	Praseodymium
Rb	Rubidium
Sb	Antomony
Sc	Candium
Se	Selenium
Sm	Samarium
Sn	Tin (Stannum)
SO2	Sulphur dioxide
SO42-	Sulphate
Sr	Strontium
Ta	Tantalum
Tb	Terbium
Te	Tellurium
Ti	Titanium
Tm	Thulium
Th	Thorium
U	Uranium
V	Vanadium
V/m	Volts per metre
W	Tungsten
Y	Yttrium
Yb	Ytterbium
Zn	Zinc
Zr	Zirconium

1. Introduction

1.1. Background

The European Bank for Reconstruction and Development (EBRD) is considering providing a sovereign loan to the Government of Mongolia to finance the construction of a 220.2 kilometre (km) double circuit 220 kilovolt (kV) overhead transmission line (OHTL) between Choir and Sainshand, construction of a new 220/110/35 kV substation in Sainshand and the extension of 220 kV Choir substation (hereafter referred to as the Project). The Ministry of Energy (MoE) will be the Client. The National Power Transmission Grid State Owned Joint Stock Company (the Company or NPTG), a state-owned power transmission utility, may act as the implementing entity and will operate the Project. A Project Implementation Unit (PIU) will likely be established either within the NPTG or the MoE to implement the Project.

The EBRD has categorised the Project as "A" in relation to its 2014 Environmental and Social Policy (ESP), which means that a comprehensive Environmental and Social Impact Assessment (ESIA) is required to determine the bankability of the Project. The EBRD has commissioned WS Atkins International (Atkins), with their sub-consultants, Sustainability East Asia LLC (SEA) to undertake the ESIA and prepare the ESIA Disclosure Package to EBRD requirements.

This document presents the ESIA Report for the Project. It forms one of several documents prepared to meet EBRD disclosure requirements as follows:

- Non-Technical Summary (NTS);
- Stakeholder Engagement Plan (SEP);
- Environmental and Social Mitigation and Management Plan (ESMMP);
- Land Acquisition and Resettlement Framework (LARF); and
- Environmental and Social Action Plan (ESAP).

1.2. Project Location and Overview

The location of the Project is shown in Figure 1-1. The Project starts at an existing substation in Choir, the main city of Govi-Sumber *aimag* (province). The OHTL will run from this substation in a south-east direction to finish at a new substation in the city of Sainshand, the capital of Dornogovi *aimag*. The new 220/110/35 kV substation will be constructed approximately 2.5 km north of the existing substation in Sainshand.

Figure 1-1. Project location

1.3. Purpose and Scope of this ESIA

In accordance with its ESP 2014, the EBRD has categorised the Project as "A", as it falls under the following criteria in Appendix 2 of the ESP: '*construction of high voltage overhead electrical power lines'*.[1] This means that a comprehensive ESIA must be carried out, followed by public disclosure of ESIA documents for a minimum period of 120 days. The objectives of the Assignment were therefore to undertake an ESIA and prepare a full package of disclosure to cover all ESIA requirements required by the EBRD ESP 2014.

ESIA is a systematic process that predicts and evaluates the impacts a project is likely to have on key aspects of the physical, biological and socioeconomic environment. The ESIA process has addressed the following:

- Scoping phase – Identification of available data, data gaps, and how data gaps will be addressed during the ESIA (see Scoping Report;
- Identify applicable national legislation and international standards (Chapter 4);
- Alternatives for the Project (Chapter 3);
- Information disclosure and engagement (see Chapter 8 and SEP);
- Environmental and Social Management (Chapters 10 and 11 and ESMMP);
- Biodiversity and Living natural resources (Section 10.2 and 11.2);
- Air quality (Section 10.5);
- Noise and vibration (Section 10.6 and 11.3);
- Soils (Section 10.3);
- Water resources (Section 10.4);
- Material use and waste management (Section 10.8 and 11.4);
- Cultural heritage (Section 10.13);
- Community health, safety and security including road safety (Section 10.11 and 11.6);
- Labour and working conditions including occupational health and safety (OHS) (Section 10.12 and 11.7); and
- Cumulative impacts (Chapter 12).

1.4. ESIA Team

The ESIA team comprises environmental and social specialists from Atkins and SEA, as well as local support from Independent Research Institute of Mongolia (IRIM LLC) as indicated in Table 1-1.

EcoTrade has also been commissioned to undertake the national Detailed Environmental Impact Assessment (DEIA) for the Project and assist SEA in field surveys, and therefore the ESIA team is working in conjunction with EcoTrade.

Table 1-1. ESIA scoping team

Name	Role	Firm
Katie Prebble	ESIA Lead	Atkins
Vera Skripkina	ESIA Coordinator	Atkins
Candice Koblun	Local Team Lead	SEA
Rachel Wildblood	Environmental Specialist	SEA
Heath Thorpe	Health and Safety Expert	SEA
Kim Cartwright	Social Specialist	SEA
Nyamdorj Namjildorj	Biodiversity Expert	SEA

[1] Environmental and Social Policy, Document of the European Bank for Reconstruction and Development, as approved by the Board of Directors at its Meeting on 7 May 2014, Annex 2: Category A Projects.

Name	Role	Firm
Tserenkhand Gurbadam	Mongolian Social Specialist	SEA
Tselmegsaikhan Lkhagva	Mongolian Social Specialist	IRIM
Yanjinpagma Nyamsuren	Mongolian Social Specialist	IRIM
Oyunchimeg Namsrai	Mongolian Land specialist	SEA
Nyamgaram G.	Social survey assistant	IRIM
Tserendorj E.	Social survey assistant	IRIM
Enhtulga.T	Mongolian Environmental Survey Lead	EcoTrade
Nandin-Erdene.B	Mongolian Biologist	EcoTrade
Bayarsaikhan.P	Mongolian Biologist	EcoTrade
Ankhbayar Ochirbat	Mongolian Environment Specialist	SEA
Purevsuren Tsolmonjav	Mongolian Ornithologist and Mammal Specialist	SEA
Chuluunbat B	Ornithologist survey assistant	SEA
Dr Robert Whitcombe	International Biodiversity specialist	Atkins
Rob Dray	International Ornithologist	Atkins
VK Venkatakrishnan	International Power and Transmission Line specialist	Atkins
Pietro Rescia	International Environment specialist	Atkins
Dr Magnus Macfarlane	International Social specialist	Atkins

1.5. Content of this ESIA

The Supplementary ESIA Report is set out as follows:

- Chapter 1: Introduction
- Chapter 2: Project Description
- Chapter 3: Analysis of Alternatives
- Chapter 4: EBRD Requirements and Mongolia Legislative Framework
- Chapter 5: Approach to the ESIA
- Chapter 6: Environmental Baseline
- Chapter 7: Social Baseline
- Chapter 8: Stakeholder Engagement
- Chapter 9: Detailed Design and Delivery Measures
- Chapter 10: Construction Impacts and Mitigation Measures
- Chapter 11: Operation Impacts and Mitigation Measures
- Chapter 12: Cumulative Impact Assessment
- Chapter 13: Conclusions

2. Project Description

2.1. Introduction

This Chapter provides a description of the Project and its context in the wider Energy Strategy of Mongolia. It is primarily based on a Feasibility Study (FS) prepared by the Ministry of Energy in 2013[2] which looked at a wider transmission project, the Choir-Sainshand-Zamyn Uud transmission line and necessary substations, of which the proposed Project is a significant part; and updates from the technical review of the FS by the EBRD Technical Consultants, Mercados Aries International.[3]

2.2. Background

The Choir-Sainshand OHTL has been identified as the top priority project by the Ministry of Energy. The Project has been on the Government's Action Plan since 2008 and the approved State Policy on Energy for 2015-2030 has outlined the priority areas and strategic goals for Mongolian power sector that can be divided into three main groups aimed at improvement of efficiency, safety, and environment protection. Among the goals to be achieved are the following:

- Support innovation and advanced technology in energy sector, and implement conservation policy;
- Ensure energy safety and reliable supply;
- Develop mutually beneficial cooperation with regional countries; and
- Increase the production share of renewables and reduce negative environmental impact from traditional power generation and greenhouse gases.

The Policy envisages an increase of renewable energies share in generation up to 30% during 2024-2030. Rich in renewable energy resources, Mongolia has a viable alternative to coal-based power plants, which currently represent around 96% of the country´s power generation pool. The role of a developed, stable and safe Transmission Grid in the achievement of these goals is crucial and the existing transmission network has to be updated in order to meet the challenges of the power sector modernization, as the Mongolian transmission network currently suffers from underinvestment with old and inefficient infrastructure and limited capacity to absorb additional power from new sources, especially Variable Renewable Energy (VRE) sources like Photovoltaic (PV) and Wind power plants.

2.3. Project Location

The location of the Project is shown in Figures 2-1 and 2-2. The Project starts at an existing substation in Choir (297069 E; 5134973 N), in the main city of Govi-Sumber *aimag* (province). The OHTL will run from this substation in a south-east direction to finish at a new 220/110/35 kV substation approximately 2.5 km north of the existing substation in the city of Sainshand (436771 E; 4975142 N), the capital of Dornogovi *aimag*.

In general, the OHTL route is sparsely populated and has vegetation characteristics of the Gobi Desert. The OHTL will run in the vicinity of the settlements of Sumber and Shiveegovi *soums* (districts) in Govi-Sumber *aimag* and Dalanjargalan, Airag, Saikhandulaan, Altanshiree and Sainshand *soum*s in Dornogovi *aimag.*

The Trans-Mongolia railway runs between the cities of Choir and Sainshand to the east of the OHTL. There is an existing 110 kV OHTL which follows the road between Choir and Sainshand. There are also 35 kV distribution lines within the settlements along the road between Choir and Sainshand, and in Choir and Sainshand cities. Shivee-Ovoo coal mine, approximately 11 km to the east of the OHTL in Shivee-Govi *soum* in Govi-Sumber *aimag*, is one of the key coal suppliers to the central economic zone of Mongolia. The nearest national park is Choiriin Bogd Mountain, approximately 27 km to the north-east. Ikh Nart, also a national park and an Important Bird Area (IBA), is approximately 10 km southwest of the OHTL route, in Dalanjargalan *soum* of Dornogovi *aimag*.

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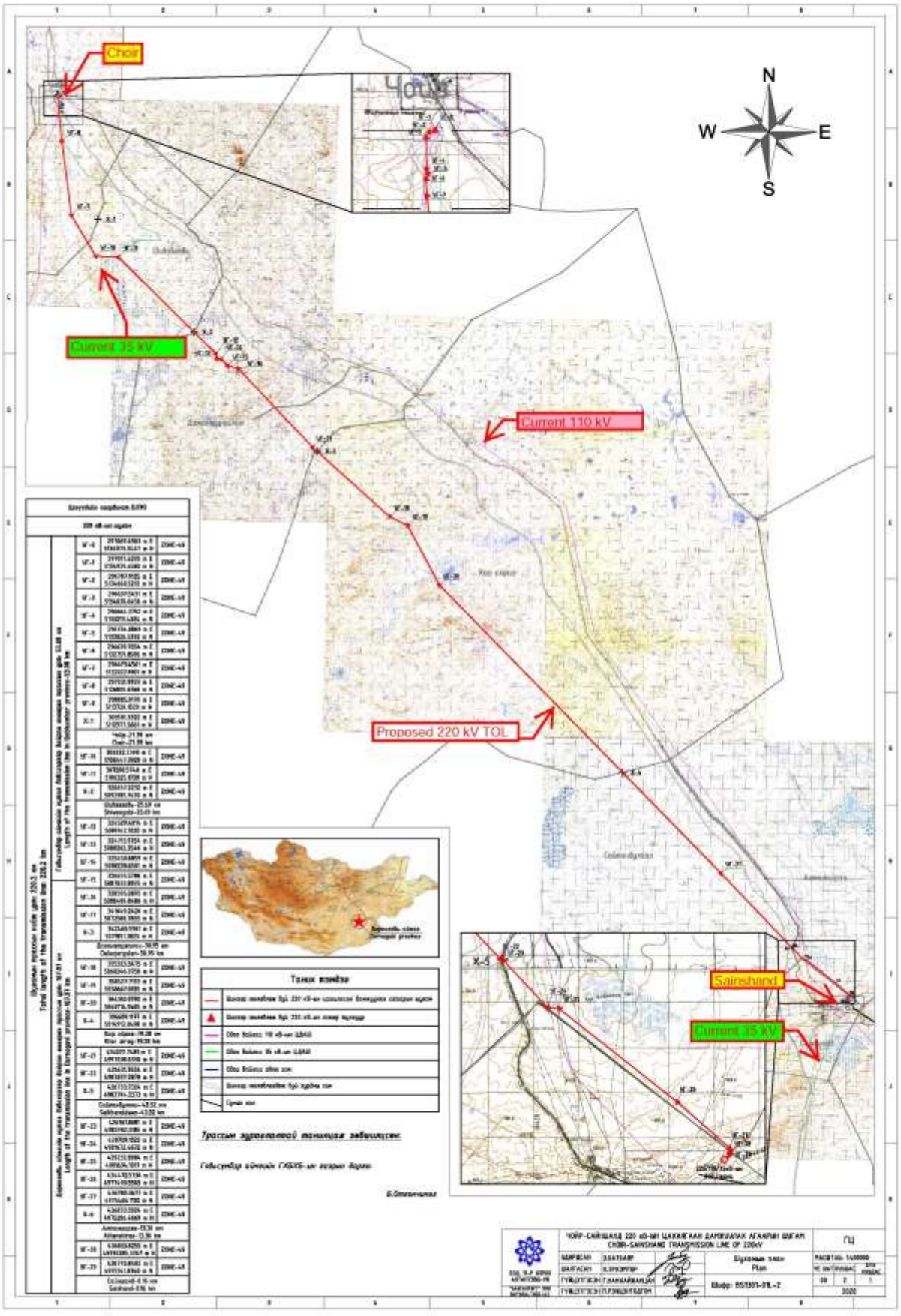
[2] Ministry of Energy 2013. *Choir-Sainshand-Zamyn-Uud 220 kV Overhead Transmission Line Feasibility Study.*
[3] Mercados Aries International (22 May 2020), *Project Preparation Study for the Construction of the CHOIR-SAINSHAND Transmission Line, Mongolia – Inception Report*; and Mercados Aries International (30 September 2020), *Project Preparation Study for the Construction of the CHOIR-SAINSHAND Transmission Line, Mongolia – 2nd Interim Progress Report*



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2-1. Transmission line

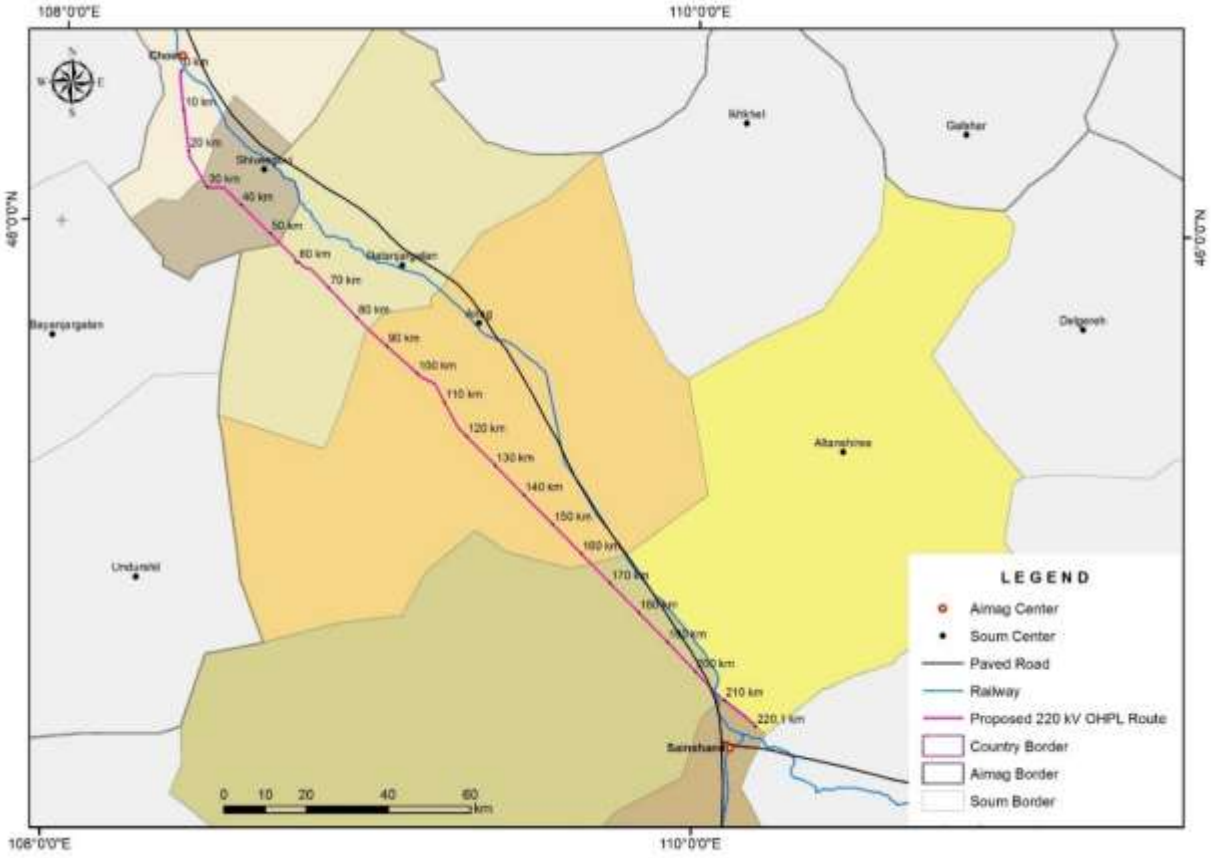

Figure 2-2. Project aimags and soums

2.4. Implementing Entities

The MoE will be the Client for this project. The project operator, the NPTG, was established in 1967 under the former Energy Authority. In 2001, the Government of Mongolia officially established the Central Regional Transmission Grid (CRETG) State Owned Joint Stock Company (JSC), which in 2012 was renamed as NPTG. NPTG's shareholders are the Ministry of Energy (70%) and Government Agency for Policy Coordination on State Property (30%).

NPTG operates within the Central Energy System (CES), which covers electricity supply to 80% of the total territory of the country and 72% of the total population. The Company's main business activity is to provide operational, maintenance, installation, performance testing and regime adjusting services for substations and electricity transmission lines with a voltage level of 220 kV, 110 kV and small length of 35 kV line.

The Project lies within the Baganuur and South-Eastern Region Power Distribution Grid (BSRDG). Once constructed the Project will supply electricity to the BSRDG within the broader CES.

2.5. Energy Context

In 2018 Mongolia's total installed capacity of electricity power generation was 1,122 megawatts (MW) with the majority (90%) of the electricity being generated from coal fired thermal plants, followed by renewables (mainly wind) (6%). The remainder is supplied by diesel and hydropower stations, which each account 2% of the total electricity generation in Mongolia. Renewable energy sources, including hydroelectric dams, wind and solar, share in the total electricity generation has increased over the last few years, from just 1% in 2013 to about 4% in 2016 and almost 7% by 2018.[4]

Mongolia is a net exporter of energy mostly through coal export, but it is a net importer of electricity. There has been an increase in the electricity demand in the country following economic development over the last decade.

[4] OECD 2019, *Sustainable Infrastructure Development for a Low-Carbon Transition in Central Asia and the Caucasus: Mapping of Potentially High-impact Infrastructure Projects and Needs Assessment*.

To satisfy periods of heightened demand, Mongolia relies on electricity imports from neighbouring countries, i.e. the Russian Federation and China. In 2018 Mongolia imported about 18.8% of its electricity.[5]

The compounded annual electricity demand rate has been forecasted at 4.4% and at that rate there will be an electricity generation shortage by 2023 in Mongolia, as shown in Figure 2-3.[6]

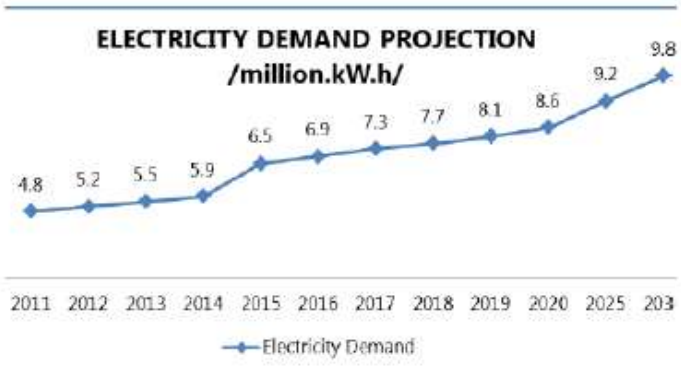

Figure 2-3. Electricity Demand Projection in Mongolia[7]

2.5.1. Electricity Generation and Transmission and Distribution Network

The Unified Power System of Mongolia consists of four independent systems, shown in Figure 2-4:

- Western Energy System covering Bayan Ulgii, Uvs and Khovd *aimags*;
- Altai-Uliastai Energy System for Zavkhan and Govi Altai *aimags*;
- Eastern Energy System Dornod and Sukhbaatar *aimags*; and
- CES covering all other *aimags* – where the Project is located.

The CES, where the Project is located, is the largest systemin the country covering key population and industrial areas, covering electricity supply to 80% of the total territory of the country and 72% of the total population. Around 20% of its demand is supplied from imports from neighbouring countries (15% from China and 5% from Russia). It is run by NPTG.

[5] Ibid.
[6] ADB 2018, *Ulaanbaatar Air Quality Improvement Program (PRP MON 51199), Sector Assessment: Energy.*
[7] Janarbaatar.J 2018. *Energy Sector of Mongolia, Country Report*. Available at: https://eneken.ieej.or.jp/data/8016.pdf. Accessed 05 May 2020).

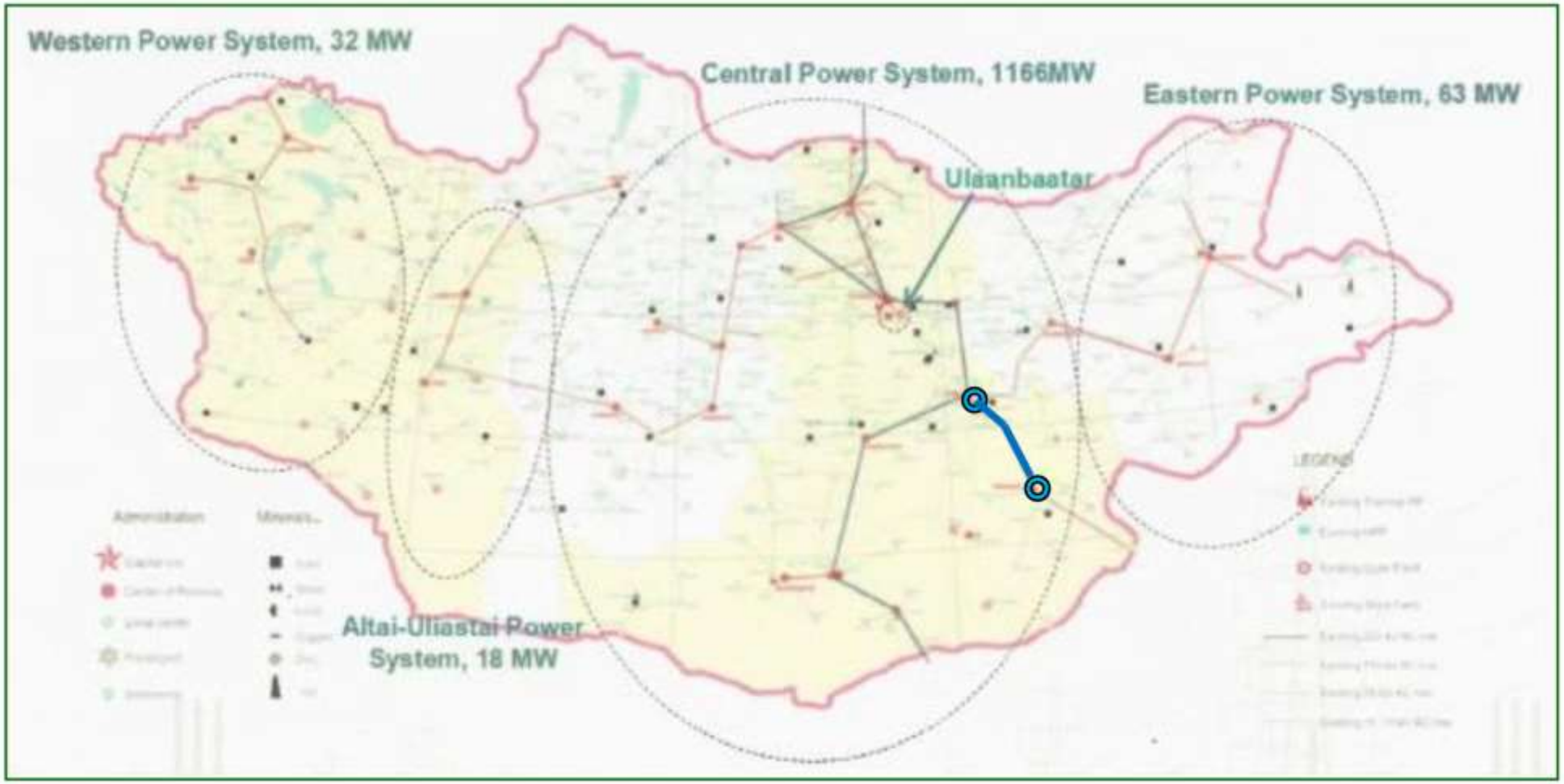

Figure 2-4. Electricity Generation and Transmission Systems in Mongolia

Source: Mercados Inception Report

2.5.1.1. Electricity Generation

In 2013, the CES consisted of five thermal power plants, one wind power plant, one transmission grid and 11 distribution networks. The total installed capacity for power generation in the CES area was 826 MW, with a gross electricity demand of around 729 MW (which accounted for approximately 95% of the total load in the country).[8] CES energy demand has increased over the years, by 42% during 2006 to 2016. This demand is expected to increase further by 78% by 2030 compared to the 2016 baseline, to meet the growing demand in the CES region.[9] This demand increase has arisen due to the major economic development and urban population increase in the region.

The major power plants within the CES include the Combined Heat and Power (CHPs) 2, 3, 4 in Ulaanbaatar, and CHP in Darkhan and Erdenet. CHP 2 and CHP 3 have been operating for more than 45 years, and the largest plant, CHP 4, has been operating for more than 25 years.[10]

At the time of the preparation of the 2013 FS, the 50 MW Salkhit Wind Farm located 75 km from Ulaanbaatar and commissioned in July 2013 was the only windfarm and private power generator in Mongolia. Since then several renewable energy generation projects have been executed in the CES. The private 50 MW Tsetsii Wind Farm was the second wind energy project developed in Mongolia, which commenced commercial operation in October 2017. A 50 MW wind power plant is located 542 km south from Mongolia's capital Ulaanbaatar in the Gobi Desert (Sogttsetsii *soum*, Umnugobi *aimag*, bordering Dornogobi *aimag* from the east).

The first 10 MW solar power plant in Mongolia was launched on January 19, 2017 in Darkhan-Uul *aimag* (230 km north of the capital city Ulaanbaatar). Thai solar power producer Sermsang Power Corporation PCL promoted construction of the Sermsang Khushig Khundii PV power plant with a capacity of 16.4 MW, which commenced commercial operations in July 2019. The solar park is located in the south of Ulaanbaatar city, near the new international airport.

In the Project Area, the following VRE projects were developed in recent years:

- Sainshand wind farm, with a power generating capacity of 55 MW, has been operational since February 2019 in Sainshand *soum* of Dornogovi *aimag*. The wind farm has a capacity of generating approximately 200 GWh of electricity per year, enough to power around 100,000 households.
- PV power plant with a capacity of 15 MW commissioned in the Sainshand soum of Dornogovi *aimag* in June 2018.
- A 10 MW solar power plant was put into operation in Sumber *soum* of Govi-Sumber *aimag* in January 2019; the project was founded by Khas Bank in collaboration with Green Climate Fund. It is estimated that the solar power plant supply 15.395 MWh of electricity into integrated power network.
- A 15 MW solar power plant Gegeen was commissioned Zamyn-Uud *soum* of Dornogobi *aimag* in June 2019.

The EBRD have also financed a 30 MW Desert Solar which will be commissioned shortly; and are currently looking at a 50 MW solar PV in Choir.

The generation for this power plant, though initial will come from traditional sources (i.e. coal), is intended to provide the stimulus for the development of further VRE.

2.5.1.2. Transmission

The Mongolian power transmission network has two transmission voltages: 220 and 110 kV. The CES is the largest system in the country, covering electricity supply to 80% of the total territory of the country and 72% of the total population. It is run by NPTG.

The existing and planned 220 kV grid in the CES is shown in Figure 2-5 overleaf. NPTG operates the substations and 220 kV and 110 KV power transmission lines within CES and will operate the Project. As of today, NPTG owns, maintains and services 59 transmission 220/110 kV substations, 1,044 km of 220 kV, 2,982 km of 110 kV and 13 km of 35 kV power transmission lines across Ulaanbaatar city, 16 *aimags* and 300 *soums*[11]. The Company has five branches in the *aimags* and employs 1,176 people in total.

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[8] Energy Charter Secretariat, 2013. *In-depth review of the investment climate and market structure in the energy sector of Mongolia.*
[9] Ibid.
[10] ADB, 2018. *Ulaanbaatar Air Quality Improvement Program* (*PRP MON 51199), Sector Assessment: Energy.*
[11] Available at: https://www.developmentaid.org/#!/organizations/view/78488/national-power-transmission-grid. Accessed July 2020.

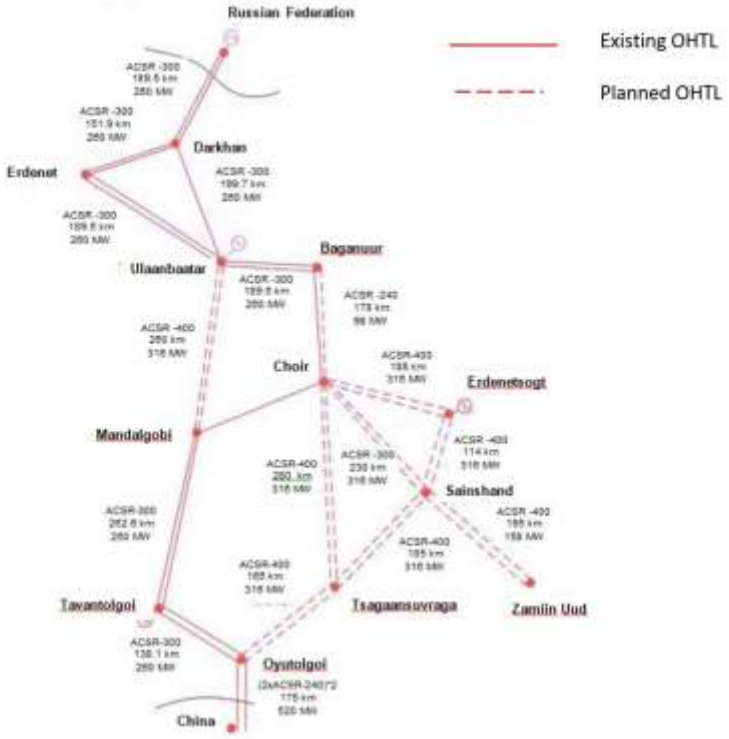


Figure 2-5. 220 kV transmission lines of CES

The following 220 kV transmission lines are in operation in the CES:

- Selenge-Darkhan OHTL, double-circuit, 189 km, connecting the CES with Russia;
- Darkhan-Erdenet OHTL, double-circuit, 151.1 km;
- Ulaanbaatar-Erdenet OHTL, double-circuit, 259.7 km, connecting CHP4 to Erdenet substation;
- Ulaanbaatar-Darkhan OHTL, single-circuit, 199.7 km, connecting CHP4 to Darkhan substation
- Ulaanbaatar-Baganuur OHTL, double-circuit, 146.8 km, connecting CHP4 to Baganuur substation;
- Baganuur-Choir OHTL, single-circuit, 178 km;
- Choir-Mandalgobi OHTL, single-circuit, 182.6 km, connecting CHP4 to Darkhan substation;
- Mandalgobi-Tavantolgoi OHTL, double-circuit, 262.6 km;
- Tavantolgoi-Oyutolgoi OHTL, double-circuit, 138.1 km;
- Oyutolgoi-China OHTL, double-circuit, 175 km.

Currently under construction are:

- Songino-Mandalgobi 220 KV OHL (designed for 330 KV), 260 km long;
- Choir-Mandalgobi 220 KV OHL, second circuit, 182.6 km long;
- Baganuur-Choir OHL, second circuit, 178 km long; and
- New Ouytolgoi - Ouytolgoi Central Substation 220 KV OHL.

2.5.1.3. Distribution

In terms of electricity distribution, this is provided by State-owned and private companies across Mongolia. The Project lies within the BSRDG. Once constructed the Project will supply electricity to the BSRDG within the broader CES transmission system in Mongolia. BSRDG supplies power distribution to a total of seven aimags in 57 *soums* covering 39,846 customers (see Figure 2-6) and over 520,000 km^2. The vast majority of the customers are residential households with a small portion of small and medium enterprises and mines. The Baganuur district of Ulaanbaatar, aimag centres of Khentii, Govi-Sumber, Dornogovi and Dundgovi *aimags* are

the main population centres connected to the BSRDG. In 2013 total distribution losses reported by BSRDG was 8%.

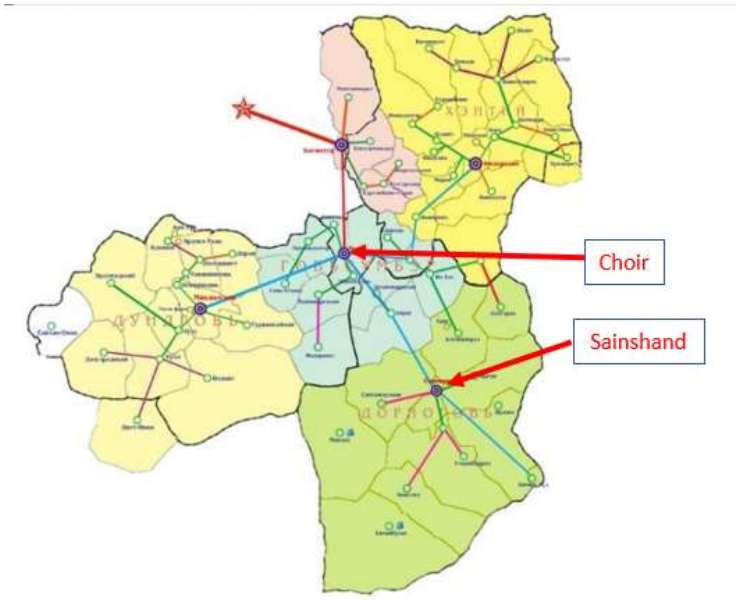


Figure 2-6. Baganuur and Southeast Power Distribution Grid coverage area

2.5.2. Project Need

Overall, the main challenges facing the Mongolian energy sector are:

- Domestic capacity shortage for generating electricity;
- Lack of investment to implement needed power generation and transmission network maintenance and expansion;
- Uncertainty in energy sector investment;
- Lower efficiency of the aging power supply infrastructure; and
- Higher loss of electricity transmission network.[12]

The existing power transmission and distribution infrastructure in Mongolia is characterised by aged infrastructure, is inefficient and unreliable with major losses along transmission lines and is in urgent need of rehabilitation and upgrade.[13] Most of Mongolia's electricity generation and transmission facilities were built between 1960 and 1980 and run on outdated technology. According to data of Ministry of Energy of Mongolia of 2019, Mongolia experiences losses of approximately 13% in transmission and distribution, far from the international best practice of 5%.[14] The long transmission distances at relatively low voltage (220 and 110 kV) also contribute to the high losses in the power system. It is therefore crucial for the Mongolian Government to secure a reliable energy supply and transmission network to ensure the development of other sectors and to support and increased generation capacity from VER.

Reliable and safe energy supply is one of the three main priorities of the Mongolia's State Energy Policy, 2015.The Project is one of the projects identified by the Mongolian Government to extend the power transmission network to meet the growing electricity demand in the south-east region of the country. It has been on the Government's Action Plan since 2008 and is in line with the Energy Sector Strategy (BDS18-237(F); the Green Economy Transition approach (BDS15-196(F) aimed at supporting cleaner production and distribution of energy through greater energy and resource efficiency; and the Country Strategy for Mongolia (BDS/MN/17-01(F). Furthermore, it is identified as one of three power transmission line projects in the

[12] Ministry of Energy 2018. *Energy Sector of Mongolia, Country Report.*
[13] ADB 2018. *Ulaanbaatar Air Quality Improvement Program* (PRP MON 51199, Sector Assessment: Energy.
[14] Herrick, D. 2019. *Sustainable Infrastructure Development for a Low-Carbon Transition in Central Asia and the Caucasus: Mapping of Potentially High-impact Infrastructure Projects and Needs Assessment. Strategic Infrastructure Planning for Sustainable Development in Mongolia*. Discussion Paper presented to the OECD GREEN Action Task Force Annual Meeting 30 September – 1 October 2019, Paris. Available at: https://www.oecd.org/countries/mongolia/sustainable-infrastructure-for-low-carbon-development-in-central-asia-and-the-caucasus-d1aa6ae9-en.htm. Accessed 05 May 2020.

Mongolian Government Action Plan 2016-2020 for the power sector, the others being the transmission network between Baganuur-Choir and a line between Baganuur-Undurkhaan. Other objectives included in the Plan to address generation, transmission and distribution challenges comprise as extending the installed capacity of CHP, constructing new power plants, increasing the share of renewable generation, extending power transmission networks, renewing heat supply systems in province centres and enhancing efficiency and introducing advanced technology.[15]

In the Project Area, the Project is needed as electricity transmission load demand has been increasing over the years for the existing 100 kV transmission line that runs between Choir-Sainshand-Zamyn Uud. For example, the peak load demand increase was about 10% between 2009 and 2012, while this figure was 19% for Zamyn Uud line for the same period.[16] The current network is very modest for the area it serves and, unlike the country as a whole, more than three quarters of electrical energy is consumed by industry in Dornogovi aimag, and there are plans of further industrial development. Dornogovi *aimag* is rich in natural resources and plans for economic development (mining industry, RES generation, recreation, tourism, etc.) are currently hampered by the underdeveloped transmission grid.

It is expected that the planned Zamyn Uud Free Economic Zone and other resource development projects in the Project Area will drastically increase the electricity demand beyond the current capacity of the existing Choir-Sainshand line. For example, the 2014 electricity demand of 11.7 MV for the Choir-Sainshand-Zamyn Uud transmission line is expected to increase to 237 Megavolts (MV) by 2025, and 342 MV by 2030, and 385 MV by 2035.[17] The Tsagaan Suvarga Mining Development, and the Zamyn-Uud Free Economic Zone projects are also expected to drive the electricity demand increases.[18]

The following existing and future users may benefit from the Project (subject to ultimate distribution connections):

- Existing users:
  - Dornogovi *aimag*, Govi-Sumber *aimag* and their *soums*;
- Planned developments:
  - Sainshand Industrial Park 280 MV (though currently on hold);
  - Zamyn Uud Free Economic Zone development 59.4 MV;
  - Tsagaan Suvarga Copper and Gold mine 75 MV;
  - Urgen Cement 16 MV;
  - Senj Sant LLC's cement and limestone mining 16 MV;
  - MIZU Cement factory 20 MV; and
  - Erdentsogt Power Plant construction use 8 MV.

There are at least four other mining and industrial development projects, with a combined electricity demand of 23 MV, which will likely source their electricity from the Project.

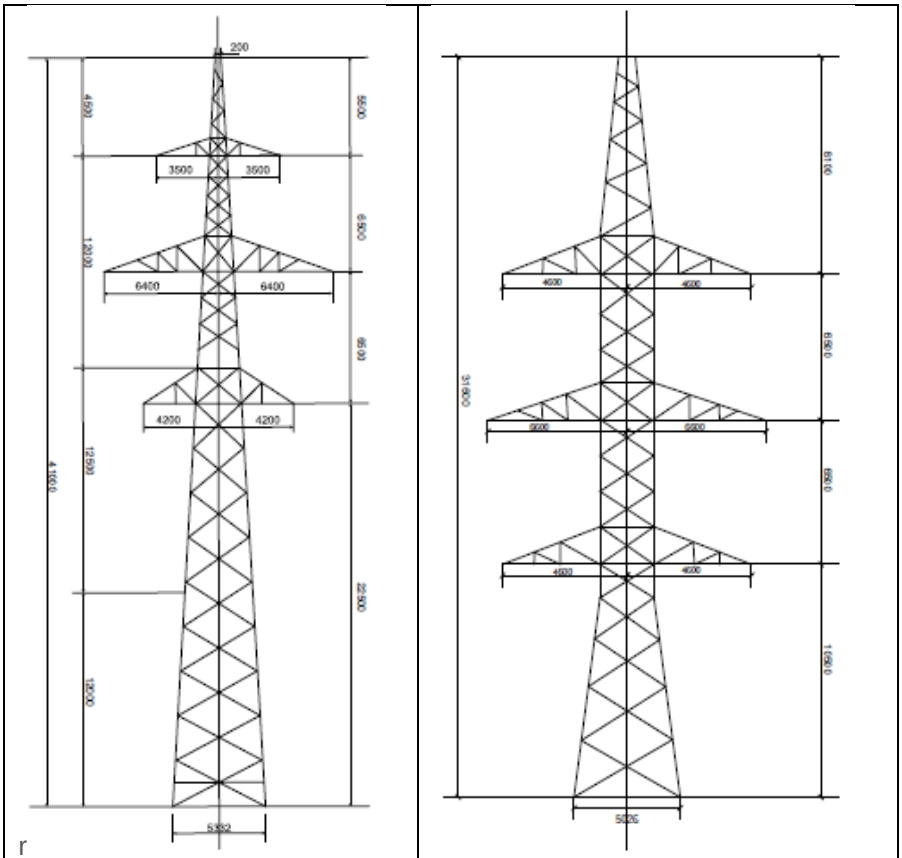
2.6. Project Description

The Project comprises the following main components:

- **Transmission line.** 220.2 km 220 kV double circuit overhead line will be constructed between the planned new substation in Sainshand and the existing substation in Choir. The OHTL will use LGJ-400/50 conductor wires and optical ground wire, OPGW-09A4 for lightning protection and system operation. This circuit will have no tee off connections at any point and will help to improve availability within Choir and Sainshand.
- **Pylons/Towers.** The double circuit OHTL will be supported by a combination of twin steel poles in a portal formation with lattice towers where longer spans are required. It is planned that a total of 663 pylons will be used, using five different types of pylon (P220-2, Y220-2, Y220-2+5, Y220-2+9, Y220-2+14). The P220-2 intermediate poles and Y220-2 anchor poles will be predominantly used (Figure 2-7). Optimisation of the overhead line design, to be undertaken by the Construction Contractor, may identify other areas where lattice towers could be employed. The P220-2 and Y220-2 pylons

[15] Ministry of Energy 2018, *Energy Sector of Mongolia, Country Report.*
[16] Ministry of Energy 2013. *Choir-Sainshand-Zamyn-Uud 220 kV Overhead Transmission Line Feasibility Study.*
[17] Ibid
[18] Ibid

foundations will have depths of 2.2 m and 3.2 m with corresponding widths of 12.2 m and 5.7 m, respectively (Figure 2-8).



P220-2 Intermediate pole	Y220-2 Anchor pole

Figure 2-7. Main types of pylons to be used for the Project

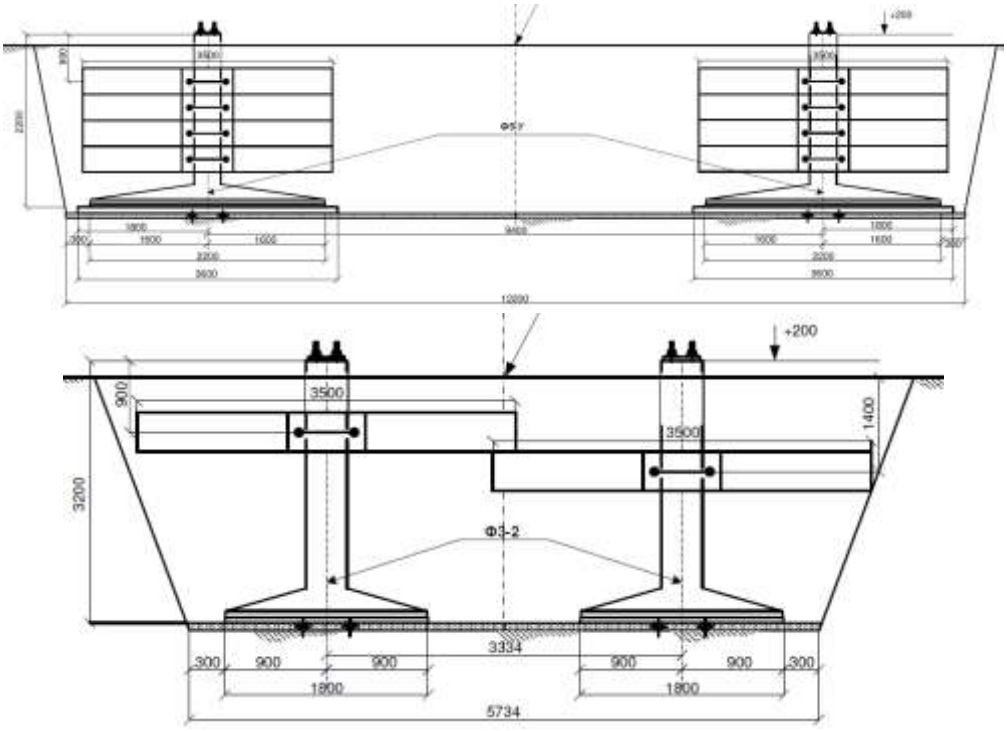


Figure 2-8. Foundations of Y220-2 Anchor pole (top) and P220-2 Intermediate poles (bottom)

- **Substations.** The existing 220 kV substation in Choir will be expanded. A new 220/110/35 kV substation will be built in Sainshand as part of the Project. The Sainshand substation characteristics and facilities are as follows:[19]
  - Two set of 220/110/35 kV autotransformers with 200 mega volt ampere (MVA) capacity;
  - 220 kV distribution equipment;
  - 110 kV distribution equipment;
  - 35 kV distribution equipment;
  - Transformer for internal use;
  - 0.4 kV distribution equipment;
  - Direct Current (DC) system;
  - Cables;
  - Lighting;
  - Lightning rod;
  - Control system;
  - Relay and automation system;
  - Security camera;
  - System for protecting natural disaster; and
  - Communications system.

A geotechnical field investigation performed in November 2013 indicates the existence of four different types of soil along the line route, which will define the types of foundations to be used in the Project. Conventional foundations are expected, however after the structure spotting is completed other types of foundations, such as piles foundations, could be considered necessary at some locations; this will be determined during the detailed design phase of the Project. Each tower will require four separate foundations for each "leg".

The location of the planned substation in Sainshand is shown in Figure 2-9. The land for this substation has already been agreed with the Sainshand *soum* land authority.

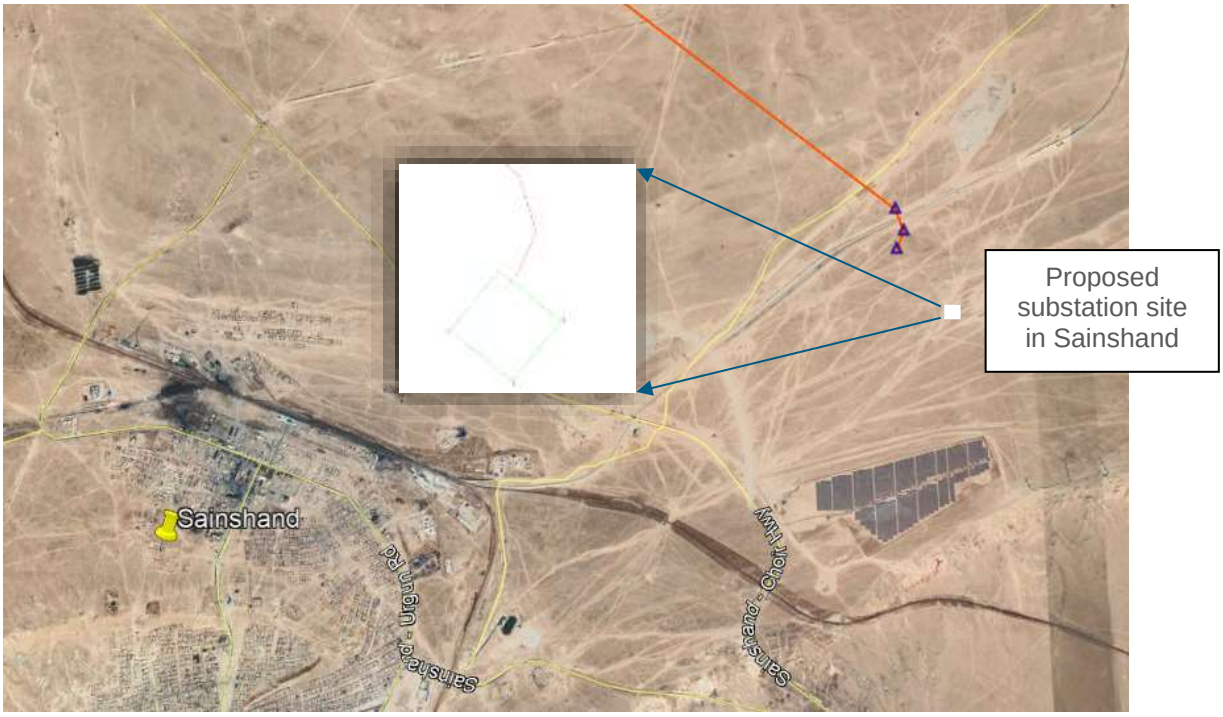


Figure 2-9. Location of Sainshand substation

[19] Ministry of Energy, 2013. *Choir-Sainshand-Zamyn-Uud 220 kV Overhead Transmission Line Feasibility Study.*

2.7. Establishment of the Right of Way

The Mongolian Law on Energy of 2001 (the Law of Energy) and Mongolian Government Resolution No. 97 of 18 March 2020, stipulates the establishment of protection zones or Right of Way (RoW) for transmission lines.

Articles 7.3 and 29.1.7 of the Law of Energy refer to the protection zone, and Article 33 (full article) is entitled "*Power transmission network protection zone*". The Energy Law does not specify the width of the ROW, however authorises governors of *aimags* and *soums* to set the RoW in accordance with safety rules for lines and determined RoW with by the Government resolution.

The Resolution sets out specific RoWs as provided in Table 2-1. The requirements for 220 kV lines are highlighted in yellow. Any activities that may interrupt energy transmission are prohibited within the RoW. This includes prohibition of infrastructure development within the RoW and any activities in the RoW area will require approval from the powerline owner.

No trees and any agricultural plantation are allowed within 25 m surrounding substations or any power distribution infrastructure. Owners of trees or shrubs planted or growing within the RoW shall be obliged to move or cut them, if the former may possibly cause damage to the network or obstruct inspection or maintenance of the powerlines.

Table 2-1. RoW for transmission lines in Mongolia

Powerline, kV	Unpopulated areas	Populated areas	Substation and distribution infrastructure	Forested areas and Parks
	Both sides of the outer line, m		Every direction, m	Both sides of the outer line, m
Up to 1 kV		1-1.5 m		
1 – 20 kV	10 m	2 m	10 m	2 m
35 kV	15 m	4 m	15 m	3 m
110 kV	20 m	5 m	20 m	3 m
220 kV	25 m	6 m	25 m	4 m
330 -500 kV	30 m	10 m	30 m	5 m

2.8. Land Acquisition

As identified above, under law a RoW or protection zone can be set up by the NPTG. However, to secure this land, the NPTG must still obtain relevant letters from each *soum* and *aimag* to declare that the land has been provided for the Project.

All the *aimag* governments have allocated land for the Project and land permits to this effect have been issued. This includes the Sainshand *soum* land authority who have agreed to the location of the substation in Sainshand.

It is understood that there are five mining concession licences (for exploration and mining) within the OHTL route RoW. These licences are issued by the Mineral Resource Authority of Mongolia (MRAM). The five mineral license holders are Kherlen golyn uils LLC, Batbadmaarag LLC, Mak tsement LLC, Olon ikht bayan LLC and Durvun talst erdene LLC. NPTG has reached an agreement with Kherlen golyn uils LLC, Batbadmaarag LLC, Mak tsement LLC, Olon ikht bayan LLC, and received official letters informing they have no objection to the OHTL passing through their license area.

With regard to the Durvun talst erdene LLC exploration license with ref no. XV-44000007, this expired on 31 July 2020 and the Ministry sent an official request to Dornogovi governor on 4 February 2021 requesting that the transmission line area be excluded from the exploration license area on renewal. The Dornogovi Governor responded in a letter dated 19 February 2021 (Ref no. 1/208) that no mineral license will be granted along the Project OHTL route.

Within the OHTL route and RoW, there are no special needs areas or crops. There are no residential structures or other within the OHTL and RoW, though there are water wells and herder households (and associated *gers*) within a 3 km buffer zone either side of the OHTL centreline (6 km buffer zone in total). These are discussed in more detail throughout this Report.

Within the substation site and 25 m around both the existing and proposed new substation site, there are no buildings or structures.

2.9. Proposed Programme

The start date for construction is not currently known, however, it is assumed that approximately 24 months for construction and will start in 2021.

2.10. Ancillary Facilities

The power supply for the operation of the Project is an associated facility, however various power supplies within the CES are already operational.

During construction, access to all tower locations will be necessary to perform the civil works, structure erection and stringing of conductors and shield wires. These routes will be determined by the Construction Contractor; however, they will be obliged to use existing roads as much as possible to minimise the impact of the works. Where possible, the OHTL corridor will be used for haulage. Existing secondary roads will be used to access the corridor however, it is likely that new roads will need to be built to support the traffic of Heavy Goods Vehicles (HGVs) to carry materials (structures, cable drums and others), equipment and personnel to site. These roads will be temporary and designed for light traffic.

The roads can be constructed as temporary (for construction phase only) or permanent roads (construction and operation phases). They would be such to permit double transmission loaded vehicles. Any temporary roads would be restored to the original condition after the end of the works; permanent roads would remain open until decommissioning.

In every case the construction of new access roads shall be avoided as much as possible. The use of existing roads is mandatory wherever possible. The Contractor shall adapt the existing ones to the project needs and restore them to the initial condition or an improved one at the end of the works.

The requirement for and location of any borrow pits or quarries is not currently known and would be determined by the Construction Contractor.

During construction, the Construction Contractor will need to install site facilities to support the construction activities: Site Offices, storage areas, worker accommodation, parking areas, etc. Whilst this will be determined by the Construction Contractor and therefore details are not currently available, it is likely that this will comprise a main camp in an intermediate point of the line route. Secondary camp(s) may be installed within the two subsections. These secondary camps will be smaller and will be installed just during the period in which the close jobs are done. As an indicative number, one secondary camp per 100 km of route is a standard procedure, therefore a maximum of two or three camps are expected.

2.11. Project Phases

The Project phases are summarised in Table 2-2.

Table 2-2. Project phases and activities

Project phase	Project activities
Pre-construction	• Line route and substation survey (detailed topographic and geotechnical survey) and design optimisation • Preparation and submission of national EIA • Establishment of a RoW and implementation of a Livelihoods Restoration Plan • Clearing of access tracks - where possible, access to the site will be along the new RoW; however, it is likely that several temporary access tracks will be required along the route. Typical machinery required is a bulldozer. • Vegetation clearance of the substation site
Construction and commissioning	• Establishment of site storage areas/compounds • Transportation of equipment and workers to site • Temporary power generation, if required • Civil works and installation of substation • Levelling and excavation of pole and tower foundations - topsoil will be stripped from areas of excavation prior to any further excavation which may be required. In most of the cases excavation will be mechanical, using excavators. Manual excavation will be performed where mechanical excavation is not possible. Concrete works will be undertaken following placement of the reinforced steel. The proposed pole/tower base areas will be levelled; where possible, backfilling will be undertaken using the excavated materials using hand tools, to level the site to design levels. Compaction works will be undertaken using small compacting machines due to the small dimensions of the compaction area.

Project phase	Project activities
	• Erection of towers/poles - The towers/poles will have concrete footings with foundation depth of 2.2-3.2 m and widths of 12.2-5.7m or more depending on the nature of soils at the selected tower spots. The towers will be erected using small derricks, pulleys, winches and ropes or alternatively, if the site accessibility allows that, using mobile cranes. • Vegetation clearance of the RoW - prior to stringing works, the RoW will be cleared of trees and vegetation that might interfere with the construction of the line. Trees out of the ROW that might interfere with the line will be also cleared or trimmed. These works are undertaken using mechanical saws and light tools. • Stringing of lines - once the towers/poles are erected, the conductors and shield wires will be strung and appropriately 'tensioned' to provide the minimum clearance between ground level and the wires. In most cases, conductors will be strung by manual labour and are performed by line sections. For each section, the stringing machine (tensioner and puller) should be positioned at the beginning and end of the section and conductor drums on supporters positioned at one of the ends. • Waste management - the major waste stream will be the disposal of surplus spoil from the pylon sites. Other wastes will comprise general domestic waste including sanitary and food waste, organic material, small volumes of wastes arising from mobile plant, chiefly waste lubricating oil and packing materials. • Testing and first operation of equipment - Once the poles/towers have been erected and the lines strung, tests and measurements will be carried out to ensure that the line performs as expected. Minimum distances such as clearance between the lines and the ground level shall be checked and the lines shall be 'tensioned' as per specifications.

Operation	Operation and maintenance of equipment based on accepted international standards and in accordance with national legislation and practices as set out by the Mongolian Ministry of Energy. The main activities to be carried out during the operation of the Project include: operation of the substations, surveillance of the condition of the overhead lines, towers and RoW; routine, planned and emergency maintenance and repairs; and vegetation control.
	• Routine maintenance – to ensure the integrity and safety of the transmission line. This will include:
	  ○ Foot patrol. Routine physical examination of the line and its component parts to ensure safety, security and integrity of the line.
	  ○ Security patrol. To check on segments of the line close to populated areas for signs of vandalism, branches of trees interfering with lines, tampering, and general security of the lines. This should ensure early detection of and rapid response to acts of vandalism and to rectify such situations as promptly as possible; and
	  ○ Pole/tower auditing and repairs. Annually 10% of all towers should be thoroughly examined. Detection and tightening of loose bolts on supports and hardware can reduce premature wear and indicate for replacement of worn components before failure.
	• Planned maintenance - scheduled maintenance programmes that should be carried out on the overhead lines in accordance with manufacturer equipment specifications or due to the need to repair equipment. Some of the activities carried out under planned maintenance will include:
	  ○ Replacement – insulation of sections of the overhead line;
	  ○ Treatment of rust and re-painting of tower components;
	  ○ Replacement of conventional bolts and nuts with anti-theft fasteners on older line sections;
	  ○ Rehabilitation of access roads and tracks; and
	  ○ Inspection and maintenance of switchgears, protection systems, etc.
	• Emergency maintenance - activities relating to correction of unplanned events. This could include spectrum of minor faults (e.g. insulator failure) to major defects such as tower failures.
	• Vegetation control and biodiversity (bird fatality) monitoring.
	• Waste management.

Decommissioning	• Removal of equipment and structures.

The final position of the individual tower structures will be determined by the Construction Contractor, based on factors such as ground conditions, elevation, and distance between pylons. The Construction Contractor will need to undertake a detailed topographic and geotechnical survey of the ROW and substation sites to inform this micro-siting exercise.

Tower spotting will need to take place; this refers to the determination of individual sites for the installation of the pylons and will rely on the results of land acquisition surveys as set out in the LARF. Minor adjustments may be needed to account for local conditions including siting to avoid impacts on any assets; or where this is not possible, sited to minimise impacts.

Construction equipment that will likely be required on site may include:

- Excavators
- Bulldozers
- Dump trucks for transporting excavation soil, construction materials and equipment
- Cranes
- Forklifts
- Concrete mixers
- Trucks
- Scaffolding
- Compactors
- Mechanical saws
- Light tools

Construction raw materials will be influenced by the final design, however it can be assumed as a minimum raw materials will include: concrete for foundations; water; power supply; construction aggregate; and road materials. Concrete for foundations will either be provided via on-site small mixers (250 litres) or will be procured from batching plans are available at a suitable distance – this will be determined by the Construction Contractors.

The main emissions during construction will be:

- Noise and vibration: from construction activities and movement of construction vehicles; and any concrete mixing/batching plant used; and
- Air emissions: exhaust emissions from onsite plant and construction traffic; dust and particulate matter may be generated by dust-raising activities on-site and the movement of HGVs on local roads; any concrete mixing/batching plant used.

The operation and maintenance of the OHTL and substation will be based on accepted international standards and in accordance with national legislation and practices as set out by the Ministry of Energy. The substation and line will be planned for operation on a 24 hour, 7 days a week basis. As identified in Table 2-2, maintenance will include routine, planned and emergency maintenance. Trees that could threaten the integrity of cables will be felled to prevent them from falling onto the overhead lines.

During operation, appropriate security fencing will be provided around the substation site. Gates will be manned by security guards and only authorised personnel will be permitted to enter. The substation will require periodic maintenance of the transformer equipment and of the site infrastructure, resulting in the generation of industrial waste including hazardous wastes such as used transformer oil. The day-to-day operation of substations will generate domestic waste and sewage and will require the supply of water and energy to the site.

The main emission during operation will be noise from the operation of the substation and, where thermal power is used, air emissions. Noise will be controlled by installing all the sound-producing equipment in sound-proof buildings. Air emissions will be controlled by ensuring that equipment used is to the latest standards and complies with national emissions standards, and ensuring that equipment, plant and vehicles used are maintained and running in good condition. Electromagnetic fields (EMFs) are considered in section 2.12 below.

In terms of decommissioning of the Project in the future, since this would take place in excess of 30 years' time, it is not possible at present to identify with accuracy all decommissioning requirements. Ultimate responsibility for decommissioning will reside with the Client. In general management and mitigation during decommissioning will follow the same requirements as during construction. Before any closure and decommissioning activities are undertaken, a formal assessment of the requirements should be undertaken, based on the design at the point of decommissioning and potential issues which may arise at that time and will require management and mitigations. The potential issues and associated management and mitigation measures should be

encompassed in a Decommissioning Plan, approved by the appropriate regulatory parties. Machinery, steel and dismantled materials would be recycled where possible and disposed of at licensed disposal sites.

2.12. Electromagnetic Fields

2.12.1. Background

EMFs are produced both naturally and as a result of human activity. EMFs occur naturally in the human body from nerve and muscle activity and are present, at background levels, at all times in the wider environment. EMFs are also produced whenever a piece of electrical or electronic equipment is used. EMFs are static electric, static magnetic and time-varying electric, magnetic and electromagnetic (radio wave) fields with frequencies, measured in hertz, up to 300 Gigahertz (GHz).

All overhead lines produce EMFs; most commonly, the electricity transported on overhead lines is an alternating current at 50 or 60 hertz (Hz). Power lines transmitting alternating current (AC) are surrounded by low frequency electric and magnetic fields.

An **electric field** is generated by voltage, the pressure behind the flow of electricity. Their strength is measured in Volts per metre (V/m). The strength, or amplitude, of the electric field depends on the voltage, which remains more or less constant as the line is energised.

Magnetic fields arise from current flows. Their strength is measured in amperes per metre (A/m). Commonly, EMF investigators use a related measure, flux density (in microtesla (µT) or millitesla (mT)) instead. The flow of electricity in the case of a transmission line varies according to the demand of power at any given time.

The strength of both electric and magnetic fields is a function of the voltage or current flow, distance from the conductors to the ground and the lateral distance from the line to receptor, and EMFs tend to be higher directly under the line and decrease to the sides at increasing distance. One difference between electric and magnetic fields is that electric fields are easily screened, while magnetic fields pass readily through most buildings.

It has been widely debated if EMFs are damaging to human health. Many studies published in the last 20 years on exposure to EMFs have exhibited a number of inconsistencies and no clear, convincing evidence exists to show that residential exposures to EMFs are a threat to human health.

Guidelines are provided below, and the assessment of potential effects of EMFs is considered in Chapter 11: Operation Impacts.

2.12.2. Guidelines

The International Commission on Non-Ionising Radiation Protection (ICNIRP) is an independent organisation that provides scientific advice and guidance on the health and environmental effects of non-ionizing radiation (NIR) to protect people and the environment from detrimental NIR exposure. The ICNIRP is formally recognized by the World Health Organisation (WHO). The ICNIRP conclude that overall research has not shown to date that long-term low-level low frequency exposure has detrimental effects on health; nor that exposure to low-level static electric and magnetic fields have detrimental effects on health (ICNIRP, 2016).

However, based on an in-depth review of the literature, ICNIRP produces guidelines recommending exposure limits on EMFs to minimise the potential for shocks and interference with the body's nervous system, which are reviewed periodically and updated if necessary. Most countries work to the 1998 guidelines, though these were most recently updated in 2010 for the frequency range 1 Hz to 100 Hz (ICNIRP, 1998 and 2010). Guidelines are set for occupation levels and an extra factor is applied for the general public. Guidelines indicate that, below a given threshold, EMF exposure is safe according to scientific knowledge. However, it does not automatically follow that, above the given limit, exposure is harmful (WHO, 2016). Reference levels are also provided, which are not the actual limits, but simply guidance figures for when it is necessary to investigate the basic restriction (ICNIRP, 1998, 2010, 2016). The reference levels for 50 Hz are shown in Table 2-3.

Table 2-3. EMF reference levels for 50 Hz

	Electric field (V/m)	Magnetic field (µT/mT)	
	1998 & 2010	1998	2010
Public exposure limits	5,000	100 µT	200 µT
Occupational exposure limits	10,000	500 µT	1 mT (1000 µT)

Source: ICNIRP, November 2010[20]

In 1999, the Council of the European Union (EU) published the Recommendation on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) (1999/519/EC). This recommendation was based on the above-mentioned Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz) of the ICNIRP. According to this recommendation the reference values for high-voltage power lines (50 Hz) are - electric field: 5 kilovolt per metre (5 kV/m) magnetic field: 100 microteslas (100 µT).

ICNIRP changed the Guidelines in 2010 and recommends a reference value of 200 µT for magnetic fields at a frequency 50 Hz. However, the EU Council Recommendation has not been changed, the reference value of 100 µT is still valid.

Countries within the EU as well as countries neighbouring the EU handle the "Recommendations" in different ways. Some Member States implemented the Recommendation in national regulations, whereby the reference values defined by the EU are obligatory. Others do not implement the Recommendation. They apply either higher limits in comparison to the reference values recommended by the EU, or other regulations, or no regulations. Finally, in some Member States regulations are stricter in respect to the EU Council Recommendation.

Regarding the protection of workers, the EMF Directive (2013/35/EU) provides additional details on the general arrangements for ensuring the health and safety of workers set out in the EU Framework Directive on Safety and Health at Work (89/391/EEC). The EMF Directive essentially gives additional detail on how to achieve the objectives of the Framework Directive for the specific situation of work with electromagnetic fields.

The EMF Directive lays down the minimum safety requirements regarding the exposure of workers to risks arising from EMFs. However, few employers will need to calculate or measure the levels of EMF in their workplace and to compare them with the exposure limit values (ELVs). ELVs are expressed in terms of health and internal effects of the internal electric field strength and are defined in the Tables A2 and A3 of the Directive (3.8×10^{-4} f Vm^{-1} and 0.0028 f Vm–1 of peak respectively, where f is the frequency expressed in Hz).

2.12.3. Overhead lines

All OHTLs produce fields. The fields are usually greatest directly under the lines and fall rapidly with distance to the sides of the line. For larger lines on steel pylons, the distance is slightly greater. Fields vary greatly from line to line and over time, and a line typically produces fields much less than the maximum it is capable of. Typical ground-level UK field levels from overhead power lines are shown in Table 2-4.

This is comparable to the earth's magnetic field, which everybody is constantly exposed to, and is around 50 µT; and the earth's electric field which is usually around a 100 V/m, though thunderstorms can make it rise to many thousands.

Table 2-4. Typical ground-level field levels (taken from the UK)

		Magnetic Field (microtesla, µT)	Electric Field (Volts per metre, V/m)
The largest steel pylons (275 kV and 400 kV)	Maximum field (under line)	100	11,000
	Typical field (under line)	5-10	3,000-5,000
	Typical field (25 m to side)	1-2	200-500
	Typical field (100 m to side)	0.05 – 0.1	10 - 40
Smaller Steel Pylons (132kV)	Maximum field (under line)	40	4,000
	Typical field (under line)	0.5 – 2	1,000 - 2,000
	Typical field (25 m to side)	0.05 - 0.2	100 - 200
	Typical field (25 m to side)	0.01 – 0.04	2 – 20

[20] Available at: https://www.icnirp.org/cms/upload/publications/ICNIRPrfgdl2020.pdf. Accessed May 2020.

Source: National Grid[21]

2.12.3.1. Magnetic fields

An example of a magnetic fields calculated for a 400 or 275 kV line is shown in Figure 2-10, and Table 2-5 sets out some typical magnetic fields in µT at distances from the centreline.

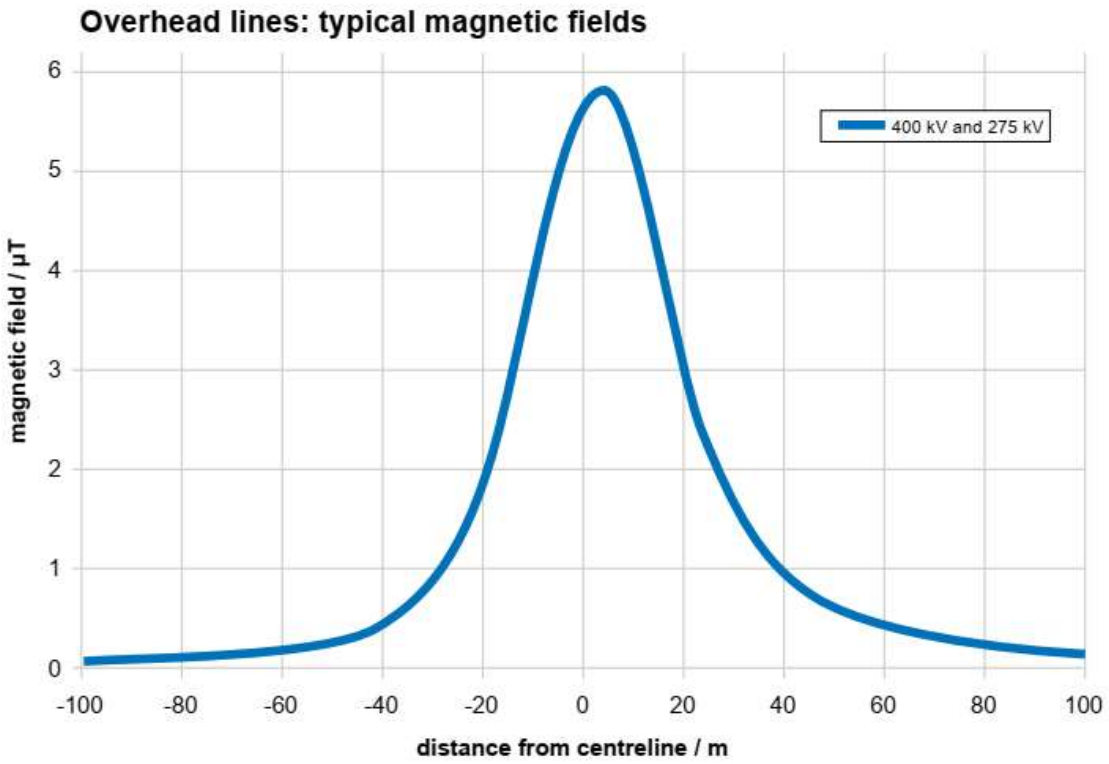


Figure 2-10. Example 275kV overhead typical magnetic field[22]

Table 2-5. Typical magnetic fields in µT at distance from centreline

				Magnetic field in µT at distance from centreline				
				maximum under line	10m	25m	50m	100m
Larger lines	Quad bundles	maximum	clearance 7.6 m phasing U load 4.7/4.7 kA	108.422	95.780	38.422	11.697	3.096
		Typical	clearance 13 m phasing U load 0.4/0.6 kA	5.783	5.247	2.194	0.578	0.119
Typical design used for new lines	Twin bundles	maximum	clearance 5.5m single circuit load .5 kA	81.942	72.818	22.103	8.148	2.145
		Typical	clearance 8 m single circuit load 0.1 kA	5.604	4.938	1.979	0.514	0.106

Source: National Grid[23]

[21] National Grid. Available at: https://www.nationalgrid.com/sites/default/files/documents/13791-Electric%20and%20Magnetic%20Fields%20-%20The%20facts.pdf. Accessed March 2020.
[22] National Grid. Available at: https://www.nationalgrid.com/sites/default/files/documents/13791-Electric%20and%20Magnetic%20Fields%20-%20The%20facts.pdf. Accessed March 2020.
[23] National Grid, 2020. Available at: http://www.emfs.info/sources/overhead/specific/275-kv/. Accessed March 2020.

2.12.3.2. Electric fields

Typical electric fields for 275 kV lines are shown in Figure 2-11. Table 2-6 sets out typical electric at distances from the centreline for 275 kV.

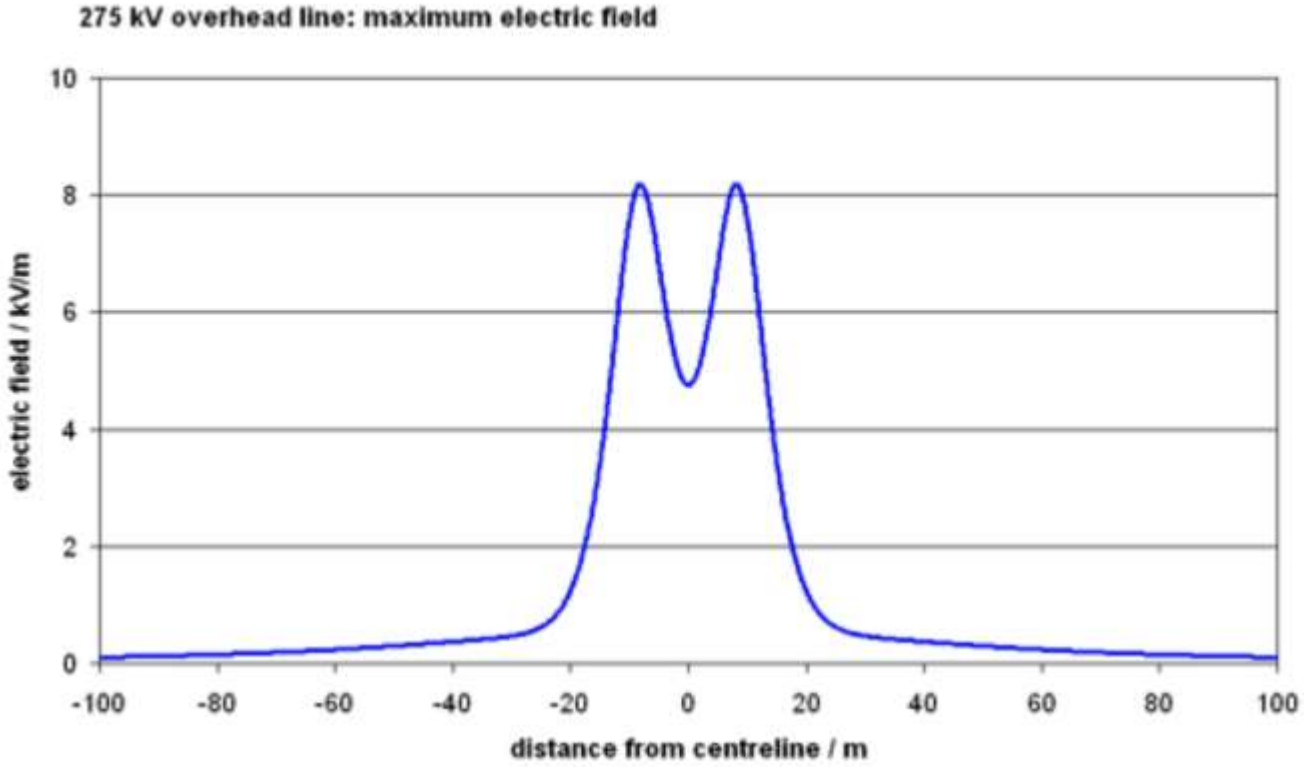


Figure 2-11. 275kV overhead typical electric field[24]

Table 2-6. Typical electric fields in Vm^{-1} at distance from centreline

				Electric field in V m^{-1} at distance from centreline				
				maximum under line	10m	25m	50m	100m
Larger lines	Quad bundles	maximum	clearance 7.6 m phasing U	7,838	6,964	532	307	107
		Typical	clearance 13.0 m phasing T	2,918	2,892	661	73	22
Typical design used for new lines	Twin bundles	maximum	clearance 7.6 m phasing U	7,316	5,782	460	278	94
		Typical	clearance 13.0 m phasing T	2,547	2,472	503	67	18

Source: National Grid[25]

2.12.4. Substations

Small electricity substations produce up to 2 μT close to their perimeter fence or wall, and often no electric field at all. The fields fall rapidly with distance, and within 1 to 2 m from a typical substation, the fields associated with it are usually indistinguishable from other fields present in homes. Larger electricity transmission substations do not produce very large fields (generally less than a μT); the fields close by are mainly produced by power lines entering them.

[24] National Grid, 2020. Available at: http://www.emfs.info/sources/overhead/specific/275-kv/. Accessed March 2020.
[25] Ibid.

3. Analysis of Alternatives

3.1. Introduction

This Chapter provides an overview of the alternatives that have been considered for the Project. Alternatives include consideration of different means to meet the purpose and requirements of the Project activities, and may include alternatives to:

a) **the type of activity to be undertaken (the "No Project" alternative)** – this requires a change in the nature of the proposed activity; this includes the 'do nothing' option i.e. the option of not implementing the activity;
b) **the site location** - alternative locations for a project, or for components of a project;
c) **the design or layout of the activity** – this considers different spatial configurations of an activity on a particular site; and
d) **the process and operational aspects of the activity** - also referred to as technological or equipment alternatives; the purpose of considering such alternatives is to include the option of achieving the same goal by using a different method or process.

3.2. ''No project' Alternative

The 'do nothing' option is the option of not implementing the activity or executing the proposed development. Assuming that the Project is not developed, the supply of electricity to the substations will reduce over time due to losses in the system, and the supply will not meet future demand. The projected electricity demand in the Project Area will also surpass the existing electricity transmission infrastructure when the planned industrial and mining developments starts.

Development of the Project would contribute to the goals of the Government of Mongolia, to address the wider programme to improve energy supply and efficiency in the generation, transmission and distribution networks, especially in the south-east of Mongolia.

It is recognised that the development of the OHTL alone will not address shortfalls in generation. However, the provision of a developed, stable and safe Transmission Grid will help contribute to the achievement of the goal to increase power from new sources.

Ultimately, a dual strategy of generation and transmission/distribution is required to fulfil energy development goals, coupled with a connection strategy to deliver the energy to the consumer. The Government strategy identifies the need to address generation, transmission and distribution as part of the future development of the energy sector.

3.3. Location Alternatives

Whilst several project decisions are best made through an evaluation of the relative merit of alternatives, economic and other factors, such as local conditions and land tenure, may dictate or limit alternatives that can be considered.

Tranmission line route

In terms of the location of the line, three main alternatives were considered, including a location adjacent the road and existing 110 kV/35 kV lines, or a location off set from the road/these lines. The Techncial Feasibility Study considered three line routings as follows:

- Alternative 1 - East routing - R1 (cyan colour in Figure 3-1).
- Alternative 2 - Central routing - R2 (red colour in Figure 3-1).
- Alternative 3 - West routing - R3 (green colour in Figure 3-1).

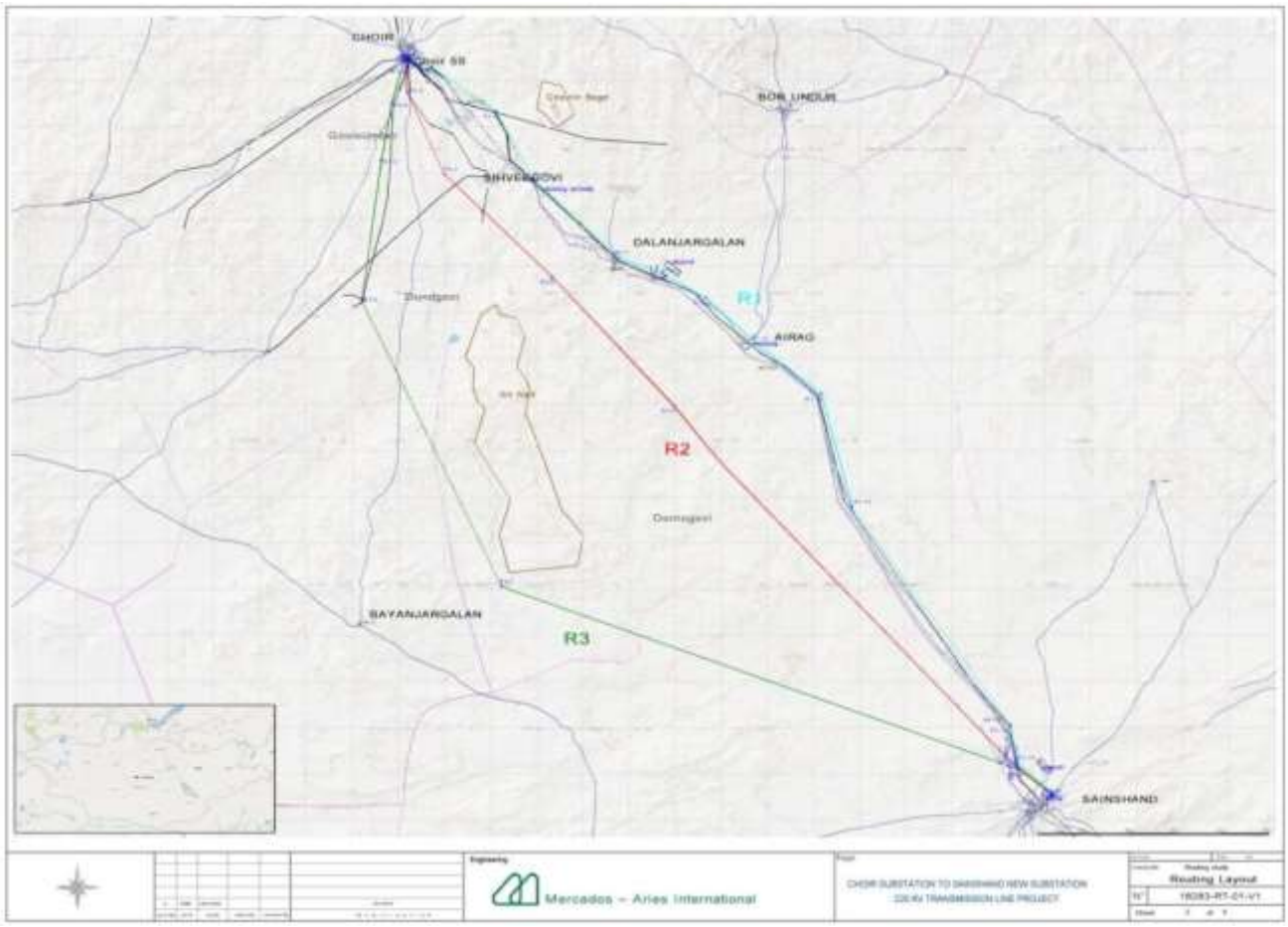


Figure 3-1. Alternative route options[26]

Alternative 1 follows the existing 110 kV OHTL route, which passes through two *soum* centres, Dalanjargalan and Har Airag before reaching Sainshand. The length of this line is 221 km.

Alternative 2 is to the south of the existing road and is 216 km in length. This option circumnavigates the existing land uses around the soum centres and the operational mining licenced areas.

Alternative 3 is further to the south, separated from all populated areas, in order to reduce the social and visual impact, with a length of 252 km.

Both Alternatives 2 and 3 would pass through grazing lands that are sparsely populated.

None of the routes passes through designated sites, however Alternative 3 is closest to Ikh Nart Natural Reserve (2.7 km to the boundary); Alternative 1 is closer to Choiriin Bogd Natural Reserve (7.9 km). Alternative 2 is the furthest from both these designations.

Alternative 1, whilst it is located parallel to the A0102 road, railway and existing transmission line, i.e. is within an existing infrastructure corridor, there is little land availability within these soum centres to accommodate a new 220 kV OHTL alongside the existing 110 kV OHTL. The existing 110 kV OHTL also crosses across the Shivee Ovoo coal mine tenement complicating the land approval process. It is also assumed that the 220 kV OHTL, as it is a higher voltage, is better positioned further from settlements both in terms of health and safety clearance and space available.

Alternative 3 increases the overall length of the transmission line and therefore would be the most expensive option. This route avoids more complicated land acquisition issues associated with Alternative 1, however, is close to the Choiriin Bogd Natural Reserve and could affected a greater number of winter camps than Alternative 2.

[26] Mercados (October 2020), Draft Interim Report.

Alternative 2 reduces the overall length of the transmission line, which is technically and economically favourable. This route also avoids more complicated land acquisition issues associated with Alternative 1, and is further from the protected sites than Alternatives 1 and 3. As such, Alternative 2 was selected as the preferred route.

Figure 3-2. Original proposed route and updated route to avoid mining licenses

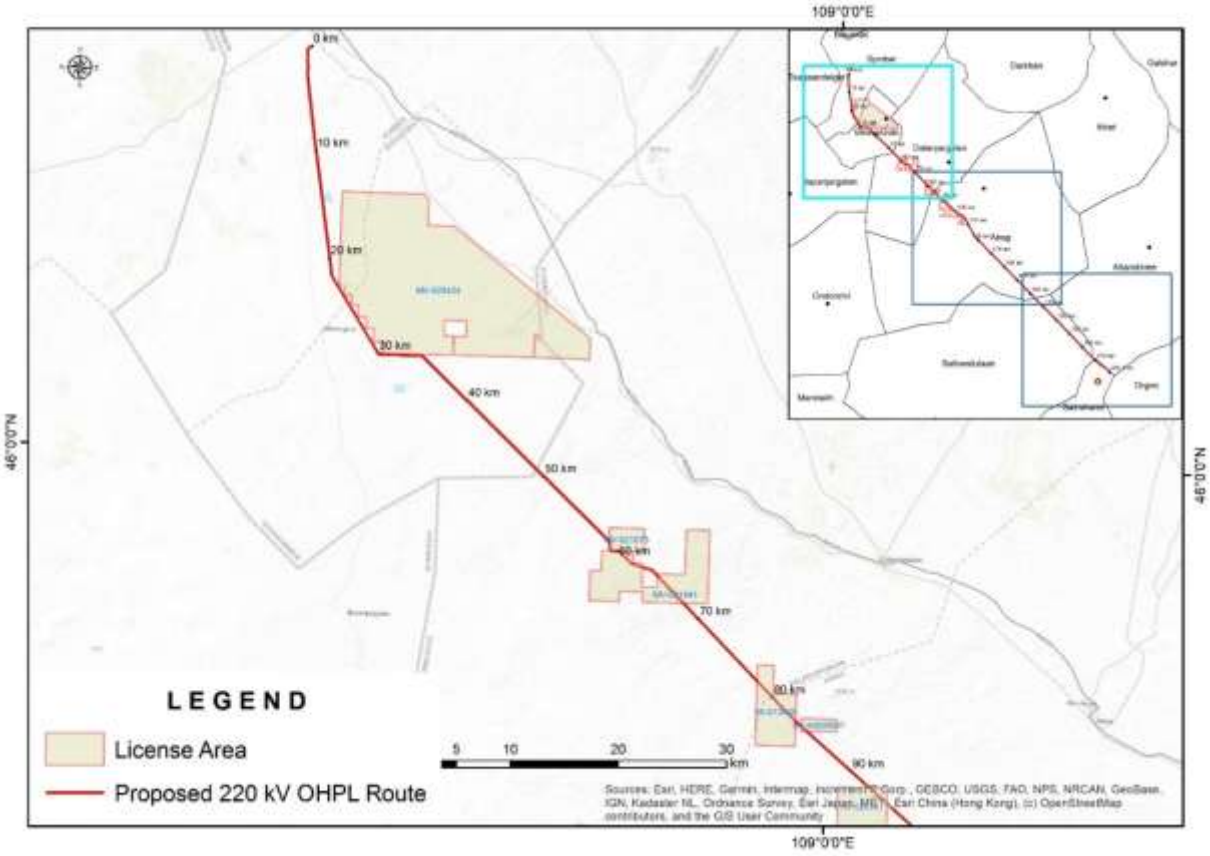


Figure 3-3. Mining licences overlapped with Alternative 2 in 0-90th km of OHTL route

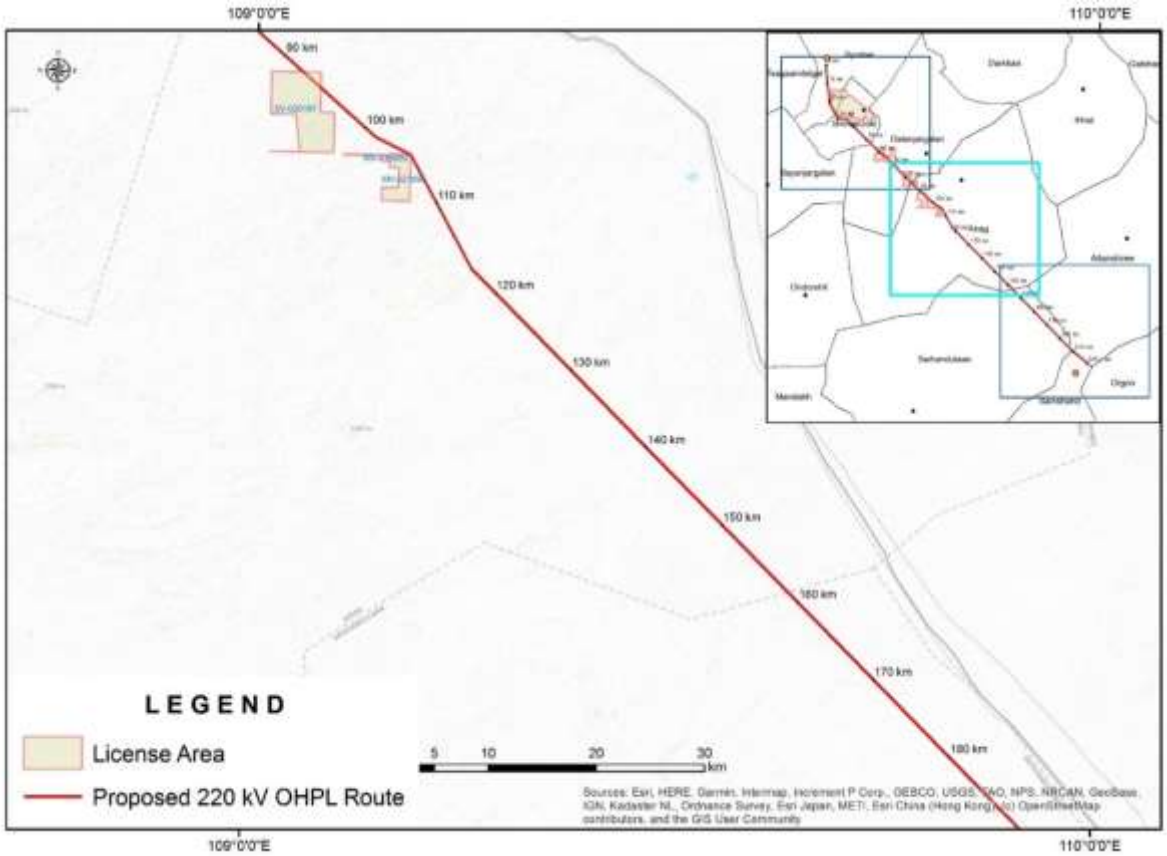


Figure 3-4. Mining licences overlapped with Alternative 2 in 60-160th km of OHTL route

Substation location

In terms of the substations, two options were considered:

- Adjacent to the existing substation
- At a new site

The most logical option is to extend the existing 110 kV Sainshand substation by adding a new 220 kV switchyard. From an economic point of view, this is the cheapest option, both in terms of the cost of construction and subsequent operation and maintenance. There is a road on the East and North side and on the other side there is private owned land. To the South there is an area that was allocated for the Sainshand Industrial Park (though this project is currently stalled, and its exact layout and location has to be specified). However, there is insufficient land available at this site due to the presence of private lands to the east of the substation. The potential to compulsory purchase these lands was considered however, the recent connection of a new wind farm and solar PV plant to the substation has necessitated underground lines from the north-east; complicating any potential expansion to the substation over these lands.

A new substation site was therefore selected based on criteria to locate it out of city, close to the existing substation; based on land availability. Several sites were reviewed, and a site was selected approximately 2.5 km north of the current 110/35/10 kW Sainshand substation, at the northern side of the first turn anchor support of the 110 kW Transmission Line, the north-east of the 3rd and 4th intermediate support poles. To reach this site, the new 220 kV overhead line (blue in Figure 3-5) will have to cross recently built rail road, paved road and 110 kV overhead line (red) to the projected petroleum plant.

Figure 3-5. Location of the existing substation and new substation

3.4. Design and Layout Alternatives

Two main options exist for transmission lines, either overhead lines or underground lines. The major advantage of overhead lines is that they are generally cheaper than underground lines (as much as up to 2.5 times cheaper). Overhead lines tend to have a longer lifespan, shorter outage durations (as faults are easier to identify and repairs are easier to address). Overhead lines can also more readily withstand overloads. Overhead power lines are more easily tapped, rerouted or modified to serve customers. Such modifications to underground power lines are more expensive because of the inability to readily access lines or relocate sections of lines.

Conversely, overhead lines have a higher visual impact, and can be more susceptible to damage such as high winds and ice-loading conditions from extreme weather. Underground options provide less risk to the public (in terms of potential illegal access), can be more reliable (i.e. fewer short and long-duration interruptions to supply) and have less voltage drop as reactance is lower. However, underground lines are more difficult to modify after the cables have been installed

Given the precedence for overhead lines in Mongolia, the relatively low level of development in the Project Area and the cost, overhead lines have been selected as the preferred option.

Two new substations were considered, one in Choir and one in Sainshand. The FS 2013 identifies that only one new substation is required as the existing one in Choir is sufficient to support this development.

3.5. Project and Operational Alternatives

In terms of single or double circuit systems and connections, the FS 2013 considered a total of 14 different options to connect the proposed 220 kV OHTL and substation to the existing 110 kV line and distribution facilities. Factors considered for the alternatives included:

- Future electricity demand in the region including the Zamyn-Uud Free economic zone development;
- Technical characteristics and capability of current power supply infrastructures in Choir, Har Airag, Sainshand;
- Power supply reliability; and
- Cost effectiveness.

To provide for enough system reliability a substation must be connected to at least two transmission lines: one incoming and one outgoing. Improving transmission system interconnections is one of the priority tasks of the Mongolian energy sector development. Three options meeting this criterion were considered in more detail in the Techncial Interim Draft Report.[27] Overall, the cheaper option was selected.

In terms of technology, the FS 2013 only considered Air Insulated Switchgear (AIS) for the new 220/110/35 kV Sainshand substation. This is understandable, since in rural areas, GIS technology normally does not offer worthwhile advantages, and mixed technology seven years ago, when the FS was prepared, was not as developed and spread as today. The Technical Report identifies that it is advisable to consider the possibility of use of Hybrid Insulation switchgear (HIS) Mixed Technology switchgear (MTS) for the new 220/110/35 kV substation or new 220 kV switchgear and/or refurbished 110 kV switchgear.

MTS has the advantage of being compact and combining multiple functions together as well. This can enable much more compact solution while still being significantly cheaper than GIS. HIS requires less than half the space of comparable AIS and has low operational costs and minimal maintenance. In this case, the most significant factors influencing the choice of the solution were the cost of acquisition and the knowledge of the proposed technology; and therefore, AIS was chosen.

In terms of the material for the transmission tower/pylon/poles that can be used, options include wood, concrete and steel.

- Wooden poles are suitable for relatively shorter spans and lower voltages. They are also cheap, however have less strength than steel or concrete poles, however, would not be suitable for the length or voltage of the Project line.
- Steel poles possess greater mechanical strength, can withstand most severe climatic conditions, have a longer life span, and allow for a greater span between poles to be used than wood poles. Steel poles can be fabricated with uniform dimensions and conformance to international specifications and tolerances. However, steel can corrode and therefore needs regular maintenance.
- Reinforced concrete poles have greater mechanical strength, a longer life span and permit a longer span between poles than either wooden or steel poles and require little maintenance. Prestressed concrete poles have consistent material properties throughout their length. They also maintain their strength throughout service. The main disadvantage is their weight, which results in high transport costs and difficulty in working in less accessible areas.

Steel is typically used for 220 kV transmission lines and therefore has been selected for this Project.

[27] Mercados (October 2020), Draft Interim Report.

The structure of the pylon depends on whether a single or double circuit is being used, the terrain and whether or not the purpose of the structure is suspension, tension, terminal (at the end of the line) or transposition. Five different types of structure have been identified including mainly P220-2 Intermediate poles and Y220-2 Anchor poles. Optimisation of the overhead line design, to be undertaken by the Construction Contractor, may identify other areas where lattice towers could be employed.

4. EBRD Requirements and Mongolian Legislative Framework

4.1. Introduction

The Project is subject to the environmental requirements of both EBRD and Mongolia. The policy, legal and institutional framework relevant to the Project, covering the EBRD requirements and the Mongolian administrative framework and national legislation, standards and guidelines are discussed in turn below.

4.2. EBRD Requirements

EBRD financed projects are expected to be designed, implemented and operated in accordance with the EBRD ESP (2014), which requires compliance with ten PRs, relevant EU standards, and national law.

4.2.1. EBRD Environmental and Social Policy (2014)

The EBRD's ESP and related PRs (see Section 2.2.2), guide the EBRD's commitment to promoting *"environmentally sound and sustainable development"* in the full range of its investment activities. The 2014 Policy[28] is relevant to this Project and aims to ensures that issues such as environmental and social sustainability, the rights of affected workers and communities and compliance with relevant regulatory requirements and good international practice are built in at every relevant stage of the project cycle.

4.2.2. EBRD Performance Requirements

The Project must comply with the EBRD PRs. The PRs provide a solid base from which the sustainability of business operations can be delivered. Where possible, projects should avoid adverse impacts on workers, communities, and the environment. If avoidance is not possible, negative impacts should be reduced, mitigated or compensate for, as appropriate. The PRs identified as relevant to the Project are summarised in Table 4-1.

PR9 Financial Intermediaries is not relevant as it does not apply to this Project. PR7 is not considered relevant as there are no Indigenous Peoples in the Project Area, or indeed Mongolia.

Table 4-1. Summary of EBRD Performance Requirements and their relevance to the Project

Performance Requirement	Summary and Objectives	Areas covered	Relevance and compliance
PR1: Assessment and Management of Environmental and Social Impacts and Issues	Summary This PR applies to all projects directly financed by the EBRD and defines the importance of a systematic approach to the management of the environmental and social impacts associated with project activities and operations. The PR provides guidance on the client's responsibilities for managing and monitoring environment and social issues and how these will be assessed in relation to the Bank's Policy. Objectives • identify and evaluate environmental and social impacts and issues of the project • adopt a mitigation hierarchy approach to address adverse environmental or social impacts and issues to workers, affected communities, and the environment from project activities • promote improved environmental and social performance of clients through the effective use of management systems • develop an ESMS tailored to the nature of the project, for assessing and managing environmental	• ESIA • Environmental and Social Management System (ESMS) • Environmental and Social Policy • Environmental and Social Management Plan • Organisational capacity and commitment • Supply chain management • Project monitoring and reporting	The Project is a Category A and therefore an ESIA commensurate to the likely impacts and risks is required. This ESIA and associated documents have been prepared to meet the EBRD PRs, together with an ESAP identifying future actions required to ensure ongoing compliance with the PRs. A DEIA is being prepared alongside this ESIA. An ESMS will need to be set up for Project implementation. The Construction Contractor will be required to develop a detailed construction ESMMP.

[28] In 2019, an updated version of the 2014 ESP was approved by the EBRD Board of Directors on 25 April 2019. This applies to projects initiated after 1 January 2020 and therefore this Project is subject to the 2014 ESP.

Performance Requirement	Summary and Objectives	Areas covered	Relevance and compliance
	and social issues and impacts in a manner consistent with relevant PRs.		
PR2: Labour and Working Conditions	Summary The EBRD required that projects comply, at minimum, with national labour, social security and occupational health and safety law, and the fundamental principles and standards embodied in the International Labour Organisation (ILO) conventions. Throughout this PR, the terms 'workers' is used to refer to the employees of the client, including part-time, temporary, seasonal and migrant workers. The requirements should be articulated through appropriate policies, working conditions and equal opportunities. Objectives • respect and protect the fundamental principles and rights of workers • promote the decent work agenda, including fair treatment, non-discrimination and equal opportunities of workers • establish, maintain and improve a sound worker-management relationship • promote compliance with any collective agreements to which the client is a party, national labour and employment laws • protect and promote the safety and health of workers, especially by promoting safe and healthy working conditions • prevent the use of forced labour and child labour (as defined by the ILO) as it relates to project activities.	• Management of worker relationships • Human resources policies • Working relationships • Child labour • Forced labour • Non-discrimination and equal opportunity • Workers' organisations • Wages, benefits and conditions of work • Occupational health and safety • Worker accommodation • Retrenchment • Grievance mechanism • Non-employee workers • Supply chain • Security personnel requirements	This PR is mainly applicable to the construction phase of the Project, when additional suppliers and workers will be employed. It is also relevant to maintenance works in the O&M phase. The number of workers likely to be employed for the Project is not currently known. Labour issues have been addressed as part of the ESIA, social impact assessment, and ESMMP. The ESMMP identifies the requirement for a Labour Management Plan and Labour Grievance Mechanism. Mongolian laws and regulations on employment and working conditions prohibit discrimination based on gender, age, physical ability, race, ethnical origins etc. Men and women are entitled for equal payment for the same job/work performed. The Labour Management Plan will need to comply with Mongolian and international requirements.
PR3: Resource Efficiency and Pollution Prevention and Control	Summary Projects must meet good international practice (GIP) with regard to resource efficiency and pollution prevention and control that are essential elements of environmental and social sustainability. The objectives of this PR are to identify project-related opportunities for energy, water and resource efficiency improvements and waste minimisation; to adopt the mitigation hierarchy approach; and to promote the reduction of project-related greenhouse gas emissions. Objectives • identify project-related opportunities for energy, water and resource efficiency improvements and waste minimisation • adopt the mitigation hierarchy approach to addressing adverse impacts on human health and the environment arising from the resource use and pollution released from the project • promote the reduction of project-related greenhouse gas emissions	• Resource efficiency • Pollution prevention and control • Greenhouse gases • Water • Waste • Safe use and management of hazardous substances and materials • Pesticide use and management	Construction works may give rise to pollution through, increased traffic, general construction practices, and construction wastes. Operation of high voltage lines may result in EMF risks. During operation, maintenance activities may also give rise to pollution risk and wastes. This ESIA assesses these risks and identifies mitigation measures for significant adverse effects. The ESMMP identifies measures for resource efficiency and pollution prevention to be implemented during the Project. The Construction Contractor will be required to prepare a detailed Construction ESMMP prior to construction.
PR4: Health and Safety	Summary This PR contains requirements for the client to take steps to identify and prevent accidents, injury and disease to workers and affected communities; to provide workers and affected communities with relevant information, guidance and training relating to health and safety hazards, risks, protective and preventive measures and emergency arrangements; and to investigate, document and analyse the findings and	• General requirements for health and safety management • Occupational health and safety • Community health and safety • Infrastructure, building and	The Project may give rise to adverse impacts on community health, safety and security during construction, for example, community health and safety impacts, including general construction impacts, electromagnetic fields and

Performance Requirement	Summary and Objectives	Areas covered	Relevance and compliance
	adopt the measures to prevent reoccurrence of accident, injury and diseases where any accident, injury and disease arises or occurs. Objectives • protect and promote the safety and health of workers by ensuring safe and healthy working conditions and implementing a health and safety management system, appropriate to the relevant issues and risks associated with the project. • anticipate, assess, and prevent or minimise adverse impacts on the health and safety of project-affected communities and consumers during the project life cycle from both routine and non-routine circumstances.	equipment design and safety • Hazardous materials safety • Product safety • Services safety • Traffic and road safety • Natural hazards • Exposure to disease • Emergency preparedness and response	electrocutions, falling from heights. During operation, the Project will have a positive impact such as improved electricity supply including for small villages along the lines as well as the risk of EMFs. This ESIA and the ESMMP set out the requirements for H&S management. Contractor will be required to prepare a detailed Construction ESMMP prior to construction.
PR5: Land Acquisition, Involuntary Resettlement and Economic Displacement	Summary This PR applies to physical or economic displacement, that can be full, partial, permanent, or temporary. The applicability of this PR to be determined during the environmental and social assessment process. Clients are encouraged to acquire land right through negotiated settlements even if they have the legal means to gain access to the land without the consent of the seller. Objectives • avoid or, when unavoidable, minimise, involuntary resettlement by exploring alternative project designs • mitigate adverse social and economic impacts from land acquisition or restrictions on affected persons' use of and access to assets and land by: (i) providing compensation for loss of assets at replacement cost; and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those affected • restore or, where possible, improve the livelihoods and standards of living of displaced persons to pre-displacement levels • improve living conditions among physically displaced persons through the provision of adequate housing, including security of tenure at resettlement sites.	• Avoid or minimise displacement • Consultation • Socio-economic assessment and census • Compensation for displaced persons • Grievance mechanism • Resettlement and/or Livelihood Restoration Framework • Monitoring • Physical displacement • Economic displacement • Loss of public amenities • Private sector responsibilities under government-managed resettlement	This PR is potentially applicable to the Project in relation to economic displacement, mainly in relation to temporary loss of access to land during construction and permanent loss of land during operation. No residential properties (winter camps) were identified during the June 2020 survey in the RoW. However, as herder households are transient, this will need to be surveyed in detail, once the final route is selected. There are also water wells within the vicinity of the RoW. Currently it is not anticipated that temporary loss of access will result in livelihood impacts. However, the permanent footprint of the route will affect 8 exploration mining licence areas and crosses two locally protected sites. A LARF has been prepared as part of this ESIA disclosure package. A detailed survey of the final route RoW will be required and, where necessary, a Resettlement Action Plan (RAP) and/or Livelihood Restoration Plan (LRP) will need to be prepared and implemented. The Construction Contractor will need to select temporary construction sites based on negotiated and voluntary transactions wherever possible. Where this is not possible, the Client will need to assess the impact of the temporary displacement related to temporary Contractor sites as part of the RAP/LRP.
PR6: Biodiversity Conservation and Sustainable Management of	Summary This PR covers the conservation of biodiversity and sustainable management of living natural resources, and the balance with the potential for utilising the multiple economic, social and cultural values of biodiversity and living natural resources. It recognises	Conservation of biodiversity • Assessment of issues and impacts	There are two locally designated sites within the RoW and permanent footprint of the Project. The nearest IBA to the site is 10 km to the south west of the OHTL route. Several protected species of

Performance Requirement	Summary and Objectives	Areas covered	Relevance and compliance
Living Natural Resources	the importance of maintaining core ecological functions of ecosystems and the biodiversity they support. Objectives • Protect and conserve biodiversity using precautionary approach • Adopt the mitigation hierarchy approach, with the aim of achieving no net loss of biodiversity, and where appropriate, a net gain of biodiversity Promote good international practice (GIP) in the sustainable management and use of living natural resources	• Biodiversity conservation requirements • Legally protected and internationally recognised areas of biodiversity value • Invasive alien species Sustainable management of living natural resources • Assessment of issues and impacts - Crop and livestock production - Fisheries and aquaculture - Natural and plantation forestry - Use of biomass fuel and biofuel production - Supply chain • Genetically Modified Organisms (GMOs)	flora and fauna have been identified in the Project Area. These species could be affected by vegetation clearance and the permanent footprint of the Project, as well as operational impacts of the OHTL on birds that fly at the height of the line. Mitigation is proposed in this ESIA and the ESMMP to minimise the potential impact on birds and habitats.
PR7: Indigenous Peoples	Summary Indigenous Peoples may be referred to in different countries by different terms. It is also recognised that the groups who might not be classified as Indigenous People in one country or region, may be classified as such in another. In the PR7 this term is used in a technical sense to refer to a social and cultural group, distinct from dominant groups within national societies. PR7 applies when a project is likely to affect Indigenous Peoples. Specific objectives of this PR include but not limited to enable Indigenous Peoples to benefit from projects in culturally appropriate manner, to recognise and respect the customary laws and customs of Indigenous Peoples and to take these into full consideration. Objectives • to ensure that the transition process fosters full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples • to both anticipate and avoid adverse impacts of projects on the lives and livelihoods of Indigenous Peoples' communities, or when avoidance is not feasible, to minimise, mitigate or compensate for such impacts • to enable Indigenous Peoples to benefit from projects in a culturally appropriate manner • to support the client to establish and maintain an ongoing relationship with the Indigenous Peoples affected by a project throughout the life of the project • to foster good faith negotiation of the client with, and the informed participation of, Indigenous Peoples when projects are to be located on traditional or customary lands used by the Indigenous Peoples, when customary or non-traditional livelihoods will be affected by the project, or in the case of commercial exploitation of the Indigenous Peoples' cultural resources	• Assessment • Avoidance of adverse effects • Preparation of an Indigenous Peoples Development Plan • Information disclosure, meaningful consultation and informed participation • Grievance mechanism and prevention of ethnically based discrimination • Compensation and benefit-sharing • Impacts on traditional or customary lands under use • Relocation of Indigenous Peoples from traditional or customary lands • Cultural heritage	Not applicable, there are no indigenous peoples in the Project Area.

Performance Requirement	Summary and Objectives	Areas covered	Relevance and compliance
	• to recognise the principle, outlined in the UN Declaration on the Rights of Indigenous Peoples,3 that the prior informed consent of affected Indigenous Peoples is required for the project-related activities identified in paragraphs 30-34 below, given the specific vulnerability of Indigenous Peoples to the adverse impacts of such projects4 • to recognise the specific needs of men, women and children of Indigenous Peoples by addressing gender issues and mitigating potential disproportionate gender impacts of a project • to recognise and respect the customary laws and customs of Indigenous Peoples and to take these into full consideration • to respect and preserve the culture, knowledge and practices of Indigenous Peoples in accordance with their wishes.		
PR8: Cultural Heritage	Summary This PR recognises the importance of cultural heritage for present and future generations. The aim is to protect cultural heritage and to guide clients in avoiding or mitigating adverse impacts on cultural heritage in the course of their business operations. PR8 covers both tangible and intangible cultural heritage. This PR is guided by applicable international conventions and other instruments. Objectives • support the protection and conservation of cultural heritage • adopt the mitigation hierarchy approach to protecting cultural heritage from adverse impacts arising from the project • promote the equitable sharing of benefits from the use of cultural heritage in business activities	• Assessment process - Screening for impacts on cultural heritage - Avoiding impacts - Assessing impacts that cannot be avoided • Managing impacts on cultural heritage - Chance finds procedure • Consultation with affected communities and other stakeholders • Project's use of cultural heritage	No direct impacts on known cultural heritage will occur as a result of the Project. However, there is a potential for unknown cultural heritage to be present in the project Area and therefore, the requirement for a Chance Finds Procedure has been identified and included in the ESMMP.
PR10: Information Disclosure and Stakeholder Engagement	Summary This PR identifies GIP relating to ongoing stakeholder engagement as an ongoing process which involves: (i) public disclosure of appropriate information; (ii) meaningful consultation with stakeholder; and (iii) an effective procedure or mechanism by which people can make comments or raise grievances. Objectives Outline a systematic approach to stakeholder engagement that will help clients build and maintain a constructive relationship with their stakeholders, in particular the directly affected communities • promote improved environmental and social performance of clients through effective engagement with the project's stakeholders • promote and provide means for adequate engagement with affected communities throughout the project cycle on issues that could potentially affect them and to ensure that meaningful environmental and social information is disclosed to the project's stakeholders • ensure that grievances from affected communities and other stakeholders are responded to and managed appropriately	• Engagement during project preparation - Stakeholder identification - Stakeholder Engagement Plan - Information disclosure - Meaningful consultation - Disclosure and consultation on Category A projects • Engagement during project implementation and external reporting • Grievance mechanism	The Project as a whole will be disclosed on the EBRD website for 120 days. The SEP identifies the requirements for stakeholder engagement prior to, during and following the construction phase.

4.2.3. European Union Standards

The EBRD ESP requires the Project to meet all relevant EU substantive environmental standards. The key relevant EU Directives are set out below. The EBRD also observes the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters and the

Espoo Convention on Environmental Impact Assessment in a Transboundary Context. These conventions are also discussed below.

EU Directive 2011/92/EU Environmental Impact Assessment, amended in 2014 by Directive 2014/52/EU

The most relevant EU Directive in relation to the Project is *EU Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by 2014/52/EU (the EIA Directive).* This Directive improves the level of environmental protection, with a view to making business decisions on public and private investments more sound, predictable and sustainable in the longer term. EIA is required for all projects in Annex I and for Annex II projects, national authorities have to decide whether an EIA is needed. It also strengthens the need for effective public participation in decision-making, protection and promotion of cultural heritage and strengthen public access to information.

A review against the EIA Directive requirements has been undertaken, to assess whether the Project are listed in Annex I or II of the EIA Directive. The following is applicable in Annex I:

> *"Construction of overhead electrical power lines with a voltage of 220 kV or more and a length of more than 15 km". (Annex I, Article 4(1)".*

It is considered that the Project falls under Annex I, which means that the Project should be subject to an EIA.

EU Directive 2009/147/EC on the Conservation of Wild Birds

The EU Directive on the conservation of wild birds (2009/147/EC), referred to as the Birds Directive, is relevant due to the presence of the IBA within 10 km of the OHTL route. Article 1 applies the Directive to the conservation of all species of naturally occurring birds in the wild state in the European territory of the Member States to which the Treaty applies. It covers the protection, management and control of these species and lays down rules for their exploitation; and applies to birds, their eggs, nests and habitats. Article 5 requires the protection of nests and eggs and prohibits deliberate disturbance of these birds particularly during the period of breeding and rearing, in so far as disturbance would be significant having regard to the objectives of this Directive.

EU Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on Public Access to Environmental Information

The purpose of the Directive is to ensure that environmental information is systematically available and distributed to the public. The Directive requires Member States to ensure that public authorities are required to make the environmental information they hold available to any legal or natural person on request.

EU Framework Directive on Safety and Health at Work (89/391/EEC)

This Framework Directive lays down the main principles to encourage improvements in the safety and health of workers at work. It guarantees minimum safety and health requirements throughout Europe while Member States are allowed to maintain or establish more stringent measures.

EU Directive 2013/35/EU of the European Parliament of and of the Council of 26 June 2013 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (20th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) and repealing Directive 2004/40/EC (the EMF Framework Directive)

This Directive covers all known direct biophysical effects and other indirect effects caused by electromagnetic fields. The Directive currently only addresses short-term effects and does not concern possible long-term effects.

The employer shall eliminate or reduce to a minimum the risks that arise from EMFs at the workplace in line with the principles of the Framework Directive . If relevant action levels are and relevant exposure limit values may be exceeded, the employer shall implement an action plan in order to ensure that the latter is not exceeded. Certain derogations apply to limit values.

It requires that risks assessment of EMFs at the workplace (if necessary including measurements and calculations, if necessary) should be carried out in line with the Framework Directive . Assessment of occupational exposure is not required if evaluation for the general public has already been completed and if the specific equipment is intended for public use. The employer shall consider updating the risk assessment and the prevention measures if workers report transient symptoms in relation to their sensory/neural system.

EU Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on Energy Efficiency

The EU Directive on Energy Efficiency is not directly applicable, but some provisions are relevant. Particularly, Article 15 covers energy transformation, transmission and distribution. It requires an assessment of the energy efficiency potentials of electricity infrastructure, in particular regarding transmission, distribution, load management and interoperability, and connection to energy generating installations. Article 15 also requires identification of concrete measures and investment for the introduction of cost-effective energy efficiency improvements in the network infrastructure, with a timetable for their introduction.

Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, 1998 (Aarhus Convention)

The Aarhus Convention establishes a number of rights of the public (individuals and their associations) with regard to the environment. This Convention provides for:

- **Access to environmental information**. The right of everyone to receive environmental information that is held by public authorities. Applicants are entitled to obtain this information within one month of the request and without having to say why they require it. In addition, public authorities are obliged, under the Convention, to actively disseminate environmental information in their possession;
- **Public participation in environmental decision-making**. The right to participate in environmental decision-making. Arrangements are to be made by public authorities to enable the public affected and environmental non-governmental organisations to comment on, for example, proposals for projects affecting the environment, or plans and programmes relating to the environment. These comments to be taken into due account in decision-making, and information to be provided on the final decisions and the reasons for it;
- **Access to justice.** The right to review procedures to challenge public decisions that have been made without respecting the two aforementioned rights or environmental law in general.

The Espoo Convention on Environmental Impact Assessment in a Transboundary Context, 1991

The Espoo (EIA) Convention sets out the obligations of Parties to assess the environmental impact of certain activities at an early stage of planning. It also lays down the general obligation of States to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact across boundaries.

The United Nations Convention on the Rights of the Child, 1990

According to the Article 32.1 the right of the child to be protected from economic exploitation and from performing any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development.

4.2.4. International Labour Organization (ILO) conventions

The EBRD PRs also requires the Project to meet the following International Labour Organization (ILO) conventions:

C087 Convention on Freedom of Association and Protection of the Right to Organise, 1948

This is one of eight conventions that form the core of international labour law. Part 1 consists of ten articles which outline the rights of both worker and employers to join organisations of their own choosing without previous authorisation. Rights are also extended to the organizations themselves to draw up rules and constitutions, vote for officers, and organize administrative functions without interference from public authorities. Part 2 states that every ILO member undertakes to ensure "all necessary and appropriate measures to ensure that workers and employers may exercise freely the right to organise." Part 3 deals with technical matters related to the Convention. Part 4 also outlines provisions for denunciation of the Convention, including a ten-year cycle of obligation.

C098 Convention on the Right to Organise and Collective Bargaining, 1949

Article 1 states that workers must be protected against discrimination for joining a union, particularly conditions of employers to not join a union, dismissal or any other prejudice for having union membership or engaging in union activities. Article 2 requires that both workers and employers' organisations (i.e. trade unions and

business confederations) should not be interfered in their own establishment, functioning or administration. Article 2(2) prohibits, in particular, unions being dominated by employers through "financial or other means" (such as a union being given funding by an employer, or the employer influencing who the officials are). Article 3 requires each ILO member give effect to articles 1 and 2 through appropriate machinery, such as a government watchdog. Article 4 requires that the law promotes "the full development and utilisation of machinery for voluntary negotiation" between worker organisations and employer groups to regulation employment "by means of collective agreements." Article 5 states that national law can provide different laws for the police and armed forces, and the Convention does not affect laws that existed when an ILO member ratifies the Convention. Article 6 further gives an exemption for "the position of public servants engaged in the administration of the State".

C029 Convention on Forced Labour, 1930 and its supplementing protocol P029, 2014

This Convention's objective is to suppress the use of forced labour in all its forms irrespective of the nature of the work or the sector of activity in which it may be performed. The Convention defines forced labour as "all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily", with few exceptions like compulsory military service.

C100 Covention on Equal Remuneration, 1951

This Convention calls for equal pay for men and women for work of equal value. The Convention applies to basic wages or salaries and to any additional emoluments.

C105 Convention concerning the Abolition of Forced Labour, 1957

This Convention cancels certain forms of forced labour still allowed under the Forced Labour Convention of 1930, such as punishment for strikes and as a punishment for holding certain political views. Each Member of the ILO which ratifies this Convention undertakes to suppress and not to make use of any form of forced or compulsory labour—

a) as a means of political coercion or education or as a punishment for holding or expressing political views or views ideologically opposed to the established political, social or economic system;

b) as a method of mobilising and using labour for purposes of economic development;

c) as a means of labour discipline;

d) as a punishment for having participated in strikes; and

e) as a means of racial, social, national or religious discrimination.

C111 Convention concerning Discrimination in Respect of Employment and Occupation, 1958

A fundamental convention relating to labour rights. With respect to this convention the term discrimination includes any distinction, exclusion or preference made on the basis of race, colour, sex, religion, political opinion, national extraction or social origin, which has the effect of nullifying or impairing equality of opportunity or treatment in employment or occupation.

C138 Convention concerning Minimum Age for Admission to Employment (1973)

Countries are free to specify a minimum age for labour, with a minimum of 15 years. minimum age of 18 years is specified for work which "*is likely to jeopardise the health, safety or morals of young persons".*

C182 Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour ("Worst Forms of Child Labour Convention"), 1999

By ratifying this Convention, a country commits itself to taking immediate action to prohibit and eliminate the worst forms of child labour. The term child shall apply to all persons under the age of 18. The worst forms of child labour include:

- All forms of slavery or practices similar to slavery;
- Commercial sexual exploitation of children;
- use, procuring or offering of a child by others for illegal activities; and
- Work, which by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children.

4.3. Mongolian Requirements

4.3.1. Institutional Framework

Mongolia is a parliamentary republic in which representatives of the State Great Khural (the national Parliament) are elected for 4 years by a direct popular vote. There are 76 seats in the State Great Khural, and presidential elections take place every 4 years. The 4th Constitution of Mongolia was adopted in 1992, which restructured the legislative branch of the government by creating a unicameral parliamentary legislature.

Governance of administrative and territorial units of Mongolia is organised by a combination of the principles of self-governance and central government. The self-governing bodies at the *aimag* (province), *soum* (district), and *bagh* (sub-district) levels are called Citizens Representative Khurals (CRKhs), or *hurals*. Representatives of the CRKhs of *aimags*, the capital city, and soums are elected for a term of four years. The competencies of *soum* and district CRKhs include:

> *"The right to discuss and make a decision on any economic, social and organisational matters other than those matters legally defined within the powers of the President, State Great Khural, Government, ministry and agency, CRKhs of higher level and other competent State authorities and officials"* (MCRK 2019).

The functions assigned to *aimag* and *soum* CRKhs include:

- Approving, reviewing, and evaluating the Governor's activities;
- Monitoring and evaluating the Governor's implementation of legislation and resolutions passed by the CRKh;
- Discussing, approving, and amending budgets; establishing and providing oversight of local development funds;
- Coordinating local socio-economic development strategies with regional strategies;
- Imposing fees and tariffs within the limits of the law;
- Approving land-use management plans and measures for environmental protection; and
- Exercising local property ownership rights.

The key institutions involved in policy making, managing and operating the energy sector at the national level according to the Energy Law as of 2001 are:

- **State Great Khural.** Mongolian Parliament which formulates state policy on energy;
- **Ministry of Energy.** The ministry is in charge of the development of policy, including the development of energy resources, energy use, import and export of energy, construction of power plants, transmission lines, energy conservation, use of renewable resources, regulation and international cooperation. It plays a key role in shaping the green development strategy for Mongolia.
- **Energy Regulatory Commission.** The body is in charge of issuing licenses, approving tariffs and protecting the rights of consumers and licensees.
- **The National Dispatching Centre.** The centre is responsible for coordinating daily system operation of all power and heat sector entities including real time coordination of power plant operation, transmission and distribution switching operation, and operation of the heat transmission network in coordination with combined heat and power operation. The NDC is also responsible for providing the information necessary for settlement of spot market transactions within the context of the wholesale electric power market.

In broad terms the responsibility for licensing is vested with the Ministry of Energy, and for price regulation with the Energy Regulatory Commission.

In addition, the institutions relevant to this Project are:

- **Central Energy System (CES).** The CES consists of five combined heat and power generation power plants, one transmission network and four distribution networks. It is one of five main energy systems in the electric power network of Mongolia.
- **National Power Transmission Grid State Owned Joint Stock Company (NPTG).** The NPTG owns and operates the 110 kV and 220 kV electricity transmission lines and substations within the CES region. The Company's main business activity is to provide operational, maintenance, installation,

performance testing and regime adjusting services for substations and electricity transmission lines and substations.

- **Baganuur and South-Eastern Region Power Distribution Grid (BSRDG).** BSRDG owns and operates power distribution lines within the south-eastern region of Mongolia.

4.3.2. National Energy Policies

The Government of Mongolia promulgated various environmental policies in the energy sector and the following are the main documents that form the base for legislative development:

- Mongolia State Policy on Energy 2015-2030;
- National Program of Renewable Energy 2005-2020;
- Mongolian Energy Sector Master Plan 2000-2020;
- Mongolia's Sustainable Energy Strategy 2002-2010;
- National Program on Renewable Energy 2005;
- Green Development Policy of 2014;
- Mid-Term National Programme to Develop the State Policy on Energy 2018-2023;
- Mongolian Integrated Power System program 2007-2040;[29]
- National Development Policy of Mongolia based on the Millennium Development Objective 2008; and
- Centralized Energy System Program 2002.

Governmental policy in energy sector is mainly implemented through the fundamental legal documents including the Energy Law (2001), Renewable Energy Law (2007), Centralized Energy System Program (2002), National Program on Renewable Energy (2005), National Development Policy of Mongolia based on the Millennium Development Objective (2008) and the Concession Law.

The State Policy on Energy 2015-2030 was approved by the Mongolian Parliament in 2015.[30] The Policy sets out the following strategic goals in the Governmental energy policy:

- Within the framework of ensuring the labour safety and operational security:
  - to ensure reliable energy supply and operational security;
  - to promote regional mutually beneficial cooperation in the energy sector; and
  - to improve workforce preparation system of the energy sector and strengthen its capacity.
- Within the framework of enhancing the efficiency of the energy sector:
  - to pursue policy on energy thrift and efficiency restoration;
  - to operate the energy sector relying on the principle of competitive market through increasing the private sector participation in the sector; and
  - to introduce innovative and advanced technology into the energy sector.
- Within the framework of environmental conservation:
  - to mitigate adverse environmental impacts and reduce the emission of greenhouse gas;
  - to increase the production of renewable energy; and
  - to promote new energy sources and environmentally-favourable technology.

4.3.3. National Environmental and Social Laws

Mongolia has enacted a comprehensive legal framework for environmental assessment and management which is comprised of policies, legislation and strategies. The hierarchy of policies and legislative provisions for environmental management in Mongolia comprises the Constitution, international treaties, and environment and resource protection laws. A fundamental principle of the Mongolian state environmental policy is that economic development must be in harmony with the extraction and utilization of natural resources and that air, water, and soil pollution is controlled.

[29] J. Janarbaatar, Senior Specialist of Policy and Planning Department, 2018. *Energy Sector of Mongolia, Country Report.* Available at: https://eneken.ieej.or.jp/data/8016.pdf. Accessed March 2020.
[30] Ibid.

The Government of Mongolia undertook a major environmental law reform in 1990 including the Law of Land, protected areas, water, forest, wildlife, and native flora resources and a further reform was undertaken in 2012.

All relevant environmental and social laws and regulations will be applied to the Project in Table 4-2.

Table 4-2. Key Laws of Mongolia relating to transmission lines and environmental and social impacts

#	Name of the law	Year adopted	Year of amendment
1	The Constitution of Mongolia	1992	
2	Law on Environmental Protection	1995	2012
3	Law on Land	2002	2012
4	Law on Sub-Soil	1988	2015
5	Law on Special Protected Areas	1994	2004
6	Law on Fauna	2000	2012
7	Law on Natural Plants	1995	2015
8	Law on Protection of Plants	1996	2007
9	Law on Water	1995	2012
10	Law on Air	1995	2012
11	Law on Environmental Impact Assessment	1998	2002, 2012
12	Law on Waste	2003	2017
13	Law on Toxic and Hazardous Chemicals	2006	2017
14	Law on Protection of Cultural Heritage	2001	2016
15	Law on Occupational Health and Safety	2008	2015
16	Law on Social Insurance	1994	
17	Law on Pensions Benefits provided by the Social Insurance Fund in Case of Industrial Accidents and Occupational Diseases	1994	
18	Law on Land Use Fee	1997	2019
19	Civil Code	1994	2002
20	Law on Allocation of Land to Mongolian Citizens for Ownership	2003	2005, 2008
21	Energy Law	2001	2017
22	Renewable Energy Law	2007	
23	Law on Energy Conservation	2015	
24	Law on Electricity, heat and coal tariff	1995	
25	Government Resolution No. 97 on Rights of Way	2020	
26	Law on Health	2011	
27	Labour Code	1999	2012
28	Law on Hygiene	2016	
29	Law on minimum wage	2010	
30	Mongolian Law on Licensing	2001	
31	Law on Social Insurance	1994	
32	Minister of Environment and Green Development, Ordinance A-117 (Inclusion of social impacts in DEIA)	2014	
33	Minister of Environment and Green Development, Ordinance A-03 (Pubic consultation procedure)	2014	
34	Law on Pastureland Management and Conservation	2019	

Source: ESIA Preparation Team

4.3.3.1. Environmental Impact Assessment requirements

The EIA requirements of Mongolia are regulated by the Law on EIA (1998, amended 2002 and again in 2012) and the purpose of the EIA law is environmental protection, the prevention of ecological imbalance, the regulation of natural resource use, the assessment of environmental impacts of projects and procedures for decision-making regarding the implementation of projects. The terms of the law apply to all new projects, as well as rehabilitation and expansion of existing industrial, service or construction activities and projects that use

natural resources. The Minister of Environment and Green Development, Ordinance A-117 of 2014 covers the need for include social impacts in the EIA using International best practices and International Finance Institution requirements/standards.

The type and size of the planned activity define responsibility as either Ministry of Environment and Tourism (MET) or aimag (provincial) government.

There are two types of EIAs defined in Law, a General EIA (GEIA) and a Detailed EIA (DEIA); the EIA procedure requires the following:

- **Preparation of a Baseline Environmental Survey Report –** this is prepared by the project implementer.
- **GEIA - screening** - to initiate a GEIA (essentially, a decision by the regulator on what level, if any, of EIA is required), the project implementer submits to Ministry of Environment and Tourism (MET) (or Environmental department of corresponding aimag) the following: Finalized Project Design or an approved Feasibility Study, Baseline Environmental Survey Report, a letter from the soum governor which requests GEIA, technical details, drawings, and other information. The GEIA may lead to one of four conclusions: (i) no detailed EIA is necessary, (ii) the project may be completed pursuant to specific conditions, (iii) a Detailed EIA is necessary, or (iv) project cancellation. The GEIA is free and usually takes up to 14-28 working days.
- **DEIA** – the scope is defined by the GEIA. The DEIA report must be produced by a Mongolian company which is authorised by MET with a special license to conduct DEIA. The developer of the DEIA should submit it to the MET (or Environmental department of corresponding aimag). An expert of MET who was involved in conducting the GEIA will make a review of the DEIA within 18-36 working days and present it to MET (or Environmental department of corresponding province). Based on the conclusion of the expert, MET (or aimag government) takes a decision about approval or disapproval of the project. If the DEIA report is rejected by MET, further guidance is provided by MET and the report is submitted again. MET may also provide comments on the approved report.

A DEIA is being prepared by EcoTrade alongside the EBRD ESIA to obtain MET approval.

4.3.3.2. Key energy legislation

Energy Law (2001)

The primary statute to regulate energy generation, transmission, distribution, consumption and dispatching activities in Mongolia is the Energy Law, in force in 2001, amended in 2017.

The Energy Law provides the legal framework for the energy sector restructuring from being centrally planned to market-based. This Law introduced the independent energy regulator, the Energy Regulatory Authority, and vested powers and responsibilities to key institutions involved in managing and operating the energy sector. With the 2001 establishment of the Energy Regulatory Authority (Energy Regulatory Commission since 2012), energy regulation has been in place for almost two decades. The Energy Law aimed to create competition and increase private participation and investment. It defines the roles of the Government, and State in the provision of energy, and defines the powers conferred to the *aimags* and *soums*.

The Energy Law fixes the power of the Energy Regulatory Commission to grant, extend, and repeal licenses for (not full list): electricity and/or heat generation; electricity transmission networks, defined as a network of high voltage power lines and substations of 110kV and higher generating main network for the transmission of electricity, as well as other power lines and substations that are connected to the network or technically and technologically required to be part of the network; and electricity distribution networks, defined as power lines and substations of 110 kV or less for distribution of electricity coming from substations of electricity transmission network to the consumer equipment. This law also defines the rules for the development and implementation of tariffs and pricing structures from the power facility.

Mongolian Government resolution No. 120 of 1996 on the Regulation on the protection of power lines, amended by Government Resolution No. 263 of 2001

The Resolution sets out specific RoW as provided in Section 2.7 in Chapter 2: Project Description.

Law on Energy Conservation (2015)

This Law regulates matters associated with efficient use of energy and its conservation. The main provisions of the Law include:

- Powers of central and local regulators on the energy conservation matters;
- Rights and obligations of energy users;
- Incentives of energy savings;
- Professional services for energy conservation measures; and
- Designation of Energy Manager position for those whose energy use exceeds Government allocated limit.

Law on Electricity, Heat and Coal Tariff (1995)

This law regulates mandatory payment by users for their electricity, heat energy, and coal supply services agreed by contractual obligations.

Energy procedures

Several procedures have also been developed and approved for regulating the energy sector, such as:

- Operational guidance for energy infrastructures and equipment. Approved by the Minister of Infrastructure Development. Order #125 of 06 June 2003.
- Procedure for energy infrastructures and equipment installation and operation. Approved by order of the Minister for Energy. Order #87 of 10 November 2005.
- Safety Guidance for electrical infrastructure operation. Approved by the Minister for Energy. Order #101 of 22 August 2014.

4.3.3.3. Mining

The Project Area includes a number of mining concession licences. The following main laws and regulations regulate mining and exploration related activities in Mongolia[31]. The relevant primary laws (as amended from time to time) are the:

- Minerals Law.
- Law of Mongolia on Prohibiting Mineral Exploration and Mining Operations at Headwaters of Rivers, Protected Zones of Water Reservoirs and Forested Areas of 16 July 2009.
- Law of Mongolia on Environmental Protection of 30 March 1995.

The relevant secondary laws are the:

- The Constitution of Mongolia of 13 January 1992.
- Law of Mongolia on Land of 7 June 2002.
- Law of Mongolia on Environmental Impact Assessment of 17 May 2012.
- Law of Mongolia on Commonly Distributed Minerals of 9 January 2014.
- Law of Mongolia on Nuclear Energy of 16 July 2009.
- Law of Mongolia on Protection of Cultural Heritage of 15 May 2014.
- Law of Mongolia on Subsoil of 29 November 1988.
- Law of Mongolia on Investment of 3 October 2013 (Investment Law).

The Mining Resource Authority of Mongolia (MRAM) grants mining and exploration licences and monitors the operations of licence holders. The registration of licences and licenced areas is maintained by MRAM. Security over the licences is registered with the MRAM and it may terminate licences based on grounds specified by law.

[31] Mining in Mongolia: overview by Christopher Melville and Erdenedalai Odkhuu, Melville Erdenedalai LLP. Available at https://uk.practicallaw.thomsonreuters.com/w-017-7372?transitionType=Default&contextData=(sc.Default)&firstPage=true&bhcp=1. Accessed July 2020.

Ownership

In Mongolia, land right holders cannot explore or mine minerals beneath the ground. These activities can only be conducted by the relevant licence holders.

There are two types of mineral related licences:

- An exploration licence, under which the licence holder can explore minerals in a designated area.
- A mining licence, under which the licence holder can mine and extract minerals, and keep the related benefits. Licences can only be held by legal entities that are registered in Mongolia.

The minerals underneath the ground are officially the property of the state. Once extracted in accordance with the applicable laws, title to the ore or minerals passes to the licence holder.

Under the Minerals Law, only legal entities incorporated in Mongolia (that is, resident taxpayers of Mongolia) are eligible to apply for and hold exploration and mining licenses.

Licence terms

Exploration licences are granted for an initial three-year term and can be extended up to three times for additional three-year periods. The maximum period that an exploration licence can be held by a holder is 12 years from the date of initial issuance. Exploration licence holders must apply for an extension at least one month before the licence term is due to expire. These licences do not prohibit other land uses on the land under concession.

Mining licences are granted for an initial term of 30 years and can be extended twice for additional 20-year period. MRAM can decide whether to grant an extension depending on the minerals reserve. Licences for minerals with radioactivity are subject to a different regime. Mining licence holders must apply for their licence extension not less than two years prior to expiry.

Granting of exploration licence

Exploration licences are granted by way of tender organised by the MRAM. Mining licences can be granted by way of tender or by request of an exploration licence holder.

4.3.3.4. Land, land use and expropriation

Since the early 1990s, the Mongolian Government has enacted numerous laws on land tenure. Several of the laws below have been amended more than once. The 2003 Law on Allocation of Land to Mongolian Citizens for Ownership has been amended five times (in 2005, 2008, 2010, 2011, and 2012). This has given rise to inconsistencies in the law particularly regarding the status of foreign ownership.[32] The 2002 Law on Land, the overarching legislation regulating land was amended in 2019 but not the Law on Allocation of Land for Mongolian Citizens for Ownership. Therefore, inconsistencies between the two pieces of legislation may exist but none have been identified to date.

Mongolian Constitution, 1992

Under the Mongolian Constitution, 1992 all land, except that given to the citizens of Mongolia for private ownership, subsoil, natural resources and water are the property of the State. The Constitution allows the State to grant ownership of land to Mongolian citizens, but they shall not transfer such land to foreign entities. Land may be leased to foreign entities.

Law on Land (in force on 1 January 2003; amended 2 May 2019)

This law regulates the ‘ownership’, ‘possession’ and ‘use’ of land. The following definitions are important in the context of the law:

- Land includes the surface of land and airspace above it.
- The ‘ownership’ of land means to have control over land and a right to dispose of it.
- The ‘possession’ of land means to have control over land in accordance with a contract that sets out the permitted use and other terms of possession.

[32] World Bank. 2015. Land Administration and Management in Ulaanbaatar, International Bank for Reconstruction and Development, p. 26.

- The ‘use of land’ means the right to right undertake legitimate and concrete activity on a land parcel to utilise some of the useful characteristics of the land in accordance with a contract granted by those who ‘own’ or ‘possess’ the land.
- A ‘certificate of land use’ means a certificate granting the right to use land to foreign legal entities.

Land must be monitored, protected, restored and used efficiently for its permitted use. Any activities that may cause damage to human health; nature and ecological balance; or national security are prohibited. Foreign countries, international organisations, legal entities and citizens may become users of land for a specific purpose and a specific time period subject to contract conditions and in compliance with the law.

According to Article 3 of the Law on Land there are three main categories of land rights, including ownership, possession, and usage:

- Article 3.1.2 establishes private ownership of land for Mongolian citizens without time limits (comparable to freehold). Land ownership rights can be granted on special terms to Mongolian citizens only, but not to legal entities. Land ownership rights can be transferred and sold only among Mongolian citizens based on an approval of the land authority. Furthermore, as provided under Article 6.2 of the Constitution of Mongolia, all lands, except those owned by Mongolian citizens, are owned by the State of Mongolia. Hence, Mongolian and foreign legal entities cannot own land.
- Article 3.1.3 defines ‘to possess land’ as being in legitimate control of the land in accordance with the purpose of its use and any terms and conditions specified in respective contracts (persons with this right can apply for the right of ownership). This regime is comparable to leasehold. In this case, the state retains ownership of the land. Possession may be limited in time (15 to 60 years), with possible extensions up to 40 years. Only Mongolian citizens and legal entities may possess land, and size limits apply for specific uses. Contracts for possession must be registered in the national registry. In accordance with the Land Law, the holder of a land possession right can allow a third-party to use the whole or part of the land held under its possession, transfer it to a third-party with approval of the local governor and only pledge the land possession right as security to Mongolian citizens and legal entities without foreign investment.
- Article 3.1.4 defines ‘to use land’ as to undertake a legitimate and concrete activity to make use of some of the land’s characteristics in accordance with contracts made with owners or possessors of land. Land use rights can be given to Mongolian citizens or foreign nationals and foreign legal entities (i.e., companies with more than 25% ownership by foreign individuals or legal entities), for five years and are renewable for five years at a time. As provided under the Land Law, land use right cannot be transferred to any third-party or pledged as a security.

The Law of Mongolia on Land also addresses land use planning and expropriation.

The Ministry of Construction and Urban Development has the power to implement legislation and policy on land use and to determine land use classifications subject to government approval. CRKhs and Governors of aimags, the Capital City, soums and districts have powers to:

- Enforce land legislation and ratify general land Management Plans;
- Take land from citizens for the special needs of aimags, the capital city and soums on submission of such proposals by corresponding level governors; and
- Determine the size and boundaries of land to be taken from Citizens and approve the use of such land; and
- make decisions on granting compensation in respect of land taken.

Governors of aimags, the capital city, soums and districts have the following powers with respect to land issues:

- To enforce land use laws;
- To prepare land use Management Plans;
- To submit to Citizens' Representatives Khurals proposals regarding taking land for special needs, upon prior agreement with the possessor of the land and the governor of the corresponding level;
- To evict people from land if they cause significant land degradation; and
- To override land use decisions made by lower level governors if there is a legal ground.

Soum and District Governors have the power to grant rights to citizens to use and possess land in accordance with annual land Management Plans approved by CRKhs. CRKhs and Governors of *baghs* and *khoroos* have

powers to regulate and protect common tenure land. Governors of *baghs* and *khoroos* have the powers to enforce land use and land protection legislation including the implementation of decisions of higher-level authorities. A separate Law on Land Fees imposes fees on the possession and use of land (1 July 1997).

A World Bank publication noted that the lower tiers of government have wide discretion in allocating land in rural areas, which makes the issuance of possession and ownership certificates subject to politics and corruption.[33] Persons who informally obtained land from 1992 to 2011 are able to bypass new regulations enforcing formal land procedures only. For instance, some individuals with influence obtained desirable land plots through informal procedures, and despite a code enacted in 2012 prohibiting ownership of informally acquired land holdings, these individuals are exempt from the code because they resided on their plots prior to 2012.[34]

Law on Land Fee (in force on 1 July 1997 and amended on 2 May 2019)

This law regulates the relations concerning the imposition of fees for the possession and use of state-owned land for citizens, business entities and organizations as well as the payment of such fees to budget.

Law on Allocation of Land to Mongolian Citizens for Ownership, 2003

The purpose of this law is to govern the "*…allocation of land to citizens for ownership and related relations arisen out of such allocation"*. According to this law, land shall be allocated to citizens for the following purposes:

- For family needs;
- For agricultural purposes; or
- For other purposes.

Civil Code of Mongolia, 2002

The Civil Code of Mongolia (2002) is applicable to land acquisition by an entity, insofar as it regulates transactions and contracts.

Chapter 10 of the Civil Code defines property and assets, including land and other immovable property. Chapter 11 details provisions for their possession by legal acquisition and Chapter 12 for property ownership by individuals and other legal persons. The Civil Code in Article 101 provides general terms for the possession, use and disposal of property (further elaborated in Articles 109 to 112), but refers to the subsequently enacted Land Law and Land Allocation Law with regard to land ownership and possession. A number of special provisions pertaining to common property ownership (Article 108), common property of family members (Articles 126 and 128) and easements (servitude) (Article 151) may be applicable to specific cases in any particular project. Central to a negotiated agreement on transfer of land are the stipulations regarding contracts in Chapter 15.

Law on Pastureland Management and Conservation, 2019

This Law is currently subject to final approvals. The law is expected to regulate the relationship that protects pastureland soil and the user rights thereof. The draft law specifies pastureland classification (common pasture area, reserved pasture area, shared pasture area and contracted pasture area) criteria on pasture usage, agreement conditions, rights and duties, information rights of herders, government organisations' mandates, and conflict resolution, among others. There are expected changes on current pasture management in the law that ensure livestock numbers are balanced with pastureland capacity, and that there is clear classification of pasture areas (State Great Khural 2019).

Customary Land Use

The state recognises customary law with respect to use rights to pastureland. Customary law consists of *"customs that are accepted as legal requirements or obligatory rules of conduct; practices and beliefs that are so vital and intrinsic a part of a social and economic system that they are treated as if they were laws".*[35] Customary law is applicable for the allocation of grazing rights between herder families and communities in Mongolia. Grazing rights may be acquired under customary law through:

[33] Ibid, 2015.
[34] Ibid. 2015,
[35] Black's Law Dictionary, 2007.

- the use of land for generations;
- the ownership or construction of animal shelters;
- the possession of a well close to grazing land;
- the possession of croplands close to grazing land; and
- inheritance through formal legal arrangements.

Customary law has less influence today than it had in the periods before and during socialism. The traditional pastoralist system, which was based on collective stewardship of the pastureland, was compatible with centralised planning under socialism, in which all land and livestock were owned by the state and the herders were state employees. With the transition to the market and introduction of private property, traditional and collective notions about pastureland management broke down.

First, herders could no longer draw salaries from the government for their herding activities and had to rely on themselves to generate income from livestock raising and sales. Their need and desire to earn a living from their livestock resulted in larger herds with increased numbers of goats whose cashmere wool was especially profitable. Whereas before the size of herds was relatively small and the composition of herds had a balance of different animal types to suit the ecology of the pastureland, the imbalance in the type of livestock being raised (the preference for goats over other animals, including cattle) has destroyed the quality of the pastureland. When grazing, goats pull plants out by their roots instead of cutting through the top layer as sheep and other livestock do, leading to the destruction and loss of grassland. The increase in the number of goats and in herd sizes has threatened land use capacity in the country as a whole and certainly in the Project area.

Second, there was no government body (such as, a public land authority) to replace the custodial stewardship of the pastureland performed by the herders and supported by the government. The Government's priority at that time was to enact a series of laws to shift the country towards a market-based land and property system. For the most part, these laws regulated tenure, allocation, expropriation and transactions associated with land and other immoveable assets. Public management of pasturelands was subsequently overlooked.

Currently herders are able to maintain their nomadic lifestyle with few movement restrictions. This may change however if large scale commercial developments continue to take place in the pastureland areas or if the current restrictions are enforced.

4.3.3.5. Key employment and working conditions laws

Labour Code, 14 May 1999 (amended 13 December 2012)

The Labour Code sets out the rights and duties of employers and employees including collective agreement, collective bargaining, collective and individual labour disputes, labour conditions, terms and conditions of work, liabilities for breach of the legislation, and to ensure gender equality.

This law provides for the rights of employees to be provided with labour conditions that comply with health and safety laws and regulations; to receive payment for work done; to holiday; to freely assemble with other employees for the purpose of protecting the rights and legitimate interests including through representative organisations and collective agreements; to strike in certain circumstances; to receive a pension, an entitlement to social insurance and death in service benefits and to other benefits as may be provided in employment and collective agreements.

Additionally, the law prohibits discrimination in the workplace based on nationality, race, sex, social origin or status, wealth, religion, or ideology, but women are prevented from undertaking certain forms of work as set out in separate regulations. Women with children are protected from discrimination and are entitled to maternity leave. Parents with children under three years old may take childcare leave and employers must re-engage such employees on their return to work. Collective agreements may be concluded within professions or economic sectors and registered with the applicable regulator. The Labour arbitration court settles collective labour disputes and a court or commission settles individual labour disputes.

Law on Occupational Safety and Hygiene, 2008 (amended in 2015)

This law sets out provisions in relation to the rights of workers; rights and duties of employers; use of machinery and equipment; use of toxic chemicals, explosives, radioactive and biological substances; fire safety; medical examinations of workers; protective equipment; workers with disabilities; registration, handling and investigation

of accidents and diseases; sanctions for non-compliance; and division of powers between different government bodies.

Employers are required to maintain safe and healthy working conditions. The law has detailed instructions for employers with regard to use of machinery and equipment, machineries for lifting, delivering and transporting as well as fire safety requirements. Employers are required to arrange free of cost preliminary and periodic medical check-ups (related to their work performance) for all workers.

Workers also have a right to work at safe and healthy workplaces, have medical insurance to cover industrial accidents, and suspend work in the face of imminent danger.

Law on Social Insurance (1994)

The purpose of this law is to define the types and forms of social insurance, and the scope of its effect, to determine the legal basis for payment of insurance premiums, formation of the social insurance fund and its administration, social insurance institutions and the activities of social insurance inspectors, and to regulate relations related to their implementation.

As prescribed by this law, employees are subject to mandatory social security withholdings. Social security contributions cover pension insurance, benefits insurance, health insurance, and unemployment insurance.

In addition to the abovementioned contributions, the employers also contribute industrial accidents or occupational diseases insurance.

Law on Pensions Benefits provided by the Social Insurance Fund in Case of Industrial Accidents and Occupational Diseases (1997)

Under the law, sick leave is compensated from the Government-run social insurance program, except for the first five days of the leave. Leave is provided as determined by the designated medical commission at the local hospital. The compensation rate is determined by the social security legislation and depends on the number of years the employee has worked. The first five days of the leave are to be paid by the employer. Employment of a worker is secure during the term of sick leave.

There is provision for benefits in the case of industrial accidents and occupational diseases if the accident occurred at workplace or in discharge of duties elsewhere, before or after work and on the way to and from work. The law provides the following benefits to the insured persons: Disability pension; Dependent's pension; Temporary disability benefit; and Rehabilitation costs.

4.3.4. Environmental Standards

Mongolian national standards applicable to the Project are listed in Table 4-3.

Table 4-3. List of Mongolian national standards (MNS) applicable to the Project

#	Name of Mongolian National Standard (MNS)
1	MNS 17.5.13. 1980. Environmental Protection: Rehabilitation of eroded land, terms and definitions
2	MNS 5914:2008. Environment. Land reclamation. Terms and definitions
3	MNS 5916:2008. Environment Requirements for fertile soil removing and its temporary storage during the earth excavation
4	MNS 5918:2008. Environment. Re-vegetation of destroyed land. General technical requirements
5	MNS 4585:2016. Air quality. General technical requirements
6	MNS 4991:2000. Occupational safety and health. Requirement for method of determination of toxic substances concentration in the air of working zone
7	MNS 5885:2008. Acceptable concentration of air pollutant elements. General technical requirements
8	MNS 6063:2010. Air quality. Acceptable concentration of pollutant elements for atmospheric air in public area
9	MNS 5803:2007. Occupational safety and health. General requirements for lead content in workplace air and the workplace
10	MNS 4586:1998. Water quality. General requirements
11	MNS 3342:1982. General requirement for preventing from groundwater pollution
12	MNS ISO 5667-11:2000. Water quality. Sampling. Part 4: Guidance on sampling of groundwater
13	MNS 6148:2010. Water quality. Maximum limit of substance contaminating the ground water

#	Name of Mongolian National Standard (MNS)
14	MNS 4943:2015. Water quality. Effluent treated wastewater. General requirements
15	MNS 6230:2010. Identification of wastewater discharge point. General requirements
16	MNS 5924:2015. Pit latrine and sewage pit. Technical requirements
17	MNS 3475:2003. Plant quarantine. Terms and definitions.
19	MNS 5850:2008. Soil quality. Soil pollutants elements and substance
20	MNS 3298:1991. Soil. General requirements for sampling
21	MNS 2305:1994. Soil. Procedure for sampling, packaging, transportation and storage.
22	MNS 5546:2005. General requirements for assessment of soil erosion and degradation of vegetation cover in pasture lands.
23	MNS 3297:1991. Environment protection. Soil. The norm for sanitary condition of soil in town and residential areas
24	MNS 4643:1998. Occupational safety and operational security signs. Colour of safety signs.
25	MNS 4994:2000. Occupational safety and health. Vibration. Requirement for general safety.
26	MNS 4994:2000. General requirements for measuring vibration.
27	MNS 5029:2011. Occupational safety and health. Label and marking of toxic and hazardous chemicals
28	MNS 5079:2001. General safety requirements for loading and unloading.
29	MNS 5105:2001. Occupational safety. Industrial hygiene. Hygiene protection areas norm, general requirements.
30	MNS 5146:2002. Occupational safety. Industrial hygiene. Electric safety. Protective conductive earth, neutralling.
31	MNS 5390:2004. Occupational safety and health. Fire safety of electricity. General requirements.
32	MNS 4930:2000. Safety of machinery. General requirements.
33	MNS 4969:2000. Organization of a training. Basic rules.
34	MNS 4643:1998. Occupational safety. Colour of safety signs.
35	MNS 4994:2000. Occupational safety and health. Vibration. Requirement for general safety.
36	MNS 0012.4.005:1985. Device and method for protection from noise.
37	MNS 5003:2000. General requirements for the measurements of noise.
38	MNS 5150:2002. Electric safety. General requirement.
39	MNS 5145:2002. Electric safety. Maximum voltage and maximum level of current.
40	MNS 5149:2002. Industrial hygiene. Power frequency electric fields. Permissible levels of field strength and requirements for control at workplaces.
41	MNS 5002:2000. Occupational safety and health. Noise. Requirements for general safety.
42	MNS 4931:2000. Personal protective equipment. Types and general requirements.
43	MNS 5388:2004. Hearing protection equipment (ear plug, ear muff). General technical requirements.
44	MNS 5389:2004. Eye protection equipment-Goggles.
45	MNS 5621:2006. Head protection equipment-Hard hat.
46	MNS 5622:2011. Safety gloves. General requirements.
47	MNS 5623:2006. Foot protection equipment. Safety boots.
48	MNS 5344:2011. General requirements for transportation of domestic waste.
49	MNS 5282:2003. Fire safety of petroleum products. General requirements.
50	MNS 5566:2005. Protection against fire. Fire protection instrument for building. Technical requirements.
51	MNS 4244:1994. Fire safety. General requirements.
52	MNS 3629:1983. Petroleum, petroleum product. Packaging, labelling and transportation.
53	MNS 4596:2014. Use of road signage, traffic light, protective bracket, and direction signs.
54	MNS 5645:2006. Transportation of construction materials in pieces and bulk. Classification, transportation condition. General requirements.

#	Name of Mongolian National Standard (MNS)
55	MNS 6515:2015. Passages for wild ungulates altogether highways and railways in steppe and gobi areas. General requirements.

Source: ESIA Preparation Team

4.3.5. National Permits

Mongolian national permits for electricity generation and transmission are as follows:

- Construction of Energy Infrastructures
- Electricity Generation
- Electricity Transmission
- Dispatching
- Electricity Distribution
- Coordinated Electricity Provision
- Un-coordinated Electricity Provision
- Electricity Import and Export

4.3.6. International Conventions

Mongolia has adopted a number of international conventions with regard to environment as shown in Table 4-4.

Table 4-4. International environmental and social conventions signed by Mongolia

#	Convention	Year of Accession
Environmental Conventions		
1	Convention on Biological Diversity	1993
2	UN Framework Convention on Climate Change (UNFCCC)	1994
3	Kyoto Protocol	1999
4	UN Convention to Combat Desertification	1996
5	Convention on the Protection of Wetlands of International Importance especially as Waterfowl Habitat (Ramsar)	1998
6	Vienna Convention for the Protection of the Ozone Layer	1996
7	Montreal Protocol (regulating substances that deplete the ozone layer)	1996
8	Convention on International Trade in Endangered Species of Fauna and Flora (CITES)	1996
9	Convention on the Transboundary Movement of Hazardous Waste (Basel)	1997
10	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	2000
11	Stockholm Convention on Persistent Organic Pollutants	2004
12	Convention on the Conservation of Migratory Species of Wild Animals	1999
13	MoU concerning the Conservation of Migratory Birds of Prey in Africa and Eurasia	2008
14	Paris Climate Accord	2016
Cultural Heritage Conventions		
15	Convention for the protection of cultural property during armed conflict	1964
16	World Heritage and Natural Heritage Convention	1990
17	Convention on the prevention measures of illegal entry and release of cultural heritage, as well as prohibition of cultural heritage ownership transfer	1991
18	Convention on the Safeguarding of Intangible Cultural Heritage	2005
19	Convention for the protection and promotion of the diversity of cultural expressions	2005

Source: ESIA Preparation Team

Although Mongolia is not a signatory, the EBRD also observes the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, the Espoo Convention on Environmental Impact Assessment in a Transboundary Context and the ILO conventions.

Mongolia has been a member of the ILO since 1968 and has ratified 20 ILO Conventions, of which 18 are in force, including all eight fundament conventions, and one convention has been denounced. Ratified conventions are listed in Table 4-5.

Table 4-5. ILO Conventions ratified by Mongolia

Convention Name	Ratification date by Mongolia
Freedom of association, collective bargaining, and industrial relations	
C087 – Freedom of Association and Protection of the Right to Organize Convention, 1948 (No.87)	03 June 1969
C098 – Right to Organize and Collective Bargaining Convention, 1949 (No.98)	03 June 1969
C135 – Workers' Representatives Convention, 1971 (No.135)	08 Oct 1996
Forced Labour	
C029 – Forced Labour Convention, 1930 (No.29)	15 Mar 2005
C105 – Abolition of Forced Labour Convention	15 Mar 2005
Elimination of child labor and protection of children and young persons	
C123 – Minimum Age (Underground Work) Convention, 1965 (No.123) Minimum age specified: 18 years,	03 Dec 1981
C138 – Minimum Age Convention, 1973 (No.138)	16 Dec 2002
C182 – Worst Forms of Child Labour Convention, 1999 (No.182)	26 Feb 2001
Equal opportunity and treatment	
C100 – Equal Remuneration Convention, 1951 (No.100)	03 Jun 1969
C111 – Discrimination (Employment and Occupation) Convention, 1958 (No.111)	03 Jun 1969
Employment policy and promotion	
C088 – Employment Service Convention, 1948 (No.88)	17 Apr 2015
C122 – Employment Policy Convention, 1964 (No.122)	24 Nov 1976
C159 – Vocational Rehabilitation and Employment (Disabled Persons) Convention, 1983 (No.159)	03 Feb 1998
C181 – Private Employment Agencies Convention, 1997 (No.181)	17 Apr 2015
Occupational safety and health	
C155 – Occupational Health and Safety Convention, 1981 (No.155)	03 Feb 1998
C176 - Safety and Health in Mines Convention, 1995 (No.176)	26 Nov 2015
Maternity protection	
C103 – Maternity Protection Convention, 1952 (No.103)	03 Jun 1969
Tripartite consultation	
C144 – Tripartite Consultation (International Labour Standards) Convention, 1976 (No.144)	10 Aug 1998

Source: ILO

5. Approach to the ESIA

5.1. Introduction

This Chapter sets out the overall approach to the preparation of the ESIA for the Project.

This ESIA has been undertaken in accordance with:

- EBRD's ESP and relevant PRs;
- Relevant EU environmental standards;
- Relevant Mongolian environmental and social legislation and regulations;
- Relevant international conventions and protocols relating to environmental and social issues, as transposed into national legislation; and
- Good International Practice (GIP).

The key stages of the ESIA process have covered the following, and each stage is discussed in more detail in this Chapter:

- Scoping;
- Stakeholder engagement;
- Policy, legal and institutional review;
- Baseline conditions including comprehensive bird survey;
- Impact assessment and identification of mitigation measures;
- Cumulative and transboundary impacts; and
- Disclosure package.

5.2. Scoping

The aim of scoping is to identify potential impacts on environmental and social receptors arising from project activities that will need to be further considered in the impact assessment and to determine how such an assessment will be undertaken. The primary output of scoping is the preparation of a Scoping Report, setting out potential impacts that will be considered in the ESIA as well as those scoped out (with reasons why).

Information for the scoping phase was collected by:

- Liaison with the Project Working Group and MET;
- Review of secondary data and legislation; and
- Site reconnaissance visit.

These are summarised below.

5.2.1. Liaison with the Project Working Group

A Working Group has been set up to manage the delivery of the Project, comprising members from the Ministry of Energy and NPGT. An initial meeting was held with the EBRD and members of the Working Group on 20 February 2020 to introduce the ESIA and discuss methods of communication.

A meeting was held with SEA, IRIM, NPTG and an engineer from Bayasaltugs LLC on 12 May 2020 to discuss the scope and nature of the second round of stakeholder consultations in light of the COVID-19 restrictions and delay in official communications about the Project to the regional and local authorities. A copy of the minutes of the meeting are provided in Appendix A.

5.2.2. Liaison with the Environmental Regulator

A meeting was also attended with the MET in relation to the DEIA requirements on 19 February 2020. The DEIA will be undertaken by EcoTrade in parallel with the ESIA to EBRD requirements.

5.2.3. Review of Secondary Data and Legislation

Data reviewed during scoping include:

- Construction of Choir-Sainshand to Zamyn-Uud 220 kV Power Transmission Line and Substation FS 2013;
- Institutional framework including government agencies with a role in the ESIA process, electricity transmission and/or wider environmental and social management;
- Environmental and social regulatory framework in Mongolia including relevant policies, legislation and standards;
- International conventions, which Mongolia has ratified or to which it has acceded;
- Relevant national licensing regime;
- EBRD ESP and PRs; and
- EU Directives.

5.2.4. Site Reconnaissance

A site reconnaissance visit has been undertaken as follows:

- Biodiversity and Environment Team from 15-17 April 2020, comprising:
  - Enhtulga.T – Lead. Environment.
  - Nandin-Erdene.B – Biologist.
  - Purevsuren.Ts – Ornithologist.
- Social and Stakeholder Team from 19-22 April 2020, comprising:
  - Tserenkhand.G – Lead Social Specialist.
  - Oyunchimeg.N – Land Use Specialist.
  - Yanjinpagma.N– Social Specialist.

The purpose of site reconnaissance was to familiarise the ESIA Team with key site locations to inform the scoping process; and to ensure sufficient evidence is gathered to support the exclusion of topics that do not warrant further consideration.

5.2.5. Scoping Report and Scope of the ESIA

A Scoping Report was prepared and submitted to the EBRD on 15 May 2020. The Scoping Report set out the technical temporal and spatial scope of the ESIA.

5.3. Stakeholder Engagement

Stakeholder engagement has been incorporated at all stages of the ESIA process. The objective of this engagement is to ensure that legislative requirements are met; sources of information and expertise are identified; stakeholder concerns and expectations are registered and addressed; and Affected Communities have the opportunity to discuss Project risks and impacts, and proposed mitigation and monitoring measures. A SEP has been prepared as a stand-alone document. This is a live document that will be updated throughout future Project phases. A summary of the stakeholder engagement process is provided in Chapter 8.

5.4. Policy, Legal and Institutional Review

The policy, legal and institutional framework review for this Project is described in Chapter 4. Understanding the legal and policy framework ensures that the Project has been assessed, as far as possible, against relevant existing environmental and social regulations and guidelines.

5.5. Baseline Conditions

Baseline data has been collected to characterise the existing environmental and social receptors and conditions in the Study Area and Area of Influence (AoI) (defined in Section 5.6), and trends in such conditions including the situation that would prevail in the absence of the Project. The baseline data has been compiled from a number of existing sources and site survey, as summarised below.

5.5.1. Secondary Data

The main secondary data reviewed has been summarised in Section 5.2.3 above. In addition to this, the following data has been reviewed during the ESIA:

- Technical Review Inception Report, Mercados (May 2020);
- Energy policies and legislation;
- Statistical data obtained from the National Statistics Office (NSO) and *aimag* and *soum* administrations;
- Ecological reports in the study area and related to avian collisions with medium and high voltage power lines in Mongolia; and
- Reports on the Tavan Tolgoi Power Plant Project Baseline.

A full list is provided in the References list in Chapter 14.

5.5.2. Field Surveys

The following field surveys have been undertaken as part of this ESIA:

- Spring bird survey, 5 to 15 May 2020:
  - Purevsuren.Ts – Ornithologist;
  - Chuluunbat B. – Survey assistant;
- Autumn bird survey, 10 to 20 September 2020:
  - Purevsuren.Ts – Ornithologist;
  - Chuluunbat B. – Survey assistant;
- Social and stakeholder engagement survey, 8 to 12 June 2020:
  - Tselmegsaikhan Lkhagva – Lead Social Specialist;
  - Oyunchimeg.N – Land Use Specialist;
  - Yanjinpagma.N– Social Specialist;
  - Nyamgaram G. – Survey assistant;
  - Tserendorj E. – Survey assistant;
- Environmental mission 1 (Geography & subsoil, flora, fauna, water, soil, traffic, protected area), 4 to 10 June 2020:
  - Enhtulga.T – Lead Environment;
  - Nandin-Erdene.B – Biologist;
  - Ankhbayar.O – Soil/Geography/Geology;
  - Bayarsaikhan.P. Biologist;
  - Nomin-Erdene.B. Field assistant;
- Environmental survey 2 (Air quality, noise), 12 to 16 June 2020:
  - Enhtulga.T – Lead Environment;
  - Anhbayar.O – Environment; and
  - Nomin-Erdene.B. - Field assistant.
- Environmental, social and ecological walkover survey of the updated route alignment, 6 to 7 May 2021:
  - Enhtulga.T – Lead Environment and social;
  - Altankhuyag – Ecology.

All surveys undertaken in 2020 were on the original route alignment; the surveys undertaken in May 2021 were undertaken at the specific sites of the realignment of the route. Both the original route and new route are shown in Figure 3-2 in Chapter 3.

5.5.3. Limitations

The EBRD has commissioned a technical review of the 2013 FS, which is being undertaken alongside the ESIA, however, the outcome of the review has not been available at the time of writing the ESIA Report.

The approach to scoping and the ESIA has been influenced by the worldwide pandemic, COVID-19. This has prevented the international team being able to undertake site visits and has limited the extent and depth of stakeholder engagement that could take place. The measures taken to address this are explained in more detail in the SEP.

5.6. Impact Assessment and Mitigation Measures

The purpose of impact assessment is to identify and evaluate the likely significance of the potential impacts on identified receptors and resources according to defined assessment criteria, to develop and describe measures that will be taken to avoid, minimize, reduce or compensate for any potential adverse environmental effects, and to report the significance of the residual impacts that remain following mitigation. Details of the approach taken in this ESIA are provided below.

5.6.1. Temporal Scope

The temporal scope of the ESIA has considered the effects arising from the pre-construction, construction and operation and maintenance (O&M) phases of the Project. Expected timescales for decommissioning are so far into the future that there is insufficient certainty about the likelihood, type or scale of activities to determine the potential effects, and therefore these impacts are considered at a high level only.

5.6.2. Technical Scope

The technical scope refers to the range of topics to be addressed in the ESIA. The technical topics considered in this ESIA are set out per topic in Chapters 10 and 11. Table 5-1 summarises the technical topics considered in this ESIA, as identified through the scoping process and confirmed during the impact assessment.,

Table 5-1. Technical scope of the ESIA

ESIA Topic	Receptors	Potential impacts	Construction phase	Operation phase
Geology and soils (including natural hazards)	Soil resources	Soil erosion, damage and deterioration, soil compaction.	✓	x
	Soil resources Local communities	Contamination of soils.	✓	x
	Construction workers	Flood and dust storms are potential risks impacting on construction worker safety.	x	x
Air quality and climate	Local communities Flora and fauna	Dust and emissions from construction activities.	✓	x
Noise and vibration	Local communities Flora and fauna	Noise and vibration from construction activities.	✓	✓
Groundwater resources	Groundwater resource	Water demand.	✓	x
	Herder wells	Damage to herder wells and demand.	✓	x
Surface water resources	Ephemeral streams Large surface water body (from the Shivee Ovoo coal mine)	Pollution events. Dewatering impacts.	✓	x
		Water demand.	✓	x
Terrestrial biodiversity, flora and fauna	Vegetation	Disturbance and direct loss of flora.	✓	x
	Birds	Disturbance and direct and indirect loss or harm.	✓	✓
	Fauna	Disturbance and direct and indirect loss or harm.	✓	x
Aquatic biodiversity, flora and fauna	Flora and fauna	No aquatic flora or fauna have been identified in the Project Area.	x	x
Waste	Landfill and hazardous waste sites Humans Soils, water resources and flora and fauna	Waste generation and management.	✓	✓

ESIA Topic	Receptors	Potential impacts	Construction phase	Operation phase
Infrastructure (power, roads, rail, telecommunication, other utilities and facilities)	Local communities Local road and road users Local hospitals	Road safety; disruption to local transport networks; and deterioration of local roads. No impacts on other utilities, telecommunications or power lines are anticipated.	✓ **(Traffic and transport)**	x
Land use, tenure and displacement	Local communities Asset owners Herders and pastureland Mining concessionaires	Loss of access to land. Disturbance or changes to land uses such as businesses and industry. Economic displacement. No physical displacement will occur.	✓	✓
Economy and employment	Local communities Local, regional and national government	Employment and economic impacts.	✓	✓
Labour and working conditions	Local communities Construction workforce	Conditions, local conflict.	✓	✓
OHS	Construction workforce	Accidents and injury to workers. EMFs during operation.	✓	✓
Livelihoods	Asset owners Herders Mining concessionaires Businesses in the area (positive)	Impacts on income and livelihoods.	✓	✓
Community health and safety (H&S)	Local communities Vulnerable People Women	Nuisance (dust, noise, traffic) to local communities; safety issues; influx; health; vulnerable groups. EMFs during operation.	✓	✓
Cultural heritage	Cultural heritage Archaeology	Damage and destruction of cultural heritage.	✓	x

5.6.3. Spatial Scope

The spatial scope of the ESIA is described by the geographical area potentially affected by the Project. The ***Project Footprint*** refers to the physical area required by the Project. This includes the permanent footprint i.e. the pylon bases and the substation, and the temporary footprint, i.e. the area required during construction only such as construction camp and temporary work area.

The ***Project or Study Area*** refers to the spatial area within which environmental and social data have been and will be collected to assess the effects of the Project. The Project Area covers Govi-Sumber and Dornogovi *aimags* and the seven *soums* which the OHTL runs through.

The ***Area of Influence (AoI)*** includes the footprint of all Project activities and a larger working strip within the RoW which is 25 m either side of the centre line in rural areas and 6 m either side in urban areas in Mongolia for a 220 kV overhead lines; and 25 m around substations. The AoI also includes an area of up to 500 m around any works areas (air quality and noise); a 6 km buffer zone (i.e. 3 km either side of the OHTL centreline) for herders; and for ecology, it includes the Ikh Nart IBA southwest of the OHTL route, in Dalanjargalan *soum* of Dornogovi *aimag.*

5.6.4. Identification of Impacts and Assessment of Effects

The term ***receptors*** or ***resources*** has been used to describe features of the environment such as water resources, habitats and species which are valued by society for their intrinsic worth and/or their social or economic contribution; and social groups such as individuals and communities that may be affected by the Project.

An environmental or social ***impact*** is defined as any change, potential or actual, to (i) the physical, natural, or cultural environment, and (ii) impacts on surrounding community and workers, resulting from the business activity to be supported.

An ***effect*** is defined as the consequences of change (or impact) acting on the resources and receptors of particular value or sensitivity. Effects are typically described in terms of their significance.

Having identified the impact, the significance of the effect will be determined in the ESIA by consideration of the following:

- *Receptor*: the human/natural environment/economic/social feature that is potentially going to receive and have to cope with an impact.
- *Importance/Sensitivity*: the ability of a receptor or resource to cope with an impact and/or its importance to Mongolia. Criteria which broadly define sensitivity are provided in Table 5-2.
- *Magnitude*: the size of the potential impact. Impacts may be short term and considered low magnitude (e.g. noise or temporary reduction of income during a short construction project) or high magnitude (e.g. the poor disposal of large quantities of hazardous waste into a water course). Indicative criteria which define magnitude are provided in Table 5-3.

Table 5-2. Illustrative example for determining receptor sensitivity

Importance/ Sensitivity of Receptor	Example of importance of receptors	Example of sensitivity of receptors
Very High	An attribute with a high quality and rarity on an international, regional or national scale with little or no potential for substitution.	Sensitive area or receptor with little resilience to imposed stresses.
High	An attribute with a high quality and rarity on an international or national scale with little or no potential for substitution.	
Medium	An attribute with a medium quality or rarity on a regional scale with limited potential for substitution, or an attribute of low quality and rarity on a regional or national scale.	The receiving environment or receptor has a moderate natural resilience to imposed stresses.
Low	An attribute of low quality and rarity on a local scale (town, site) with potential for substitution locally.	The receiving environment or receptor has a high natural resilience to imposed stresses.

Table 5-3. Illustrative example for determine magnitude

Magnitude	Impact type	Illustrative description
High	Adverse	Loss of resource and/or quality and integrity of resource; impact extends to national or international level.
	Beneficial	Large scale or major improvement to resource quality; enhancement; impact extends to national or international level.
Medium	Adverse	Measurable change in resource quality/integrity; medium loss of key characteristics or features; impact extents to regional level.
	Beneficial	Medium benefit to or addition of key characteristics or features; impact extents to regional level.
Low	Adverse	Minor loss or detrimental alteration to one or more characteristics or features; impact extends to the local level or immediate area.
	Beneficial	Minor benefit or addition of key characteristics or features; impact extends to the local level or immediate area.

Once the sensitivity of receptors and magnitude of impacts has been established, potential significant effects will be classified using the following matrix as shown in Figure 5-1. Assessing the likely significant effects of the Project considers the direct and indirect effects, secondary, cumulative and whether the effect is adverse or beneficial. In general, those effects identified as Major or Moderate are considered significant.

		Receptor/resource sensitivity/importance			
		Very high	High	Medium	Low
Magnitude of impact	High	Major	Major	Major	Moderate
	Medium	Major	Major	Moderate	Minor
	Low	Major	Moderate	Minor	Negligible
	Very Low	Moderate	Minor	Negligible	Negligible

Figure 5-1. Impact significance matrix

5.6.5. Mitigation of Effects

For Major and Moderate adverse effects (significant effects) identified through the ESIA, mitigation measures will be proposed that can be practicably implemented to prevent or reduce any significant effects on the environment, to satisfy EBRD and GIP requirements. The identification of such measures will be undertaken in parallel with the design process so that measures can be incorporated into the Project wherever feasible. Mitigation measures will be considered in line with the following hierarchy:

- **Avoid** - making changes to a project's design or location to avoid adverse effects on an environmental feature.
- **Minimise** - reduction of adverse effects through sensitive environmental treatments/design.
- **Restore** - measures taken during or after construction to repair/reinstate and return a site to the situation prior to occurrence of impacts.
- **Compensate/offset** - where avoidance or reduction measures are not available, it may be appropriate to provide compensatory/offsetting measures. It should be noted that compensatory measures do not eliminate the original adverse effect, they merely seek to offset it with a comparable positive one.
- **Improvement measures** - projects can have positive effects as well as negative ones, and the project preparation stage presents an opportunity to enhance these positive features through innovative design.

5.6.6. Residual Effects

The residual significance is the potential effect that remains following mitigation. This more accurately describes the effects of the Project as it is anticipated. Residual effects of the Project will be considered in the ESIA.

5.7. Cumulative and Transboundary Impacts

The EBRD PRs and the EU EIA Directive require the consideration of cumulative impacts. The **cumulative impacts** of an action or activity can be viewed as the total effects on a resource, ecosystem, or human community of that action and all other activities affecting that resource. Cumulative impacts may arise as a result of:

- Impacts of interrelationships within the same project on a single receptor; and
- Impacts on a resource, ecosystem, or human community of that action arising from the Project in combination with other existing, planned or reasonably defined developments.

The term **transboundary impact** refers to an impact, which occurs across political boundaries. The most common and relevant (to the Project) transboundary impact is the impact on water resources since as it was mentioned above all rivers from which water is abstracted or will be abstracted are either transboundary rivers or the tributaries of transboundary rivers. Other potentially transboundary impact is associated with climate change. Such transboundary impacts such as impacts on biological resources (migratory animal or bird

populations), social aspects and climate change impacts are not relevant to the Project scope and therefore have not been considered in this ESIA.

5.8. Disclosure Package

This document presents the ESIA Report for the Project. It forms one of several documents prepared to meet EBRD disclosure requirements for a Category A project as follows:

- **NTS** – this presents a concise, over-arching, standalone summary of the ESIA Report, written in non-technical language.
- **SEP** – this covers the engagement undertaken to date and engagement proposed for the future phases of the Project;
- **ESMMP** – this provides a framework for managing (and avoiding) potential environmental and social risks and impacts for the Project. It comprises of a set of management, mitigation and monitoring measures to be taken during construction and O&M phases to manage key potential environmental and social impacts. It outlines the generic approach (and control processes) to be applied for to the Project in the development and implementation of a more detailed “Project ESMMP” to be prepared by the Client, the “Construction ESMMP” to be prepared by the Contractor and the “O&M ESMMP” to be prepared by the NPTG
- **LARF** –a Land Acquisition and Resettlement Framework has been prepared which sets out the framework for addressing potential economic displacement and, if it arises, any potential physical displacement, as a result of the Project.
- **ESAP** – this sets out the gaps and issues identified during the impact assessment against the EBRD PRs. It also identifies the future actions required to comply with the EBRD PRs and other Project commitments arising for example from national regulatory requirements.

6. Environmental Baseline

6.1. Introduction

This Chapter presents the baseline environmental conditions in the Project Area. The Project is located within the two *aimags* of Govi-Sumber and Dornogovi. Further details on the social baseline are provided in Chapter 7. Data is based on available secondary data as well as the field surveys. The 2020 field surveys were based on the original route alignment (Alternative 2 as identified in Chapter 3); an additional walkover survey was undertaken in May 2021 following two minor realignments to the route. The baseline conditions section therefore covers both survey periods and identifies the survey period when the data were collected.

6.2. Topography and Geomorphology

6.2.1. Source of Data

The ESIA field team conducted a field reconnaissance visit 15 to 17 April 2020 and a further field survey visit including a low-level flight over the OHTL route on the 4 to 10 June 2020. A final walkover survey of the new route alignment was undertaken in May 2021. Topographic maps and satellite maps at a scale of 1:100,000 and 1:200,000 were also used.

6.2.2. Baseline

The Project is in an area of plains in the Gobi region in the south-eastern area of Mongolia which is part of the Dundgovi structural-tectonic uplift zone of the Central Mongolian fold system. The Project Area is characterised by low hills (Khargana Budarganat hills) and shallow valleys and plains with the highest point at 1,280 m above sea level (masl) and the lowest at 930 masl.

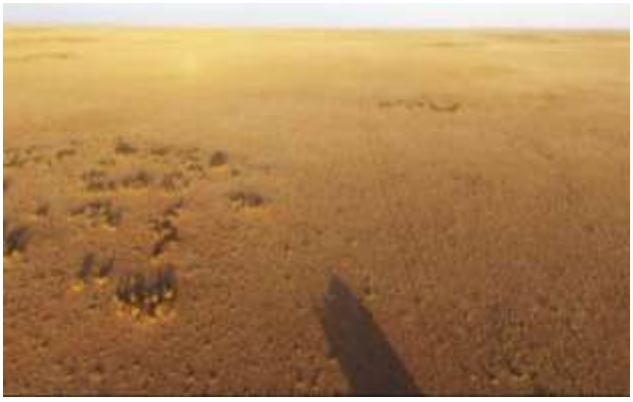
The starting point of the route, the area originating from Choir substation, is the Gobi steppe transition zone at an altitude of 1,250 masl, with a sloping surface from northwest to southeast. The surface forms a uniform plateau with low cross-sections, including ancient valley patterns. The central part of the OHTL, at kilometre (KM) 100-150 of the OHTL route, is dominated by low Gobi lowlands and narrow valleys between them. Low hills often form a rocky surface with a north-east-facing outcrop. KM 160-200 of the route covers the territory of Saikhandulaan *soum* of Dornogovi *aimag*, and the lowest elevation. From KM 200 the end the surface transitions to a hilly steppe with hills of 980 masl to 1,010 masl with smooth tops interspersed with small riverbeds and hollows. Aerial photos showing the key characteristics of the topography along the Project corridor are shown in Figure 6-1 and a cross section of the elevation of the OHTL corridor is shown in Figure 6-2 overleaf.

The area has a unique geomorphological development due to its location in the central uplift zone of Dornogovi and its location on the border of the steppe Gobi region. In addition, the regional geomorphology has been greatly influenced by the extreme continental climate, the acidic and alkaline composition of the rocks, and a zone of active tectonic movements. Erosion and flattening or mountain top surfaces is evident in low mountains, hills and ridges which are influenced by exogenous processes, such as weathering, atmospheric precipitation, wind, extreme weather conditions, acidic, alkaline, and carbonate environments. Erosion and sediment transportation is evidenced by mountains, hills, ditches and ravines. On mountain slopes, weathering and erosion have led to the gradual sliding of the diluvium sediments which remain uncompacted, forming ravines, eroded by rainwater runoff, and the formation of wide depressions.

Surface accumulation of sediments of deluvial and proluvial origin is evidenced by large valleys, lake depressions, and mountain slopes. Sediments are transported by temporary runoff and wind and accumulate in depressions between valley valleys, forming flat surfaces and slightly sloping features.

Choir substation, start of the OHTL

Middle part of route at km 110



km 180

km 200 near Sainshand Soum

Figure 6-1. Typical topography of the Project Area
Source: ESIA Field Team

Figure 6-2. Vertical elevation of the transmission line Choir to Sainshand
Source: ESIA Field Team

6.3. Climate Conditions

6.3.1. Source of Data

The ESIA field team undertook statistical analysis of (2010-2019) air, soil temperature, relative humidity, air pressure, precipitation, wind speed and direction data for Choir provided by Govi-Sumber *aimag*, and for Sainshand data collection from Sainshand meteorological station in Dornogovi *aimag*. Climate change projections have been reviewed based on the latest United Nations Framework on Climate Change (UNFCC) National Communication on Climate Change and other national data sources.

6.3.2. Climate Baseline

Govi-Sumber *aimag*: According to the weather observation data for 2010-2019, the average annual air temperature in this region is 1.9˚C and the average soil surface temperature is 4.4˚C. Relative humidity averages 53% and total annual precipitation averages 129.8 millimetres (mm). The average wind speed in this region is 3.7 metres per second (m/s), the maximum speed is 24 m/s, and the north and northwest winds prevail (see Figure 6-3).

Dornogovi *aimag*: The average annual air temperature of the *aimag* in 2010-2019 was 5.4˚C and the average soil surface temperature was 7.4˚C. The average annual precipitation was 122 mm and the average relative humidity was 43% (Figure 6-3). The average wind speed in this region is 4.3 m/s, the maximum speed is 36 m/s, and the northwest and north winds prevail (see Figure 6-4).

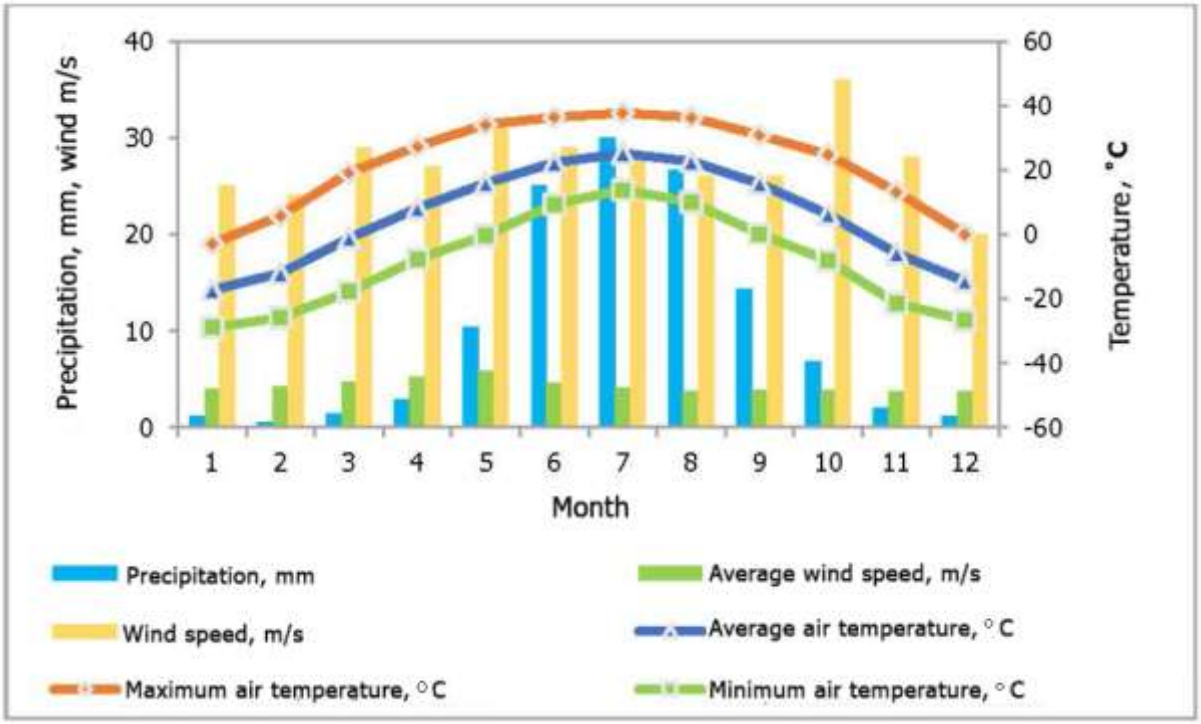


Figure 6-3. General climate data, Govi-Sumber *aimag*

Source: Govi-Sumber Meteorological Station.

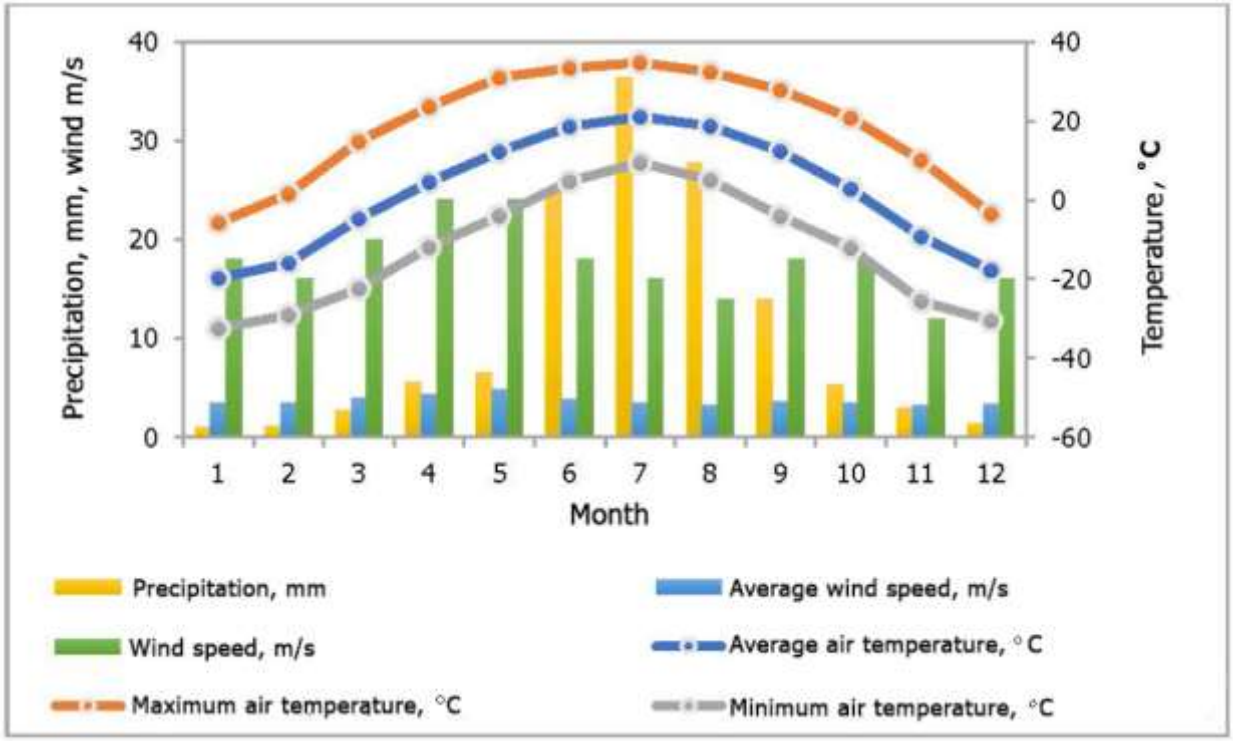


Figure 6-4. General climate data, Sainshand *aimag*
Source: Sainshand Meteorological Station.

6.3.3. Air Temperature Change

Based on records from 48 meteorological stations distributed across the country, the annual mean temperature in Mongolia has increased by 2.24°C from 1940 to 2015, see Figure 6-5. The warmest 10 years in last 76 years occurred since 2000. The warming trend intensity was higher in the mountainous regions compared to Gobi and Steppe regions of the country.

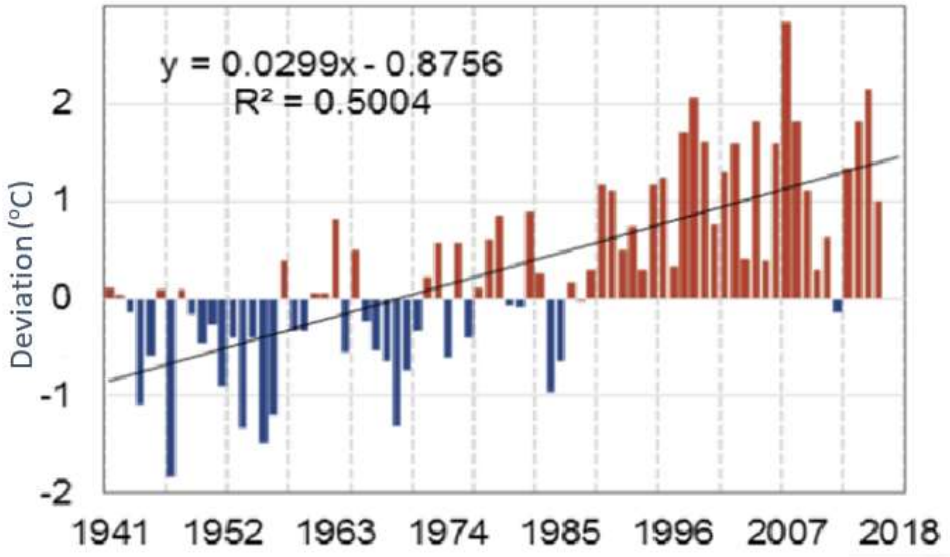


Figure 6-5. Average temperature trend for 1940-2016, Mongolia
Source: MET (2017), Annual Environmental State Report 2015-2016.

6.3.4. Changes in Precipitation

Analysis shows there was no significant change in annual precipitation during the last 76 years, however a 7% decrease is detected. Winter snow is beginning to increase; since 1940, it increased by 22% and also 40% since 1961. This is considered to indicate that winter snow is influenced by high-intensity global warming. Since 1940, drought conditions are observed to increase; consecutive drought years are increasingly frequent since 2000. In particular there were significant droughts in 2000, 2002 and 2015.

6.3.5. Climate Change Projections

According to the latest assessment report[36] on climate change, the changes that are likely to occur in Mongolia as a whole[37] are set out in Table 6-1.

The assessment analyses temperature changes under several representative greenhouse gas (GHG) representative concentration pathway (RCP) scenarios. The intensity of temperature changes is similar for all RCPs scenarios until the first half of this century and then it gives different results while increasing year to year. In near future up to 2035, the seasonal temperature change is projected to increase by 2.0-2.3°C, but it will be may increase to 2.4-6.3°C depending on each RCP scenarios from 2081-2100 (Figure 6-6).

A slight increase, i.e. 10-14%, is projected for winter precipitation in the next two decades, with more pronounced change by end of the century with 15-50% increase in winter precipitation, depending on the RCP scenario. Summer precipitation is not expected to increase drastically over the coming decades, with maximum projected increase less than 10% for all RCP scenarios (Figure 6-7).

Table 6-1. Seasonal climate change predictions in Mongolia

Scenarios*	Season	Projection time frame 2016-2035		Projection time frame 2081-2100	
		Temperature (^{0}C)	Precipitation (%)	Temperature (^{0}C)	Precipitation (%)
RCP2.6	Winter	2.3	10.1	2.5	15.5
	Spring	2.3	9.2	2.4	11.7
	Summer	2.2	6.2	2.5	5.1
	Autumn	2.1	7.6	2.4	7.6
RCP4.5	Winter	2.1	12.3	3.7	28.7
	Spring	2.0	7.8	3.4	17.4
	Summer	2.1	1.1	3.5	7.8
	Autumn	2.0	8.1	3.4	11.7
RCP8.5	Winter	2.2	14.0	6.3	50.2
	Spring	2.2	9.8	5.6	28.6
	Summer	2.2	2.4	6.0	8.7
	Autumn	2.2	6.4	6.1	24.1
***Note: RCP**	Representative Concentration Pathway (RCP) is a greenhouse gas concentration trajectory, not emissions model, aiming to represent GHG concentrations under a range of possible scenarios.				

Source: MET (2018)[38]

[36] Ministry of Environment and Tourism, 2018. *Third National Communication of Mongolia; Under the United Nations Framework Convention on Climate Change (UNFCC).*
[37] No climate projections available for Transmission Line corridor assessment area.
[38] Ministry of Environment and Tourism (MET), 2018. *Mongolia Third Assessment Report on Climate Change.*

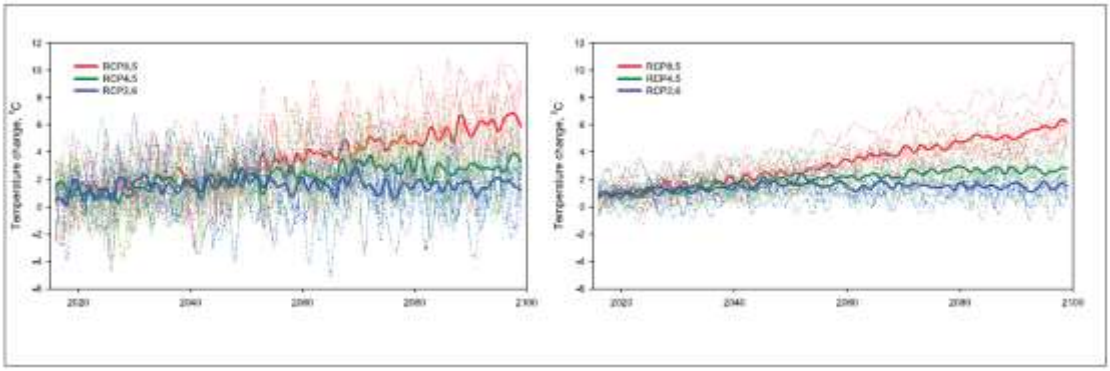


Figure 6-6. Winter and summer temperature change 2016-2100
Source: MET (2018)[39]

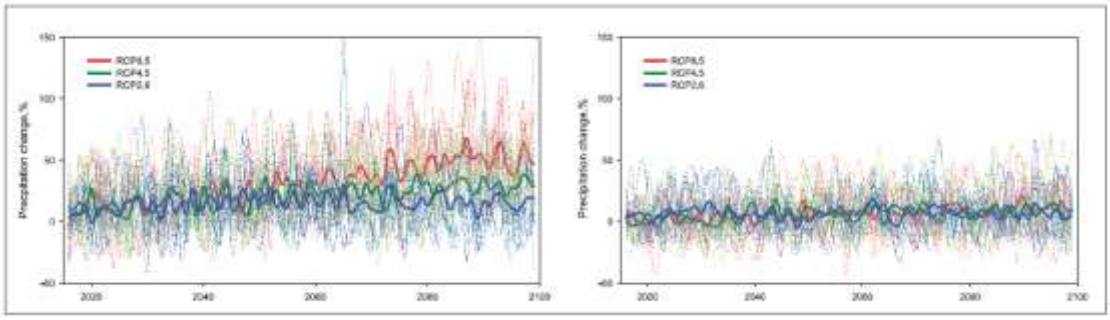


Figure 6-7. Winter and summer precipitation change 2016-2100
Source: MET, 2018[40]

6.3.6. Natural Hazards

The primary natural hazards in the area relevant to the Project are climate related; hazards relating to non-climatic factors such as earthquakes and permafrost are not relevant to the part of Mongolia in which the Project is located. For dust storms and sand storms see Air Quality (Section 6.6) and flooding see Surface Water (Section 6.5.1.3).

6.4. Soils and Geology

6.4.1. Source of Data

Topographic maps and satellite maps at a scale of 1:100,000 and 1:200,000 were reviewed and a field survey campaign undertaken.

6.4.2. Field Survey Method

Field soil surveys were conducted at 19 sites along the OHTL route, and heavy metal samples were taken at four sites between 4 to 9 June 2020 (Figure 6-8). Soil samples taken during the field survey were analysed by the soil laboratory of the Institute of Geography and Geoecology of the Academy of Sciences in Ulaanbaatar to determine the chemical and physical properties of the soil and the heavy metal content was determined by the ALS Global's geochemistry laboratory services in Ulaanbataar.

[39] MET, 2018. *Mongolia Third Assessment Report on Climate Change.*
[40] MET, 2018. *Mongolia Third Assessment Report on Climate Change.*

Figure 6-8. Soil sampling trial pit

6.4.3. Baseline

The Project Area is located in the Dundgovi tectonic uplift zone of the Central Mongolian fold system, where geological formation includes layered classified sediments and sedimentary and metamorphic rocks. The earliest sediments are within a metamorphic strata which includes marbled and crushed limestone, sparse distribution of shale and gneiss. Mesozoic sediments are distributed southwest of the OHTL route, north of the Ulaan Nuur Valley. A cenozoic strata defines the most modern geology and sediments are the most modern; neogene sediments are widespread in the OHTL area and are loose sediments containing 20-30% rock fragments bound with sand and loam. Sediments of this age are located along valleys, ravines, and ditches, and are of alluvial, proluvial, and to some extent wind-derived origin. Alluvial sediments are formed in the basins of temporary lakes and dry riverbeds. Modern wind-borne sediments are thinly spread over the entire Project Area and accumulate forming sand and sandstone up to 1-2 m thick. Figure 6-9 shows the geology in the OHTL corridor. The Soil Map of Mongolia (Figure 6-10) shows within the Project Area corridor soil cover of brown, brown and light brown soil types are prevalent.

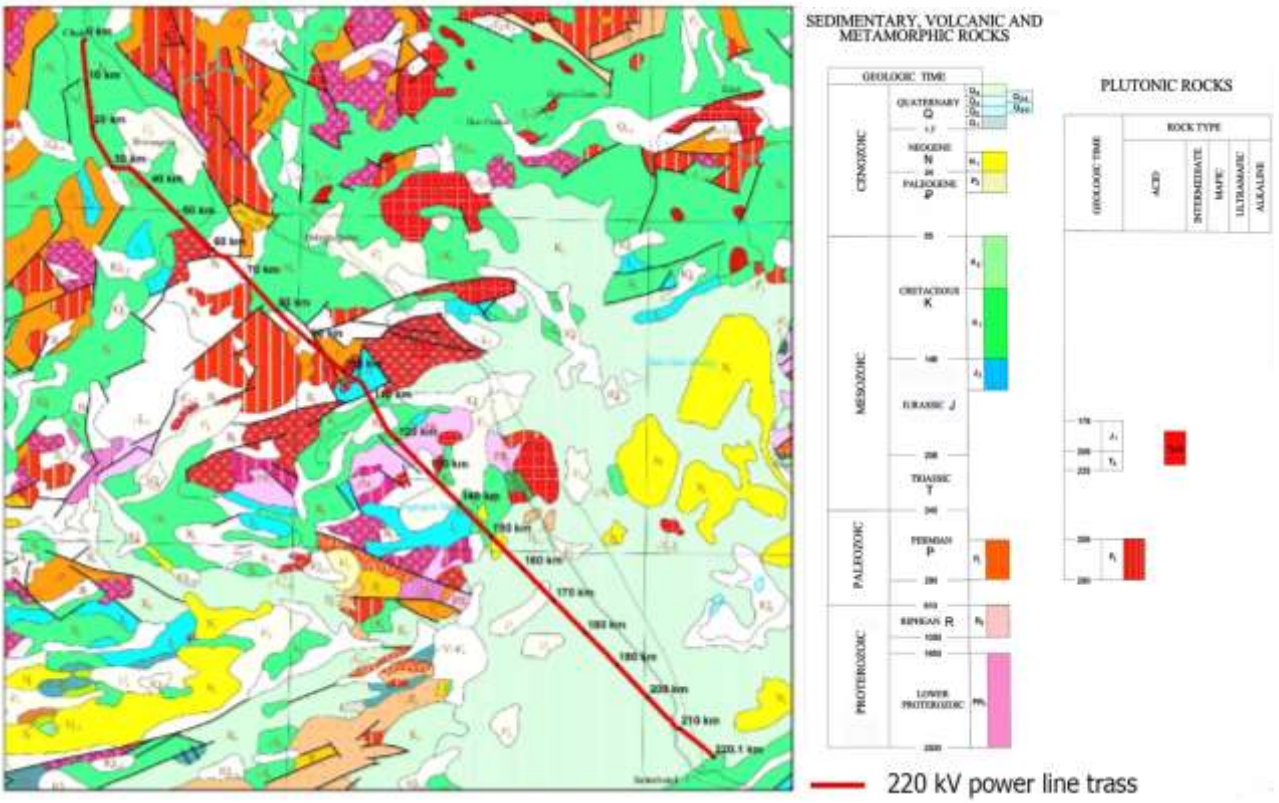


Figure 6-9. Project Area Geological Map

Source: Mineral resources authority of Mongolia, Mongolian academy of sciences, Geological map of Mongolia, scale 1:1.000.000, Ulaanbaatar 1998

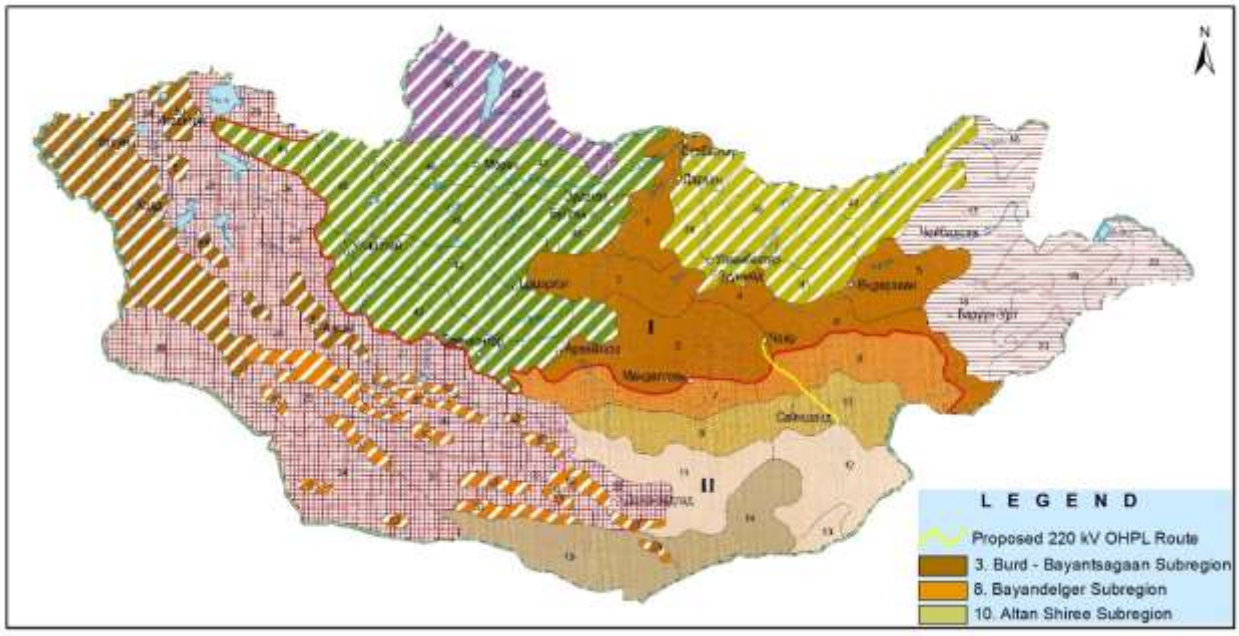


Figure 6-10. Soil Geography of Mongolia

Source: Academy of sciences, Geographical Institute, Mongolian National Atlas (2009)

In the 19 hand dug trial pits for soil profile analysis, a total of 14 types of desert brown soil were identified along the OHTL route as follows:

1. Glazed brown soil
2. Brown soil with sand cover
3. Rough brown soil
4. Light brown soil with sand cover
5. Medium thickness light brown soil with sand cover
6. Thick light brown soil
7. Rough, thin, light brown soil
8. Carbonate light brown soil
9. Loamy brown and loamy thin brown soils
10. Sandy brown soil
11. Maralag brown soil
12. Rough, thin brown soil
13. Loose brown soil
14. Brown carbonate soils with sand cover

The pits were dug to a depth of 25 to 120 cm. An example soil profile for soil type 6, thick light brown soil, is shown in Table 6-2 in which sample the soil is distributed in a wide flat valley between low hills between km 117-133 in Airag *soum*.

Table 6-2. Example trial pit results

Pit Depth, см	Soil morphology
0-4cm	Dry, loose sand cover layer
4-40 cm	Light brown, dry, brittle sandy loam. The delicate roots of the plant are rare. Contains <0.3 cm of crumbly rock <5% by volume
40-75 см	Brownish-yellow, moist, sandy layer. <0.3 cm gravel contains 3% by volume. The plants are finely distributed.g

Source: ESIA Field Team.

Laboratory analysis shows that the average thickness of the fertile layer of soils in the Project Area is 5-20 cm, the humus content is 0.2-2.2%, mobile phosphorus is 0.52-1.54 mg/100 grams (g), and mobile potassium is 7.9-20.6 mg/100 g or less indicating that the overall level of soil fertility along the route is low.

Laboratory analysis also showed soil samples contained 60-85% sand (2-0.05 mm), 7-31% dust (0.05-0.002 mm), and 5-12% clay (<0.002 mm). A surface gravel layer protects the soil surface from wind and influences the evaporation which has a significant effect on the soil moisture regime and biological processes in the soil. The basic chemical properties of the soil samples are shown in Table 6-3.

Table 6-3. Chemical analysis, soil samples

Sample Number	Sample depth (cm)	pH	$CaCO_3$ (%)	Humus (%)	EC(dS/m)	Mobility (mg/100gr)	
						P_2O_5	K_2O
CHSSPL-01	0-12	7.04	0.00	1.008	0.131	0.95	11.2
CHSSSP-03	0-20	7.53	0.00	0.616	0.063	0.52	8.4
CHSSSP-04	0-10	7.14	0.00	0.719	0.054	0.83	10.6
CHSSSP-06	3-10	7.27	0.00	0.693	0.063	0.58	8.7
CHSSSP-07	2-15	7.07	0.00	0.922	0.077	0.87	10.8
CHSSSP-08	4-20	7.33	0.00	0.644	0.046	0.55	7.9
CHSSSP-10	0-5	7.04	0.00	1.342	0.091	1.21	14.3
CHSSSP-11	0-4	7.28	0.00	1.088	3.510	1.02	13.6
CHSSSP-12	2-12	7.52	0.00	0.761	0.068	0.71	9.8
CHSSSP-13	0-20	7.15	0.00	0.774	0.032	0.85	10.9
CHSSSP-15	3-20	7.31	0.00	2.229	0.908	1.54	20.6
CHSSSP-16	0-5	7.19	0.00	0.776	0.049	0.73	10.1
CHSSSP-18	0-15	8.12	7.63	2.031	0.412	1.51	20.4
CHSSSP-19	5-20	7.74	0.00	1.346	0.354	1.24	15.1

Source: Institute of Geography and Geoecology, Mongolian Academy of Sciences, Soil laboratory test results, June 15, 2020, ESIA Field Team

Soil contamination

The field study team noted the majority of the soil cover is not severely damaged by human activity, however at the end of the route, infrastructure such as road and rail crossings and household waste, particularly around Choir substation are affecting the soil quality. In order to determine the soil heavy metal content, samples were taken from the topsoil near the proposed substation site. The samples were compared to Mongolian National Standard (MNS) 5850: 2019 (*Soil quality, Maximum allowable levels of soil contaminants and elements*). Mercury (Hg) was found in sample 1 and 4 with a concentration of 1 mg/kg or 0.5 mg/kg higher than the standard; no other non-compliances were found (see Table 6-4).

Table 6-4. Heavy metal analysis, soil samples

Element	Unit	Sample 1	Sample 2	Sample 3	Sample 4	MNS 5850:2019		
						Permissable Level	Toxic Content	Hazardous Content
Ag	ppm	<0.2	<0.2	<0.2	0.6			
Al	%	1.28	1.73	1.25	1.14			
As	ppm	3	6	12	8	10	50	100
B	ppm	10	10	<10	10	15	100	300
Ba	ppm	100	120	90	70			
Be	ppm	0.8	1	0.8	0.7			
Bi	ppm	<2	<2	<2	<2			
Ca	%	0.27	0.36	0.25	0.32			
Cd	ppm	<0.5	<0.5	<0.5	<0.5	1	10	20
Co	ppm	6	6	6	4	30	500	1000
Cr	ppm	15	18	31	24	60	400	1500
Cu	ppm	8	10	10	9	60	500	1000
Fe	%	1.32	1.69	1.98	1.62			
Ga	ppm	<10	<10	<10	<10			
Hg	ppm	1	<1	<1	1	0.5	10	20
K	%	0.25	0.34	0.23	0.24			
La	ppm	20	20	20	20			
Mg	%	0.38	0.5	0.22	0.21			
Mn	ppm	406	409	385	327			
Mo	ppm	1	<1	1	1	5	20	50
Na	%	0.01	0.02	0.01	0.01			
Ni	ppm	9	11	10	8	150	1000	1800
P	ppm	410	560	450	400			
Pb	ppm	10	11	12	12	100	500	1200
S	%	<0.01	<0.01	<0.01	0.01			
Sb	ppm	<2	<2	<2	<2			
Sc	ppm	2	3	3	2			
Sr	ppm	37	49	34	35	800	3000	6000
Th	ppm	<20	<20	<20	<20			
Ti	%	0.02	0.02	0.06	0.06			
Tl	ppm	<10	<10	<10	<10			
U	ppm	<10	<10	<10	<10			
V	ppm	22	26	46	38	150	600	1000
W	ppm	<10	<10	<10	<10			
Zn	ppm	36	47	45	48	300	600	1000

Source: ALS LLC laboratory test results, June 15, 2020
Ppm – parts per million

6.5. Water Resources

6.5.1. Surface Water

6.5.1.1. Source of Data

The ESIA field team conducted a field visit on the 15 to 17 April 2020 and a further field visit between the June 4 to 10 June 2020. Consultation with stakeholders also informed the baseline and Umard Gobi River Basin authority provided information on water sources. Topographic maps at a scale of 1:100,000 and previous studies and reports were used.

6.5.1.2. Baseline

The Project Area is hydrologically located in the Central Asian watershed, in terms of global watersheds, and in the Guveet-Khalkh middle steppe basin of the North Gobi of Mongolia. Due to the natural environment and climatic conditions, there are no rivers and streams in this region. However, there are dry riverbeds with temporary rainwater runoff, rainwater-fed saline lakes and dry lake beds which can be spring fed.

The field survey team noted five dry lakes and 31 dry gravel river beds along the OHTL corridor. The lakes included Munkhiin Ulaan, Biluut Tsagaan Nuur, Urd Undur Khar Toirom, and two unnamed lakes. There is also a large surface water body (from the Shivee Ovoo coal mine dewatering) 15-16 km south east of Choir and as close as 7-8 km to the planned OHTL. The location of the features is show in Table 6-5 and Figures 6-11 and 6-12.

Table 6-5. Locations of Surface Water features along the OHTL route

Feature	Distance along route	Location
Dry Lake 1 - Urd Undur Khar Toirom Nuur	Between 70-80 km	N45°48'39.79", E108°54'27.39",
Dry lake 2 - unnamed	Between 60-70 km	N45°51'48.39", E108°50'42.69"
Dry lake 3 - Biluut Tsagaan Nuur	Between 60-70 km	N45°54'19.78", E108°47'14.06"
Dry lake 4 – unnamed	Between 30-40 km	N46°2'39.05", E108°33'32.86",
Dry lake 5 – Munkhiin Ulaan Nuur	Between 10-20 km	N46°12'45.2", E108°23'15.9"
Dry riverbed 1	Between 130-140 km	N45°29'14.8", E109°23'02.1"
Dry riverbed 2	Between 130-140 km	N45°30'57.8", E109°20'36.6"
Dry riverbed 3	Between 130-140 km	N45°31'13.4", E109°20'04.6"
Dry riverbed 4	Between 120-130 km	N45°32'44.9", E109°17'56.8"
Dry riverbed 5	Between 120-130 km	N45°33'2.7", E109°17'29.6"
Dry riverbed 6	Between 120-130 km	N45°33'6", E109°17'24.8"
Dry riverbed 7	Between 120-130 km	N45°33'9.3", E109°17'20.5"
Dry riverbed 8	Between 120-130 km	N45°33'15.83", E109°17'15.23"
Dry riverbed 9	Between 120-130 km	N45°33'22.4", E109°17'1.1"
Dry riverbed 10	Between 120-130 km	N45°33'25.5", E109°16'57.2"
Dry riverbed 11	Between 120-130 km	N45°33'28.1", E109°16'52.5"
Dry riverbed 12	Between 120-130 km	N45°33'32", E109°16'48.3"
Dry riverbed 13	Between 120-130 km	N45°33'50", E109°16'17.4"
Dry riverbed 14	Between 120-130 km	N45°33'58.4", E109°16'4.5"
Dry riverbed 15	Between 120-130 km	N45°34'13.7", E109°15'47.8"
Dry riverbed 16 (old route)	Between 110-120 km	N45°36'13.6", E109°13'33.9"
Dry riverbed 17 (old route)	Between 100-110 km	N45°36'45.3", E109°12'57"
Dry riverbed 18 (old route)	Between 100-110 km	N45°37'15.4", E109°12'26.2"
Dry riverbed 19 (old route)	Between 100-110 km	N45°38'12.5", E109°11'24.4"
Dry riverbed 20	Between 60-70 km	N45°52'2.8", E108°51'0.8"
Dry riverbed 21	Between 60-70 km	N45°52'36.7", E108°50'11.3"
Dry riverbed 22	Between 60-70 km	N45°52'44.8", E108°50'0.5"
Dry riverbed 23	Between 60-70 km	N45°53'54.5", E108°48'17.5"
Dry riverbed 24	Between 60-70 km	N45°54'12.1", E108°47'55.6"
Dry riverbed 25	Between 60-70 km	N45°54'27.6", E108°47'33.6"
Dry riverbed 26	Between 60-70 km	N45°54'41.7", E108°46'36.3"
Dry riverbed 27	Between 50-60 km	N45°55'55.6", E108°44'17.5"
Dry riverbed 28	Between 50-60 km	N45°58'16.1", E108°40'44.1"
Dry riverbed 29	Between 50-60 km	N45°58'33.5", E108°40'21.6"
Dry riverbed 30	Between 50-60 km	N45°58'57.2", E108°39'42.9"
Dry riverbed 31	Between 40-50 km	N45°59'53", E108°38'15"

Feature	Distance along route	Location
Dry riverbed 32 (old route)	Between 20-30 km	N46°9'30.71", E108°26'21.65"
Dry riverbed 33 (old route)	Between 10-20 km	N46°10'16.6", E108°25'26.9"
Dry riverbed 34 (old route)	Between 10-20 km	N46°10'23.9", E108°25'23.2"
Dry riverbed 35 (old route)	Between 10-20 km	N46°13'1.7", E108°24'3"
Dry riverbed 36	Between 0-10 km	N46°16'22.8", E108°22'1"
Dry riverbed 37 (May 2021)	Between 30-40 km	N46°5'0.780", E108°27'54.007"
Dry riverbed 38 (May 2021)	Between 30-40 km	N46°5'3.844", E108°28'31.501"
Dry riverbed 39 (May 2021)	Between 30-40 km	N46°4'59.592", E108°28'46.848"

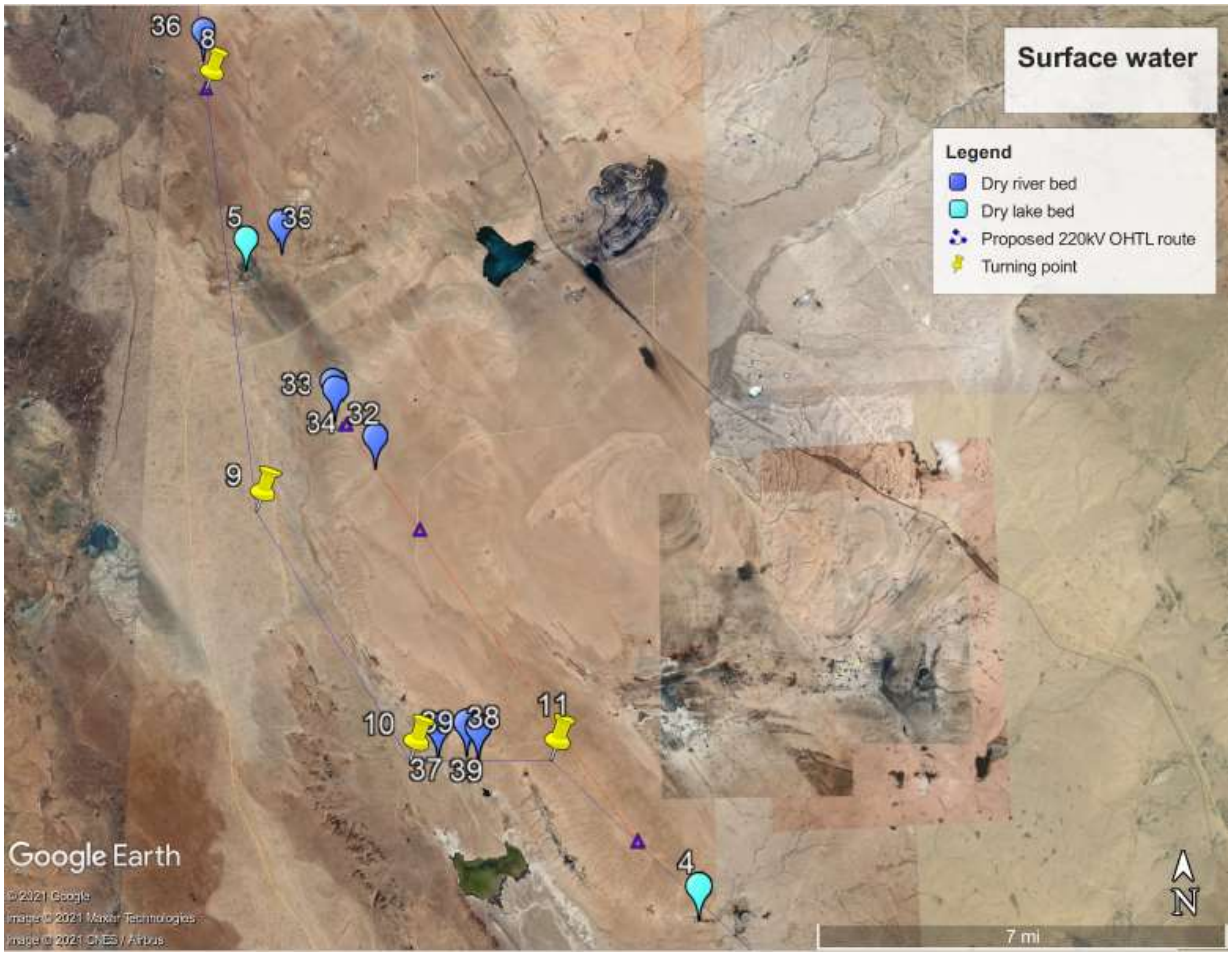


Figure 6-11. Surface water features at TP-8 to TP-11

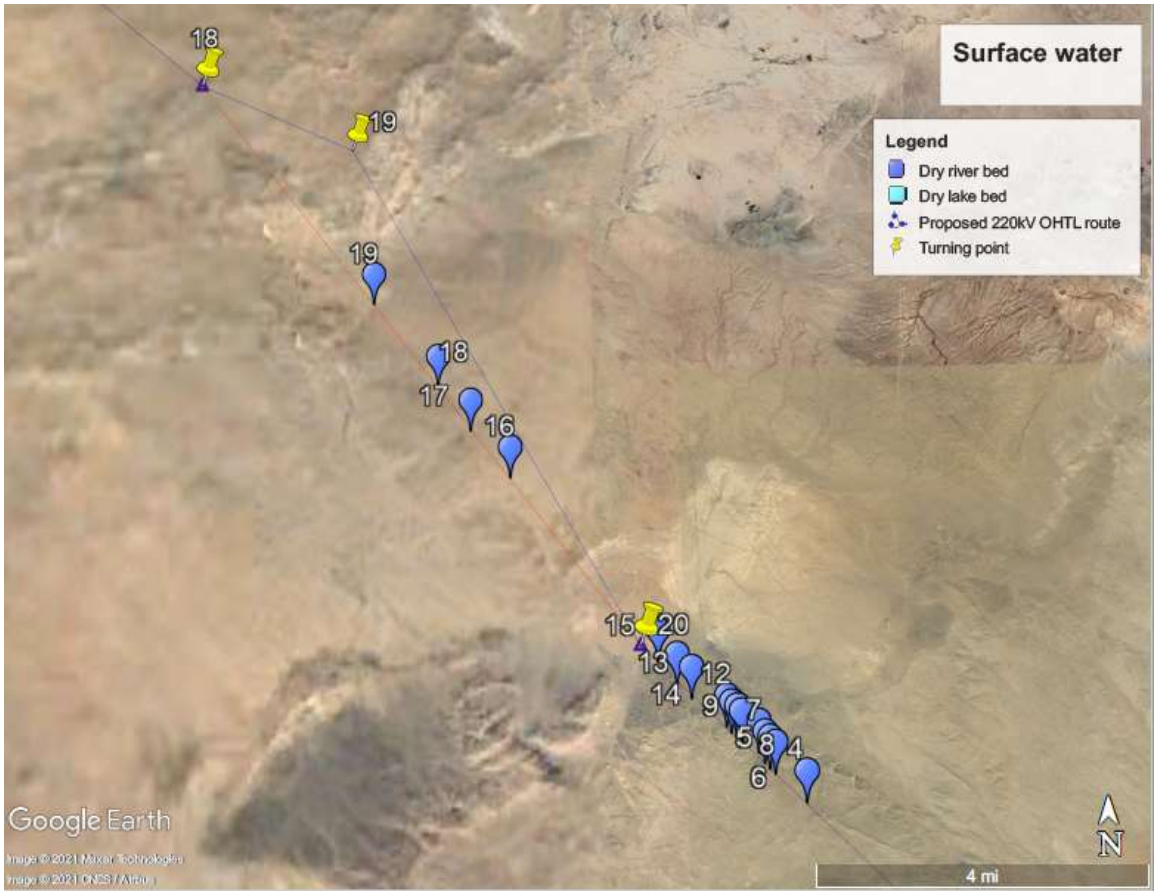


Figure 6-12. Surface water features at TP-18 to TP-20

In addition, large ravines characterise the Project Area at 40-50 km and high passes (1,210-1,250 m high). In this area, river beds range from 14-37 m wide and 30-65 cm deep. Example dry river beds, dry lakes and a satellite image of a typical dry river bed and dry lake are shown in Figure 6-13.


Dry lake, at 45.86408, 108.5844


Dry lake, at 45.47102, 109.40800


Dry river bed at N46°16'22.8", E108°22'1 (1191 m elevation)


Dry river bed at 45.98292, 108.66197


Dry river bed at 45.97621, 108.67594


Dry river bed at N46°10'23.9, E108°25'23.2 (1174 m elevation)


Dry lake 70m from Transmission Line


Dry river bed crossing the transmission line


Dry river bed at N45°58'16.1", E108°40'44.1" (1161 m elevation)

Figure 6-13. Surface water features in the Project Area
Source: ESIA Field Team

6.5.1.3. Flooding

The field surveys show the topography and lack of vegetation cover have a limited impact on slowing overland flow from precipitation which means significant rainfall can have an impact on flooding, causing difficulties for transportation, infrastructure and other activities. Although dry for the majority of time, the river beds may be subject to flash floods in spring and summer; neighbouring Tov *aimag* was subject to significant flooding in June 2019 and July 2020.[41] In August 2018 rain flooded Airag *soum*, Dornogovi *aimag* 19 km from the transmission line alignment, leading to derailment of a train as the track and surrounding area was flooded.[42]

[41] FloodList. Mongolia floods. Available at: http://floodlist.com/?s=mongolia&submit=. Accessed May 2020.
[42] Unurzul.M, Flood hot railway line. Available at: https://www.montsame.mn/en/read/136341. Accessed May 2020.

Dalanjargalan *soum* in Dornogovi *aimag* was also subject to significant flooding in 2019 leading to damage to transport infrastructure with two to three bridges affected.[43]

The precipitation trends in both Govi-Sumber and Dornogovi *aimags* show a slight downward trend over the last 10 years however with significant peaks above average in some years indicating a level of more intense rainfall events. Detailed graphs on monthly rainfall in both *aimags* are shown in Figures 6-14 to 6-17. These graphs show both *aimags* have a clear peak in precipitation from June to August, which corresponds to recent flood events in the past two years.

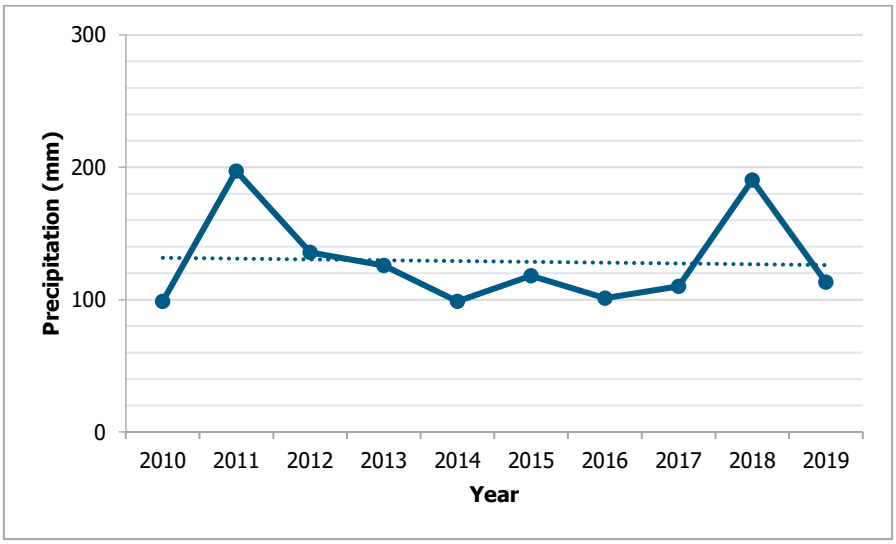


Figure 6-14. Annual precipitation trend, Govi-Sumber *aimag*
Source: ESIA Field Team

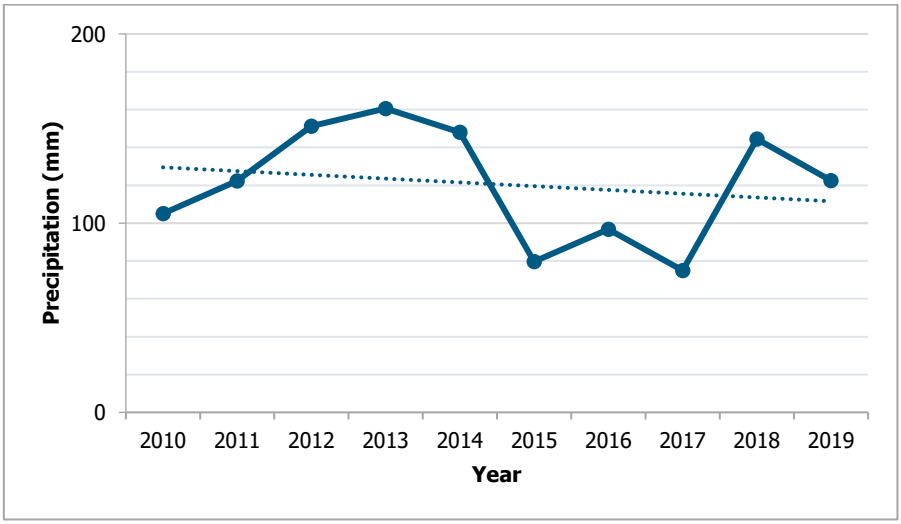


Figure 6-15. Annual precipitation trend, Dornogovi *aimag*
Source: ESIA Field Team

[43] Consultation with Dandarbaatar, Environment and Tourism Specialist, Dalanjargalan *soum* office

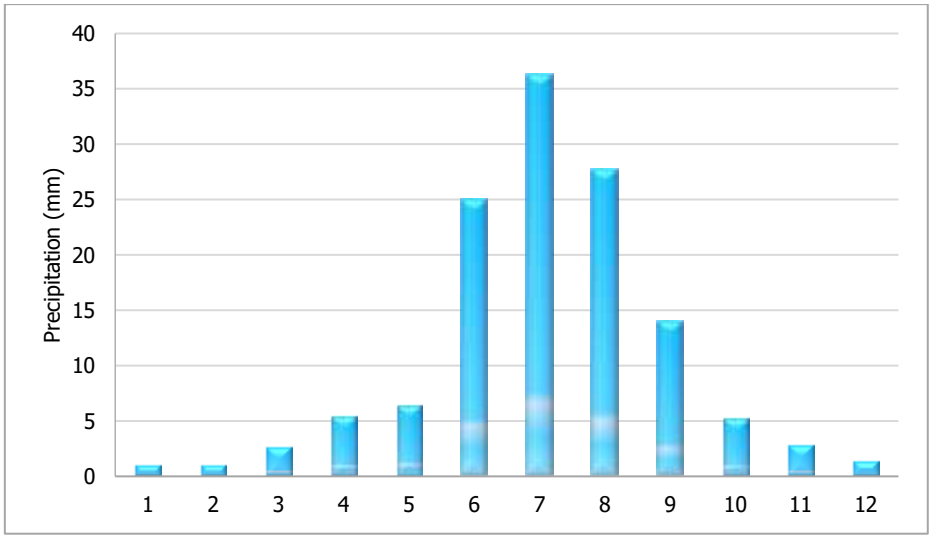


Figure 6-16. Monthly average precipitation, Govi-Sumber *aimag*
Source: ESIA Field Team

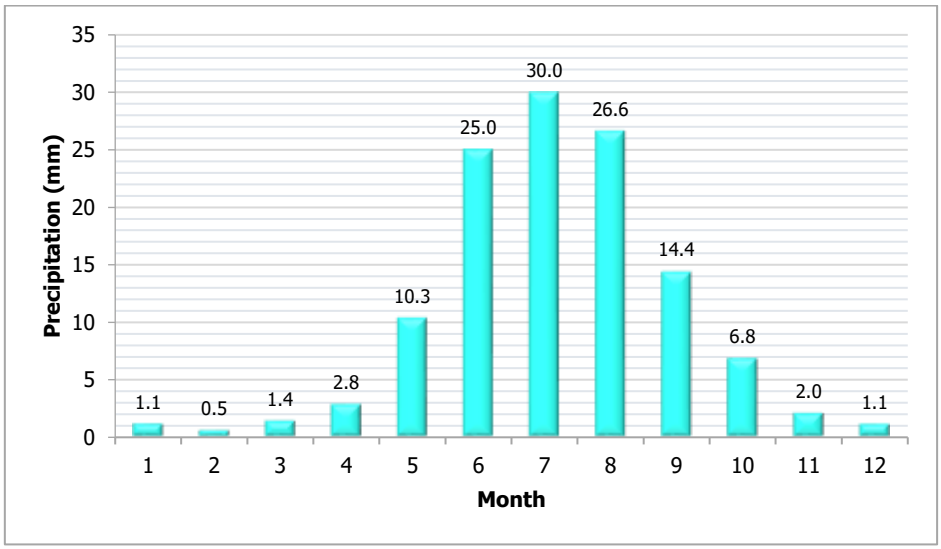


Figure 6-17. Monthly average precipitation, Dornogovi *aimag*
Source: ESIA Field Team

6.5.2. Groundwater

6.5.2.1. Baseline

The Project Area in the desert steppe zone, characterised by abundant groundwater, which gives rise to small lakes and springs in the region.[44] Groundwater is the main water supply in the Project Area.

Available groundwater data for Choir are limited, however in Sainshand, groundwater is the main source of water supply, which is hydro-geologically separated into three layers: Upper cretaceous water formation of Bayanshiree layer, upper cretaceous water formation of Sainshand layer and lower cretaceous water formation of Zuunbayan layer.

Groundwater monitoring in Sainshand undertaken for an Asian Development Bank (ADB) project[45] sampled three locations in the city and found the depth to groundwater is more than 2.6 m and groundwater quality generally complies with drinking water standard MNS 900:2005, with exception of sodium. *Salmonella* and *E.*

[44] Available at: https://mongolia-guide.com/. Accessed March 2020.
[45] ADB, 2016. *Initial Environmental Examination Mongolia: Southeast Gobi Urban and Border Town Development Project Additional Financing*.

coli were not detected in the samples. Consultation[46] with local stakeholders in the Project locality noted that groundwater levels are reducing yearly, for which climate change and mining are considered the main reasons. An average depth of 120 m is required for a groundwater well, leading to relatively high costs of drinking water. It is common for the well to become exhausted in summer leading to conflicts between herders as competition for water increases.

Water supply for herders is usually from manual wells. According to the NSO, there are 1,515 active wells in the seven *soum*s, shown in Table 6-6. Many of these wells are enclosed with wooden, concrete or stone structures. Dornogovi *aimag* waters 40% of its pasture lands and has an active well drilling programme; 15-20 wells are drilled on average every year, each costing 25 million Mongolian tugriks or 7,700 EUR (July 2020), and the future focus for local government on increasing the number of engineered wells drilled in the pasture land.[47]

Table 6-6. Numbers of wells, by soum, in 2019.

Indicators	Sumber	Shiveegovi	Sainshand	Airag	Altanshire	Dalanjargalan	Saikhandulaan
Well (total)	**265**	**60**	**216**	**241**	**177**	**236**	**320**
Abyssinian and artesian well	54	16	53	6	32	22	33
Manhole	1	2	29	0	3	5	4
Simple mine well	144	41	120	230	140	201	283
Other	66	1	14	5	2	8	0

Source: NSO.www.1212.mn

Information obtained from Umard Gobi River Basin Authority noted over 262 wells and 13 *bulag* (springs) within a 10 km zone around the OHTL route, as shown in Figure 6-18. Within the 6 km buffer zone, 51 wells were mapped (see Land Use section). Of these, none are within the 25 m RoW and only three wells (one of which was unused) were identified by the Project ESIA within 300 m of the OHTL centreline and a further three wells within 600 m. These were located at KMs 20-30, 40, 60, and 180-190 (see Table 6-7).

Table 6-7. Groundwater wells in transmission line corridor

Type of well	Location (km)	Depth and water Levels	Distance from ROW	Users/Details
	Between KM 20-30 N46° 6' 32.753", E108° 26' 13.837"	8m deep, 4m to water level	383 m	Well, Winter Quarter
	Between KM 20-30 N46° 5' 41.431", E108° 27' 14.335"	34m deep, 18m to water level	600 m	Well, tree nursery/plantation

[46] Naranbold, Director, Agriculture and SME department, Dornogobi. Social Field Team Interviews. June 2020
[47] Naranbold, Director, Agriculture and SME department, Dornogobi. Social Field Team Interviews. June 2020

Type of well	Location (km)	Depth and water Levels	Distance from ROW	Users/Details
Agtny well 	Between km 180 and km 190 N45°06′14.8, E109°55′43.5	12m deep, 7m to water level	170 m	10 households use for drinking and for 12,000 head of livestock Pumped by generator
Biluut well 	Km 60 N45°54′41.7, E108°46′36.4	2m deep, 0.7m to water level	130 m	Well owner dug it in 1998. 10-20 herder families use for drinking and 4,000 head of livestock Pumped by hand
Well (unnamed) 	Km160 N45°14′31.3, E109°38′20.7	No information - locked	550 m	No information
Unused well 	Km 40 N46°2'46.46", E108°34'5.02"	Unused	260 m	-

Source: ESIA Field Team

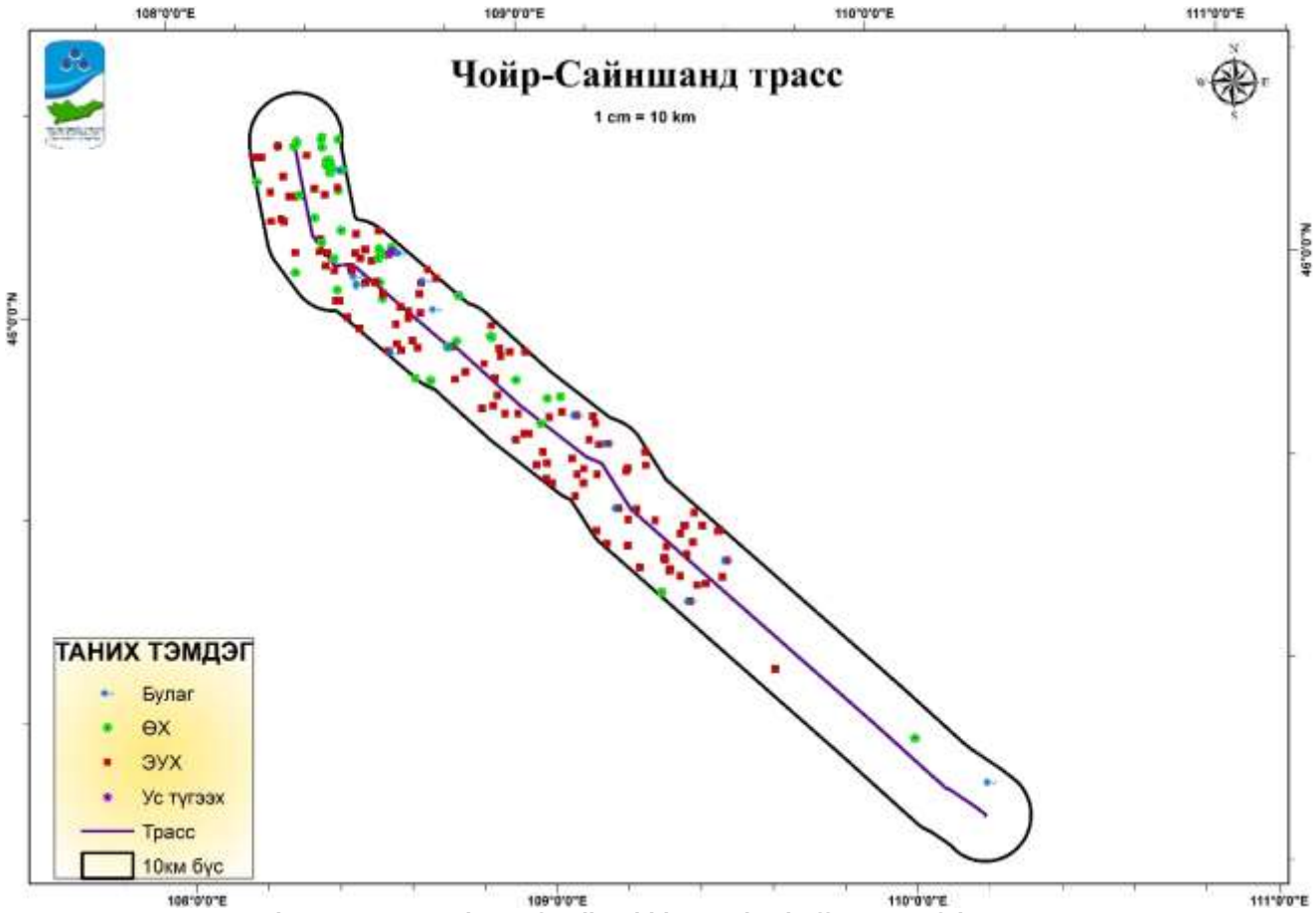


Figure 6-18. Locations of wells within a 10 km buffer zone of the OHTL
Source: ESIA Field Team and Umard Gobi River Basin. Key: • well ☐ 10km buffer

Two of the actively used wells were sampled by the ESIA field team, with the analysis given in Table 6-8 and Table 6-9. The analysis shows the samples met the Mongolian National Drinking Water Standard (MNS 0900: 2018) apart from sodium and uranium. The presence of uranium in the water of these two wells may be due to the nature of the sedimentary rocks, and there are no uranium deposits nearby and similarly for sodium, the OHTL crosses naturally saline areas.

Table 6-8. Groundwater analysis

#	Analytical parameters	Unit of measurement	Biluut well	Agtny well	MNS 0900:2018
1	Potassium (K^+) Sodium (Na^+)	mg/l	354.12	206.46	-
2	Ammonium (NH_4^+)	mg/l	0.087	0.043	1.5
3	Calcium (Ca^{2+})	mg/l	28.85	15.23	100
4	Magnesium (Mg^{2+})	mg/l	24.81	14.1	30
5	Chloride (Cl^-)	mg/l	326.14	143.93	350
6	Sulphate (SO_4^{2-})	mg/l	128.47	107.75	500
7	Nitrogen dioxide (NO_2^-)	mg/l	0.003	0.003	1
8	Nitrate, (NO_3^-)	mg/l	4.36	15.73	50
9	Carbonate (CO_3^{2-})	mg/l	0.2	0.3	-
10	Calcium bicarbonate (HCO_3^{2-})	mg/l	414.8	262.3	-
11	pH	-	7.8	8.26	6.5-8.5

#	Analytical parameters	Unit of measurement	Biluut well	Agtny well	MNS 0900:2018
12	Electrical conductivity	mSm / cm	1.887	1.175	1.0
13	Total hardness	mg-eq / l	3.48	1.92	7
14	Dry residue, Total Dissolved Solids (TDS)	mg/l	1209.0	836.0	1000
15	Ferric Thiocyanate, Fe3+	mg/l	0.047	0.037	-
16	Temperature (in-field analysis)	^{o}C	12.3	15.7	-

Source: ESIA Field Team

Table 6-9. Groundwater heavy metal analysis

Analytical parameters	Unit of Measurement	Biluut well	Hunting Well	MNS 0900:2018	MNS 6148:2010
Aluminium, Al	µg/l	<10	<10	500	500
Barium, Ba	µg/l	14	<10	700	2000
Calcium, Ca	mg/l	26.6	8.76	100	-
Chormium, Cr	µg/l	<10	<10	50	70
Copper, Cu	µg/l	9	<5	1000	1000
Iron, Fe	µg/l	<50	<50	300	300
Potassium, K	mg/l	6.2	1.9	-	-
Magnesium, Mg	mg/l	22.8	8.64	30	-
Manganese, Mn	µg/l	<5	<5	100	100
Sodium, Na	mg/l	345	237	200	-
Potassium, P	µg/l	<50	<50	-	-
Strontium, Sr	µg/l	1937	258	2000	-
Titamium, Ti	µg/l	<10	<10	-	-
Vanadium, V	µg/l	<10	<10	-	600
Zinc, Zn	µg/l	<5	<5	5000	5000
Berryllium, Be	µg/l	<0.1	<0.1	0.2	1
Candium, Sc	µg/l	6	4	-	-
Carbon, Co	µg/l	0.21	0.08	-	-
Nickel, Ni	µg/l	1.9	<0.3	20	100
Gallium, Ga	µg/l	<0.02	<0.02	-	-
Molybdenum, Mo	µg/l	8	17	70	40
Arsenic, As	µg/l	6.81	9.67	10	10
Selenium, Se	µg/l	<0.2	<0.2	10	40
Rubidium, Rb	µg/l	27.3	0.8	-	-
Yttrium, Y	µg/l	0.03	0.005	-	-
Zirconium, Zr	µg/l	0.57	0.05	-	-
Columbium, Nb	µg/l	0.165	0.05	-	-
Silver, Ag	µg/l	<0.2	<0.2	100	100
Cadmium, Cd	µg/l	<0.01	<0.01	3	3
Indium, In	µg/l	<0.001	<0.001	-	-
Tim (Stannum), Sn	µg/l	<0.1	<0.1	-	-
Antomony, Sb	µg/l	<0.2	<0.2	20	-
Tellurium, Te	µg/l	<0.1	<0.1	-	-
Caesium, Cs	µg/l	3.03	0.007	-	-
Lanthanum, La	µg/l	<0.01	<0.01	-	-
Cerium, Ce	µg/l	<0.05	<0.05	-	-
Praseodymium, Pr	µg/l	<0.006	<0.006	-	-

Analytical parameters	Unit of Measurement	Biluut well	Hunting Well	MNS 0900:2018	MNS 6148:2010
Neodymium, Nd	µg/l	<0.01	<0.01	-	-
Samarium, Sm	µg/l	<0.002	<0.002	-	-
Europium, Eu	µg/l	0.004	0.002	-	-
Gadolinium, Gd	µg/l	<0.003	<0.003	-	-
Terbium, Tb	µg/l	<0.002	<0.002	-	-
Dysprosium, Dy	µg/l	<0.001	<0.001	-	-
Holmium, Ho	µg/l	<0.001	<0.001	-	-
Erbium, Er	µg/l	<0.001	<0.001	-	-
Thulium, Tm	µg/l	<0.001	<0.001	-	-
Ytterbium, Yb	µg/l	<0.001	<0.001	-	-
Lutetium, Lu	µg/l	<0.002	<0.002	-	-
Hafnium, Hf	µg/l	0.337	0.04	-	-
Tantalum, Ta	µg/l	0.216	0.06	-	0.5
Tungsten, W	µg/l	14.5	4.49	-	-
Mercury, Hg	µg/l	<0.5	<0.5	1	2
Titanium, Ti	µg/l	<0.007	<0.007	-	-
Lead, Pb	µg/l	<0.5	<0.5	10	50
Bismoth, Bi	µg/l	<0.01	<0.01	-	-
Thorium, Th	µg/l	0.044	0.011	-	-
Uranium, U	µg/l	20.3	32.2	15	20

Source: ESIA Field Team

6.6. Air Quality

6.6.1. Source of Data

The ESIA field team measured baseline air quality data during a field visit between 12 to 16 June 2020. The air quality survey team measured air quality parameters of sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and dust levels (particulate matter, PM_{10} $PM_{2.5}$) at seven locations (Figure 6-19 along the OHTL corridor using Aeroqual Series 500 instruments (Figure 6-20). These locations represent sensitive receptors for air quality in the AoI. Two of the seven monitoring points were located at existing infrastructure i.e. the existing overhead line (location 1) and Choir sub-station (location 7). The remaining five locations were adjacent to herders' winter shelters, which are considered to be air quality sensitive receptors during the construction period.

NO_2 and SO_2 measurements were taken for 20 minutes at all seven locations to allow comparison with Mongolian air quality standard *MNS4585:2016*. Particulate matter (PM)2.5 and PM10 thresholds in *MNS4585:2016* were according to a 24 hour averaging period. Therefore, at locations 1 and 7 the measurements were taken for a 24-hour period. At the remaining locations, PM2.5 and PM10 measurements were taken for 20 minutes, therefore are not directly comparable to the thresholds in *MNS4585:2016* or those set by the World Health Organisation (WHO) which are also 24-hour averaged.

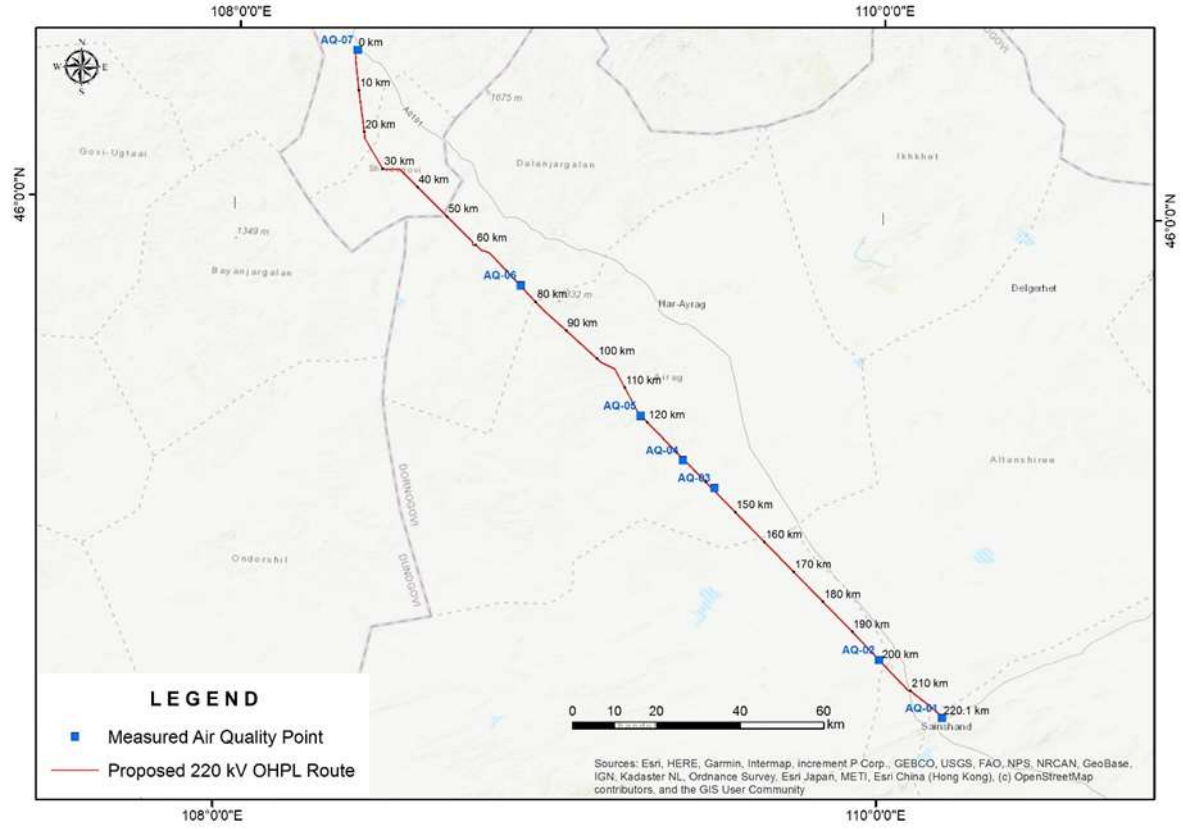


Figure 6-19. Locations of air quality monitoring
Source: ESIA Field Team.

Figure 6-20. Air quality monitoring example sites
Source: ESIA Field Team.

6.6.2. Air Quality Standards

Mongolian air quality standard *MNS4585:2016* sets common air pollutants threshold values for ambient air quality and indoor air quality. The WHO ambient air quality guidelines are also applicable to meet EBRD PRs. Table 6-10 presents ambient air quality standards applicable for the Project.

Table 6-10. Mongolian and WHO air quality standards

Pollutant	Averaging Period	Mongolian Standards (µg/m³)	Averaging Period	WHO Ambient Air Quality Guidelines
Sulphur Dioxide (SO_2)	20 min	450	10 min	500
	24 hour	50	24 hour	20
	Annual	20		
Nitrogen Dioxide (NO_2)	20 min	200		
	24 hour	50	1 hour	40
	Annual	40	Annual	40
Carbon Monoxide (CO)	20 min	60,000		
	1 hour	30,000		
	8 hour	10,000		
Ozone (O_3)	8 hour	100	8 hour	100
Lead (Pb)	24 hour	1		
	Annual	0.25	Annual	
Benzo-a-pyrene ($C_{20}H_{12}$)	24 hour	0.001		
Particulate Matter (PM10)	24 hour	100	24 hour	50
	Annual	50	Annual	20
Particulate Matter (PM2.5)	24 hour	50	24 hour	25
	Annual	25	Annual	10
Total suspended particles	20 min	500		
	24 hour	150		
	Annual	100		

Source: ESIA Field Team.

6.6.3. Air Quality Baseline

The results of the field measurements are in Table 6-11. The concentration of PM10 and PM2.5 particles were compared with the 24 hours average for Mongolian Air Quality Standard (MNS 4585: 2016) and the concentrations of NO_2 and SO_2 were compared with the 20-minute average of the Mongolian Air Quality Standard. When comparing the results of the field measurements with the Mongolian Air Quality Standard, all indicators meet the Standard i.e. they are under the maximum allowable level. However, the WHO Guidelines for particulate matter levels are not met at Choir substation for PM10. The results for PM10 and PM2.5 were measured for 20 minutes at most sample locations, and not the required 24 hour averaging as specified in the Mongolian and WHO standards, which therefore does not allow direct comparison against these standards.

Table 6-11. Air quality analysis results

#	Location / Potential Receptor	Location		Wind direction and speed m/s	SO2	NO2	PM 10		PM 2.5	
					20 min		20 min	24h	20 min	24 h
		Latitude	Longitude		µg / m³					
1	Next to Sainshand substation	44°55′36.1″	110°11′56.1″	SE 1.3-1.4	0	173		3		1
2	Outside unknown herder family	45°03′00.6″	110°00′20.3″	SE 4.2-4.8	0	168	4		1	
3	Herder G.Nergui	45°24′54.7″	109°29′51.1″	SW 5.0-5.8	40	188	9		2	
4	Herder Ts. Munkhbat	45°28′24.5″	109°23′55.7″	SE 6.5-9.8	0	165	69		16	
5	Herder Zolzaya	45°34′02.9″	109°15′59.0″	SW 6.8-9.2	10	167	15		5	
6	Herder Ganchimeg	45°50′31.2″	108°53′20.8″	NW 9.3-12.0	0	143	48		9	

#	Location / Potential Receptor	Location		Wind direction and speed m/s	SO2	NO2	PM 10		PM 2.5	
					20 min		20 min	24h	20 min	24 h
		Latitude	Longitude		µg / m³					
7	Next to Choir substation	46°20′16.0″	108°21′51.9″	SW 7.8-12.1	0.0	191		95		18
MNS4585:2016					450	200		100		50
WHO (2005)								50		25

Source: ESIA Field Team.

6.6.4. Dust and sand storms

Dust and sand storms are a significant natural hazard in the OHTL corridor and a major influence on air quality. Strong dust storms create reduced visibility, as well as respiratory health concerns if people are exposed to dust for extended periods. Dust storm frequency is most common during Spring, due to the windy conditions and general dryness of the season Through consultation with local officials the occurrence of dust storms is a challenge in the Gobi region, exacerbated by climate change and significant areas of land used for mining activities which remain un-rehabilitated, particularly in Dalanjargalan and Airag *soums*. Climate data showing prevalence of winds and sand storms are in Table 6-12. A dust storm occurred during the traffic count for this ESIA, as shown in Figure 6-21.

Table 6-12. Climate data related to dust and sand storms

		Dornogovi *aimag*			Govi-Sumber *aimag*		
№	Year	Number of days with high wind (+16 m/sec)	Number of days with storm (+28 m/sec)	Number of days with sandstorm	Number of days with high wind (+16 m/sec)	Number of days with storm (+28 m/sec)	Number of days with sandstorm
1	2000	34		24	28	20	14
2	2001	24		19	17	15	10
3	2002	26	4	20	26	28	6
4	2003	14		13	36	25	13
5	2004	27		36	38	18	18
6	2005	34		47	42	25	14
7	2006	19		65	61	37	4
8	2007	19	2	47	44	29	14
9	2008	22	1	20	43	38	13
10	2009	27	1	30	57	28	14
11	2010	32		22	22	19	29
12	2011	16	1	27	32	4	15
13	2012	24	1	18	5	3	2
14	2013	30	4	17	9	12	6
15	2014	31	1	15	4	3	1
16	2015	29		21	1	3	
17	2016	29		24	1	2	
18	2017	28	2	21	19	3	

Source: ESIA Field Team[48]

[48] *Climate observation station in Sainshand soum, Dornogovi aimag and Choir soum, Govi-Sumber aimag (2000-2017)*

Figure 6-21. Dust storm, Choir
Source: ESIA Field Team

The dominant wind direction for both *aimags* is shown in Figure 6-22 and Figure 6-23. The location of receptors in relation to a point source of dust during construction and the impact of dust generation from the source, will be influences by the prevalent wind direction.

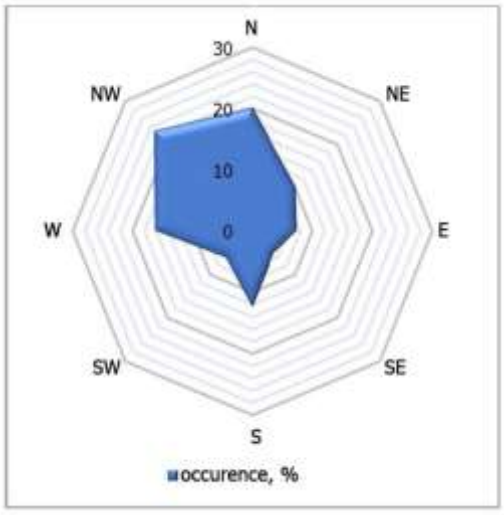


Figure 6-22. Wind rose, Dornogovi
Source: ESIA Field Team

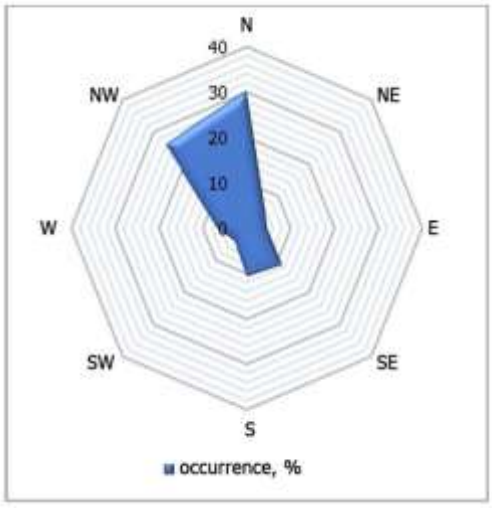


Figure 6-23. Wind rose, Govi-Sumber
Source: ESIA Field Team

6.7. Noise and Vibration

6.7.1. Source of Data

The ESIA environmental field team conducted a field between 12 to 16 June 2020. Nine points were selected along the total route and measurements were performed using a calibrated MS6701 Digital Sound Level Meter. The meter was placed 1.5 m above ground level i.e. the level stipulated by the manufacturer of the instrument.

The locations were selected in order to provide a baseline at noise sensitive receptors i.e. herders' homes and adjacent to existing infrastructure including substations in Choir and Sainshand, the 100 kV overhead line and a wind turbine. Noise measurements were taken for 16 hours in the day time and 8 hours at night at both substation locations and 20 minutes in the day time at all remaining locations.

Monitoring took place between 9 to 20 m from herders' winter shelters and was adjacent to the substations and overhead line.

6.7.2. Ambient Noise Standards

Mongolian noise standards are included in Ambient Air Quality Standards *MNS 4585:2016 General technical requirements, Air quality.* The Air Quality Standard sets an allowable limit for noise in daytime at 60 decibels (dB), and night at 45 dB, with day and night measurements of 16-hour and 8-hour averages respectively.

According to the WHO Guidelines for Community Noise (1999), noise impacts should not exceed the levels presented in Table 6-13 or result in a maximum increase in background levels of more than 3 dB at the nearest receptor location off-site.

According to the WHO Night Noise Guidelines (2009), annual average night exposure should not exceed 40 dB, corresponding to the sound from a quiet street in a residential area. Persons exposed to higher levels over the year can suffer mild health effects, such as sleep disturbance and insomnia. Long-term average exposure to levels above 55 dB, similar to the noise from a busy street, is considered increasingly dangerous for public health, with a sizeable proportion of the population highly annoyed and sleep disturbed, and evidence that the risk of cardiovascular disease increases.

It is noted that new guidance was issued by the WHO in October 2018 for the European Region, where the threshold noise levels for adverse effects to human health were revised and specific noise levels by source were recommended, including road noise, railways, wind turbines, air craft and leisure noise.

There are no Mongolian standards for vibration and no level of vibration has been specified in WHO Guidelines.

Table 6-13. Noise level guidelines used by WHO

Receptor	L_{aeq} (dBA)	
	Day 07:00 – 22:00	Night 22:00 – 07:00
WHO guidelines: Residential, institutional or educational	55	45
WHO guidelines: Industrial, commercial	70	70
Mongolian standards	60	45

Source: WHO (1999), Guidelines for Community Noise. Notes: Guidelines values are for noise levels measured out of doors. L_{Aeq}: A-weighted, equivalent sound level. dBA: A-weighted decibel

6.7.3. Noise Baseline

Noise can affect sensitive receptors such as homes, schools and hospitals. Traditional *ger* dwellings offer little protection from noise. The majority of the proposed OHTL corridor is in an area with limited significant and sustained sources of noise.

A noise survey was undertaken at 11 locations in Sainshand in 2015 as part of an Environmental Impact Assessment (EIA).[49] This monitoring showed wind to be the main source of noise. Other sources of noise were road and rail traffic, and mining. Other small industries present in Choir and Sainshand will have a minor contribution to the localised noise baseline.

The OHTL ESIA environmental field team conducted noise measurements in nine locations along the OHTL corridor in June 2020. The results are compared with MNS 4585: 2016 (Air quality, General technical requirements) and WHO noise guidelines. The locations of the measurements are provided in Figure 6-24 and the results and location co-ordinates in Table 6-14.

WHO standards are based on one-hour LAeq (dBA) which is a noise pressure level adjusted for the human ear; Mongolian standards do not use the LAeq adjustment. The measurements taken along the OHTL corridor are not LAeq adjusted, therefore accurate comparison is not possible with the WHO standard. In addition the majority of the samples are for short time periods (20 minutes) which will impact on the actual average required to compare to the standards for day or night time averages. However, where the standards appear not to be met e.g. sample 5, outside a herder household, the field team noted that the wind speed was 14.4-17.9 m/s, which contributed to the high noise level for the night-time measurement. This can be considered to support the 2015 EIA study[50] which noted wind noise as the main noise source in the Project Area.

[49] Environ LLC, Draft Environmental Baseline Report EIA in ADB, 2016. *Initial Environmental Examination Mongolia: Southeast Gobi Urban and Border Town Development Project Additional Financing.*

[50] Environ LLC, Draft Environmental Baseline Report EIA in ADB, 2016. *Initial Environmental Examination Mongolia: Southeast Gobi Urban and Border Town Development Project Additional Financing.*

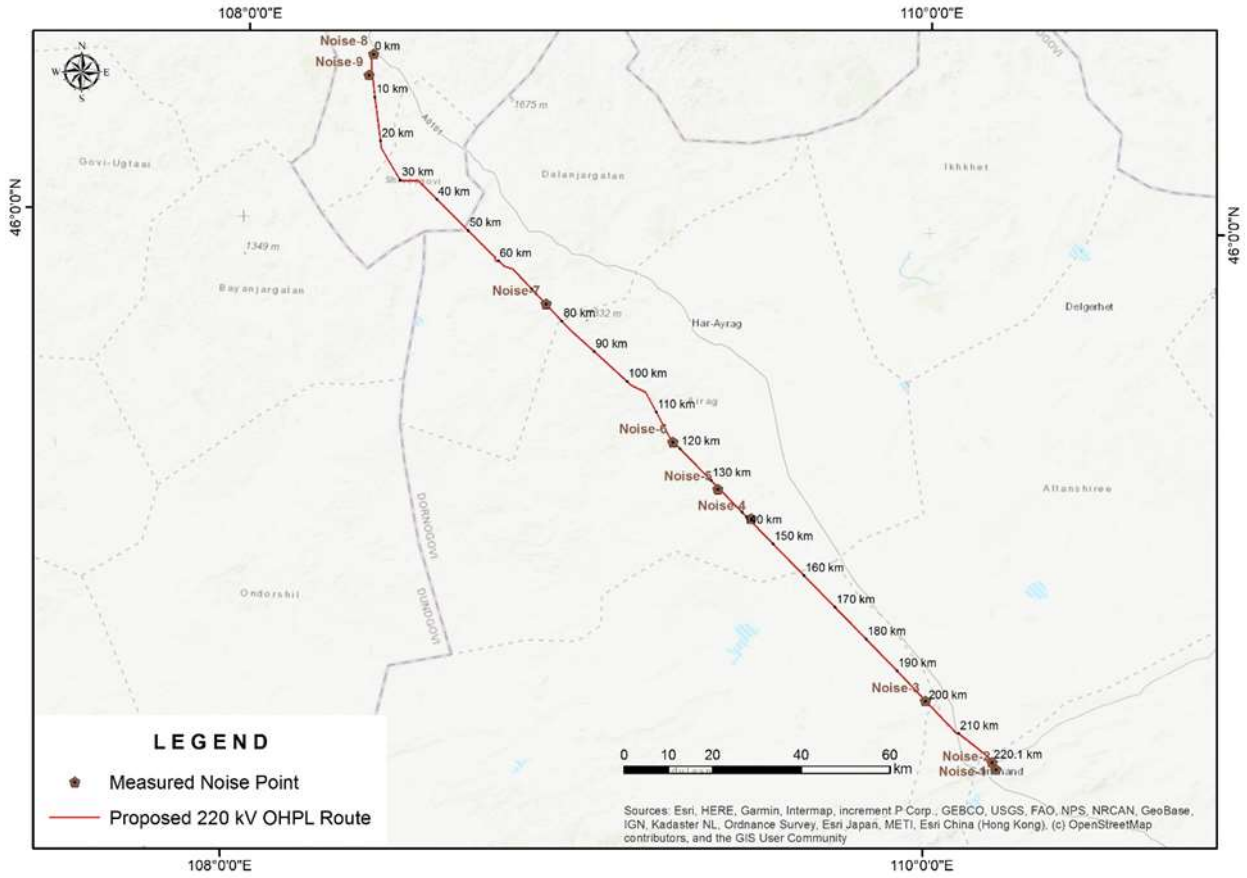


Figure 6-24. Locations of noise monitoring

Source: ESIA Field Team.

Table 6-14. Noise monitoring results

#	Location		Location description	Altitude (m)	Measurement time	Noise level, dBA
	Longitude	Latitude				
1	44°55′36.1″	110°11′56.1″	Next to Sainshand substation	1001	Day	34.0
					Night	39.5
2	44°54′45.3″	110°12′36.5″	Wind Turbine	1011	Day	52.7
3	45°03′00.6″	110°00′20.3″	Outside unnamed family home	920	Day	39.0
4	45°24′54.7″	109°29′51.1″	Outside herder G.Nergui	1015	Day	58.4
5	45°28′24.5″	109°23′55.7″	Malchin Ts. Outside Munkhbat	995	Night	62.2
6	45°34′02.9″	109°15′59.0″	Outside herder Zolzaya	1022	Day	41.9
7	45°50′31.2″	108°53′20.8″	Outside herder Ganchimeg	1170	Day	56.0
8	46°20′16.0″	108°21′51.9″	Next to Choir substation	1277	Night	62.0
9	46°17′41.9″	108°21′10.5″	Under 110 kV overhead line	1222	Day	53.1
MNS 4585:2016 (07-22)					Day	60
(22-07)					Night	45
WHO Guidance (07-22)					Day	55
(22-07)					Night	45

Source: ESIA Field Team.

6.8. Traffic

6.8.1. Sources of Data

The ESIA environmental and social field teams conducted research including a traffic survey and consultation with local stakeholders. Publicly available reports and published data were also analysed.

6.8.2. Baseline

Both Govi-Sumber and Dornogovi *aimags* are connected to Ulaanbaatar by paved road, a part of the 4th Asian highway network (Ulaanbaatar-Choir – 240 km and UB-Sainshand – 450 km, respectively). The two aimag centres and soum centres have inner paved roads, in addition *soums* in the Project Area are connected either by paved roads (*soum*s along the 4th Asian highway network) or unpaved (earth) roads.

The National Traumatology and Orthopedics Research Centre reports that traffic related accidents cause 13% of all injuries and 20% of all accidental deaths nationally. In 2019, Govi-Sumber and Dornogovi *aimags* had three and 35 road fatalities, respectively.[51] The number of transport accidents in Mongolia is increasing in both urban and rural areas. Govi-Sumber and Dornogovi *aimags* have a far higher incidence of traffic related injuries than the national or provincial average (Table 6-15).

Table 6-15. Number of injuries caused by road accidents, 2017-2019

#	Area	2017	2018	2019	2019 (cases per 10,000 population)
1	National	17,603	20,345	20,978	64.8
2	Ulaanbaatar	11,495	13,564	14,300	95.9
3	Rural average	6,108	6,781	6,678	38.2
4	**Govi-Sumber *aimag***	171	219	164	92.2
5	**Dornogovi *aimag***	516	661	655	94.5

Source: ESIA Field Team

Traffic counts were undertaken during the ESIA field surveys, in the cities of Sainshand, Choir and in Dalanjargalan *soum*; the results are provided in Appendix B. The majority of the vehicles recorded at all sites were light vehicles (cars), followed by HGVs at all sites. Two motorcycles only were recorded, in Sainshand. Other traffic included small trucks and buses in Choir and Dalanjargalan *soum.* Total vehicle movements recorded are provided in Table 6-16. Traffic was highest in Choir.

Table 6-16. Number and distribution of vehicles recorded

Location	HGV	LGV	Bus	Car	Motorcycle
Choir	27	10	3	136	0
Dalanjargalan *soum*	15	8	2	37	0
Sainshand	13	7	0	78	2

6.9. Protected Areas

6.9.1. Sources of Data

Sources of data were obtained from secondary data sources and engagement with *aimag* and *soum* administrations.

[51] Traffic data. Available at: http://www.gemtel.mn/uploads/%D0%AD%D1%80%D0%B3%D1%8D%D0%BD%20%D0%BC%D1%8D%D0%B4%D1%8D%D1%8D%D0%BB%D1%8D%D0%BB-2019%20%D0%BE%D0%BD..pdf. Accessed May 2020.

6.9.2. Baseline

6.9.2.1. International Designations

There is one internationally recognised biodiversity conservation site within the Project Area, Ikh Nart IBA (reference No MN041, criteria A1, A3). This IBA overlaps with the Ikh Nart Nature Reserve (see Figure 6-23 below). The site also contains many archaeological sites[52] (see section 7-13).

This reserve area is located 10 km southwest of the OHTL route. It is officially called Ikh Nartiin Chuluu Nature Reserve by Birdlife International and the IBA area covers an area of 43,740 ha. Over 120 bird species have been recorded in Ikh Nart, including the threatened Lesser Kestrels and many migrating species.

According to the IBA classification[53], the site is an 'island' of rocky terrain and canyons, rising up from the surrounding desert steppe. Willow and elm trees grow among the rocks and ravines. Freshwater springs supply the Ikh Nart valley, where there are many streams and ponds. Khalzan, a historical spar, is located in the north-west of the site. This area is an important winter shelter for local people and their livestock. There are many abandoned mines at the site, which, in the absence of rehabilitation activities, have contributed to soil erosion. Disturbance, poaching and pollution from artisanal mining are the main threats to biodiversity at the site. Livestock and human waste are polluting the freshwater springs, while illegal hunting and domestic dogs are threatening the populations of wild ungulates.[54]

The site supports one Globally Threatened bird species, Lesser kestrel *Falco naumanni* (Vulnerable, VU), as well as the Near Threatened (NT) Cinereous vulture *Aegypius monachus* (NT). The site also supports an assemblage of species restricted to the Eurasian steppe and desert biome.[55]

Non-bird biodiversity includes several Globally Threatened mammals - *Argali Ovis ammon* (NT), Siberian ibex *Capra sibirica*, Goitered gazelle *Gazella subgutturosa* (VU), Mongolian gazelle *Procapra gutturosa* and Asiatic wild ass *Equus hemionus* (Endangered, EN). In winter, hundreds of Mongolian gazelle remain in the area[56].

6.9.2.2. Nationally Protected Areas

The Law on Mongolian Special Protected Areas (1994) recognises four main categories of nationally protected areas i.e. a) Strictly Protected Areas, b) National Parks, c) Nature Reserves, and d) Monuments. Types of economic activities and land uses allowed in the different categories of protected areas are the main practical differences distinguishing the protected areas status according to their conservation importance. For example, the Strictly Protected Areas are areas in which natural conditions are very well preserved, and where human use is severely restricted. National Parks are areas in which natural conditions are relatively well preserved, and which have historical, cultural, scientific, educational, and ecological importance. Nature Reserves comprise areas protected for the conservation, preservation and restoration of ecological, biological, palaeontological or geological features. Monuments are areas protected for the purposes of preserving natural heritage and historical and cultural sites. The Law on Protected Areas permitted local governments to set aside some areas under local protection for legitimate reasons, however permitted land use types on the locally protected areas and their conservation statuses are not clearly defined legally and subject to the local government's decision.

State protected areas have designated management funded by state budget, but the locally protected areas have no such management structure. Local governments' approval for land use type (for example, mining vs pasture use) is the main practical mechanism to enforce the protection measures on the locally protected areas.

[52] Publications. Official website of Ikh Nart. Available at: http://www.ikhnart.com/Ikh_Nart_Archeological_Sites.pdf. Accessed March 2020.
[53] Birdlife International. Available at: http://datazone.birdlife.org/site/factsheet/ikh-nartiin-chuluu-nature-reserve-iba-mongolia. Accessed June 2020.
[54] Available at: http://datazone.birdlife.org/site/factsheet/ikh-nartiin-chuluu-nature-reserve-iba-mongolia. Accessed March 2020.
[55] Idem.
[56] Idem.

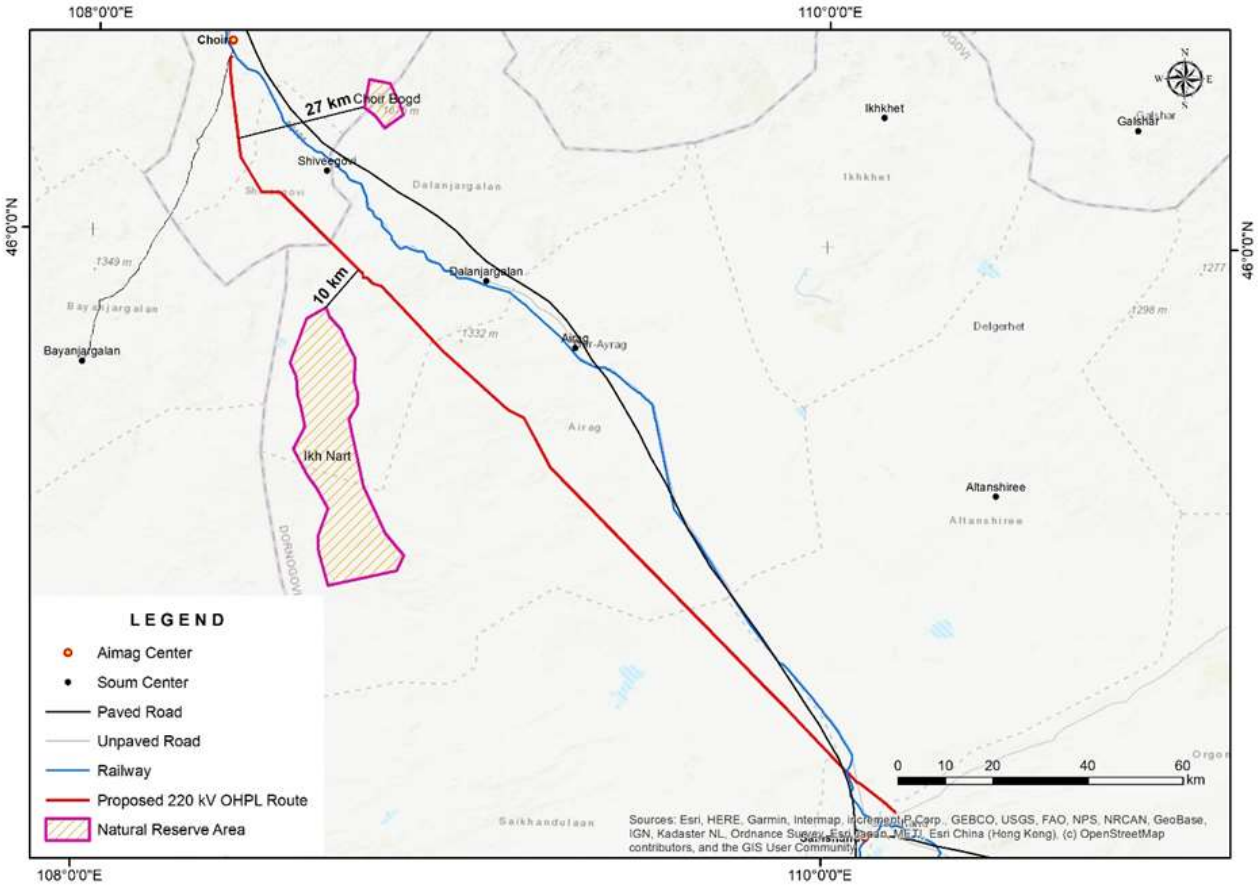


Figure 6-25. Locations of State Protected Areas in the Sainshand – Choir 220 kV powerline area

6.9.2.2.1. Nature Reserves

There are two Special Protected Areas within 25 km from the proposed OHTL corridor - Choiryn Bogd Nature Reserves and Ikh Nart Nature Reserve (Figure 6-23).

Choiryn Bogd Nature Reserve

The Choiryn Bogd Nature Reserve is located 27 km northeast of the OHTL route. It covers 5,265 hectares (ha) of area bordering Sumber *soum* of Govi-Sumber and Dalanjargalan *soum* of Dornogobi *aimags*. The Choiryn Bogd mountain provides habitat for wild sheep argali (Ovis ammon) and listed as nature reserve area by the Mongolian parliament decision in 2011.

Ikh Nart Nature Reserve

This reserve area is located 10 km southwest of the OHTL route, covering an area of 66,592 ha. This reserve provides unique habitat for more than 30 species of mammals (including the rare large ungulates such as argali, Siberian ibex, Goitered gazelle), over 120 species of birds, and various types of reptiles. Grassland and semi-desert steppe environments in the reserve provides habitat for one of the last remaining populations of Argali Sheep. Mongolian Parliament listed Ikh Nart as a Nature Reserve in 1996.

6.9.2.2.2. Locally Protected Areas

Within the Sainshand-Choir *soums* that the OHTL passes through, there are 47 Locally Protected Areas. The Locally Protected Areas within 10 km from the planned OHTL route are provided in Table 6-17 and shown in Figure 6-26. Construction and operation of powerlines are not prohibited in Locally Protected Areas (Annex 1 of the Ministers Order No 7 of 10 January 2001).

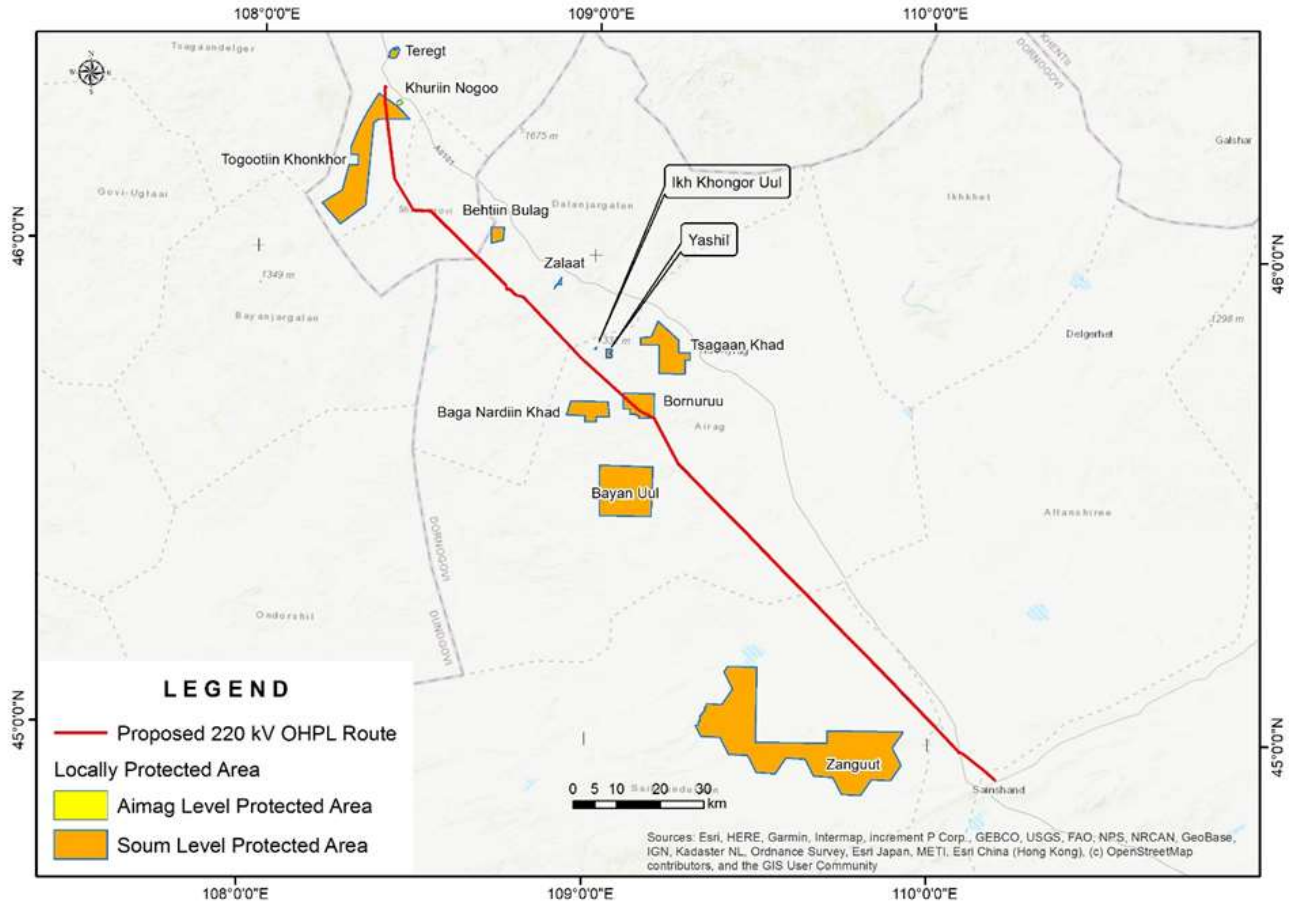


Figure 6-26. Locations of locally protected areas within 10 km radius from the proposed OTHL route

Table 6-17. Locally protected areas within 10 km from the OHTL alignment

#	Locally protected area	Distance to the OHTL route (km)	Purpose of protection	Area
Gobisumber aimag				
1	Khuriin Nogoo	2.6	Biodiversity habitat and water resources protection	123.90
Sumber soum				
2	Togootyn Khonkhor	**Overlaps 5.2 km**	Nature and historical heritage area	15,115.78
3	Teregt	6.8	Biodiversity habitat and water resources protection	404.88
Shiveegovi soum				
4	Bekht Spring	4.6	Biodiversity habitat and water resources protection	930.78
Dalanjargalan soum				
5	Zalaat	6.5	Reserve pasture	850.37
Airag soum				
6	Bayan Uul	5.2	Biodiversity habitat and water resources protection	1,3945.43
7	Baga Nardyn Khad	3.4	Biodiversity habitat and water resources protection	3,443.56
8	Bornuruu	**Overlaps 7.2 km**	Special purpose	3,553.07

#	Locally protected area	Distance to the OHTL route (km)	Purpose of protection	Area
9	Yashil	3.9	Special purpose (small scale artisanal mining area)	238.00
10	Ikh Khongor uul	3.6	Nature and historical heritage area	8.23
11	Tsagaan Khad	9.4	Special purpose	6,497.65
Sailkhandulaan soum				
12	Zanguut	6.1	Biodiversity habitat and water resources protection	48,306.95

Source: http://eic.mn/spa/gis.php

6.10. Biodiversity, Flora and Fauna

6.10.1. Sources of Data

Detailed baseline biodiversity information along the Project OHTL route is scarce, despite some descriptive studies at regional scale. This ESIA therefore used the following data sources for the biodiversity baseline:

- Environmental and biodiversity reconnaissance trip along the entire OHTL corridor in April 2020;
- Detailed environmental baseline survey undertaken in May 2020;
- Spring bird survey in May 2020 and Autumn bird survey in September 2020;
- Walkover in May 2021 of the revised route alignment; and
- Relevant reference studies.

6.10.2. Field Survey Methodology

The ESIA team undertook flora baseline surveys for the Project area between 04 and 10 June 2020. Objectives of the field baseline assessment were:

- Identification of vegetation species along the proposed OHTL and associated areas that will be disturbed by the works; and
- Identification of vegetation species with high conservation value such as threatened category species in the International Union of Conservation of Nature (IUCN) and regional Red Lists.

Vegetation survey sites were selected in areas that represented major vegetation communities found within the Project Area. Selected vegetation survey plot locations along the proposed OHTL corridor are shown in Figure 6-27.

10 m x 10 m survey plots were selected at each vegetation monitoring site (Figure 6-28) to describe the general baseline conditions using the following parameters:

- Vegetation condition using the classification scheme developed by Keighery (1994);
- List of plant species;
- Plant species abundance;
- Plant coverage versus bare ground and rocks;
- Vegetation communities by dominant species;
- Biomass of 1x1 m small plot; and
- Coordinates and photos of rare and endangered plant species (IUCN and Regional Red List species, and species designated as rare by Mongolian regulations) and their abundance.

Photos and topographical information (position in the landscape, aspect, slope) of the plots were also documented.

Conservation status of the observed plants species were determined according to the IUCN Threatened Species Red List, Mongolian Threatened Plant Species Red List, and Mongolian government designated rare species list approved by the Mongolian Law on Natural Plant 1995 and its relevant regulations.

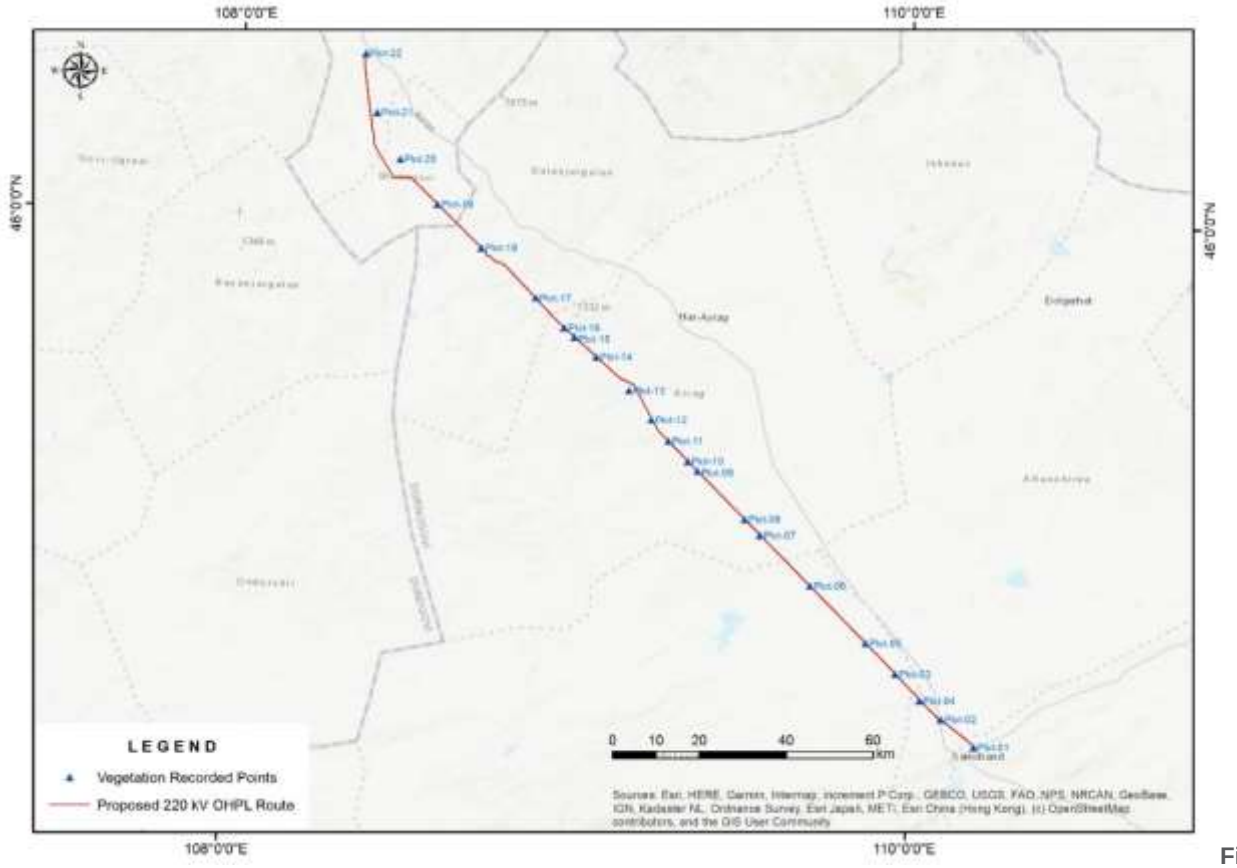


Figure 6-27. Location of vegetation survey plots

a) b)

Figure 6-28. Example of vegetation monitoring plots used for the baseline study a) 10 m x 10 m plot and (b) 1 m x 1 m plot for biomass measurement

6.10.2.1. Fauna Field Work

Mammal survey

Large mammals were recorded from direct observations from select observation spots and from incidental sightings during driving along the OHTL corridor. The fauna observation corridor included a 500 m buffer area either side of the OHTL centreline.

The biodiversity team undertook the following tasks during the field work:

- Identification of mammal species;
- Counting of observed individual species;
- Taking photos where possible;
- Recording of coordinates and description of observation sites;
- Inspect traces of wildlife species such as burrows, carcasses, or any areas such as shrubs or densely vegetated areas that might provide habitat for small mammals;
- Tracks of fauna; and
- Taking notes for large mammal movement direction.

Small mammal observations were undertaken by sightings, inspecting animal tracks, droppings, burrows in potential habitats such as rocky and bushy areas, and valleys.

Night time observations were conducted in three areas (Figure 6-29) along the OHTL corridor for nocturnal species by using spotlights and traps for capture and release of small mammals.

During the field study the biodiversity team opportunistically sought[57] local community members knowledge of wildlife species in their areas and recorded the stated responses.

Herpetofauna survey

No herpetofauna surveys were undertaken as there were no permanent water bodies within the Project Area at the time of the survey. Several dry river beds were observed during the environmental survey, however they no water was in them.

Invertebrates / Insect surveys

The following methods were used for invertebrate studies, adapted to the field conditions:

- Direct observation. Active and visible species such as butterflies, dragonflies and bumblebees may be observed and identified in the field during a walk-over of the site.
- Hand searching. A search of important invertebrate habitats, including dead wood, bare ground, beneath stones and discarded objects, and common invertebrate host-plants.
- Trapping. A variety of traps can be used, including pitfall, malaise, flight intercept, sticky and light traps. Bait traps can be used for butterflies and other insects attracted to fruits and sugar.

[57] Engagement with local herders was not part of the field study protocol due to COVID19 restrictions, but the biodiversity team opportunistically collected wildlife information from local community members who they met during the field survey.

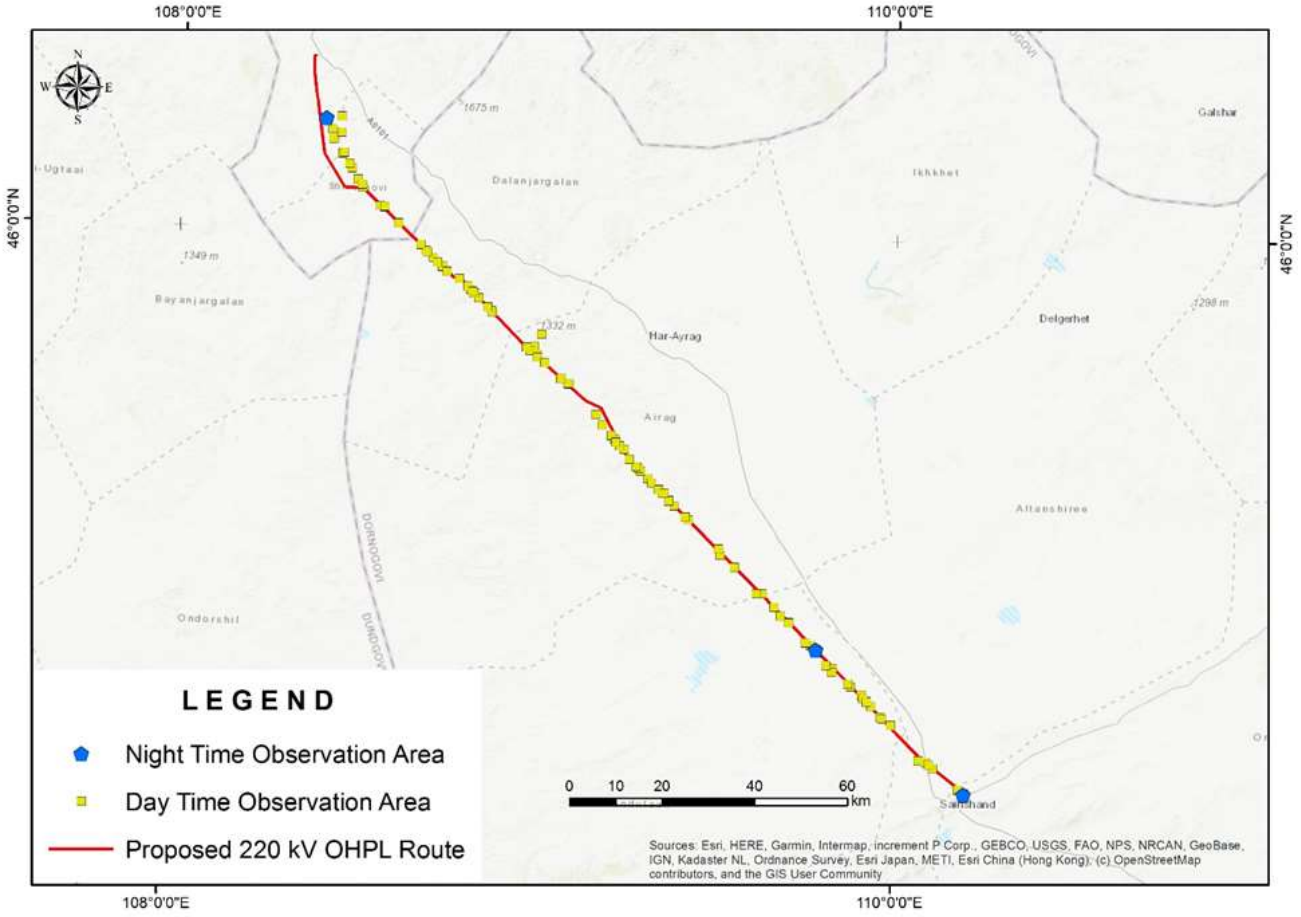


Figure 6-29 Fauna observation locations

Avifauna surveys

Detailed bird surveys were undertaken between 05 to 15 May 2020 (referred as the "spring bird survey") and 10 to 20 September 2020 (referred as the "autumn bird survey") along the proposed OHTL route. The avifauna surveys followed the general guidance set out in the Scottish Natural Heritage (SNH) 2016 Assessment and Mitigation of Impacts of Power Lines and Guyed Meteorological Masts on Birds, as adapted to the local situation, as well as the SNH (2005) *Survey Methods for Use in Assessing the Impacts of Onshore Windfarms on Bird Communities* (as although the 2005 guidance has been superseded,[58] it is the only version with a section specific to associated infrastructure including overhead powerlines).

Following the route alignment changes in 2021, a walkover survey of the new sites was undertaken and this is reported following the section on the surveys undertaken to SNH guidance.

Key requirements of the guidance with regard to bird surveys include:

- Migration watches should take account of key periods for the target species to be surveyed, and reference should be made to known peaks in their migration and weather patterns that can produce larger scale movements;
- Vantage Point (VP) observation should be tailored to the ecology of the target bird species involved. This should provide a spread over the full daylight period available (from official local sunrise to sunset times) which will vary depending on the time of year. Watches should be spread across all calendar months when the species is present or likely to be so;
- At least 36 hours of survey per season at each VP;

[58] SNH (2014) and (2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms*.

- Survey to be done within 2 km detection range;
- VPs to be chosen to achieve maximum visibility with the minimum number of points;
- VPs should not be located near to sensitive sites for target species;
- VP watches are conducted as a series of watches each of not more than 3 hours continuous duration at a time with suitable breaks of at least 30 minutes between watches to minimise observer fatigue. A combination of more than 9 hours VP watches should not be carried out by the same observer(s) over the course of a single 24 hour period;
- A record of what was record in the field, i.e. species, number, flight height, flight time the height bands, direction, and weather condition; and
- Flight heights should be classified into height bands, i.e. below the rotor- swept area, the rotor-swept area and above the rotor-swept area.

The SNH (2016) Guidance for Assessment and Mitigation of Impacts of Power Lines and Guyed Meteorological Masts on Birds states that "*depending on the scale of the development, it may not be necessary to undertake VP watches along the whole length of the route corridor".* The VPs could potentially be focussed on sensitive sites and areas used by target species; and this has informed our proposed approach.

Based on the initial scoping visit in April 2020, a total of 22 potential areas were identified as potential VPs along the entire route of the 216 km OHTL, with an average interval of 10 km. However, considering the locational constraints and conditions of the site, and reviewing other surveys undertaken in the area, a total of 15 VPs along the proposed OHTL have been used for the spring bird survey – four VPs at sensitive sites and 11 VPs at less sensitive sites (Figure 6-30). A modified SNH approach for this ESIA was considered appropriate due to the location of the Project Area away from any major bird migration routes and the lack of potential bird habitats due to lack of surface water and vegetation along the OHTL alignment.

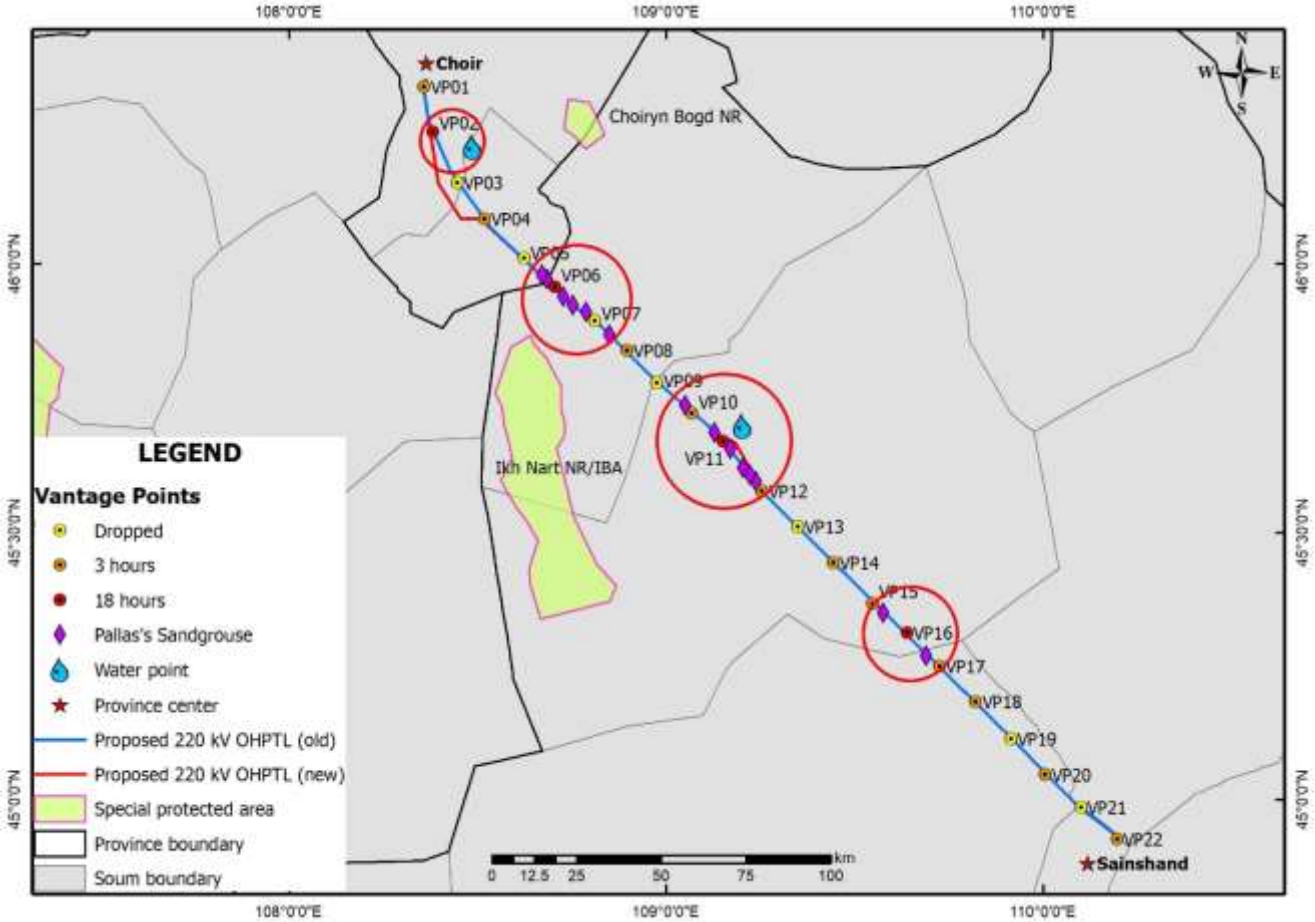


Figure 6-30. Locations of identified sensitive sites and Vantage Points used for bird survey

The following main criteria have been applied to the selection of the VPs out of the 22 identified in the scoping study:

- Sensitive sites for target species in the area (i.e. potential breeding habitats for Asian houbara (*Chlamydotis macqueenii*), stopover sites for Great bustards (*Otis tarda*), stopover lakes/ponds for water and shore birds, and areas containing a large number of Pallas's sandgrouses (*Syrrhaptes paradoxus*)).
- Visibility of the areas for bird observation; and
- Proximity to IBAs.

A total of 18 hours of observation (covering 1.5 days during daylight time hours) were conducted at each of the three VPs (VP-02, VP-06 and VP-16) selected in the sensitive areas (see Figure 6-30 above) during both the spring and autumn bird surveys. VP-11 was also selected for 18 hours observation due to its proximity to natural surface water observed during the reconnaissance trip in April 2020. However, the ephemeral surface water body was found to be dried out during May and had lost its attraction as a stop-over site for migratory birds associated with water, thus the planned hours at this VP during the spring bird surveys was reduced to five hours. Eighteen hours of survey were undertaken at this VP during the autumn bird surveys. Three hours of observations were carried at all other 11 VPs during the spring and autumn bird surveys. The duration of bird observation at each VP is shown in Table 6-18.

Table 6-18. Duration of bird observations at each Vantage Point

#	VP #	Criteria	Duration of the observation	
			Spring	Autumn
1	VP-01	Power line start point. Close to Choir town.	3 hrs	3 hrs
2	VP-02	Identified sensitive site as located close the water point.	18 hrs	18 hrs
3	VP-04	Additional VP with flat area with medium visibility.	3 hrs	3 hrs
4	VP-06	Identified sensitive site. Close proximity to Ikh Nart IBA.	18 hrs	18 hrs
5	VP-08	Elevated site with good visibility near small mine pit. Close to Ikh Nart IBA.	3 hrs	3 hrs
6	VP-10	Additional VP with elevated site with good visibility.	3 hrs	3 hrs
7	VP-11	Identified sensitive site. Elevated site with good visibility. There is a small lake in about 2.5 km to the east from the line route.	5 hrs	18 hrs
8	VP-12	Additional VP with relatively open landscape with good visibility.	3 hrs	3 hrs
9	VP-14	Additional VP with relatively open landscape with good visibility.	3 hrs	3 hrs
10	VP-15	Additional VP with elevated site with very good visibility. Pallas's sandgrouse observed.	3 hrs	3 hrs
11	VP-16	Identified sensitive site. Open steppe with good visibility.	18 hrs	18 hrs
12	VP-17	Additional VP with slightly elevated site with good visibility in 360 degree view.	3 hrs	3 hrs
13	VP-18	Additional VP on open steppe with scattered shrubs and good visibility.	3 hrs	3 hrs
14	VP-20	Additional VP with good visibility, located in 200 m from the line.	3 hrs	3 hrs
15	VP-22	Close to the end of the power line with elevated site with good visibility.	3 hrs	3 hrs
		Total observation time per season	92 hrs	105 hrs

During the spring bird survey, flight bands for recording observed birds were selected as 0-25 m, 25-50 m and 50-100 m for this Project to reflect below the powerline (equivalent to below the rotor-swept area), level with the powerline (equivalent to rotor-swept area) and above the powerline (equivalent to above the rotor-swept area, i.e. what was understood to be the minimum and maximum height of the overhead powerlines at the time of the spring bird survey.

The number of flight bands were increased during the autumn bird survey due to additional details of the different powerline heights becoming available and to allow for a greater level of detail in the impact assessment. The flight bands used in the autumn bird survey were 0-10 m, 10-20 m, 20-30 m, 30-40 m, 40-50 m and >50 m). Powerline actual heights from ground surface will vary depending on the environmental conditions (relief and temperature) and sag due to weight. Above height bands correspond to the estimated heights of the earthing wire which runs along the top of the conductor wires. It is documented that majority (84%) of the bird species collision with powerlines results from colliding with the earth wires (Bernardino *et al.* 2018). Table 6-19. List of bird species recorded in the project area in April and May 2020

#	Common name	Latin name	Red List Status		Mongolian legal status	Occurrence form	On vantage point	Off vantage point
			National	IUCN				
	GALLIFORMES							
	Phasianidae							
1	Chukar	*Alectoris chukar*	LC	LC	No	RB		+
	ANSERIFORMES							
	Anatidae							
2	Common Shelduck	*Tadorna tadorna*	LC	LC	No	BV/PM		+
3	Ruddy Shelduck	*Tadorna ferruginea*	LC	LC	No	BV/PM	+	
4	Mallard	*Anas platyrhynchos*	LC	LC	No	PM		+
5	Common Teal	*Anas crecca*	LC	LC	No	PM		+
	COLUMBIFORMES							
	Columbidae							
6	Rock Pigeon	*Columba livia*	LC	LC	No	RB	+	
7	Eurasian Collared-dove	*Streptopelia decaocto*	LC	LC	No	PM	+	
	PTEROCLIFORMES							
	Pteroclidae							
8	Pallas's Sandgrouse	*Syrrhaptes paradoxus*	LC	LC	No	RB	+	+
	CAPRIMULGIFORMES							
	Apodidae							
9	Common Swift	*Apus apus*	LC	LC	No	PM	+	
	GRUIFORMES							
	Gruidae							
10	Demoiselle Crane	*Anthropoides virgo*	LC	LC	No	BV/PM	+	
	CHARADRIIFORMES							
	Charadriidae							
11	Greater Sandplover	*Charadrius leschenaultii*	LC	LC	No	BV	+	+
12	Oriental Plover	*Charadius veredus*	LC	LC	No	BV	+	+
	Scolopacidae							
13	Snipe sp	*Gallinago sp*	LC	LC	No	PM	+	
	Laridae							
14	Common Gull	*Larus canus*	LC	LC	No	PM	+	
15	Mongolian Gull	*Larus mongolicus*	LC	LC	No	PM	+	
16	Common Gull-billed Tern	*Gelochelidon nilotica*	LC	LC	No	PM	+	+
	STRIGIFORMES							
	Strigidae							

#	Common name	Latin name	Red List Status		Mongolian legal status	Occurrence form	On vantage point	Off vantage point
			National	IUCN				
17	Little Owl	*Athene noctua*	LC	LC	No	RB		+
18	Long-eared Owl	*Asio otus*	LC	LC	No	PM		+
	ACCIPITRIFORMES							
	Accipitridae							
19	Oriental Honey-buzzard	*Pernis ptilorhynchus*	LC	LC	No	PM	+	
20	Cinereous Vulture	*Aegypius monachus*	LC	NT	No	RB	+	+
21	Steppe Eagle	*Aquila nipalensis*	LC	EN	No	PM	+	+
22	Golden eagle	*Aquila chrysaetos*	LC	LC	No	RB	+	+
23	Booted Eagle	*Hieraaetus pennatus*	LC	LC	No	PM	+	
24	Japanese Sparrowhawk	*Accipiter gularis*	LC	LC	No	PM	+	
25	Eurasian Sparrowhawk	*Accipiter nisus*	LC	LC	No	PM	+	
26	Black Kite	*Milvus migrans*	LC	LC	No	BV	+	
27	Eurasian Buzzard	*Buteo buteo*	LC	LC	No	PM		+
28	Upland Buzzard	*Buteo hemilasius*	LC	LC	No	RB		
	BUCEROTIIFORMES							
	Upupidae							
29	Common Hoopoe	*Upupa epops*	LC	LC	No	BV	+	+
	PICIFORMES							
	Picidae							
30	Eurasian Wryneck	*Jynx torquilla*	LC	LC	No	PM		+
	FALCONIFORMES							
	Falconidae							
31	Lesser Kestrel	*Falco naumanni*	LC	LC	No	BV	+	+
32	Common Kestrel	*Falco tinnunculus*	LC	LC	No	RB	+	
33	Amur Falcon	*Falco amurensis*	LC	LC	No	PM	+	
34	Eurasian Hobby	*Falco subbuteo*	LC	LC	No	PM	+	
35	Saker Falcon	*Falco cherrug*	VU	EN	No	RB	+	+
	PASSERIFORMES							
	Corvidae							
36	Red-billed Chough	*Pyrrhocorax pyrrhocorax*	LC	LC	No	RB		+
37	Common Raven	*Corvus corax*	LC	LC	No	RB	+	+
	Alaudidae							
38	Asian Short-toed Lark	*Alaudala cheleensis*	LC	LC	No	RB	+	+
39	Mongolian Lark	*Melanocorypha mongolica*	LC	LC	No	RB	+	+
40	Horned lark	*Eremophila alpestris*	LC	LC	No	RB	+	+
41	Crested lark	*Galerida cristata*	LC	LC	No	RB	+	
	Hirundinidae							
42	Barn Swallow	*Hirundo rustica*	LC	LC	No	PM	+	
	Turdidae							
43	White's Thrush	*Zoothera aurea*	LC	LC	No	PM		+

#	Common name	Latin name	Red List Status		Mongolian legal status	Occurrence form	On vantage point	Off vantage point
			National	IUCN				
44	Naumann's Thrush	*Turdus naumanni*	LC	LC	No	PM		+
45	Dusky Thrush	*Turdus eunomus*	LC	LC	No	PM		+
46	Rufous-throated Thrush	*Turdus ruficollis*	LC	LC	No	PM		+
	Muscicapidae							
47	Taiga Flycatcher	*Ficedula albicilla*	LC	LC	No	PM	+	
48	Daurian Redstart	*Phoenicurus auroreus*	LC	LC	No	PM	+	+
49	Common Stonechat	*Saxicola torquatus*	LC	LC	No	PM		+
50	Northern Wheatear	*Oenanthe oenanthe*	LC	LC	No	PM		+
51	Isabelline Wheatear	*Oenanthe isabellina*	LC	LC	No	BV	+	+
52	Desert Wheatear	*Oenanthe deserti*	LC	LC	No	BV	+	+
53	Pied Wheatear	*Oenanthe pleschanka*	LC	LC	No	BV	+	+
	Passeridae							
54	Eurasian Tree Sparrow	*Passer montanus*	LC	LC	No	RB	+	+
55	Rock Sparrow	*Petronia petronia*	LC	LC	No	RB	+	+
56	Small Snowfinch	*Pyrgilauda davidiana*	LC	LC	No	RB	+	+
	Motacillidae							
57	Tree Pipit	*Anthus trivialis*	NT	LC	Rare	PM		+
58	Blyth's Pipit	*Anthus godlewskii*	LC	LC	No	PM		+
	Emberizidae							
59	Little Bunting	*Emberiza pusilla*	LC	LC	No	PM	+	+

Note: EN – endangered, VU – vulnerable, NT – near threatened, LC – least concerned; RB – resident breeder, BV – breeding visitor, PM – passage migrant.

Table 6-20. List of bird species recorded in the survey area in September 2020

#	Common name	Latin name	Red List Status		Mongolian legal status	Occurrence form	On Vantage point	Off Vantage point
			National	IUCN				
	Order: *ANSERIFORMES*							
	Family: *Anatidae*							
1	Swan Goose	*Anser cygnoid*	NT	VU	No	PM	+	
2	Common Shelduck	*Tadorna tadorna*	LC	LC	No	BV/PM		+
3	Ruddy Shelduck	*Tadorna ferruginea*	LC	LC	No	BV/PM		+
	Order: *PTEROCLIFORMES*							
	Family: *Pteroclidae*							
4	Pallas's Sandgrouse	*Syrrhaptes paradoxus*	LC	LC	No	RB	+	+
	Order: *OTIDIFORMES*							
	Family: *Otididae*							
5	Great Bustard	*Otis tarda*	VU	VU	Rare	PM		+
	Order: *CICONIIFORMES*							
	Family: *Ciconiidae*							
6	Black Stork	*Ciconia nigra*	LC	LC	No	PM	+	
	Order: *PELECANIFORMES*							

#	Common name	Latin name	Red List Status		Mongolian legal status	Occurrence form	On Vantage point	Off Vantage point
			National	IUCN				
	Family: *Threskiornithidae*							
7	Eurasian Spoonbill	*Platalea leucorodia*	LC	LC	No	PM		+
	Family: *Ardeidae*							
8	Grey Heron	*Ardea cinerea*	LC	LC	No	PM	+	
	Order: *SULIFORMES*							
	Family: *Phalacrocoracidae*							
9	Great Cormorant	*Phalacrocorax carbo*	LC	LC	No	PM	+	
	Order: *CHARADRIIFORMES*							
	Family: *Charadriidae*							
12	Oriental Plover	*Charadius veredus*	LC	LC	No	BV	+	
	Family: *Scolopacidae*							
13	Snipe sp	*Gallinago sp*	LC	LC	No	PM	+	
	Wood Sandpiper	*Tringa glareola*	LC	LC	No	PM	+	
	Family: *Laridae*							
14	Mongolian Gull	*Larus mongolicus*	LC	LC	No	PM	+	+
	Order: *STRIGIFORMES*							
	Family: *Strigidae*							
15	Little Owl	*Athene noctua*	LC	LC	No	RB	+	
	Order: *ACCIPITRIFORMES*							
	Family: *Accipitridae*							
16	Cinereous Vulture	*Aegypius monachus*	LC	NT	No	RB	+	+
17	Steppe Eagle	*Aquila nipalensis*	LC	EN	No	PM	+	
18	Eastern Marsh-harrier	*Circus spilonotus*	LC	LC	No	PM	+	
19	Hen Harrier	*Circus cyaneus*	LC	LC	No	PM	+	
20	Eurasian Sparrowhawk	*Accipiter nisus*	LC	LC	No	PM	+	
21	Black Kite	*Milvus migrans*	LC	LC	No	BV	+	
22	Long-legged Buzzard	*Buteo rufinus*	LC	LC	No	BV	+	
23	Upland Buzzard	*Buteo hemilasius*	LC	LC	No	RB	+	+
	Order: *FALCONIFORMES*							
	Family: *Falconidae*							
24	Common Kestrel	*Falco tinnunculus*	LC	LC	No	RB	+	
25	Merlin	*Falco columbarius*	LC	LC	No	PM	+	
26	Saker Falcon	*Falco cherrug*	VU	EN	No	RB	+	
	Order: *PASSERIFORMES*							
	Family: *Corvidae*							
27	Red-billed Chough	*Pyrrhocorax pyrrhocorax*	LC	LC	No	RB	+	
28	Common Raven	*Corvus corax*	LC	LC	No	RB	+	+
	Family: *Alaudidae*							
29	Asian Short-toed Lark	*Alaudala cheleensis*	LC	LC	No	RB	+	+
30	Mongolian Lark	*Melanocorypha mongolica*	LC	LC	No	RB	+	+
31	Horned lark	*Eremophila alpestris*	LC	LC	No	RB	+	+

#	Common name	Latin name	Red List Status		Mongolian legal status	Occurrence form	On Vantage point	Off Vantage point
			National	IUCN				
32	Crested lark	*Galerida cristata*	LC	LC	No	RB	+	
	Family: *Turdidae*							
33	White's Thrush	*Zoothera aurea*	LC	LC	No	PM		+
	Family: *Muscicapidae*							
34	Siberian Rubythroat	*Calliope calliope*	LC	LC	No	PM		+
35	Desert Wheatear	*Oenanthe deserti*	LC	LC	No	BV	+	+
	Family: *Passeridae*							
36	Rock Sparrow	*Petronia petronia*	LC	LC	No	RB	+	+
37	Small Snowfinch	*Pyrgilauda davidiana*	LC	LC	No	RB	+	+
	Family: *Motacillidae*							
38	White Wagtail	*Motacilla alba*	LC	LC	No	PM	+	

6.10.3. Flora Baseline

6.10.3.1. Characteristics of the Project Area

The OHTL passes through desert steppe and dry steppe zones within the broader Dornogovi (Eastern Gobi) and Middle Khalkha phytogeographic region in south eastern Mongolia (Figure 6-31). The Dornogovi region is characterised by dry climate with limited rainfall of less than 100 mm annually. The number of plant species growing in the Project Area is generally limited by the dry climate, and the vegetation species abundance varies from season to season depending on the amount of rainfall during the growing season.

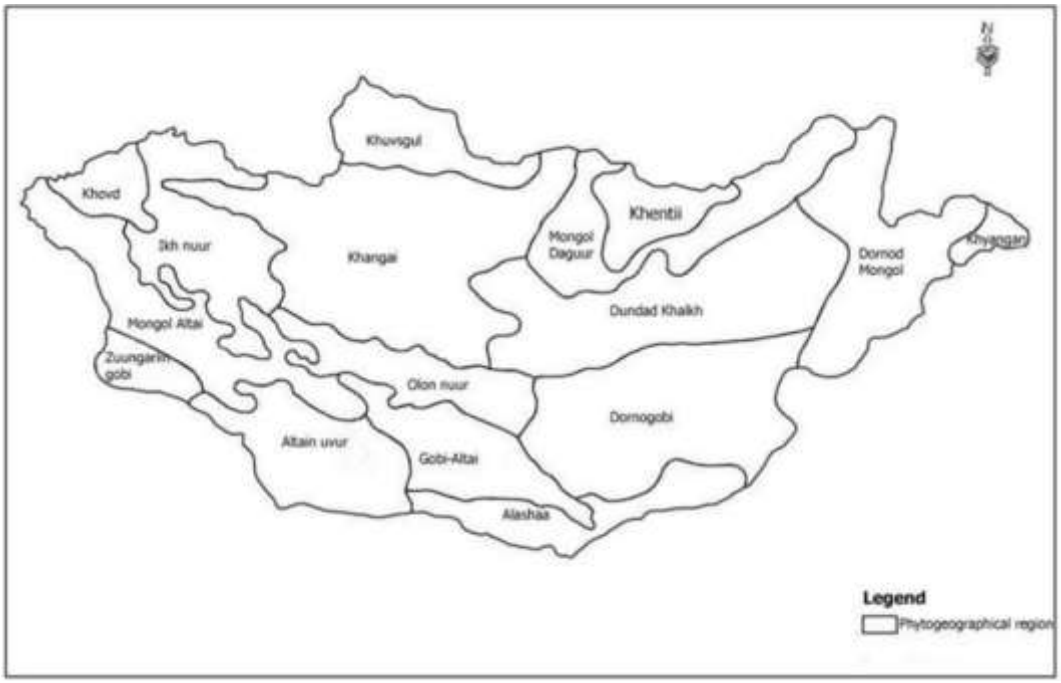


Figure 6-31. Phytogeographic regions of Mongolia

Source: Grubov, 1982. Keys to the Vascular Plants of Mongolia

The Dornogovi desert steppe zone is characterised by its scarce vegetation cover consisting of mostly grass and woody shrub species. A total of 327 species of plants have been recorded in this botanical region (Ulziikhutag N. 1989). The Middle-Khalkha zone has more diverse plant species compared to the Dornogovi region in the south, due to its location in the transitional zones between Central Asian and Duarian steppe zones. Historically, a total of 931 plant species have been recorded in this region (Ulziikhutag N. 1989).

Most of the vegetation species in the Project Area is adapted to the arid environment with key plant species being drought tolerant shrub species such as anabasis (*Anabasis brevifolia),* golden peashrub (*Caragana leucophloea)*, Gobi needlegrass *(Stipa gobica),* leek *(Allium pollyrizum),* gray sparrow's saltbush (*Salsola passerina)*, Dzungarian reaumuria (*Reaumuria soongorica).*

6.10.3.2. Summary of vegetation survey results

Vegetation coverage was generally low and consistent with the regional plant species coverage across the Gobi Desert region of the southern Mongolia. The reconnaissance survey observed very low vegetation coverage in April 2020, with the highest coverage being about 50% comprising Needleleaf sedge (*Carex duriuscula)* and Gray sparrow's saltbush (*Salsola passerina)* communities. The baseline vegetation survey undertaken in June 2020 and May 2021 identified 55 vegetation species belonging to 39 genuses and 19 families. The most common species in the OHTL corridor were *Asteraceae* (10 species), *Poaceae* (8 species), *Chenopodiaceae* and *Fabaceae* families with seven different species each. Most of the observed vegetation species were perennial (87%) with the remainder being (13%) annual plants. Grassy vegetation is dominant (70%) followed by semi-shrubs (17%) and shrubs (13%). The list of observed plant species is presented in Table 6-21. No tree species exist along the OHTL route.

The main shrub and grasses observed during the May 2021 walkover survey of the realigned sections of the route were Golden peashrub (*Caragana leucophloea*), Little-leaf Peashrub (*Caragana microphylla*), Pygmy peashrub (*Caragana pygmaea*) and grasses by Helictotrichon (*Helictotrichon Schellianum*), Lamiaceae (*Lagochilus ilicifolius*), Eurasian steppe grass (*Stipa glareosa*), Kryolv tussock grass (*Stipa krylovii*), Arctic sage (*Artemisia frigida*), Asian wild onion (*Allium polyrrhizum*), Cleistogenes (*Cleistogenes squarrosa*), Gypsophila desertorum (*Gypsophila desertorum*).

Table 6-21. List of vegetation species observed along the OHTL route

	Scientific name	English name	Conservation Status		
			IUCN Red List	Mongolian Red List	Mongolian Regulatory Designation
Family - Poaceae Juss					
1	*Achnatherum splendens* (Trin.) Nevski	Chee-grass	NE	NE	No designation
2	*Aristida heymannii* Rgl.	Sixweeks threeawn	NE	NE	No designation
3	*Cleistogenes squarrosa* (Trin.) Kenq	No common English name	NE	NE	No designation
4	*Elymus chinensis* (Trin.) King	False wheatgrass	NE	NE	No designation
5	*Setaria viridis* (L.) P.B.	Green bristle grass	NE	NE	No designation
6	*Stipa glareosa* P.Smirn	Needlegrass	NE	NE	No designation
7	*Stipa gobica* Roshev.	Gobi Needlegrass	NE	NE	No designation
8	*Stipa krylovii* Roshev.	Needlegrass	NE	NE	No designation
9	*Helictotrichon Schellianum*	Helictotrichon	NE	NE	No designation
Family - Cyparaceae Juss					
10	*Carex duriuscula* C.A.Mey	Sedge	NE	NE	No designation
Family - Liliaceae Juss					
11	*Allium mongolicum* Rgl.	Mongolian leek	LC	NE	No designation
12	*Allium polyrrhizum* Turcz. Ex Rgl	Leek	NE	NE	No designation
13	*Asparagus dahuricus* Fisch.	No common English name	NE	NE	No designation
Family - Polygoniceae Juss					
14	*Atraphaxis pungens* (M.B.) Jaub. Et Spach.	Goats wheat	NE	NE	No designation
Family - Chenopodiaceae Vent					
15	*Anabasis brevifolia* C.A. Mey.	Anabasis	NE	NE	No designation
16	*Chenopodium aristatum* L.	Wormseed	NE	NE	No designation
17	*Corispermum chinganicum* Iijin.	Chingan mountain bugseed	NE	NE	No designation

	Scientific name	English name	Conservation Status		
			IUCN Red List	Mongolian Red List	Mongolian Regulatory Designation
18	*Eurotia ceratoides* (L.) C.A. Mey	Winterfat	NE	NE	No designation
19	*Kalidium gracile* Fenzl	Pigweed	NE	NE	No designation
20	*Kochia prostrata* (L.) Schrad.	Perennial semi-shrub	NE	NE	No designation
21	*Salsola passerina* Bge.	Gray sparrow saltbush	NE	NE	No designation
Family - Caryophyllaceae Juss					
22	*Gypsophila desertorum* (Bge.) Fenzl	Heterochroa	NE	NE	No designation
Family - Curiciferae Juss					
23	*Erysimum flavum (*Georgi) Bobr.	Wallflower in species	NE	NE	No designation
24	*Lepidium cordatum* Willd.	Peppergrass	NE	NE	No designation
Family - Rosaceae Juss					
25	*Potentilla bifurca* L.	Forked leaf	NE	NE	No designation
26	*Sibbaldianthe adpressa* (Bge) Juz.	No common English name	NE	NE	No designation
Family - Fabaceae Juss					
27	*Astragalus galactites* Pall.	No common English name	NE	NE	No designation
28	*Astragalus laguraidos* Pall.	No common English name	NE	NE	No designation
29	*Astragalus miniatus* Bge.	No common English name	NE	NE	No designation
30	*Caragana leucophloea* Pojark	Golden peashrub	NE	NE	No designation
31	*Caragana microphylla* (Pall.) Lam.	Littleleaf Peashrub	NE	NE	No designation
32	*Caragana pygmaea* (L.) DC	Pygmy peashrub	NE	NE	No designation
33	*Oxytropis bungei* Kom.	Locoweed	NE	NE	No designation
Family - Geraniaceae Juss					
34	*Erodium stephanianum* Willd.	No common English name	NE	NE	No designation
35	*Erodium tibetanum* Edgew.	No common English name	NE	NE	No designation
Family - Zygophyllaceae R.Br					
36	*Peganum nigellastrum* Bge.	No common English name	NE	NE	No designation
37	*Zygophyllum xanthoxylon* (Bge) Maxim	Yellow beancaper	NE	NE	No designation
Family - Rutaceae Juss					
38	*Haplophyllum dauricum* (L.) G.Don	Wild rue	NE	NE	No designation
Family - Tamaricaceaea Link					
39	*Reaumuria soongorica* (Pall.) Maxim	Dzungarian reaumuria	NE	NE	No designation
Family - Umbelliferae Juss					
40	*Ferula bungeania* Kitag	No common English name	NE	NE	No designation
Family - Convolvulaceae Juss					
41	*Convolvulus ammanii* Desr	Ammonis Bindweed	NE	NE	No designation
Family - Crassulaceae DC					
42	*Chamaerhodos sabulosa* Bge.	No common English name	NE	NE	No designation
Family - Lamiaceae Juss					
43	*Panzeria lanata* (l.) Bge.	No common English name	NE	NE	No designation
44	*Lagochilus ilicifolius*	Lamiaceae	NE	NE	No designation
Family - Orobanchaceae Vent					
45	*Cistanche deserticola* Y.C.Ma	Dessertliving Cistanche	NE	**EN**	Very rare

	Scientific name	English name	Conservation Status		
			IUCN Red List	Mongolian Red List	Mongolian Regulatory Designation
Family - Asteraceae Juss					
46	*A. adamsii* Bess	No common English name	NE	NE	No designation
47	*A. frigida* Willd	Prairie sagewort	NE	NE	No designation
48	*Artemisia scorparia* Waldst. Et Kit.	Redstem wormwood	NE	NE	No designation
49	*Artemisia xyrophytica* Krasch.	Wormwood	NE	NE	No designation
50	*Heteropappus hispidus* (Willd.) Novopokr	No common English name	NE	NE	No designation
51	*Scorzonera capito* Maxim.	No common English name	NE	NE	No designation
52	*Scorzonera divaricata* Turcz.	No common English name	NE	NE	No designation
53	*Scorzonera pseudodivaricata* Lipsch.	No common English name	NE	NE	No designation
54	*Serratula centauroides* L.	No common English name	NE	NE	No designation
55	*Tugarinova mongolica* Iijin.	Mongolian thistle	NE	**VU**	Very rare

Note: NE-Not Evaluated, EN-Endangered, VU-Vulnerable

6.10.3.3. Dominant Vegetation Communities

A total of nine different vegetation communities (Table 6-22) have been identified during the baseline studies. Vegetation communities are named starting with the most dominant species followed by second and third dominant species. Conditions of some of the vegetation communities are shown in Figure 6-32.

Table 6-22. Dominant vegetation communities along OHTL route

Vegetation Community	Areas of Occurrence (KM along the route from start in Choir)	Vegetation cover (%)	Species abundance	Biomass
Anabasis brevifolia - Reaumuria soongorica - Salsola passerina –Stipa gobica - Leymus chinensis - Cleistogenes squarrosa	KM 130, 140-150 Small hills, Valley	Vegetation 35% Litter cover 5% Barren land 60%	8 species /100m^2	28 g/m^2
Caragana eucophloea - Caragana microphylla - Artemisia frigida – Stipa gobica - Leymus chinensis - Cleistogenes squarrosa	KM 40, 80, 110-130 Open steppe, Small hills	Vegetation 40% Litter cover 5% Barren land 55%	12 species /100m^2	12 g/m^2
Caragana leucophloea - Caragana pigmaea - Artemsia frigida - Stipa gobica - Leymus chinensis - Cleistogenes squarrosa	KM 50, 160-180 Between hills, Small hills, Open steppe	Vegetation 55% Litter cover 10% Barren land 35%	15 species /100m^2	288 g/m^2
Caragana leucophloea - Eurotia ceratoides - Atraphaxis pungens - Stipa krylovii - Leymus chinensis - Cleistogenes squarrosa	KM 190 Small hills, Open steppe	Vegetation 35% Litter cover 5% Barren land 60%	12 species /100m^2	253 g/m^2
Caragana microphylla – Stipa glareosa - Leymus chinensis - Cleistogenes squarrosa	KM 40, 80 Between hills	Vegetation 40% Litter cover 0% Barren land 60%	4 species /100m^2	85 g/m^2
Carex duriuscula – Convolvulus ammanii - Artemisa frigida - Peganum nigellastrum - Artemisia scorparia	KM 216 Open steppe	Vegetation 65% Litter cover 20% Barren land 15%	16 species /100m^2	24 g/m^2
Kalidium gracile - Reaumuria soongorica	KM 20, 40 Valley	Vegetation 75% Litter cover 0% Barren land 25%	5 species /100m^2	250 g/m^2
Stipa glareosa - Leymus chinensis - Cleistogenes squarrosa – Achnatherum splendens	KM 50-60, 130 Between hills	Vegetation 35% Litter cover 0% Barren land 65%	13 species /100m^2	270 g/m^2
Caragana leucophloea - Caragana pygmaea - Stipa krylovii - Convolvulus ammanii - Artemisa frigida - Peganum nigellastrum	KM 50-80, 110, 210 Open steppe, Small hills	Vegetation 40% Litter cover 20% Barren land 40%	14 species /100m^2	9 g/m^2

Carex duriuscula – Convolvulus ammanii - Artemisa frigida - Peganum nigellastrum - Artemisia scorparia

Occurrence area: KM 216

Caragana leucophloea - Caragana pygmaea - Stipa krylovii - Convolvulus ammanii - Artemisa frigida - Peganum nigellastrum

Occurrence areas: KM 50-80, 110, 210

Anabasis brevifolia - Reaumuria soongorica - Salsola passerine - Stipa gobica - Leymus chinensis - Cleistogenes squarrosa

Occurrence areas: KM 130, 140-150

Figure 6-32. Examples vegetation communities in the Project Area

6.10.3.4. High Conservation Value Vegetation Species

The locations of the high conservation value plant species are shown in Figure 6-33. No IUCN Red Listed threatened plants species (i.e. VU - Vulnerable, EN - Endangered, or CR - Critically Endangered) were observed within areas surveyed. However, two plant species, *Tugarinovia mongolica* and *Cistanche deserticolla,* listed as threatened in the Mongolian Red List, were recorded, as described below.

In Mongolia, plant species rareness is also determined legally by the 'rare' or 'very rare' species designation, which is set out in the Mongolian Law on Plants (1995). Both of the threatened species i.e. *Tugarinovia mongolica* and *Cistanche deserticolla* are listed as 'very rare' species by the Mongolian Government designation.

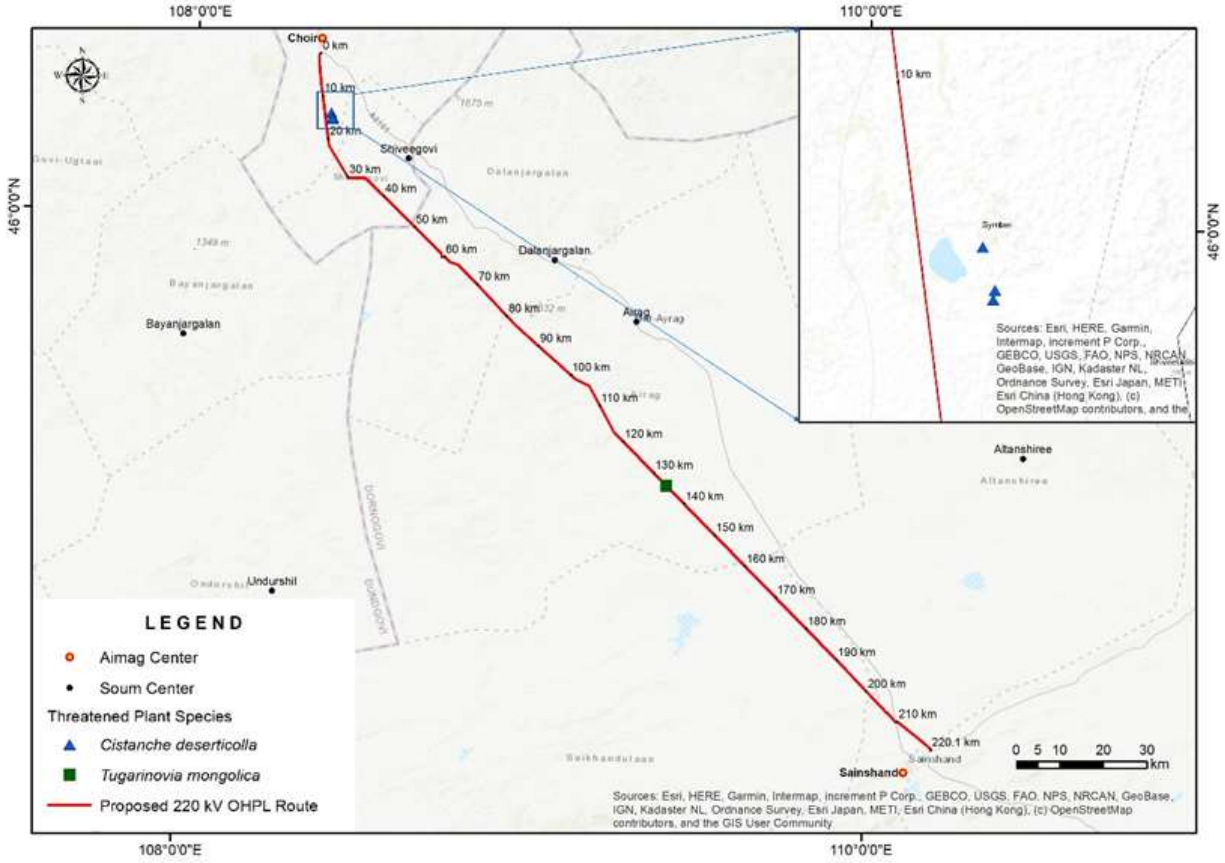


Figure 6-33. Locations of threatened plant species

Tugarinovia mongolica

Tugarinovia mongolica (or Shardalan in Mongolian, no English name) (Figure 6-34) is a monotypic genus plant. Its geographic distribution includes southern Gobi region of Mongolia and Inner Mongolian region of northern China. The species has a limited geographical range and declining populations (Zhao et al. 2019). It is relatively widespread in the Southern Gobi region of Mongolia. It is not assessed by the IUCN Red List but categorised as VU and included in the Mongolian Red List of threatened plant species due to the shrinking habitat of this species in the country (Nyambayar et al. 2012). *Tugarinovia mongolica* is observed at one location (KM 130+370) within the proposed OHTL RoW (Figure 6-33). Species abundance was rare.

Cistanche deserticolla

Cistanche deserticola (Desert living cistanche in English) (Figure 6-34) is assessed as Endangered (EN) in the Mongolian Red List of threatened plant species due to its decreasing population from medicinal and commercial use, decrease in its host plant (i.e. saxual - *Haloxylon ammodendron*) population from fuel use, and land degradation pressure (Nyambayar et al. 2012). Desert living *cistanche* distribution in Mongolia includes **Dornogovi (in the Project Area)**, Galbyn Gobi, Khar Zagiin Khooloi in the southern Altai mountains, Baruun Khuurai of Dzungarian Gobi, Olon Nuuriin Khundii, Ulaan Nuur, Bayan Zag and Ergiin Zag areas (MEGD 2014) (see Figure 6-32). *Cistanche deserticolla* species were observed within 50 – 200 m from the proposed OHTL centreline at KM 14+400, KM 15+480, and KM 15+700 (Figure 6-33) during the environmental baseline survey. Species abundance was rare.

Known distribution of *Tugarinovia Mongolica*

Source: Nyambayar et al. 2012

a)

Known distribution of *Cistanche Deserticola*

Source: Nyambayar et al. 2012

b)

Figure 6-34. Threatened plant species observed a) *Tugarinovia Mongolica* b) *Cistanche deserticol*a and their other known distributions in Mongolia

6.10.4. Fauna Baseline

6.10.4.1. Zoogeographic Region of the Project Area

The fauna of the Mongolian Gobi region is diverse, with many widespread species typical of the Central Asian and Near Eastern Deserts. The low human population density and high degree of isolation of the Gobi region of Mongolia has resulted in survival of many threatened species that are much rarer in neighbouring countries.

According to the geographical zonation of wildlife in Mongolia, the Project Area is situated within the Eastern Gobi Range and Middle Khalkha Steppe zones (Figure 6-35).

Source: Tsegmid (1969)

Note; 1-Khuvsgul Mountain Range, 2-Khentii Mountain Range, 3-Khangai Mountain Range, 4- Mongol Daguur Steppe, 5-Ikh Hyangan Mountain Range, 6-Mongol Altai Mountain Range, 7-Middle Halh Steppe, 8-Eastern Mongolia, 9- Great Lakes Depression, 10-Valley of the Lakes, 11-Northern Gobi, 12-Eastern Gobi, 13-Govi Altai Mountain Range, 14-Dzungarian Gobi Desert, 15-Trans Altai Gobi Desert, 16-Alashan Gobi Desert

Figure 6-35. Zoogeographic regions of Mongolia

Mammal and bird species of interest, which have been historically reported in the broader Project region include grey wolf (*Canis lupus*), fox (*Vulpes vulpes*), corsac fox (*Vulpes corsac*), Pallas's cat (*Otocolobus manul*), Mongolian gazelle (*Procapra guttorosa*), goitered gazelle (*Gazella subgutturosa)*, Asiatic wild ass (*Equus hemionus*), Asian houbara (*Chlamydotis macqueenii*), saker falcon (*Falco cherrug*) and steppe eagle (*Aquila nipalensis*).

The Gobi region supports habitat for a variety of reptile species due to its arid environment and landscape. Common reptile species in the broader region include Mongolian toad (*Bufo raddei*), tuvan toad-headed agama (*Phrynocephalus versicolor*), multi-ocellated racerunner (*Eremias multiocellata*), even-fingered gecko (*Alsophylax pipiens*), Mongol gurvel (*Eremias argus*), Gobi lizard (*Eremias przewalskii*), slender racer (*Coluber spinalis*), steppe rat snake (*Elaphe dione*) and Halys pit viper (*Gloydius halys*) (TNC 2014).

This section presents fauna species observed during the biodiversity studies in April and June 2020 and May 2021 along the OHTL alignment.

6.10.4.2. Mammals

Six different species of mammals, Mongolian gazelle *(Procapra gutturosa),* red fox (*Vulpes vulpes*), corsac fox (*Vulpes corsac),* tolai hare (Lepus tolai), Mongolian gerbil (*Meriones unguiculatus*), long-eared hedgehog (*Hemiechinus auritus*) were observed during the field survey (Table 6-23; Figure 6-36). The Mongolian gazelle was the most abundant mammal species observed. A total of 10 mammal species, including the species identified by the biodiversity team, were reported by local community members as large mammal species occur in the Project Area. The community-reported species (Table 6-23) were not observed during the field work, however their indicated locations were consistent with the known geographical range of these species in Mongolia, thus included in this ESIA.

Table 6-23. Mammal species observed along the OHTL alignment

	Scientific name	English name	Conservation Status		
			IUCN Red List	Mongolian Red List	Mongolian Regulatory Designation
Large mammals					
1	*Procapra gutturosa*	Mongolian gazelle	LC	**EN**	No
2	*Vulpes vulpes*	Red fox	LC	NT	No
3	*Vulpes corsac*	Corsac fox	LC	NT	No
4	*Gazella subgutturosa**	Goitered gazelle	VU	VU	Rare

	Scientific name	English name	Conservation Status		
			IUCN Red List	Mongolian Red List	Mongolian Regulatory Designation
5	*Ovis ammon**	Argali	NT	EN	Rare
6	*Capra sibirica**	Siberian Ibex	LC	NT	Rare
7	*Meles meles**	Eurasian badger	LC	LC	No
8	*Spermophilus erythrogenys**	Red-cheeked ground squirrel	LC	LC	No
Small mammals					
9	*Lepus tolai*	Tolai hare	LC	LC	No
10	*Meriones unguiculatus*	Mongolian gerbil	LC	LC	No
11	*Hemiechinus auratus*	Long-eared hedgehog	LC	LC	No

*Note: LC-Least Concerned, EN-Endangered, NT-Near Threatened, *-Local community reported species*

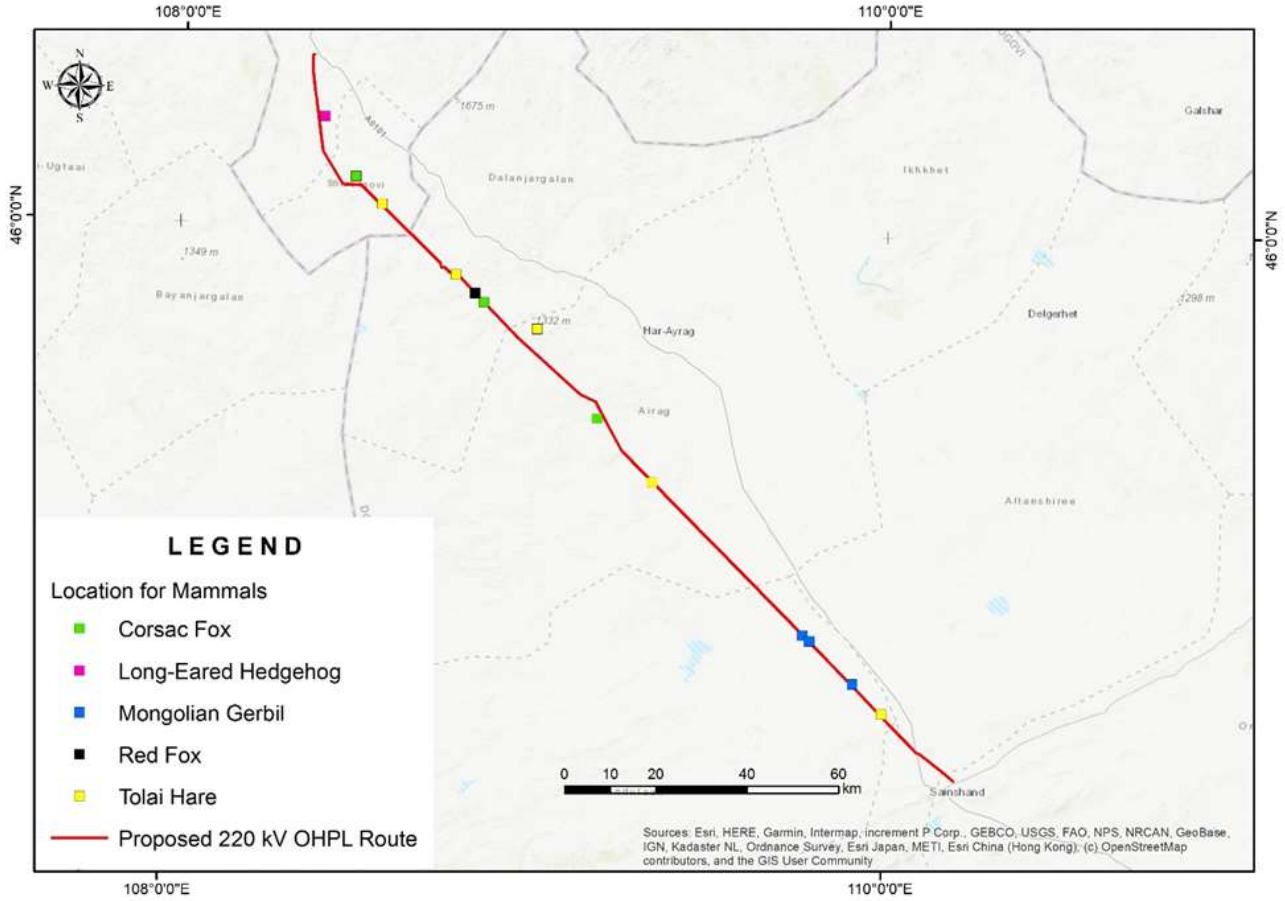


Figure 6-36. Locations of observed mammals

The regional distribution of the mammal species with high conservation status (i.e. Threatened category species in the IUCN or Mongolian Red List or designated rare species by the Mongolian regulation) are shown in Figure 6-37.

Mongolian gazelle regional distribution

Source: IUCN

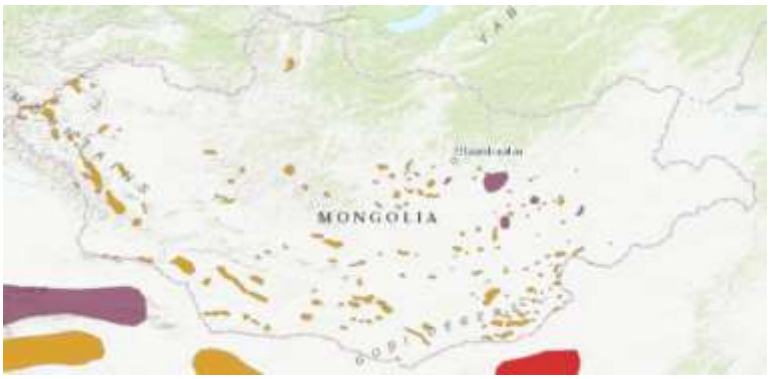
Goitered gazelle regional distribution

Source: IUCN

Siberian ibex regional distribution

Source: IUCN

Argali regional distribution



Source: IUCN

Figure 6-37. Regional distribution of sensitive receptor mammal species

Mongolian gazelle was the most abundant mammal species observed during the field survey in April and June 2020. An estimated total of 1,187 individuals were observed at 31 different locations along the proposed powerline OHTL route, with herd populations ranging from 2 to 150 individuals (Figures 6-38 and 6-39). The largest herds were observed between KM 60 and KM 200 in the territory of Dalanjargalan, Airag and Saikhandulaan *soums* of Dornogobi *aimag*. Movement directions of this species varied during the field study. For example, it was mostly south to north-east in Saikhandulaan, whereas movement to the east direction was dominant in other locations during the field study. It was also the only mammal species identified during the May 2021 walkover survey, when 10 individuals were observed at KM 110.

Figure 6-38. Herd of Mongolian gazelle in near Baga Teeg Mountain (07 June 2020)

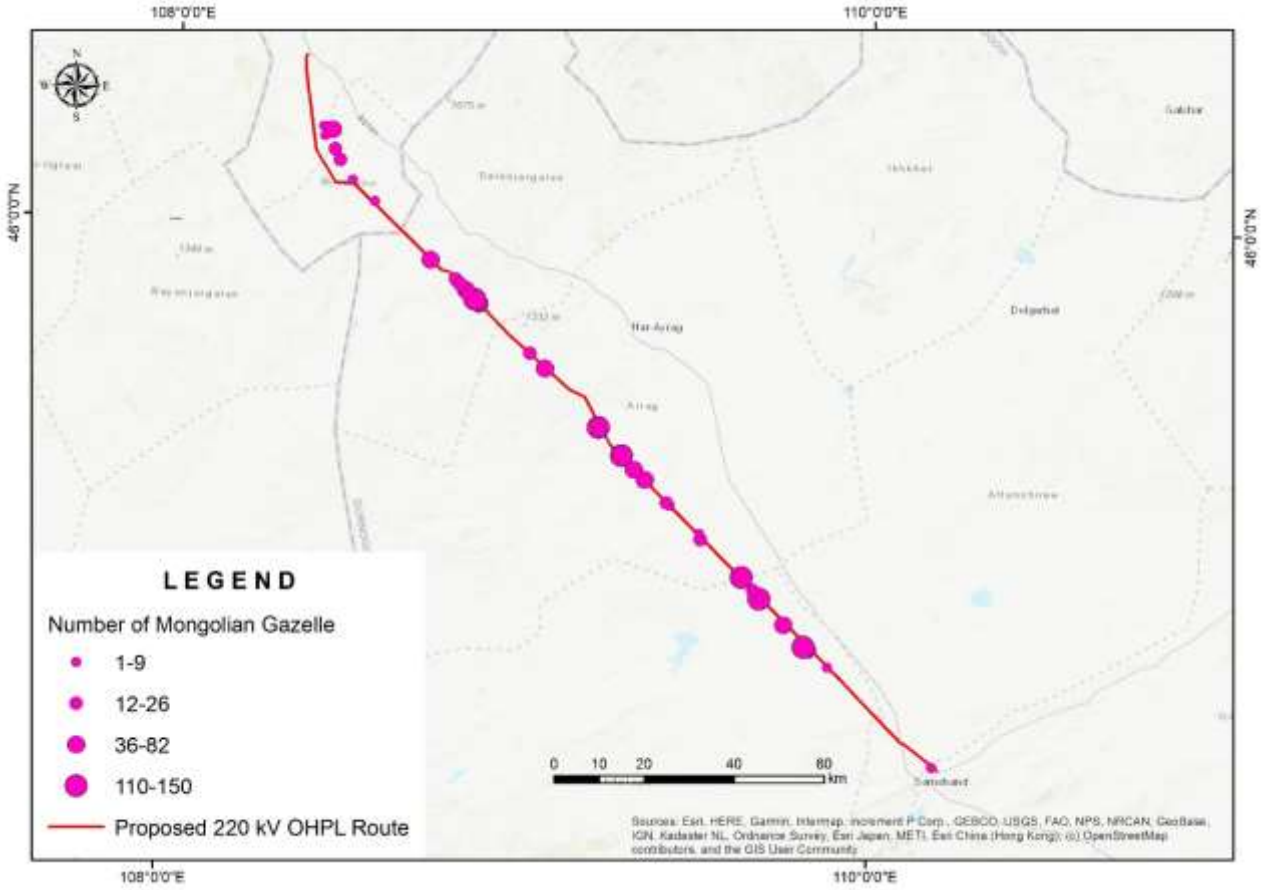


Figure 6-39. Locations and abundance of observed Mongolian gazelle

6.10.4.3. Reptiles

The Mongolian Gobi-desert region provides suitable habitat for a variety of reptile species with some of them are uniquely adopted to the region's warmer and arid climate. As relic species, they are often more vulnerable to environmental changes than most other vertebrates. Reptiles play a critical role in the maintenance and functioning of an ecosystem (Munkhbaatar et al. 2011) because reptiles are the main food source for some predatory mammals, birds, and large invertebrates including spiders. Some regional studies in south-east Mongolia indicate the presence of more than 10 species (Professional Biological Society of Mongolia, 2019).

The environmental baseline surveys in June 2020 identified three species of reptiles (two lizards and one snake) along the proposed OHTL route. The tuvan toad-headed agama (*Phrynocephalus versicolor*) was the most abundant and frequently occurring species throughout the study sites. During the survey 49 individuals were observed at 16 locations. Five individuals of multi-ocellated racerunner (lizard) *(Eremias multiocellata)* was observed at four locations. Only one individual of Halys Pit Viper (*Gloydius halys)* snake was observed in bushy and rocky habitat.

The walkover survey in May 2021 identified one multi-ocellated racerunner (*Eremias multiocellata*) and one tuvan toad-headed agama (*Phrynocephalus versicolor*) in Airag *soum* of Dornogovi *aimag*.

a) b) c)

Figure 6-40. Identified reptile species a) Halys Pit Viper b) Multi-ocellated racerunner c) Tuvan toad-headed agama

Locations of the observed reptile species are shown in Figures 6-39 and Table 6-24. None of the observed reptiles are listed as threatened species in the IUCN and Mongolian Red List of threatened reptiles.

Table 6-24. Locations of observed reptile species during June 2020 field study

#	Coordinates		Locality	No of individuals
Phrynocephalus versicolor				
1	44°59'03.7''	110°06'08.1''	Khar Toirom Gobi, Altanshiree	9
2	44°59'03.8''	110°06'10.0''		7
3	44°59'02.8''	110°06'12.1''		1
4	45°06'17.4''	109°55'48.2''	Agtny Well, Saikhandulaan	3
5	45°06'20.6''	109°55'51.4''		1
6	45°08'23.4''	109°52'45.8''	Sumber Khar Tolgoi, Saikhandulaan	4
7	45°12''21.5''	109°47'21.6''	Khundlun well, Saikhandulaan	2
8	45°15'22.9''	109°42'51.9''	Khuren Tovog, Saikhandulaan	5
9	45°30'41.2''	109°20'52.5''	Airag	2
10	45°34'07.6''	109°15'57.0''	Durvuljiin Ovoo, Airag	1
11	45°35'41.2''	109°14'18.4''	Jargalan Gobi, Airag	7
12	45°36'06.2''	109°13'40.4''	Jargalan Gobi, Airag	1
13	45° 39'18.608"	109° 11' 31.189"	Airag	1
14	45°39'14.8''	109°10'18.3''	Airag	1
15	45°43'22.2''	109°04'17.5''	Airag	1
16	45 46 54.3	108 58 26.1	Airag	2

#	Coordinates		Locality	No of individuals
17	45 56 36.1	108 43 20.0	Airag	2
18	46° 5' 42.925"	108° 26' 39.332"	Shivee Gobi	1
Eremias multiocellata				
1	45°04’38.8	109°58’04.3’’	Aguit South Valley, Saikhandulaan	1
2	45°06’18.0’’	109°55’50.3’’	Agit well, Saikhandulaan	1
3	45°30’38.5’’	109°20’55.3’’	Airag	2
4	45° 40' 1.7"	109° 11' 0.9"	Airag	1
5	45°56’36.1’’	108°43’20.0’’	Dalanjargalan	1
Gloydius halys				
1	45°56’32.5’’	108°43’22.7’’	Dalanjargalan	1
2	45°56’38.9’’	108°43’19.3’’	Dalanjargalan	1
3	45°57’52.1’’	108°41’10.5’’	Dalanjargalan	2

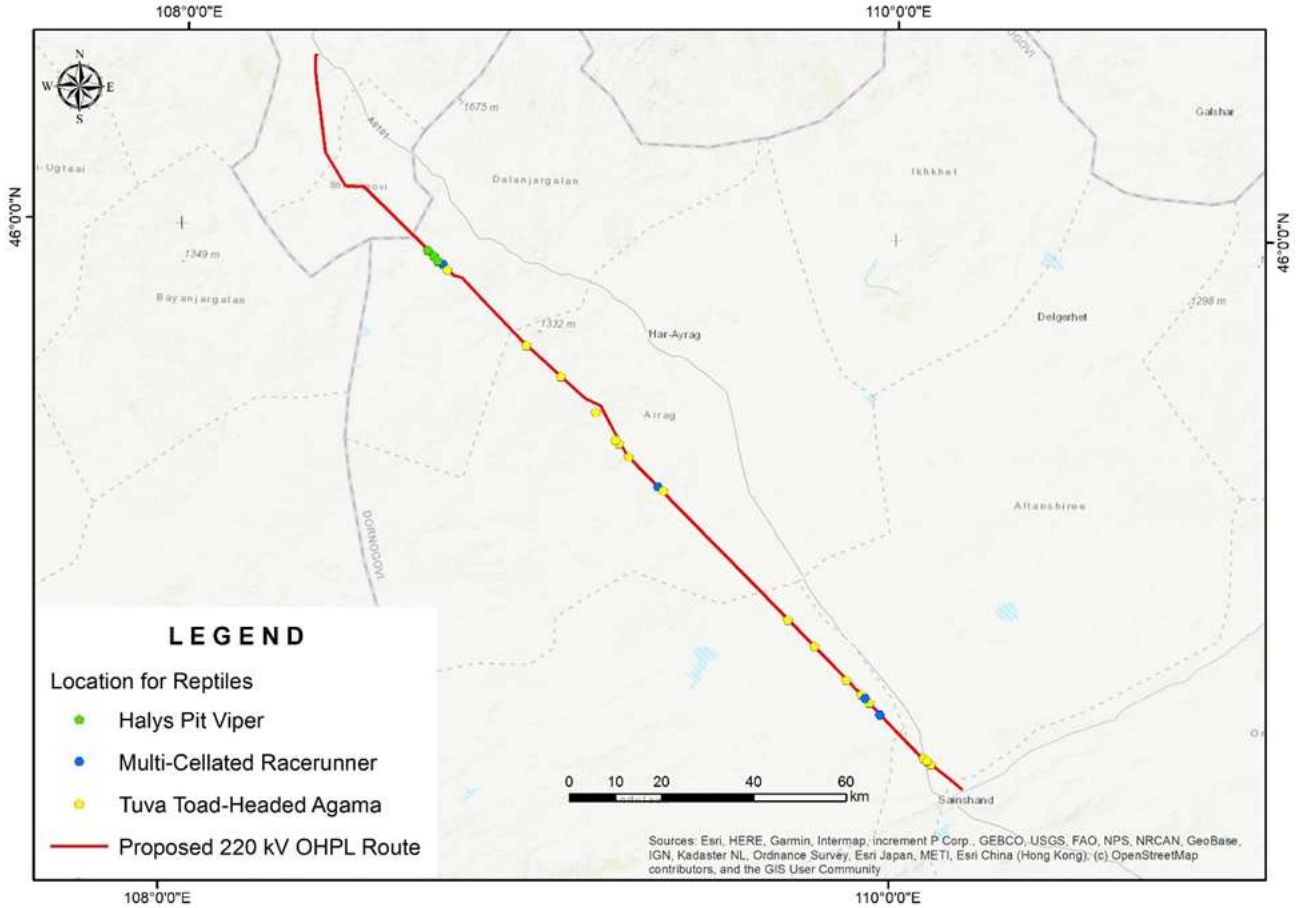


Figure 6-41. Locations of observed reptile species along the OHTL route

6.10.4.4. Invertebrates

Four different species of insects belonging to three genuses were identified during the 2020 field surveys. These were *Microdera deserta, Anatolica eremita, Platyope leucogramma* and *Mylabris aulica* species. These invertebrates are common in the area and none of them are rare or threatened species.

6.10.4.5. Amphibians

No amphibians were observed during the field surveys.

The only amphibian known to occur within the Mongolian Gobi region is the Mongol toad (*Buffo raddei*), listed as LC by the IUCN and the Mongolian Red Lists. The Mongol toad is associated primarily with permanent springs in Gobi, where they breed in early spring. No such habitats have been identified in the proposed Project Area.

6.10.4.6. Fish

The Project Area has no permanent natural surface water to support fish or any other aquatic species.

6.10.4.7. Birds

Key findings of the spring and autumn 2020 bird surveys and the May 2021 field walkover are presented below.

6.10.4.7.1. Spring 2020 bird survey

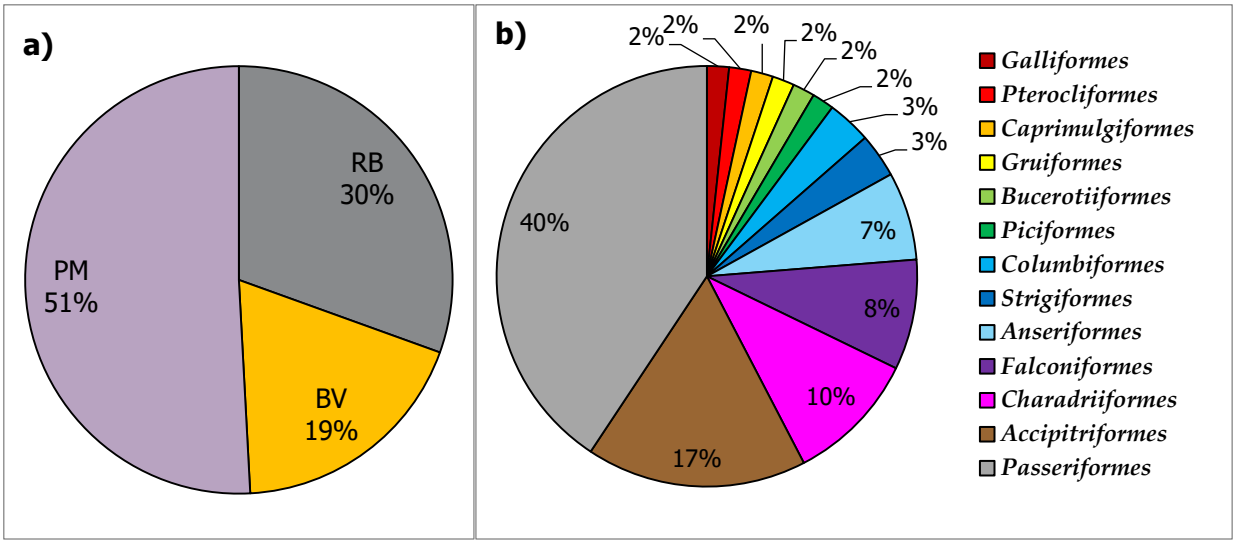
A total of 59 species of birds were observed during the Spring 2020 survey. Of these, more than half (51%) of the species were passage migrants (PM), followed by resident breeders (RB) (30%), and breeding visitors (BV) (19%). The majority of the species belong to *Passeriformes* making up 40% of the total species recorded and followed by *Accipitriformes* (17%) and *Charadriformes* (10%) (Table 6-25; Figure 6-42).

Table 6-25. List of bird species identified during the spring bird survey

#	Scientific name	Common name	Red List Status		Mongolian regulatory designation	Occurrence form
			IUCN	National		
1	*Accipiter gularis*	Japanese sparrowhawk	LC	LC	No	PM
2	*Accipiter nisus*	Eurasian sparrowhawk	LC	LC	No	PM
3	*Aegypius monachus*	Cinereous vulture	NT	LC	No	RB
4	*Alaudala cheleensis*	Asian short-toed lark	LC	LC	No	RB
5	*Alectoris chukar*	Chukar	LC	LC	No	RB
6	*Anas crecca*	Common teal	LC	LC	No	PM
7	*Anas platyrhynchos*	Mallard	LC	LC	No	PM
8	*Anthropoides virgo*	Demoiselle crane	LC	LC	No	BV/PM
9	*Anthus godlewskii*	Blyth's pipit	LC	LC	No	PM
10	*Anthus trivialis*	Tree pipit	LC	NT	**Rare**	PM
11	*Apus apus*	Common swift	LC	LC	No	PM
12	*Aquila chrysaetos*	Golden eagle	LC	LC	No	RB
13	*Aquila nipalensis*	Steppe eagle	**EN**	LC	No	PM
14	*Asio otus*	Long-eared owl	LC	LC	No	PM
15	*Athene noctua*	Little owl	LC	LC	No	RB
16	*Buteo buteo*	Eurasian buzzard	LC	LC	No	PM
17	*Buteo hemilasius*	Upland buzzard	LC	LC	No	RB
18	*Charadius veredus*	Oriental plover	LC	LC	No	BV
19	*Charadrius leschenaultii*	Greater sandplover	LC	LC	No	BV
20	*Columba livia*	Rock pigeon	LC	LC	No	RB
21	*Corvus corax*	Common raven	LC	LC	No	RB
22	*Emberiza pusilla*	Little bunting	LC	LC	No	PM
23	*Eremophila alpestris*	Horned lark	LC	LC	No	RB
24	*Falco amurensis*	Amur falcon	LC	LC	No	PM
25	*Falco cherrug*	Saker falcon	**EN**	**VU**	No	RB
26	*Falco naumanni*	Lesser kestrel	LC	LC	No	BV
27	*Falco subbuteo*	Eurasian hobby	LC	LC	No	PM
28	*Falco tinnunculus*	Common Kestrel	LC	LC	No	RB
29	*Ficedula albicilla*	Taiga flycatcher	LC	LC	No	PM
30	*Galerida cristata*	Crested lark	LC	LC	No	RB
31	*Gallinago sp*	Snipe sp	LC	LC	No	PM
32	*Gelochelidon nilotica*	Common gull-billed tern	LC	LC	No	PM
33	*Hieraaetus pennatus*	Booted eagle	LC	LC	No	PM
34	*Hirundo rustica*	Barn swallow	LC	LC	No	PM
35	*Jynx torquilla*	Eurasian wryneck	LC	LC	No	PM
36	*Larus canus*	Common gull	LC	LC	No	PM
37	*Larus mongolicus*	Mongolian gull	LC	LC	No	PM
38	*Melanocorypha mongolica*	Mongolian lark	LC	LC	No	RB
39	*Milvus migrans*	Black kite	LC	LC	No	BV
40	*Oenanthe deserti*	Desert wheatear	LC	LC	No	BV

#	Scientific name	Common name	Red List Status		Mongolian regulatory designation	Occurrence form
			IUCN	National		
41	*Oenanthe isabellina*	Isabelline wheatear	LC	LC	No	BV
42	*Oenanthe oenanthe*	Northern wheatear	LC	LC	No	PM
43	*Oenanthe pleschanka*	Pied wheatear	LC	LC	No	BV
44	*Passer montanus*	Eurasian tree sparrow	LC	LC	No	RB
45	*Pernis ptilorhynchus*	Oriental honey-buzzard	LC	LC	No	PM
46	*Petronia petronia*	Rock sparrow	LC	LC	No	RB
47	*Phoenicurus auroreus*	Daurian redstart	LC	LC	No	PM
48	*Pyrgilauda davidiana*	Small snowfinch	LC	LC	No	RB
49	*Pyrrhocorax pyrrhocorax*	Red-billed chough	LC	LC	No	RB
50	*Saxicola torquatus*	Common stonechat	LC	LC	No	PM
51	*Streptopelia decaocto*	Eurasian collared-dove	LC	LC	No	PM
52	*Syrrhaptes paradoxus*	Pallas's sandgrouse	LC	LC	No	RB
53	*Tadorna ferruginea*	Ruddy shelduck	LC	LC	No	BV/PM
54	*Tadorna tadorna*	Common shelduck	LC	LC	No	BV/PM
55	*Turdus eunomus*	Dusky thrush	LC	LC	No	PM
56	*Turdus naumanni*	Naumann's thrush	LC	LC	No	PM
57	*Turdus ruficollis*	Rufous-throated thrush	LC	LC	No	PM
58	*Upupa epops*	Common hoopoe	LC	LC	No	BV
59	*Zoothera aurea*	White's thrush	LC	LC	No	PM

Note: *EN – Endangered, VU – Vulnerable, NT – Near Threatened, LC – Least Concerned; RB – resident breeder, BV – Breeding visitor, PM – passage migrant.*



Note: PM-Passage migrants, RB-Resident breeders, BV-Breeding visiors

Figure 6-42. a) Occurrence form of the species, b) Ratio of species by orders

Conservation status of bird species

The majority of the species recorded during the spring bird survey have low conservation priorities. For example, most (96%, n=57) of the identified bird species were of Least Concern by the IUCN (95%, n=56) and Mongolian Red List (96%, n=57) of Threatened Bird Species (Table 6-25). Two threatened category birds, Saker falcon (*Falco cherrug*) and Steppe eagle (*Aquila nipalensis*), were identified. These species are both listed as EN in the IUCN Red list, but LC (Steppe eagle) and VU (Saker falcon), respectively, in the Mongolian Red List. There is only one species, Tree pipit (*Anthus trivialis*), listed as 'Rare' category by the Mongolian regulatory designation.

Use of the survey area by birds

Although just over a half of all species PM (Passage Migrants) in the survey area, they comprised a minor proportion (n=46) of the total number of observations (n=482) recorded during the survey. Resident breeders comprised most of the observations (n=368), while breeding visitors make up 14% (n=68) of the total number of

observations (Figure 6-43). The most frequently encountered species were Pallas's sandgrouse (n=283), Cinereous vulture (45), Oriental plover (n=29), Common raven (n=21) and upland Buzzard (n=20) at the VPs along the OHTL route (Figure 6-42). This indicates that the survey area (OHTL route) is mainly used by resident species along with some breeding visitors for breeding, hunting/feeding and seeking water, etc.

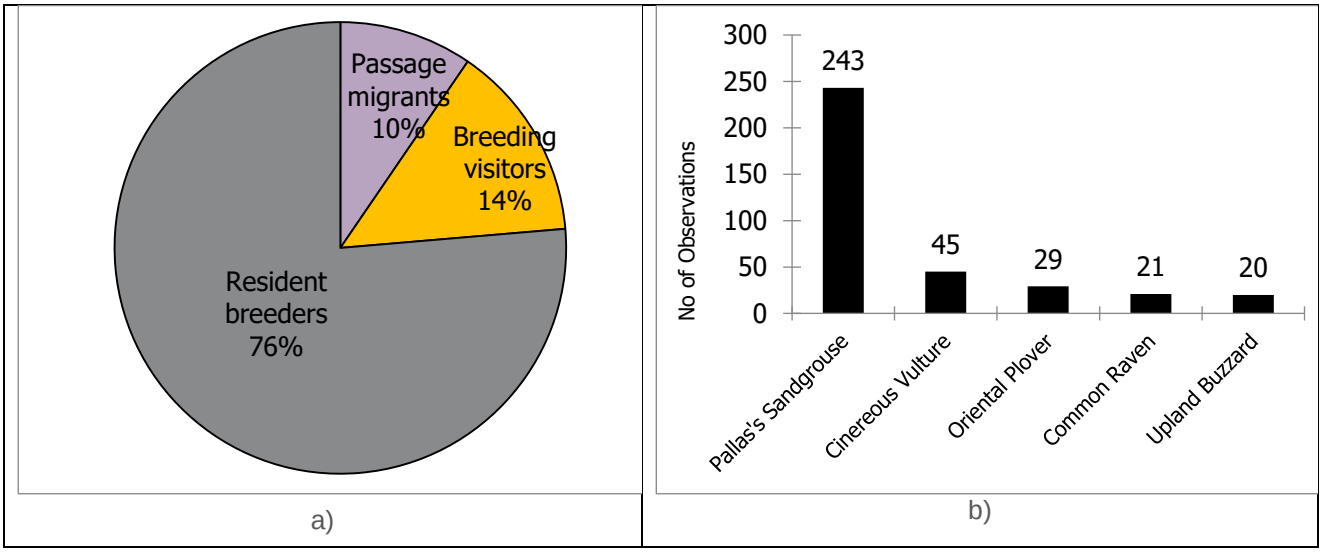


Figure 6-43. Habitat use by bird species: a) percentage of observations by different occurrence form by bird species b) common species recorded

Areas between KM 60-70, KM 90-100 and KM 110-120 had more bird densities during the spring bird surveys compared to other areas along the OHTL route (Figure 6-44).

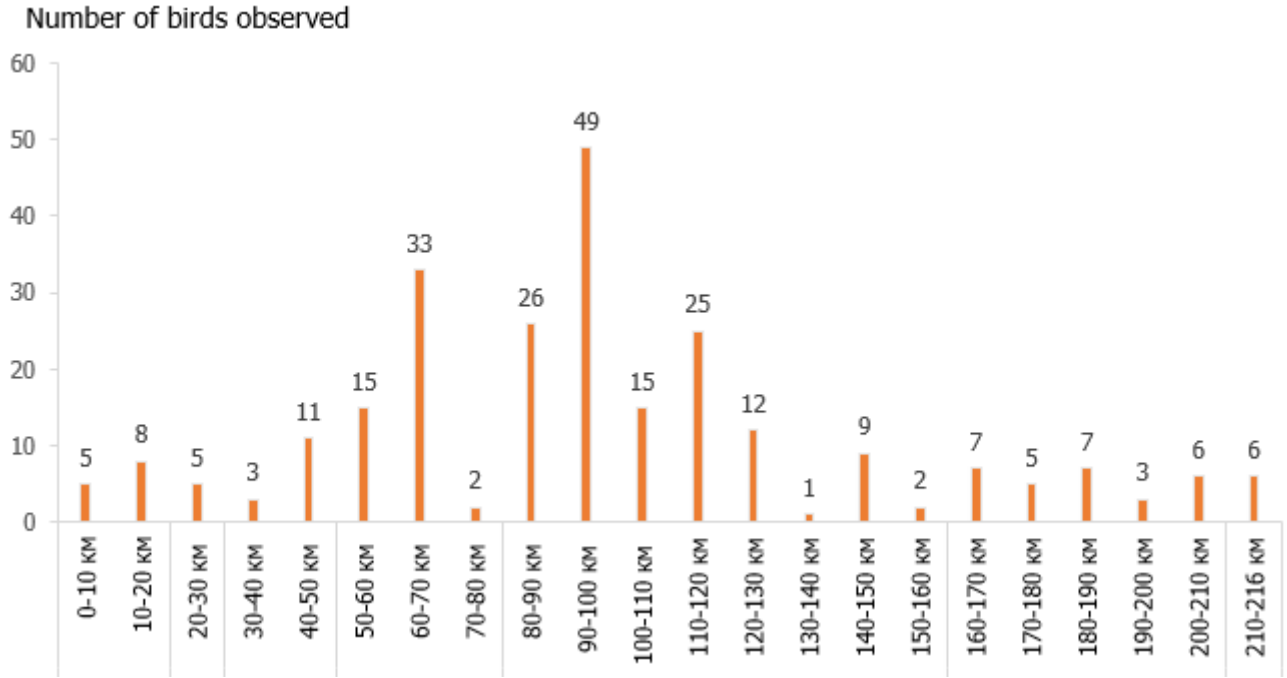


Figure 6-44. Number of birds observed along the proposed OHTL (per km) during the spring bird surveys

Presence of bird habitat sites

The proposed Project Area landscape is generally open steppe with no diverse bird habitat supporting features such as surface water, trees or vegetation species that provide nesting habitat (Figure 6-45). Areas identified as potentially bird hot spots are described below.

Figure 6-45. General view of habitats along the proposed OHTL route

The 2020 spring bird survey identified a small rocky valley located (N 45.96834; E 108.68881) 300 m from the OHTL route. The valley contained several individuals of Siberian elm trees (*Ulmus pulmila*) and other bushes that provide nesting substrates and shelter for breeding and migratory birds. Active nest of Golden eagle (*Aquila chrysaetos*) and Cinereous vulture (*Aegypius monachus*) were located in this area along with sightings of some other breeders such as Lesser kestrel (*Falco naumanni*), Chukar (*Alectoris chukar*), Rock sparrow (*Petronia petronia*), Pied wheatear (*Oenanthe pleschanka*), Common hoopoe (*Upupa epops*) and Eurasian tree sparrow (*Passer montanus*). Migrants such as Tree pipit (*Anthus trivialis*), Blyth's pipit (*Anthus godlewskii*), Daurian redstart (*Phoenicurus auroreus*), Eurasian wryneck (*Jynx torquilla*), Naumann's thrush (*Turdus naumanni*), White's thrush (*Zoothera aurea*), Common stonechat (*Saxicola torquatus*) and Little bunting (*Emberiza pusilla*) were also observed in the valley.

During the 2020 spring bird survey, a small lake (N 45.90496; E 108.78704) 440 m from the proposed OHTL was also identified as potential bird habitat. Common shelducks (*Tadorna tadorna*), Common teals (*Anas crecca*), Common gull-billed terns (*Gelochelidon nilotica*) and Mallards (*Anas platyrhynchos*) were present at this lake.

Male oriental plovers (*Charadius veredus)* were observed displaying at seven sites (Figure 6-46). This species breeds in open dry steppe with sparse grassy vegetation and gravelly soil across the country. It is sensitive to OHTL collision because of its unusual display flight which occurs many times a day. The species is not threatened at regional or global scale. However, Mongolia supports globally important breeding populations of this species and it has a socio-economic value as it is sought-after by foreign bird watchers.

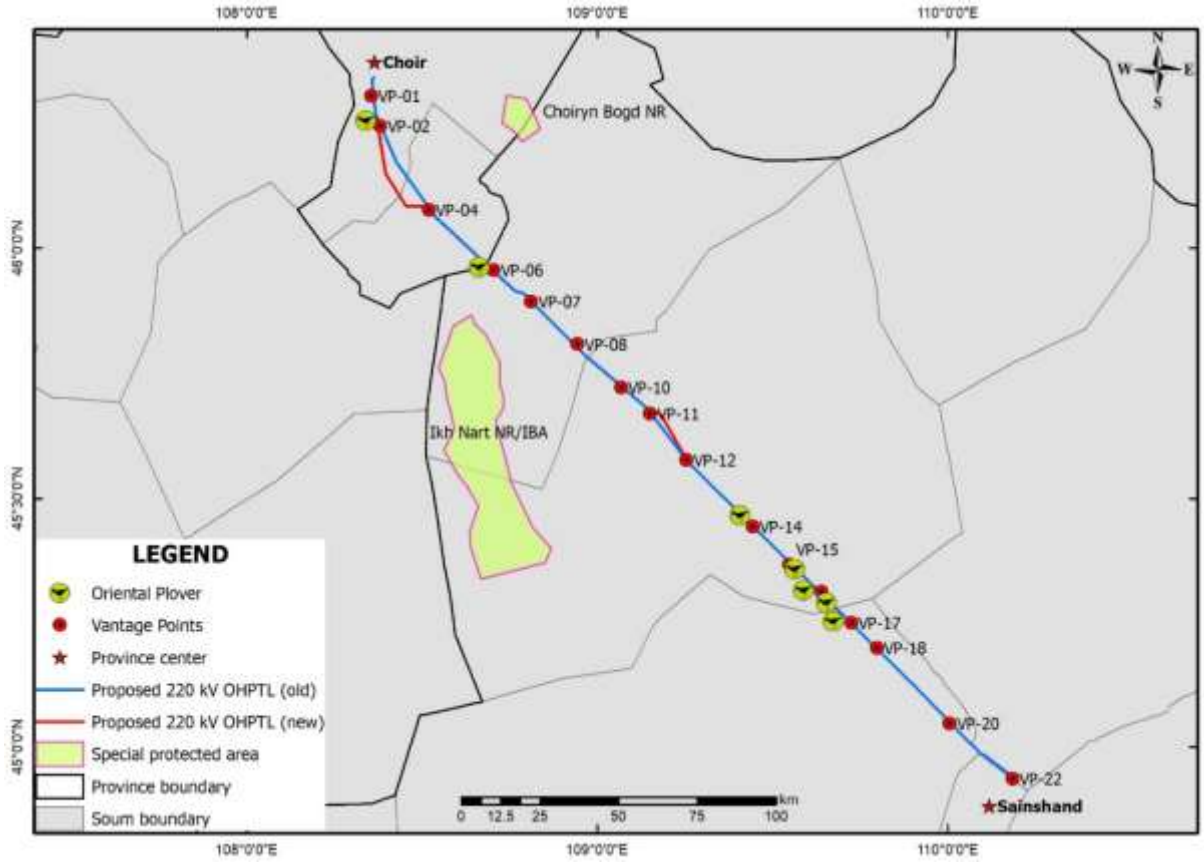


Figure 6-46. Locations of oriental plovers breeding sites

Areas with large number of Pallas's sandgrouse

Pallas's sandgrouse (*Syrrhaptes paradoxus*) was the most numerous species recorded during the spring bird survey. Pallas's sandgrouse was observed in most (11 out of 15) of the VPs in various numbers. The average number of Pallas's sandgrouse observed per hour varied at each VP. There were three VPs (VP8, VP12 and VP20) where more than 10 individuals of Pallas's sandgrouse were observed per hour (Figure 6-47). These sites represent areas that are more frequently used by Pallas's sandgrouse and could be potentially sensitive sites for Project construction and operation.

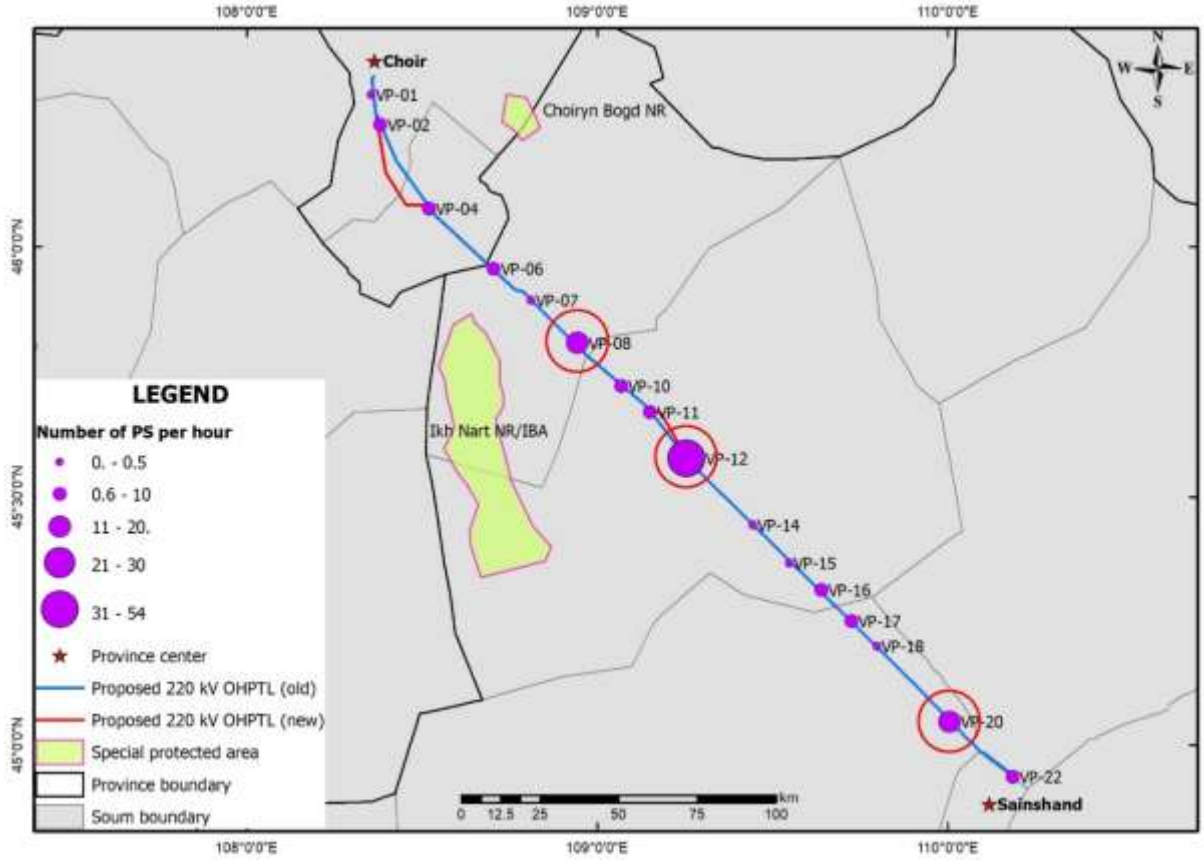


Figure 6-47. Number of Pallas's sandgrouse observed per hour at each VP

6.10.4.7.2. Autumn 2020 bird survey

A total of 37 species of birds were recorded during the autumn bird surveys. Of these, 38% (n=14) were resident breeders (RB), 16% (n=6) were breeding visitors (BV) and 46% (n=17) of the total species were passage migrants (PM).

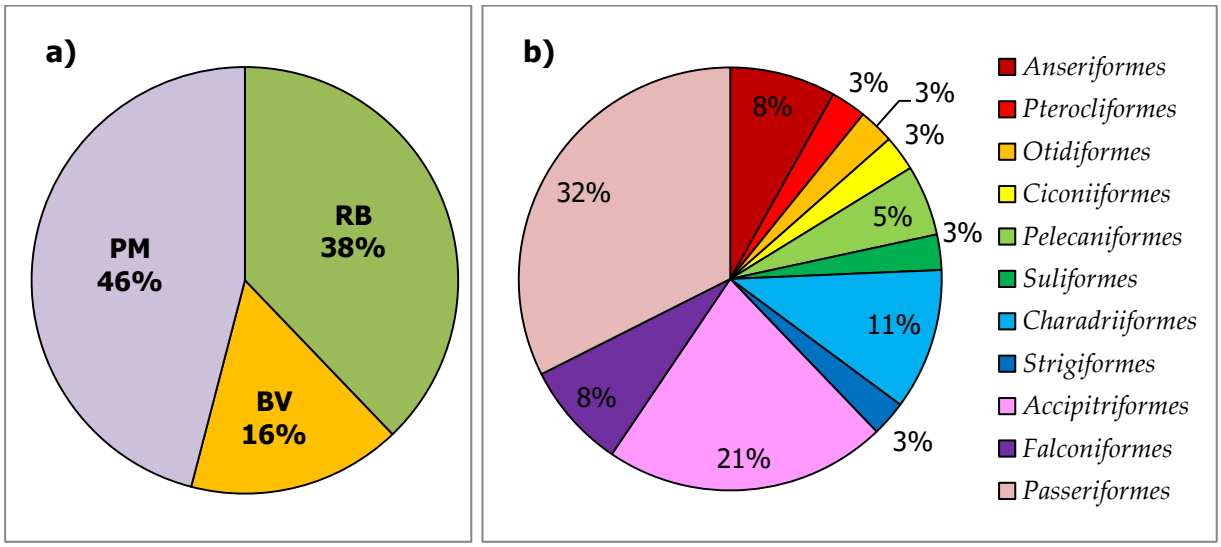
The majority of the species belong to *Passeriformes* making up 32.4% of the total species recorded and followed by *Accipitriformes* (21.6%) and *Charadriformes* (10.8%) (Table 6-26; Figure 6-48).

Table 6-26. List of bird species identified during the autumn bird survey

#	Scientific name	Common name	Red List Status		Mongolian regulatory designation	Occurrence form
			IUCN	National		
1	*Accipiter nisus*	Eurasian Sparrowhawk	LC	LC	No	PM
2	*Aegypius monachus*	Cinereous Vulture	NT	LC	No	RB
3	*Alaudala cheleensis*	Asian Short-toed Lark	LC	LC	No	RB
4	*Anser cygnoid*	Swan Goose	VU	NT	No	PM
5	*Aquila nipalensis*	Steppe Eagle	EN	LC	No	PM
6	*Ardea cinerea*	Grey Heron	LC	LC	No	PM
7	*Athene noctua*	Little Owl	LC	LC	No	RB
8	*Buteo hemilasius*	Upland Buzzard	LC	LC	No	RB
9	*Buteo rufinus*	Long-legged Buzzard	LC	LC	No	BV
10	*Calliope calliope*	Siberian Rubythroat	LC	LC	No	PM
11	*Charadius veredus*	Oriental Plover	LC	LC	No	BV
12	*Ciconia nigra*	Black Stork	LC	LC	No	PM
13	*Circus cyaneus*	Hen Harrier	LC	LC	No	PM
14	*Circus spilonotus*	Eastern Marsh-harrier	LC	LC	No	PM
15	*Corvus corax*	Common Raven	LC	LC	No	RB
16	*Eremophila alpestris*	Horned lark	LC	LC	No	RB
17	*Falco cherrug*	Saker Falcon	EN	VU	No	RB
18	*Falco columbarius*	Merlin	LC	LC	No	PM
19	*Falco tinnunculus*	Common Kestrel	LC	LC	No	RB

#	Scientific name	Common name	Red List Status		Mongolian regulatory designation	Occurrence form
			IUCN	National		
20	*Galerida cristata*	Crested lark	LC	LC	No	RB
21	*Gallinago sp*	Snipe sp	LC	LC	No	PM
22	*Larus mongolicus*	Mongolian Gull	LC	LC	No	PM
23	*Melanocorypha mongolica*	Mongolian Lark	LC	LC	No	RB
24	*Milvus migrans*	Black Kite	LC	LC	No	BV
25	*Motacilla alba*	White Wagtail	LC	LC	No	PM
26	*Oenanthe deserti*	Desert Wheatear	LC	LC	No	BV
27	*Otis tarda*	Great Bustard	VU	VU	Rare	PM
28	*Petronia petronia*	Rock Sparrow	LC	LC	No	RB
29	*Phalacrocorax carbo*	Great Cormorant	LC	LC	No	PM
30	*Platalea leucorodia*	Eurasian Spoonbill	LC	LC	No	PM
31	*Pyrgilauda davidiana*	Small Snowfinch	LC	LC	No	RB
32	*Pyrrhocorax pyrrhocorax*	Red-billed Chough	LC	LC	No	RB
33	*Syrrhaptes paradoxus*	Pallas's Sandgrouse	LC	LC	No	RB
34	*Tadorna ferruginea*	Ruddy Shelduck	LC	LC	No	BV/PM
35	*Tadorna tadorna*	Common Shelduck	LC	LC	No	BV/PM
36	*Tringa glareola*	Wood Sandpiper	LC	LC	No	PM
37	*Zoothera aurea*	White's Thrush	LC	LC	No	PM

Note: *EN – Endangered, VU – Vulnerable, NT – Near Threatened, LC – Least Concerned; RB – resident breeder, BV – Breeding visitor, PM – passage migrant.*



Note: PM-Passage migrants, RB-Resident breeders, BV-Breeding visiors

Figure 6-48. a) Occurrence form of the species, b) Ratio of species by orders

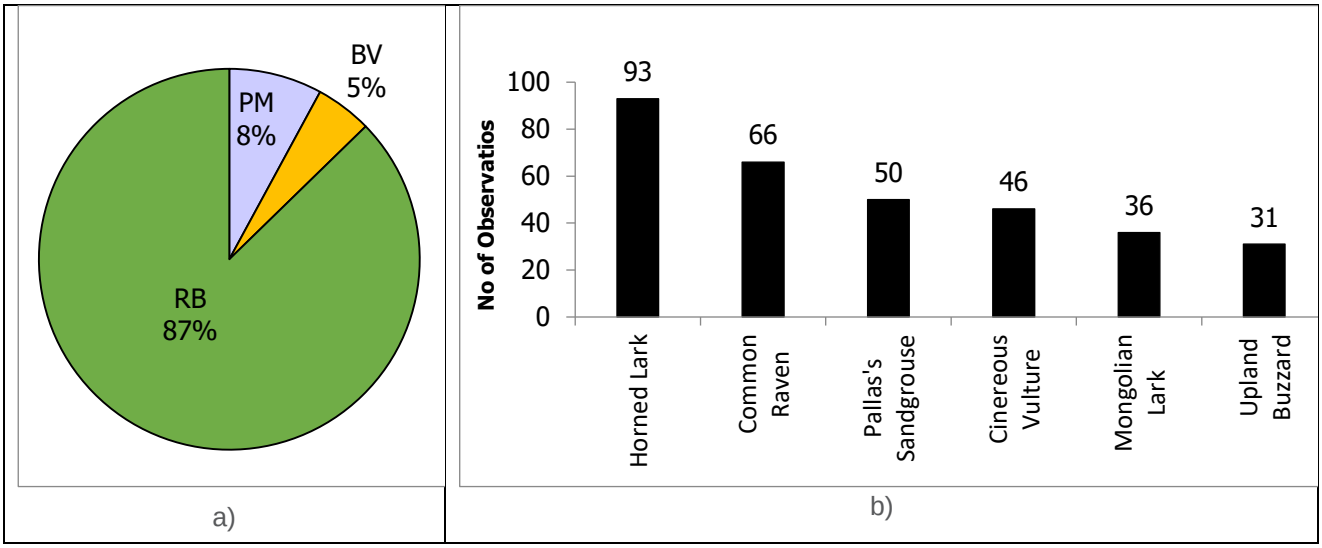
Conservation status of bird species

The majority of the species recorded during the autumn bird survey have low conservation priorities according to the Regional and Global Red List status. Species with status of least concern (LC) made up 92% (n=34; Regional Red List) and 87% (n=32; IUCN Red List) respectively of the total species recorded during the autumn field survey. The species with higher conservation status according to the Regional Red List include Great bustard (*Otis tarda*) (VU), Saker falcon (*Falcon cherrug*) (VU), and Swan goose (*Anser cygnoid*) (NT), while species with higher conservation priorities by IUCN Red List were Steppe eagle (*Aquila nipalensis*) (EN), Saker falcon (EN), Great bustard (VU), Swan goose (VU) and Cinereous vulture (*Aegypius monachus*) (NT) (**Error! Reference source not found.**-49). There is only one species, Great bustard, listed as 'Rare' by the Mongolian Law on Fauna (2012) among all species of birds recorded during the autumn bird survey.

Use of the survey area by birds

Although nearly a half of all species recorded during the autumn bird survey are passage migrants (PM) (46%) in the survey area, they comprise a minor proportion (n=33) of the total number of occasions (n=417) recorded on and off vantage points. Resident breeders (RB) comprise the most number of occasions (n=364) in the survey area, while breeding visitors (BV) make up the least number of occasions (n=20) on and off vantage point efforts (Figure 6-49).

The most frequently recorded species were Horned lark (n=93), Common raven (n=63), Pallas's sandgrouse (n=49), Cinereous vulture (n=43), Mongolian lark (n=33) and Upland buzzard (n=30) (Figure 6-49).



Note: PM-Passage migrants, RB-Resident breeders, BV-Breeding visitors

Figure 6-49. Habitat use by bird species: a) percentage of observations by different occurrence form by bird species b) common species recorded

Areas with large number of Pallas's sandgrouse

Pallas's sandgrouse was the most numerous species in terms of number during the autumn bird survey. The species was recorded in various numbers and occasions at 9 VPs out of 15 VPs surveyed in total. We calculated the average number of Pallas's sandgrouse observed per hour at each VP as the length of observation varied between VPs. There are six vantage points where more than 10 individuals of Pallas's sandgrouse were observed per hour (Figure 6-50). These sites represent areas that are more frequently used by Pallas's sandgrouse, therefore the risk of collision with the power line could be higher.

However, it appears that the distribution of Pallas's sandgrouse varies across the seasons. They move in their range to seek water and suitable foraging grounds that have high productivity of plant seeds. It was observed during the survey that they were more common in the areas with tall vegetation such as *Artemisia* spp., while they were absent or rarely observed in the areas with short and sparse vegetation. Thus, their distribution might be highly dependent on the vegetation conditions in the region. In this case, it would be difficult to precisely identify the important areas for Pallas's sandgrouse.

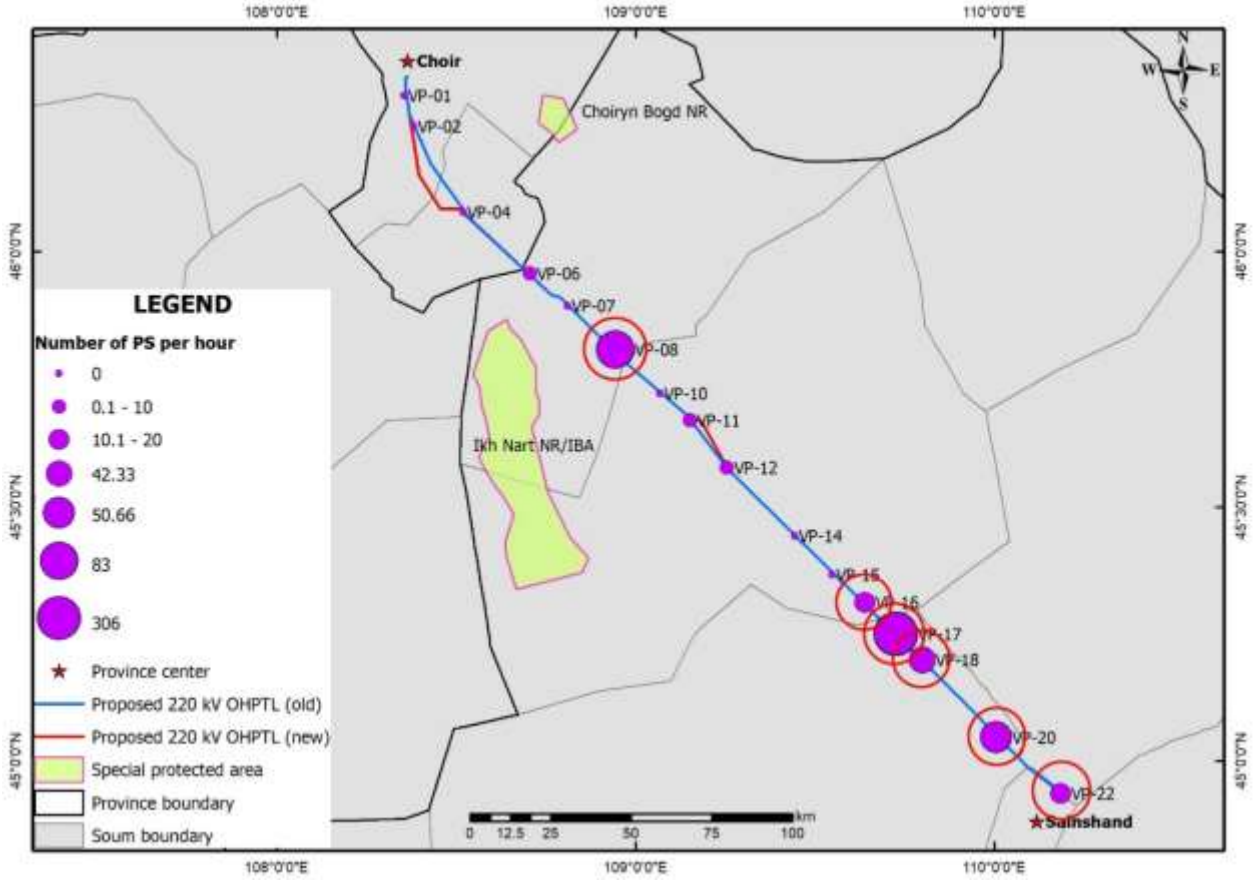


Figure 6-50. Number of Pallas's sandgrouse observed per hour at each VP

6.10.4.7.3. May 2021 bird survey

During the 2021 field survey, five species of bird were identified during the walkover survey undertaken between 6-7 May 2021 at a small lake, 4 km northeast of the updated transmission line route located in the territory of Airag *soum*. The species recorded are provide in Table 6-27.

Figure 6-51. Birds observed at a lake about 4 km north of TP-19

Table 6-27. Species identified during May 2021 survey at a lake 4 km north of 105 km

No	Species	Number of individuals	Coordinates		Height	Distance from transmission line
			Longitude	Latitude		
1	Common shelduck *(Todorna todorna)*	5	109°12'55.21"	45°41'29.80"	1057	4 km
2	Ruddy shelduck *(Todorna ferrugina)*	2				
3	Pied avocet *(Recuirosta avosetta)*	10				
4	Common tern (*Sterna hirundo*)	2				
5	Wood sandpiper (*Tringa glareola*)	12				

6.11. Critical Habitats

The objectives of EBRD's Performance Requirement 6 (PR 6): Biodiversity Conservation and Sustainable Management of Living Natural Resources are to:

- protect and conserve biodiversity using a precautionary approach;
- to adopt mitigation hierarchy approach, with the aim of achieving no net loss of biodiversity, and where appropriate, a net gain of biodiversity; and
- promote good international practice in the sustainable management and use of living natural resources.

The PR contains requirements for the assessment of issues and impacts, biodiversity conservation, legally protected and internationally recognised areas of biodiversity value, and invasive alien species.

6.11.1. Priority Biodiversity Features

EBRD PR6 adopts a critical habitat criterion-based approach for priority biodiversity features, combining the concept of irreplaceability (the limited number of places in which the feature is found) and vulnerability (the risk of the feature being lost over time). The following characteristics are provided for assessment in determining whether any given habitat has priority biodiversity features:

(i) Threatened habitats – For example, those that are considered to be under pressure by national, regional, or international assessments.

(ii) Vulnerable Species – For example, those species listed by the IUCN or any other national/regional lists (such as national Red Lists) as Vulnerable (VU) or equivalent. These include animal and plant species of community interest identified under the EU Habitats Directive (Annex II and Annex IV).

(iii) Significant biodiversity features identified by a broad set of stakeholders or governments – For example, Key Biodiversity Areas and IBAs, nationally or internationally important species or sites for conservation of biodiversity, areas meeting national habitat definitions.

(iv) Ecological structure and functions needed to maintain the viability of priority biodiversity features – For example, riparian zones and rivers, dispersal or migration corridors, hydrological regimes, seasonal refuges or food sources, keystone or habitat-forming species, where these are essential for priority biodiversity features.

As defined in the Guidance Note on EBRD PR6, the priority biodiversity features have a high, but not the highest degree of irreplaceability and/or vulnerability. Although a level below critical habitat in sensitivity, they still require careful consideration during project assessment and impact mitigation.

6.11.2. Critical Habitat

The PR also defines the most sensitive biodiversity features as critical habitat, which comprise the following Criteria:

(i) Highly threatened or unique ecosystems (Ecosystems that are at risk of significantly decreasing in area or quality; have a small spatial extent; and/or contain concentrations of biome-restricted species);

(ii) Habitats of significant importance to endangered or critically endangered species (Areas supporting species at high risk of extinction (critically endangered or endangered) on the IUCN Red List of threatened species or equivalent national/regional systems);

(iii) Habitats of significant importance to endemic or geographically restricted species (Areas holding a significant proportion of the global range or population of species qualifying as restricted-range under Birdlife or IUCN criteria).

(iv) Habitats supporting globally significant migratory or congregatory species (Areas that support a significant proportion of a species' population, where that species cyclically and predictably moves from one geographical area to another (including within the same ecosystem), or areas that support large groups of a species' population that gather on a cyclical or otherwise regular and/or predictable basis).

(v) Areas associated with key evolutionary processes (Areas with landscape features that might be associated with particular evolutionary processes or populations of species that are especially distinct and may be of special conservation concern given their distinct evolutionary history); or

(vi) Ecological functions that are vital to maintaining the viability of biodiversity features described (as critical) (Ecological functions without which critical biodiversity features could not persist).

The International Finance Corporation's (IFC) Performance Standard 6 Guidance Note provides detailed guidance on undertaking critical habitat assessment, and EBRD PR6 Guidance Note recommends using the IFC's critical habitat assessment guidance until internationally agreed methods are developed. Use of the IFC's guidance for Critical Habitat assessment to satisfy EBRD's Critical Habitat assessment is considered acceptable. EBRD's Guidance Note on PR6 provides further definitions (Table 6-28) and examples for critical habitat and qualifying thresholds as described in the IFC's Guidance on PS6.

Table 6-28. Examples of features for Critical Habitat and relationship with priority biodiversity features criteria

Critical Habitat	Examples	Criterion Qualifying Thresholds
1. Highly threatened or unique ecosystems	Ecosystems that are at risk of significantly decreasing in area or quality; have a small spatial extent; and/or contain concentrations of biome-restricted species. For example: • Ecosystems listed as, or meeting criteria for, Endangered or Critically Endangered by the IUCN Red List of Ecosystems • Areas recognised as priorities in official regional or national plans, such as National Biodiversity Strategy and Action Plans • Areas determined to be of high priority/significance based on systematic conservation planning carried out by government bodies, recognised academic institutions and/or other relevant qualified organisations (including internationally recognised NGOs).	According to GN6, thresholds for Criterion 4 are the following: a) Areas representing ≥5% of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN. b) Other areas not yet assessed by IUCN but determined to be of high priority for conservation by regional or national systematic conservation planning.
2. Habitats of significant importance to endangered or critically endangered species	Areas supporting species at high risk of extinction (Critically Endangered or Endangered) on the IUCN Red List of Threatened species (or equivalent national/regional systems). For example: • Alliance for Zero Extinction sites	The following thresholds are used for the Criterion 1: a. Areas that support globally important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥ 5 reproductive units of a CR or EN species); b. Areas that support globally important concentrations of an IUCN Red-listed VU species, the loss of which would result in the

Critical Habitat	Examples	Criterion Qualifying Thresholds
	• Animal and plant species of community interest in need of strict protection as listed in EU Habitats Directive (Annex IV).	change of the IUCN Red List status to EN or CR and meet threshold a) above; and c. As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.
3. Habitats of significant importance to endemic or geographically restricted species	Areas holding a significant proportion of the global range or population of species qualifying as restricted range under Birdlife or IUCN criteria. For example: • Alliance for Zero Extinction sites • Global-level Key Biodiversity Areas and Important Bird and Biodiversity Areas identified for restricted-range species	Restricted range refers to a limited extent of occurrence (EOO) and for terrestrial vertebrates and plants with ranges of 50,000 km^2 or less. According to IFC Guidance Note 6 (GN6), the single threshold for Criterion 2 is the following: (a) Areas that regularly hold ≥10% of the global population size and ≥10 reproductive units of a species.
4. Habitats supporting globally significant (concentrations of) migratory or congregatory species	Areas that support a significant proportion of a species' population, where that species cyclically and predictably moves from one geographical area to another (including within the same ecosystem), or areas that support large groups of a species' population that gather on a cyclical or otherwise regular and/or predictable basis. For example: • Global-level Key Biodiversity Areas and Important Bird and Biodiversity Areas identified for congregatory species • Wetlands of International Importance designated under criteria 5 or 6 of the Ramsar Convention.	According to GN6, thresholds for Criterion 3 are the following: a) areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle. b) areas that predictably support ≥10 percent of the global population of a species during periods of environmental stress.
5. Areas associated with key evolutionary processes	Areas with landscape features that might be associated with particular evolutionary processes or populations of species that are especially distinct and may be of special conservation concern given their distinct evolutionary history. For example: • Isolated lakes or mountaintops • Populations of species listed as priorities by the Edge of Existence programme.	No quantitative significance thresholds exist for this criterion: therefore, there is a reliance on expert opinion and qualitative value judgement. While no thresholds are given in Guidance Note 6, for illustrative purposes, some potential examples of spatial features associated with evolutionary processes are as follows: • Landscapes with high spatial heterogeneity are a driving force in speciation, as species are naturally selected based on their ability to adapt and diversify. • Environmental gradients, also known as ecotones, produce transitional habitat, which has been associated with the process of speciation and high species and genetic diversity. • Edaphic interfaces are specific juxtapositions of soil types (for example, serpentine outcrops, limestone, and gypsum deposits), which have led to the formation of unique plant communities characterized by both rarity and endemism. • Connectivity between habitats (for example, biological corridors) ensures species migration and gene flow, which is especially important in fragmented habitats and for the conservation of

Critical Habitat	Examples	Criterion Qualifying Thresholds
		metapopulations. This also includes biological corridors across altitudinal and climatic gradients and from "crest to coast." • Sites of demonstrated importance to climate change adaptation for either species or ecosystems are also included within this criterion.
6. Ecological functions that are vital to maintaining the viability of biodiversity features described (as critical habitat features)	Ecological functions without which critical biodiversity features could not persist. For example: • Where essential for critical biodiversity features, riparian zones and rivers, dispersal or migration corridors, hydrological regimes, seasonal refuges or food sources, keystone or habitat-forming species.	Ecological structure and functions needed to maintain the viability of priority biodiversity features

Where an assessment identifies that a project could have adverse impacts on a critical habitat, there is a requirement to conduct an assessment of the potential adverse impacts on this critical habitat[59], i. e a critical habitat assessment.

The section below sets out an initial screening of existing biodiversity features that could be defined as Critical Habitat and which may be affected by the Project. In order to assess the presence or absence of Critical Habitat-qualifying features a review against each criterion (i-vi) was conducted.

The assessment has been undertaken using a combination of desk-based study, environmental baseline findings and professional judgement. The assessment uses

6.11.3. Critical Habitat Screening Results

6.11.3.1. Highly threatened or unique ecosystems

This CH screening has used IFC GN6 approaches (i.e. use of the IUCN Red List of Ecosystems) for the Highly Threatened and/or Unique Ecosystems criteria. There is no IUCN listed Endangered or Critically Endangered Ecosystems, or areas determined to be high priority/significance based on systematic conservation planning carried out by government bodies, recognised academic institutions and/or other relevant qualified organisations within the Project Area to meet this Criterion. Therefore, the Project Area is not considered to trigger this criterion.

6.11.3.2. Habitats of significant importance to endangered or critically endangered species

Flora: No IUCN listed CR, EN and VU plant species were observed during the baseline surveys, but one species of the Mongolian Red List EN category plant is recorded:

- Desert living cistanche (Cistanche deserticola) with EN Category by the Mongolian Red List of Threatened Plants.

Desert living cistanche is assessed as EN in the Mongolian Red List due to its decreasing population from medicinal and commercial use, decrease in its host plant (i.e. saxual - *Haloxylon ammodendron*) population from fuel use, and land degradation pressure (Nyambayar *et al.* 2012). Desert cistanche distribution in Mongolia includes Dornogobi, Galbyn Gobi, Khar Zagiin Khooloi in the southern Altai mountains, Baruun Khuurai of Dxuungariin Gobi, Olon nuuriin khundii, Ulaan nuur, Bayan zag and Ergiin zag areas (MET 2014). Only three individuals of Desert living cistanche is found with rare abundance in the Project Area. Thus, the Project Area is unlikely to provide critical habitat for this species to meet this CHA Criterion.

Fauna: Two species of mammals are recorded as critical habitat triggering specie in the Project Area:

- Argali. EN Category mammal in the Mongolian Red List of Threatened Mammals

[59] Available at: https://www.ebrd.com/environment/pdf-guidance-note-ebrd-performance-requirement-6.pdf

- Mongolian gazelle. EN Category mammal in the Mongolian Red List of Threatened Mammals

Historically, argali occurred in disjunct populations across all but eastern Mongolia, in areas with rolling hills, mountains, rocky outcrops, canyons, and plateaus (Harris and Reading 2008). The current distribution of argali in Mongolia covers large areas including the mountains of Mongol Altai, Gobi Altai, Dzuungarian Gobi, Trans Altai Gobi, Alashan Gobi and Dornod Gobi from the north of the Gobi Region to the south of steppe, forest steppe and mountain taiga. There are also some argali sheep populations around the Central Khalkha Mountains, Khan-Khukhiin Mountain, Khangai Mountain, and the Arsain River in Khuvsgul Province. Most argali live on alpine grasslands at 3,000 to 5,500 m altitude, descending lower in winter, but in arid southern Mongolia they permanently live at lower elevation areas (TBC and FFI 2012). Argali appear to be expanding their distribution in eastern Mongolia (Harris and Reading 2008). Argali population in Mongolia is estimated to be around 13,000-15,000 individuals with an estimated habitat of around 530,000 km^2 (Harris and Reading 2008).

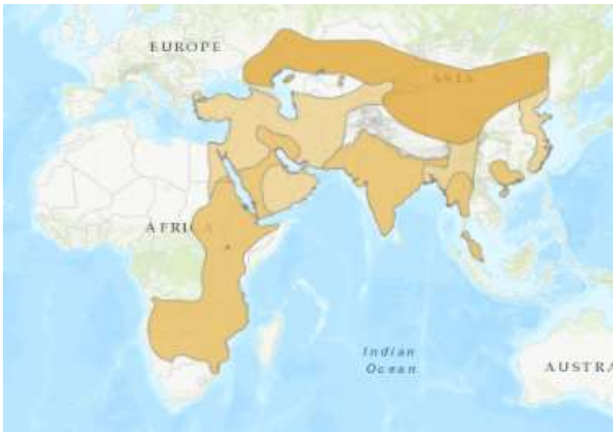
Mongolian gazelle was widely distributed in steppe and semi-desert habitats throughout Mongolia. Populations have become fragmented in the central and southern Mongolia due to construction of the Trans Mongolian railway in the 1940s (Lkhagvasuren et al. 2001). Mongolian gazelle current distribution includes Northern Gobi, Eastern Gobi, Middle Khalkha Steppe, Eastern Mongolia, and eastern part of the Valley of the Lakes in the western Mongolia. This species is highly nomadic and is often absent from some areas for extended periods of time, giving the false impression that its range is expanding or contracting (Clarke et al. 2006). Mongolian gazelle was hunted at industrial scale in the past leading to population decline in the region. The Mongolian Law on Animals (2012) permits subsistence hunting of Mongolian gazelle during September to November months despite its EN status in the country's threatened species Red List.

Considering the Project's limited area compared to the Argali and Mongolian gazelle wider habitat in Mongolia it is screened that the Project area will not trigger CHA for the above gazelle species.

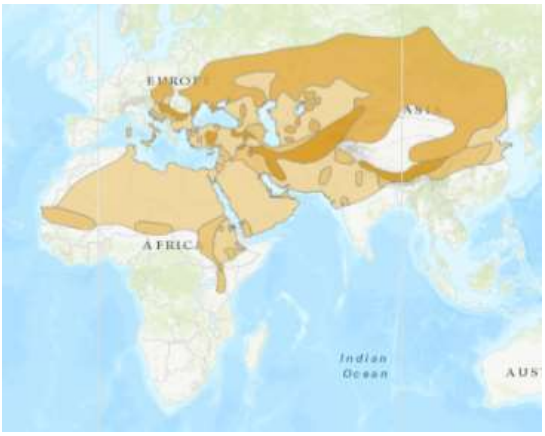
Birds: The following CHA qualifying bird species were recorded in the Project area:

- Saker falcon. IUCN EN and Mongolian Red List VU category species
- Steppe eagle. IUCN EN and Mongolian Red List NT category species

The Saker falcon and Steppe eagle species global distribution range stretches from north-east Asia to northern and southern Africa (See Figure Below). There are no baseline studies on these species population in the Project area. Considering the Project Area's limited spatial extent compared to these two bird species global and regional distribution. These two species are also widely distributed nearly whole of Mongolian territory (Figure 6-52). Based on the Project Area limited coverage in these species global and regional distribution, it is concluded that the Project Area will not trigger the CHA Criterion.



Steppe eagle Global Distribution



Saker falcon Global Distribution

Steppe eagle Mongolian Distribution

Saker falcon Mongolian Distribution

Figure 6-52. Global (top) and Mongolian (bottom) distribution of Steppe eagle and Saker falcon

6.11.3.3. Habitats of significant importance to endemic or geographically restricted species

No terrestrial vertebrates and plant species were found to trigger this CHA Criterion i.e. with limited occurrence within 50,000 km^2 area or areas that regularly hold ≥10% of the global population size and ≥10 reproductive units of a restricted range species trigger this Criterion.

6.11.3.4. Habitats supporting globally significant (concentrations of) migratory or congregatory species

Guidance Note EBRD PR6 suggests areas that support a significant proportion of a species' population such as Global-level Key Biodiversity Areas and IBAs must be identified for migratory and congregatory species criterion. The Project AoI is not known to hold any habitat areas that meet this criterion. The closet IBA, Ikh Nart, is about 10 km in the south-west of the OHTL route, and Project activities are not expected to impact the IBA.

The goitered gazelle is considered as triggering mammal species for the Criterion in Mongolia[60,61]. The goitered gazelle range stretches from south-eastern Mongolia to south Caucasus through northwest China, Kazakhstan, Turkmenistan, Uzbekistan, and marginally in Tajikistan and Kyrgyzstan, Iran, Afghanistan and Pakistan, although its habitat is decreasing (IUCN 2017). This species Mongolian range is estimated to be about 526,600 km^2 covering much of the Dzungarian Gobi Desert, Great Lakes Depression, Valley of the Lakes, Trans Altai Gobi Desert, Eastern and Alashan' Gobi Desert areas (Clark et al. 2006). However, given this species global range and the Project's limited area of influence, the Project is unlikely to meet this Criterion threshold.

6.11.3.5. Areas associated with key evolutionary processes

This criterion is principally defined by the physical features of a landscape that might be associated with particular ecological and evolutionary processes. Although key evolutionary processes may operate at various spatial scales, in the context of PS6, the most appropriate unit of analysis is that which may potentially experience direct, primary impacts from the Project. The primary impact areas of the Project are not known to

[60] ESIA assessment for the Oyu Tolgoi Copper and Gold Mine (2012)
[61] ESIA Assessment for the Erdene Resource Khundii Gold Mine (2019)

contain any endemic species or assemblages of species of unusual evolutionary provenance and is representative of the broad ecoregion within which it is embedded. This Criterion is not triggered.

6.11.3.6. Ecological functions that are vital to maintaining the viability of biodiversity features described (as critical habitat features)

Guidance Note EBRD PR6 requires assessment of ecological functions and structures that are vital to maintaining the viability of Critical habitat. As the Project Area is unlikely to meet any of the above critical habitat qualifying thresholds, this Criterion is not assessed.

6.12. Waste Management

6.12.1. Sources of Data

The ESIA environmental and social field teams conducted research including consultation with local stakeholders.

6.12.2. Baseline

Solid waste management infrastructure is limited in the Project Area. *Soum* centres generally have an area outside the built-up areas where waste is taken such as an old borrow site or a relatively remote location. Waste is dumped and can be partially burned within this defined location. There is little control in terms of environmental management, however the relatively sparse populations, dry climate and low volume of wastes means no significant issues are anticipated from waste currently in the Project Area.

The field team noted four locations along the OHTL route in general where household waste was observed. This included waste which had been burned and was a mix of ash and unburned waste, a deposit of tens of tyres and a site which appears to have been regularly used by residents in Choir.

A typical waste dumping area which appears to have been used regularly on the edge of Choir city is shown in Figure 6-53. Local herders are known to either bury or burn their waste, rather than transport it to the nearest public disposal site.

Commercial entities generating waste from businesses or industry are required to make an agreement with the local government for waste disposal. The waste payment amount is set by the Citizens Representative Hural, the elected council at the subnational level. Entities transport their waste to the main public waste disposal site and the *bagh* governor directs them to the location for depositing their waste.

Figure 6-53. Waste disposal area near Choir (GPS 46.33449, 108.35742)

Source: ESIA Field Team

6.12.3. Environmental Baseline Conclusion

In summary, the environmental baseline indicates that:

- The Project is in an area of plains in the Gobi region in the south-eastern area of Mongolia which is part of the Dundgovi structural-tectonic uplift zone of the Central Mongolian fold system. The Project Area is characterised by low hills (Khargana Budarganat hills) and shallow valleys and plains with the highest point at 1,280 masl and the lowest at 930 masl.

- The annual mean temperature in Mongolia has increased by 2.24°C from 1940 to 2015. In Govi-Sumber *aimag* the average annual air temperature in this region is 1.9˚C, total annual precipitation averages 129.8 mm and the average wind speed is 3.7 m/s, north and northwest winds prevail. In Dornogovi *aimag* the average annual air temperature is 5.4˚C, average annual precipitation is 122 mm and the average wind speed in is 4.3 m/s, northwest and north winds prevail.
- The primary natural hazards in the area relevant to the Project are climate related - dust storms and sand storms, and floods; hazards relating to non-climatic factors such as earthquakes and permafrost are not relevant to the Project Area.
- The Project Area is located in the Dundgovi tectonic uplift zone of the Central Mongolian fold system, where geological formation includes layered classified sediments and sedimentary and metamorphic rocks. Alluvial sediments are formed in the basins of temporary lakes and dry riverbeds. Brown and light brown soil types are prevalent. Laboratory analysis shows that the average thickness of the fertile layer of soils is 5-20 cm. A surface gravel layer protects the soil surface from wind and influences the evaporation which has a significant effect on the soil moisture regime and biological processes in the soil. The majority of the soil cover is not severely damaged by human activity along the OTHL route, except where the route enters the cities, especially around Choir substation.
- The Project Area is hydrologically located in the Central Asian watershed, in terms of global watersheds, and in the Guveet-Khalkh middle steppe basin of the North Gobi of Mongolia. Due to the natural environment and climatic conditions, there are no rivers and streams in this region. However, there are dry riverbeds with temporary rainwater runoff, rainwater-fed saline lakes and dry lake beds which can be spring fed. The field survey team noted five dry lakes and 36 dry gravel river beds along the OHTL corridor. The lakes included Munkhiin Ulaan, Biluut Tsagaan Nuur, Urd Undur Khar Toirom, and two unnamed lakes. There is also a large surface water body (from the Shivee Ovoo coal mine dewatering) 15-16 km south east of Choir and as close as 5-6 km to the planned OHTL. In addition, large ravines characterise the Project Area at 40-50 km and high passes (1,210-1,250 m high).
- The field surveys show the topography and lack of vegetation cover have a limited impact on slowing overland flow from precipitation which means significant rainfall can have an impact on flooding, causing difficulties for transportation, infrastructure and other activities. Although dry for the majority of time, the river beds may be subject to flash floods in spring and summer.
- The Project Area in the desert steppe zone, characterised by abundant groundwater, which gives rise to small lakes and springs in the region. Groundwater is the main water supply in the Project Area.
- Water supply for herders is usually from manual wells. There are 1,515 active wells in the seven Project *soum*s, and information obtained from Umard Gobi River Basin Authority noted over 262 wells and 13 *bulag* (springs) within a 10 km zone around the OHTL route. Of these, none are within the 25 m RoW and only three wells (one of which was unused) were identified within 300 m of the OHTL centreline; these were located between 128-200 m from the centreline, at KMs 60 and 180-190. Two of the actively used wells were sampled; the analysis shows the samples met the Mongolian National Drinking Water Standard apart from sodium and uranium. The presence of uranium in the water of these two wells may be due to the nature of the sedimentary rocks, and there are no uranium deposits nearby and similarly for sodium, the OHTL crosses naturally saline areas.
- NO_2 and SO_2 measurements were taken at seven locations along the OHTL route near potentially sensitive receptors. PM2.5 and PM10 measurements were also taken. The results for PM10 and PM2.5 were measured for 20 minutes at most sample locations, and not the required 24 hour averaging as specified in the Mongolian and WHO standards, which therefore does not allow direct comparison against these standards. Dust and sand storms are a significant natural hazard in the OHTL corridor and a major influence on air quality. Strong dust storms create reduced visibility, as well as respiratory health concerns if people are exposed to dust for extended periods.
- Nine noise sample points were monitored at potentially sensitive sites along the OHTL route. WHO standards are based on one-hour LAeq (dBA) which is a noise pressure level adjusted for the human ear; Mongolian standards do not use the LAeq adjustment. The measurements taken along the OHTL corridor are not LAeq adjusted, therefore accurate comparison is not possible. However, where the WHO standards appear not to be met (at one site only), this was due to the wind speed creating a high noise level at the time of the measurement.

- The main AH road connects Choir and Sainshand. Govi-Sumber and Dornogovi *aimags* have a far higher incidence of traffic related injuries than the national or provincial average. Traffic counts undertaken during the ESIA field surveys show a predominance of cars, followed by HGVs.
- There is one internationally recognised biodiversity conservation site within the Project Area, Ikh Nart IBA, 10km to the south-west of the OHTL centreline. This IBA overlaps with the Ikh Nart Nature Reserve. There is one further Nature Reserve, Choiryn Bogd, located 27 km northeast of the OHTL route. The proposed OHTL route crosses two of the locally protected areas, Togootyn Khonkhor (Nature and historical heritage area) and Bornuruu (Special purpose).
- Potentially sensitive flora and fauna include:

  Flora:
  - Shardalan (*Tugarinovia mongolica)* Mongolian Red List 'Vulnerable' and 'Very rare' category species by Mongolian regulatory designation; and
  - Desert living cistanche (*Cistanche deserticola*). Mongolian Red List 'Endangered' and "very rare' category species by the Mongolian regulatory designation.

  Mammals:
  - Goitered gazelle (*Gazella subgutturosa*). Both IUCN and Mongolian Red List 'Vulnerable' category species;
  - Mongolian gazelle (*Procapra gutturosa*). Mongolian Red List 'Endangered' category species;
  - Argali (*Ovis ammon).* Mongolian Red List 'Endangered' category species; and
  - Siberian ibex (*Capra Sibirica*). Mongolian regulatory designated 'Rare' mammal.

  Birds:
  - Swan goose (Anser cygnoid). IUCN Red List 'Vulnerable' category species;
  - Great bustard (Otis tarda). IUCN Red List 'Vulnerable' category species;
  - Steppe eagle (*Aquila nipalensis*). IUCN Red List 'Endangered' category species;
  - Saker falcon (*Falco cherrug*). IUCN listed 'Endangered' and Mongolian Red List 'Vulnerable' category species;
  - Cinereous vulture (*Aegypius monachus*). IUCN Red List 'Near-threatened' category species; prone to OHTL collision and electrocution and present in high numbers.
  - Tree pipit (*Anthus trivialis*). Mongolian regulatory designated 'Rare' bird;
  - Pallas's sandgrouse (*Syrrhaptes paradoxus*). Most common and vulnerable species to OHTL collision in the Project Area;
  - Oriental plovers (*Charadius veredus*). Species of socio-economic value. Prone to OHTL collision; and
  - All other nesting species.
- Critical Habitats is not assessed as being present in the Project Area.

7. Social Baseline

7.1. Introduction

This Chapter presents the social baseline conditions in the Project Area. The Project OHTL will run between Choir and Sainshand, through the territory of Sumber and Shiveegovi *soums* of Govi-Sumber *aimag* and Dalanjargalan, Airag, Saikhandulaan, Altanshiree and Sainshand *soums* of Dornogovi *aimag*.

Data has been collated from secondary data sources and social surveys and stakeholder engagement.

The ESIA social team undertook an initial site reconnaissance and stakeholder engagement between 19 to 22 April 2020 and undertook a more detailed survey including Key Informant Interviews (KIIs) and Household Surveys (HHS) between 8 to 12 June 2020 (Appendix C). This was based on the Alternative 2 route as shown in Figure 3-2 in Chapter 3, prior to the alignment of two sections of the route. A further walkover survey was then undertaken of any structures within the 3 km buffer during May 2021 along the revised section of the route only.

During the initial site reconnaissance, KIIs were undertaken with Govi-Sumber aimag and Dornogovi *aimag* officials and officials from the following *soums*: Sumber, Shiveegovi, Dalanjargalan, Saikhandulaan and Sainshand. The Altanshiree *soum* official was called away during the meeting, and the State Emergency Commission road closure (due to COVID-19) resulted in the cancellation of meetings in Airag *soum* of Dornogovi *aimag* (see Chapter 8 and the SEP for further details).

During the second social field mission, a team of five in-country social and land specialists undertook formal meetings, further KIIs, and HHS from 8 to 12 June 2020. The five *soums* of Sumber, Shiveegovi, Dalanjargalan, Airag and Sainshand were visited. The *soums* of Altanshiree and Saikhandulaan were not covered as it had previously been identified that there were unlikely to be any herder households in the vicinity of the OHTL line due to the small number of herder households that reside or transit through these two *soums* where the quality of pastureland is exceptionally poor.

Further details of the approach are provided in Chapter 8; in summary the following was undertaken to collect data:

- **Formal meetings**: Discussions with local authorities were conducted to increase awareness about the Project and to obtain their perspectives on the Project in relation to the areas in their authority. A total of 54 officials were engaged
- **KIIs**: A total of 34 KIIs were conducted with the local authorities and specialists on issues within their expertise.
- **Consultations with households**: The Team visited 57 winter and spring shelters using the GPS coordinates provided by the *aimag* and *soum* land specialists. The Team interviewed 22 households using the criteria: (i) officially registered herder households within a 6 km buffer zone of the transmission line route; and (ii) households living at the time of the survey within this buffer zone. The HHS covered a diverse range of topics, including information about land uses and seasonality, income and expenditure, livestock and other assets. The questionnaire also contained questions about household composition, livelihood sources, local informal land tenure practices, social organisation, women's status, youth issues, community health and safety, cultural heritage sites of local value and views on potential impacts of the Project on their household and the wider community.

Following the update to the route alignment at KM 7 to 35 and KM 100 to KM 120, a walkover survey was undertaken including a survey of any structures within a 3 km boundary either side of the new centreline.

7.2. Social Structures

7.2.1. Sources of Data

The ESIA social field team conducted secondary data and field research including consultation with local stakeholders.

7.2.2. Baseline

Mongolia is a parliamentary republic, in which representatives of the State Great Khural (Parliament) are elected by direct universal suffrage for a duration of four terms. There are 76 seats in the State Great Khural,

and presidential elections take place every four years. The Fourth Constitution of Mongolia was adopted in 1992, which restructured the legislative branch of the government by creating a unicameral parliamentary legislature. The Constitution provides authority to key state executive, legislative, and judicial bodies, and defines their respective character, composition, and powers.

The primary administrative division in Mongolia is the *aimag*, or province, which are further divided in *soums* (districts). The third and lowest level of administration in Mongolia is the *bagh*, or sub-district.

Principles of self-governance and central government authority underline the governance of administrative and territorial units in Mongolia. The self-governing bodies at the *aimag* and *soum* levels are called Citizens Representative Khurals (CRK), or *hurals*. At the *bagh* level, the self-governing body is Bagh General Meeting. *Hurals* are elected for a term of four years. The competencies of *soum* and *aimag* CRKs include "the right to discuss and make a decision on any economic, social and organisational matters other than those matters legally defined within the powers of the President, State Great Khural, Government, ministry and agency, CRKs of higher level and other competent State authorities and officials".[62]

At the *aimag* level, Government institutions mirror those at the national level. The central body at all levels of local government is the Governor. The Governors are the representatives of the State and directly report to their respective higher-level Governors. The Governor of the *aimag* and city is nominated by the respective *hural* and appointed by the Prime Minister.

The typical *Aimag* Governor's Office consists of the following departments: Public Administration Management Department; Legal Department (and archives); Investment; Development Policy and Planning Department; Social Policy Department; Finance and Treasury Department; Monitoring; Evaluation and Internal Audit Department; Veterinary Department; and Military Section.[63]

Depending on local characteristics, size of territory, population, and economic and industrial development scale in *aimags*, *Aimag* Governor's offices may have more staff. As for the *aimags* in the Project Area, Dornogovi *aimag* Governor's Office may have up to 37 employees, and the Governor's Office in Govi-Sumber *aimag* may have up to 29 employees. In addition, there are numerous agencies under the Aimag Governor such as those responsible for environment, customs, land, professional inspection, local property management, financial control and audit, standardization, statistics, tax, registration, labour and social welfare, food and agriculture, police, health services, insurance, veterinary service, court decision enforcement, forensic service, education, sport and culture, family, children and youth issues.

The second administrative division is the *soum*, or district. Most *soum*-level funding is delegated from the national government. *Soum* Governor's Offices are limited to a maximum of 13-23 people, based on the number of *soum* population and is approved by the *Aimag* Governor. *Soum* Governor's office typically consists of Governor; Vice Governor; Head of Governor's Office; Social development officer (employment, social welfare policy); Agriculture and Environmental Officer, ranger; Social care officer (poverty reduction, and social care); finance officer, treasury specialist, land officer, legal specialist, and Operations Officer.[64]

The third and lowest level of administration in Mongolia is the *bagh*, or sub-district. This level consists of a bagh Governor, a Civic Registration Officer and Section Leaders. The Governor's responsibilities are provided for in legislation. Each *bagh* has its own budget, which is regulated by law, however in actuality, the soum Governor's Office manages the budgets. The baghs have discretion only over maintenance costs, pensions and honorary prizes for exemplary best workers, citizens and taxpayers.

7.3. Demography and Population Dynamics

7.3.1. Sources of Data

Data have been collected from *aimag* statistical pocketbooks, statistics sources and liaison with *aimag* Governors, as well as the HHS.

[62] Responsibilities of Citizens' Representatives Khural. Available at: http://www.khural.mn/en-us/n/8xyy. Accessed March 2020.
[63] Available at: https://www.legalinfo.mn/law/details/12089; https://www.legalinfo.mn/law/details/13635?lawid=13635. Accessed March 2020.
[64] ibid.

7.3.2. Baseline

7.3.2.1. Demography

The broad geographic features and population density of the *aimags* and *soums* in the Project Area are summarised in Table 7-1.

Table 7-1. Size and population density of Dornogovi and Govi-Sumber *aimags* and *soums*, 2018

Aimag/Soums	Number of baghs	Size (km^2) (thousand km^2)	Population density (Number of persons per $km^{2)}$
Total, Govi-Sumber aimag	***10***	***5.5***	***3.2***
Sumber soum	6	3.8	3.4
Shiveegovi soum	2	0.86	4.1
Total, Dornogovi aimag	***64***	***109.4***	***0.6***
Airag soum	4	7.4	0.5
Altanshiree soum	4	7.2	0.2
Dalanjargalan soum	5	4.1	0.7
Saikhandulaan soum	4	9.5	0.1
Sainshand soum	8	2.3	10.7

Source: Dornogovi aimag statistical pocketbook, 2018. Dornogovi aimag Statistics Department.[65]

Govi-Sumber *aimag*

General population statistics in Govi-Sumber *aimag* are presented in Table 7-2. In 2019, the total registered population of Govi-Sumber *aimag* was 17,445, of which 98,792 (50.4%) were men and 8,653 (49.6%) were women. Thirty-five percent of the total population were children aged 0-14, 59.2% were people aged 15-59, and 6.3% were people aged 60 and over. Nearly 5,000 (4,979) households were counted in the same year, a decrease by 7.5% compared to the previous year. Of the total households in the *aimag*, 2,948 or 59.2% live in Choir, the *aimag* centre.

Table 7-2. Key parameters of Govi-Sumber *aimag* and *soums* (2019)

Selected Parameters	Govi-Sumber *aimag*, total		Sumber soum		Shiveegovi soum	
Population, total (registered population)	**17,445**		**12,704**		**3,612**	
Male/female	**8,792**	**8,653**	**6,358**	**6,346**	**1,862**	**1,750**
Number of households	4,979		3,634		1,007	
Households with herd[66]	1,022		723		143	
Herder households[67]	699		525		85	

Source: Govi-Sumber Aimag Statistics Office. Introduction to Govi-Sumber Aimag's population and households, as the end of 2019.

Population data at the *bagh* level is presented in the Table 7-3. At the end of 2019, 12,704 or 72.8% of the total population lived in Sumber *soum* and 3,612 or 20.7% in Shiveegovi *soum*.

Table 7-3. Population in the Project Area, by *soums* and *baghs* in Govi-Sumber *aimag* (2019)

	Population	Households	Herder households	Number of herders
Sumber soum	12,704	3,634	525	837
Bagh I	2,918	759	4	7

[65] Available on-line:http://www.dornogovi.nso.mn/index.php. Accessed on 2 April 2020.
[66] A household raising livestock as an additional livelihood source.
[67] A family herding livestock through the year and for which livestock products and benefits become livelihood sources. Mongolian National Statistical Office (2013).

	Population	Households	Herder households	Number of herders
Bagh II	3,300	1,003	19	24
Bagh III	4,209	1,186	8	15
Bagh IV	817	243	152	240
Bagh V	744	225	148	239
Bagh VI	716	218	194	312
Shiveegovi soum	3,612	1,007	85	122
Bagh I	2,546	687	6	8
Bagh II	1,066	320	79	114

Source: Govi-Sumber Aimag socio-economic parameters 2019. Govi-Sumber Aimag Statistics Office.
*Note: * baghs in the AoI*

Dornogovi *aimag*

At the end of 2019, Dornogovi *aimag* had 71,000 people registered in the population and household database. The split was roughly 50:50 men to women. Sixty four percent of the total population lived in the *aimag* centre, 13.3% in *soum* centres and 22.6% in rural areas (Table 7-4).

Table 7-4. Key parameters of Dornogovi *aimag* and *soums* (2019)

Selected Parameters	Dornogovi aimag, total		Sainshand soum		Airag soum		Altanshiree soum		Dalanjargalan soum		Saikhandulaan soum	
Population, total (registered)	**71,014**		**26,048**		**3,649**		**1,325**		**2,855**		**1,381**	
Male/female	35,578	35436	12,539	13,509	1,854	1,795	701	624	1,488	1,367	755	626
Number of households	20,062		7,260		443		363		676		345	

Source: Dornogovi aimag Statistical yearbook 2019.

Herders in the Project Area

As of 2019, the Project seven *soums* accommodated 3,381 herders; 2,249 households with livestock and 2,170 herder households. The number of herders in Sumber, Shiveegovi, Altanshiree, Dalanjargalan and Saikhandulaan *soums* has decreased by 3% to 5% in the past three years, as shown in Figure 7-1.

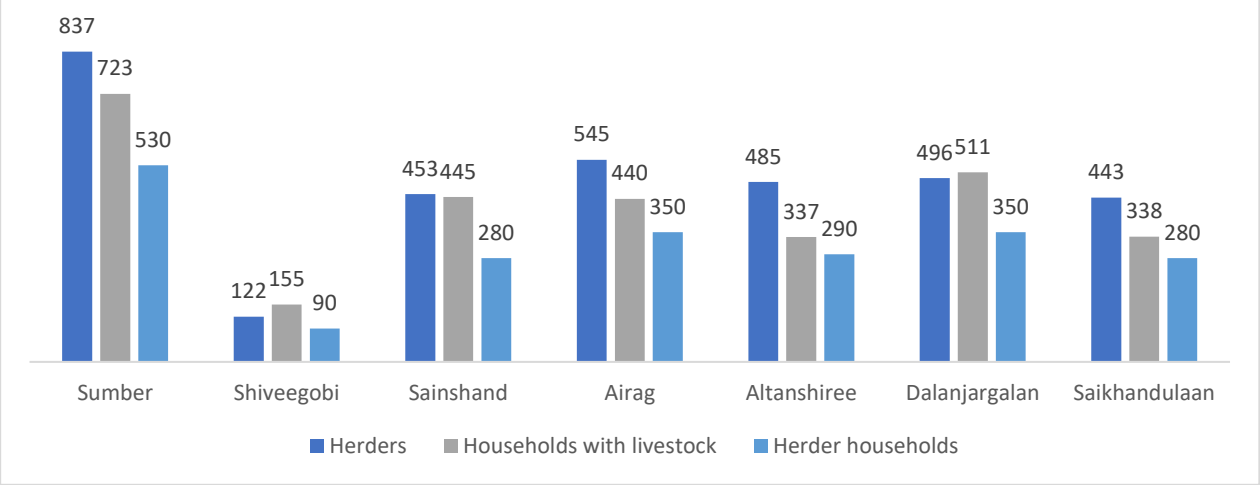


Figure 7-1. Herders and herder's households, by soum and number
Source: National Statistical Office (NSO), 2019[68]

[68] NSO. 2019. Householder indicators – Number of herdsmen. 1212.mn. *Note that any discrepancies in numbers with Table 7-1 are due to the different data collection methods of the NSO and the aimag statistical offices.*

7.3.2.2. Population Dynamics

National level

The first nationwide study of migration in Mongolia conducted by the National University of Mongolia with the support by the International Organisation for Migration (IOM) and the Swiss Agency for Development and Cooperation (SDC)[69] reveals that most of the country's internal migrants over the past 30 years have moved from rural areas to the capital, Ulaanbaatar, causing intensive urbanization and de-population of the countryside. Nearly half of the country's population (47%) are now living in the capital, up from a little over a quarter (26.8%) in 1989. Between 2010 and 2016 approximately 126,143 people arrived in Ulaanbaatar, bringing the total population to 1.4 million. Economic considerations, educational opportunities, better health services, reunification with the family and the desire for improved living conditions are the main motivating factors for migrant households to move from their communities of origin. According to the National Statistics Office (NSO), in 2018 for the country as a whole, 23% of out-migrants left their native aimags for better living conditions and opportunities, 7% for employment, while 68% did not specify the reason.

Govi-Sumber and Dornogovi *aimags*

Trend data for in- and out-migration are available for Govi-Sumber and Dornogovi *aimags*, as shown in Tables 7-5 and 7-6. In Govi-Sumber *aimag*, during the last few years, 67.6% of out-migrants from the aimag moved to Ulaanbaatar. Most in-migrants come from Ulaanbaatar and neighbouring *aimags*; Dundgovi *aimag* in particular. Most in-migrants are men, which indicates that the mining, transportation and construction sectors are being developed in the *aimag*.[70]

According to Dornogovi *Aimag* Statistics Office, in recent years 49.7% of total out-migrants moved to Ulaanbaatar, which follow the general rural to city migration pattern. In 2019, 1,621 people migrated to Dornogovi *aimag*, while 1,252 people migrated out. 47.5% of out-migrants went to Ulaanbaatar, 9.5% to Umnugovi *aimag*, 6.2% to Darkhan-Uul *aimag*, and 5.8% to Selenge *aimag*. Conversely, 34.7% of in-migrants came from Ulaanbaatar city, 7.6% from Khentii *aimag*, 7.5% from Selenge *aimag*, 5.5% from Umnugovi *aimag*, and 5.3% from Sukhbaatar *aimag*.

Table 7-5. Out-migration, 2009-2018.

Aimag	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Govi-Sumber	600	720	584	440	714	748	677	687	489	547
Dornogovi	1,529	1,523	1,328	1,071	1,554	1,590	1,912	1,547	1,224	1,688

Source: Mongolia's population. NSO, 2018.

Table 7-6. In-migration, 2009-2018

Aimag	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Govi-Sumber	719	936	829	525	816	748	799	745	639	553
Dornogovi	1,458	1,777	1,583	834	1,673	1,516	1,505	1,607	1,888	1,732

Source: Mongolia's population. NSO, 2018.

7.4. Ethnicity and Religion

7.4.1. Sources of Data

Data have been collected from statistical sources and liaison with *aimag* Governors.

[69] Mongolia: Internal migration study. 2018.
[70] Summary of Population and Housing Census 2020 in Govi-Sumber *aimag*. Govi-Sumber Aimag Statistics Office.

7.4.2. Baseline

7.4.2.1. Ethnicity and National Minorities

National level

Ethnic Mongols account for almost 97% of the population. They are distinguished by dialects of the Mongolian language. The Khalkhs make up 86% of the ethnic Mongol population. The remaining 14% include Oirats, Buryats and other smaller nationalities. Ethnic distinctions among the Mongol subgroups are relatively minor. Language or tribal differences are not a political or social issue.

Significant ethnic Turkic speaking Kazakhs constitute 3.9% of Mongolia's population. The Khotons and Chantuu are people originating from Turkey who have become assimilated into Mongolian culture over time. Their first language is Mongolian.

Govi-Sumber and Dornogovi *aimags*

In the Project *aimags*, 95.3% of resident population of Govi-Sumber *aimag* are Khalkhs, followed by Bayads (1.4%), Dörvöd (Dörbed) (1.2%), Kazakhs (0.4%), Dariganga and Buryats (0.3%).[71] 96.5% of the registered population in Dornogovi *aimag* are Khalkhs, followed by Dariganga (1.4%). Other smaller nationalities account for less than 1% each.[72]

7.4.2.2. Religion

National level

Most Mongolians, around 94% of the population, practise Tibetan Buddhism. The Gelugpa, or "Yellow Hat," school of Tibetan Buddhism gained prominence in Mongolia during the 16th century. Six percent of the Mongolian population are Sunni Muslim, mainly members of Turkic minorities. Two percent of Mongolians are Shamanist, following the traditional belief system of the region.

Govi-Sumber and Dornogovi *aimags*

The 2020 Census results show that 90.3% of the population in Govi-Sumber *aimag* are Buddhists, 6.7% are Shamans, 2.0% are Christians, 0.4% are Muslims, and 0.6% practise other religions. Among religious people, women outnumber men by 57.0%, and 89.3% of religious women are Buddhists, 6.6% are shamanic, and 3.3% are Christians.

In Dornogovi *aimag*, half of the population over age of 15 is religious. Buddhists account for 89.1% of the population who practice a religion, 6% are Shamanist, 2.2% are Christians, while 2.8% practice other religions.

7.5. Vulnerable Groups

7.5.1. Sources of Data

Data have been collected from the KIIs at the *aimag* and *soum* levels in the Project Area. The EBRD ESP definition of vulnerable was reviewed to identify vulnerable people or groups in the Project Area, whereby 'vulnerable groups' refers to

> "*people who, by virtue of gender identity, sexual orientation, religion, ethnicity, indigenous status, age, disability, economic disadvantage or social status may be more adversely affected by project impacts than others and who may be limited in their ability to claim or take advantage of project benefits. Vulnerable individuals and/or groups may also include, but not be limited to, people living below the poverty line, the landless, the elderly, women and children-headed households, refugees, internally displaced people, ethnic minorities, natural resource dependent communities or other displaced persons who may not be protected through national legislation and/or international law.*"

During the social baseline surveys, vulnerable groups and vulnerability criteria was also discussed with the local authorities. The results of these interviews with local authorities indicated vulnerability criteria used locally to define vulnerable groups relate to age, economic disadvantage, disability, single headed households with four and more children under the age of 18, as prescribed by the Mongolian Law on Social Welfare, 2012.

[71] Summary of Population and Housing Census 2020 in Govi-Sumber *Aimag*. Govi-Sumber Aimag Statistics Office.
[72] Summary of Population and Housing Census 2020 in Dornogovi *Aimag*. Dornogovi Aimag Statistics Office.

Vulnerable groups in the Project Area are therefore defined as people with disabilities (PWD), single headed households and households with economically inactive persons.

Herders as a group are not considered vulnerable in the context of the Project Area (see later information in incomes and earnings).

7.5.2. Baseline

Govi-Sumber *aimag*

As of 2019, there were 742 PWD in Govi-Sumber *aimag* (531 in Sumber *soum*; and 157 in Shiveegovi *soum*), which is 4% of the total resident population; out of which 404 (55.4%) are men and 303 (44.6%) are women. There are 568 single headed households in the two *soums*, 487 in Sumber *soum*, and 81 in Shiveegovi *soum*. Out of a total of 602 single headed households registered in the *aimag* at the end of 2019 (98 male single headed households and 504 female single headed households), 568 households live in the two Project *soums,* namely 487 in Sumber *soum*, and 81 in Shiveegovi *soum* (the remainder in other *soums* in the *aimag*).

Dornogovi *aimag*

As of 2019, there are 2,642 PWD in Dornogovi *aimag*, which is 3.7% of the total population; of which 1,061 (40.2%) are women. Out of total number of PWD, 209 were in Airag *soum*, 65 in Altanshiree *soum*, 86 in Dalanjargalan *soum*, 59 in Saikhandulaan *soum*, and 989 in Sainshand *soum*[73].

A total of 2,050 single headed households live in the aimag, of which 1,741 households are female-headed households. In addition there are 1,017 elderlies who live in single-headed household. Out of total 2,050 single headed households 255 HHs (of which 203 are female-headed households) live in Airag *soum*, 43 (of which 33 are female-headed households) in Altanshiree *soum*, 81 (of which 67 are female-headed households) in Dalanjargalan *soum,* 25 (of which 21 are female-headed households) in Saikhandulaan *soum,* and 855 (of which 775 are female-headed households) in Sainshand *soum.*

Household survey

Of the 22 herder households interviewed, 20 households consider themselves to be local to the area. On average, 11 (50%) households have been living on the land within the OHTL RoW and buffer zone for over 21 years, eight households (36.4%) have been living there between 10 and 20 years, and three (13.6%) households have been living there less than 10 years. Out of surveyed households, the majority of households (72.7%) had a husband and wife and the remaining six households (27.3%) are single parent families.

Seven households (31.8%) have one or more economically inactive family members. One household has a disabled family member and another household has two adult family members in need of care. Nine households (40.9%) have children who are aged 5 and under, and 13 households (59.1%) have school-aged children (6 to18 years old). All but one of the school-aged children attend school. One child had dropped out of school, which the parent explained was because of a “private household issues”. The highest level of education completed by the household heads is secondary education (40.9%); this is followed by primary education (31.8%), and vocational / middle education (27.3%). All but one of the household heads generated income by herding livestock in the past month (21 households or 95.5%).

7.6. Landscape, Tenure and Use

7.6.1. Source of Data

The baseline conditions for landscape and land uses had been sourced from published secondary data, such as the Agency of Land Affairs database, Environmental Information Centre databases, the LandWise for Resource Equity database, the Government of Mongolia portal and published reports and book chapters. Primary qualitative and quantitative data collected during the field visits provided contextual information on land use in the Project Area.

[73] Dornogovi *aimag* Socio-economic profile. Dornogovi *aimag* Statistics Department, December 2019.

7.6.2. Baseline

7.6.2.1. Landscape

Based on the Worldwide Fund for Nature (WWF) typology, Mongolia can be divided into “key ecoregions” (Figure 7-2). Ecoregions are defined as large units of land or water containing a geographically distinct assemblage of species, natural communities, and environmental conditions.[74] Each ecoregion is characterised by distinct landscape characteristics.

The Project is located within the following two ecoregions.

- **Mongolian-Manchurian grassland**: an ecoregion that covers the central and eastern part of Mongolia and consists of low mountains, hills and plains with heights averaging 1200 m above sea level.
- **Eastern Govi desert steppe**: a steppe that covers most of southern Mongolia. This area of govi and desert covers an area of low hills, plains and lowlands.

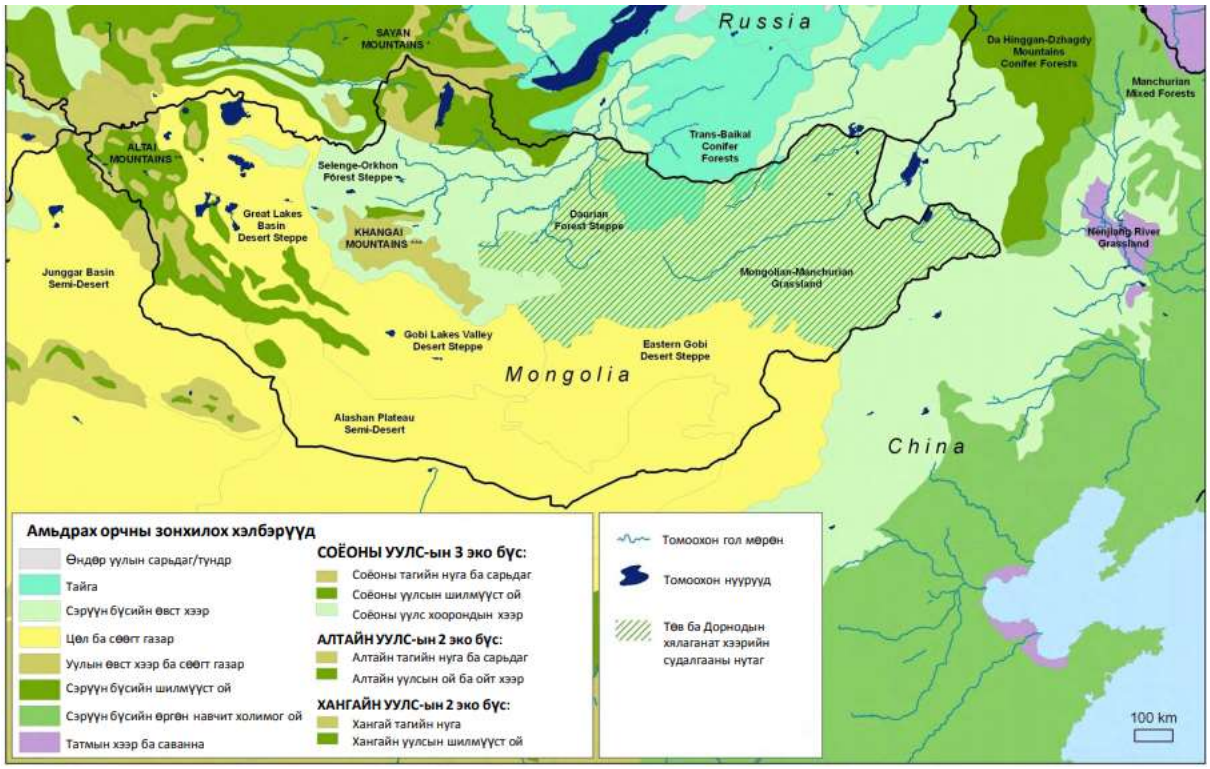


Figure 7-2. Mongolian ecoregions

Source: The Nature Conservancy[75]

7.6.2.2. Land Tenure

Background

Land tenure status in Mongolia is set out in Chapter 4. In summary, there are three categories of land tenure in Mongolia, as set out in the Law on Land (2003, amended 2019):

- **Land ownership.** Ownership rights are limited to Mongolian citizens and include the right to manage and sell the land. As of November 2004, forestland, pastureland, water basins, and special needs/protected areas could not be owned. Mongolian citizens can own plots of land for family residential and/or commercial purposes, and privatisation of cropland is expected in the near future.

[74] Available at: www.worldwildlife.org/biomes. Accessed June 2020.
[75] The Nature Conservancy. Available at: https://www.nature.org/media/conservationlands/e-mongolia-grasslands-era-mon.pdf. Accessed June 2020.

- **Land possession.** Certificates for possession of land are granted to Mongolian citizens for periods of 15–60 years with an option to renew for up to 40 years. In practice it has become commonplace to grant possession for 15 years.[76] The right of possession includes the right to manage the land. A right of possession can be transferred by inheritance or by consent of the legal body that originally granted the possession rights but cannot be sold.
- **Land use.** A right of land use provides for the right to make use of a particular land feature, with no right to alienate the land. Land-use contracts are granted for terms of five years with one extension. Foreign entities can obtain use-rights but cannot use the land for agriculture or livestock.

Unless otherwise provided by the law, the following categories of land are used for common purpose under relevant government agency control and regulation, regardless of possession or use:

- Pasture lands, water points in pasturelands, wells and salt licks;
- Pubic tenure lands in cities, villages and other settlements;
- Land under roads and networks;
- Lands with forest resources; and
- Lands with water resources.

The state recognises customary law with respect to use rights to pastureland. Currently herders are able to maintain their nomadic lifestyle with few movement restrictions. This may change however if large scale commercial developments continue to take place in the pastureland areas or if the current restrictions are enforced. In the Project Area, for instance, only registered herders meeting certain criteria (e.g. usually prior long-term use of the land) are allowed to use the pastureland in mining concession areas; and only registered herders have the legal right to reside in the winter camps. In practice, however unregistered herders reside in winter camps and allow their livestock to graze the land in the mining concession areas.

In general, the pastureland is state land and therefore public, not private property. Article 7 of the 2002 Law on Allocation to Mongolian Citizens of Land Ownership privatised, free of charge, small plots of land (up to 0.35 ha in *aimag*, *soum* and village centres). Article 6 however limited privatisation to non-common use areas, therefore excluding pasturelands and by extension, herders.

All herders have the right to use the pastureland except in areas which are designated for purposes other than agriculture (including herding) and areas where a possession certificate is required. Possession certificates are only issued for winter camps. As mentioned above, land possession can be as long as 60 years or as short as 15 years, and land that is possessed can be transferred or inherited. The only land eligible for possession in the pastureland areas is a small plot for the *ger* and shelters for the animals. This area is what is referred to as the "winter camp". None of the surrounding pastureland, sometimes referred to as "winter pasture" is possessed or owned; it can only be used. As explained below, "winter pasture" is a misnomer as it can be used by any one herder at any time of the year.

Herders own the structures and assets within the land area of a winter camp. These structures include g*ers*, animal shelters, wells, storage sheds for animal feed, fences, garden produce and crops. Generally, when departing the winter camp, the only structures herder households leave behind are those too heavy or difficult to carry (usually, animal shelters, storage sheds, fences, wells). These can be considered "permanent structures". The *ger* is a mobile structure, as it was designed by herders to accommodate the nomadic lifestyle. It is light weight and can be assembled and disassembled. When herders move from place to place, they take their *gers* with them. The *ger* is therefore a temporary structure in the winter camp. Regardless of the length of time a herder-household has resided in the winter camp – 5 years or 5 decades - family members live in a temporary housing structure. For this reason, permanent structures, such as winter shelters and bore holes (and not the typical *ger*) are most commonly the only visible forms of evidence that an area of land was used. Figure 7-3 shows typical *ger* structures.

[76] World Bank. 2015. p. 22.

Figure 7-3. Ger structures

In the foreground a newly erected ger; in the background, the wooden frame of a ger in the process of being assembled. A wooden structure is first covered in a thin cotton covering, then a thick felt layer, and finally a waterproof canvas layer.

In relation to the ownership of wells, according to the Law on Water (2012), citizens and business entities have the right to use water in accordance with the legislation on the basis of water use permits and agreements of specific purpose and conditions. There are two classifications depending on the purpose of water use and consumption: the water user[77] and the water consumer[78]. As indicated in the law, if water consumers (households) wish to obtain permission to consume water from a well, they need to submit a request to the *aimag* Environment Department containing information on the purpose and quantity of the water to be used, a copy of the land certificate (ownership, possession or use), and details of the well. The *aimag* Environment Department then registers the water consumer wells in a water database and issues a "well passport". According to the law, the right to possess and use water facilities and wells is granted for a period up to five years.

Herder tenure in the Project AoI

Two categories of herder households reside in the winter camp: herder households that are registered with the authorities and possessing the camp certificate and other herder households. It is incorrect to assume that the longer a household has resided in the winter camp, the more likely it has obtained the legal right to possess the land parcel they and their animals occupy in the camp. One of the 22 households residing in the winter camp in the 6 km buffer zone, for instance, reported that although they have returned to the same winter camp for 60 years, they have not registered their land parcel, while another household who has returned to the camp for 11 years have registered their parcel.

It is generally uncommon for herder households to live at the same location in the pastureland area year-round. This holds true for herder households who possess camp certificates. Typically, herder movements are dictated by weather conditions and the quality of the pastureland for their animals. Starting in October, herders and their livestock begin moving to winter camps where they remain for the winter. When the weather gets warmer (anytime between March and May), herders leave the winter camp though some stay the entire spring in the winter camp. Outside the winter period, the herders and their livestock move every 5 to 7 days in search of good pasture, and intermittently return to the winter camp to store hay and other animal feed for the approaching winter.

During summer and autumn, when pastures grow, herders transfer their *gers* to more favourable grazing locations than those in the winter and spring pastures. While herders frequently return to similar areas for summer grazing, ultimately, the decision where to settle depends on the weather and grazing conditions. The most important parameters for choosing the summer camp are rangeland yields and water points. In order to

[77] "Water user" means a citizen, business entity or organization that uses water, aquatic environment and mineral water for production and services for profit (Article of 3.1.27, Law on Water, 2012)

[78] "Water consumer" means a consumer who uses water and aquatic environment for drinking, household and family needs, animal husbandry and agriculture without the purpose of making a profit (Article of 3.1.28, Law on Water, 2012)

protect winter camp sites, it is commonly accepted that a summer camp and pasture should not encroach on a winter camp / pasture area.

Some of the herders interviewed for this Project have a possession certificate however ultimately, the Government has eminent domain over pastureland, including winter camps, and in theory is able to acquire any land needed for the Project, on a temporary or permanent basis. EBRD PR 5 in contrast entitles land users to compensation regardless of their legal status. Further details are set out in the LARF in relation to land tenure and Project requirements.

7.6.2.3. Land Use Overview

The proposed OHTL route will start at an existing substation in Choir city, Govi-Sumber *aimag* and finishes at a new substation in Sainshand city, Dornogovi *aimag*. It passes through seven *soums*, namely Sumber and Shiveegovi *soums* in Govi-Sumber *aimag and* Dalanjargalan, Airag, Saikhandulaan, Altanshiree and Sainshand *soum*s in Dornogovi *aimag.* The relevant *baghs* are as follows:

- Choir Substation and Transmission line – Govi-Sumber *aimag*, Sumber *soum*, *Bagh* VI
- Transmission line – Govi-Sumber *aimag*, Shiveegovi *soum*, *Bagh* II
- Transmission line – Dornogovi *aimag*, Dalanjargalan *soum*, *Bagh* V
- Transmission line - Dornogovi *aimag*, Airag *soum*, *Bagh*s I and III
- Transmission line - Dornogovi *aimag*, Saikhandulaan *soum*, *Bagh* III
- Transmission line - Dornogovi *aimag*, Altanshiree *soum*, *Bagh* III
- Sainshand Substation and Transmission line - Dornogovi *aimag*, Sainshand *soum*, *Bagh* IV

These *aimags* and *soums*, and their distance from the OHTL route, are shown in Figure 7-4. The closest *soum* centre (village) to the route is Shiveegovi, at 10 km from the OHTL centreline and therefore all *soum* centres, with the exception of Sumber (Choir) and Sainshand, are outside the Project AoI i.e. up to 3 km from the centreline of the OHTL.

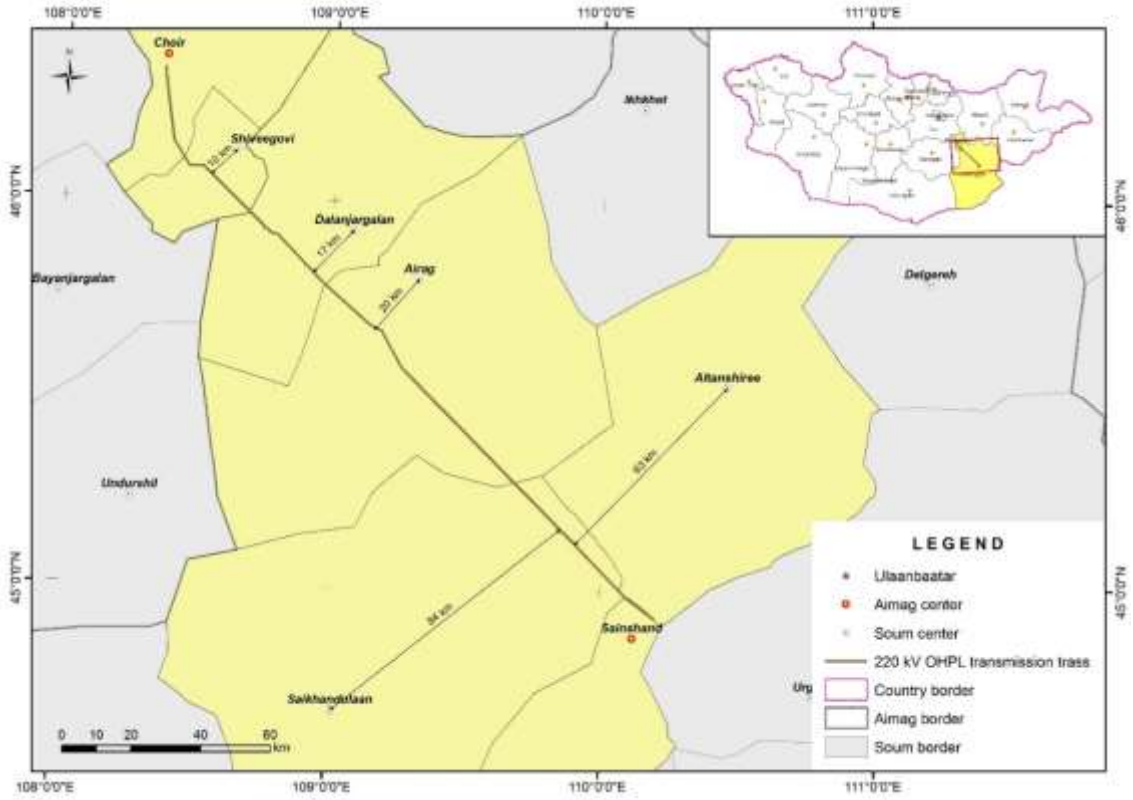


Figure 7-4. Administrative boundaries in the Project Area

The Choir-Sainshand road (Asian Highway 3) connects the cities of Choir and Sainshand. The Trans-Mongolian Railway, which connects the Trans-Siberian Railway from Ulan-Ude in Russia to Ereenhot and

Beijing in China through the capital Ulaanbaatar, also runs between Choir and Sainshand. There are several spur lines, including a line to Zuun-Bayan, a *bagh* in Sainshand *soum* in Dornogovi *aimag*. A 27 km industrial purpose railway line connects Sainshand with Altanshiree *soum*, Dornogovi *aimag*, to allow development of the Mongolian oil refinery under construction in Altanshiree *soum*.

The land use in each Project *soum* is summarised in Table 7-7. With the exception of the two cities, Choir and Sainshand, land use is dominated by agriculture and pasturelands. In general, the OHTL route is sparsely populated and has vegetation characteristics of the Gobi Desert. Land use in the Project Area is homogeneous in these rural areas, differing in the residential areas due to proximity of main auto and railroads and the ongoing mining and industrial development.

Table 7-7. Land use in the Project *soums*

Land use	Sainshand	Saikhandulaan	Altanshiree	Airag	Dalanjargalan	Shiveegovi	Sumber
Pastureland	-	✓	✓	✓	✓	✓	✓
Winter shelter	-	✓	-	✓	✓	✓	✓
Mining site	-	-	-	✓	✓	✓	✓
Industry/factory	-	-	-	-	✓	-	✓
Auto road	✓	-	✓	✓	✓	✓	✓
Farmland	-	-	-	-	-	✓	✓
Protected areas	-	-	-	-	-	-	✓

Source: Agency of Land Affairs, Geodesy and Cartography. www.gazar.gov.mn

The substations represent the more urban locations of the Project Area, although technically rural in the administrative classifications. Land use at the substation sites and within the 25 m RoW radius (as defined in the legislation) is shown in Figure 7-5. As can be seen, there is no infrastructure (e.g. commercial or residential buildings) within the 25 m radius RoW.

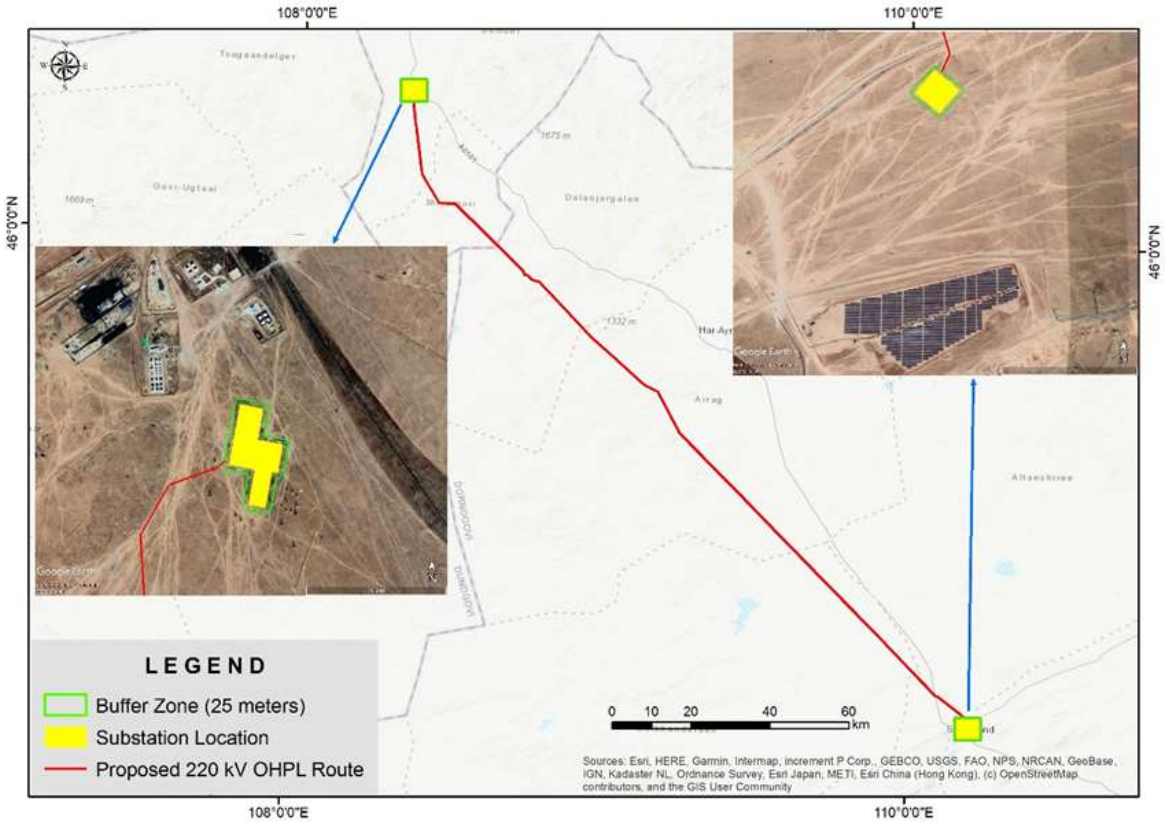


Figure 7-5. Substations and their 25 m RoW

There are also no residential structures within the 6 m RoW at the departure and arrival points of the OHTL with the substations. When approaching the new Sainshand substation the OHTL crosses a planned paved road, the railway line, and the existing electricity line that connects the oil production plant with Sainshand city (Figure 7-6). The nearest residential structures identified during the June fieldwork was one *ger* inside the PV power plant fence, 2 km to the southwest of the Project site; there was also a small grouping of *gers* to the west of the main Highway, about 2.3 km southwest of the Sainshand substation site. These were all summer camps and therefore temporary.

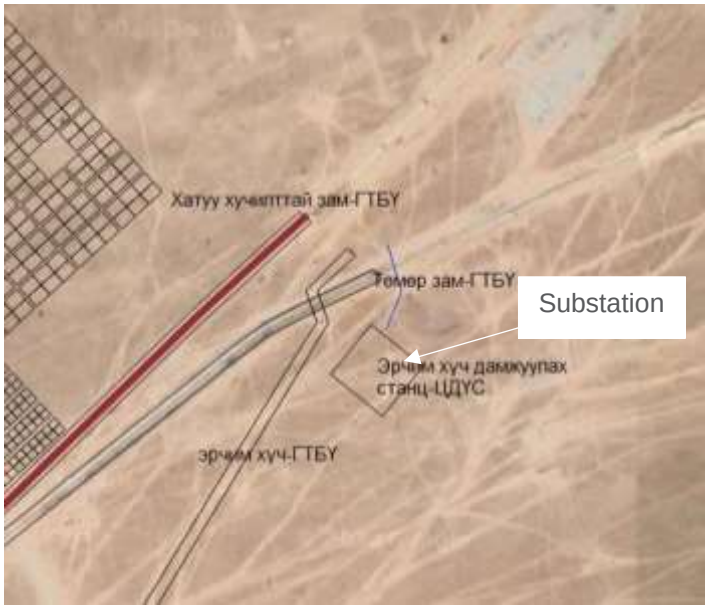


Figure 7-6. Intersection of the OHTL with the planned paved road, railway and electricity line at Sainshand substation

Along the OHTL route in the rural areas, the OHTL and its 25 m RoW passes through pastureland and eight mining concession areas, as discussed in more detail further below. At 3.6 km west of the OHTL route there are several farms situated near Lake Khayalga in Shiveegovi *soum* in Govi-Sumber *aimag*. They have been scoped out of the study because, as crops, their location is too far to be impacted by the Project.

There are no inhabitants from the *soums* in the Project AoI (a 6 km buffer zone around the OHTL route) except a community of herder households linearly dispersed along the OHTL route. There were 22 *ger* households present in the Project AoI at the time of the second field mission (8 to 12 June 2020). Their locations are given in Table 7-8. They are presented in vertical order of the route shown in Figure 7-4, starting with Sumber and Shiveegovi *soums*.

No herder households were identified as living in Altanshiree *soum*. At the time of the ESIA surveys in 2020, no permanent winter camp structures (or any other structures, temporary or permanent) were recorded within the RoW of the OHTL (i.e. 25 m either side of the OHTL centreline). The closest winter camp was 45 m from the RoW.

Given the mobility patterns of herders, it will be important for the Project to ensure that no permanent structures, such as shelters and sheds are built in the buffer zone between now and the cut-off date.

Table 7-8. Herder-households interviewed in the Project AoI during the 2020 surveys

Project Element	*Aimag* / *Soum*	Households present during the Social Survey fieldwork	Distance from RoW	X coordinate	Y coordinate
Transmission line – 23.76 km	Govi-Sumber *aimag* – Sumber *soum*	1 household	2.5 km	46°18'11.06″N	108°23′36.01″E
Transmission line – 26.43 km	Govi-Sumber *aimag* – Shiveegovi *soum*	2 households in Bagh II	0.2 km	45°59'43.52″N	108°38′13.14″E

Project Element	*Aimag / Soum*	Households present during the Social Survey fieldwork	Distance from RoW	X coordinate	Y coordinate
			0.6 km	45°59'43.52″N 46°01'19.66″N	108°38′13.14″E 108°35′20.75″E
Transmission line – 30.61 km	Dornogovi *aimag* – Dalanjargalan *soum*	5 households in Bagh III	1.1 km 0.7 km 2.6 km	45°48'17.7″N 45°49'34.52″N 45°51'33.97″N 45°52'59.61″N 45°55'38.43″N	108°55'10.3″E 108°53'44.7″E 108°53'52.16"E 108°52'27.89"E 108°48'42.08"E
Transmission line – 78.76 km	Dornogovi *aimag* – Airag *soum*	5 households in Bagh I 4 households in Bagh III	 1.7 km 4.3 km 1.7 km 2.1 km 2 km 1.6 km 18.9 km[79] 11.7 km[80] 3.1 km	Bagh I 45°45'45.55″N 45°47'15.39″N 45°45'45.28″N 45°41'00.99″N 45°32'54.64″N Bagh III 45°28′48.84″N 45°47'56.08″N 45°41'14.86″N 45°28′53.86″N	Bagh I 109°02′24.12″E 109°02′56.27″E 109°02′24.09″E 109°05′44.14″E 109°15′29.94″E Bagh III 109°21′54.86″E 109°18′58.25″E 109°19′25.67″E 109°20′09.96″E
Transmission line – 43.32 km	Dornogovi *aimag* – Saihandulaan *soum*	4 households in Bagh III	5.2 km 0.5 km 0.4 km 0.7 km	45°08'37.03″N 45°06′33.02″N 45°13′19.02″N 45°13′21.21″N	109°47′00.68″E 109°54′59.43″E 109°45′29.59″E 109°45′04″E
Transmission line – 13.16 km	Dornogovi *aimag* – Altanshiree *soum*	0 households			
Transmission line – 0.16km and substation	Dornogovi *aimag* – Sainshand *soum*	1 household in Bagh III	4.3 km	44°56′27.17″N	110°15′06.02″E
Total households present during field survey		22			
No. households registered with the local authorities		74			

The exact number of households who use the land within the 6 km buffer zone is unknown given that by definition, herders are nomadic and move to different locations throughout the year. A review of the maps held by the *aimag* authorities showed 74 herder households have winter camps recorded in the 6 km buffer zone (note, being recorded at the aimag level does not mean that the herder household necessarily has a possession certificate). These do not account for recorded camp users. In addition, during the field mission, the social fieldwork team counted 39 winter shelters in the vicinity. From this information, the estimated number of herder households potentially affected by the Project range from 39 to 74+ households. The upper range is currently not known and could exceed 74 households depending on the number of unregistered herder

[79] The household member was interviewed at the Airag *soum* center and not on site during the field survey.
[80] Same as above.

households using the winter camp, as such more precise numbers need to be established before construction works in line with the approach set out in the LARF.

At face value, the 22 households in the AoI at the time of the household survey do not appear to have different characteristics than those households who had since moved to spring pastures. The interviewers formed the opinion that the herders using the pasture in the AoI have similar viewpoints and values. This means that the ways of life described by the 22 household respondents in the HHSs may be similar to, even representative of, the lifestyle and work activities of households that had left their winter camps.

During the survey in May 2021 of the new route alignment two summer camps, and 22 winter quarters were identified within the 6 km buffer zone, with one 300 km from the new centreline. Two summer camps and 10 winter quarters were located in Sumber *soum and* 11 summer camps in Shiveegovi *soum*, both in Govisumber *aimag*. One winter camp was identified in Airag *soum* of Dornogovi *aimag.* Further details are provided in Table 7-9. The location of these sites on a map are shown in Figures 7-10 to 7-17.

Once the final optimised design is determined a detailed survey of all assets will be required and, where assets are within the Project footprint or imemdaitely adjacent it, a census and socio-economic survey of the affected persons will be required and will be reported in a RAP/LRP; further details of future survey requirements are set out in the Project LARF.

Table 7-9. Herder camps identified in the Project AoI during the May 2021 surveys

#	Summer camp, winter quarter	Soum	Owner	Longitude	Latitude	Distance, km
1	Summer camp	Sumber	No information	108° 21' 54.2"	46° 14' 35.6"	0.7
2	Winter quarter	Sumber		108° 21' 48.4"	46° 14' 27.1"	0.8
3	Winter quarter	Sumber		108° 21' 23.2"	46° 14' 32.4"	1.3
4	Winter quarter	Sumber		108° 22' 5.4"	46° 13' 27.1"	0.8
5	Summer camp	Sumber		108° 22' 18.2"	46° 12' 33.7"	0.7
6	Winter quarter	Sumber		108° 24' 5.8"	46° 10' 18.3"	0.9
7	Winter quarter	Sumber		108° 24' 4.7"	46° 9' 28.7"	0.6
8	Winter quarter	Sumber		108° 26' 13.8"	46° 6' 32.7"	0.4
9	Winter quarter	Sumber		108° 25' 41.9"	46° 8' 35.5"	1.9
10	Winter quarter	Sumber		108° 25' 46.8"	46° 8' 13.4"	1.6
11	Winter quarter	Sumber		108° 24' 9.9"	46° 6' 58.5"	1.4
12	Winter quarter	Sumber		108° 25' 4.4"	46° 6' 24.8"	1
13	Winter quarter	Shiveegovi		108° 25' 40.6"	46° 5' 41.8"	1.1
14	Winter quarter	Shiveegovi		108° 27' 0.7"	46° 5' 51.9"	0.6
15	**Winter quarter**	**Shiveegovi**		**108° 29' 41.6"**	**46° 4' 50.2"**	**0.3**
16	Winter quarter	Shiveegovi		108° 30' 15.5"	46° 4' 23.0"	0.9
17	Winter quarter	Shiveegovi		108° 25' 34.6"	46° 4' 45.9"	2.1
18	Winter quarter	Shiveegovi		108° 25' 35.2"	46° 4' 41.8"	2.1
19	Winter quarter	Shiveegovi		108° 25' 47.5"	46° 4' 5.8"	2.6
20	Winter quarter	Shiveegovi		108° 30' 26.1"	46° 6' 35.9"	3
21	Winter quarter	Shiveegovi		108° 31' 38.9"	46° 5' 41.3"	2.1
22	Winter quarter	Shiveegovi		108° 32' 33.5"	46° 2' 47.6"	1.1
23	Winter quarter	Shiveegovi		108° 31' 52.8"	46° 3' 4.7"	1.3
24	Winter quarter	Airag		109° 12' 23.5"	45° 39' 23.2"	1

In addition to the herder households, there are five mining license areas crossed by the OHTL RoW and two locally protected areas. These are discussed in more detail further below.

7.6.2.4. Land Use in Dornogovi and Govi-Sumber *aimags*

The growth of mining industry and population size in these *aimag*s have resulted in progressive changes of the land use patterns, and a gradual change in the occupational and livelihood patterns of people. Nevertheless, the land coverage in the Project Area in the rural areas remains mostly composed of gobi and arid steppe, with pastureland and occasional agricultural plots of a seasonal plantation.

Table 7-10 summarises land allocations in the seven *soums* of the Project Area published by the Environmental Information Centre. In the consultations with officials from the Agency of Land Affairs, Geodesy and Cartography, estimates for the entire land area described in Table 7-9 (2,802,257 ha) were provided. The officials estimate that 94.7% of the total land in the seven Project *soums* is allocated for agriculture, but used primarily for grazing, 2.5% is allocated for Special Needs Areas[81], and 1.5% are allocated for urban purposes. From these estimates it can be concluded that forested areas comprise 0.06% of the land and land for water reservoirs comprise 1.24% of total land in the seven *soums*.

Table 7-10. Land use by *soum*

Land use	Sumber	Shivee-gobi	Sain shand	Airag	Altan shiree	Dalan jargalan	Saikhan dulaan
Total land (ha)	376,819	85,755	234,280	744,258	722,000	404,589	955,834
Of which, allocated for (%):							
• **Agriculture**	98.7	96.0	80.4	94.8	99.9	93.9	99.2
• **Forested area**	0.0	0.0	0.7	0.0	0.0	0.0	0.0
• **Land for water reservoir**	0.2	0.9	0.7	0.1	0.0	0.2	0.4
• **Special needs area**	0.0	0.0	10.0	3.9	0.0	3.7	0.0
• **Urban area**	0.4	2.2	6.7	0.6	0.0	1.1	0.0
• **Land for roads, communications and other infrastructure**	0.7	0.9	1.5	0.6	0.1	1.2	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Environmental Information Centre

Agricultural Land Uses

As mentioned above, roughly 95% of land in the Project *soum*s is allocated for agriculture. However, due to limited water in this region, crop production and vegetable cultivation is marginal. Areas for cultivating hay are insignificant. According to the NSO, a total of 95 ha of land was cultivated in the seven Project *soum*s for potatoes, vegetables, and fodder crops in 2019.[82] This is only 0.003% of the total land area (2,802,257 ha). The proposed OHTL, its RoW and 6 km buffer zone will not pass through any cropland.

Table 7-11. Land allocation for agricultural purposes (by ha)

Components	Sumber	Shivee govi	Sain shand	Airag	Altan shiree	Dalan jargalan	Saikhan dulaan
Total agricultural land	Not available	Not available	184,435	701,861	686,259	338,594	941,631
Of which, allocated for:	Not available	Not available					
• **Pastureland**	Not available	Not available	120,391	691,238	681,565	337,945	940,950
• **Hay field**	Not available	Not available	0	0	0	0	0

[81] According to Article 3 of the Law on Special Protected Areas, Special Protected Areas shall be classified as: Strictly protected areas; National conservation parks; Nature reserves; and Monuments. *Aimags*, the capital city, *soums* and *baghs* may take certain areas within their territorial jurisdictions under special protection as "local protected areas".
[82] NSO. Available at: www.1212.mn. Accessed March 2020.

Components	Sumber	Shivee govi	Sain shand	Airag	Altan shiree	Dalan jargalan	Saikhan dulaan
• **Cropland**	Not available	Not available	147.16	41.70	20.00	30.00	0

Source: Agency of Land Affairs, Geodesy and Cartography. www.gazar.gov.mn

Herding practices and pastureland

Herders in the Project Area typically move at least twice a year, in spring (March – May depending on weather) and at the beginning of winter (October - November). More significant movements are sometimes necessary however in the search for better pastures and water resources. In general, herders in the Mongolian Gobi region face challenges of pasture degradation and access to water which influences their herding practices. Pasture degradation has been significantly affected by the increase in livestock numbers (and changes in herd structure) which results in overgrazing. An increase in the number of livestock, particularly goats, is commonly cited as a major contributing cause of pasture degradation in Mongolia (Whitten 2009; Sternberg 2010; Reeves 2011; Leisher et al. 2012). Also, the Mongolian Gobi region has abundant groundwater resources but poor surface water therefore the herders of this region tend to live in the vicinity of wells.

Herder households build winter camps and use them for holding animals during winter time. Due to the need for shelter from the wind, winter camps are often located at the base of hills where water is collected and it is possible to establish a shallow well.

Winter camps protect herders and their animals from life threatening weather conditions. For this reason, the winter camp is the pastureland area where herders can legally possess up to 0.35 ha of land. According to the Department of Land Management, Construction and Urban Development in Dornogovi and Govi-Sumber *aimags,* as of June 2020, only 20% of herders in the two *aimags* have legal possession of a winter camp (in the form of a Possession Certificate). While this indicates that only one-fifth of herders have possession certificates, demand for the certificates began to rise a few years ago from the necessity to shelter the growing number of livestock in the winter. Demand is likely to continue to rise as herds become larger and the supply of winter camp locations located within commuting distance from good quality pastureland diminishes.

Cropland and plantation

As identified earlier, there is a variety of land use patterns within both *aimag*s, such as pastureland and farm lands with limited species of plants, including potato, watermelons and sea buckthorn (see Tables 7-12 and 7-13). There are a few farms in the wider Project Area, concentrated around Lake Khayalga, which is located 3.6 km west of the OHTL route in Shiveegovi *soum* in Govi-Sumber *aimag*. A small number of these farm (non-herder) households grow sea buckthorn on small plots.

Table 7-12. Sown area in soums in the Project Area, in ha, 2019

Indicators	Sumber	Shivee gobi	Sain shand	Airag	Altan shiree	Dalan jargalan	Saikhan dulaan
Size of sown area	38.69	7.15	28.78	3.02	0.41	12.17	0.85
Potato area	14.87	2.5	4.03	0.52	0.15	3.3	0.35
Fodder area	10	1	2	1	n/a	4.0	n/a
Vegetables area	13.82	3.65	22.75	1.5	0.26	4.87	0.5

Source: NSO, www.1212.mn

Table 7-13. Total crops, in tonnes, 2019

Type of crops	Sumber	Shivee govi	Sain shand	Airag	Altan shiree	Dalan jargalan	Saikhan dulaan
Potatoes	108.81	18	5.89	7.35	0.28	38.13	1.9
Vegetables	110.69	31.71	64.94	5.16	0.26	26.55	1.98
Fodder crops	50	n/a	n/a	n/a	n/a	7	n/a

Source: NSO. www.1212.mn

Herding livestock and pasture management

The majority of residents of Airag, Dalanjargalan, Altanshiree and Saikhandulaan *soums* are rural and/or seasonal herders and herder-households. The number of herders and herder housholds is much lower in Sainshand, Shiveegovi and Sumber *soums*. Table 7-14 shows the distribution of herder households by type of herder in each *soum*. According to the NSO's classifications, these are distinguished as:

- Households with livestock refer to a household that owns livestock, including herder-households. They mostly live in *soum* or *aimag* centres; and do not herd livestock by themselves. Instead they mostly rely on herder relatives, extended herder family members to herd their livestock or contracted herders in a few cases;
- Herder household refers to a family that earns the majority of its income from profits of privately-owned livestock herds; a herder-household may be comprised of more than one individual herder; and

Herder refers to a person/individual who earns the majority of their income from raising and tending livestock and herding full-time. These herders may also belong to a herder household.

Table 7-14. Herders and herder's households, by *soum* and number, 2019

№		Total households (#)	Households with livestock (#)	Herderhouseholds (#) (%)	Herders (#)
1	Sumber	3,634	723	530 (14.5)	837
2	Shiveegovi	1,007	155	90 (8.9)	122
3	Sainshand	7,281	445	280 (3.8)	453
4	Airag	1,093	440	350 (32.0)	545
5	Altanshiree	462	337	290 (62.7)	485
6	Dalanjargalan	916	511	350 (38.2)	496
7	Saikhandulaan	460	338	280 (60.8)	443

Source: NSO. www.1212.mn

Summer and autumn grazing is conducted informally, and there are no designated summer pasture areas, as these change from year to year depending on forage conditions, livestock numbers, weather and the individual requirements of herder families. According to the Law on Land, summer or autumn settlements and rangelands shall be allocated to *baghs* and *khot ail*[83] and shall be used collectively.

In the past three years, there have been fluctuations in the number of herders across the Project *soums.* In Sumber, Altanshiree, Dalanjargalan and Saikhandulaan *soums*, they fell from between 2 to 9% and in Shiveegovi, Sainshand and Airag *soums* they rose from between 3 to 16%.

Table 7-15. Changes in the number of herders across Project *soums*, 2013-2019 (compared to the previous year, %)

№	*Soums*	2013	2014	2015	2016	2017	2018	2019	Comments
1	Sumber	9.4	13.8	2.2	8.2	-6.2	-4.5	-1.6	Decreased
2	Shiveegovi	0.9	23.6	4.4	5.6	-4.7	-16.8	2.5	Increased
3	Sainshand	8.9	-9.3	6.3	12.7	-3.3	1.3	16.2	Increased
4	Airag	7.9	5.8	9.9	1.7	-6.7	-1.4	7.5	Increased
5	Altanshiree	10.1	1.0	1.8	3.1	-7.5	-1.0	-0.2	Decreased
6	Dalanjargalan	6.6	1.7	10.1	5.7	-10.5	-2.2	-7.6	Decreased
7	Saikhandulaan	11.3	4.3	8.1	-2.1	2.7	-7.3	-8.8	Decreased

[83] It is customary for households to camp together in small groups called *khot ail*. The households in *khot ail* are often, but not always, related through kinship. Within a *khot ail*, households pool their livestock into herds of the same species (sheep and goats, cattle, horses, and camels) achieving economies of scale in herding labour. Households within a *khot ail* usually also share tasks, such as hay-cutting and seasonal nomadic movements. However, the composition of *khot ail* is seldom stable and often shifts from season to season and year to year. *Khot ail* tend to be larger in the more productive, mountain-steppe zones and smaller in the more arid desert steppe regions, such as in the Project Areas. Source: Fernandez-Gimenez, M. E. 2002. Spatial and Social Boundaries and the Paradox of Pastoral Land Tenure: A Case Study from Post socialist Mongolia. Human Ecology, 49-78.

Source: NSO. Agricultural Statistics. www.1212.mn

As Table 7-16 shows, in 2019, there were 325,930 livestock in Sumber *soum*, 55,390 in Shiveegovi *soum*, 132,110 in Sainshand *soum*, 183,260 in Airag *soum*, 146,940 in Altanshiree *soum*, 196,770 in Dalanjargalan *soum* and 193,080 in Saikhandulaan *soum*.

Table 7-16. Number of livestock in Project *soums*, 2014-2019

№	*Soums*	2014	2015	2016	2017	2018	2019
1	Sumber	245,300	278,390	295,310	324,030	311,700	325,930
2	Shiveegovi	40,890	43,710	43,430	48,040	29,260	55,400
3	Sainshand	85,090	95,990	94,880	109,610	117,850	132,110
4	Airag	134,330	143,220	123,670	148,370	164,820	183,270
5	Altanshiree	111,090	120,010	113,140	127,230	134,560	146,940
6	Dalanjargal	145,750	158,230	154,380	174,720	176,420	196,770
7	Saikhandulaan	123,180	138,510	145,010	164,790	182,210	193,080

Source: NSO. Agricultural Statistics. www.1212.mn

Interviewed households noted that the most profitable livestock are goat (42.8%) and sheep (47.1%), respectively. Compared to raw products obtained from other livestock, goat cashmere is the most lucrative. After goat, sheep and cattle rank second and third in terms of profitability. This is illustrated in Figure 7-7, which shows the composition of livestock in the seven Project *soums* in 2019.

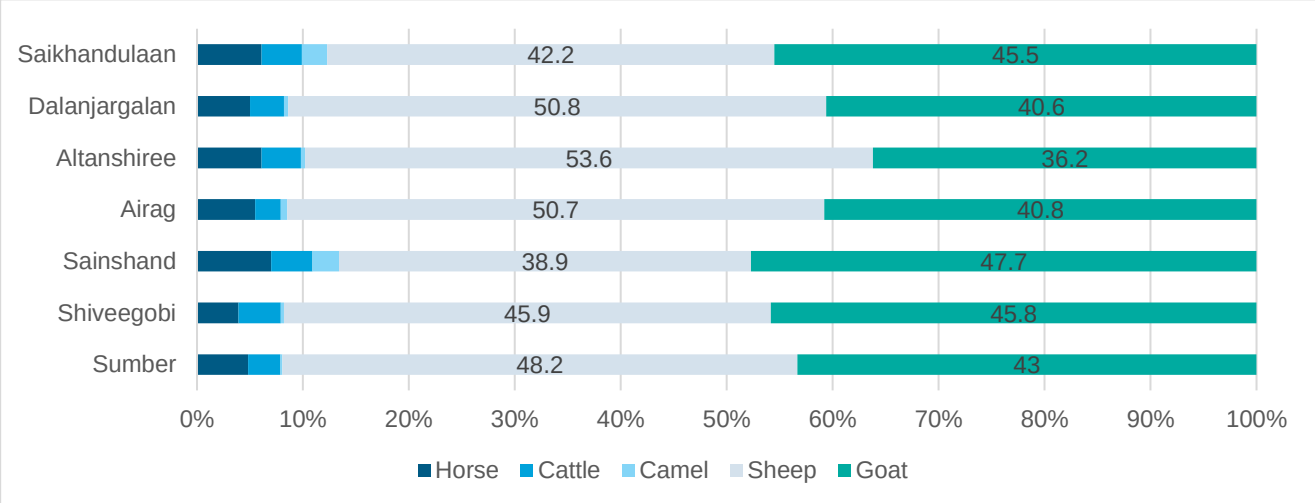


Figure 7-7. Livestock composition, by % (2019)

Seasonal movements and winter camps in the OHTL route buffer zone

Seasonal movements in non-winter months

During spring, summer and autumn when pastures grow, seasonal herders move their *gers* to a location which they consider has good access to pasture. Summer camps are normally located in the vicinity of a water source, usually a hand dug shallow well that provides water for animals and families. Summer/autumn grazing allows winter grazing areas time to recover and let livestock gain weight.

On average, herder households move with their herds two times a year within the range of between 5 to 10 km. Seasonal grazing movements are distinct to the *otor*[84] migration where a household will travel every 3 to 5 days to a new location.

Winter camps

[84] *Otor* means long-distance migration of Mongolian herders, typically in autumn, to fatten livestock for winter. Source: Asian Development Bank. Making grasslands sustainable in Mongolia: Adapting to climate and environmental change. Mandaluyong City, Philippines: Asian Development Bank, 2013.

Winter is generally a sedentary season with few herder families moving. If the quality of pasture near their winter camp is good, households interviewed in the HHS reported that they may start residing at the winter camp in mid-October. In general, herder households reside in the winter camp from November to February. If the springtime is exceptionally cold or blustery, herder households may not leave the winter camp until the end of spring in May.

Winter camps are usually located near wells, and a sheltered location is favoured, often a protected nook on a mountainside, in a canyon, or on the side of a hill. Camps are key for survival –with winter temperatures averaging minus 30-40°C. A good camp site is developed over time and typically has many winters accumulation of dung, which insulates animals and people against the cold, and may be used by herders as fuel. Livestock are kept close by, and families use fodder, hay, and wheat as a supplement feed for their animals during this time.[85] In Mongolia generally, a winter shelter has a fence, *gers*, a well, and pit latrines (albeit less frequently).

Use of winter camps is dependent on seasonal conditions; consequently having a possession certificate does not mean the household will use the winter camp if the winter is exceptionally mild.

Figure 7-8 shows typical winter camps found in the Project AoI. Figure 7-9 shows a typical winter camp plot in the Project AoI. Figures 7-10 and 7-11 show a Winter quarter (Shiveegobi soum) closest to 220kV route (0.3km) and a summer camp from the 200kV OPTL route (Sumber soum), respectively.

Figure 7-8. Typical winter camps (Airag, Dalanjargalan and Sumber *soums*, June 2020)

[85] Fernandez-Gimenez, M. E. 2002. Spatial and Social Boundaries and the Paradox of Pastoral Land Tenure: A Case Study from Post socialist Mongolia. Human Ecology, 49-78.

Figure 7-9. Winter camp plot with no permanent structures (Airag *soum*, June 2020)

Figure 7-10. Winter quarter (Shiveegobi soum) closest to 220kV route (0.3km)

Figure 7-11. Nearest (0.7km) summer camp from the 200kV OPTL route (Sumber soum)

Of the 22 surveyed households, 17 households migrate from their winter camp and five households never travel from their present location in their winter camp.

The herder households' winter camps, spring shelters and surrounding wells have been captured in a 3 km buffer zone (AoI) to the OHTL centreline in the seven Project *soums* and are mapped in Figures 7-12 to 7-19 below. These maps show:

- The 74 registered winter camp plots inside the 6 km buffer zone provided by the Dornogovi and Govi-Sumber *aimag* Land Department officials (pink icon);
- The location of the 22 households identified by the ESIA Social Team during their site visit in June 2020 along the OHTL route (green icon). Of these 22 households, 5 households were in their winter camp locations. Most of the winter camps and herder households were found from between KM40 and 80 of the OHTL route, in Airag and Dalanjargalan soums.
- The location of 17 winter camp locations identified by the existence of animal shelters, however where no households were present in June 2020 (black icon).
- The 22 winter camps and 2 summer camps identified during the May 2021 survey.

- Herder wells (blue icon).

There were no winter camps with permanent structures or any other temporary structures in the 25 m RoW on either side of the OHTL.

According to the ESIA field surveys, no wells were within the 25 m RoW. During the ESIA surveys, three wells were identified (one of which was disused) within 300 m of the OHTL centreline – at 130 m, 170 m and 260 m from the centreline. As the maps show, there are a number of wells within the 6 km buffer zone. Once the final design has been identified, including any access roads, all wells within the RoW and a 600 m zone either side of the centreline should be mapped prior to construction in order to identify specific measures to protect these wells from construction impacts. No herder's wells will be permitted to be used by the Construction Contractor or other third parties associated with the Project.

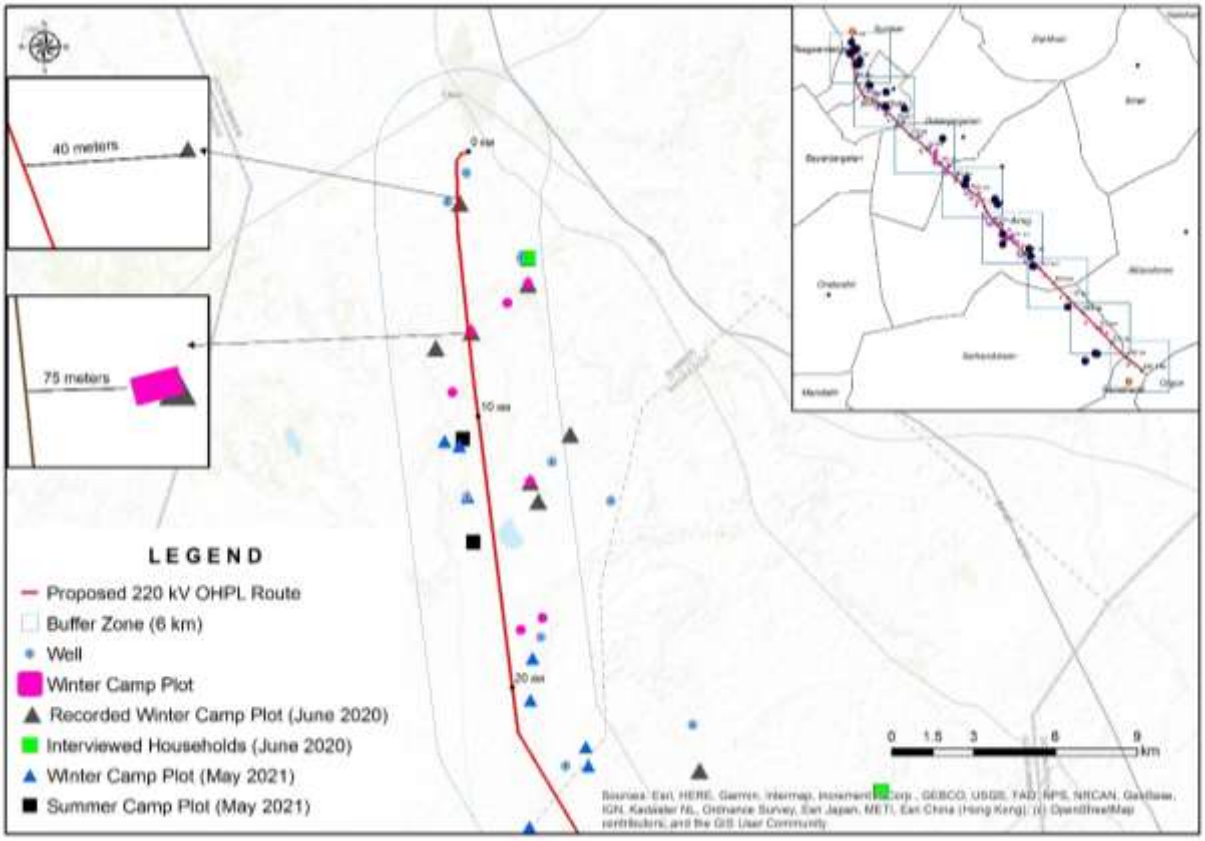


Figure 7-12. Camps and wells in 0-20th km of OHTL route

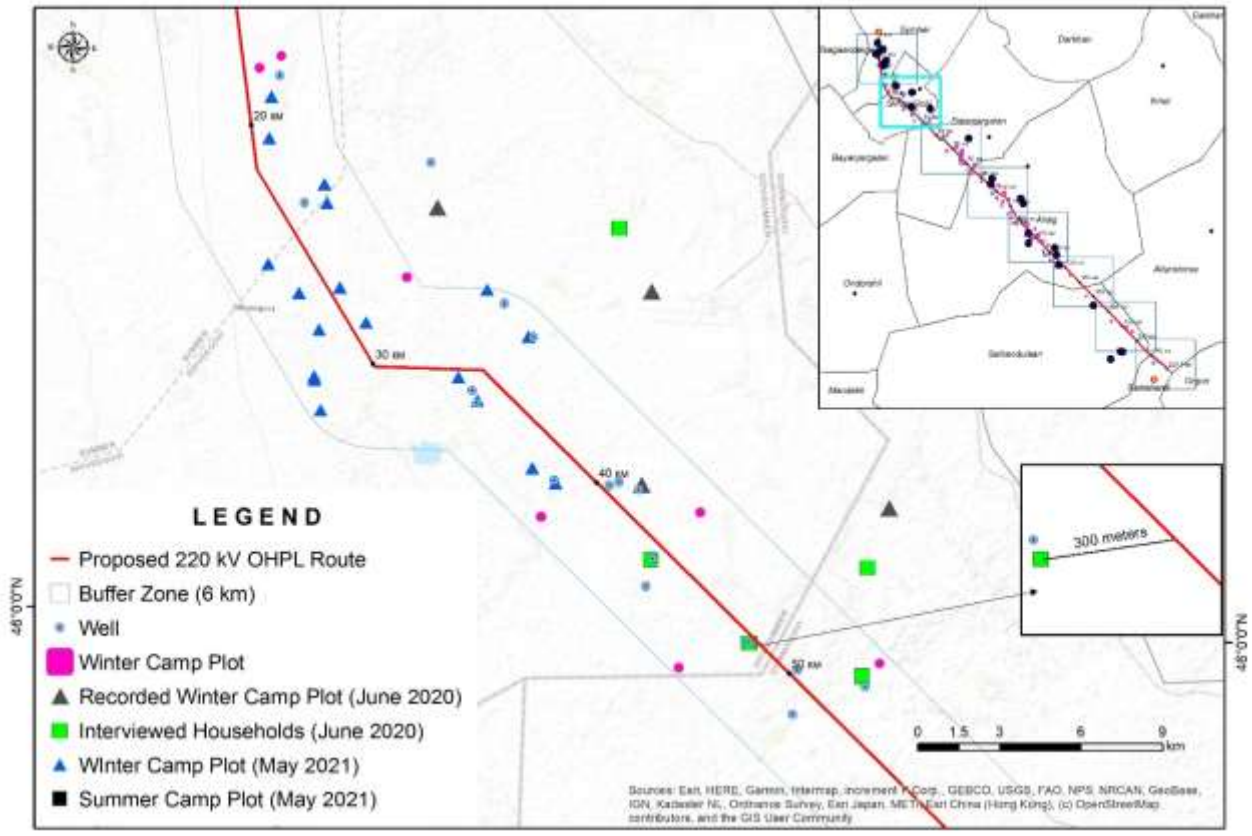


Figure 7-13. Camps and wells in 20-50th km of OHTL route

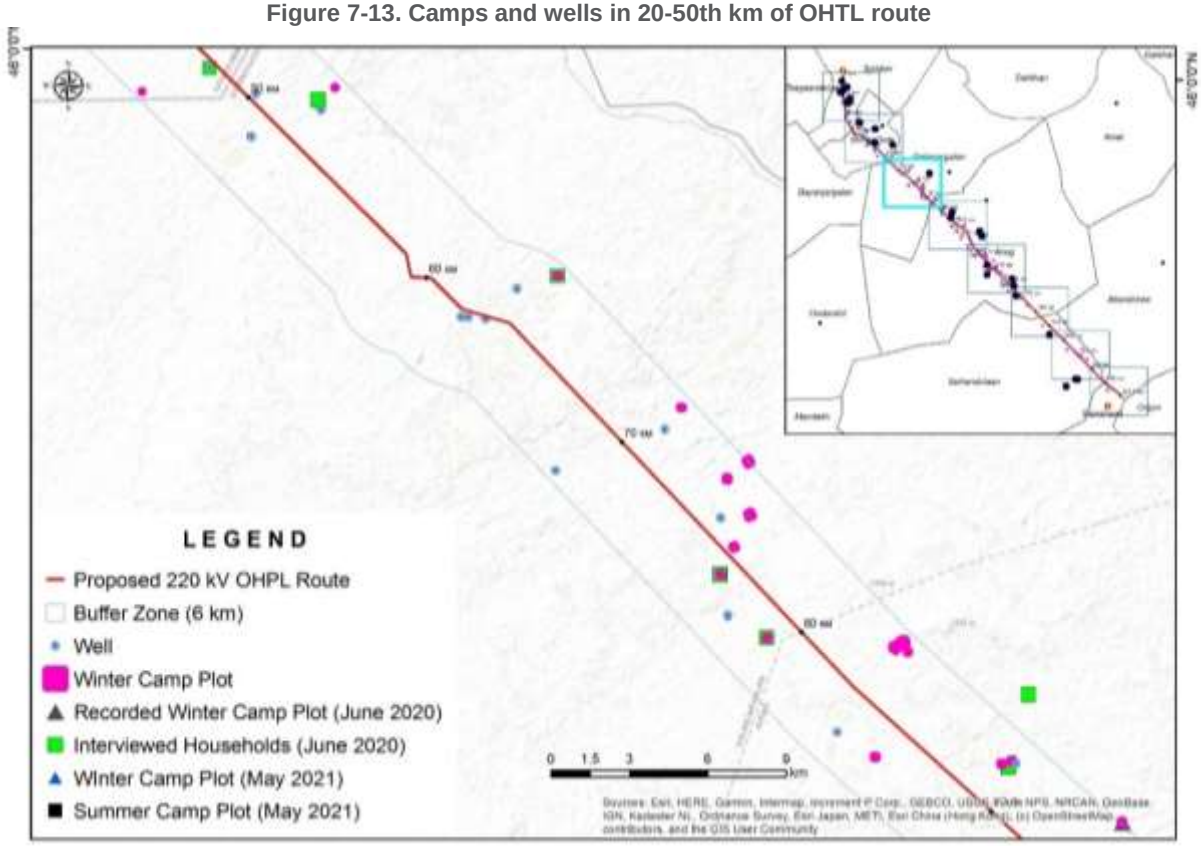


Figure 7-14. Camps and wells 50-80th km of OHTL route

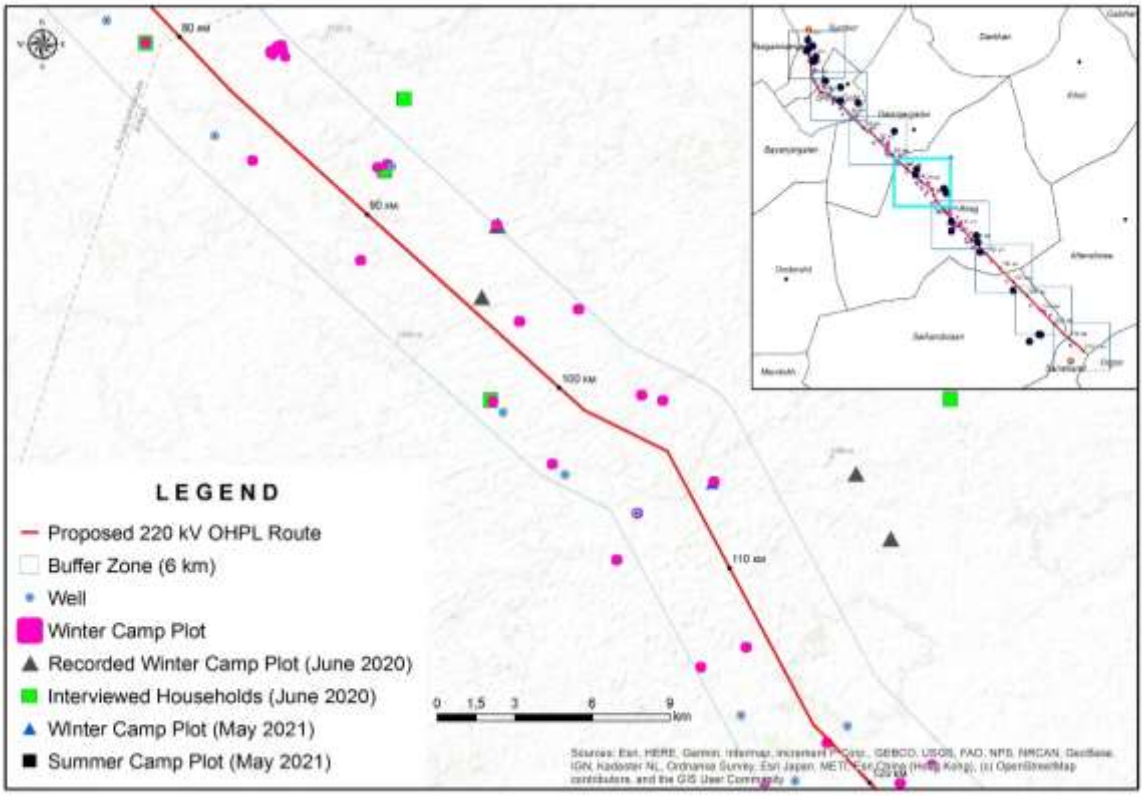


Figure 7-15. Camps and wells in 80-110th km of OHTL route

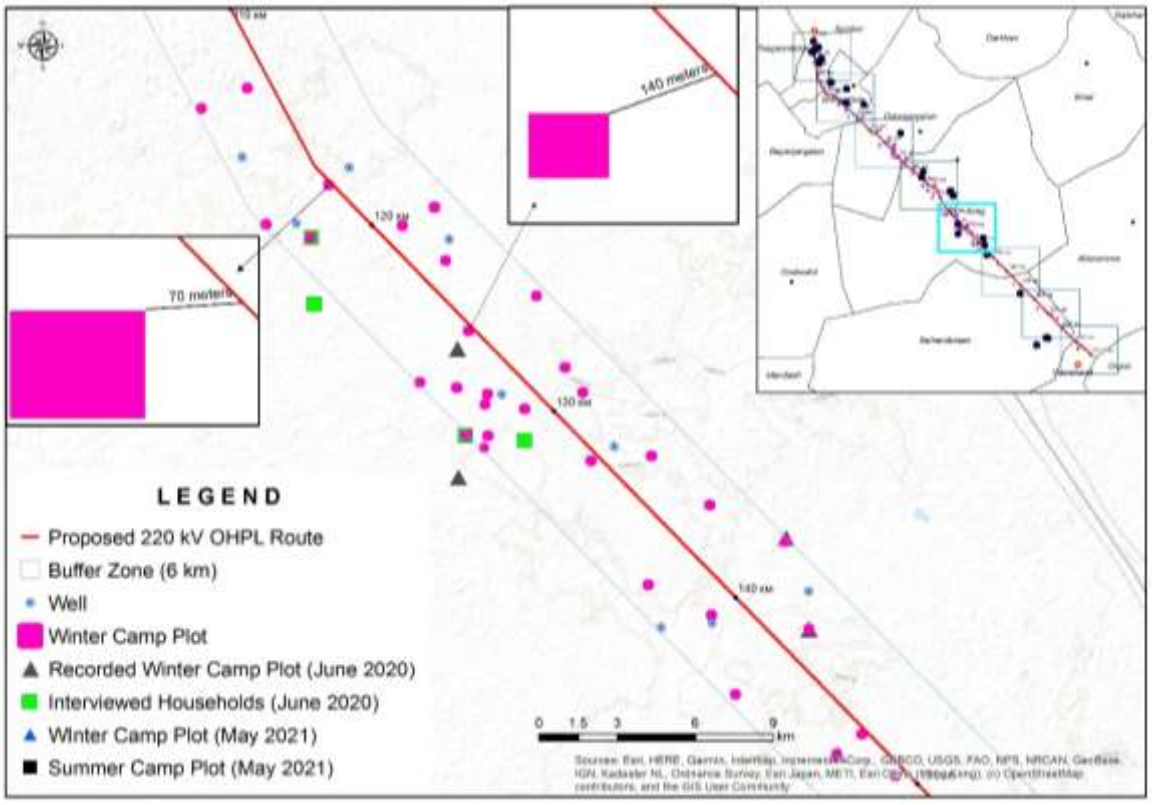


Figure 7-16. Camps and wells in 110-140th km of OHTL route

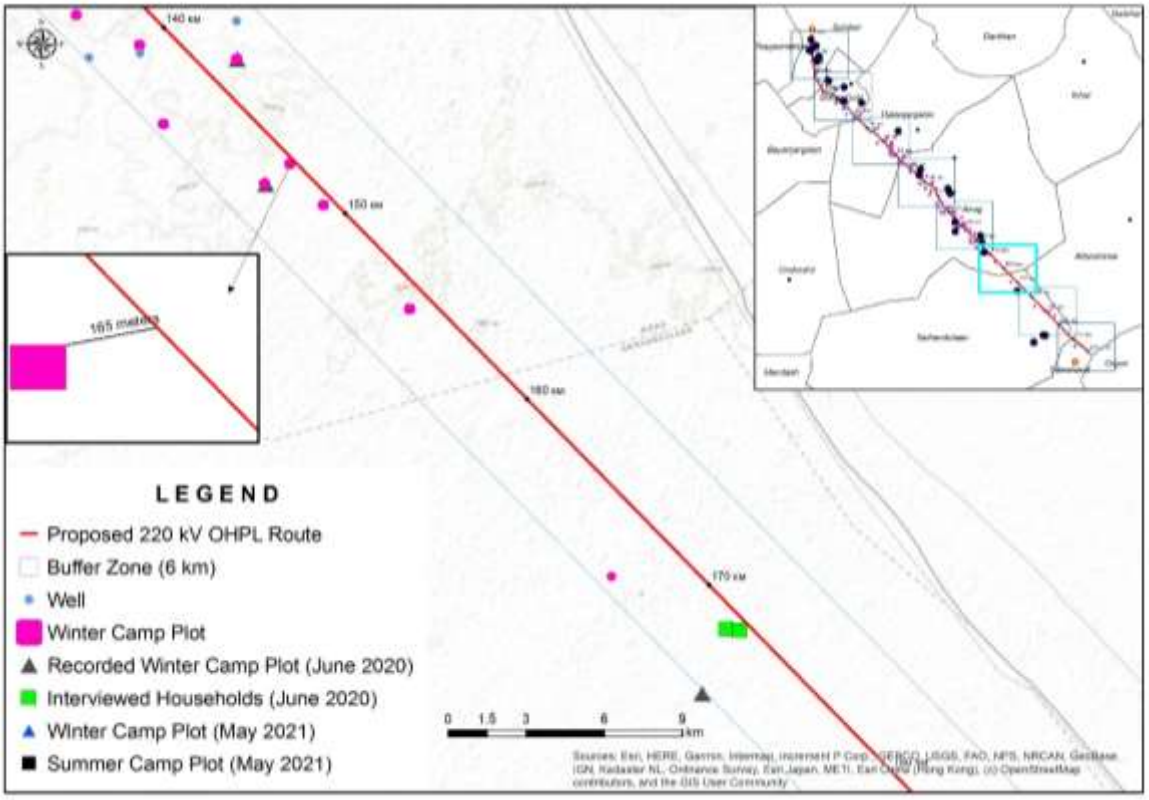


Figure 7-17. Camps and wells in 140-170th km of OHTL route

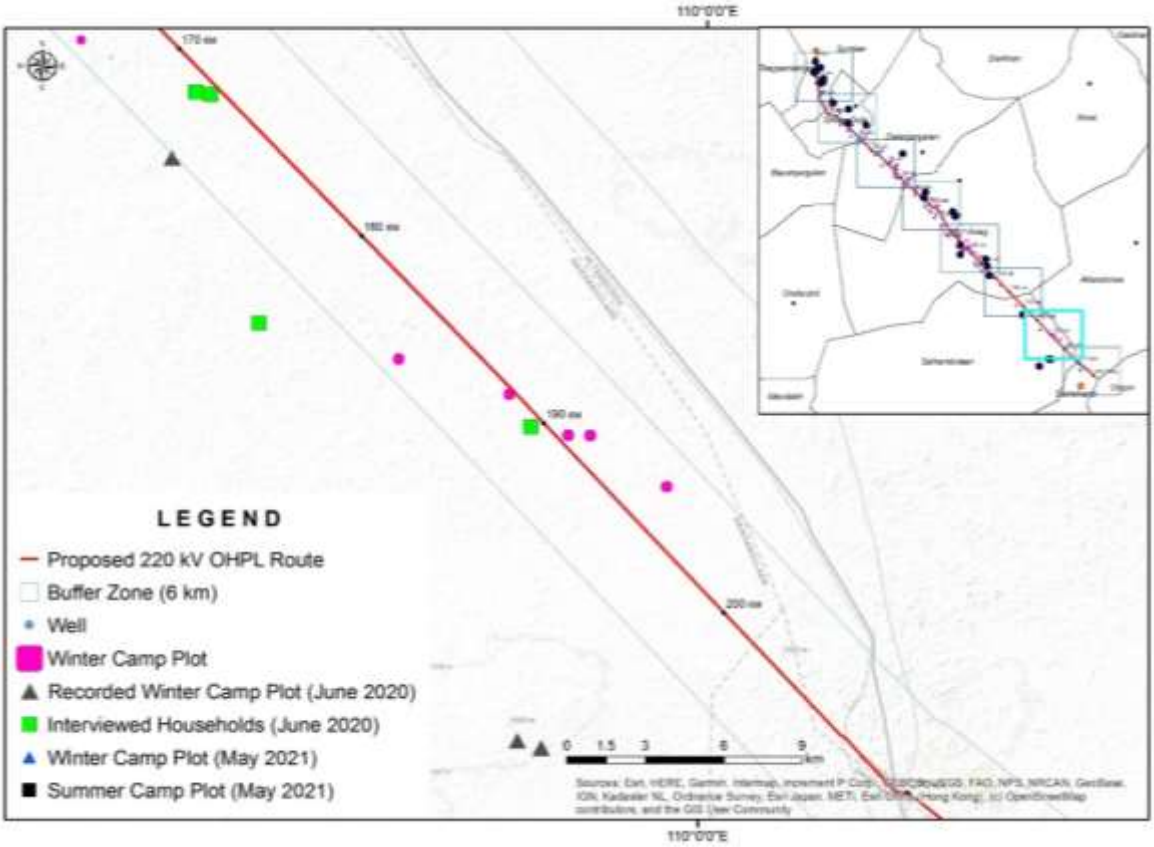


Figure 7-18. Camps and wells in 170-200th km of OHTL route

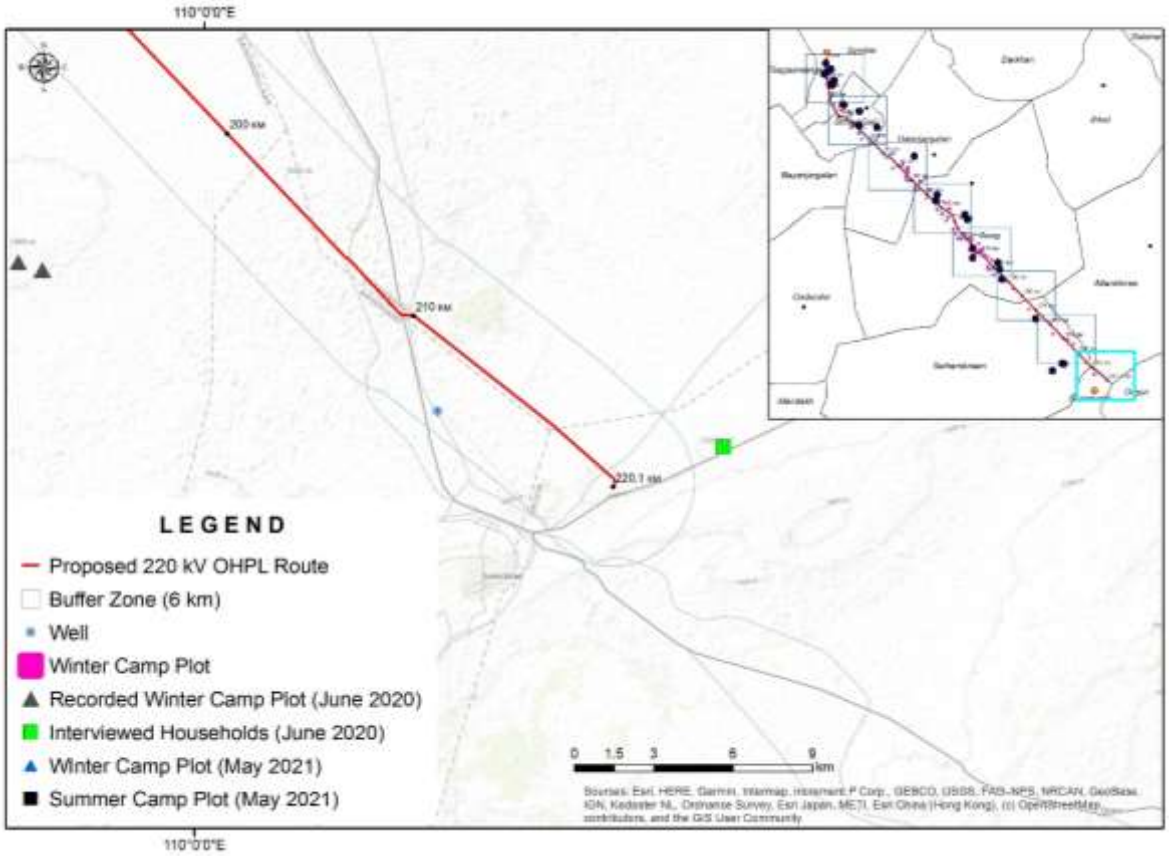


Figure 7-19. Camps and wells in 200-220th km of OHTL route

Protected Areas Land Uses

There are two natural reserve areas, “Ikh Nart” Nature Reserve in Dornogovi *aimag* and “Choirin Bogd Uul” in Govi-Sumber *aimag*. These are located 10 km and 27 km respectively, from the site. The proposed OHTL route does however cross two locally protected areas, Togootliin Khonkhor and Bornuruu (discussed in more detail in Section 6.9.2.2). These sites do not have any specific significance for local herder households. Although they have been designated for broad ecological reasons, the sites are not cordoned off or managed and herders are permitted to graze in these areas. They are also permitted to sell wool to tourists.[86] However, engagement at the *soum* and herder household level for this Project indicated that these sites provide no ecosystem services to herder households.

Mining Licence Land Uses

In the Project Area, there are rich mineral resources, such as fluoride, pink marble, copper, ironstone, limestone, coloured stone, coal, various earthenware formations, uranium, oil, and gold. According to the Mineral and Petroleum Resources Authority of Mongolia, a total 11.7% of the Dornogovi *aimag* land and 8.2% of the Govi-Sumber *aimag* land is allocated to mining exploration and operation licenses.[87]

According to the Land Department of Govi-Sumber and Dornogovi *aimag*, there are five licences currently active in the Project’s RoW. The list of mining license owners in Table 7-17 corresponds to the number of license areas in Figures 7-20 to 7-22. Whilst four of these are under exploration, there are no active operational mines under the OHTL route and the current licences do not provide for operation. According to the Working Group, the current OHTL route alignment was specifically selected to avoid the Shivee Ovoo coal mine that is active, and other many smaller transmission lines.

Where the OHTL passes through these areas, the land has been allocated for the use of this Project only.

[86] Gender, Land and Mining in Mongolia. WOLTS Research Report No.1 January 2018. Page 107, Ikh Nart Nature Reserve in Dalanjargalan *soum*, Dornogovi *aimag*. Available at: https://mokoro.co.uk.
[87] MRPAM. (2019). Mining and Geology Statistics. Mineral Resources Authority of Mongolia. Available at: https://mrpam.gov.mn/public/pages/133/2019-12-mon.pdf. Accessed April 2020.

Table 7-17. Mining licence owners

#	Owners name	License Name	License ID number	Type	Note
1	AQ Sora	Khuren Dukh	MV-020424	Mining	OHTL re-routed to avoid overlap
2	MAK Tsement	Khadan Khoshuu	MV-021073	Mining	No objection by the owner
3	Olon Ikht Bayan	Khudagt	MV-021441	Mining	No objection by the owner
	Kherlen Golyn Uils	Khoid Khongor	XV-013405	Exploration	No objection by the owner
5	Durvun Talst Erdene	Delgerekh	XV-44000007	Exploration	Expired in July 2020, Any future renewal will exclude areas overlapping with the OHTL
6	Batbadmaarag	Modot-3	XV-020181	Exploration	No objection by the owner
7	Modot Uul	Modot	MV-021695	Mining	OHTL re-routed to avoid overlap

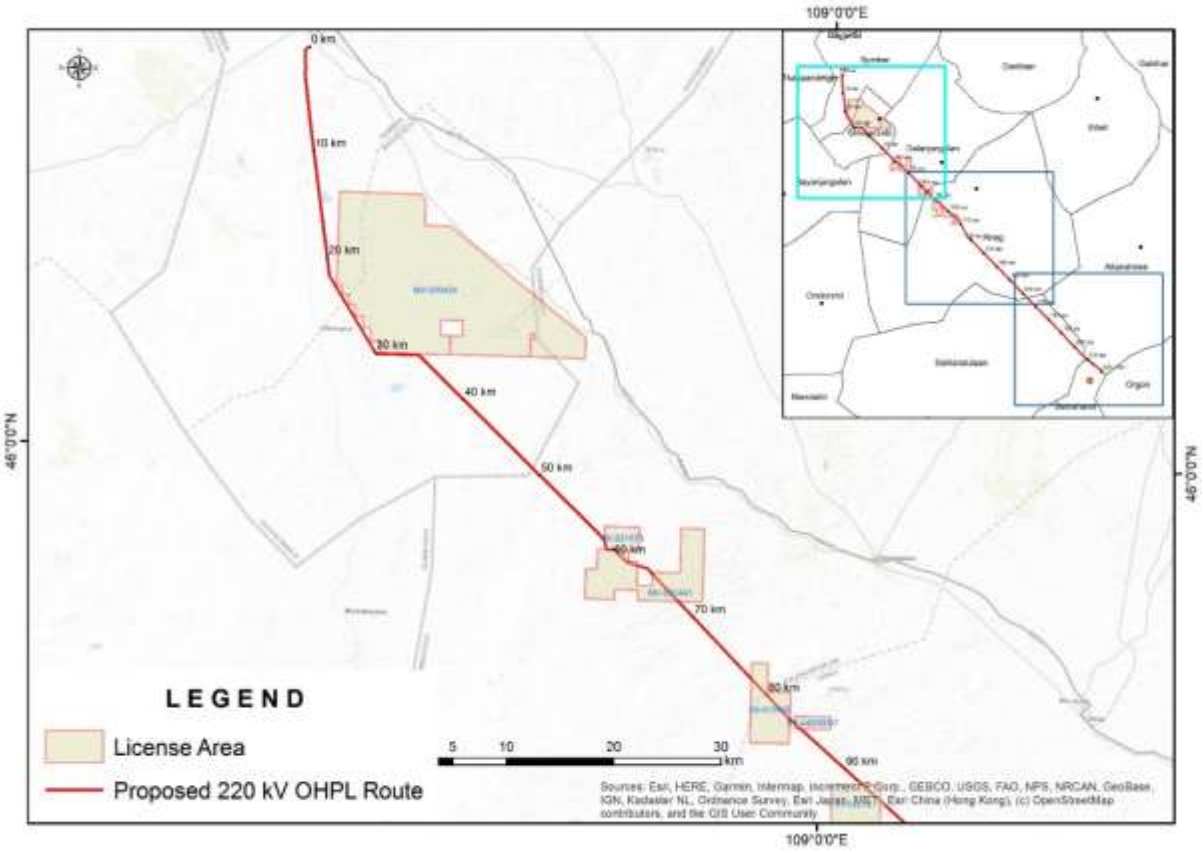


Figure 7-20. Mining licences overlapped with RoW in 0-90th km of OHTL route

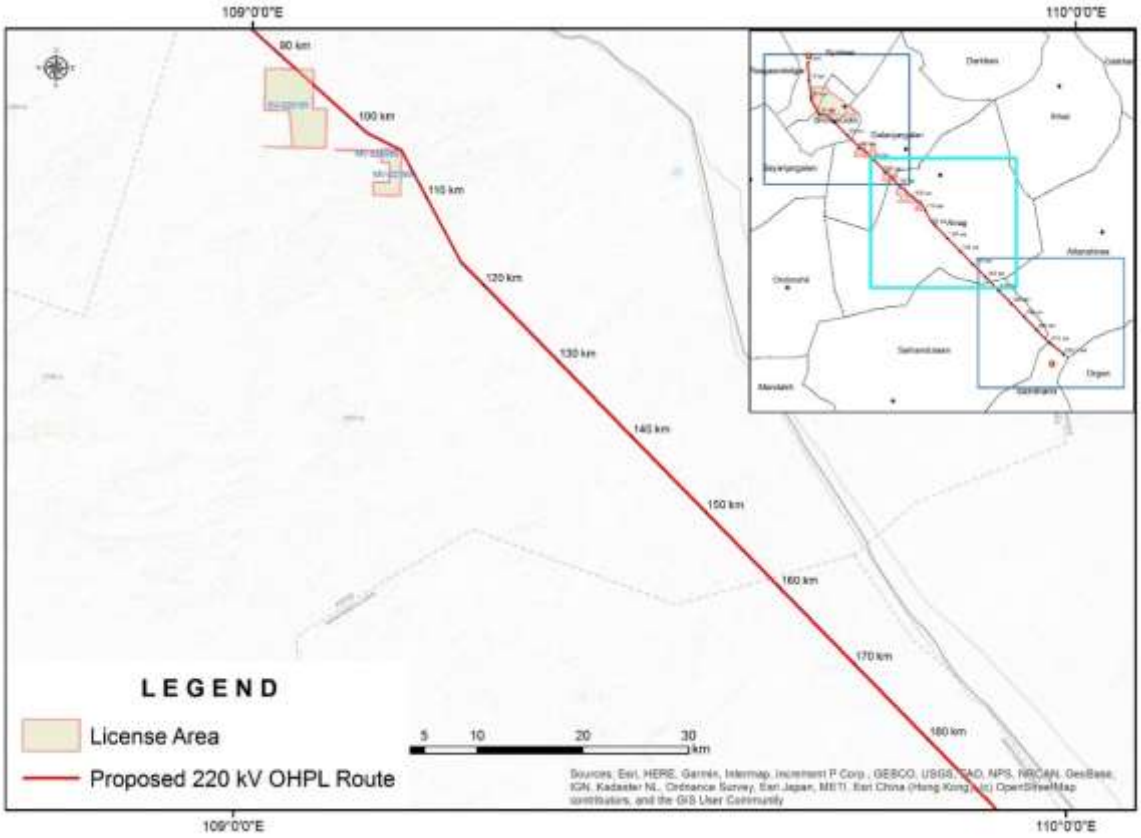


Figure 7-21. Mining licences overlapped with RoW in 60-160th km of OHTL route

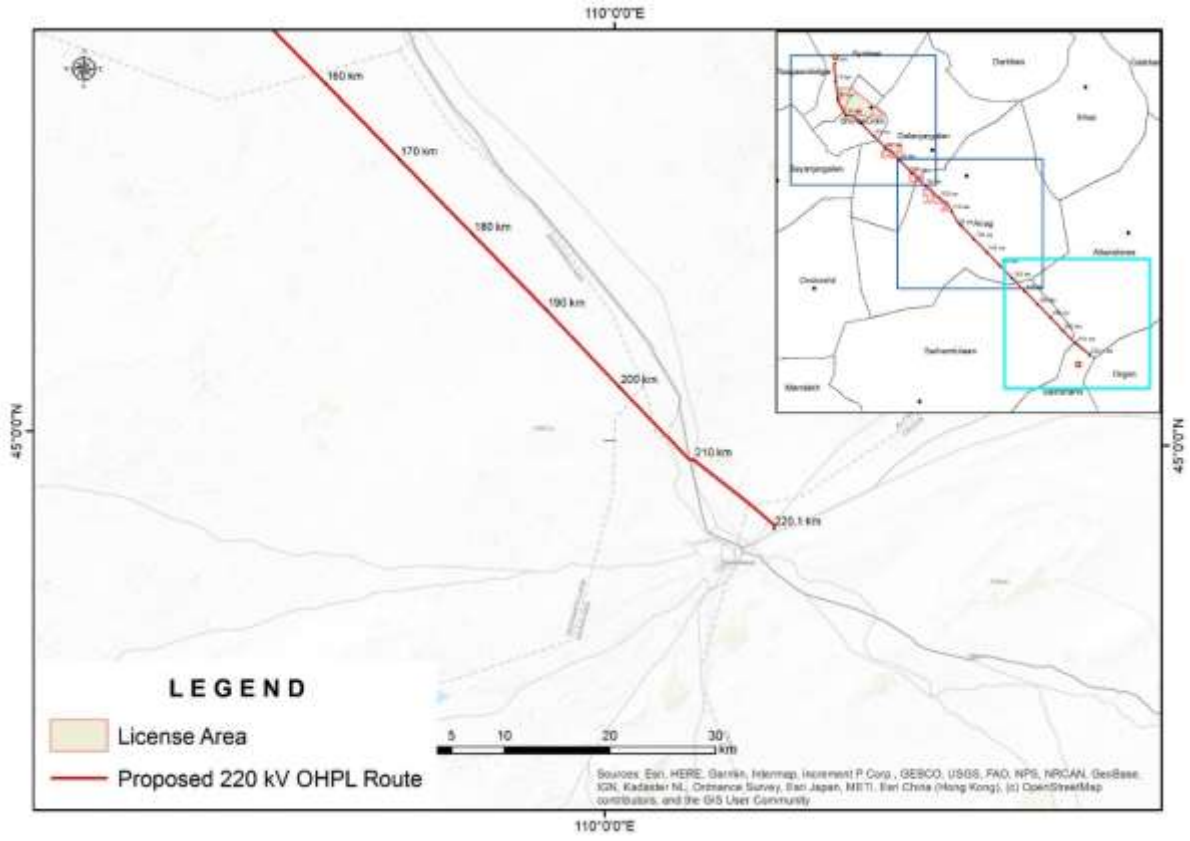


Figure 7-22. Mining licences overlapped with RoW in 130-216th km of OHTL route

7.7. Energy Infrastructure

7.7.1. Sources of Data

Data have been sourced from secondary data sources and the Working Group. Further details are provided in Chapter 2.

7.7.2. Baseline

7.7.2.1. Electricity consumption

As shown in Figure 7-23, from 2009 to 2018, electricity consumption by sector has not seen major changes. In 2018, 62.1% of total electricity was consumed by industry and construction, 24% by households and communal housing and public utilities, 4.2% by transport and communication, 1.1% by agricultural sector, and the remaining 8.7% by other industries.[88]

Per capita average consumption of electricity increased significantly in the last few years. As Figure 7-24 shows, since 2005 the per capita energy consumption rose by 57.4%.

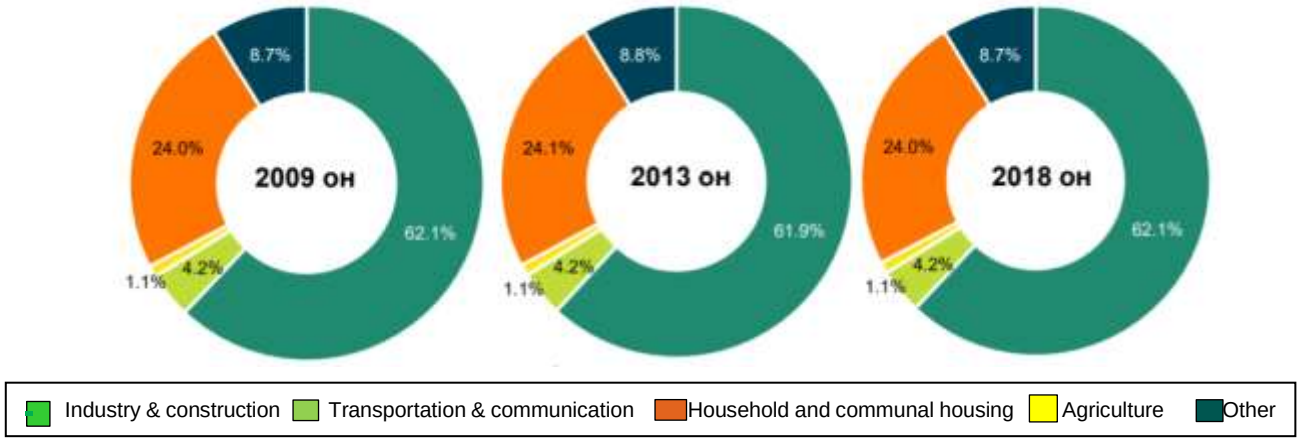


Figure 7-23. Electricity consumption by sector, %
Source: Industry -2018. NSO, 2019.

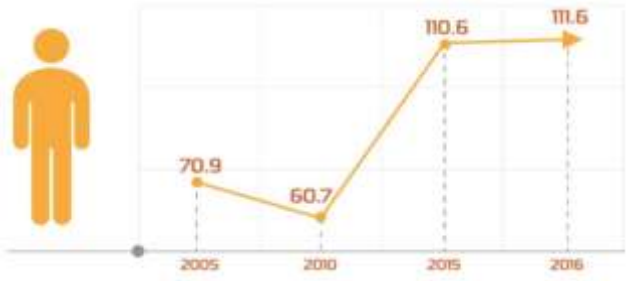


Figure 7-24. Electricity consumption per head, GJ/head
Source: Mongolia's energy efficiency, accessibility and structural analysis. NSO. 2019.

7.7.2.2. Power generation in the Project Area

Both Govi-Sumber and Dornogovi *aimags* are connected to the CES, which is primarily supplied from CHP 4 in Ulaanbaatar. Other sources of energy include solar and wind power, as summarised below.

There is a solar power plant in Sumber *soum* of Gobisumber *aimag* that started operation in 2019. It is anticipated that the solar power plant will be able to supply 15 MW electricity to the integrated power network while reducing greenhouse gas emission by 12,270 tons and saving 171 million litres of water annually.

[88] Industry – 2018. NSO, 2019.

'Gegeen' 15MW solar power plant in Zamyn-Uud *soum* was commissioned in June 2019. The plant contributes around 25.5 million kilowatts of renewable energy to the CES. The power plant is intended to fulfil the increasing demand for electricity in the region, where Sainshand Industrial Park, Zamyn-Uud free economic zone and major mining projects are planned to be implemented, and improve stability and reliability of the integrated network in the future.

There is also a wind farm at Sainshand in Dornogovi *aimag*, operational since February 2019, with a power generating capacity of 55 MW. It is anticipated that the wind farm will be capable of enough to supply around 100,000 households.

7.7.2.3. Access to electricity supply and energy poverty

Access to electricity (measured as the percentage of population with access to electricity) in Mongolia was reported at 81.78% in 2016, according to the World Bank collection of development indicators, compiled from officially recognized sources.[89]

According to the World Bank, Sustainable Energy for All (SE4ALL),[90] 81.78% of the population overall had access to electricity in 2016, with 95.81% of the urban population and 44.17% of the rural population having access. In 2017, access to electricity in Mongolia was 85.87%. From Figure 7-25, it can be seen that access was at its lowest in 2000 at 67.3%, with a peak in 2005 at 86.2% before it dropped again. Access has, however, been steadily increasing since 2012 and, as of 2018, 98.1% of total population had access to electricity. This indicates major improvements in terms of Mongolia's access to electricity overall, though there is a marked contrast between urban and rural population access.

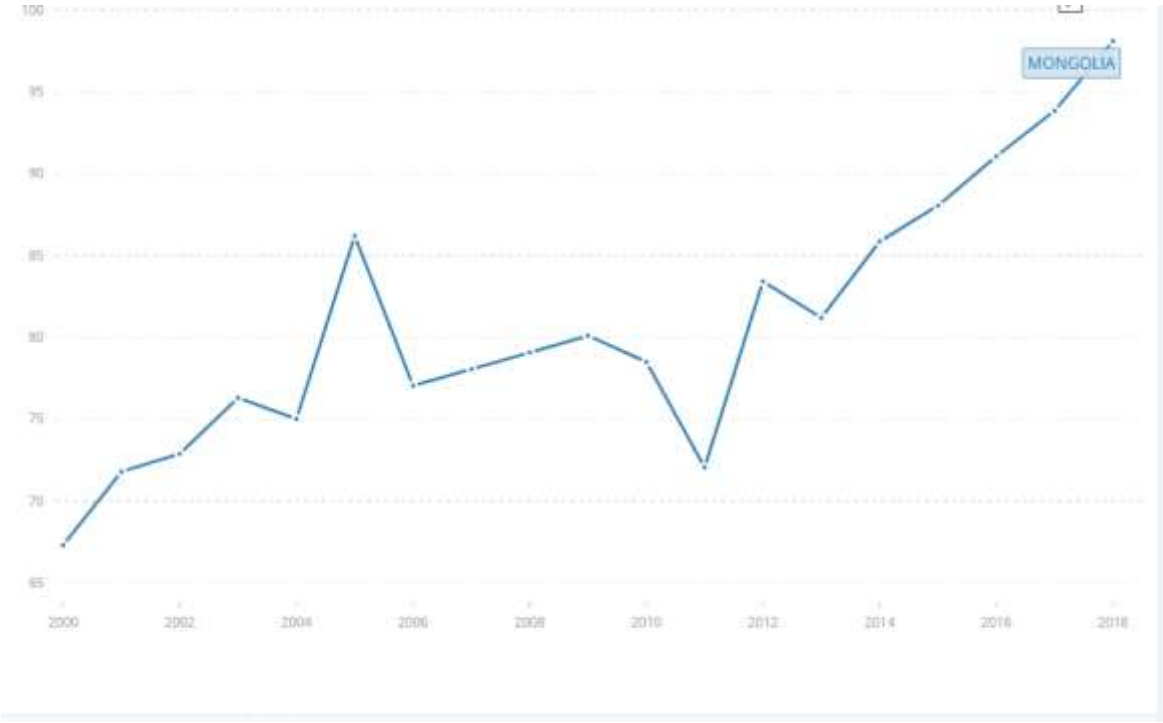


Figure 7-25. Access to electricity, 2000-2018

Source: Database from the SE4ALL Global Tracking Framework led jointly by the World Bank, International Energy Agency, and the Energy Sector Management Assistance Program.

Access to electricity is crucial to human development as electricity is, in practice, indispensable for certain basic activities, such as lighting, refrigeration and the running of household appliances, and cannot easily be replaced

[89] Trading economics. https://tradingeconomics.com/. Accessed 6 July 2020.
[90] Database from the SE4ALL Global Tracking Framework led jointly by the World Bank, International Energy Agency, and the Energy Sector Management Assistance Program. Available at: https://data.worldbank.org/indicator/EG.ELC.ACCS.ZS. Accessed June 2020.

by other forms of energy. Individuals' access to electricity is one of the most clear and undistorted indication of a country's energy poverty status. [91]

There is not an officially agreed definition of what exactly constitutes being “energy poor”. The United Nations define energy poverty as an “*inability to cook with modern cooking fuels and the lack of a bare minimum of electric lighting to read or for other household and productive activities at sunset*”.[92] A more quantifiable approach is also used, by either estimating household expenditure on energy (roughly, 10-20% of the household’s income) or by estimating energy consumption per household member.

In order to satisfy the basic needs of heating, cooking and lighting, it is estimated that an individual needs about 50-100 KWh/year. According to UNDP estimates, around 2,000 KWh/year per person is needed for modern energy services.[93]

Energy poverty exists in both rural and urban areas in Mongolia, due to either the lack of modern energy structures or the inability to access existing services. The 2015 Census results (Table 7-18) showed that nationwide, 6,800 households were without electricity, which was 3.4 times less than in the previous census of 2010. According to the NSO, this decrease in the number of households without electricity is due to an increase by 42,400 households or 31.8% in the number of households living in rural areas using renewable energy, and a decrease by 6,000 households or 36.1% in households without electricity – probably due to in-migration to cities such as Ulaanbaatar. Eighty-five percent (85.2%) of households without electricity lived in *gers*, of which 66.6% lived in rural areas.

Table 7-18. Number of households with access to power sources, by urban and rural population, in %, 2015

Power source	Total		Urban		Rural	
	Thous.HH	%	Thous.HH	%	Thous.HH	%
TOTAL	**859.1**	**100.0**	**579.3**	**100.0**	**279.8**	**100.0**
Centralized system	677.8	78.9	566.3	97.7	111.5	39.9
Diesel power station	2.5	0.3	1.1	0.2	1.4	0.5
Renewable energy devices	156.7	18.2	7.5	1.3	149.2	53.3
Small power generator	15.4	1.8	2.2	0.4	13.1	4.7
No power supply	6.8	0.8	2.3	0.4	4.5	1.6
HOUSE	**465.3**	**100.0**	**389.2**	**100.0**	**76.1**	**100.0**
Centralized system	443.7	95.4	386.9	99.4	56.8	74.6
Diesel power station	1.1	0.2	0.4	0.1	0.7	0.9
Renewable energy devices	16.8	3.6	1.0	0.3	15.8	20.7
Small power generator	2.9	0.6	0.4	0.1	2.5	3.3
No power supply	0.9	0.2	0.5	0.1	0.4	0.5
GER	**389.9**	**100.0**	**187.9**	**100.0**	**202.1**	**100.0**
Centralised system	230.7	59.2	177.2	94.3	53.5	26.5
Diesel power station	1.4	0.4	0.6	0.3	0.8	0.4
Renewable energy devices	139.6	35.8	6.5	3.4	133.2	65.9
Small power generator	12.4	3.2	1.8	1.0	10.6	5.2
No power supply	5.8	1.5	1.8	0.9	4.0	2.0

Source: Intermediate Population and Housing Census 2015: Summary. NSO. 2016.

Connecting to the central grid is not possible for all isolated herder households due to their nomadic lifestyle. In general, herder households with access to electricity utilise wind or solar panels (Figure 7-26). Other energy mainly comes from combustion of biomass, particularly dung and fuelwood.

[91] FAO and WEC, (1999): The Challenge of Rural Energy Poverty in Developing Countries. London: World Energy Council and Food and Agriculture Organization of the United Nations.
[92] “Energy Sector Management Assistance Programme, United Nations Development Programme, UN Millennium Project, and World Bank.
[93] UN Secretary-General’s Advisory Group on Energy and Climate. 2010.

Figure 7-26. Solar home system of herders in *gers*

Energy consumption is for mainly for lighting, television and radio. An average herder-household's basic electricity consumption, estimated by the National Renewable Energy Centre of Mongolia (NREC), is 1.2 kWh (equivalent to 36 kWh per month and 432 kWh per year). A 2012 survey on herder households' energy consumption estimated herder household's electricity consumption to be 100-140 Wh per day.[94] This amount of energy consumption is 25-30 times lower than that in cities or towns.

The remaining nomadic herder households have no access to electricity; the main reasons include (**i**) high costs of household power systems coupled with low incomes of many herder households; (**ii**) sustainable policy support for providing adequate energy sources to herder household level; and (**iii**) a nascent market of renewable energy production which lacks basic quality and service standards.

7.7.2.4. Electricity demand

The activated electricity demand from 2011 to 2030 is shown in Table 7-19.[95] Future energy demand in Mongolia is expected to increase due to the recent mining boom. The Ministry of Energy estimated that 500-600 MW will be added to existing demand by 2020, corresponding to an average annual growth rate of 3.5%.[96] This is largely driven by the opencast operations of the Oyu Tolgoi copper and gold mine, which was commissioned in 2012 and is undergoing capacity expansion; and the operation of underground mining at the Tavan Tolgoi coal mine.

Within the Project Area, the following future developments will result in an increased demand for electricity:

- Sainshand Industrial Park 280 MV (though currently on hold);
- Zamyn Uud Free Economic Zone development 59.4 MV;
- Tsagaan Suvarga Copper and Gold mine 75 MV;
- Urgen Cement 16 MV;
- Senj Sant LLC's cement and limestone mining 16 MV;
- MIZU Cement factory 20 MV; and
- Erdentsogt Power Plant construction use 8 MV.

There are at least four other mining and industrial development projects, with a combined electricity demand of 23 MV, which will likely source their electricity from the Project.

[94] Ganchimeg G. Energy consumption and household's wealth: Case of herder households in Mongolia. Journal of agricultural sciences №11 (02), 2013.
[95] ADB TA No. 7502-MON 2011. *Cited in The Preparatory Survey on the Ulaanbaatar 4th Thermal Power Plant Rehabilitation Project in Mongolia*. December 2012. JICA and Electric Power Development Co.,Ltd.
[96] Mongolia: Renewable readiness assessment. International Renewable Energy Agency (IRENA), 2016.

Table 7-19. Electricity demand, 2011-2030

Years	2011	2012	2013	2014	2015*	2016	2017	2018	2019	2020	2025	2030
Central Energy System												
CHP-2 (MW)	10	10	10	0	0	0	0	0	0	0	0	0
CHP-3 (MW)	120	120	120	120	80	80	80	80	80	80	80	80
CHP-4 (MW)	510	510	510	510	510	510	510	510	510	510	510	510
Erdenet CHP (MW)	15	15	15	15	15	15	15	15	15	15	15	15
Darkhan CHP (MW)	40	40	60	60	60	60	60	60	60	60	60	60
Total generation (MW)	695	695	715	705	665	665	665	665	665	665	665	665
Original CES Demand (MW)	**762**	**819**	**862**	**934**	**1,003**	**1,074**	**1,141**	**1,214**	**1,290**	**1,376**	**1,661**	**1,933**
CHP-5 (MW)	0	0	0	0	450	450	450	450	450	820	820	820
Import/Other sources (MW)	**67**	**124**	**147**	**229**	**-112**	**-41**	**26**	**99**	**175**	**-109**	**176**	**448**
Gobi Mining Area												
Ukhaahudag CHP (MW)	36	36	36	36	40	40	40	40	100	150	150	150
Oyutolgoi diesel plant (MW)	24	0	0	0	0	0	0	0	0	0	0	0
Import/Other sources (MW)	83	128	181	196	270	280	302	290	235	202	219	238
Gobi area demand (MW)	**143**	**164**	**217**	**232**	**310**	**320**	**342**	**330**	**335**	**352**	**369**	**388**
Power Balance												
Total generation of exisitng power plant of CES (MW)	***695***	***695***	***715***	***705***	***705***	***705***	***705***	***705***	***765***	***815***	***815***	***815***
CHP-5 (MW)	0	0	0	0	450	450	450	450	450	820	820	820
Total Balace of CES (MW)	***67***	***124***	***147***	***229***	***158***	***239***	***328***	***389***	***410***	***93***	***395***	***686***
Total demand of CES (MW)	**762**	**819**	**862**	**934**	**1,313**	**1,394**	**1,483**	**1,544**	**1,625**	**1,728**	**2,030**	**2,321**

Source: ADB TA No. 7502-MON 2011. Cited in The Preparatory Survey on the Ulaanbaatar 4th Thermal Power Plant Rehabilitation Project in Mongolia. December 2012. JICA and Electric Power Development Co.,Ltd.

7.8. Economy

7.8.1. Sources of data

Economic data has been sourced from various secondary data sources as well as statistical data provided during KIIs and HHS at the *aimag* and *soum* levels.

7.8.2. Baseline

7.8.2.1. Economy

After the recession in 2015-2016, the Mongolian economy has been recovering. Economic growth averaged 5.9% over the past three years. The main sectors contributing to the economy are mining, wholesale and retail trade, manufacturing, agriculture, and construction. The Mongolian economy is greatly dependent on the mining and service industries.

Economic growth was 5.1% in 2019, mainly due to the export of materials (coal and cooper), revival of foreign direct investment, improvement of business environments and effective implementation of the adjustment program by the Government of Mongolia with the support of International Monetary Fund (IMF).[97]

In terms of inflation, Mongolia experienced a sharp increase in inflation in the market transition phase which occurred from 1990 to 1995. Inflation peaked at 250%, hitting an all-time high in 1993 and then decreasing into the single digits by 2000. Deflation came about as a result of tighter monetary policies, the effect of free trade on national commodity prices and the change to an open market. Mongolia's inflation rate reached a low of 1.3% in 2016 and subsequently rose to 8.1% in 2018. By 2019, inflation fell to 5.2%.

[97] IMF Extended fund facility fund, ADB financial package funded by Japan, Korea, China, ADB and World Bank.

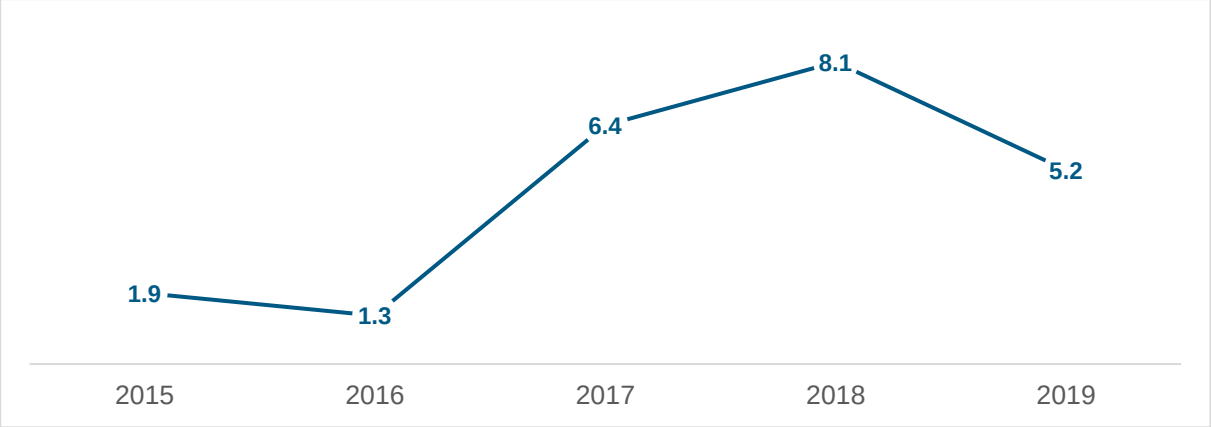


Figure 7-27. Inflation in Mongolia 2015-2019

Economic growth in 2020 was expected to be 4.9% due to consumption and investment in mining and industry. However, Mongolia's economy is likely to shrink mainly due to the adverse impacts of the COVID-19 global pandemic in 2020. According to Central Bank of Mongolia, economic growth is expected to decline up to 1.8%.[98] Women and small businesses are particularly vulnerable.

Possible short-term and medium-term economic risks include political instability (2020 Parliamentary elections), unstable prices of raw materials and a lack of correlation (i.e. a discrepancy) between the banking and finance sectors. Furthermore, the dependency of Mongolia on its mining sector (over 20% of Gross Domestic Product (GDP) and 90% of exports) is a major challenge at a structural level and increases vulnerability of the economy to changes in the price of raw materials and other shocks.

The economy, with its dependence on mining, remains vulnerable to swings in commodity prices. Mongolia is also heavily dependent on trade with its neighbour, China, where an economic slowdown has triggered a sharp fall in export prices in Mongolia affecting transport, tourism, retail trade, and services.

In response, on 27 March 2020, the Government launched a Countercyclical Development Expenditure Program (CDEP), with the intention of introducing USD$1.8 billion in counter-measures against the COVID-19 pandemic. The Government has also announced special measures, including the cancellation of individual income taxes and social insurance payments from employees and employers for six months (from April to September 2020). All legal entities with less than MNT1.2 billion annual income have been given these tax exemptions. The Government also announced an additional MNT10,000 for each Mongolian child per month.

Despite these measures, with large international bond payments due in the coming years, the Mongolian Government will face huge challenges to address the longer-term economic impacts of the virus.[99]

Dornogovi *aimag*

In 2019, Dornogovi *aimag's* nominal GDP was MNT 405.3 billion, which was approximately 11% of the Central Region's[100] GDP. Compared to the previous year, the GDP of Dornogovi aimag rose by MNT 37.0 billion. In the past decade, the GDP of the *aimag* has increased seven times. The main sectors contributing to the *aimag's* economy are agriculture (31.5%), manufacturing and construction (19.8%), and services (48.7%), of which manufacturing is a top regional priority. The main products of manufacturing are coal, food, concrete, and wooden products.[101]

In 2019, a total of 1,261 public and private entities actively operated in Dornogovi *aimag*, an increase of 9.6% from the previous year. The *aimag* promotes small-scale industrial activity, such as trade, service, transportation and storage, financial service, and hotel and catering. The majority (82%) of active entities have one to nine employees.

[98] Bank of Mongolia, Inflation report, 2020-04
[99] Bank of Mongolia, Annual Report, 2019. https://www.mongolbank.mn/listpublications.aspx?id=4
[100] The National Statistics Office (NSO) classifies Mongolia's 21 aimags into four regions - Western, Khangai, Central and Eastern regions. Central region includes Dornogovi, Govi-Sumber Dundgovi, Umnugovi, Selenge, Tuv and Darkhan-Uul aimags.
[101] Dornogovi *aimag*'s government. 2012. *Development Planning: Social and Economic of Altanshiree soum, 2012-2022*

At the *soum* level, Airag *soum* has 49 active entities; there are 22 in Altanshiree, 42 in Dalanjargalan, 19 in Saikhandulaan, and 677 in Sainshand. Examples include bread and pastry shops, a construction block business, a household wooden furniture shop and a sewing shop. Coal mining and cement production are located in Dalanjargalan soum.[102]

Govi-Sumber aimag

As of 2019, Govi-Sumber *aimag's* nominal GDP was MNT 97.6 billion, approximately 3% of the Central Region's GDP and an increase of MNT 8.4 billion from the previous year. The main economic sectors were services (43.2%), manufacturing (34%), mining (24.2%), and agriculture (22%).

The private entity, Shiveeovoo JSC, which produces around 93% of the manufacturing in Govi-Sumber, is the main mining company in Govi-Sumber aimag. In 2019, a total of 246 public and private entities actively operated in Govi-Sumber *aimag*. Like Dornogovi *aimag*, Govi-Sumber *aimag* also promotes small-scale industrial activity, particularly trade, services, transportation, catering, construction, and processing.[103]

7.8.2.2. Economic sectors

In 2019, the main labour-intensive sectors at the national level were agriculture, services, manufacturing, education, and construction (Table 7-20). In Dornogovi *aimag* the main sectors were agriculture/livestock, wholesale and retail trade, service, transportation and logistics; and in Govi-Sumber *aimag* they were agriculture/livestock and mining.[104] These economic sectors (and market channels) in the two Project *aimags* are discussed below.

Table 7-20. Number of workers by economic activity in 2019

№	Sectors	National rate	Central Region	Dornogovi	Govi-Sumber
1	Agriculture, arboriculture, fishing, hunting	290,160	76,539	9,416	2,167
2	Mining and quarrying	57,923	12,713	1,419	1,132
3	Manufacturing	90,378	11,460	2,056	316
4	Electricity, gas, steam and air conditioning supply	19,348	4,933	568	249
5	Water supply; waste water, waste management and cleaning services	10,786	1,575	444	108
6	Construction	68,847	6,392	349	12
7	Wholesale and retail trade, automobile and motorcycle repair services	160,405	21,556	4,991	772
8	Transportation and storage services	61,123	13,415	4,424	450
9	Hotels, accommodation and catering services	36,280	3,987	744	108
10	Information and communication	13,019	1,097	0	16
11	Financial and insurance activities	24,257	3,201	347	158
12	Real estate activities	1,154	225	0	0
13	Professional, scientific and technical activities	18,031	2,146	0	60
14	Administration and support services	20,163	1,470	10	16

[102] Dornogovi *aimag*'s Statistical Office. 2019. *Statistical Yearbook.*
[103] Govi-Sumber *aimag*'s Statistical Office. 2018. *Statistical Yearbook.*
[104] National Statistical Office of Mongolia, www.1212.mn

№	Sectors	National rate	Central Region	Dornogovi	Govi-Sumber
15	Public administration and defense activities, mandatory social security	85,965	13,098	1,452	594
16	Education	96,108	14,745	1,579	598
17	Health and social services	44,376	6,901	1,613	35
18	Art, entertainment, games, recreational activities	17,999	2,214	744	0
19	Other service activities	24,547	2,895	879	313
20	Activities of households who hire labour	3,275	783	681	38
21	International organizations, country representative activities	2,014	0	0	0
	All	**1,146,161**	**201,346**	**31,717**	**7,252**

7.8.2.2.1. Livestock

Dornogovi *aimag*

By the end of 2019, Dornogovi *aimag* had 2,404,200 livestock: 43,500 camels, 152,600 horses, 91,900 cattle, 1,021,600 sheep and 1,094,600 goats. The total number of livestock increased by 256,100, which is 11.9% higher than 2018. Goats and sheep comprise the largest share of livestock herds, 46% and 43% respectively. Horses comprise 6%, cattle 4% and camels 2%.

Govi-Sumber *aimag*

By the end of 2019, Govi-Sumber aimag had 452,000 livestock: 22,700 horses, 14,500 cattle, 900 camels, 219,500 sheep and 194,200 goats. The total number of livestock increased 5.7% since 2018.

Project *soums*

In the seven Project *soums*, goats, sheep and camels are the main livestock. Livestock numbers in Saikhandulaan and Dalanjargalan *soums* have increased in the last few years, and in the seven Project soums, the number of goats is increasing due to high commodity prices for wool and especially cashmere. Most goat products (cashmere, milk and meat) are sold at the *aimag* and *soum* markets and only a small amount is consumed by the producing households.

The surveyed herder-households follow the same pattern of other herders in the Project Area. They too sell their livestock products at the central markets in the *soum* or *aimag* centre. Fifty-four percent of the households sold their animal products and raw materials at the *soum* central market, 20% at the *aimag* centre market and 26% at a market in Ulaanbaatar.

7.8.2.2.2. Agriculture

In the vicinity of the proposed OHTL, no agriculture is practiced. The closest crop fields are located near Khaylaga Lake, which is 3.6 km west of the OHTL.[105] None of the surveyed households have garden plots or fields commonly found in rural areas. This means that the Project will not affect household plots.

7.8.2.2.3. Industry

As of 2019, there were a total of 187,126 public and private entities in Mongolia, of which 8.7% or 16,304 entities were registered in the Central Region. Table 7-21 shows the industrial sectors in the Project Area for 2019.

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

Table 7-21. Industrial sectors in the Project Area – Active Establishments in 2019

№	Sectors	Dornogovi *aimag*	Sainshand	Airag	Altanshiree	Dalanjargalan	Saikhandulaan	Govi-Sumber *aimag*	Sumber	Shiveegovi
1	Agriculture, arboriculture, fishing, hunting	32	10	4	1	1	2	26	2	5
2	Mining and quarrying	12	6	1	0	0	0.	2	0	1
3	Manufacturing	49	36	1	0	0	2	18	1	1
4	Electricity, gas, steam and air conditioning supply	3	1	0	0	0	0	4	1	1
5	Water supply; wastewater, waste management and cleaning services	8	6	0	0	0	0	1	0	0
6	Construction	58	47	2	0	1	0	11	1	0
7	Wholesale and retail trade, automobile and motorcycle repair services	370	163	18	8	18	5	118	8	19
8	Transportation and storage services	53	33	1	0	1	0	13	0	0
9	Accommodation and food industry and catering services	70	37	4	1	2	1	20	1	2
10	Information and communication	18	11	0	0	0	0	11	1	0
11	Financial and insurance services	60	42	1	1	0	0	11	1	0
12	Real estate activities	19	16	0	0	0	0	6	0	0
13	Professional, scientific and technical activities	49	11	5	3	4	2	13	1	1
14	Administration and support services	24	15	1	0	1	0	6	0	0
15	Public administration and defense activities, mandatory social security	69	27	2	2	4	2	28	2	2
16	Education	77	36	2	2	2	2	31	2	4
17	Health and social services	39	21	1	1	2	1	9	1	1
18	Art, entertainment, games, recreational activities	30	13	1	1	2	1	12	1	2
19	Other service activities	220	146	5	2	4	1	44	1	4
Total		1,261	677	49	22	42	19	384	24	43

Source: National Statistical Office – Business Register, Active Establishments, 1212.mn

Dornogovi *aimag*

Dornogovi *aimag* has a total of 1,751 entities registered, of which 1,261 (72%) are actively operating and 490 (28%) are inactive. A total of 158 new entities were created in 2019, and 15 entities either migrated or were liquidated. Compared to the previous year, the number of registered entities rose by 9.6%, but the proportion of operating entities fell by 0.7%. The distribution of entities are as follows: 28.4% are registered in trade; 17.5% in other services; 5.8% in transportation, storage and communication; 5.5% in the financial transactions; 5.4% in hotel, food industry and catering; and 5.2% in education.

Govi-Sumber *aimag*

In Govi-Sumber *aimag*, a total of 492 entities are registered.[106] The number of services and small and medium enterprises (SMEs) have risen in Dornogovi and Govi-Sumber *aimags* due to the implementation of infrastructure and large-scale factory and electrical energy projects in recent years. According to the local governmental authorities, the new power line will serve an important role in the development of many new small and medium enterprises (SMEs) servicing the mining and infrastructure sector.

[106] National Statistical Office of Mongolia. Available at: www.1212.mn. Accessed March 2020.

7.8.2.3. Finance

Ninety-four percent of the financial sector in Mongolia is comprised of banks. At the end of 2019, there were 13 banks, 538 non-bank financial institutions (NBFI), 261 savings and credit cooperatives, 18 insurance companies, 54 insurance agencies, and 27 loss adjuster companies operating in Mongolia.

In the *aimag* centres of Dornogovi and Govi-Sumber, there are a number of banks, including branches of the Central Bank of Mongolia, as well as five other commercial banks, which include the Trade and Development Bank, State Bank, XAC Bank, Golomt Bank and Khan Bank.

According to the Central Bank of Mongolia (Table 7-22), **Govi-Sumber *aimag*** had MNT 73,779 million in commercial bank loans as of 31 December 2018. Of these loans, 98% were active and 2% were either overdue or non-performing loans. For the same period, **Dornogovi *aimag*** had MNT 285,896 million in commercial bank loans, of which 97% were active and 3% were overdue or non-performing.[107] The proportion of loans that are overdue or non-performing in the two *aimags* are at a similar level to that of the Central Region, which is 2%, but much lower than the national average of 15%.

At the end of 2018, personal savings reached MNT 19,398 million in Govi-Sumber *aimag* and MNT 107,445 million in Dornogovi *aimag*.

Table 7-22. Loans and savings (in million MNT) in the Project *soums*

Location	Total amount of loans	Of which			Total amount of savings	Of which	
		Normal loans	Overdue and non-performing loans	% of overdue and non-performing loans		Term deposit	Demand deposit
Nation-wide	17,082,386	14,460,722	2,621,664	15	13,075,824	10,468,796	2,607,028
Central Region	1,576,607	1,535,558	41,049	3	753,997	563,671	190,326
Govi-Sumber *aimag*	73,779	72,272	1,507	2	19,398	15,651	3,747
• Sumber *soum*	59,854	58,658	1,197	2	16,719	13,535	3,184
• Shiveegovi *soums*	10,744	10,545	199	2	2,010	1,543	467
Dornogovi *aimag*	285,896	276,985	8,911	3	107,445	75,916	31,529
• Sainshand *soum*	120,751	117,822	2,929	2	44,544	35,237	9,307
• Airag *soum*	7,893	7,723	170	2	2,436	1,125	1,311
• Altanshiree *soum*	2,433	2,336	96	4	726	545	181
• Dalanjargalan *soum*	8,805	8,457	348	4	2,784	2,143	641
• Saikhandulaan *soum*	2,532	2,528	3	0	677	311	366

Source: Central Bank of Mongolia[108]

7.9. Employment and Livelihoods

7.9.1. Sources of Data

Employment and livelihoods data have been sourced from various secondary data sources such as the Mongolian NSO, as well as statistical data provided during KIIs and HHS at the *aimag* and *soum* levels.

[107] Central Bank of Mongolia. Provinces Loan and Savings Statistics. 2018. Available at: https://www.mongolbank.mn/liststatistic.aspx?id=13. Accessed March 2020.

[108] Central Bank of Mongolia. Provinces Loan and Savings Statistics. 2018. Available at: https://www.mongolbank.mn/liststatistic.aspx?id=13. Accessed May 2020.

7.9.2. Baseline

7.9.2.1. Employment

National level

In 2019, Mongolia had 1,273,896 economically active persons, of which 90% were employed and 10% were unemployed. A slightly higher percentage of men than women were employed in the labour force; 53% compared to 47% of women. Similarly, of the 127,736 persons who were unemployed, 59% were male and 41% were female.

The labour force participation rate is 61 overall, 55% in urban areas and 71% in rural areas where livestock farming predominates. Due to the surge in employment in mining and infrastructure in recent years, the labour force participation rate is relatively higher in the Project Area than nationwide. It is 65.1% in the Central Region, 74.6% in Govi-Sumber *aimag* and 68.9% in Dornogovi *aimag*.[109]

Dornogovi *aimag*

As of 2019, Dornogovi *aimag* had 32,985 economically active persons and the labour force participation rate was 68.9%. Compared to the previous year, the number of economically active people increased by 5.3%. The male labour force participation rate (73.1%) was 8.7% larger than the female labour force participation rate (64.8%). The number of employed persons was 31,717, of which 57.4% were males and 42.6% were females (Table 7-23).

The most labour-intensive sectors in Dornogovi were agriculture (29.7%), transportation and storage (13.9%) and wholesale and retail trade (15.7%). As a result of developments in the manufacturing sector, employed persons in this sector doubled from 3.5% to 6.5% in the last few years.

Table 7-23. Labour status of Dornogovi *aimag* and Project *soums*, 2019

Indicators	Dornogovi			Project target *soums*				
	Total	Male	Female	Airag	Altanshiree	Dalanjargalan	Saikhandulaan	Sainshand
Working-age population	47,850	24,535	23,315	2,433	839	1,707	873	15,328
Economically active population	32,985	17,364	15,621	1,144	643	1,195	650	8,625
Employed	31,717	18,217	13,500	1,100	602	1,136	636	8,187
Unemployed	1,300	500	800	44	41	59	14	438
Economically inactive population	14,861	6,374	8,487	1,289	196	512	223	6,703
Labour force participation rate, %	68.9	73.1	64.8	47.0	76.6	70.0	74.5	56.3
Employment rate, %	66.3	71.2	61.5	45.2	71.8	66.5	72.9	53.4
Unemployment rate, %	3.9	2.7	5.8	3.8	6.4	4.9	2.2	5.1

Source: National Statistics Office and Dornogovi aimag's Statistical Yearbook, 2019

Govi-Sumber *aimag*

In 2019, Govi-Sumber *aimag* had 8,058 economically active persons, an increase of 7.9% from the previous year. The male labour force participation rate (77.3%) was 5.4% higher than the female labour force participation rate (71.9%). Female labour force participation in Govi-Sumber *aimag* is much higher than the national average, 72% and 47% comparatively (Table 7-24).

[109] National Statistical Office of Mongolia. Available at: www.1212.mn. Accessed May 2020.

In 2019, the number of employed persons in Govi-Sumber was 7,252, of which 53% were males and 47% were females. The main labour-intensive sectors were mining, agriculture, and transportation.

Table 7-24. Labour status of Govi-Sumber *aimag* and Project *soums*, 2019

Indicators		Govi-Sumber			Project target *soums*	
		Total	Male	Female	Sumber	Shiveegovi
Working-age population		10,796	5,722	5,074	7,495	2,022
Economically active population		8,,058	4,222	3,836	-	-
	Employed	7252	3,868	3,384	4,099	1,250
	Unemployed	806	354	452	-	-
Economically inactive population		2,738	1,500	1,238	-	-
Labour force participation rate, %		74.6	77.3	71.9	-	-
	Employment rate, %	67.2	70.8	63.5	-	-
	Unemployment rate, %	10	8	12	-	-

Source: National Statistics Office and Govi-Sumber aimag's Statistical Yearbook, 2019

Surveyed households

Findings from the HHS (June 2020) (Table 7-25) show that all the households earn income from agricultural products associated with herding activities. Seventy percent (n=23) of household members of working ages are economically active, of which 78% (n=18) are engaged in herding and 22% (n=5) work in the private sector. In the four rural *soums in* Dornogovi *aimag* (Saikhandulaan, Altanshiree, Dalanjargalan and Airag), the majority of employed people work as herders: 76% of employed persons in Saikhandulaan, 73% in Altanshiree, 47% in Dalanjargalan, and 46% in Airag.

Table 7-25. Income-generating activities in surveyed Households (n=22)

Total number of households	Number	%
Number of households reporting earnings	21	95%
Number of households reporting earnings from two occupational types (herding and the private sector)	3	7.3%
Number of households with an unemployed household member	0	0%
Number of household members in the working age (21 HHs)	65	100%
* of whom generate income	55	85%
Number of household members engaged in herding	50	91%
Number of household members engaged in private sector activities	5	9%

Source: Social Baseline Household Survey, June 2020

7.9.2.2. Unemployment

In 2019, the unemployment rate in Mongolia was 8.1% at the national level, 9.8% in urban areas and 7.4% in rural areas. Youth unemployment is widespread.[110]

Dornogovi *aimag*

Compared to national figures, the unemployment rate in Dornogovi *aimag*, a rural area, is comparatively low, with estimates ranging from 2.2% to 6.4% across the *soums* in the Project Area. Unemployment in Dornogovi *aimag* is also lower than in the Central Region as a whole. As in the rest of the country, youth unemployment is high. In the *aimag*, youth comprise 60% of the unemployed, and over half of them (59%) have completed secondary education.

[110] NSO. (2019). *Social and Economic Survey*

Dornogovi *aimag* has a Labour and Social Welfare service, a governmental body, to assist residents in finding jobs. In 2019, 1,300 residents registered with the Service, of which 60% were between the ages of 25 and 34 and all but 9% were graduates of either secondary or vocational school. Ninety-one percent had a minimum of completed vocational or secondary education. In the same period, the Labour and Social Welfare service arranged 1,321 job placements. The majority of employment offers came from mining and quarrying (32%) and "other services" in light and heavy industry.

In 2019, there were 44 unemployed people in Airag *soum*, 41 in Altanshiree *soum*, 59 in Dalanjargalan *soum*, 14 in Saikhandulaan *soum,* and 438 in Sainshand *soum*. By the end of the year, approximately 90% of them found employment through the Governmental Labour and Social Welfare Service. As of 2019, Dornogovi *aimag* was placed first among the country's aimags in hiring personnel sourced through the Service.

The employment rate for both men and women in Dornogovi *aimag* is expected to rise in the future. More jobs are being created from the Government's large-scale infrastructure projects in oil, manufacturing, railway construction and mining. Moreover, the collaboration contracts with the mining companies include a clause stating a specific quota of the labour force must be local hires.[111] While there are indications that public service will be hiring, with the majority of positions going to women, it is anticipated that these gains in employment will favour men more than women. In addition, the greater employment prospects in Dornogovi *aimag* have attracted young workers and families from other areas whose labour contributions will benefit the *aimag* in the short- and long-terms.

Govi-Sumber *aimag*

The unemployment rate is relatively high in Govi-Sumber *aimag*: it is 11.4% compared to 7.9% in the Central Region and the national average of 8.1%.[112]

In 2019, 2,271 people registered with the Governmental Labour and Social Welfare Service. The proportion of unemployed who were male was slightly lower than females, 48.7% compared to 51.3%. As in Dornogovi *aimag*, educated youth and young adults comprised a large proportion of the unemployed. [113]

Surveyed households

Findings from the HHS indicate that there are no unemployed members in the 22 households interviewed. As shown in Table 7-14 above, 10 persons of working age in seven of the interviewed households had not worked to generate any income in the last month, and in most cases, the past year. They were economically inactive because they were studying or recently graduated from university/military academy. Some of them were resigned to the fact that they were not going to find a suitable job in the local area and had stopped looking. The more educated family members are generally not interested in herding, and although willing to work in the *soum* centres, experience difficulty finding positions commensurate with their level of education.

The share of the economically inactive population (persons neither working nor actively seeking employment) is much higher in Airag and Sainshand *soums* than other *soums*; 53% of the working-age population in Airag *soum* and 44% of the working-age population in Sainshand *soum*.[114]

7.9.2.3. Earnings

National level

The primary data source for the earnings reported at the national and *aimag* levels come from the Mongolia NSO, which conduct Entity Worker's Salary Survey and Household socio-economic surveys every year. The Entity Worker's Salary Survey covers all type of entities from both public and private sectors. The latest data available are from the year 2019 (Figure 7-28).

In Mongolia, the average worker earns MNT 1,124,300 per month (1.1 million). The highest paid economic sector is the mining and quarrying industry, where the average pay is MNT 2.3 million per month and the lowest paid economic sector is the service industry, where the average pay is MNT 0.6 million per month.[115]

[111] Baseline field study data
[112] NSO. (2019). *Labor Force Survey Report*
[113] Ibid.
[114] Saikhandulaan *Soum*'s Government. (2012). *General Development Plan of Saikhandulaan soum 2012-2022.*
[115] NSO. 2019. Entity Worker's Monthly Average Salary Survey. Available at: https://1212.mn/BookLibraryDownload.ashx?url=average_wage_2019.pdf&ln=Mn. Accessed June 2020.

Figure 7-28. Dynamics of the Entity Worker's Average Salary (2010-2019)

Source: NSO. 2019. Entity Worker's Monthly Average Salary Survey

Article 49.2 of the Labour Code of Mongolia (1999) mandates that "*male and female employees performing the same work shall receive the same salary".* Presumably, as a result of greater enforcement of the Labour Code and heightened attention on women's status starting in 2005 with the establishment of the Secretariat of the National Council on Gender Equality chaired by Prime Minister Tsakhiagiin, the wage differential in earnings between men and women fell to just 11.4% in 2006 and 8.8% in 2016.[116] In 2019, the gender pay gap was reported to be minimal, however data reported at the lower administrative units show that the gender pay gap can be as high as 13%, and some reports from NGOs give an estimate of 25%.[117]

Several factors that may account for this pay gap can still be found between men and women. Women continue to have a limited presence in higher-level managerial positions and in entrepreneurial work.[118] Working women must also shoulder most of the household and care duties, unlike men. In particular in herding households, women milk the livestock, process milk into dairy products for household use and sale, in addition to caring for children and the elderly, while men are responsible for pasturing livestock.[119] As seen in Figure 7-29, a gap remains between male and female wages, across almost all occupations.

Figure 7-29. Entity worker's average salary (in MNT thousands)

Source: NSO. 2019. Entity Worker's Monthly Average Salary Survey

[116] INTEM Consulting, Inc. 2013. Country Gender Profile: Mongolia. Country Report. Prepared for the Japan International Cooperation Agency (JICA). Available at: https://www.jica.go.jp/english/our_work/thematic_issues/gender/background/c8h0vm0000anjqj6-att/mongolia_2013.pdf. Accessed June 2020.

[117] NSO. 2019. Entity Worker's Monthly Average Salary Survey. Available at: https://1212.mn/BookLibraryDownload.ashx?url=average_wage_2019.pdf&ln=Mn. Accessed June 2020.

[118] International Labour Organization. 2019. Accelerating the 2030 Sustainable Development Goals through decent work – Mongolia. Accessed July 2020 at: https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo-beijing/documents/publication/wcms_673936.pdf. Accessed June 2020.

[119] Ahearn, A. 2018. Winters without women: social change, split households and gendered labour in rural Mongolia. Gender, Place & Culture 25(1):1-17.

Dornogovi and Govi-Sumber *aimags*

According to the NSO, the average salary of an entity[120] worker in Dornogovi *aimag* is MNT 1,014,700. Men receive MNT 1,129,500 on average and women, MNT 889,700. The average salary of an entity worker in Govi-Sumber *aimag* is MNT 1,052,800. Men receive MNT 1,183,400 on average and women MNT 922,200. Average salaries in the *aimags* are constantly increasing (shown in Figure 7-30).[121]

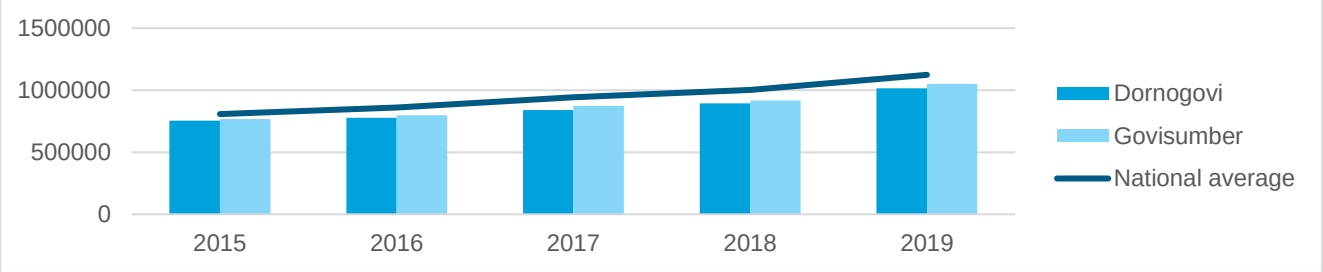


Figure 7-30. Amount of average monthly income nationally and in the Project aimags (MNT)

Source: NSO. 2019. Entity Worker's Monthly Average Salary Survey

Surveyed households

Due to the relatively few salaried workers in the household study, data on employment earnings are limited to reports from five workers residing in three households. The workers reported monthly salaries ranging from MNT 800,000 to 900,000, the average of which was MNT 840,000.

7.9.2.4. Household income

National level

At the national level, the average monthly household income was MNT 1,343,428 in 2019, which rose by MNT 162,361 (13.7%) from the previous year. The monthly average income of households residing in rural areas was MNT 1,180,662, which is lower by MNT 246,280 (23.8%) than the urban average. In the Central Region, average monthly income of the households was MNT 1,241,848 in 2019.[122]

At the national level, 421,088 (12.8%) people received social welfare pensions and allowances of MNT 303,820.7 million in 2019. The minimum subsistence level of population (per capita, per month) is MNT 198,300 in 2018 in the Central Region, including Govi-Sumber and Dornogovi *aimags*, whereas it is MNT 230,000 in Ulaanbaatar.[123]

Dornogovi and Govi-Sumber *aimags*

Income generation from raising and selling livestock is highly dependent on local market conditions, and as such, is unstable with long periods of no income. Consequently, herders sell wool and dairy products from their livestock to earn a living. Civil service employment and employment in the railway sector are the main sources of regular employment in the *soums*.

In Dornogovi *aimag*, 25,721 people received social welfare pensions and allowances of MNT 8,252,006 thousand in 2018. In Govi-Sumber *aimag*, 7,748 people received social pensions and allowances of MNT 1,979,889 thousand in 2018.

Surveyed households

The income of the surveyed households consists of two main sources: social welfare payments and sales of agricultural products. Only three households have members who earn salaries. Table 7-26 shows household income and income sources of the surveyed households.

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[120] i.e. a company, state-owned entity, local governing entity, cooperative, entrepreneur, partnership or NGO
[121] Ibid.
[122] NSO. 2019. Household Socio-Economic Survey Report. Available at: https://1212.mn/BookLibraryDownload.ashx?url=Tan_HSES_19.IV.pdf&ln=Mn. Accessed June 2020.
[123] NSO. www.1212.mn Available at https://www.1212.mn/tables.aspx?tbl_id=DT_NSO_1900_010V1&AIMAG_select_all=0&AIMAGSingleSelect=_5&YearY_select_all=0&YearYSingleSelect=_2020&viewtype=table

Table 7-26. Household median income and income sources, monthly and annual

Income sources	Median income (MNT)	The highest income (MNT)	The lowest income (MNT)
Monthly sales of agricultural products (n=22)	750,000	2,583,000	250,000
Monthly social welfare payment (n=19)	300,000	100,000	880,000
Monthly salary income (n=3)	840,000	900,000	800,000
Households' monthly median income (n=22)	1,392,000	3,400,000	500,000
Households' annual median income (n=22)	16,740,000	40,800,00	6,000,000

Source: ESIA field survey HHS.

Sales income of agricultural products: All the surveyed households earn income from agricultural products. Household monthly income from sales of agricultural products average MNT 750,000, and the highest income is earned from live animal sales, meat, and cashmere. In 2019, the surveyed households reported selling a combined total of 4,083 animals, 16.8 tonnes of meat, and 1,060 tonnes of cashmere. On average, each household sold 60 animals, 250 kg of meat, and 75 kg of cashmere last year. The main market was the *soum* and *aimag* centres. As illustrated in Figure 7-31, the median annual income from the sales of agricultural products was MNT 9,000,000.

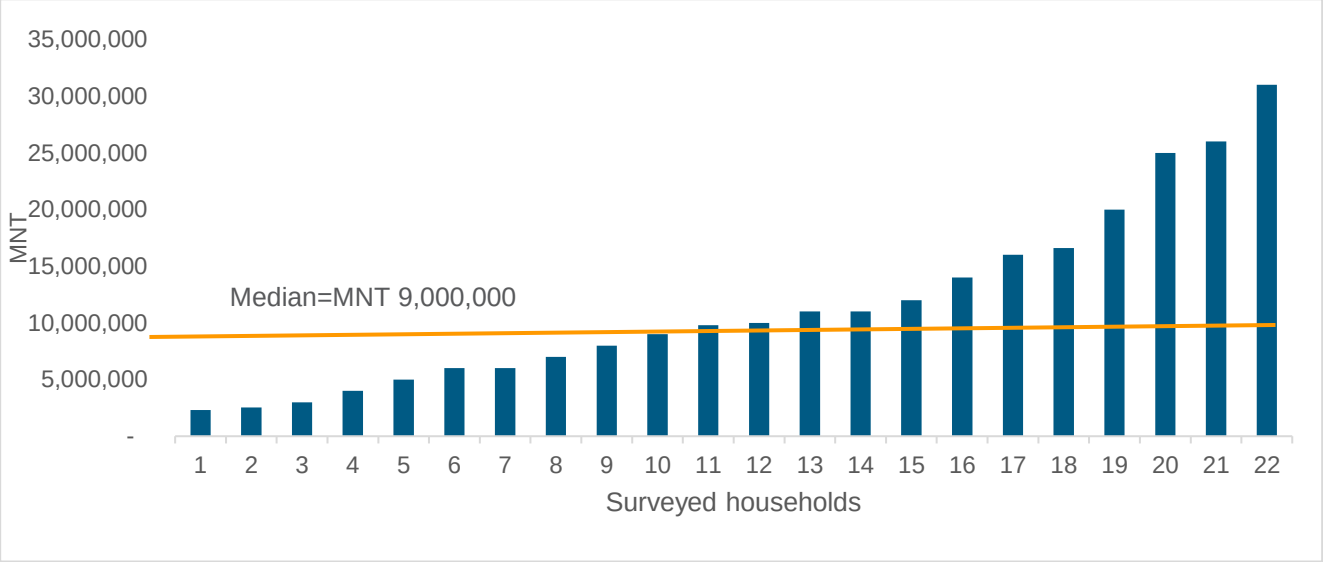

Figure 7-31. Distribution of household income from the sales of agricultural products

Social welfare payments: There were 17 households with at least one family member who receives social welfare. The two forms of subsidies paid were child welfare allowances and pensions. Every child younger than 18 years of age receives a cash grant of MNT 100,000 per month. The standard pension is MNT 350,000 per month. The median income from social welfare payments was MNT 300,000.

Monthly salary income: There were only 3 households having a family member who works in private sector. The average monthly salary was MNT 840,000 for those three households.

7.9.2.5. Consumption expenditure and debt

National and regional level

At the national level, the average monthly household consumption expenditure was MNT 1,416,640 in 2019, which was an increase of MNT 175,909 (14.2%) from the previous year. In the Central Region, the average

monthly household expenditure in 2019 was MNT 1,394,514, which is slightly lower than the national average.[124]

Surveyed households

Monthly median household expenditure was MNT 1,966,667 among the surveyed households (Table 7-27), which is much higher than the average monthly consumption in the Central Region. Among the surveyed households, consumer durable purchases were the highest spend, averaging MNT 13.7 million per year; this was followed by expenditures on petrol and car service amounting to an average of MNT 5.3 million per year.

Table 7-27. Household consumption expenditure

Expenditures	Number of households (given answers)	Average expenditure per year (MNT)
Cost for livestock feeding, veterinary and tax	21	2,436,905
Petrol and car service	21	5,361,905
Electricity and heating	2	330,000
Food	22	3,422,727
Education (tuition fee, uniform etc)	16	3,056,250
Medical expenses	14	1,378,571
Consumer durables (car, house items, furniture)	11	13,700,000
Clothes	20	2,970,000
Mobile and internet	21	666,667
Social activity, events, celebrations	20	3,240,000
Other expenses	1	1,000,000
Average monthly expenditure	-	**2,264,527**
Median monthly expenditure	-	**1,966,667**
Average annual expenditure	-	**27,174,318**
Median annual expenditure	-	**23,600,000**
Average monthly expenditure per capita	-	**666,715**
Median monthly expenditure per capita	-	**470,417**

Seventeen of the 22 surveyed households borrowed money in the past year, primarily from banking institutions (85%). The mean and median amounts borrowed are MNT 11.94 million and MNT 10.00 million respectively (n=16). The reasons for borrowing money are presented in Table 7-28. Over 40% of households borrowed money to cover household expenses.

Table 7-28. Reasons why the surveyed herder-households borrowed money in the past year

Reason	Number (%)
Livestock raising	3 (17.6)
Household-based production and service	2 (11.8)
Building of house and fence *(khashaa)*	3 (17.6)
Covering household expenses	7 (41.0)
Other	2 (11.8)
Total	17 (100)

Source: Social Baseline Household Survey, June 2020

[124] NSO. 2019. Household Socio-Economic Survey Report. Available at https://1212.mn/BookLibraryDownload.ashx?url=Tan_HSES_19.IV.pdf&ln=Mn. Accessed June 2020.

7.9.2.6. Household assets

National level

According to the NSO, over 80% of herder-households have solar, wind, and small electric generators; 70% have satellite antenna and televisions, and 30% have radios.[125]

Surveyed households

Questions in the household survey about assets were limited to savings and livestock. Of 21 households, 7 or 33% have savings. The amount of savings held is unknown.

When asked about the number of livestock raised in the past 12 months, 21 households reported that their herds had increased in size and one reported the opposite. The 22 surveyed households own a combined total of 15,420 animals, primarily sheep and goat. Twenty households own horses, 16 own cattle, and 2 own camels. The average number of livestock per household is 700.[126] Table 7-29 presents these numbers in detail below.

Table 7-29. Number of livestock of surveyed households

	Camel	Horse	Cattle	Sheep	Goat	Total
The number of households owning livestock	7	20	16	22	22	22
Average animals owned by households	38	43	23	397	236	701
Minimum amount of animals owned by households	3	2	3	75	40	180
Maximum amount of animals owned by households	110	173	86	1,100	600	1,802

Source: Social Baseline Household Survey, June 2020

7.9.2.7. Forced labour and child labour

As of 2019, two cases of forced labor were registered at the General Police Department in Mongolia. From these two cases, one was registered in Sukhbaatar *aimag* and the other was in Ulaanbaatar. In the context of Mongolian culture, forced labour is a different phenomenon than child labour, which is considered an integral part of traditional nomadic herding culture that involves for the boys, herding livestock, horseback riding, haymaking; and for the girls, helping with cooking and watching younger siblings. It is believed that such traditional methods provide children with the necessary skills to lead productive lives in the future.

7.10. Poverty

7.10.1. Sources of data

Poverty data was collected from a review of statistical data and KIIs and HHS.

7.10.2. Baseline

National level

Poverty in Mongolia is persistent, and the poverty incidence is higher in rural areas. As of 2018, the poverty headcount rate was 28.4% at the national level, 27.2% in urban areas, and 30.8% in rural areas. However, poverty reduction was uneven, decreasing in rural areas but not in urban areas. The main reasons were the increase in livestock prices and the expansion of poverty-targeted social protection programs in rural areas.[127]

Nationally, the incidence of poverty increased in urban areas between 2014 and 2018. During the period between 2017 and 2018, the poverty rate declined by 4% in rural areas and increased by 0.1% in urban areas.

[125] NSO. Available at: www.1212.mn. Accessed March 2020.
[126] Due to time constraints, no attempt was made to calculate the values of livestock inventories.
[127] National Statistical Office and the World Bank, Mongolian Poverty Update, 2018.

This decrease in poverty in rural areas may be attributed to the increase of economic growth that Mongolia has experienced over the past decade, as well as increasing herd sizes and large transfers of public revenue from mining and Ulaanbaatar to rural areas. Although the poverty rate remains high in rural areas, with two-thirds of the total population of Mongolia living in urban areas, poverty has become concentrated in urban areas.[128]

Dornogovi and Govi-sumber *aimags*

There is a considerable difference in poverty levels across *aimags*. Govi-Sumber *aimag* had the highest poverty incidence in 2018, with over half of its population (51.9%) living in poverty. Dornogovi *aimag* is relatively better off with respect to poverty, where 23.4% of the population is living below the poverty line.

Surveyed households

Only one of the herder-households in the baseline survey is poor. Its per capita monthly income taking into account herding income, allowances and livestock sales is MNT 175,000, which is just 88% of the subsistence minimum or poverty line (MNT 198,300). Another household has a per capita monthly income of 222,222, which is only 12% above the subsistence minimum.

According to the recent report of the NSO and the World Bank,[129] the poverty reduction in rural areas was driven by farm income growth, especially higher livestock product prices. On average, rural household real income grew by 2.6% and the poorest rural quintile recorded the highest growth of 3.8%. Regardless of any variations in households' livestock inventories, higher prices for livestock products, especially cashmere, contributed to the increase in herders' income reported in the HHS. Growth in farm income alone thus reduced the rural poverty rate by 1.8% between 2016 and 2018.

Yet, the herders' livestock-dependent livelihood is vulnerable to unexpected shocks. The year 2016, 2017 and 2018 were good years for almost all rural herders as a result of higher livestock product prices, but this reflects the reality that they are highly vulnerable to livestock price shocks and especially to harsh winters or any other natural disasters which could destroy their livestock herds. The rapid advance of pastural degradation on the back of increasing demand in livestock products could threaten the sustainability of herders' livestock activities.

7.11. Education and Access to Education

7.11.1. Sources of data

Educational data have been sourced from various secondary data sources such as the Mongolian Sustainable Development Visions-2030, National Development Agency[130] and Mongolian NSO[131], as well as statistical data provided during KIIs at the *aimag* and *soum* levels.

7.11.2. Baseline

National level

Mongolia has a well-established education system, the literacy rate is high (98.4% in 2018), and 85% of the population has completed secondary school. The Human Development Index (HDI) is high, 0.74 at the national level in 2018, and is higher in the Project *aimags*, at 0.677 and 0.707 in Dornogovi and Govi-Sumber respectively. It is noteworthy that the HDI is higher for women than for men in Mongolia. The gross enrolment rate is 97.1 in basic education (1-9th grades) at the national level, which is similar for men and women. This rate is 97.4 for both Dornogovi and Govi-Sumber *aimags*.

However, educational performance is still less than optimal in the coverage and delivery of services. Many primary schools operate in shifts with 2 or 3 shifts per day. The teacher-student ratio is 1:20 on average, and 1:27 in secondary schools.132 All educational institutions are supplied with a constant supply of electricity and most schools have a school building, a sports hall and dormitories.

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[128] World Bank. 21 June 2019. Mongolia's 2018 Poverty Rate Estimated at 28.4 Percent. Available at: https://www.worldbank.org/en/news/press-release/2019/06/21/mongolias-2018-poverty-rate-estimated-at-284-percent. Accessed June 2020.
[129] NSO and WB. 2020. *Mongolia Poverty Update 2018.* The Main Report of The Household Socio-Economic Survey 2018. Available at: https://1212.mn/BookLibraryDownload.ashx?url=Poverty_report_2018_ENG.pdf&ln=Mn. Accessed June 2020.
[130] Available at: https://ldi.nda.gov.mn/?province_id=7&region_id=152. Accessed June 2020.
[131] Available at: http://www.dornogovi.nso.mn/uploads/users/88/files. Accessed June 2020.
[132] Mongolian Sustainable Development Visions-2030.

Project Area and Household Surveys

The Project Area education statistics are provided in Table 7-30. In general, primary schools offer nine years of schooling, while the secondary schools offer twelve years.

All school-aged children of herders interviewed who live in the 6 km buffer zone are fully enrolled in school and no school drop-outs were reported. Rural parents are paying more attention to accessing quality education for their children and have become more active in school activities in recent years. Herder households are, on average between 15 and 25 km away from school. It is not difficult to participate in school activities since most herder households own a car and motorcycle.

Table 7-30. Educational indicators, at the National level and in the Project Area, 2019

	National level	Dorno-govi Aimag	Airag	Altan-shiree	Dalan-jargala n	Saik-hand-ulaan	Sains-hand	Govi-Sumber Aimag	Sumber	Shivee govi
General educational schools										
Number of general education schools	820	22	1	1	2	1	5	5	3	1
Number of full-time students	640,449	13,971	667	139	433	147	6,319	3797	2914	740
Number of children with disabilities	6,053	75	-	-	-	-	-	29	-	-
Number of full-time teachers	32,085	649	31	12	19	12	271	185	136	37
Student-teacher ratio	20	21.5	-	-	-	-	-	20.5	-	-
Gross enrolment ratio, basic education, total	97.1	96.7	101.4	77.9	92.3	57.2	105	98.7	-	-
Gross enrolment ratio, basic education (1-9th grades), male	98.7	94.9	-	-	-	-	-	106.2	-	-
Gross enrolment ratio, basic education (1-9th grades), female	95.4	96	-	-	-	-	-	101.4	-	-
Pre-school institutions (#)										
Kindergartens	1,439	41	2	1	2	1	15	11	8	2
Pupils	263,333	6,370	273	98	281	76	2,558	1,985	1,412	375
Pupils with disabilities	1,076	33	-	-	-	-	-	9	-	-
Employees	**56,140**	**1,570**	**68**	**24**	**78**	**24**	**648**	**390**	**292**	**72**
Pre-school staff	28,070	785	34	12	39	12	324	195	146	36
Full-time teachers	8,068	214	11	3	10	3	92	55	41	11
Teaching assistants	6,870	190	10	3	9	2	78	52	38	11
Other staff	13,132	381	13	6	20	7	154	88	67	14
TVET and higher education										
TVETs in Dornogovi: number of students	755									
MNUMS in Dornogovi: number of students	475									

Source: National Statistical Office. Education statistics. www.1212.mn

Dornogovi *aimag* and *soums*

As of 2019, the total number of students reached 15,200, which was an increase of 7.4% from the previous year. Dornogovi aimag had 22 general educational schools in total, in which 13,971 students were recorded in 2019. Fifty-four percent (54.3%) of the students were in grades 1-5, 32.6% were in grades 6-9, and 13.1% were in grades 10-12. As of 2019, a total of 807 students boarded at the secondary school, of which 54.9% were female and 70.8% were children of herders.

Primary school enrolment is 97% and secondary school enrolment is 95% in Dornogovi *aimag*. Several school-aged children study in Ulaanbaatar. There are 58 out-of-school children aged 6-14, of which 44 are boys and 14 are girls. A total of 650 teachers are carrying out of training activities in the *aimag*, of which 532 (82%) are women. There are also 234 primary, 276 secondary and 140 high school teachers. An average of 1,655 children are enrolled in first grade each year, including 787 females. A total of 807 pupils live in the dormitory, of which 443 (55%) are girls and 364 (45%) are boys.

A total of 6,370 children studied in 41 kindergartens in 2019, which was an increase of 3.7% from the previous year. The ratio of children to teachers at pre-school institutions is around 30 to 1.

There are two technical-vocational educational institutions (TVETs) and a branch of Mongolian National University of Medical Science (MNUMS) in Dornogovi, with a total of 1,230 students in 2019. In the past three years, the number of TVET students increased 21.2%, whereas the number of MNUMS students decreased 30.7%.

***Airag soum*:** There is a secondary school in Airag *soum* centre. The official capacity of the school is 320 pupils, however it has 667 students. The primary school gross enrolment rate (GER) in Airag *soum* is 98.6% and the secondary school GER is 93.8%. The ratio of boys to girls in secondary education is 0.89, while in primary education it is 0.90. There is an average of 21.5 students per teacher in the soum. The school building was commissioned in 1976 with central engineering and heating supply. In 2000, a major overhauling was carried out by the “Grant Assistance for Grassroot Project” financed by the Japanese Government, and the quality of construction was assessed as being “moderate”. There are currently 57 pupils living in the school dormitory which has capacity for 60 children. The school dormitory is mainly occupied by children from herder households. There is a kindergarten in Airag *soum* with a capacity of 150 children, but currently it is overcrowded with 177 children. There are 7 teachers in the kindergarten and 25 children per teacher.

There is also a 1,440 m^2 gymnasium, a Cultural Centre with 130 seats and a library with 16 seats in the *soum* centre. The Cultural Centre provides art performances, clubs, and library activities to the public. As Airag is an inter-soum centre, the services have difficulty keeping up with demand brought about by the large excess of students.

Altanshiree soum: There is a school with a capacity of 154 pupils in the centre of Altanshiree *soum*. Currently, it has 139 pupils. The GER is 67.1%, while the primary school enrolment rate is 79.6% in the *soum*. The remainder of school-age children study in the *aimag* centre and in Ulaanbaatar City. The ratio of boys to girls in secondary education is 0.83, while the ratio in primary education is 0.65. There is an average of 11.6 students per teacher in the soum. The school building was commissioned in 1976 and it has central engineering and heating supply with good construction quality. The school dormitory has a capacity of 60 children and currently it has 30 pupils. There is a kindergarten with capacity of 50 pupils but, currently it has 98 children and three teachers. This means that there are 33 children per teacher.

There is also a gymnasium, a Cultural Centre with 250 seats and a library with 16 seats in the *soum* centre. The Cultural Centre provides art performances, clubs, and library activities to the public.

Dalanjargalan soum: There are two schools in the *soum*, one a primary school in Olon Ovoo bagh and a secondary school with a capacity of 320 children. Currently, 433 pupils are studying in these two schools. The secondary enrolment rate is 77.5% and the primary education enrolment rate is 92.4%. The rest of the school-age children are studying in the aimag centre and in Ulaanbaatar City. The ratio of boys and girls in secondary education is 0.88, while the ratio in primary education is 0.90. There is an average of 22.8 pupils per teacher in the soum. The school itself is a brick building which is an independent engineering structure of high quality, which was commissioned in 1978. The school dormitory has a capacity of 50 pupils and currently it is almost at capacity with 49 pupils. A kindergarten in Dalanjargalan soum has a capacity of 120 children, but it is currently overcrowded with 226 children. There are 8 teachers in the kindergarten and 28 children per teacher.

There is also a gymnasium, a Cultural Centre with 150 seats and a library with 40 seats in the *soum* centre.

Saikhandulaan soum: The secondary school in the *soum* has a capacity of 250 pupils. Currently, it has147 pupils. The enrolment rate of secondary education of the *soum* is 63.5%, while the primary education enrolment rate is 56.6%. The rest of the school-age children study in the *aimag* centre and in Ulaanbaatar City. The ratio of boys and girls in secondary education is 0.77, while the ratio in primary education is 0.65.

The school building was commissioned in 2020. It has good quality with central engineering and heating supply. A sport gymnasium was commissioned in 2007. The school dormitory has a capacity of 50 children and currently it has 34 pupils.

There is a kindergarten in the *soum* which has capacity for 50 children, but it is overcrowded with 76 children. There are three teachers in the kindergarten and 25 children per teacher.

There is also a gymnasium, a Cultural Centre with 250 seats and a library with 40 seats in the soum centre. The Cultural Centre in the *soum* centre provides art performances, clubs, and library activities to the public.

Sainshand soum: There are five secondary schools operating in the *soum*. The schools have capacity for 4,894 pupils, but 6,319 pupils are studying currently. The enrolment rate of secondary education of the soum is 110.4%, while the primary education enrolment rate is 105.4%. The ratio of boys to girls in secondary education is 1.04, while the ratio in primary education is 0.96. There is an average of 23.3 pupils per teacher in the *soum*. There are 2 dormitories for the schools' pupils. Currently, 217 pupils are living the dormitories.

There are 13 kindergartens in Sainshand *soum* with a total of 2,296 children enrolled and 84 teachers. There are 28 children per teacher.

There are 6 gymnasiums, 1 Cultural Centre with 450 seats, 1 library, and 1 museum operating in the *soum* centre.

Key challenges reported in education sector is a shortage of qualified teachers and high staff instability in the rural *soums* of Shiveegovi, Airag, Dalanjargalan, Saikhandulaan and Altanshiree. Non-competitive wages, limited growth opportunities, and poor working conditions are mentioned as a main reason why young and qualified teachers rarely seek jobs as teachers in the soums.

Govi-Sumber *aimag* and *soums*

In 2019, Govi-Sumber *aimag* had five general educational schools in total, in which 3,767 students were enrolled and taught by 279 teachers. Fifty-five percent of the students were in grades 1-5, 32% were in grades 6-9, and 13% were in grades 10-12.

In 2019, a total of 1,985 children studied in 11 kindergartens in *Govi-Sumber aimag,* of which 202 were children of herders (12%) and 840 were girls (42%). In total, 173 teachers and staff worked at the kindergartens.

As in Dornogovi *aimag*, school facilities include a main school building, a sports hall and dormitories.

Public cultural and educational activities are organised once or twice a year in the rural *soums* of Shiveegovi, Airag, Dalanjargalan, Saikhandulaan and Altanshiree.

***Sumber soum*:** There are three secondary schools in the soum. Currently, 2,914 pupils are studying in these three schools even though they have a capacity of 2,309 pupils. A dormitory for secondary school with a capacity of 60 pupils is operating in the soum. Also, there is 1 gymnasium, 2 sport gyms, Song and Dance Ensemble 'Borgigon', 1 museum, 1 library are operating the soum centre. The Song and Dance Ensemble 'Borgigon' is a largest cultural centre of the southern region.

***Shiveegovi soum*:** There are 740 pupils studying in the school of this *soum* centre even though it has a capacity of 420 pupils. A dormitory of the school has a capacity of 40 children. A kindergarten of the *soum* centre with a capacity of 280 children is also overcrowded with 375 children attending. There are also 2 sport gyms, 1 cultural centre with 150 seats, 1 library with 20 seats are operating in the *soum* centre.

Overall, the enrolment of school-age children in the Project's seven soums is universal. The capacity of schools in Shiveegovi, Airag and Dalanjargalan soums are exceeded as a result of internal migration, which has been increasing along the main road, railway, and mining zone in the last several years.

7.12. Health and Access to Health Care

7.12.1. Sources of data

Health and health care data have been sourced from various secondary data sources such as the National Development Agency[133] and Mongolian NSO[134], as well as statistical data provided during KIIs at the *aimag* and *soum* levels. According to KII in Govi-Sumber *aimag*, there is no governmental health survey directed specifically at herders. Thus, data on mortality are based on available reports on national and sub-national or *aimag* levels.

7.12.2. Births

National level

As of 1 January 2020, the population of Mongolia was estimated to be 3,198,531 people. This is an increase of 1.74 % (54,641 people) compared to the year before. In 2019, the natural increase was positive, as the number

[133] Available at: https://ldi.nda.gov.mn/?province_id=7&region_id=152. Accessed June 2020.
[134] Available at: http://www.dornogovi.nso.mn/uploads/users/88/files. Accessed June 2020.

of births exceeded the number of deaths by 57,973. However, due to external migration, the population declined by 3,333. The sex ratio of the total population was 0.970 (970 males per 1 000 females) which is markedly lower than the global sex ratio, which exceeds 1.0.

In 2019, there were 77,371 live births and 19,398 deaths registered at the national level. Natural increase totalled 57,973 people.

Govi-Sumber aimag

The birth rates for the *aimag* are shown in Table 7-31. In 2019, a total of 427 births were registered in Govi-Sumber *aimag*, which is lower by 9.3% compared to the previous year.

Table 7-31. Birth rates, Govi-Sumber *aimag*, 2015-2019

Indicators	2015	2016	2017	2018	2019	2019/2018 %
Number of births	442	446	416	471	427	90.7
Number of live births	446	450	418	470	429	91.3
Number of still births	2	2	2	1	3	300.0
Under 5 child mortality	1	2	3	2	0	0.0

Source: Govi-Sumber aimag Statistics Office. Living environment and social indicators of Govi-Sumber aimag population - 2019.

Dornogovi *aimag*

In 2019, 824 boys and 775 girls were born in Dornogovi *aimag*, a total of 1,599 births. During the same period, 416 people died, bringing the net population growth to 1,183. Compared to the previous year, the number of births increased by three and the number of deaths increased by nine. The sex ratio of newborns was 106.3 (more boys were born) and the sex ratio of the deceased was 190.9 (more men died).

Project *soums*

Data was only available for five soums in the Project Area, as shown in Table 7-32. The sex ratio of newborns in all soums follows the pattern at the *aimag* level.

Table 7-32. Births, by sex, by *soums* in Dornogovi *aimag*, 2019, numbers

Aimag and soums	Sex	2015	2016	2017	2018	2019
Govi-Sumber *aimag*	**Total**	449	461	408	498	445
	Male	210	237	219	258	217
	Female	239	224	189	240	228
Sumber *soum*	**Total**	335	342	300	364	340
	Male	160	170	157	184	163
	Female	175	172	143	180	177
Shiveegovi soum	**Total**	72	90	85	93	76
	Male	31	49	48	54	39
	Female	41	41	37	39	37
Dornogovi *aimag*	**Total**	1,558	1,538	1,395	1,596	1,599
	Male	792	819	711	829	824
	Female	766	719	684	767	775
Airag *soum*	**Total**	91	100	96	83	88
	Male	48	55	46	48	48
	Female	43	45	50	35	40
Altanshiree *soum*	**Total**	25	33	29	35	28
	Male	12	17	14	22	15
	Female	13	16	15	13	13
Dalanjargalan *soum*	**Total**	64	59	55	65	53
	Male	33	41	31	41	28

Aimag and soums	Sex	2015	2016	2017	2018	2019
	Female	31	18	24	24	25
Saikhandulaan *soum*	**Total**	29	47	24	30	34
	Male	11	29	13	14	19
	Female	18	18	11	16	15
Sainshand *soum*	**Total**	600	556	536	597	637
	Male	307	281	275	307	331
	Female	293	275	261	290	306

Source: National Statistics Office, www.1212.mn

7.12.3. Mortality and morbidity

National level

On a national scale, mortality is mainly caused by non-communicable diseases. Nationally, high blood pressure and unhealthy lifestyle behaviours, such as dietary risks, malnutrition, and alcohol and tobacco are the main causes of deaths and disability.[135]

Diseases of the circulatory system, cancer and injuries, poisoning and external causes have been the leading causes of mortality since 1995. By the end of 2018, a total of 17,331 deaths were registered nationwide, which increased by 1,519 cases or 8.7% compared to the previous year. Of the total deaths, 60.2% were males and 39.8% were females. The leading causes of mortality in 2018 were diseases of the circulatory system (34.4%), cancer (24.6%), injuries, poisonings and certain other consequences of external causes (16.8%), diseases of the digestive system (6.8%), and diseases of the respiratory system (4.3%). Deaths from these diseases accounted for a combined 87.1% of all deaths.

According to the National Cancer Centre, in 2018, 6,073 cases of malignant neoplasms were registered in the country, out of which 29 cases (males - 16; females -13) were registered in Govi-Sumber *aimag* and 111 cases (males - 59; females - 59) in Dornogovi *aimag*, respectively.

On the national level, the leading primary cancer in men were liver, stomach, lung, esophagus and colon/rectum; while in women, liver, cervix, stomach, and breast and esophagus cancers were most common. There were no major observed systematic differences compared to 2017.

[135] Institute of Health Metrics and Evaluation, 2017. Available at: http://www.healthdata.org/mongolia. Accessed June 2020.

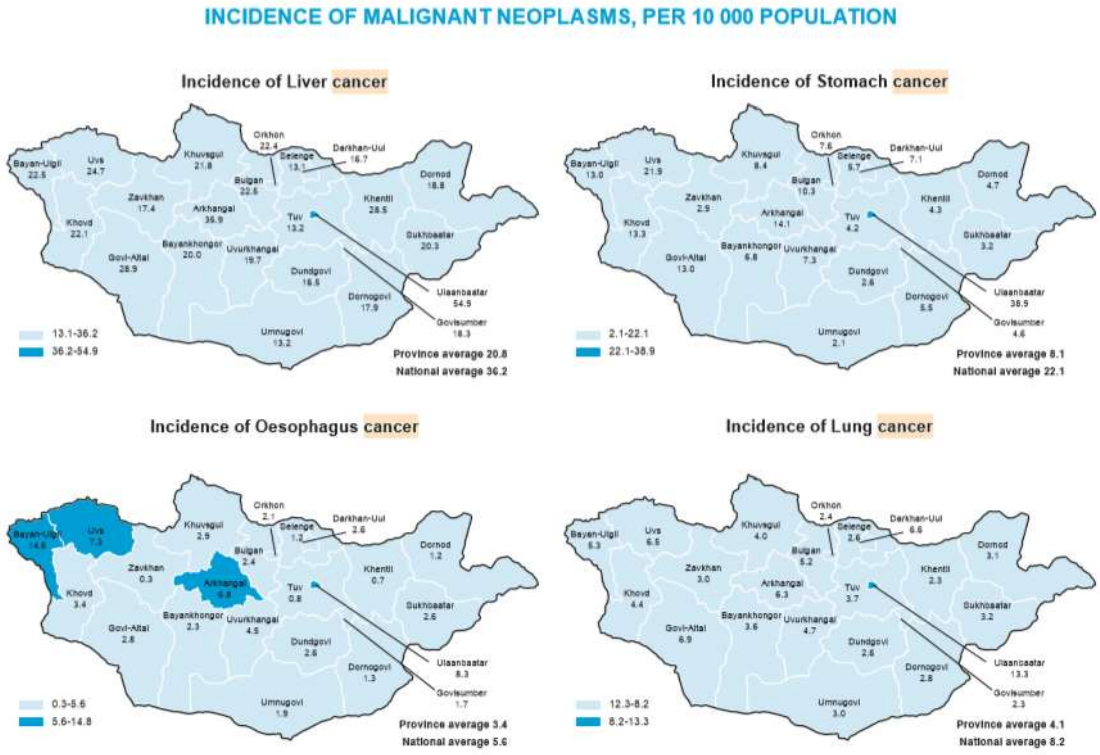

Figure 7-32. Incidence of Malignant neoplasms per 10,000 population in Mongolia (2018)[136]

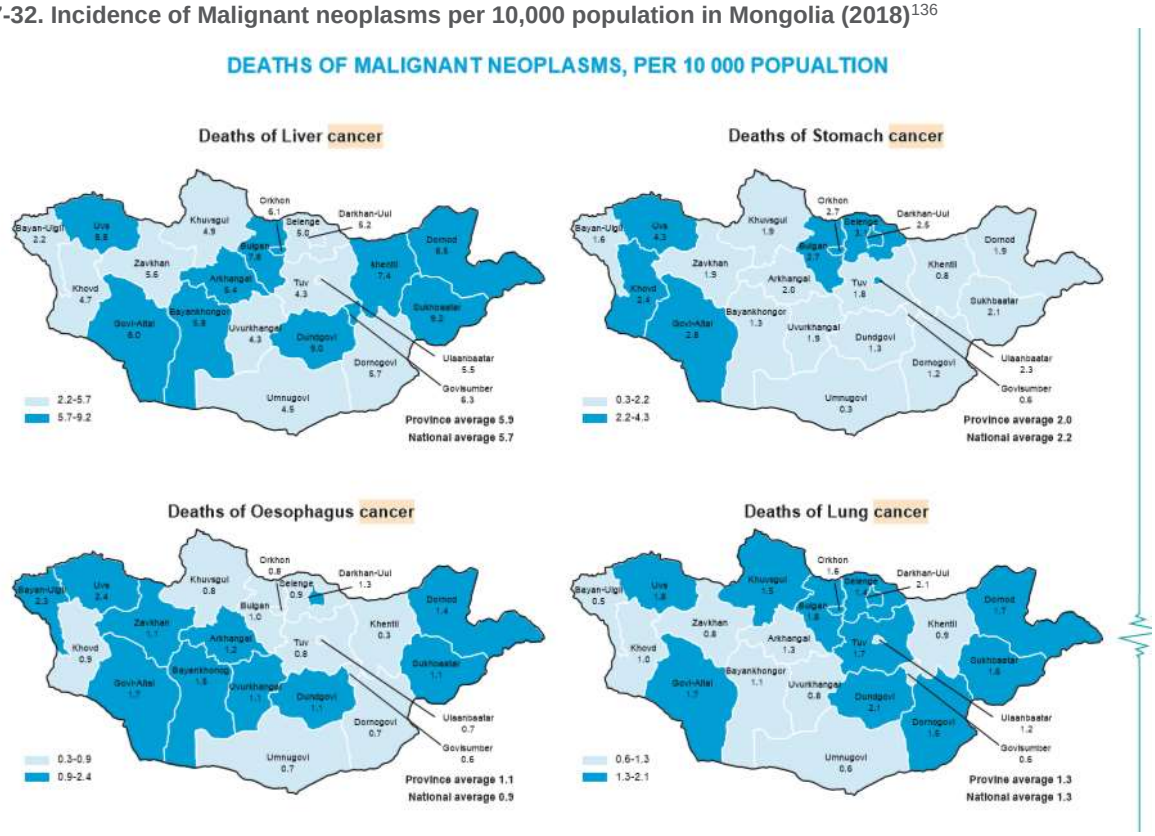

Figure 7-33. Deaths of malignant neoplasms per 10,000 population in Mongolia (2018)

[136] Institute of Health Metrics and Evaluation. 2017. Available at: http://www.healthdata.org/mongolia. Accessed March 2020.

Govi-Sumber and Dornogovi *aimag*

Mortality rates in the *aimags* are shown in Table 7-33. In general, mortality has fallen since 2015. There were no registered cases of mortality to children under 5 years of age in 2019 in either *aimag*.

Table 7-33. Mortality indicators, Govi-Sumber and Dornogovi *aimags*, by sex, in numbers, 2015-2019

Aimag	2015	2016	2017	2018	2019
Govi-Sumber *aimag*, total	**93**	**115**	**101**	**90**	**86**
Male	58	64	55	58	55
Female	35	51	46	32	31
Dornogovi *aimag*, total	**362**	**415**	**362**	**407**	**416**
Male	242	267	241	248	273
Female	120	148	121	159	143

Source: National Statistics Office, www.1212.mn

The five leading causes of mortality in the Project *aimags* are shown in Table 7-34. In 2018, mortality was high in both *aimags*, and in both *aimags* mortality was higher for male patients.

Table 7-34. Five leading causes of mortality in the Project *aimags*, per 10,000 population, 2018

Aimag	Diseases of the circulatory system	Neoplasms	Injury, poisoning and certain other consequences of external causes	Diseases of the digestive system	Diseases of the respiratory system
Govi-Sumber	11.47	8.60	6.31	5.16	2.29
Dornogovi	12.63	11.91	15.54	5.95	3.19
Aimag average	**20.88**	**13.27**	**7.42**	**3.32**	**2.20**
National average	**18.88**	**13.64**	**9.25**	**3.76**	**2.38**

Source: Centre for Health Development. 2018

According to the Govi-Sumber a*imag* Health Department, leading causes of mortality in the *aimag* closely correlate with the national average. Diseases of the circulatory system (stroke) are the major leasing causes, followed by traffic accident fatalities. Neoplasms is the third major factor, and diseases of the digestive and respiratory systems are among the top five leading causes of mortality in the *aimag*.

The key Informant interview with the Dornogovi *aimag* Health Department confirmed that diseases of the circulatory system, and injuries, followed by neoplasms (tumours of the liver, lungs, stomach, esophagus and gynecology) are the main leading causes of mortality in the *soums*. Unhealthy lifestyle, poor diet, lack of exercise resulting in overweight, men not visiting doctor for health screening are main factors leading to neoplasms related. Sixty to seventy percent of the population receiving health care services are women while the mortality of men is higher than that of women. In Dornogovi *Aimag* injury mortality is higher than the national average.[137]

Project *soums*

Data on mortality was only available for five soums, as shown in Table 7-35. This shows that more males died in all *soums*, exempt Altanshiree *soum*. This pattern is in line with *aimag* ratio of male to female deaths, in general.

Table 7-35. Mortality indicators, soums, by sex, in numbers, 2015-2019

Soums	2015	2016	2017	2018	2019
Govi-Sumber *aimag*					
Sumber *soum*, total	76	85	84	70	67
Male	48	50	44	45	45
Female	28	35	40	25	22
Shiveegovi *soum*, total	12	24	15	14	11
Male	7	10	9	9	6

[137] Interview with Head of Health Department in Dornogovi *aimag.*

Soums	2015	2016	2017	2018	2019
Female	5	14	6	5	5
Dornogovi *aimag*					
Airag *soum*, total	16	19	25	32	34
Male	12	14	12	19	22
Female	4	5	13	13	12
Altanshiree *soum*, total	13	13	9	15	8
Male	11	7	4	6	4
Female	2	6	5	9	4
Dalanjargalan *soum*, total	15	18	23	25	22
Male	11	10	11	15	13
Female	4	8	12	10	9
Saikhandulaan *soum*, total	6	6	10	10	11
Male	5	3	8	6	9
Female	1	3	2	4	2
Sainshand *soum*, total	157	178	133	139	157
Male	99	108	84	84	97
Female	58	70	49	55	60

Source: National Statistics Office, www.1212.mn

7.12.4. Maternal and child health

National level

For the last decade, the maternal mortality rate has decreased in Mongolia significantly from 49 per 100,000 live births in 2008 to 26 per 100,000 live births in 2015. At the national level the maternal mortality rate per 100,000 live births was estimated at 27.1 in 2018, an increase of 0.2 compared to the previous year.[138]

Nearly all deliveries occur in hospitals (99.6%) and attended by skilled health personnel (99.3%) in the country. At the national level, complications of pregnancy (52.4%), complications related to the puerperium, complications of delivery and disorders unrelated to pregnancy and childbirth are main causes of maternal mortality.

Govi-Sumber and Dornogovi *aimags*

In 2018, there were no cases of maternal mortality in Govi-Sumber and Dornogovi *aimags,* as shown in Table 7-36. No home births were registered in Govi-Sumber *aimag*, while four cases (total number of births 1,365) were registered in Dornogovi *aimag* (end 2018).

Table 7-36. Maternal and child mortality, 2017-2018

Aimag, soum	Maternal mortality rate, per 100 000 live births		Infant mortality rate, per 1 000 live births		Under five mortality rate, per 1 000 live births	
	2017	2018	2017	2018	2017	2018
Govi-Sumber aimag	***0.0***	***0.0***	***7.2***	***2.1***	***14.4***	***6.4***
Sumber	0.0	0.0	7.2	2.1	14.4	6.4
Dornogovi aimag	***0.0***	***0.0***	***12.8***	***11.7***	***13.6***	***16.0***
Sainshand	0.0	0.0	9.6	9.0	10.6	10.8
Airag	0.0	0.0	250.0	0.0	250.0	0.0
Altanshiree	0.0	0.0	0.0	0.0	0.0	0.0
Dalanjargalan	0.0	0.0	0.0	0.0	0.0	0.0
Saikhandulaan	0.0	0.0	0.0	0.0	0.0	0.0

Source: Centre for Health Development. Health Indicators 2018.

[138] Health indicators 2018. Centre for Heath Development, WHO, Western Pacific Region, 2018.

7.12.4.1. Communicable diseases

The total number of infectious diseases at the national and aimag level is shown in Table 7-37.

Table 7-37. Infectious diseases in the aimags (per 10,000 population) in 2018

	National average	Govi-Sumber *aimag*	Dornogovi *aimag*
Viral hepatitis	1.5	1.7	1.3
Varicella	25.6	23.6	18.5
Tuberculosis	11.0	21.3	14.7
Brucellosis	0.3	0.0	0.0

Source: Centre for Health Development. Health Indicators 2018.

National level

In 2018, a total of 42,074 cases with 27 different types of communicable diseases were reported (132.4 per 10,000 population) at the national level, which decreased by 2,226 cases or by 12.5 per 10,000 population.

At the national level, the percentage breakdown of communicable diseases are, as follows: 31.2% are respiratory infectious diseases, 38.3% are sexually transmitted infections, 24.3% are intestinal infections, 0.9% are blood-borne infections, 0.9% are zoonotic bacterial diseases and 4.4% are other infections.

Historically, at the national level, the incidence of viral hepatitis peaked in December 2007, 2010 and in November 2011. Since 2012, viral hepatitis cases have decreased steadily. In 2018, a total of 475 new cases of viral hepatitis were registered at the national level, which accounted for 1.1% of all communicable diseases. The incidence decreased by 52 cases or 0.2 per 10,000 population compared to the previous year. Out of all viral infections, 5.5% were viral hepatitis A, 56.6% were viral hepatitis B, 19.6% were viral hepatitis C and 18.3% were other viral hepatitis.

In 2018, a total of 3,498 new cases of tuberculosis were registered which accounted for 8.3% of all communicable diseases, and the new registered incidence rate of tuberculosis decreased by 1.4 per 10,000 population, compared to the previous year.

At the national level, a total of 8,130 cases or 25.6 per 10,000 population of chicken pox (varicella) were registered in 2018. This corresponded to an increase in the incidence rate of 5.9 per 10,000 population or 1,513 cases compared to the previous year. Varicella accounted for 19.3% of all communicable diseases.

Govi-Sumber and Dornogovi *aimags*

As Table 7-38 shows, the incidence of reported communicable diseases in 2018 was higher than the national average (132.4 per 10,000 population) in Govi-Sumber *aimag*. Overall, incidencs of communicable diseases reported in Govi-Sumber and Dornogovi *aimags* vary by type and year.

Govi-Sumber *aimag* had a higher incidence rates of viral hepatitis (1.7) than the country average of 1.5 per 10,000. Conversely, Dornogovi *aimag* had lower incidence rates than the national average, at 1.3 per 10,000.

The incidence rate of tuberculosis per 10,000 population was higher than the national average (11) in Govi-Sumber (21.3 per 10,0000) and Dornogovi (14.7 per 10,0000) *aimags*. Thirty-seven new cases of tuberculosis (16.3 per 10,0000 population) were registered in 2018 in Govi-Sumber *aimag*, which is higher by 10 cases compared to 2017. The same tendency occurred in Dornogovi *aimag*, with 100 cases in 2018 (93 cases in 2017). Both *aimags* had higher incidence rates of tuberculosis compared to the national average in 2017-2018.

Compared to the national average (25.6) and Govi-Sumber *aimag* (23.6), Dornogovi *aimag* had a markedly lower rate of varicella per 10,000 population at 18.5.

Youth and transit populations, especially those located in larger *soums*, experience the highest incidence of Sexually Transmitted Infections (STIs), as these groups travel long periods seeking employment and economic opportunities, they have greater exposure to risk-taking activities than sedentary populations.[139] STI records for the two *aimags* are provided in Table 7-37.

[139] Byambajav, D., Mendee, J. and U. Purevsuren. 2018. *Human rights impact assessment of mining and transportation of coal from Tavan Tolgoi*. MIfIP, NHRCM and UNDP.

Table 7-38. Sexually Transmitted Infections (STIs) in the *aimags* (per 10,000 population) in 2018

	Incidence of Gonococcal Infection	Incidence of Syphilis	Incidence of Trichomoniasis
Govi-Sumber	23.0	33.4	6.3
Dornogovi	28.2	18.2	13.8
National average	**17.2**	**19.4**	**14.1**

Source: Centre for Health Development. Health Indicators 2018.

The interview with the Govi-Sumber *aimag* Health Department indicated that cases of STIs are mainly recorded among students of the polytechnic college and miners. In addition, there was a tuberculosis outbreak in prison number 425. However, despite this the number of STIs has been reducing in past years, and Govi-Sumber is ranked as the second *aimag* in the country with the least cases of STIs.

According to the Head of the Dornogovi *aimag* Health Department in the first half of 2020, the STI rate was 3.6 per 10,000 population. The STIs account for 54-55% of all infectious diseases. Compared to other *aimags*, Dornogovi is ranked 5th or 6th in terms of cases of STIs. Mining, unregistered people and mobile population are the main recordings of STIs cases.[140]

7.12.4.2. Alcohol and drug abuse

National level

The only available data on alcohol and drug abuse dates back to 2004, in which it was reported that 72% of serious crimes (murder, violent robbery, and attacks) were alcohol-related and 5% of all traffic accidents were caused by drunk driving. More recent data indicate that in 2017, alcohol consumption and tobacco use ranked as the fourth and fifth top-ten risks contributing to the most death and disability when combined on a national scale. Death and disability caused by alcohol and tobacco use increased by 2% and 18% respectively between 2007 and 2017 nationally.[141]

Govi-Sumber and Dornogovi *aimags*

An interview held with the Govi-Sumber *aimag* Health Department indicated that alcohol abuse and an unhealthy life style are preconditions for the top five illnesses in the *aimag*.

7.12.4.3. Access to health care

National level

The health facilities system of Mongolia consists of state-owned, private and mixed-owned health facilities that oversee public health, medical care service, pharmaceutical supply, health education, and research and training. Medical care service is controlled by the integrated regulations of the state. Family health centres (FHC), *soum* and village health centres, inter-soum hospitals, clinics, maternity hospitals, public health centres, general hospitals, sanatoriums, ambulances service centres, regional diagnostic and treatment centres (RDTCs), central hospitals and specialized medical centres provide medical care services across the country to the entire population.

Soum health centres (SHC) and village health centres (VHC) provide health care services by modern and traditional medicine to their catchment populations, the quantum of which depend on the number of residents and geographical location of the *soum* or *bagh.* Inter-soum hospitals provide health care services to the population of their own soum and neighbouring soums. depending on population size of catchment and remoteness. In this SPS soum or village health centres were classified into three categories according to their population size of catchment and remoteness.

In 2018, a total of 4,343 health facilities were operating and delivering health care services around the country, including 13 central and specialized hospitals, 5 RDTCs, 16 *aimag* general hospitals, 12 district general hospitals and public health centres (PHCs), 6 rural general hospitals, 39 inter-soum hospitals, 219 family health centres, 273 soum health centres, 243 private hospitals and 1,340 *aimag* clinics.

[140] Interview with Head of Health Department in Dornogovi *Aimag.*
[141] Institute for Health Metrics and Evaluation 2017.

Govi-Sumber and Dornogovi *aimags*

A total of 2,766 health professionals were working in 219 FHCs, including 1,000 physicians and 940 nurses. The Structural and Performance Standards for FHCs require one family doctor per 1,800-2,000 population. In fact, the country average is one family doctor serving 2,147 population in 2018. Govi-Sumber *aimag* meets these standards compared to Dornogovi where the ratio was higher.

Govi-Sumber *aimag* is ranked 8th (71.1) by the number of hospital beds per 10,000 population while Dornogovi *aimag* is ranked 7th (71.3). This is slightly higher than average for all *aimags* (69.6), and lower that the national average (78.7) (Table 7-39).

Table 7-39. Main health indicators in the Project Area, 2018

Aimag	Population, 2018	Per 10,000 population				Number of persons per hospital bed	Numner of persons per physician	Number of mid level personnel per physician	Number of nurses per physician
		Hospital beds	Physicians	Nurses	Total health workers				
Govi-Sumber	17,796	71.1	36.1	37.3	159.9	140.7	276.9	0.9	1.0
Dornogovi	69,304	71.3	35.1	36.3	167.0	140.3	284.6	0.9	1.0
Aimag average*	1,747,104	69.6	24.7	33.4	137.3	143.7	404.3	1.2	1.4
National average	3,238,479	78.8	35.4	39.1	165.5	127.0	282.8	0.7	1.1

Source: Centre for Health Development. 2018.

*Note: * average for all 21 aimags*

Govi-Sumber *aimag* has one aimag general hospital, one family hospital, one *soum* health centre in Shiveegovi *soum*, one hospital, four private hospitals for outpatients, one health department, one medical supply organisation and 10 private drug stores. The *aimag* hospital has 136 beds and providers medical care services like obstetric services, gynaecology, paediatrics, surgery, trauma and treatment of infectious diseases.

As the Table 7-40 shows, the ratio of patients per physician and per nurse is higher in Dornogovi *aimag* compared to Govi-Sumber *aimag*. According to Dornogovi *Aimag* Health Department, *soum* hospitals lack medical staff, especially experienced personnel since mostly fresh graduates work at the soum hospitals.

According to the key informant interviews, *soum* residents are not satisfied with the high turnover of young medical doctors and nurses in soum hospitals. Consequently, some hospitals in the *soums* hire retired nurses to fill vacancies.

Table 7-40. Physicians, and nurses, by *aimag/soums*, 2018

Aimag, soum	Number of population	Physicians	Persons per physician	Nurses	Persons per nurse	Physician to nurse ratio	Mid-level medical personnel
Govi-Sumber aimag	17,444	63	277	65	268	1	123
Sumber soum	12,742	57	224	53	240	1	104
Shivee Govi soum	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Dornogovi aimag	68,876	242	285	250	276	1	465
Sainshand soum	25,023	186	135	166	151	1	314
Airag soum	3,789	2	1,894	4	947	2	9
Altanshiree soum	1,344	2	672	4	336	2	9
Dalanjargalan soum	2,822	2	1,411	5	564	3	10
Saikhandulaan soum	1,379	1	1,099	5	276	5	9

Source: Centre for Health Development

Note: not available

According to a 2018 survey sponsored by the Govi-Sumber Health Department, between 25-32% of medical services are provided to the non-resident and mobile populations.[142]

In 2018, Dornogovi *aimag* had 82 health services facilities, including five family hospitals, 12 *soum* health centres, one inter-soum hospital, one rural general hospital, one *aimag* general hospital, five private inpatient hospitals , 21 private hospitals for outpatients, one health department, 4 medical supply organisation, 24 private drug stores and five other medical facilities based on occupation of the patients (e.g. the border guards' and the prisoners' hospital, law enforcement officials' hospital, railway hospital). When compared to other *aimags* in Mongolia, Dornogovi ranks 9th and Govi-Sumber occupies last place at twenty-one.

In Airag *soum*, there is a health centre with 15 beds. The health centre in Dalanjargalan *soum* has fewer medical personnel compared with the Airag *soum* health centre and just ten beds. The health centre in Saikhandulaan *soum* is small and has only seven beds due to the small population size (roughly 1,000 residents). Altanshiree *soum* has a similar situation. The health centre in Altanshiree *soum* has seven beds. All *soum* health centre provide basic health care services. As the Table 7-41 shows, all *soums* in the Project AoI in Dornogovi *aimag*, except Altanshiree *soum,* have seen a slight increase in number of beds from 2015 until 2019.

Table 7-41. Hospital beds, by soums in Dornogovi *aimag*, 2015-2019

	2015	2016	2017	2018	2019	2019/2015 %	2019/2018 %
Total	**404**	**488**	**512**	**555**	**556**	**137.6**	**100.2**
Airag	15	12	12	15	15	100.0	100.0
Altanshiree	7	7	7	7	7	100.0	100.0
Dalanjargalan	7	7	7	10	10	142.9	100.0
Saikhandulaan	5	5	5	7	7	140.0	100.0
Sainshand	240	457	481	516	517	215.0	100.2

Source: Dornogovi aimag Health Department

Altanshiree *soum* health centre has around 20 medical personnel,[143] including three physicians. Information on medical personnel in Project *soums* in Dornogovi aimag is not available. Sainshand *soum* has highest lack of physicians among Project *soums* in the *Aimag* (see Table 7-42).

Table 7-42. Number of physicians, by soums in Dornogovi *aimag*, 2015-2019

	2015	2016	2017	2018	2019	2019/2015 %	2019/2018 %
Total	**210**	**223**	**169**	**242**	**203**	**96.7**	**83.9**
Airag	3	2	2	2	3	100.0	150.0
Altanshiree	3	2	2	2	3	100.0	150.0
Dalanjargalan	3	2	3	2	3	100.0	150.0
Saikhandulaan	2	1	1	1	1	50.0	100.0
Sainshand	139	171	117	186	135	97.1	72.6

Source: Dornogovi aimag Health Department

Interviews held with Health Departments in both *aimags* reported that the workload of medical staff is high. This shortage is aggravated seasonal due to diseases (flu in winter and digestive system diseases in summer). The hospitals in the *soums* provide primary health services (such as check-ups, vaccinations and health screening). From the end of 2018, *soum* hospitals and Family Group Practices have been providing four sets of medical services (for example, rehabilitation treatment, home care, tests) funded from The Health Insurance Fund.[144] There is a shortage of experienced medical doctors and nurses. According to key informants, health service facilities and providers are facing considerable budgetary pressures. Unregistered mobile populations such as mine workers and truck drivers contribute to the budgetary pressure of health service facilities in the *soums*. At

[142] Interview with the Head of Govi-Sumber *Aimag* Health Department.
[143] KII, Dornogovi *Aimag* Health Department.
[144] Interview with the Head of Dornogovi *Aimag* Health Department.

times, therefore, medical facilities experience shortages of staff with the attendant health risks this situation entails.

7.12.4.4. Family planning

Family planning advice and free contraception is available from hospitals. However, the contraception usage rates are low, 55.5% in Govi-Sumber *aimag* and 47.9% in Dornogovi *aimag*. At the national level, the contraceptive prevalence rate is comparatively low at 55.1%.

7.12.4.5. COVID 19

Mongolia was one of the first countries to take pre-emptive measures to slow the progression of the coronavirus by closing its borders, schools and other public institutions in late January. Unlike other countries, Mongolia took immediate measures to prevent and combat the COVID-19 outbreak, well before the first case was confirmed. Mongolia became the second country in the world to close its border to travellers from China, starting on the 25 January 2020. With the coronavirus, social distancing was introduced long before the first case was confirmed. Key measures taken by the Government included suspension of international flights, closure of air and overland border crossings, cancellation of public events, gatherings, closure of all kindergartens, schools and universities from the end of January, introduction of penalties for breach of public hygiene prevention measures.

The first positive case was registered on 9 March when a French national who arrived in Mongolia on 2 March 2020, was tested positive. Since then the total number of positive cases is 220,[145] all cases are imported, and 188 patients are released from hospital. Recovered people are monitored for 21 days in order to avoid re-occurrences. No lethal case is registered in Mongolia. No cases of transmission to people within the country. Two patients being guaranteed in specially dedicated hotels and resorts have birth (to a baby girl and baby boy).

The State emergency commission has extended the curfew until 15 July, but it has tightened the state of high alert. Resorts, restaurants, cafes and gym, fitness clubs, libraries and museums activities are opened now for public while taking measures like social distancing, taking temperature of clients, and disinfecting the premises.

In the past few months, thousands of Mongolians have been repatriated from Russia, China, South Korea, Japan, Turkey, Kazakhstan, Europe, Thailand, Philippines, Australia and USA. In June 2020, a total of 2,358 citizens have been repatriated from abroad. As of June, there were 11,600 Mongolians requiring repatriation in 45 countries due to COVID-19 border restrictions.

The situation of COVID-19 is likely to result in on-gong challenges to movement and the health and safety of construction workers as well as the local population.

7.13. Gender

7.13.1. Sources of Data

Data on gender aspects in Mongolia and the Project Area has been obtained through secondary data sources and interviews with the local *aimags* and herder households.

7.13.2. Baseline

According to the Organisation for Economic Co-operation and Development (OECD)'s latest cross-country ranking classifying countries according to their level of discrimination in social institutions, Mongolia is among 43 countries with a low level of discrimination in social institutions.[146] According to this rating, the Social Institutions and Gender Index (SIGI) for Mongolia is 20147. The SIGI is an unweighted average of the following five sub-indices: discriminatory family code (28 for Mongolia), restricted physical integrity (8), restricted access to productive and financial resources (20), and restricted civil liberties (28).

[145] Ministry of Health. Available at: https://covid19.mohs.mn/p/cat/post/57/. Accessed on 4 April 2020.
[146] Social Institutions and Gender Index. 2019. Available at: https://www.genderindex.org/country/mongolia/. Accessed on 4 April 2020.
[147] Higher values indicate higher inequality. Percentages range from 0to 100, while legal variables are categorised as 0%, 25%, 50%, 75% or 100%.

According to research sponsored by the Swiss Agency for Development and Cooperation (SDC), the *"gender situation in Mongolia is not straightforward and varies from sector to sector and among different socio-economic groups, thus making it hard to generalise"*.[148]

The Gender development index[149], an index designed to measure gender equality, for Dornogovi *aimag* is 1.054, which is higher than average national level (1.043) while the same index for Govi-Sumber *aimag* is 0.993, less than the national average.[150]

In most developing countries, girls have fewer educational opportunities than boys. In Mongolia, the trend is reversed — referred to as a "reverse gender gap". In recent history, in herding communities, boys were pulled out of school to help manage the herd, while girls were encouraged to continue their schooling. Today, males still lag behind females in education, with women accounting for 62% of university, college and institute graduates in 2015, according to the NSO. This inverse education gap has resulted in Mongolia's female-dominated professional class, though men still control the top roles in government and business. However, boys living in rural areas are particularly vulnerable to dropping out of school, which creates underemployment, wealth disparities, substance abuse, and increased violence, particularly domestic abuse.

A study by Swiss Development Agency151 showed that the gender situation among herder community is not straightforward. Both surveyed men and women earn income from livestock, with males earning more from the sale of cashmere, livestock and meat sales, and wool and skins and women earning more from selling dairy products, wool, cashmere and skins. Most of the decisions related to livestock production152 are made by men. In terms of decision-making, husbands represent 50.2%, wives 26.2%, sons 17.9%, and daughters 5.7%. According to the respondents, among the main reasons for men's dominance in decision-making is that men have to lead livestock production and generally have more knowledge about the land, pastures, water, vegetation, winter disasters and droughts, with women being less familiar and less interested in these areas.

Herders participation in community meetings

The SDC survey found that in general the participation of female herders was significantly less than males in most of the surveyed *soums* in the western *aimags*. Women's level of participation was more equal in the surveyed *soums* in the central *aimags* of Tuv and Dundgovi. For women, the main reasons were not being able to delegate household task (33.2%) and not being able to delegate the care of children and the elderly (7.3%). These reasons, coupled with a lack of driving skills (21.3%) and the presence of social norms that did not support their involvement (16.3%), contributed to limiting women's participation. Time and physical distance from meetings were also factors impacting upon women's participation (19.6%); factors which also were the principal reasons for limited male participation (14.6%), along with not being able to delegate tasks at the household level (13.6%), a lack of information and a lack of civic interest.

Household property ownership

According to the Civil Law of Mongolia, the ownership of any property registered after marriage is the common property of all family members; however, if property is registered under only one partner's name, he/she can sell the property without their partner's agreement. The majority of household property, 58.5%, is registered under the name of husbands, 10.7% under the name of both husbands and wives, and only 8.5% under the name of wives. In relation to children, 8%of household property is under the name of sons, 3.3% under the name of daughters. In general, 5.7% of property is registered under the name of children, and 2.6% under the name of mothers and children. Livestock, winter and spring camps, motorcycles and other vehicles are mainly registered under the name of husbands. Property outside the local area is mainly under the name of sons due to the tradition of preparing a dwelling for the son when he marries. In the course of the ESIA fieldwork, it was

[148] Gender Overview –Mongolia. A Desk Study, 2014, page 55.

[149] The GDI measures gender gaps in human development achievements by accounting for disparities between women and men in three basic dimensions of human development—health, knowledge and living standards using the same component indicators as in the Human Development Index, HDI. It is a direct measure of gender gap showing the female HDI as a percentage of the male HDI.

[150] www.1212.mn; GDI for 2018.

[151] Gender analysis in pastoral livestock herding in Mongolia. Swiss Agency for Development and Cooperation, Ulaanbaatar 2015. 366 persons were surveyed in eight soums of eight aimags, including Govi-Altai, Khovd, Umnugovi, Bayan-Ulgii, Zavkhan, Tuv and Dundgov aimags.

[152] Livestock production includes such decisions as otor and seasonal grazing movements, involvement in pastureland management plans and herd management.

observed that rural women often did not think household property could be registered under their name because family property was registered under the name of the head of the family.

Gender-based violence

Mongolia is known for its strides in the regulatory framework for gender equality. Its situation of "endowment for women" is relatively higher than other Asian countries in terms of education and health. The UN Gender Development Index increased from 0.677 in 2005 to 1.026 in 2015. In terms of the Global Gender Gap Index, Mongolia ranked 58 out of 144 countries in 2018153. However, there are some areas for improvement to gender equality, specifically in gender-based violence and representation in the decision making level.

By the end of 2019, in the country as a whole 8,265 crime cases "against the immunity of human health" were registered, of which 207 were domestic violence related. In Gobi-Sumber *aimag*, there were 4 domestic violence cases out of a total of 62 cases and in Dornogovi *aimag*, there were 2 domestic violence cases out of a total of 169 cases.[154] These statistics indicate that domestic violence cases are rarely tried in court. Unofficial reports state that 20% of the calls received by the police per day are from domestic violence caused by alcohol.

Under a National Study on Gender-based Violence in Mongolia in 2017,155 five forms of partner violence were measured through the household survey[156]: physical, sexual, emotional and economic violence, and controlling behaviours. More than half (57.9 %) of Mongolian women have experienced one or more of the five types of violence measured in their lifetime. Physical and/or sexual partner violence is often used for international comparison as the definitions of these forms of violence are fairly robust and universal. In Mongolia, 31.2% of women have experienced physical and/or sexual violence in their lifetime, which is close to the global estimate of 30%. The rates vary between the provinces and the capital, with lifetime rates of physical and/or sexual partner violence being highest in Darkhan-Uul (41%), Umnugovi (39.7%), and Govi-Sumber (39.1%), Bulgan (35.7%) and Khovd (32.9%). In Ulaanbaatar, 31.7% of partnered women have experienced physical and/or sexual violence in their lifetime. While the prevalence level in Ulaanbaatar is not the highest in the country, the number of victims of physical and/or sexual violence is the highest.

According to findings of the survey, in relation to the forms of domestic violence experienced by women herders, most were verbal abuse, economic deprivation and turbulence or intimidation under the influence of alcohol. Six out of 239 people faced severe abuse, such as physical abuse, beatings, and being hit by objects or having objects thrown at them. The results of the anonymous questionnaire (n=299) show that problems related to domestic violence, such as economic deprivation, quarrelling, pressure and violence linked to alcohol abuse, are present within herders' families. Survey participants understood domestic violence as turbulence from husbands or neighbours.

During the ESIA reconnaissance visit, local officials reported that in recent years, stress resulting from the fragmentation and separation of families has given rise to domestic violence and divorce. Increasingly, during the school-year from September to June, women with school-aged children, leave the main home in rural *baghs* so that their children can attend the primary school in the *soum* centres, while the men remain with their livestock in the rural home.

According to police statistics, at the end of 2019, 610 cases of "crimes against human sexual freedom and inviolability" were registered in Mongolia, of which five were rape cases registered in Gobi-Sumber *aimag*, and 17 rape cases and 10 sexual exploitation cases registered in Dornogovi *aimag*.

Sex workers and human trafficking

In 2019, there were 115 registered crimes depriving persons of their rights of liberty. These included 14 human trafficking cases, four kidnappings, three assaults, 56 threats, 10 unlawful entries into homes, four illegal pursuits, and two involving forced labour. In Govi-Sumber *aimag*, no crime cases of "against the right of liberty of a human" were registered, while in Zamyn-Uud *soum* of Dornogovi *aimag*, there was one registered case of human trafficking and one registered case of unlawful entry into a home.[157]

According to official research, the majority of cross-border sex workers are based in the Chinese border city of Ereen. According to a 2019 survey, more than 300 women work as prostitutes in Ereen city, the majority of

[153] World Economic Forum. (2018). *The Global Gender Gap Report 2018.* Cologny/Geneva: World Economic Forum.
[154] Ibid.
[155] Breaking the silence for equality. 2017 National Study on Gender-based Violence in Mongolia. NSO/UNPF, Ulaanbaatar 2018.
[156] 7069 households in all 21 aimags were interviewed.
[157] National Police Agency. 2019. Annual statistics of registered crime nationwide. Accessed: http://police.gov.mn/a/4867

whom are between the ages of 18 and 40.[158] Police and health organizations reputedly check these women for STIs and seek to protect them from STIs and other communicable diseases, undue pressure from superiors and customers, and from human trafficking. The location of the Project Area is a known transit point for sex workers commuting to and from Mongolia to Ereen city. However, according to official police records, there were no sex workers nor human trafficking victims in the vicinity of the Project Area in the first quarter of 2020.

7.14. Cultural Heritage

7.14.1. Sources of Data

The types of cultural heritage considered in the baseline include: Archaeological and Paleontological sites, Monuments, and items of Intangible Cultural Heritage value. No data on cultural heritage was collected as part of the 2013 FS. A key secondary data source was a list of sites provided by the Cultural Heritage Centre of Mongolia. Other secondary data sources included available reports on projects and programs in the Project Area. Primary data was collected during field visits to the Project Area through Key informant interviews with land use officers and through Household surveys.

7.14.2. Heritage Context

Historical and cultural heritage is governed by the Law of Mongolia on Protection of Cultural Heritage, and the protection of cultural heritage is addressed by EBRD PR8 (2014).

Mongolia has a rich history and culture rooted in nomadic traditions. The past few decades have seen a rapid increase in social changes, globalisation and urbanisation which have visible effects on the cultural traditions of Mongolia. A serious challenge now and in the future is balancing rapid growth and the preservation of cultural heritage.

The types of cultural heritage considered in the baseline include:

- **Archaeological sites**, defined as physical remains of ancient or historic human activity or occupation, most often including subsurface resources, and often indicated by the presence of surface artefacts or structural remains. These include ancient graves, ancient settlements, and surface ceramic scatters, among others.
- **Monuments**, defined as above-ground structures of public interest and/or historical significance such as religious monuments, among others.
- **Sites and items of Intangible Cultural Heritage value**, defined as sites that form part of the spiritual or cultural lives of modern populations, nomadic herding, and folk legends. Intangible Cultural Heritage refers to oral traditions, social practices, rituals, festive events, knowledge and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts. These traditions, practices and beliefs make a people or region distinctive and socially cohesive. Sites with Intangible Cultural Heritage value often include the traditional forms of cultural heritage such as historic monuments, archaeological sites, and historic landscapes, but they may also include natural features.

EBRD PR 8 defines tangible cultural heritage as movable or immovable objects, property, sites, structures or groups of structures that have archaeological (prehistoric), palaeontological, historical, cultural, artistic, aesthetic and/or religious values. Unique features of the natural environment that embody cultural values or are attributed special spiritual significance are also included within this definition. These natural elements and protected landscapes are also known as "**living" tangible heritage**, together with structures built for spiritual purposes. Typically for Mongolia, living tangible cultural heritage comprises the following types of elements:

- *Ovoo* (also known as oboo), which is either:
    - *a stone structure* erected to mark historically, culturally or religiously significant places. These are also known as worship cairns; or
    - *a particular mountain or hill (i.e. a natural feature)* that is situated separately from other mountain ranges.[159]

[158] U.S. Embassy in Mongolia. 2019. Trafficking in Persons Report. Accessed: https://mn.usembassy.gov/our-relationship/official-reports/2019-trafficking-persons-report/

[159] Historically, *ovoos* were also set up to mark boundaries and to define the terrain, and in some cases they continue to be used as such in modern times.

- *Stupa,* which is a religious monument/worship location made of bricks, mud, wood and other materials.[160]

7.14.3. Baseline Conditions

7.14.3.1. Tangible Cultural Heritage

National level

At a national level, Mongolia hosts a number of sites that are listed on the United Nations Education, Scientific and Cultural Organisation's (UNESCO) World Heritage List, including:

- Great Burkhan Khaldun Mountain and its surrounding sacred landscape (2015);
- Orkhon Valley Cultural Landscape (2004);
- Petroglyphic Complexes of the Mongolian Altai (2011);
- Landscapes of Dauria (2017); and
- Uvs Nuur Basin (2002).

Given Mongolia's rich history, undiscovered archaeological sites likely exist within the country. A summary of the key known archaeological resources at a country level is presented in Table 7-43, none of which have been identified within the Project Area.

Table 7-43. Chronological summary of known archaeological resources

Cultural period	Age	Site type	Geographic extent (known sites)
Lower Palaeolithic	ca. 800,000 to 100,000 years ago	Stone tools	Bayankhongor *aimag*, Umnugovi *aimag*, Bayan-Ulgii *aimag*
Middle Palaeolithic	ca. 100,000–40,000 years ago	Several small campsites and settlements	Bayankhongor *aimag* Umnugovi *aimag* Uvur-Khangai *aimag*
Upper Palaeolithic	ca. 40,000–12,000 years ago	Mostly stone tool production sites	Bulgan *aimag* Khentii *aimag* Uvur-Khangai *aimag*
Mesolithic Period	ca. 12,000–8,000 years ago	Various Mesolithic stone tools	Most regions of Mongolia
Neolithic Period	ca. 8,000-3,000 years BCE	Various Neolithic stone tools and pottery	Most regions of Mongolia
Bronze Age	Began ca. 2000 BCE	Remains from bronze smelting activities, slab graves, Khirgisuur tombs, deer stones, rock painting and rock art	Throughout Mongolia
Chandmani Culture	early Iron Age	The special graves indicating a unique tribe	Chandmani Uul near Ulaangom *soum* in Uvs *aimag*
Pazyryk Culture	6th to 2nd century BCE	Graves with highly crafted artefacts	Altai Mountains of Mongolia
Xiongnu Period	3rd century BCE	Graves (elite and common), large urban settlements, and rock art.	Throughout Mongolia

[160] Originally, *stupas* were used as places of worship in the Buddhist tradition.

Cultural period	Age	Site type	Geographic extent (known sites)
Turkic Period	6th to 10th century CE	Memorial monument complexes that were built for emperors and for commoners, stone stelae covered with runic script, architectural objects, drawings and inscriptions on rocks and other components, as well as burial sites and graves.	Prevalent from the Khentii Mountains to the Altai Range

Note: BCE – Before Common Era, CE – Common Era.

Along with having rich archaeological resources, Mongolia also has many world renown palaeontological sites. Palaeontological localities like Baishin Tsav, Khuurai Tsav, Amtgai, Urlub Khudag, and Shar Tsav constitute the main evidence of animal (in particular, dinosaurs) and plant evolution dating back to the early Late Cretaceous Period of the Mesozoic Era, nearly 145 million years ago.

Govi-Sumber and Dornogovi *aimags*

Within Dornogovi *aimag*, several sites with palaeontology finds have been noted, including the Shariin-Gol formation in Altanshiree *soum*, and the Khuren Dukh site in Dalanjargalan *soum*. Palaeontologists still continue to discover fossils in the current territory of the Gobi Desert, such as the Bayanshiree formation (N44-16-1320; E109-54-4864; A-730m) in the far South-western soums of Dornogovi aimag, Zuunbayan and Ulaanbadrakh.[161]

There are two nature reserves near the project, Ikh **Nart Nature Reserve** located 10 km from the proposed transmission line and **Choiriin Bogd Mountain** located 27 km to the north-east of the proposed OHTL.

Ikh Nart Nature Reserve within Dornogovi aimag contains many archaeological sites[162] such as the Cymbur Prayer Ovoo, burial mounds, remains of Bugrasnii Am Monastery, and several petroglyphs. With support of the Earthwatch Institute, an archaeological team visited Ikh Nart for reconnaissance surveys in 2010 and conducted four field seasons (2011-2014). Preliminary results from the sample data indicate that nearly 5,000 archaeological sites exist within Ikh Nart's 66,000 ha. Site types recognised include residential areas, stone-working areas, Bronze Age burial features of several types, Xiongnu (Hunnu), Turkic Period, Kitan, and Mongolian Empire period burial features and burial complexes, as well as ruins of Buddhist communities and religious structures.[163]

Choiriin Bogd Mountain Natural Reserve has three historical sites; the temple of Zuun Janjin Choir, and Tsagaan dari eh burhan which is a rock sculpture painting. The area is 52.65 km².[164]

In addition, three sites of tangible cultural heritage are under protection at the *aimag* level:

1. **Ruin of Choir monastery** in Sumber *soum* – Govi-Sumber *aimag*. 32 km northeast of Choir.
2. **Stone statue and tomb** in Sumber *soum* – Govi-Sumber *aimag*. 56 km northeast of Choir.
3. **Khar Khutul, "Shine Us" well palaeontological monument** in Saikhandulaan *soum*, Dornogovi *aimag*. 82 km southwest of Sainshand.

A field visit by the ESIA team identified one location where a **burial place** within the 25 m RoW that could be directly affected by the Project. This site is 9 m from the planned OHTL centreline, in Shiveegovi *soum*, Govi-Sumber *aimag* (coordinates 46.05940, 108.54485).

[161] UNESCO. 2014. *Cretaceous Dinosaur Fossil Sites in the Mongolian Gobi.* Available at: https://whc.unesco.org/en/tentativelists/5944/. Accessed March 2020.
[162] Publications. Official website of Ikh Nart. Available at: http://www.ikhnart.com/Ikh_Nart_Archeological_Sites.pdf. Accessed March 2020.
[163] Schneider et al. 2016. *Mongolian "Neolithic" and Early Bronze Age ground stone tools from the northern edge of the Gobi Desert.* Journal of Lithic Studies (2016) vol.3, no.3, p.479-497.
[164] Available at: https://mongolia-guide.com/place/choiriin-bogd-mountain. Accessed March 2020.

Figure 7-34. Photo of burial place found near the proposed OHTL centreline, in Shiveegovi *soum*, Govi-sumber *aimag*[165]

Figure 7-35. Photo of an example tomb found near Choir, Govi-Sumber aimag[166]

The household survey sought to explore perceptions and awareness of cultural heritage at the local level. It asked respondents to name what aspects or things they consider to be Mongolian cultural heritage. Responses were archaeological sites, sacred mountains known as *ovoos*, special protected areas, and places with unique natural formations. Several respondents noted that there are few visible historical and archaeological sites nearby, as households located along the transmission line are close to, or inside mining licence areas. The most commonly identified places named by herders included Ikh Nart Nature Reserve and Choiriin Bogd Mountain. They did not name any other springs, historical tombs or places with unique natural formations along the transmission line.

However, whilst the ESIA surveys and stakeholder engagement did not identify any further tombs, it cannot be ruled out altogether and therefore chance finds monitoring will need to be in place during the construction phase.

Project *soums*

Historical and cultural heritage objects/sites are located in the territory of the wider Project Area, including all seven *soums* the Project will pass through. However, most are located a substantial distance from the planned OHTL route.

A full list of tangible cultural heritage, as defined by the Cultural Heritage Centre (2020) in the Project Area *soums* is provided in Appendix D. Figure 7-36 includes the three sites under *aimag* level protection, natural reserves with cultural heritage, and sites located between the main roads from Choir to Sainshand and the OHTL. There are no registered sites on this list within 25 m of the OHTL centreline.

[165] Photo taken by Environmental team, April 2020.
[166] ADB. 2017. *Draft Initial Environmental Examination for ADB Eastern Regional Road Project*. Photo taken by PPTA team.

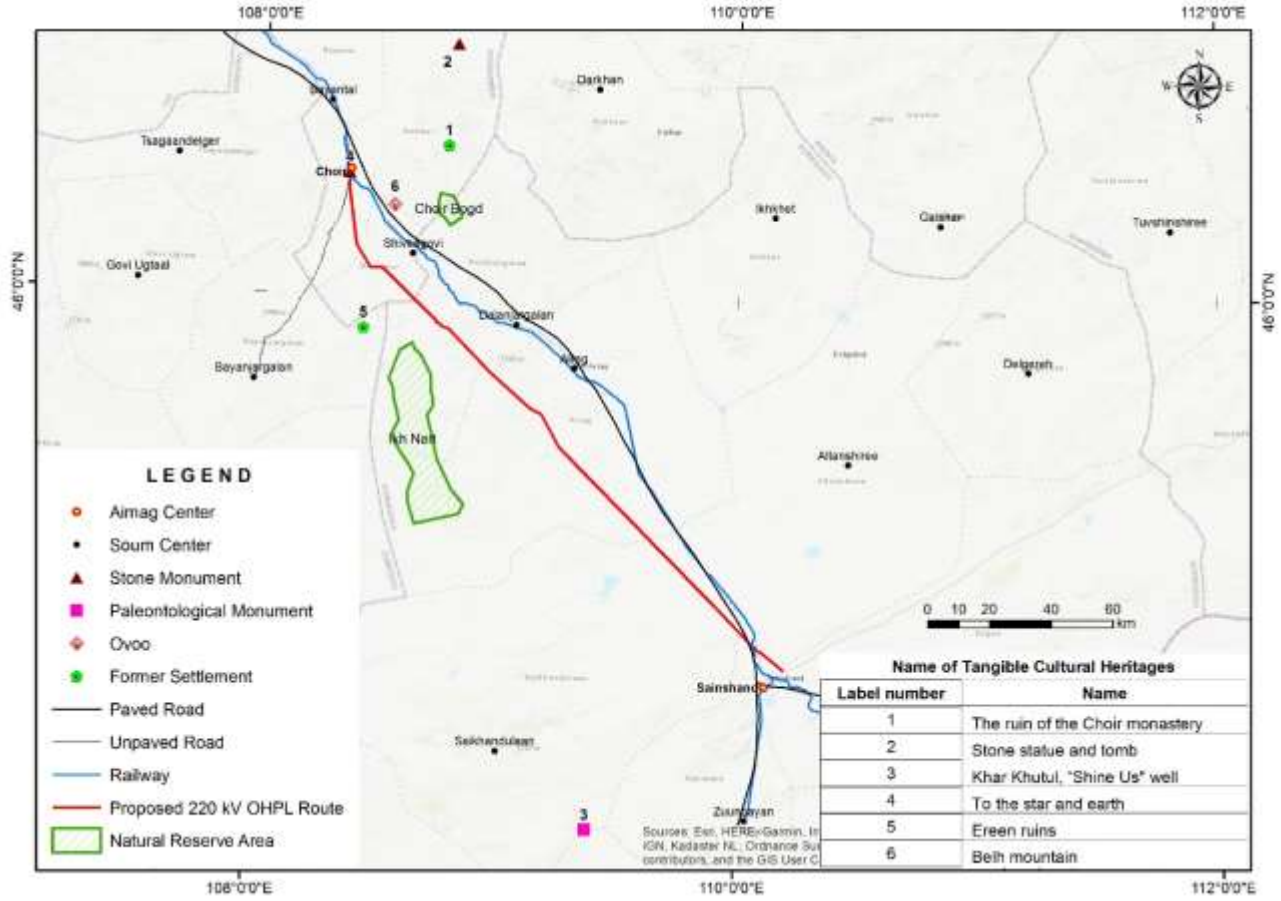

Figure 7-36. Tangible cultural heritage in the Project AoI

7.14.3.2. Sacred landscapes and living cultural heritage

During the social reconnaissance visit conducted from 19 to 22 April 2020, Land Use Officers in the *aimags* were asked about protected areas and any sacred or holy sites near the OHTL route and substations. During that fieldwork, Land Use Officers identified only one protected area, Ikh Nart Natural Reserve in Dornogovi *aimag*, and referred to Choiriin Bogd Mountain as a "sacred mountain". Land Use Officers did not identify any sacred places near the OHTL route.

Additional interviews and HHS were undertaken as part of the social baseline fieldwork from 8 to 12 June 2020 to establish the existence of living tangible cultural heritage; in other words, features of the natural and built environment that are ascribed special spiritual significance and used for spiritual practices and other rituals.

During the household survey interviews, several households indicated that they have personal *ovoos* and shrines, where customary religious rituals are held. Many of the households had participated in *ovoo* worship in some way over the past 12 months, but they did not worship *ovoos* or shrines close to the OHTL route.

Herder households also indicated two locations which are believed to contain healing benefits for visitors. The first is located in Airag *soum*, 0.2 km east of the OHTL route (see Figure 7-37). Named Nudengiin Khonkhor, it was taken under special protection of the aimag in 2011. It contains a mineral spring used widely by both livestock and people, for the relief of digestion and other health benefits. The second is named Khuriin Nogoon Nuur located in Sumber *soum*, 2.6 km from the OHTL route and listed in Section 6.10: Protected Areas. This lake contains water and mud that are believed to be good for rheumatism, muscle stiffness, joints and some skin diseases.

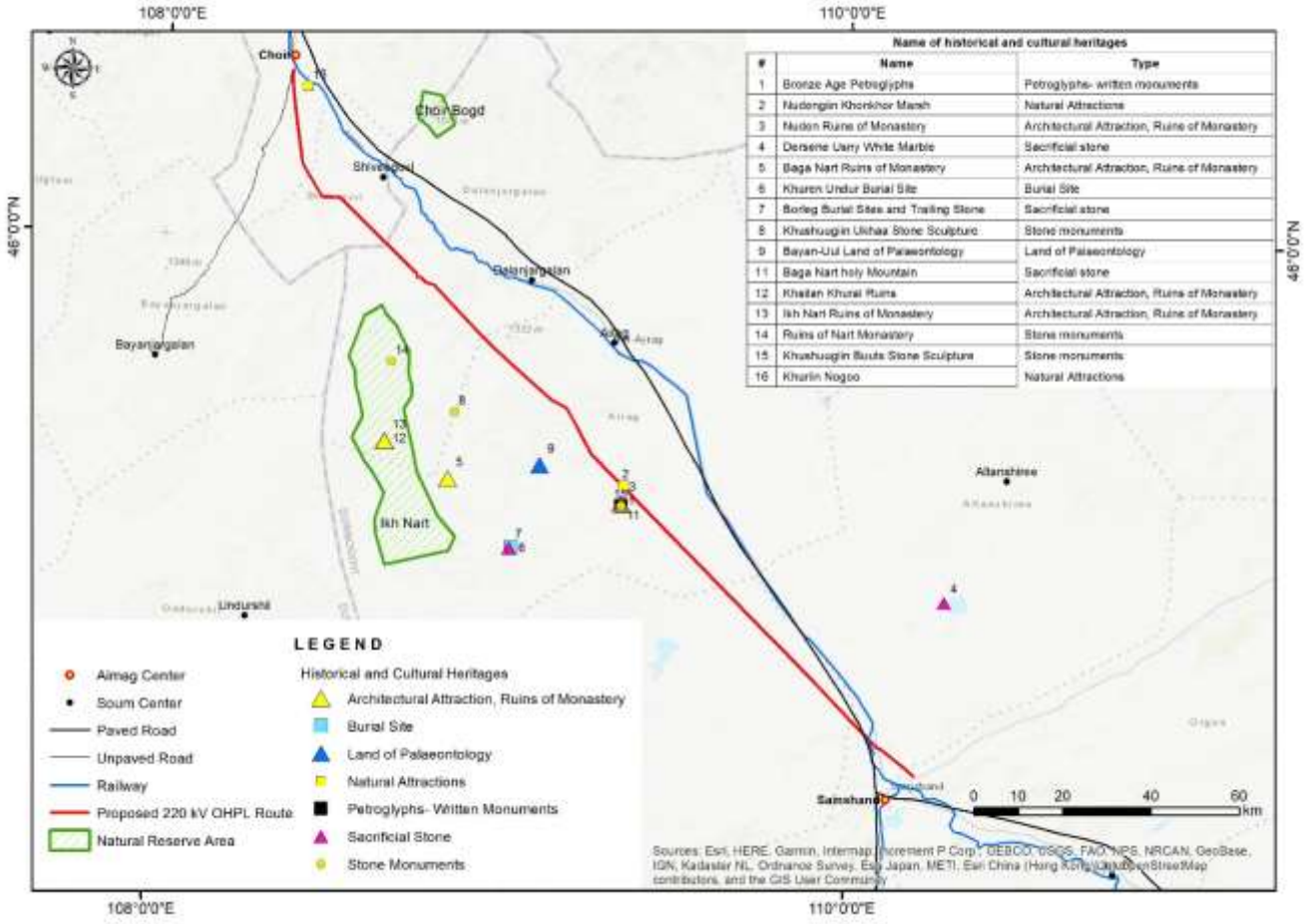

Figure 7-37. Traditional and sacred memorial places in the Project AoI

During the social baseline fieldwork in June 2020, *aimag* level officials also provided lists of local protected areas (see also Section 6.10: Protected Areas), as well as a list of historical, cultural heritage and significant places, shown in Table 7-44 and Figure 7-38 above.

The UNESCO Tentative Lists also contain Khanbayanzurkh Mountain in Sainshand *soum*, Dornogovi *aimag* as a sacred mountain in Mongolia. It is located 34 km south-west of Sainshand and was declared a State Sacred Mountain in 1995. There are three wooden temples at the Mountain, and it is a popular worship destination for pilgrims and tourists in Mongolia.[167]

Table 7-44. List of historical, cultural heritage and holy/sacred places within the Project Area

Name of monument / landmark	Distance from OHTL	Type	Decision, purpose of land use	Location
Bronze Age Petroglyphs	4 km West	Petroglyphs-written monuments	Locally protected by the decision #19/05 of the Dornogovi aimag CRKh in 2015	45 28 13 N 109 20 50 E **Airag soum**
Nudengiin Khonkhor Marsh	0.2 km East	Natural Attractions	Locally protected by the decisions #9/05 of Dornogovi aimag CRKh in 2011	45 30 40.1 N 109 21 09.1 E **Airag soum**
Nuden Ruins of Monastery	3 km Southwest	Architectural Attraction, Ruins of Monastery	Locally protected by the decision #19/05 of Dornogovi aimag CRKh in 2015	45 28 28 N 109 20 46 E **Airag soum**

[167] UNESCO. 2015. Sacred Mountains of Mongolia. Available at: https://whc.unesco.org/en/tentativelists/6068/. Accessed March 2020.

Name of monument / landmark	Distance from OHTL	Type	Decision, purpose of land use	Location
Dersene Usny White Marble	36 km Northeast	Sacrificial stone	Locally protected by the decision #16/16 of Airag soum's CRKh in 2015	45 16 54 N 110 17 4 E **Altanshiree soum**
Baga Nart Ruins of Monastery	33 km West	Architectural Attraction, Ruins of Monastery	Locally protected by the decision #16/16 of Airag soum's CRKh in 2015	45 31 02.1 N 108 50 37.2 E **Airag soum**
Khuren Undur Burial Site	29 km West	Burial Site	Locally protected by the decision #16/16 of Airag soum's CRKh in 2015	45 22 55 N 109 2 1 E **Airag soum**
Bor Eleg Burial Sites and Trailing Stone	29 km West	Sacrificial stone	Locally protected by the decision #16/16 of Airag soum's CRKh in 2015	45 22 46 N 109 1 34 E **Airag soum**
Khushuugiin Ukhaa Stone Sculpture	22 km West	Stone monuments	Locally protected by the decision #16/16 of Airag soum's CRKh in 2015	45 39 11 N 108 51 31 E **Airag soum**
Bayan-Uul Land of Palaeontology	12 km West	Land of Palaeontology	Locally protected by the decision #03/04 of Airag soum's CRKh in 2019	45 32 58 N 109 6 31 E **Airag soum**
Ikh Khongor Sacred Cairn	4 km Northeast	Sacrificial stone	Locally protected by the decision #16/16 of Airag soum's CRKh in 2015	45 48 32 N 109 0 23 E **Airag soum**
Baga Nart Burial Sites	35 km from Airag soum, on the western side	Burial Site	Locally protected by the decision #16/16 of Airag soum's CRKh in 2015	No information
Baga Nart holy Mountain	4 km West	Sacrificial stone	Locally protected by the decision #16/16 of Airag soum's CRKh in 2015	45 28 28 N 109 20 46 E **Airag soum**
Khailan Khural Ruins	39 km West	Architectural Attraction, Ruins of Monastery	Locally protected by the decision #18 of Airag soum's CRKh in 2016	45 35 28 N 108 39 27.8 E **Airag soum**
Ikh Nart Ruins of Monastery	39 km West	Architectural Attraction, Ruins of Monastery	Locally protected by the decision #18 of Airag soum's CRKh in 2016	45 35 27 N 108 39 27 E **Dalanjargalan soum**
Ruins of Nart Monastery	24 km West	Stone monuments	Locally protected by the decision #18 of Airag soum's CRKh in 2016	45 45 8 N 108 40 15 E **Dalanjargalan soum**
Khushuugiin Buuts Stone Sculpture	4 km West	Stone Monuments	Locally protected by the decision #19/05 of the Dornogovi aimag CRKh in 2015	45 28 13 N 109 20 50 E **Dalanjargalan soum**

Source: Director of Dornogovi aimag museum

7.14.3.3. Intangible Cultural Heritage

Mongolia has a rich variety of intangible cultural heritage, some of which has been recognized internationally by the UNESCO. While national laws exist to protect cultural heritage, there is no national law or particular act focusing on intangible cultural heritage as a whole. A few examples of intangible cultural heritage recognised by UNESCO[168] include:

- **Traditional music of the Morin Khuur (2008):** Traditional Morin Khuur music is an integral part of rituals, ceremonies and everyday activities in the nomadic Mongolian society, and has featured in Mongolian culture for over seven centuries. The Morin Khuur is a two-stringed instrument with an ornamental horse-head on its upper end.
- **Urtiin Duu, traditional folk long song (2008), (multinational nomination submitted together with China):** Urtiin duu is one of the oldest genres of Mongolian musical art, a professional classical art that

[168] UNESCO. 2019. Report on the Implementation of the Convention and on the Status of Elements Inscribed on the Representative List of the Intangible Cultural Heritage of Humanity. Periodic Report. https://ich.unesco.org/en/state/mongolia-MN?info=elements-on-the-lists. Accessed May 2020.

dates back to the 13th Century. Urtiin duu involves the performance of complicated, drawn-out vocal sounds. It is representative of vast, wide spaces and demands great skill and talent from the singers in their breathing abilities and guttural singing techniques.

These examples provide a general description of some intangible cultural heritage practices to be found in the larger areas surrounding the Project Area. As the Project encompasses an OHTL with temporary construction, it is not expected to impact intangible cultural heritage.

7.14.4. Social Baseline Conclusion

In summary, the social baseline indicates that:

- Over the past three years, there have been fluctuations in the number of herders across the Project *soums*. In Sumber, Altanshiree, Dalanjargalan and Saikhandulaan *soums*, they fell from between 2 to 9% and in Shiveegovi, Sainshand and Airag *soums* they rose from between 3 to 16%.
- Govi-Sumber *aimag* has one *aimag* general hospital, one family hospital, one *soum* health centre in Shiveegovi *soum*, one hospital, four private hospitals for outpatients, one health department, one medical supply organisation and 10 private drug stores.
- Dornogovi *aimag* in 2018 had 82 health services facilities, including five family hospitals, 12 soum health centres, one inter-soum hospital, one rural general hospital, one aimag general hospital, five private inpatient hospitals , 21 private hospitals for outpatients, one health department, 4 medical supply organisation, 24 private drug stores and five other medical facilities.
- In 2019, the unemployment rate in Mongolia was 8.1% at the national level, 9.8% in urban areas and 7.4% in rural areas.
- In 2019, Govi-Sumber *aimag* had 8,058 economically active persons. The male labour force participation rate (77.3%) was 5.4% higher than the female labour force participation rate (71.9%). Female labour force participation in Govi-Sumber *aimag* is much higher than the national average, 72% and 47% comparatively.
- As of 2019, Dornogovi *aimag* had 32,985 economically active persons and the labour force participation rate was 68.9%. The male labour force participation rate (73.1%) was 8.7% larger than the female labour force participation rate (64.8%).
- Youth unemployment is widespread. Compared to national figures, the unemployment rate in Dornogovi *aimag*, a rural area, is comparatively low, with estimates ranging from 2.2% to 6.4% across the *soums* in the Project Area. The unemployment rate is relatively high in Govi-Sumber *aimag*: it is 11.4%.
- As of 2019, the Project seven *soums* accommodate 3,381 herders; 2,249 households with livestock and 2,170 herder households. In general herders in the Mongolian Gobi region face challenges of pasture degradation and access to water. Although the Mongolian Gobi region has abundant groundwater resources but poor surface water. Therefore the herders of this region tend to live in the vicinity of wells.
- There are up to 74 registered herder households within a 6 km buffer zone of the OHTL route (winter camp area); 22 of these were present during the HH surveys and 5 of which do not move to summer pastures (i.e. stay in their winter land plot all year). During the June 2020 survey, no herder households or household structures were identified within the 25 m RoW of the OHTL.
- A total of 22 winter gers and two summer gers were identified within the 6 km buffer zone of the realigned section of the OHTL route during the May 2021 survey.
- A detailed survey once the final route optimisation has taken place will be required to confirm these findings.
- Findings from the HHS (June 2020) show that all the households earn income from agricultural products associated with herding activities. Seventy percent (n=23) of household members of working ages are economically active, of which 78% (n=18) are engaged in herding and 22% (n=5) work in the private sector. Of the 22 households surveyed, 10 persons of working age had not worked to generate any income in the last month, and in most cases, the past year.
- Vulnerable groups in the Project Area have been identified as PWD, single headed households and economically active persons without employment. Among the members of the 22 households in the winter camp interviewed, there is a disabled person and two elderly persons requiring care who qualify

as vulnerable. As there are a greater number of households who reside in the winter camp than present at the time of the June 2020 interview, there could be more vulnerable members of herder households.

- The June 2020 surveys also indicated that there were no herder wells within the RoW. There were three wells identified within 300 m of the centreline. However, a detailed survey once the final route optimisation has taken place will be required to confirm these findings.
- There are no other buildings or structures within 25 m of the substations (new and proposed). However, a detailed survey once the final route optimisation has taken place will be required to confirm these findings.
- The OHTL 25 m RoW passes over five mineral concession licences, four of which are identified as “operational” however, the OHTL does not pass across any active mining pits.
- The OHTL 25 m RoW passes over two locally protected areas, Togootliin Khonkhor and Bornuruu.
- Five locally protected cultural heritage sites are located within 4 km of the OHTL route; and one potential tomb may be directly or indirectly affected by the Project as it is located with the 25 m RoW.
- There is a possibility of unknown buried cultural heritage to be present in the RoW.

8. Stakeholder Engagement

8.1. Introduction

The EBRD has assigned the Project as a Category A, which means that as part of the ESIA, a separate SEP must be prepared. A SEP has been developed in accordance with EBRD's PR10 *Information Disclosure and Stakeholder Engagement* and the EBRD's ESP 2014.

The SEP is a 'living document' and will be developed in more detail by the NPTG and their Construction Contractor, prior to the start of construction to reinforce both ownership and execution of the Plan in the Project stages. It is intended to be a document that responds to the specific and unexpected circumstances and challenges that arise in the Project Area about which stakeholders need to be informed and consulted with if they are or will be potentially affected.

As a Category A project, the Project must engage with stakeholders at every phase of the Project and their feedback needs to be built into the relevant project documents. The ESIA documents, including the SEP, are intended to be publicly disclosed for comments on the EBRD website and locally.

This Chapter provides a summary of the stakeholder engagement process that has fed into the ESIA process; a more detailed account of stakeholder identification and future engagement is provided in the SEP.

8.2. Identification of Stakeholders

In order to develop effective stakeholder engagement, it is necessary to identify who the stakeholders are and understand their needs and expectations for engagement, and their priorities and objectives in relation to the Project. Project stakeholders have been identified following the requirements of EBRD PR10 which takes into account individuals or groups who:

(i) are affected or likely to be affected (directly or indirectly) by the project (affected parties); or

(ii) may have an interested in the project (other interested parties).

During the ESIA process, the Project stakeholders have been identified in an exercise using the criteria of (i) and (ii) above, on the basis of location (i.e. what administrative units are associated with the Project – see Table 8-1) and those groups or individuals identified on the basis of potentially being impacted by the Project. The following has been taken into consideration:

- The Project's activities and area of influence (AoI);
- Potential, or review of current, positive and negative Project impacts;
- Contact with Project relevant government bodies and civil society and business groups; and
- Contact made with organisations expressing, or likely to have, an interest in the Project.

The Project intersects with two *aimags* and seven *soums* and associated *baghs* that may experience direct and/or indirect environmental or social impacts from construction and operation of the Project, and therefore all relevant administrative departments and stakeholder groups within these areas have been identified.

The identification of stakeholders has also included the identification of individuals and groups that may be differentially or disproportionately affected by the Project because of their disadvantaged or vulnerable status, and/or whether these individuals or any other stakeholder groups are likely to be excluded from, or unable to participate in, the mainstream consultation process or would require specific measures and/or assistance to do so.

A stakeholder list has been prepared and is available in the SEP. It is expected that other stakeholders may be identified during future Project phases and as such, this list will be updated as required and will be reviewed regularly and updated throughout the Project cycle. The risk associated with each stakeholder group can also be subject to change and therefore will also be reassessed periodically.

At a minimum, the stakeholder list will be revised prior to the start of the construction and operation phases.

8.3. NPTG Stakeholder Engagement

During the 12 April 2020 meeting between the ESIA team and the Working Group, comprising NPTG management representatives, it was established that previous stakeholder engagement had been limited to meetings between NPTG, a contracted mapping company, and local authorities for the purposes of creating and modifying the OHTL route in 2013 and 2019. A Feasibility Study (2013) had been produced, which may have been informed by other technical specialists and governmental departments.

In early 2020, NTPG approached the *Hurals* (citizens representatives) in each of the seven *soums* with requests for land located in their jurisdictions to be allocated to the Project. By June 2020, six of the seven *Hural* authorities had agreed to allocate land for the Project. Sumber *soum* of Govi-Sumber *aimag* has preliminarily agreed to allocate land and is waiting for approval from the *Hural* authorities, who has not convened due to the recent parliamentary election.

Due to the limited stakeholder engagement which concerned technical issues only, no specific environmental or social issues had been raised by these stakeholders.

No further engagement to date has been undertaken by NPTG.

8.3.1. ESIA Scoping Phase

KIIs took place with local government officials between 19 to 23 April 2020 for the purposes of collecting baseline information and listening to concerns and issues about the Project. This fieldwork visit took place during the COVID-19 restrictions and the lambing period, both of which had the effect of limiting the number of key officials available for the interviews. The closure of the road from Sainshand to Ulaanbaatar, for instance, resulted in the cancellation of meetings in Airag *soum* of Dornogovi *aimag*. In addition, two *bagh* officials in Sainshand soum declined to meet with the Team claiming they had not received official permission from their higher governing bodies. A further limitation was that since the Land Use Officials had not seen advance copies of the proposed new OHTL route, they could only provide general information about land use in the vicinity of the Area of Influence (AoI).

Table 8-1 provides a summary of key stakeholder engagement undertaken between 19 to 23 April 2020.

Table 8-1. Stakeholders engaged with during ESIA scoping phase

Location	Officials met
Govi-Sumber *aimag*	**Meetings with Govi-Sumber *aimag* officials (April 20):**
	Land officer – D. Misheel
	Chief Engineer of the Govi-Sumber electricity distribution network - Boldbaatar
	Meetings with Sumber *soum* /Choir officials (April 20):
	Land officer – B. Altantuya
	Treasury fund specialist – D. Munkhtsogt
	Soum Governor and deputy Governor – Amarsaikhan and Khishgdorj
	Head of the Governor's office - Khatantumur
	Agricultural specialist – Suvdshur
	Governors of *Baghs* #3 and #4 – T. Gantulga and Odgerel
	Meetings with Shiveegovi soum officials (April 20):
	Soum Governor and deputy Governor – S. Yagaantsetseg and Bamunkh
	Chairman of Citizen's Representative *Hural* – Ts. Erdenebat
	Land officer – E. Bayarmagnai
	Governor of *Bagh* #1 - Nandintsetseg
Dornogovi *aimag*	**Meetings with Dornogovi aimag officials (April 21):**
	Head of *Aimag* Governor's office – B. Ganzorig
	Investment, development policy and planning specialist – B. Tsen-Ayush
	Aimag statistical department, senior officer – B. Tserendorj
	Director of Dornogovi electricity distribution network – D. Chintogtokh

Location	Officials met
	Meetings with Dalanjargalan *soum* officials (April 20):
	Soum Governor – S. Urantsetseg
	Land officer – Otgonbat
	Head of Governor's office – B. Oyubyamba
	Head of Treasury department - Tsogzolmaa
	Governor of *Bagh* #4 – Bekhbat
	Meetings with Sainshand *soum* officials (April 21):
	Land officer – Myagdagmaa
	Land cadastre and land ownership specialist – A. Ankhildul
	Land management and planning specialist – U. Narangerel
	Meetings with Saikhandulaan *soum* officials (April 21):
	Soum Governor – Erdenejargal
	Land officer – Ganaajav
	Tsokio *Bagh* leader – no name recorded
	Meetings with Altanshiree *soum* officials (April 21):
	Soum Governor – L. Tsetsegdari (was called away for urgent meeting)
	Statistics specialist – no name recorded
	Meetings with Airag *soum* officials: no meetings due to State Emergency Commission road closure

Table 8-2 presents the key issues and feedback identified in relation during the scoping phase.

Table 8-2. Summary of stakeholder issues

Topic	Stakeholder Issues and Concerns
Unregistered herders using pastureland under mining licenses in *bagh* II, Shiveegovi soum and *bagh* IV, Sainshand soum.	Unregistered herders need to be identified and consulted with regarding access restrictions and other Project-induced impacts. Tensions or conflicts with mining licensees need to be anticipated and mitigated.
All pastureland users in the AoI	There is competition among herders and non-resident herders for quality pastureland in the Project Area. Overgrazing, lack of water supply points, and shared use with native wild animals, such as white gazelles create tension and conflicts. The *bagh* leaders stated their intentions to examine how the Project may aggravate social relationships among users and their follow-on impacts on biodiversity. This has nothing to do with the Project. Access restrictions during construction will be temporary. The Project will not impede herders' movement or livelihood in a significant way. Access restriction to structure depends on how long it takes to build the TL in that area and the season. If during winter/spring, then will have much more disruption than in autumn/summer. Vehicle dust during construction stage.
Herders' spring and winter shelter users	Need to be identified and covered. A total of 80 were identified by the Project Team and documented on maps. This would presumably be the same group as the row below.
Herder- households living in the winter camp	Construction impacts, such as dust and noise affecting health of people and livestock. Access restrictions during construction. Herding-related transport accidents may increase due to influx of trucks and machinery to and from the Project site. This is only relevant during winter and early spring. They will be moving around after that in other pastures.

Topic	Stakeholder Issues and Concerns
Residents	Confirm wwhether residents have access to 220 kV electricity from the transmission line. It is assumed that direct beneficiaries will be businesses and mines, however residents who have access to the CES distribution will indirectly benefit.
Industrial versus agricultural producers	Livestock pastureland is gradually being squeezed out by the mining industry due to the intensity of regional mining. There is a growing concern that the Project will provide a reliable source of energy for the region to support mining and other heavy industries at the expense of the livestock animal husbandry sector.

8.3.2. ESIA Baseline/Impact Engagement Phase

For the ESIA Baseline/Impact Engagement phase, a *Choir-Sainshand TL Project ESIA – Social Baseline Field Work Plan* was prepared to obtain baseline data and undertake consultations. The focus of the engagement, which was undertaken alongside the social baseline fieldwork, was to gather further data and feedback on the Project-affected communities within the AoI and the potential impact of the Project on their livelihoods.

A team of five in-country social and land specialists undertook the formal meetings, KIIs and HH surveys from 8 to 12 June 2020. The five *soums* of Sumber, Shiveegovi, Dalanjargalan, Airag and Sainshand were visited. The *soums* of Altanshiree and Saikhandulaan were not covered as it had previously been identified that there were unlikely to be any herder households in the vicinity of the OHTL line due to the small number of herder households that reside or transit through these two soums where the quality of pastureland is exceptionally poor; and because the KIIs with the soum officials had already been carried out in the Scoping Stage engagement.

A summary of the ESIA Baseline/Impact Engagement is as follows:

1. **Formal meetings:** Discussions with local authorities were conducted to increase awareness about the Project and to obtain their perspectives on the Project in relation to the areas in their authority. A total of 54 officials were engaged during the baseline fieldwork visit.

2. **KIIs:** A total of 34 KIIs were conducted with the local authorities and specialists on issues within their expertise.
    - *Map development meetings*: The Team consulted with specialists in the Departments of Land Management, Urban Planning, and Cadastre in the *aimags* of Dornogovi and Govi-Sumber to obtain detailed locational data about the households and substations in the AoI, which resulted in the production of three key maps. Contained in these maps are:
        - GPS coordinates of herder-household shelters, cultural heritage sites and protected areas, and areas with mining licences within the 6 km buffer zone in the five *soums* of Dornogovi *aimag* and in the two *soums* of Govi-Sumer *aimag* (two separate maps); and
        - GPS coordinates of the areas planned for the substations in Sainshand and Choir and surrounding environs.
3. **Consultations with households:** The Team visited 57 winter and spring shelters using the GPS coordinates provided by the *aimag* and *soum* land specialists. Of these 57 shelters, the Team interviewed 22 households which were still residing in the area (the other households had already moved to summer pasturelands outside the AoI). During these visits, the Team conducted a household survey covering a diverse range of topics, including information about land uses and seasonality, income and expenditure, livestock and other assets. The questionnaire also contained questions about household composition, livelihood sources, local informal land tenure practices, social organisation, women's status, youth issues, community health and safety, cultural heritage sites of local value and views on potential impacts of the Project on their household and the wider community.

Table 8-3 provides a summary of the key stakeholder engagement undertaken from 8 to 12 June 2020.

Table 8-3. Key stakeholder engagement during the Baseline Engagement phase

Location	Officials met
Govi-Sumber *aimag*	**Meetings with Govi-Sumber *Aimag* officials (June 11):**
	Senior criminal investigator of the Aimag Police Department – Batkhuyag
	Head of Aimag Health Department – Munkh-Od. D

Location	Officials met
	Head of Agriculture and SMEs Department – Davaakhuu. N
	Specialist of Department of Environment and Tourism – Munkh-Erdene. D
	Head of Department of Finance and Treasury – Otgontuya. A
	Head of Department of Development Policy and Planning – Bat-Erdene. T
	Specialist of Department of Agriculture and SMEs - Erdenebayar
	Specialist of Department of Land, Construction and Urban Development – Ganzorig. D
	GIS specialist of Umard Gobi Guveet Khalkhyn Dundad Talyn River Basin - Batkhuu
	Head of Management Department of Aimag Police Department – Ariunaa. Sh
	Culture specialist of Department of Education, Culture and Science – Garamsan. B
	Meetings with Sumber *soum* /Choir officials (June 12):
	Deputy Governor of *Soum* Governor's Office – Khishigdorj
	Bagh #4 Governor – Odgerel. T
	Specialist in charge of agriculture - Erdenebayar
	Department of Education and Culture, Culture specialist – Zurgaanjin. A
	Meetings with Shiveegovi *soum* officials (June 12):
	Chairman Citizen's Representative *Khural* – Erdenebat. Ts
	Head of Department of Agriculture and SMEs – Buyannemekh. Sh
	Land Specialist – Bayarmagnai
	Environmental specialist – No name recorded
	Specialist of Department of Social Welfare/Labour – Baasandalai. Z
Dornogovi *aimag*	**Meetings with Dornogovi *aimag* officials (June 8-9):**
	Infrastructure specialist - Munkhbayasgalan
	Head of *Aimag* Branch of Chamber of Trade and Industry – Otgonbayar. Sh
	Head of Department of Agriculture and SMEs - Naranbold
	Head of *Aimag* Police Department - Erdenebaatar
	Head of the Department of Agriculture - Tsetseg-Ochir
	Head of *Aimag* Health Department - Enkhtsetseg
	Specialist of Department of Protected Areas – Enkhzorig. S
	Head of Department of Investment, Development Policy and Planning – Tuvshintur. T
	Head of Department of Finance and Treasury – Sodkhuu. Ts
	Head of Department of Land, Construction and Urban Development - Oyunsaikhan
	Specialist in charge of land management, planning and engineering exploration and monitoring - – Narangerel
	Head of Department of Land Management – Oyungerel
	Department of Land, Construction and Urban Development, Specialist in charge of geodesy and cartography– Enkhbat. Ch
	Cadastre specialist of Department of Land, Construction and Urban Development - Ankhildul
	Head of *Soum* Governor's Office – Tungalagtuya
	Head of Statistics Department – Ulziisaikhan
	Head of Galba-Oosh Dolood River Basin – Yalaltbayar
	Head of Department of Environment and Tourism – Suren
	Director of Aimag Museum – Erdenebat

Location	Officials met
	Head of Development Policy Department - Olzbayar. L
	Head of Meteorological and Environmental Research Agency - Enkhmaa
	Meetings with Dalanjargalan *soum* officials (June 10):
	Head of *Soum* Governor's Office – Oyunbileg. B
	Specialist of Department of Agriculture and SMEs – Narandelger. M
	Specialist of Department of Environment and Tourism – Dandarbaatar. S
	Bagh # 3 (Bichigt bagh) Governor – Purevsuren. A
	Chairman of Citizen's Representative Khural – Mendsaikhan. G
	Social Welfare/Labour specialist – Tsetsegmaa. U
	Land Officer – Otgonbat. M
	Meetings with Sainshand *soum* officials (June 10):
	Head of Department of Agriculture and SME – Tsetseg-Ochir
	Social policy specialist - Uugantsetseg
	Head of Sainshand Mayor's Office - Otgonbayar
	Citizen's Representative Khural – Erdenebayar. D
	Representative of Citizen's Representative Khural - Batbayar
	Land Officer – Jargalsaikhan
	Head of Deparment of Development Policy and Planning – Olzbayar. L
	Meetings with Airag *soum* officials (June 10-11):
	Soum Governor – Munkhjargal. L
	Bagh #1 Governor – Myadagmaa. N
	Bagh # 2 Governor – Batbayar. B
	Specialist of Department of Environment and Tourism – Lkhamsuren. E

Table 8-4 provides a summary of key stakeholder issues and feedback provided.

Table 8-4. Summary of stakeholder issues

Stakeholder group	Key concerns, raised issues and engagement ideas
Local communities	
Herder households with permanent structures in the 6 km buffer zone	• Herders who participated in the survey had no prior information about the OHTL line Project. • Herders were not in favour of the Project. The building of the OHTL line will not have a direct effect on the lives of herders. It was reported, however, that dust from the construction phase of the Project may adversely affect the health of herders and their livestock. • Pasture lands are shrinking due to the regional context of the area and its developing mining industry. Providing reliable, high voltage, electrical energy sources to the mines and supporting the mining and manufacturing industry is seen to squeeze out traditional livestock industry and further reduce the area of pastureland available. • Only one road must be used during the building phase of the Project in order to prevent land damage caused by multiple roads. • Herders are concerned about activities such as building camps, digging soil and industrial truck operations due to the development of the mining industry in the region. Therefore, it is highly advisable to inform herders about planned activities and their purpose before launching operations as they might have opposing ideas if they are not well informed. • One of the key concerns among herders is the scarcity of water in Govi. Therefore, the OHTL should not permanently obstruct herders' access to water wells. Any temporary access restrictions require mitigation.

Stakeholder group	Key concerns, raised issues and engagement ideas
	• It was highlighted that the best way to get information to the herders was through the *bagh* general meetings. • The majority of the herders are locals; they know each other well and have strong communication links. • Herders obtain information about their area through their phones, community Facebook groups and *Bagh* Governors. • Local herders are opposed to both mining companies and non-local users of summer pastures having access rights to the pasturelands they use.
Users of summer pastures from other *soums* and neighbouring *aimags*	• Herders who use summer pastures from other *soums* and neighbouring *aimags* had no prior information about the Project. • They have difficult relationships with local herders and they move from pasture to pasture every 2-3 days. • They have difficult relationships with the local government. • Herders who use summer pastures from other *soums* tend to be interested in receiving information about their local *soum* rather than the *soum* where they are residing. Local government officials refer to this attitude as "distant loyalty".
People and businesses in the Project Area	• People residing in the Project Area had no prior knowledge about the Project. • The building of this OHTL line does not have high significance in the lives of *soum* residents as they already have a reliable, electrical source. • The Project does not have a direct effect on the lives of the *soum* residents as it will not pass through the *soum* centre.
Mining concessions within the Project area of influence	• Two mines in Dalanjargalan *soum* receive their electrical supply from Sumber *soum*. • No meetings were held during the baseline study due to the halt of mining activities.
External stakeholders	
***Aimag* level Government / Regulators / Administration**	• Two official letters were received from the Ministry of Energy. They also received information in May because the Citizen's Representatives *Hural* (CRH) had been determined to launch the Project. • They were in favour of the Project. As it is a project implemented by the Government of Mongolia, they made commitments to focus on settling all issues concerning the Project as quickly as possible. • Regular cooperation must be developed between the Project implementor and local government.
Investment, economy SME officials	• They had prior knowledge about the Project. However, they did not have detailed information. • They were in favour of the Project. • Information about the Project location and how it fits in with other local government plans must be distributed which will help the local government effectively plan and use the new TL line. • Attention must be paid on how the new OHTL connects to the prior electrical supply line.
Land, Environment, Agricultural officials	• They had no prior information about the Project. • Project implementor must make agreements with the local governments on waste management and water usage. • Project implementor must discuss the location of the camp with the *Bagh* Governor(s).
Social policy, social welfare and employment officials	• They had no prior information about the Project. • There was feedback highlighting the importance of employing the local work force.
Health officials	• They had no prior information about the Project. • Special attention must be paid to protecting the health of the local population and livestock during the construction phase of the Project by avoiding excessive dust generation. • Industrial accidents must be prevented during the construction phase of the Project. Cooperation with the local hospital must be developed in terms of immediate response in cases of industrial accidents.

Stakeholder group	Key concerns, raised issues and engagement ideas
Education and cultural officials	• They had no prior information about the Project. • Cooperation must be developed in terms of protecting and preserving local natural and cultural landmarks and discovery of historical findings.
***Soum* level Government / Regulators / Administration**	• They were in favour of the Project. • Mutual understanding and cooperation with inhabitants of the Project Area needs to be developed.
***Bagh* level leaders**	• They had no prior information about the Project. • More information about the Project must be distributed at the *Bagh* general meetings. • They said that herders are concerned about local birds, such as black kites (*milvus migrans*) and buzzards (*buteo lagopus*), which feed on field mice dying from exposure to the electrical lines. • They suggested that attention must be paid to avoid building OHTL lines in areas where wells, winter camps and spring camps of herders are located. • They suggested that all possible miscommunication and lack of communication must be avoided during Project launch and implementation because locals and herders may raise disputes regardless of the scale of the issue.
Regional Non-Governmental Organisations (NGOs) and Community-Based Organisations (CBOs) – data provided by proxy on Dayar Mongol" NGO	• "Dayar Mongol" NGO, a NGO which carries out environmental protection activities in Mongolia has a branch in Dornogovi *aimag* through which they operate in the *aimag*. According to interviewed herders, they contact "Dayar Mongol" NGO directly about matters concerning the mines rather than the local government, which is an issue in Dalanjargalan *soum*. • Dalanjargalan *soum* established a non-governmental organisation to work in environment protection and monitoring consisting of three representatives from each *bagh*.
Local businesses and business organisations (Chamber of commerce)	• They had no prior information about the Project. • They were in favour of the Project. • There are many infrastructure, large-scale factories, electrical energy projects being implemented in Dornogovi, Govi-Sumber *aimag* during the last few years making it possible for small and medium enterprises to be developed and employment opportunities to increase. • There is expectation from local entities for electricity bills to decrease following the implementation of this large-scale, infrastructural, energy Project.

8.4. Future Engagement

The future Stakeholder Engagement Programme will comprise several phases as follows:

- ESIA Disclosure and Consultation Phase;
- Pre-construction Phase;
- Construction Phase; and
- O&M Phase.

The Project ESIA Disclosure Package will be provided in English and Mongolian and posted on the EBRD website (www.ebrd.com) for a period of 120 days in line with EBRD requirements.

Hard copies of these documents will also be available at EBRD offices and MoE / NPTG offices in Ulaanbaatar, Mongolia.

As public consultation is not currently possible, hard copies of the NTS, LARF (and as relevant non-personalised data of the RAP/LRP when available) and SEP will be shared with the local administrations at the *aimag*, *soum* and *Bagh* level in Project-affected soums and Bagh's for perusal by interested parties. Where possible, a round of face-to-face meetings (using current safe social distancing practices) will be held with the key administration representatives; however, if this is not possible a telephone or web conference call will be organized.

A short leaflet version of the NTS will also be prepared for the *aimag*, *soum* and *Bagh* level that can be used on local Public Information Boards. The format will be such that the same information can be used by NPTG on their website and provided at MoE / NPTG local branch offices and customer service halls.

During the social fieldwork, most people suggested that using local Facebook groups is preferred for sharing information than media notices, therefore local Facebook groups will be used to disseminate Project information and availability of documentation. The MoE / NPTG will also inform the Project affected people via *Bagh* and *soum* leaders; and one-to-one consultation will be held with directly affected herder households. Further details are set out in the Project SEP.

The NPTG will also publicly notify how a copy of the Project ESIA documentation can be accessed and comments provided, including electronically and comment books at local MoE / NPTG offices and through MoE / NPTG staff as part of routine consultation activities.

Following the disclosure period, an updated ESIA Report and associated documents will be prepared and issued on the EBRD website; and an updated NTS and leaflets, where necessary, provided at the *aimag*, *soum* and *Bagh* level.

A future plan for engagement during the pre-construction, construction and O&M phase of the Project is set out in Chapter 6 of the SEP.

8.5. Grievance Mechanism

A formal community *Grievance Mechanism* will be implemented to ensure that relevant parties (CLient/PIU/Contractor) are responsive to any concerns and complaints, particularly from affected people and communities; and to ensure that there is a central approach and record of grievances. A grievance mechanism is set out in Chapter 7 of the SEP.

Special attention will be paid to the training of designated staff involved in the management of the *Grievance Mechanism*. This *Grievance Mechanism* covers non-employees (i.e. affected people and other relevant stakeholders such as local communities).

A separate internal grievance procedure for Project employees/ workers will be provided.

9. Detailed Design and Project Delivery

9.1. Introduction

This Chapter presents an overview of the actions that will be required in the Detailed Design and Pre-construction phase to meet the EBRD PRs in relation to the management and delivery of the Project.

9.2. Project Management and Delivery

As identified in Chapter 1, the MoE is the Client and it is likely that a PIU will be set upin the MoE offices to oversee Project implementation. Within the PIU, a person responsible for the Environmental and Social Management System (ESMS) should be appointed. This individual will be responsible for ensuring adequate training of the PIU staff and, where necessary, Contractor staff.

A Construction Contractor (or Contractors) will be appointed for the construction of the Project. It will be essential to ensure that the contractual relationships between the MoE, PIU and the Construction Contractor is clear and in particular that obligations stated in this ESIA, in any local permits and those obligations under EBRD PR2 and PR4 form part of construction contract.

As the Construction Contractor has not been appointed, there is no information available yet to assess their organisational capacity. The Construction Contractor shall provide sufficient staffing to manage the ESMS performance of the Project (see below), and ESMS staff shall be approved by the PIU.

The Construction Contractor will be expected to undertake monitoring and inspections of their compliance with the Project ESMS documentation, including the ESAP, and the PIU shall undertake regular inspections and audits of the Construction Contractor to ensure compliance with the Project ESMS and ESAP.

9.3. Environmental and Social Management System and Plans

The PIU shall set up an overarching “Project ESMS” to manage the environmental and social commitments of the Project. The Project ESMS will provide the framework for the Contractor’s management system, thus enabling a common standard to be met. The ESHS will also provide the framework for the development of O&M management plans.

The Project ESMS will cover the following:

- Policies and procedures, including a Code of Conduct;
- Project ESMMP;
- Legal and permit register;
- Roles and roles and responsibilities; and
- Project schedule.

As part of this ESIA Report, an ESMMP has been developed. It is expected that the PIU will develop this in more detail prior to contracting the Construction Contractor, to reflect additional surveys and any updates to the Project design – this will become the Project ESMMP. This will also need to include all mitigation measures identified in the DEIA and associated permit obligations. The Project ESMMP should form a requirement of the tender documents.

The Construction Contractor will be obliged to adopt this ESMS and develop more detailed systems and plans to address construction-specific aspects of Project delivery. The Construction Contractor will, naturally, be required to comply with all relevant Mongolian legislation, such as the Mongolian OHS Law and related standards. This will be overseen and monitored by the PIU.

During operation, the development of the ESMS for the O&M stage will be the responsibility of the NPTG.

Roles and roles and responsibilities for ESMS implementation will be defined by all relevant parties, and a Project Schedule (programme) developed to indicate the timing of all actions required to meet ESMS requirements.

9.4. Land Requirements

The land acquisition process for the Project is being undertaken by the NPTG, in conjunction with the local authorities (*aimag* and *soum* governments). These activities are generally being undertaken in line with national requirements, however, do not fully meet EBRD's PR 5 *Land Acquisition, Involuntary Resettlement and Economic Displacement.*

As such, a separate Land Acquisition and Resettlement Framework (LARF) has been prepared to report on the activities to date and set out further actions that will need to be taken to meet EBRD requirements, such as the consideration of potential economic displacement of the Project e.g. the potential loss of, or damage to, pastureland, or loss of mining concession licence areas.

Depending on the final design, a Resettlement Action Plan (RAP) and/or Livelihoods Restoration Plan (LRP) may be required to cover the Project and/or any temporary land requirements that could result in involuntary economic or physical displacement. The actions related to this are set out in the LARF.

9.5. Temporary Site Requirements

At the time of writing, no information is available on the location of the Construction Contractor's camps or other temporary sites such as works areas and haul/access roads. The Construction Contractor will therefore be required to select temporary works sites and camps on the basis of minimal environmental and social impacts, avoiding or if this is not possible, minimising, involuntary displacement, and assess final sites chosen so that, where necessary, additional mitigation measures can be applied to reduce adverse impacts.

Any workers' camps will be required to be compliant with EBRD/IFC Guidance Note: Workers' accommodation: processes and standards.[169] Careful consideration will need to be given to any use by the Construction Contractor of existing capacity in accommodation and other available local amenities to avoid social tensions between locals and contractors.

Sites and measures proposed will be provided for review and PIU for approval.

9.6. Legislation and Permits

The Project will need to comply with national and EBRD requirements. In addition, a number of permits will be required for construction. A Legal and Permit Register shall be developed by the PIU and issued to the Construction Contractor. The Construction Contractor will be required to ensure that all necessary permits to are in place prior to the start of permitted activities (e.g. construction camps, borrow pits, etc.). The PIU will monitor Construction Contractor compliance with the permit register.

9.7. Stakeholder Engagement

A Stakeholder Engagement Plan (SEP) has been prepared as part of this ESIA process. Prior to construction, the PIU will develop the SEP to set out the overarching approach to Project engagement (the "Project SEP"). The Construction Contractor will then develop a detailed Construction SEP, for approval by the PIU, and then implement it. The Construction Contractor will also appoint a Community Liaison Officer (CLO) or equivalent to manage stakeholder engagement activities and interfaces with the PIU. The PIU will have overview and oversight of stakeholder engagement activities to ensure a coordinated approach to stakeholder and grievance mechanism (see below) is provided.

9.8. Grievance Mechanism

Prior to construction, the Construction Contractor will have in place a community grievance mechanism that meets the requirements of the Project (i.e. EBRD PRs). The PIU will have oversight of this process and will monitor delivery of engagement by the Construction Contractor. The Grievance mechanism will tie into the existing system for grievances at the *aimag* and *soum* levels, as described in the SEP.

A labour grievance mechanism is also required, both within the PIU and the Construction Contractor organisation, to manage labour grievances during Project construction and operation.

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[169] EBRD/IFC (August 2009), Workers' accommodation: processes and standards. A guidance note by IFC and EBRD. Available at: https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_gpn_workersaccommodation

9.9. Site Handover

Prior to handover of the sites from the Construction Contractor to the MoE / NPTG following the construction works, the Construction Contractor will be required to undertake the necessary rehabilitation of sites including all temporary works areas and removing all wastes from the Project corridor, to the satisfaction of the PIU.

9.10. Summary of Measures

Table 9-1 summarises the proposed mitigation measures and actions related to Project planning and delivery.

Table 9-1. Summary of Project planning and delivery measures

Potential risk	Supplementary Mitigation Measures	Responsibility
No Project ESMS	Develop and implement an integrated Project ESMS. This should include: • Policies and procedures • Project ESMMP • Legal and permit register • Roles and roles and responsibilities • Project schedule. Clear roles and responsibilities to be identified. Relevant requirements during construction should be made the responsibility of the Construction Contractor, monitored by the PIU, and during operation the responsibility of the NPTG. *[Note: system(s) should generally meet objectives of ISO14001 and ISO 45001, but need not be certified].*	PIU
No Project environmental, social or human rights policies	Develop Project policies and Code of Conduct within ESMS, covering as minimum: • Environmental and Social policy • Human resources policy (covering labour and working conditions and community health and safety) • Contractor/Supply Chain policy • Code of Conduct The Construction Contractor shall be required to comply with Project policies.	PIU
Lack of comprehensive mitigation and monitoring measures	Update and implement the Project ESMMP, comprising details of performance requirements and obligations for construction and operation of the Project. The Project ESMMP should cover: • Roles and responsibilities • General measures to be employed • Site specific measures to be employed • Inspection and monitoring requirements, including tools • Inspections, audits and reporting • Non-conformance and Accident/Incident procedures The Project ESMMP should include results of additional surveys to be undertaken prior to start of construction on site. To include Supply Chain management.	PIU
	Develop a detailed Construction ESMMP based on the Project ESMS, for approval by PIU. Topics to be covered in the Construction ESMMP include as a minimum: • Emergency preparedness and response • Spill prevention and response • Workers' camp management • Water management • Materials use and Waste management, including borrow pits and quarry management • Cultural heritage • Labour management including Labour grievance mechanism • Biodiversity • Traffic management (on and off construction site areas) • OHS • Community health and safety – including protection of herder wells and grazing areas • Air, noise and vibration	Construction Contractor

Potential risk	Supplementary Mitigation Measures	Responsibility
	• Security • Site rehabilitation • SEP including a community grievance mechanism • Training • Supply chain management The management plans should, as necessary, identify impacts of proposed location of borrow pits, construction camps and any temporary works areas including any haul/access roads. Detailed monitoring requirements/plan will be incorporated into Construction ESMMP.	
Physical and economic displacement impacts not identified, resulting in additional cost/ Project delay	Develop detailed RAP/LRP, in compliance with the LARF and EBRD PR5.	MoE/PIU
	Maintain records of voluntary agreements made with land owners for temporary use of land.	Construction Contractor
Impacts of temporary site requirements not assessed and managed	The Construction Contractor will be required to select temporary site locations on the basis of minimal environmental and social impacts, avoiding or if this is not possible, minimising, involuntary displacement, and assess final sites chosen so that, where necessary, additional mitigation measures can be applied to reduce adverse impacts. Maps of temporary land requirements should be provided. A Camp Management Plan should be prepared in accordance with EBRD/IFC *Guidance Note: Workers' accommodation: processes and standards.*	Construction Contractor
Permits not in place prior to start of permitted activity	Permit register to be developed and provided to the Construction Contractor. Monitor Construction Contractor to ensure permits are in place and their compliance with permit requirements.	PIU
	Ensure relevant permits are in place and their compliance with permit requirements. All necessary permits to be in place prior to the start of permitted activities (e.g. water abstraction permit batching plant, construction camps, borrow pits, etc.). permits may include: • Water use. Obtain well drilling permissions from the local soum authorities and water use permission from the basin administration. • Access. Haul road permissions from relevant authority. • Waste. Permission for waste disposal from relevant authority.	Construction Contractor
Organisational Capacity and Commitment not provided, interfaces not managed	Clearly identify team structures, organisations roles and responsibilities. Appoint and maintain person(s) to be responsible for ESMS within the PIU. Assess the capacity of PIU staff, Construction Contractor and other key appointments.	PIU
	Provide sufficient staffing to manage the ESMS performance of the Project.	Construction Contractor
Contractor not aware of, or do not comply with, mitigation and management measures	Construction Contractor tender documents to incorporate requirements of the DEIA, ESIA, ESMMP and ESAP. This should stipulate that the Construction Contractor will be required to: • Adopt Project ESMS • Develop, implement and maintain detailed Construction ESMMP • Obtain necessary permits and maintain Legal and Permits Register • Develop detailed Construction SEP • Report on ESMS performance	MoE
	Review of Construction Contractor Construction ESMMP, policies and practices upon selection and appointment. Conduct regular audit/inspection of contractors' ESMS performance, including inspections of contractors' construction works and camps. Set up and maintain an ESMS incident reporting procedure to maintain records of annual monitoring, accidents and incidents. The procedure must be overarching, unique and integrated for the Project and used by the Construction Contractor.	PIU

Potential risk	Supplementary Mitigation Measures	Responsibility
Grievances not managed, too many interfaces for grievance logging, labour issues not addressed	Set up and maintain a formal community grievance mechanism. PIU will issue general public notices to inform the public within the Project Area of the grievance mechanism, and contact information (website address, PIU address and telephone number, PIU contact point email address, contractor contact point details).	PIU
	Construction Contractor to support PIU in implementation of the community grievance mechanism.	Construction Contractor
	Set up and maintain a formal labour grievance mechanism for employees and disseminate information about its uses to the workforce in the language(s) of the workers, including possibility of anonymous grievances submission.	PIU, Construction Contractor
Sites not rehabilitated	Specific requirements for rehabilitation should include: • Rehabilitation of all affected areas • Revegetation should only be undertaken with native species; soum to advise • Aftercare of planted seeds • Re-contouring land and borrow pits • All wastes to be removed from the project corridor, all ancillary sites and any other locations the contractor has stored waste. Waste to be disposed of in permitted sites.	Construction Contractor

10. Construction Impacts and Mitigation Measures

10.1. Introduction

This Chapter presents the potential construction impacts, effects and proposed mitigation measures for significant effects. Construction impacts are those which may arise during the construction works, temporary use of land, movement of construction vehicles, presence of the construction camp and workers, and all other construction-related activities.

For each topic, the following is discussed:

- Scope of assessment;
- Sources of impact;
- Potentially sensitive receptors;
- Potential impacts; and
- Mitigation measures and residual effects.

10.2. Terrestrial Biodiversity, Flora and Fauna

10.2.1. Scope of Assessment

The scope of assessment includes:

- Direct impacts to flora species from construction activities such as increased traffic, camp construction, vegetation clearing and dust accumulation;
- Indirect impacts to flora species such as gathering of beneficial species by Project personnel; and
- Direct impact to fauna species such as destruction of nests, clearance of vegetation, collision with vehicles, etc.

Indirect fauna habitat loss from increased presence of human activities. The Project AoI includes all land within and adjacent to the Project footprint, permanent and temporary access roads, laydown areas, temporary camps and associated facilities where direct or indirect impacts on biodiversity receptors could occur as a result of Project activities. In general, this covers an area if around 500 m either side of the OHTL during construction. Impacts to aquatic flora and fauna species are scoped out of this assessment as there are no permanent natural water bodies in the Project AoI to support such species.

10.2.2. Sources of Impact

The proposed construction activities that could potentially impact biodiversity include:

Flora

- Increased movement of people and materials along the RoW and access roads;
- Establishment and use of camp and associated facilities;
- Clearance of vegetation along the RoW;
- Tower foundation earthworks and substation construction;
- Use of heavy machinery and equipment for construction;
- Use of quarries and borrow pits;
- Accidental spillage of contaminants;
- Introduction of invasive species; and
- Indirect dust impacts arising from earth works at the towers and vehicle movement.

Fauna

- Increased movement of people and materials along the RoW and access roads;
- Increased presence of humans i.e. construction workers and temporary construction camps;
- Presence of the construction sites;
- Use of heavy machinery and equipment for construction; and
- Temporary and permanent vegetation clearance for camp establishment, OHTL construction, earthworks and potential borrow pits and quarries.

10.2.3. Potentially Sensitive Receptors

During construction, potentially sensitive receptors are as follows:

Flora:

- Shardalan (*Tugarinovia mongolica)* Mongolian Red List 'Vulnerable' and 'Very rare' category species by Mongolian regulatory designation; and
- Desert living cistanche (*Cistanche deserticola*). Mongolian Red List 'Endangered' and "very rare' category species by the Mongolian regulatory designation.

All other plant species in the Project AoI are considered to have low receptor sensitivity due to their conservation status and existing land use disturbance.

Mammals:

- Goitered gazelle (*Gazella subgutturosa*). Both IUCN and Mongolian Red List 'Vulnerable' category species;
- Mongolian gazelle (*Procapra gutturosa*). Mongolian Red List 'Endangered' category species;
- Argali (*Ovis ammon*). Mongolian Red List 'Endangered' category species; and
- Siberian ibex (*Capra Sibirica*). Mongolian regulatory designated 'Rare' mammal.

Birds:

- Swan goose (*Anser cygnoid*). IUCN Red List 'Vulnerable' category species;
- Great bustard (*Otis tarda*). IUCN Red List 'Vulnerable' category species;
- Steppe eagle (*Aquila nipalensis*). IUCN Red List 'Endangered' category species;
- Saker falcon (*Falco cherrug*). IUCN listed 'Endangered' and Mongolian Red List 'Vulnerable' category species;
- Cinereous vulture (*Aegypius monachus*). IUCN Red List 'Near-threatened' category species; prone to OHTL collision and electrocution and present in high numbers;
- Tree pipit (*Anthus trivialis*). Mongolian regulatory designated 'Rare' bird;
- Pallas's sandgrouse (*Syrrhaptes paradoxus*). Most common and vulnerable species to OHTL collision in the Project Area;
- Oriental plovers (*Charadius veredus*). Species of socio-economic value. Prone to OHTL collision; and
- All other nesting species.

All other fauna species are not considered sensitive receptors due to their abundance globally and regionally. However, impact mitigation measures identified for the sensitive species are also applicable to the other non-sensitive biodiversity species in the Project Area.

10.2.4. Flora Impact Assessment

Habitat loss and degradation

An estimated total of 9.49 ha of habitat will be permanently lost under the OHTL towers (3.19 ha) and the substation footprint at Sainshand (6.3 ha). Estimates of the direct ground disturbance area is shown in Table 10-1. Areas in Table 10-1 is conservatively considered to be permanent habitat loss under permanent structures.

Table 10-1. Estimate of total permanent disturbance area

Infrastructure	Foundation Dimensions (m)		Disturbance Area (m2)	Numbers	Total Disturbance Area (Ha)
Tower П220-2 (P220-2)	5.73	7.20	41.3	618	2.55
Tower У220-2+14	12.20	12.20	148.9	9	0.13
Tower У220-2	9.0	9.0	81.0	36	0.29
Substation	256	246	62976.0	1	6.30
Total Permanent Disturbance					9.27 ha

Source: Bayasaltugs (2020)

Habitat may also be temporarily lost as a result of the establishment of construction camps, access roads and lay down areas; and degraded as a result of the movement of construction traffic and personnel along the RoW, access/haul roads and pads used for stringing the powerline. The total area of the temporary footprint was not available at the time of preparing this ESIA. Locations and the footprints of these temporary areas will be identified once the Construction Contractor has been engaged.

The habitat in the Project Area is not pristine, it has been disturbed by existing land uses, mainly infrastructure (powerlines, roads and railways) around Choir and Sainshand cities; and livestock grazing along the OHTL route. No globally threatened species were observed, but two plant species, i.e. Shardalan and desert living Cistanche, listed as VU and EN, respectively, in the Mongolian Red List of Threatened Plant Species were observed during the baseline survey and *Tugarinovia mongolica* was observed within the RoW. Both the Shardalan (KM 130+370) and desert living Cistanche (KM 14+400, KM 15+480, and KM 15+700) species occur along the OHTL route with rare abundance. The presence of these species within the footprint of the tower locations and at any temporary works sites (such as construction camps) is therefore possible.

Contamination of soils by accidental spillage can also impact vegetation species in a localised area and therefore this also poses a risk to these two species.

Overall, without mitigation in place, the magnitude of the impact is considered Low and the species Shardalan and Cistanche of High sensitivity. Without appropriate imagination, a Moderate Adverse effect could occur.

Introduction of invasive species could also pose a potential threat to native species, but considering the arid regional climate and soil conditions, invasive species are not considered a threat.

There is the potential for dust impacts to arise, as assessed under Air Quality. However, as dust generating activities are limited to earth works at the OHTL towers and substation, and vehicle movements along access roads, they are not considered to result in significance adverse effects on species that are already adapted to the dusty environment.

The Shardalan is assessed as Vulnerable in the Mongolian Red List due to its shrinking habitat from land disturbances by mining activities (Nyambayar et al. 2012). No economic use is known for this species. On the other hand, the Desert living cistanche is known for its historical traditional medicinal use. However, its use by general public is reduced except its reported use as recipe for local brand liquor[170] by licenced food manufacturer. Therefore, it is considered that the magnitude of indirect collection impact to these species by Project personnel is Very Low resulting in a Minor Adverse effect without mitigation measures in place.

10.2.5. Flora Mitigation Measures and Residual Effects

Mitigation measures and resulting residual effects are summarised in Table 10-1.

The Project will require a pre-construction disturbance survey for all vegetation clearing activities between KM 12 and KM 16 (for Desert living cistanche) and KM 130 and KM 131 (for Shardalan). Any disturbance activity will be subject to the prior disturbance survey findings. Objectives of the prior disturbance survey include:

- to identify sensitive flora species;
- evaluating potential engineering and design changes to avoid sensitive flora species destruction;

[170] Available at: http://industry4.nda.gov.mn/company/459. Accessed June 2020.

- marking locations of sensitive flora species by erecting physical barriers or signage around them to avoid unnecessary damage; and
- identifying other mitigation and rehabilitation measures where avoidance is not feasible.

Selection of construction camp locations and temporary access roads should be based on pre-disturbance results and avoid sensitive species and areas. New access roads where required should, as far as possible, also use existing earth tracks. As earth tracks tend to widen over time as new tracks are developed to go around deeply rutted areas, the Project will minimise the propensity for this by implementing best management practices in the construction and maintenance of unpaved roads. Other mitigation measures include restricting vehicles from parking beside roads, or leaving access roads, except in an emergency or to manage fatigue.

Table 10-2. Mitigation measures and residual effects for the protection of soils

Potential impact	Mitigation measures	Residual effect
Direct loss and disturbance	• Undertake a disturbance survey to identify if any of the sensitive receptor flora species exist under the final Project footprint. • Develop and deliver biodiversity awareness training to Project personnel on sensitive biodiversity species and Project commitments. • Where possible, existing tracks and the RoW will be used. Where this is not possible (i.e. a new access road is required), the new access routes will be selected with minimal disturbance to vegetation species including the two sensitive species. • Contractors to develop and implement detailed traffic management plans for construction vehicles to prevent driving on unauthorised/ unplanned areas. • Working areas will be clearly demarcated and not works outside of designated areas will be permitted. • Contractor will undertake progressive rehabilitation according to the Project standards.	**Minor Adverse.** With mitigation in place, the siting of any temporary locations can be such to avoid adverse effects on vegetation species. However, clearance of the RoW will still occur and it is possible that final tower foundations could impact the two identified species.
Indirect loss through increased dust deposition on plants	• Limit all Project related vehicles speed on earth tracks to avoid excessive dust. • Contractor will plan and undertake earth work and materials transport activities during less windy times as practicable. • Contractor will water earth works sites and tracks as necessary.	**Minor Adverse.** With mitigation in place, dust impacts are considered Minor.
Direct impact through increased harvesting of the species by project personnel	• Prohibit all Project personnel to collect, purchase or damage sensitive flora species. Punitive action will be taken if this commitment is ignored. • Toolbox talks on sensitive flora species information.	**Negligible.** With mitigation in place, it is anticipated that Project personnel will not harvest local species.
Contamination of soil by accidental spillage	• Contractor will prepare and implement a Soil Management Plan.	**Minor Adverse** With mitigation in place, there remains a low risk of contamination which, if it occurred, could result in an adverse effect on identified vegetation species.

10.2.6. Mammal Impact Assessment

This assessment covers four species of sensitive mammal receptors (goitered gazelle, Mongolian gazelle, argali, and Siberian Ibex).

The main potential direct impact to large mammals, i.e. Mongolian gazelle and goitered gazelle, is collision with Project related vehicles, as the Project construction sites overlap with these species' regional habitat.

Given the slower speeds that construction vehicles will be required to travel along access roads and in works areas, the likelihood of these species being hit by construction vehicles is very low. Mongolian gazelle and goitered gazelle avoid human presence, and therefore, given the Project Area's open terrain with high visibility, these species are likely to avoid any construction sites, therefore reduced the potential collision risk further along access tracks.

Project vehicle traffic on the main road between Choir and Sainshand may present some collision risk, but it is not expected to be significant as the road already exists and is the main highway linking the Chinese border and Ulaanbaatar therefore currently has high levels of traffic. Any additional construction traffic would not significantly increase these levels. The road also runs parallel to the fenced Trans Mongolian railway, which serves as a complete barrier to these species' movement.

Overall, the risk (magnitude of impact) of collision is considered Low, so with the High sensitivity of the Mongolian Gazelle and Goitered gazelle species the overall significance of effect pre-mitigation is considered Moderate Adverse.

The risk of construction vehicle collision with Argali and Siberian ibex is assessed as very low, as these species live in rocky outcrops in the mountainous areas and the Project Area does not directly overlap with these species habitat. The closest known habitat of argali and Siberian ibex is the Ikh Nart nature reserve area, about 10 km south west of the proposed OHTL route. It is extremely unlikely that the Project vehicles will need to travel near this area. Therefore, no direct impacts on these species are anticipated.

Construction activities such as prolonged presence of humans in mammal territories, increased traffic, noise and light, especially at night time, could affect the movement of Mongolian gazelle and goitered gazelles within their habitats as they avoid the construction sites and associated facilities. However, the construction phase is not expected to be long enough to cause long term avoidance and, given the overall habitat size available to these migratory species in the region, the magnitude of impact is considered Low as Mongolian gazelle and goitered gazelles are receptors of High sensitivity, overall the significance of effect would be Moderate Adverse; but for the period of construction only (i.e., no long term adverse effects are anticipated). No fragmentation of access to habitat is expected for during construction due to the limited time duration of the works are any one site and large habitat available to these species.

Another indirect impact to sensitive mammal species is the potential increase in hunting pressure, especially for the Mongolian gazelle and goitered gazelle as these species are hunted for their meat. Any illegal practice of buying these species meat from locals by the Project personnel or any misguided perception by locals to sell wildlife products to the project personnel potentially increases the hunting pressure to all wildlife species (not only the sensitive species). Illegal hunting for meat or trophies, and habitat loss from increased livestock grazing and resource development are believed to be the main man-made threats to these sensitive mammal species population in Mongolia (Clark *et al.* 2006). The proposed Project activities are limited in terms of timing, spatial coverage and number personnel to work on site, thus the potential hunting risks to the sensitive mammal species will be temporary and localised along the powerline. Therefore, the risk associated with this is considered Low, so with the High sensitivity of mammals this could result in a Moderate Adverse effect without mitigation in place.

10.2.7. Mammal Mitigation Measures and Residual Effects

Mitigation measures and resulting residual effects are summarised in Table 10-3.

Table 10-3. Construction mitigation measures and residual effects for sensitive fauna species

Potential impact	Mitigation Measures	Residual effect
Direct impact - Vehicle collision	• Contractor will develop and deliver biodiversity awareness training to Project personnel on sensitive biodiversity species and Project commitments, and penalties for breaching wildlife commitments and statutory regulations. • Only designated roads will be used for construction traffic, and vehicle speed limits will be enforced to minimise the risk of road accidents with wildlife. Construction vehicle movement will be restricted to daylight hours wherever possible to minimise risks of collision. • Construction deliveries will be organised in convoys to reduce impacts to mammals. • Contractor will provide driver education and enforcement.	**Negligible to Minor Adverse.** With the mitigation measures proposed, it is considered that the overall effect can be reduced to Minor Adverse due to the low numbers of such species and the existing presence of the road and other barriers (the railway).

Potential impact	Mitigation Measures	Residual effect
Indirect impacts - Habitat avoidance and increased hunting pressure	• Contractor will plan and undertake construction activities during the daytime wherever possible, when wildlife movement is lower. • Vehicle movements will be restricted to daylight hours only wherever possible. • Vehicles will be prohibited from parking alongside access roads, or leaving access roads, except in an emergency or to manage fatigue. • The Code of Conduct will include a ban on the purchase of wildlife products, which will be enforced through periodic inspection and penalties for anyone breaking the rules. • Contractor will engage with local community and government regulators to monitor illegal wildlife products being sold in associated with Project personnel.	**Negligible.**

10.2.8. Bird Impact Assessment

During the spring and autumn bird survey in 2020 a total of 72 species of birds were identified (59 species recorded in spring and 37 species recorded in autumn), with most being non-threatened category species. Only four species of threatened birds (i.e. Swan goose (*Anser cygnoid*) (NT by the IUCN List, VU by the Mongolian Red List), Great bustard (*Otis tarda*) (VU by the IUCN List and Mongolian Red List), Saker falcon (*Falco cherrug*) (EN by the IUCN List and VU by the Mongolian Red List) and Steppe eagle (*Aquila nipalensis*) (EN by the IUCN and LC by the Mongolian Red List)) and two species of 'Rare' bird (i.e. Great bustard and Tree pipit (*Anthus trivialis*) by the Mongolian regulatory designation were observed along the OHTL route. Pallas's sandgrouse (*Syrrhaptes paradoxus*) and Oriental plover (*Charadius veredus*) species were also considered sensitive receptors due to their vulnerability to collision with the OHTL, and stakeholder perception (tourism, bird watching) attached to them.

Potential impacts to bird species from construction activities include potential habitat loss under the Project temporary and permanent footprint and disturbance from human activities resulting in habitat avoidance, destruction of nests or nesting habitats, disruption of breeding behaviour and nest abandonment, and collision with powerline wires as the wires are strung. As the last impact is one that continues into operation, the impact of the presence of the OHTL on birds is addressed in Chapter 11: Operation Impacts.

10.2.8.1. Habitat Loss and Avoidance

The Project Area is located in dry Gobi Desert region characterized by open dry steppe and semi-desert with low hills and sparse vegetation. There are no permanent natural surface water, trees or larger bush areas along the OHTL route. From the spring bird survey it was observed that the landscape in the Project AoI is relatively homogeneous with no specific bird habitats associated with vegetation communities (Figure 10-2). There is one IBA, Ikh Nart Nature Reserve is located about 10 km in the south west of the OHTL route.

Given the lack of diverse bird habitat along the OTHL route, and the OTHL not being on a major bird migratory route, it is not considered that construction activities will result in the avoidance of habitats as there is sufficient habitat in the general area to support the species of concern.

However, although the OHTL route does not contain specific bird habitat features (i.e. permanent surface water, trees, and vegetation), the spring bird survey identified several hotspots as potential localised habitat for birds, which are discussed in turn below:

Rocky valley

The spring bird survey identified a rocky valley (N 45.96834; E 108.68881 at KM 50) located 300 m north-east of the OHTL route (Figure 10-1). The bird survey team observed 16 different bird species in the valley consisting of both resident breeders and migratory species (see Bird Baseline Section). Some of the elm trees (*Ulmus pulmila*) in the valley had active nests of Golden eagle and Cinereous vulture in May 2020. This valley also has some bushy vegetation that provides nesting substrate and shelter for breeding and migratory birds.

Figure 10-1. Rocky Valley at KM 50

Ephemeral lake

The spring bird survey located a small lake (N 45.90496; E 108.78704 located at KM 60) about 440 m from the OHTL route. The Lase is shown in

Figure 10-2. This lake and its surrounding wetland could provide additional bird habitat during the wet years. Common shelducks (*Tadorna tadorna*), common teals (*Anas crecca*), common gull-billed terns (*Gelochelidon nilotica*) and mallards (*Anas platyrhynchos*) were present at this lake during the spring bird survey.

Figure 10-2. Ephemeral lake at KM 60

The OHTL route does not pass over this lake, therefore no direct impact on this site is expected. However, indirect disturbance to the habitat, or access to the habitat, may occur due to an increased human presence and construction activities close to this site (i.e. the OHTL is 440 m from the lake). The lake, when present, is considered to be a receptor of Medium sensitivity if present. Due to the distance from the construction works, the potential for disturbance is considered to result in a Low magnitude of impact and therefore overall, the significance of the effect is Low Adverse.

10.2.8.2. Nest Destruction

The Endangered sensitive species (i.e. Saker falcon, and Steppe eagle in rare occasions) typically use elevated places such trees and manmade structures for nesting. The OHTL route does not have trees or structures, therefore nest destruction or abandonment for Saker falcon is unlikely to occur. However, the construction activities have a potential to result in nest destruction (or nest abandonment) for ground nesting Endangered and Vulnerable species such as Steppe eagle and Great bustard as a result of vegetation clearing (and presence of construction activities). There is a potential that ground nesting bird species may be impacted temporarily (maximum of one nesting season) and spatially (the Project Area is homogenous so birds can easily move to other nesting locations in the same area) to a limited extent. As such, the overall sensitivity of these species is considered Medium. The magnitude of the impact is considered Low therefore overall, a Minor Adverse effect is predicted prior to mitigation. It is expected that all disturbed areas will be rehabilitated progressively with the total permanent vegetation clearing of about 3 ha under the tower foundations. The planned substation has a larger footprint of permanent clearing, but the substation location is on heavily disturbed area next to the regional town with limited possibility of bird nesting.

10.2.8.3. Collision and Electrocution

Bird collision with the OHTL during construction is considered to be insignificant for the following reasons:

- Wires of the OHTL will not be strung until the towers are erected;
- The stringing process (i.e. use of pullers manned by people, presence of people and supporting machineries at the site) will likely to discourage birds from approaching the construction area during stringing;
- The risk of collision during construction phase is limited to a narrow time window between power towers erection and commissioning; and
- Bird diverters will be installed during or immediately after the wires are strung in the bird hotspot areas.

The potential significance of collision is therefore considered in the operation impact assessment only.

No electrocution risk is expected during the construction phase.

10.2.9. Bird Mitigation Measures and Residual Effects

Mitigation measures and resulting residual effects are summarised in Table 10-4.

Table 10-4. Bird mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effects
Habitat avoidance, Nest destruction, Collison	• Bird species hotspots (i.e. the Rocky valley area at KM50, ephemeral lake and any other temporary surface water areas) to be included in the biodiversity awareness training for Project personnel. • Contractor to manage works to avoid critical times (migration, nesting, and breeding) of the sensitive receptor birds, as far e as possible. • Construction workers will be required to work in designated areas only. Visits to hotpots and other areas with high bird activity (for example, the breeding sites of the Oriental plovers) will be prohibited by construction staff during the construction period. • Pre-disturbance site examination by trained specialist to avoid bird nests in construction areas. • No unnecessary idling of heavy equipment in the vicinity of the bird hotspots and any other areas with high bird activity.	**Negligible to Minor Adverse.**

10.3. Soils

10.3.1. Scope of Assessment

The soil assessment considers the following:

- Loss and deterioration of soils from excavation, removal and stockpiling;
- Compaction where soils are left in situ but are subject to traffic loads; and
- Contamination as a result of accidental spillage of fuels or chemicals and/or potential to encounter contaminated land.

The AoI covers the footprint of the Project, including any temporary facilities and areas used for construction purposes and adjacent land that may experience deterioration in soil quality.

10.3.2. Sources of Impact

Pathways are the means by which an activity can affect a receptor. In some cases, this may be a physical migration pathway, such as a movement of contamination through soil/groundwater, or it may be the inherent nature of the activity itself; for example, excavation of soil will have a physical impact on the soil. The main pathways considered are summarised:

- Removal of soils during earthworks;
- Clearance of vegetation (though minimal in the AoI, it still has a binding property);
- Construction vehicle movements;
- Temporary access roads;
- Temporary land take for site storage/compounds and work camps, if required;
- Stockpiling;
- Use of machinery;
- Construction wastes and wastewater;
- Borrow sites and quarries, if used; and
- Previously contaminated land.

10.3.3. Potentially Sensitive Receptors

Sensitive receptors in relation to impacts on soils include:

- Topsoil;
- Herder households and their livestock;
- Flora and fauna; and
- Surface water bodies.

10.3.4. Impact Assessment

Soil loss and quality deterioration

The Project will be constructed predominantly in an area used as pasture for grazing herds. Fourteen types of desert brown soil were identified along the OHTL route and the majority of the soil cover is not severely damaged by human activity, except where the route is closer to the cities where soil quality is deteriorated. Other than two samples, no non-compliances with heavy metal content were found. The soils' resilience and recoverability are considered to be low as soil formation is a long-term process and there is no natural resilience to imposed stresses. In particular, fertile topsoil is a valuable resource and therefore topsoil is considered to be a receptor of High sensitivity.

Soils will need to be excavated for the tower foundations (approximately 663 pylons) and for the substation at Choir (an area of 6.3 ha). Inappropriate storage (e.g. stockpile too high) or storage for too long may result in loss of soil structure, which can increase the risk of soil deterioration, including encouraging processes such as soil erosion and soil compaction. The loss of soil structure also potentially impacts organism activity, water

retention capacity and nutrient retention capability. It general, it will be possible to reverse the impact of storing topsoils as long as the soils are stockpiled in accordance with best guidance and are not stockpiled for too long. As topsoils are a receptor of High sensitivity, and the magnitude of impact could be Medium to High, the overall significance of the loss of topsoils, without rehabilitation, would be Moderate to Major Adverse.

Soil compaction

All construction haul roads, construction sites and ancillary sites risk compaction where topsoils are left in place. The soils' ability to recover from compaction is considered to be medium due to the long-term nature of soil formation however the soils' resilience to imposed stress is potentially low and therefore is a receptor of High sensitivity. The impact will be highly localised and possible to reverse in temporary construction areas. Consequently, the impact magnitude has been classified as Low. The overall significance of the effect without mitigation measures is Moderate Adverse.

Soil contamination

There is a risk of contamination of soils from leaks and minor spills during the handling and storage of fuels and chemicals, for example during refuelling and operation of plant and septic tanks, washing of equipment; and inappropriate management and storage of wastes, including wastewaters. Based on the anticipated activities and materials to be used during construction an unmitigated spill or leak would be of minor extent and recover in several years and is considered an impact with a potential medium magnitude. Contaminated soil from minor spills may affect construction workers through being inadvertently inhaled or through dermal contact; as well as the general public, livestock, flora and fauna, and waterbodies depending on the location of the spill. Soils are receptors of High sensitivity therefore the overall significance of contamination, if it were to occur, is assessed as Moderate Adverse.

The Project may encounter unidentified contamination which may be disturbed by earthworks, in particular around the existing Choir substation area. It is anticipated that if contaminated soil is present, it will have been present for a reasonably long time however disturbance by the Project may mobilise the contaminants and may impact on human health when the contamination is excavated and moved to a safe disposal location. Based on the available information the potential effect on human health and other receptors, before mitigation, is assessed as Moderate Adverse.

10.3.4.1. Mitigation measures and residual effects

Mitigation measures and residual effect are set out in Table 10-5.

Table 10-5. Mitigation measures and residual effects for the protection of soils

Potential impact	Mitigation measures	Residual effect
Soil loss and quality deterioration	**General soil management** • Contractor will prepare a Soil Management Plan showing the areas and type of topsoil and any subsoil to be stripped, haul routes, the methods to be used, and the location, type and management of each soil stockpile. • Contractor will plan construction haul roads and acquire any necessary approvals from *Soum* authority to avoid multiple earth tracks • Contractor will, where practicable, implement a wheel washing system dislodge accumulated dust and mud prior to leaving the sites. • Construction activities will be timed to avoid the rainy season. **Soil stripping and stockpiling** • Contractor will strip topsoil and store in accordance with Mongolian standards MNS 5916: 2008 (stripping and storage of fertile soil during earthworks) and protect against wind and rain erosion and contamination with waste and other materials. • Contractor will not strip soil during windy periods where this does not constrain the construction programme; or water dousing will be employed • Contractor will store stripped topsoil separately in topsoil stockpiles for a short a time period as possible • Contractor will ensure that the following parameters have been met for any topsoil stockpile: a. maximum height is 2 m, b. length is 30-50 m; c. lateral slopes shall not exceed 20 degrees, and	**Minor Adverse.** Land will be disturbed during the construction period, however the relative permanent land take (tower and substation footprint) will be limited. Land take for camps and construction will be temporary and will be rehabilitated (e.g. borrow sites contoured). When construction is completed, it is intended that all topsoil will be reused and therefore not lost.

Potential impact	Mitigation measures	Residual effect
	d. the top compacted. • Contractor will ensure topsoil stockpiles are used for rehabilitation.	
Compaction of soils	• Contractor to develop and implement detailed traffic management plans for construction vehicles to prevent driving on unauthorised/ unplanned areas. • Contractor to train all drivers and ensure suppliers are aware of the correct and approved haul roads and to avoid creating multiple earth trucks.	**Minor Adverse.** As above.
Soil contamination	• Contractor will follow the requirements of the Emergency Response and Preparedness Plan and will develop and implement detailed Spill Management Plan for the management of all chemicals, fuels and oils used during the Project, including the septic tanks and diesel generator. • Contractor will train all staff and third party suppliers in the emergency procedures. • Contractor will ensure spill kits are kept in accessible locations at all times during construction, and employees trained in their use and disposal. • Contractor will ensure all vehicles, machinery and equipment are maintained and refuelled on hard standing and will develop and adopt procedures to minimise the risk of spills to the environment. • Contractor will develop a detailed Waste Management Plan to include solid and liquid wastes to reduce risk of soil contamination. Wastes generated during the construction activities that have the potential to pollute will be stored within appropriate storage facilities (bunded, secondary containment) and procedures will be implemented for handling, storage, transport and transfer, subject to a full method statement to address construction risks and avoid impacts. • Maintenance of machinery and equipment will be conducted in a designated area where the conditions are not adverse to the soil and the environment.	**Minor Adverse.** Impacts identified for the most part will be localised and are manageable through the implementation of best practice measures, particularly during the construction phase. Provided that the mitigation measures are implemented, it is expected that overall there will be minor adverse to negligible residual effects.
Rehabilitation of soils	*Post-construction phase:* • Contractor will undertake revegetation only with native species; *soum* to advise. MNS 5917: 2008 (Rehabilitation of land disturbed by mining operations. General technical requirements) will guide rehabilitation. • Contractor will execute site rehabilitation including all waste removal and soil restoration at all sites impacted by construction activities.	**Negligible to Positive.** The rehabilitation of works should have a neutral (restoration to baseline conditions) to a positive effect (improvements over the baseline)

10.4. Water Resources

10.4.1. Scope of Assessment

The scope of the groundwater and surface water resources assessment comprises:

- Potential impacts on hydrology (drainage and channel morphology);
- Impacts on water resource quality from potential pollution, affecting the resource and the health of resource users;
- Potential impacts on water resource supply (including herder wells); and
- Potential flood risk.

The AoI has been defined as the above ground infrastructure for wells used by herders, groundwater within Project corridor and ancillary facilities, and dry surface water channels that cross the OHTL corridor.

10.4.2. Sources of Impact

Sources of potential groundwater impacts include:

- Accidental damage to above ground well infrastructure;
- Water demand for construction activities and workers; and
- Accidental release of contaminants.

Sources of potential surface water impacts include:

- Accidental release of contaminants; and
- Construction around dry river channel features.

10.4.3. Potentially Sensitive Receptors

Water related receptors during road construction include:

- Hydrology regime, including rivers and groundwater;
- Communities that use surface water and groundwater;
- Nomadic herder households and their livestock, who use surface waters and groundwater water for drinking/watering; and
- Construction workers and camp residents.

10.4.4. Impact Assessment

The OHTL corridor contains at least five dry lakes and 31 dry gravel river beds; and three wells which are actively used within 300 m of the centreline. The groundwater levels in the two used wells sampled was varied at 0.7 m and 7 m below the surface.

Ground water resources depletion and accessibility

Water will be required for the construction workforce on site and at camps, and construction activities such as water dousing. Detailed Project water use information i.e. water demand and water sources to use, was not available at the time of preparing this report, thus it was not feasible to assess in detail how the Project water use could cause depletion of local water sources. The Project will not source its water supply from local herder wells and all permits for water supplies, and all water sources will require permits from the relevant authorities, thus ensuring that potential impacts on water supplies are considered.

There is a potential for accidental damage to above ground well infrastructure impacting on groundwater access during the construction phase, which would affect local herders and their livestock that rely on these wells.

Without mitigation measures, the significance of effect could be Major Adverse, as the magnitude of impact is considered Medium given the scale of people and livestock relying on one well and its infrastructure, and the sensitivity of herders and livestock are High in relation to available water resources.

Potential impacts on hydrology

Construction projects inevitably alter, to a certain degree, the natural drainage regime by altering natural sheet run-off in areas where temporary camps or construction sites are set up. However, there will be no significant areas of hard standing affecting infiltration. In addition, construction works are not anticipated in or around the dry river channels (tower foundations will be sited to avoid these channels), therefore the Project will not be expected to impact the hydrological regime, giving rise to a Minor Adverse effect.

Water resources pollution

Construction related pollution risks include accidental release of fuel or chemicals and contamination from poor practices; contamination from construction machinery working in or near a surface water channel or through percolation into groundwaters; discharges and disturbance of soil and sediment that drain into surface waters. The impact on surface water will only be seen if the channels have a flow. There is a heightened risk of pollution during periods of high rainfall and river flow, when pollutants can be more easily washed into adjacent and downstream surface water features, although it is also recognised that higher flows will also provide increased dilution. Any washing of machinery or vehicles in rivers and streams will also result in pollution risk to these water bodies. Impacts on the quality of surface and groundwater could have an indirect effect on humans, livestock and fauna that use these water resources. Pollution to surface waters could also affect groundwater quality, and groundwater is the main source of water supply in the Project Area. Key avoidance and mitigation measures to avoid surface and groundwater pollution include storage of fuels and chemicals in safe distance from surface water resources or natural drainages with accidental spills prevention measures in place.

Dewatering of any tower foundations may be required, which may lead to pollution of surface water bodies due to high suspended particulate matter load. The discharge of high volumes of water to land might also create temporary swamps or pools of water.

Construction camp activities such as domestic waste and use of field latrines can potentially cause both surface and ground water contamination through surface run off and or through leaching through surface to

groundwater aquifers. Camp site and location of latrines should be carefully selected under the local environmental authority's guidance.

Given the ephemeral nature of the streams, and the environment through which they flow, increased sediment loading from construction activities or poor construction site drainage and subsequent downstream impacts is not considered a likely impact as aquatic flora and fauna are not present in the dry channels and surface water is not used for human consumption.

Impacts to surface water features are likely to be temporary. Impacts to groundwater resources can be harder to address and may have a longer-term effect if a major pollution event took place near an area of higher water table. Overall, the risk is considered Low given the mainly dry nature of the surface water channels however surface water features a receptor is of Medium sensitivity and groundwater and human relying on unpolluted groundwater High sensitivity, therefore the significance of effect prior to mitigation is considered to be Moderate Adverse (for groundwater) and Minor Adverse (for surface water).

Flood risk

Although dry for the majority of the year, the 31 river channels in the OHTL corridor fulfil a valuable role in moving storm water from the area during periods of heavy precipitation. The precipitation has caused significant floods in the local area in 2018 and 2019, of such magnitude that a train was derailed. Construction workers could be put at risk when construction takes place in flood prone areas during rainfall events or flood risk to local herder properties could be exacerbated with a poorly sited construction sites or construction drainage; given the increasing impacts of climate change leading to climate unpredictability and storm severity, without mitigation the significance of the impact is considered Major Adverse.

10.4.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effects are set out in Table 10-6.

Table 10-6. Mitigation measures and residual effects for the protection of water resources

Potential impact	Mitigation Measures	Residual effect
Groundwater resources depletion and water demand	• Contractor will prepare and implement a detailed Water Management Plan which identifies a water needs and supply assessment; water saving good practices; and obtain necessary permits for water abstraction. Ongoing monitoring will be required to ensure that any construction groundwater abstraction is not affecting herder well water availability, in accordance with permit requirements. • Contractor will not use surface or groundwater without prior permissions in place, including when ephemeral streams are in full flow. • Contractor will not use herder wells; and will ensure all wells that could be impacted (e.g. near access road) are protected from construction works. Inspection of the local herders' wells after the completion of the construction works each construction site. • Contractor will monitor water use / extraction from any permitted groundwater wells used. • Contractor will undertake regular training of workers on measure to conserve water during construction and within any work camps required. • Construction workers will be provided with potable water from approved sources i.e. urban water supply source.	**Minor to Moderate Adverse.** It is assumed with permits in place and efficient use of water, water demand will be managed to acceptable levels however, there will still be a demand that needs to be meet for construction purposes. With protection in place, there should be no impact on herder groundwater wells.
Ground water accessibility	• Contractor will map local herder wells within final Project footprint and/or adjacent Project works. Any loss of wells to be relocated/replaced, in accordance with the LARF. • Any wells adjacent to construction works should be visibly and clearly demarcated and protected from damage. • Contractor will hand over any wells constructed for Project water use to local authorities at the end of construction. The well will be functioning at the time of hand over.	**Minor Adverse to Positive.** Wells will be identified and protected. Potential increased herder accessibility to groundwater when any construction wells are and handed over.
Surface water hydrology	• Contractor will not cause any change to the flow or channel morphology of ephemeral streams. Contractor will not site any tower foundations in ephemeral streams. • Contractor will not cause any change to natural run off routes for surface water flow through siting of construction camps or laydown areas.	**Negligible.** With construction outside the surface water channels, impacts on hydrology are not anticipated.

Potential impact	Mitigation Measures	Residual effect
Water resources pollution	• Fuels and chemicals: Contractor will store them in designated containers with accidental spill control measures including storage on impermeable surface, clear labels, bonding in an area that can contain 110% of the largest container volume. Storage areas will be a minimum of 100 m from any surface water feature including dry rivers. • Fuel trucks to carry spill kits. • Refuel vehicles outside any surface water features. • Train all fuel and chemicals handling staff to use spill kits work according to the emergency preparedness and response plan • Vehicle and equipment wash to be undertaken at designated areas where all wastewater can be collected and disposed of by an approved contractor. No direct or indirect discharge to the site or surface water features is permitted • Wastewater treatment to be implemented in construction camps as depth to groundwater under camp(s) cannot be confirmed. • Contractor will prohibit waste or litter entering surface water features.	**Minor Adverse**. With appropriate construction methods in place, spills should be avoided and, if they do occur, they should be cleaned up quickly in accordance with the spill management plan.
Flood Risk	• Contactor will not allow any permanent or temporary construction related activities to take place in or within 50 m of dry river beds or dry lakes. • Contractor will ensure no flood risk exacerbation through careful consideration of construction drainage and flood risks to local properties from construction activities. • Contractor will assess flood risk daily in periods of high rainfall through contact with meteorological stations and soum authorities.	**Minor Adverse.** With construction outside the surface water channels the risk of damage to construction infrastructure or health and safety from flooding is minimised.

10.5. Air Quality

10.5.1. Scope of Assessment

The scope of the air quality assessment includes consideration of the following:

- Increase in dust emissions at sensitive receptors;
- Increases in particulate matter concentrations at sensitive receptors due to construction activities;
- Change in ambient concentrations of gaseous emissions at sensitive receptors as a result of exhaust emissions arising from construction plant and traffic; and
- Greenhouse Gas (GHG) emissions.

The AoI for Air Quality is determined based on the extent of the area where changes in pollutant concentrations or dust deposition could affect sensitive receptors. It is considered likely that receptors could be potentially affected by an increase in dust and particulate matter where they are within 350 m of construction activities or 50 m from the route used by construction vehicles on the public highway, up to 500 m from compounds and other secondary access points.[171]

10.5.2. Sources of Impact

The primary emissions impacting on air quality from construction activities include dust and gaseous emissions from the following sources:

Dust generating sources

- Excavations of foundations and earth moving activities;
- Preparation and use of temporary haul roads;
- Concrete batching plant;
- Construction and worker vehicle movements;
- Topsoil storage piles; and
- Rehabilitation of temporarily disturbed areas.

[171] Holman *et al* (2014), Institute of Air Quality Management (IAQM) *Guidance on the assessment of dust from demolition and construction*, Institute of Air Quality Management, London.

Gaseous emission sources

- Gaseous and GHG emissions from construction equipment/machinery; and
- Gaseous and GHG emissions from construction vehicle movements.

10.5.3. Potentially Sensitive Receptors

Sensitive receptors during road construction include:

- Herder households who camp near the OHTL corridor or ancillary construction sites on a permanent or seasonal basis;
- Flora and fauna, including livestock; and
- Communities and businesses living and working in Choir and Sainshand near the OHTL corridor/ substation sites.

Communities and businesses in the soum centres close to the main road may also be affected by emissions from construction vehicles. Impacts on construction workers are considered under OHS.

10.5.4. Impact Assessment

The baseline showed that the air quality in the road corridor is largely unpolluted by human activity, meeting national standards for chemical pollutants however, at two sites, the WHO Environmental Air Quality Guidelines for particulate matter levels were not met (though these results are based on one reading only and therefore need to be interpreted with care). This would support the conclusion that dust and sand storms are a significant natural hazard in the Project Area.

Dust impacts

Construction activities can give rise to dust emissions under particular circumstances if not effectively managed. Construction activities have the potential to affect receptors near to the main construction sites due to dust generated from site preparation, site excavation, construction activities and the tracking out of dust from HGVs onto the local road network. Earth works will result in exposed areas of soil which will potentially generate dust when it is windy, with dust potentially being generated when winds blow at all times of day or night, not just during active periods of construction. The presence of concrete batching plant could also result in significant emissions of dust, though the impact will depend on their location in relation to sensitive receptors. This will be exacerbated by natural dust storms which are most common in Spring.

Larger dust particles fall out of the atmosphere quickly after initial release and therefore tend to be deposited in close proximity to the source of emission. The level and distribution of dust emissions will vary according to the duration and location of activity, weather conditions, and the effectiveness of suppression measures. Although unlikely to cause long-term or widespread changes to local air quality, the Project is in an area where dust is already a concern, and for example living quarters such as *gers* are not equipped with glass windows to prevent dust ingress.

Humans will be the primary receptor and are of High sensitivity. In general, impacts of dust from construction should be considered within the following zones:[172]

- For ‘human sensitive receptors’ (locations where members of the public are exposed for eight hours or more per day, e.g. residential properties, hospitals, schools):
  - (i) 350 m from construction activities; and
  - (ii) 50 m either side of ‘trackout’ routes used by construction vehicles on the public highway, up to 500 m from compounds and other secondary access points to the construction activities from the public highway.
- For ecological receptors (protected sites sensitive to dust deposition):
  - (i) 50 m from construction activities; and
  - (ii) 50 m either side of trackout routes used by construction vehicles on the public highway, up to 500 m from compounds and other secondary access points to the construction activities from the public highway.

The OHTL RoW is assumed to also be the main construction route that will be used by construction vehicles to access the Project, though it is likely that some temporary access roads or existing tracks will also be used to

[172] Ibid.

access the route along its length. It is therefore also likely that some construction traffic will use the main AH road between Choir and Sainshand.

The main works site will be along the OHTL corridor, which runs from the edges of two cities through very sparsely populated areas. In these rural areas, in addition to the two summer camps, there are winter herder households, some of which do not move to summer pastures (five as recorded in the Household Surveys); and a total of 74 registered herder households that use the 6 km buffer zone in winter however the final number would need to be confirmed through detailed survey work following detailed design optimisation. The closest of these camps was recorded as being 45 m from the RoW, though given the transient nature of herders, there could be other camps close to the RoW at the time of the proposed works. In Choir, there are a number of places of work potentially within 300 m of the OHTL terminus. There are no sensitive receptors within the vicinity of the Sainshand substation site.

The predicted magnitude of dust impacts is High as the works will exacerbate local dust conditions. The main receptors will be herder households, which are considered High sensitivity. Flora and fauna and other receptors are considered to be Low to Medium sensitivity. The significance of effect for dust, prior to mitigation, is Major Adverse for humans and Moderate for flora and fauna, including livestock.

Gaseous emissions

The main sources of gaseous emission during construction will be construction machinery, equipment and construction HGVs. The operation of vehicles and equipment will result in emissions of carbon monoxide, sulphur dioxide, and oxides of nitrogen. In particular, it is noted the diesel is often used as a fuel in Mongolia. However, the emissions will only be emitted during the use of machinery during active construction periods.

The greatest impact on air quality due to emissions from vehicles and plant will be in the areas immediately adjacent to site access. Generally, it is considered that additional vehicle movements generated during the construction phase will have the potential to influence local air quality at sensitive receptors located within 200 m of roads used by construction traffic.[173] This will therefore apply mostly to several isolated herder household camps where they are located within 200 m of construction traffic movements and the RoW (along which it is assumed that construction traffic will also move). Final details of the plant and equipment likely to be used on site will be determined by the appointed Contractor. The number of plant and their location within the site are likely to be variable over the construction period.

As concentrations of gaseous emissions from construction equipment and construction traffic is considered unlikely to reach the WHO guidelines on the basis of similar projects, the predicted magnitude of gaseous emissions is Low. The sensitivity of human receptors is High; and of flora and fauna and other receptors, Low to Medium. The significance of effect for gaseous emissions, prior to mitigation, is Moderate Adverse for humans and Minor Adverse for flora and fauna.

GHG emissions

GHGs have an effect on global warming in relation to their potential for trapping heat in the atmosphere. During the construction phase, the primary sources of greenhouse gases are CO_2 generated from combustion sources. There will also be limited GHG emissions associated with on-site use of plant and equipment. A full GHG assessment has not been undertaken for the Project. However, it is considered that overall, GHG emissions would be Minor Adverse given the nature of the proposed works.

10.5.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effects are set out in Table 10-7.

Table 10-7. Air quality mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effects
Air quality / Dust	• Work camps, construction facilities, laydown and storage areas and access roads will be located at least 500 m from herder winter camps or other structures sites. • Inform herder households of construction schedule at least 3 months in advance of activities starting (assuming the construction period will occur between April and October) Community grievance mechanism in place.	**Minor to Moderate Adverse**. Mitigation measures cannot fully control dust in an existing dusty and windy environment therefore dust is anticipated throughout the entire construction period.

[173] Highways England (2007), Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 HA207/07 Air Quality (Figure C1).

Potential impact	Mitigation measures	Residual effects
	• Contractor to Comply with Mongolian dust emission standard (MNS 4585: 2007). • Mixing plant, if used, shall be located at a distance of at least 500 m downwind of sensitive receptors. • Regular dust suppression (watering based on 2-4 litres/m^2) along roads and the earthwork sites. • Enforce speed limits for all construction vehicles of no more than 20 km/h. • Avoid unpaved haul roads wherever possible. Construction vehicles will strictly follow approved routes to avoid creating multiple earth tracks. Erect visible signs informing site road traffic of permissible routes. • Earth material transporting trucks shall be covered with tarpaulin. • PPE will be provided to workers exposed to dust. • All project staff including drivers to be inducted for environmental awareness and site procedures, for example vehicle speed, use of designated roads to reduce suspension of dust. • Soil stripping during windy periods will be prohibited where this does not constrain the construction programme; or water dousing will be employed. Fertile soil stockpiles will be designed in accordance with Mongolian standards GIP. • Avoid site runoff of water or mud from site compounds by providing appropriate temporary drainage. • Where practicable, implement a wheel washing system dislodge accumulated dust and mud prior to leaving the sites. • Rehabilitate disturbed areas as soon as practicable. • Where necessary, i.e. prior to and during known dust-generating construction activities and/or on receipt of valid complaints, dust monitoring will be undertaken.	
Air quality / Gaseous emissions and GHGs	• Vehicles and machinery that meets the emission standard only shall be allowed to operate. • Construction vehicles, machinery and equipment shall be inspected at the start of construction and regularly to ensure the vehicles meet relevant emission standards. • Prohibit idling of road construction machinery. • Parked construction vehicles and equipment will not be located close to sensitive receptors (e.g. herder camp). • Prohibit burning of flammable materials.	**Minor Adverse**. With relevant mitigation measures in place and considering the short term nature of the impact on receptors, it is concluded that gaseous emission on air quality will be low during construction.

10.6. Noise and Vibration

10.6.1. Scope of Assessment

The scope of the noise and vibration assessment covers:

- Potential effect from noise-generating equipment and construction traffic on noise sensitive receptors; and
- Vibration impacts arising from construction activities and construction traffic.

The AoI has been determined based on the extent of the area where changes in noise and vibration over existing ambient levels of noise and vibration could affect Noise Sensitive Receptors (NSRs). The AoI for assessing the potential construction noise impacts during the day is expected to be limited to within about 300 m of the proposed construction activities. Noise impacts on fauna and construction workers (occupational health and safety) are considered in the relevant sections of this report.

10.6.2. Sources of Impact

Construction equipment during site preparation, excavations e.g. for tower foundations and construction of the Sainshand substation are identified as sources of noise. Excavations will be major noise sources as noise levels up to 90 dB(A) are expected within 5 m of the machinery as shown in Table 10-8.

Table 10-8. Construction machinery noise

Type of machinery / Noise, dB	Distance to machinery, m									
	5	10	20	40	60	80	100	150	200	300
Loader	90	84	78	72	68.5	66	64	60.5	58	54.5
Vibratory road roller	86	80	74	68	64.5	62	60	56.5	54	50.5
Bulldozer	86	80	74	68	64.5	62	60	56.5	54	50.5
Land scraper	90	84	78	72	68.5	66	64	60.5	58	54.5
Excavator	84	78	72	66	62.5	60	58	54.5	52	48.8
Roller	87	81	75	69	62.5	63	61	57.5	55	51.5

Source: ADB (2018), IEE.

10.6.3. Potentially Sensitive Receptors

Noise sensitive receptors (NSRs) during construction include:

- Herder households who camp near the OHTL corridor or ancillary construction sites on a permanent or seasonal basis;
- Flora and fauna, including livestock; and
- Communities and businesses living and working in Choir and Sainshand near the OHTL corridor/ substation sites.

Communities and businesses in the soum centres close to the main road may also be affected by construction vehicles. Impacts on construction workers are considered under OHS.

10.6.4. Impact Assessment

Whilst prediction methods are available to determine the level of noise during construction activities, the precision of any such predictions is necessarily limited by the number of assumptions that must be made regarding the number and type of plant to be utilised, their location and detailed operating arrangements. At this stage, very little is known about the number, type and location of construction plant that might be used as the Construction Contractor has not been appointed. It is therefore considered appropriate for a qualitative assessment to be made of the temporary impacts likely to arise from construction works, based on available information and professional judgement.

Temporary noise and vibration effects will occur as a result of the use of equipment, earthworks, movement of construction workers and construction vehicles, and quarry/borrow pit activities (if required). The noisiest construction activities will be earthworks (i.e. bulldozing and excavation) for site preparation and foundations, mainly at the Sainshand substation but also at each individual tower foundation location. The locations of haul roads are not known but it is anticipated that they will extend beyond the immediate construction corridor, primarily between the national highway (Choir to Sainshand) and the construction corridor.

Noise and vibration will also be generated from operations at quarries, including blasting activities however, it is not yet known if quarries will be required given the nature of the Project and, if they were, it is likely that existing sites will be used, therefore at have been excluded from the assessment.

The baseline indicated that there are no major permanent noise generating activities such as industrial operations along the majority of the road corridor; some mining activities exist but there are no operational mines close to the Project sites. Baseline data for Sainshand show noise to be below the national standard for ambient noise.

Noise impacts due to construction are temporary and for the most part localised and of short duration at a single site. The OHTL corridor runs from the edges of two cities through very sparsely populated areas. In the rural areas, through which the majority of the OHTL corridor passes, the temporary nature of the works means that the potential for disturbance is likely to be limited. However, there are winter herder households along the route, some of which do not move to summer pastures (five as recorded in the Household Surveys); and a total of 74 registered herder households that use the 6 km buffer zone in winter. The closest of these camps was recorded as being 45 m from the RoW, though given the transient nature of herders, there could be other camps close to the RoW at the time of the proposed works. In Choir, there are a number of places of work potentially within 300 m of the OHTL terminus. There are no NSRs within the vicinity of the Sainshand substation site.

Although the majority of the works will be undertaken during daytime hours, it is also possible that night time working may occur due to the short climatic window in which to compete the works.

Generally, in accordance with British Standard BS5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*, noise levels generated by site activities are deemed to be potentially significant if the total noise exceeds the pre-construction ambient noise levels by 5 dBA and/or exceeds a cut off limit of 65 dB LAeq by 5 dBA. Where the distance from the noise source is <50 m, the perceived construction noise levels would be dominated by the equipment closest to the nearest site boundary; at distances >50 m, the perceived construction noise levels would be a summation of contribution from several equipment items spread-out over the wider construction site.

Taking into account the levels identified in Table 10-4 as a guide, an exceedance of 65 dB by 5 dBA is possible within 40 to 80 m, depending on the machinery in use, for short periods during which the machinery is in use. The predicted construction noise levels therefore have the potential for Medium to High magnitude of impacts on receptors within approximately 50 m distance from the noisy activity. There is only one herder household camp that currently is located within 50 m of the OHTL route.

Given the construction site location with regard to potential NSRs (i.e. most are significantly outside the area where noise impacts would be felt), in general, the overall effect of noise is considered to be Negligible. However, for works close to Choir substation and in the proximity of the closest herder household camp, a Major Adverse effect would be predicted for the construction period due to the sensitivity of humans being High. In relation to any construction work camps, they will be sited considering noise impacts and therefore no additional significant adverse effects of noise on NSRs are predicted from temporary construction facilities.

In the absence of piling activities, vibration levels from typical mobile construction equipment are generally imperceptible at distances greater than around 20 m from the source. It is expected that vibration generating equipment will not be located at distances less than 20 m from any receptor for any prolonged period of time. On this basis there are no anticipated significant effects from construction vibration, and this has therefore not been considered any further.

10.6.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effect are set out in Table 10-9.

Table 10-9. Mitigation measures and residual effects for noise

Potential impact	Mitigation Measures	Residual effect
Noise	Advance warning should be given to local communities regarding construction activities (e.g. construction schedule). Community grievance mechanism must be put in place and disclosed. Contractor will prepare a Noise and Vibration Management Plan in detail prior to construction. Control measures will include the following: • Ensure all staff and operatives are briefed on the requirement to minimise noise nuisance. • Use of attenuation measures such as silencers/enclosures where appropriate. • Avoidance of unnecessary hooting of horns. • Establishment of agreed criteria whilst undertaking significantly noisy or vibration-causing operations near to sensitive locations e.g. herders and their livestock. • Work at night should be avoided where possible, especially where in proximity to herder households and local business properties/community in Choir. Where this is not possible, advance warning should be given to those potentially affected. • Where necessary, monitoring of noise at NSRs. • Maximum speed limit for all construction vehicles is 20 km/h. Ancillary site/facility siting: • Work camps, construction facilities, laydown and storage areas and access roads will be located at least 500 m from herder winter camps or other structures sites. All construction machinery and equipment will be: • In conformance with relevant national or international standards, directives or recommendations on noise or vibration emissions. • Modern and maintained regularly, paying attention to all noise-reducing	**Negligible (local communities along the Choir-Sainshand road and in Sainshand).** No NSRs sufficiently close to the works to generate significant noise impacts. **Minor to Moderate Adverse (Herder households and local community/businesses near Choir substation).** Noise will be generated during the construction period that could affect herder households within 50 m of construction works and local businesses/ communities close to Choir substation. These impacts will be temporary and, with mitigation in place, likely Minor Adverse. However, taking a precautionary approach and the potential for noise impacts to be cumulative due to natural wind noise baseline, the impact is assessed as up to

Potential impact	Mitigation Measures	Residual effect
	devices, silencers or mufflers. • Subject to preventive inspections and planned maintenance in order to maintain in good condition with regards to minimising environmental noise and vibration as well as workers exposure to harmful noise and vibration. • Positioned appropriately to minimise noise at sensitive locations. • Started up sequentially rather than all together. • Not revved unnecessarily and turned off when not in use.	Moderate Adverse with mitigation for these NSRs.

10.7. Traffic and Transport

10.7.1. Scope of Assessment

The scope of the traffic and transport assessment includes:

- Impact of construction traffic on the existing road network;
- Impact of construction traffic on road users; and
- Impact on safety from an increase in the volume of construction-related HGVs.

The AoI equates to the Choir-Sainshand AH main road and the local access roads to the Choir and Sainshand substation sites. Impacts in relation to air quality and noise have been addressed under those impact assessment topics above.

10.7.2. Sources of Impact

Sources of impact during construction include:

- Movement of construction-related vehicles and equipment; and
- Creation of access roads.

10.7.3. Potentially Sensitive Receptors

Sensitive receptors during construction include:

- Local communities along the main Choir-Sainshand road and local access roads to the substation sites;
- Herder households (and their livestock) near access roads and the RoW where it is used as a haul road;
- Road users.

10.7.4. Impact Assessment

Details of the Construction Contractor's working procedures are not yet known however, it is reasonable to assume that the Contractor will use the main Choir-Sainshand road to transport heavy equipment and materials to camps and site; and that the RoW itself will be used as a haul road along the route of the OHTL during construction. It is also likely that some additional temporary or permanent access roads will be required from the main road to the OTHL route, using existing track wherever possible.

Traffic impacts include increased road congestion; noise, vibration and air quality impacts; and increased accident and safety risks. Access roads and use of the RoW as a haul road could create conflict with local users, especially herders and their roaming livestock. A temporary increase in traffic can also result in the deterioration of local tracks.

The traffic survey indicated that the main road between Choir and Sainshand is mainly used by light vehicles, with some small trucks and HGVs. Within Choir and Sainshand, traffic levels were generally higher with light vehicles again being the most significant road users. Any increase in traffic will be short-term and temporary; and can be managed mainly through appropriate mitigation measures include sensitisation of the local population, identification of key routes and hours during which deliveries are made.

Overall, as most construction related traffic will use haul roads the impact on the main road and road users (Medium sensitivity) is considered Low (given volume of traffic, road condition and use of specified haul roads),

and therefore the effect Minor Adverse. The use of local tracks however, could result in a Moderate Adverse effect on herders and their livestock, who are considered to have High sensitivity to an increase in construction traffic movements.

10.7.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effect are set out in Table 10-10.

Table 10-10. Transport and traffic measures and residual effects

Potential impact	Mitigation measures	Residual effects
Transport and accessibility	• Contractor will prepare and implement a detailed Traffic Management Plan. • Wherever possible, the RoW should be used as the haul road, minimising the need for new access roads. • Where new temporary or permanent roads are required for access, they should as far as possible use existing tracks. • Appropriate ingress/egress will be provided where construction traffic requires to move to/from the haul road to the public road. • Advance warning to herders and, where necessary, traffic marshals will be in place during HGV deliveries to site.	**Minor Adverse.** With the mitigation measures in place, no significant effects on traffic and transport are anticipated.

10.8. Materials Use and Waste Management

10.8.1. Scope of Assessment

The scope of assessment includes:

- Impacts associated with material use;
- Impact of excavated materials;
- Potential waste streams likely to be generated during construction and impacts associated with waste management, including disposal and capacity of existing waste management facilities.

The AoI for waste is any quarries or borrow pits, construction sites and construction camps, and landfills sites to account for any potential facilities receiving waste from the construction sites.

10.8.2. Sources of Impact

Sources of impact on material resources and waste management include:

- Earthworks including excavating, site clearance and land levelling;
- Construction works, including construction equipment repair and maintenance;
- Workers' accommodation camp; and
- Borrow pits and quarries.

10.8.3. Potentially Sensitive Receptors

Potentially sensitive receptors include:

- Construction workers;
- Project and third-party materials and waste facilities;
- Local communities close to potential borrow pits and quarries;
- Herder households along the OHTL route;
- Flora and fauna (including livestock);
- Surface water bodies and ground water; and
- Soils.

10.8.4. Impact Assessment

The consumption of construction materials and the generation and disposal of waste during construction has the potential to have adverse environmental effects. These are considered in turn below.

Materials use

The consumption of natural and non-renewable resources will have an adverse impact on material resources. The potential for significant effects depends on the volumes required, origins and sources of materials, including their general availability (production, stock, sales) and the proportion of recovered (reused or recycled) materials they contain. The main resources required for construction include aggregates, concrete and water.

There is limited data on the availability of materials within the region as well as the specific requirements for the Project, therefore only a limited qualitative assessment can be undertaken. The majority of the materials are likely to be procured in country, from existing resources, and therefore whilst their use will reduce the available materials, where existing sites are used this will reduce the potential damage caused to the topsoil and subsoils as a result of formation of new quarries or borrow pits. It is also likely that primary materials consumption will be reduced by the reuse of material generated through excavation arisings where possible.

The natural resources required for the Project are considered available in Mongolia and therefore of Low sensitivity, and the magnitude of the requirement Medium, resulting in a Minor Adverse effect.

Waste management

The Project will generate both solid non-hazardous and hazardous wastes throughout the construction phase. The generation, storage and disposal of waste can have an adverse effect through degradation of the environment and reduction in landfill capacity, and through nuisance and health and pollution risks to workers, the local community and other receptors such as soils, water, flora and fauna.

Anticipated waste types and quantities include:

- Excavated material
- Construction material
- Municipal Solid Waste
- Wastewaters

Excavated materials

The majority of the material generated during the construction phase is anticipated to be excavated spoil. The main activities that will generate excavated spoil are excavations for the substation at Sainshand and for the tower foundations along the OTHL route (663 pylons anticipated). The total volume of excavated wastes is not currently known, however, proposed waste management methods for excavated material (other than removal by truck to landfill) include:

- material to be used as backfill around structures;
- material to be left on-site and graded to levels; and
- materials to be recycled (on or off site) or screened and re-used (on or off site).

Undertaking such on/off-site reuse and recycling reduces the amount of waste leaving site. This in turn will reduce the amount of site traffic for trucks removing material and reduce the burden on limited local waste management infrastructure. It is anticipated that all the topsoil removed will be re-used on and around the sites.

Construction material

Construction waste will also be generated, including non-hazardous waste, such as construction debris, packaging waste, waste wood and metals, in addition to hazardous waste (e.g. oils and lubricants, paint and emulsion and fuels, small amounts of machinery maintenance materials such as oily rags, used oil filters, used oil, and spill clean-up materials from oil and fuel spills).

The UK Waste and Resources Action Programme (WRAP) Wastage Rates produced by the Construction Resource and Waste Platform[174] provide indices to calculate the volume of waste that is estimated to arise from each waste stream within a Project, based on the volume of material to be used. Sufficient detail is not currently available on volumes to calculate waste rates. However, WRAP also provides UK standard practice recovery rates (Table 10-11). The Project should strive for standard practice recovery rates as a minimum. If the standard practice recovery rate of 60% (derived by UK projects by WRAP) was achieved this would enable the potential to divert a significant quantity of material over the course of construction. Overall, if careful planning and management measures are used, as outlined as mitigation measures in Table 10-11, it will aid the prevention, reuse and recycling the materials where possible and will minimise the overall amount of material disposed of in landfill.

Table 10-11. Standard, good and best practice recovery rates by material

Material	Standard practice recovery (%)	Good practice recovery (%)	Best practice recovery (%)
Wood	57	90	95
Metals	95	100	100
Packaging	60	85	95
Ceramics/Masonry	75	85	100
Concrete	75	95	100
Inert	75	95	100
Plastics	60	80	95
Miscellaneous	12	50	75
Electrical Equipment	Limited Information	70	95
Cement	Limited Information	75	95
Liquids and Oils	100	100	100
Hazardous	50	Limited information*	Limited Information*
Commonly Achieved	**60%**	**80%**	**90%**

% = percentage
**This cannot be 100% as numerous hazardous wastes cannot be recycled e.g. asbestos.*

Municipal solid waste (MSW)

MSW is also anticipated to arise from the site-based workforce during construction, in particular at the construction camps. This includes non-hazardous solid wastes such as office, kitchen, and domestic wastes. According to the World Bank[175], an estimated 0.66 kg/day of waste was generated per person in Mongolia in 2012 (latest available figures). MSW will be taken to landfill.

Wastewater

Construction camps will require latrines, as will workers on site. The Construction Contractor will be responsible for wastewater management, therefore details are not currently available.

Waste management and disposal impacts

Waste management and the minimisation of potential impacts during construction will depend on the implementation of appropriate procedures, protocols and monitoring of materials being delivered, handled and stored prior to disposal. There are potentially a number of risks to human health and the environment that are associated with the handling, storage and disposal of waste, both on and off-site. Incorrect handling and storage could result in possible cross contamination, wind-blown litter, and contamination of air, soil and water resources; as well as direct and indirect effects on human health. Environmental pollution with organic and non-organic waste generated from Project activities may occur due to uncontrolled disposal and inadequate

[174] Construction Resources and Waste Platform (2010), UK Waste and Resources Action Programme (WRAP) Wastage Rates.
[175] World Bank (2012), What a Waste: A Global review of Solid Waste Management, Available at: https://openknowledge.worldbank.org/handle/10986/17388

management of waste during road construction and operation of the camps for construction workers. Discharge of untreated wastewaters can result in pollution to soils, water bodies and have adverse effects on human health, flora and fauna and surface and groundwater.

It is anticipated that, as a minimum, the Construction Contractor will follow Mongolian legislation in relation to waste management. Humans are considered a High sensitive receptor and the environment Medium. Without appropriate mitigation measured in place, the impact magnitude could be Medium and therefore, the significance of effect on humans could be Major Adverse, and on the environment, Moderate Adverse.

In relation to landfill capacity, there are no official landfills within the Project Area though there is a waste dumping area just outside Choir. The Project Area does not have a high standard of waste management. It is therefore likely that the Construction Contractor will have to make specific arrangements for waste management. The Construction Contractor will need to collect construction waste and then transport it to a designated point approved by local authority (permit shall be obtained by the Construction Contractor). As identified above, recovery of materials will reduce the volume of waste that goes to landfill. Overall, the significance of the effect on landfill capacity is considered Moderate Adverse due to the likely requirement to create a landfill site, without mitigation (recovery) of materials in place.

Hazardous waste such as used oil, empty drums or replaced parts of the construction machinery may cause environmental pollution if poorly disposed of. There are no controlled hazardous waste management facilities designed for wastes such as oils or chemicals in the Project Area. The impact of hazardous waste management is considered high risk due to the lack of facilities available however, the magnitude of hazardous wastes will be Low and therefore overall a Moderate Adverse effect is identified prior to mitigation.

10.8.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effects are set out in Table 10-12.

Table 10-12. Waste management mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effect
Materials use	• Material use will be undertaken in compliance with the requirements of the Project ESMMP. Wherever possible, the efficient use of materials will be sought.	**Minor Adverse.** Regardless of the mitigation measures, the Project will still require use of natural resources for the Project.
Waste Management and Disposal – Non-hazardous waste	• Contractor shall prepare and implement a detailed Materials Use and Waste Management Plan. • The waste hierarchy shall be applied in project planning to ensure efficient use and management of resources so that priority is to prevent generation of waste at source (i.e. smart purchase approach by estimating the amount correctly and efficient use of materials so that no surplus material that might end up as a waste) and facilitate waste recovery wherever possible. • Provide project employees with training on waste management to improve knowledge and awareness on reducing waste generation, waste types and their classification, and project waste management rules. • Disposal of wastes without a permit shall be prohibited. • Designated waste storage area will be located away from surface water drains and areas which discharge directly to the water environment. Each designated waste storage area will be equipped with waste skips, containers or bins for temporary storage before recycling, treatment or disposal off site. • Periodic inspections of waste storage areas will be conducted; inspection findings will be documented. • Temporary storage areas for inert and non-hazardous waste will: a. be placed in areas with minimum fire and explosions risks; b. be easily identifiable and clearly signed; c. have periodic inspections and findings documented. • Waste storage containers will be: a. clearly labelled – to describe the contents using the appropriate waste labels which shall be completed; b. old labels shall be removed to avoid confusion; c. appropriate to the waste they contain; d. appropriately sealed (e.g. with a lid or cover);	**Minor to Moderate Adverse.** Waste will be produced throughout construction, though can be limited through good planning of construction activities and recovery rates. However, the lack of waste management infrastructure means mitigation through sound disposal cannot necessarily be implemented.

Potential impact	Mitigation measures	Residual effect
	e. not emitting any harmful gases or generating heat. • Food waste shall be disposed to a designate collection points protected with fencing in order to prevent from animal poisoning. • The burning of waste will be prohibited.	
Waste Management and Disposal – hazardous waste	• Hazardous waste transportation will comply with the "Regulation on Classification, Collection, Packing, Temporary Placement, Transport, Safety, and Completion of Hazardous Wastes" and "Law on Waste" (May 2012). Hazardous waste will be transported from the construction site to appropriately licenced/permitted facilities for treatment, recycling, re-use or disposal. • Waste will be stored in a manner that: a. prevents a contact between incompatible wastes, and b. allows for inspection between containers to monitor leaks or spills. • Hazardous waste will be stored in closed containers away from direct sunlight, wind and rain. • Secondary containment systems will be constructed with materials appropriate for the wastes being contained and adequate to prevent loss to the environment. Secondary containment is included wherever liquid wastes are stored in volumes greater than 220 litres. The available volume of secondary containment will be at least 110% of the total storage capacity, or 25% of the total storage capacity. • Adequate ventilation will be provided where volatile wastes are stored. • Readily available information on chemical compatibility to employees will be provided, including labelling each container to identify its contents. • The hazardous waste storage area will be clearly identified and demarcated, including on a facility map or site plan. Access to hazardous waste storage areas will be limited to employees who have received proper training. • Spill response and emergency plans will be prepared to address their accidental release. For spills, once the sand absorbs oil, it shall be disposed designated waste disposal area. Before removing contaminated soils, take special containers or plastic bags to avoid pollution. • Storage areas will be provided with fire extinguishers, spill kits according to the type and quantity of stored hazardous waste. Waste containers will be secured and labelled with the contents and associated hazards, be properly loaded on the transport vehicles and be accompanied by a shipping paper with the description of the load and its associated hazards.	**Minor Adverse**. Due to the low level of hazardous wastes, overall with mitigation in place the effect is considered Minor.

10.9. Land Use, Tenure and Displacement

10.9.1. Scope of Assessment

The scope of the assessment includes:

- Land use; and
- Land tenure and displacement.

The AoI equates to people and groups directly affected by the Project, considered to cover people's assets and use of land within the 25 m RoW from the centreline and an additional buffer zone of 6 km, as well as the towns and cities within the Project *soums*. As the landtake would occur during construction, both temporary and permanent impacts of displacement have been considered in this section.

10.9.2. Sources of Impact

Sources of impact on land use, tenure and displacement include:

- Footprint requirements of the Project:

  - Permanent land take for the new substation in Sainshand and the 25 m RoW around the substation;
  - 25 m RoW around the existing substation in Choir;
  - Permanent land take for the footprint of the OHTL foundations;
  - Permanent land classification in the RoW of the OHTL route (25 m in rural areas and 6 m in Choir and Sainshand cities);
- Construction working areas including any temporary or permanent access roads; and
- Construction works, including movement of construction workers and construction-related vehicles and equipment.

10.9.3. Potentially Sensitive Receptors

Sensitive receptors during construction include:

- Communities living near the substations and OHTL route in the seven *soums*, in particular communities in *Bagh* IV in Sumber *soum* of Govi-Sumber aimag; *Bagh* II in Shiveegovi *soum* of Govi-Sumber aimag; *Bagh* V in Dalanjargalan *soum* of Dornogovi aimag; *Bagh* I and III in Airag *soum*, in Dornogovi aimag; *Bagh* III in Saikhandulaan *soum* of Dornogovi aimag; *Bagh* III in Altanshiree *soum* in Dornogovi aimag; and *Bagh* IV in Sainshand *soum* of Dornogovi aimag;
- Herder households with permanent structures in 6 km buffer zone;
- Users of pastures from other soums and neighbouring *aimags*; and
- Local business and business organizations.

10.9.4. Impact Assessment

The Project will require permanent land take for the construction of the new substation in the area of Sainshand Wind Park and for construction of the tower foundations for the OHTL along the Project route. The RoW is also a permanent designation around substations and OHTLs, though does not result in the restriction of all activities once operational.

The RoW is a 25 m radius around substations; and 25 m (in both directions) from the centreline of the OHTL in rural areas and 6 m from the centreline in the cities of Choir and Sainshand. It is likely that some minor vegetation clearance (due to lack of vegetation in the Project Area) will be undertaken in the OHTL route RoW for construction, and that this will be used as a construction working area (though this is yet to be confirmed).

Temporary land take will also be be required for the construction works and construction compounds, including the compounds for workers; and temporary or permanent land take for access (haul) roads however, as identified in Chapter 2: Project Description, wherever feasible existing routes and tracks will be used to minimise land take. It is assumed that existing quarries and borrow pits would be used wherever possible, however, if this is not possible, this would also result in temporary land take.

A such, the Project will result in the following impacts, discussed in more detail below:

- Permanent loss of land for the substation at Sainshand
- Temporary loss of access to grazing pasturelands during construction and permanent loss of land under the tower footprints
- Permanent loss of land under the tower footprints in eight exploration mining licenced areas
- Permanent loss of land under the tower footprints in two locally designated sites

Substations

A total of 62.9 m^2 of land will be acquired for the substation in Sainshand. The site location has been allocated to the Project by the local *aimag* government. Therefore, no impacts on land tenure are anticipated.

As is shown in Figure 7-5 in Chapter 7, the site is currently unused and there are no businesses or residential properties within the 25 m RoW of the station site, which was verified in the fieldwork visits. The new substation will therefore not have an impact on existing land uses or result in any physical or economic displacement.

The substation at Choir is an existing substation on the outskirts of Choir (Figure 7-5 in Chapter 7). The nearest residential “settlement” to the site are several *gers*, located 1.6 km from the substation (and therefore outside

the 25 m RoW of the substation). The nearest buildings to the substation are mainly industrial with the town the other side of the railway. The existing substation will therefore not have an impact on existing land uses or result in any physical or economic displacement.

OHTL route

The OHTL route between Choir and Sainshand substations passes predominately in open countryside, across pastureland (there is no distinction between good and poor quality pasture in the Project Area). Where the line exits Choir substation, it does not cross over any structures (See Figure 7-5 in Chapter 7). Where the line enters into the new Sainshand substation, the line will cross a paved road, the railway line and an electricity line that connects the Oil Production Plant with Sainshand city.

The land across which the OHTL passes is, effectively, all State-owned land; though there are several mining licences and Herder Possession Certificates (discussed further below). The land for the OTHL route (the centreline and its 25 m RoW) has been allocated to the Project by the local *aimag* governments..

In terms of land uses, there are no crops within the OHTL RoW or within the 6 km buffer zone. The closest farms are near Lake Khayalga in Shiveegovi *soum* in Govi-Sumber *aimag*, approximately 3.6 km west of the OHTL route and therefore will not be affected by the Project. A number of villages between Choir and Sainshand are passed, however the closest village is Shiveegovi at 10 km to the east.

The ESIA field work has identified that there are no herder household structures, temporary or permanent, within the RoW of the OHTL. However, a review of the maps held by the *Aimag* authorities show 74 herder-households are registered the 6 km buffer zone however, these records do not account for unregistered camp users. From the field visit and these data, the estimated number of herder-households potentially within the 6 km buffer zone ranges from 39 to 74+ households. Herder households from other soums are also understood to use these pastures during winter.

Whilst most of the registered households had moved to summer pastures, the field survey in June 2020 identified 22 households that had remained within the 6 km buffer zone. Of these, all but five were planning to move on to summer pastures. The remaining five were reported as staying in the same location all year round. All of these households had *gers*, however, all are outside the 25 m RoW. During the walkover survey in May 2021 of the new alignment, 22 winter camps and 2 summer camps were identified within the 6 km buffer zone, though all were outside the 25 m RoW. The Project is therefore not anticipated to result in any physical displacement of residential properties.

However, during construction there will be a temporary loss of access to pastures within the temporary working footprint of the OHTL (assumed to be the 25 m RoW). This could also affect land tenure, where the herder households have Possession Certificates. As identified in Chapter 7, only 20% of herders in the two *aimags* have legal possession of a winter camp (in the form of a Possession Certificate) – and those holding such certificates had subsequently departed to summer pastures by the time of ESIA household survey. Ultimately, the Government has eminent domain over the pastureland, including winter camps, and therefore the land allocation is determined by the *aimag* government as identified above. However, further clarification will be required once the final route and temporary works areas are identified, so that appropriate measures are taken into account in terms of notice access restrictions.

Whilst three wells were identified in the ESIA field trip within 300 m from the OHTL centreline (at Km 60 and 180-190), none were identified within the 25 m RoW. Therefore, no structures are considered to be directly affected and requiring relocation as a result of the Project. However, this should be confirmed during detailed survey once the final route is confirmed.

The magnitude of the potential impact during construction on the temporary loss of access to grazing lands will depend on whether the works are undertaken in winter (when the land is in greater use – with possibly around 74+ herder households in the 6 km buffer zone) or in summer (when fewer herder households remain – around five households according to the ESIA survey). Dust emissions from the construction works may also further limit access to pasturelands. Taking these factors into consideration, the extent of pasturelands (officials estimate that 94.7% of the total land in the seven Project *soums* is allocated for agriculture, but used primarily for grazing) and the location of the herder households, the sensitivity of the herders is considered to be Low (summer) to Medium (winter); the magnitude of impact is considered to be Low given that the works are unlikely to be along the entire length of the OHTL route at the same time, and therefore, access restrictions and impacts will be localised and short term only. No loss of income is anticipated as a result of the temporary access restrictions. The overall significance of effect on herder land uses and access to land during construction is considered to be Negligible to Minor Adverse.

In terms of permanent loss of pastureland, the Project will result in a permanent loss of land under the footprint of the towers. Overall, 29,769 m^2 of land will be permanently lost to the Project. Some of this land is under other land uses, therefore this is a worst case scenario. In the context of the total RoW (50 m wide x 216 km long = 10,830,000 m^2), and that 97% of land in all soums is available for pastureland, the permanent magnitude of impact of the tower footprint is considered Very Low. The overall long term significance of effect on herder land uses and access to land is considered to be Negligible.

The OHTL passes across five mining licences. Of these, four are under exploration and four have no activity. Under exploration simply means that the land is being explored to see if there are valid deposits. To become operational a separate licence is required from MRAM and tends to be for a much smaller area than that issued for exploration. There are no operational mines within or near the OHTL RoW. The construction works will result in a temporary loss of access to land within these licenced areas, and the tower foundations will result in a permanent loss of land under concession, as no exploration will be possible under the OHTL. The Working Group identified that by the law the Government has the authority to appropriate land for state special purpose uses. Of the five mineral licence holders, four have provided letters informing NPTG that they have no objection to the OHTL passing through their licence area. The fifth site was subject to renewal of the licence, and the Dornogovi Governor responded in a letter dated 19 February 2021 that no mineral license will be granted along the Project OHTL route. Given the status of these licences, i.e. exploratory, and is the fact that it is not known if there are viable deposits within the affected area, their sensitivity is considered Low and the magnitude of the impact is considered Low due to the small area that would be affected under the OHTL route and the approval by the various concessionaires for the land to be used for the Project. Therefore, the overall significance of effect is Negligible.

There are also two locally protected areas, Togootliin Khonkhor (Nature and historical heritage area - 15,115.78 m^2) and Bornuruu (Special purpose - 3,443.56 m^2), within the OHTL RoW. The sensitivity of these sites is Medium as a local designation, and the impact magnitude during construction is considered Medium mainly due to the movement within the 25 m RoW during construction; therefore, the overall significance of effect will be Moderate Adverse during construction. During operation, there will be a loss of area under the Project towers; this is considered Low to Very Low (as the number of pylons in each site is not yet known) and therefore, the long term significance of effect will be Negligible to Minor Adverse.

The impacts as a result of Contractor temporary land requirements on displacement are not currently known as these sites have not yet been determined. In summary, temporary landtake and accidental damages could result in:

- Temporary loss of land or access to land / changed access to land (pastureland mainly); and
- Physical displacement of, or damage to structures (mainly herder wells) and cultural resources.

However, given the Project Area, with appropriate siting to avoid impacts, overall effects are likely to be Negligible to Minor Adverse.

10.9.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effect are set out in Table 10-13.

Table 10-13. Land use, tenure and displacement mitigation measures and residual effects

Potential impact	Mitigation measures	Residual Effects
Land use, tenure and displacement	• A line route survey is required to identify the specific location of towers. The final corridor and pylon locations should be reviewed and the assessment updated. In selecting final locations, and in the siting of any temporary sites such as camps and access road, the Project and Contractor will consult with local authorities, mining concessionaires and herders. Due attention to be given to herders owning Possession Certificates. • The Contractor should undertake a full survey along the route of the OHTL for any wells and structures that may have been omitted or relocated within the 25 m RoW since the ESIA survey. Engagement with the local government and herders is necessary, including confirmation of a cut off date (to avoid herders using the final corridor). If any relocation is necessary, a Resettlement and Livelihoods Action Plan will be prepared, affected persons will be consulted and structures will be relocated at full replacement value.	**Negligible (herders).** Overall, permanent landtake is relatively small and temporary landtake will be for the short term only. Localised access restrictions will occur during the construction phase however, this will not result in an economic impact on herders. No structures have been identified within the 25 m RoW that require relocation. Overall, the residual effects are assessed as Negligible. **Negligible (mining concessions).** As these are exploration licences, the loss of the small area under the OHTL route is not considered to materially affect potential future mining opportunities, assuming that

Potential impact	Mitigation measures	Residual Effects
	• The RoW clearance and construction works sites and timings will be announced in advance to affected land users to allow them to take adequate actions. • The timing of the works will be such to minimize impact on herders, where possible e.g. during summer months when there are fewer herders present. • The Contractor shall ensure the reuse of existing paths and tracks for access roads wherever possible. Any temporary roads should be reinstated after use. • Clearance and construction works shall be restricted to within designated working areas. • Contractor shall undertake regular watering of earth/haul roads. • A grievance mechanism shall be put in place.	exploration indicates that there are viable mining options in these areas. Provisoin of land to the project has been negotiated. **Negligible to Minor Adverse (locally protected sites).** Overall, the residual effects are assessed as Negligible to Minor Adverse depending on the location and number of pylons in relation to the designated sites.

10.10. Economy, Employment and Livelihoods

10.10.1. Scope of Assessment

The scope of this assessment includes:

- Economy;
- Employment; and
- Livelihoods.

For these topics, the AoI equates to people and groups directly affected by the Project (herders, local communities and businesses) as well as potential economic effects extending to the local, regional and national levels during construction.

10.10.2. Sources of Impact

Sources of impact on the economy, employment and livelihoods during construction include:

- Footprint requirements of the Project;
- Construction employment; and
- Demand for services and products.

10.10.3. Potentially Sensitive Receptors

Sensitive receptors during construction include:

- National, regional and local government and administrations;
- Communities living near the substations and the OHTL route in the seven soums (as identified in section 10.1.2.3 above);
- Herder households within the 6 km buffer zone of the OHTL;
- Users of summer pastures from other soums and neighbouring aimags;
- Potential workers from the Central region and/or other regions; and
- Local business and business organizations.

10.10.4. Impact Assessment

Project construction will have a number of positive national, regional and local economic and employment benefits. It will beneficially impact the national economy through import duties and value added taxes on construction supplies, and indirectly through work force income taxes and contributions to the social welfare fund, the extent to which will depend on whether a local or international Contractor will be used.

The construction phase will be in the order of 24 months and it is expected that during this time, short-term direct employment opportunities will be created. The construction workforce numbers are not currently known; the extent of local hires will depend on whether a national or international Contractor is used. It is not known at this stage if the selected Contractors will employ workers from local aimags/soums, however wherever possible

local employment will be encouraged (see section 10.3.2.5). During the stakeholder engagement undertaken for this ESIA, local communities expressed that unemployed people should be recruited for the construction phase for semi-skilled or unskilled jobs. The potential direct effects on the local economy and employment will be Positive if local employment occurs; and can be enhanced if the employment of a local workforce is maximised during construction. Hiring local workers for the construction phase would have a positive impact on workers to have secure income sources for the construction period. This will be felt most positively in Govi-Sumber *aimag* where the unemployment rate is higher; and for herder households which have reported household members of working ages who have not managed to secure jobs.

The local economy will also be positively affected by salary-based expenditure of construction employees on transport, assets, hard goods and consumables, and will provide additional stimulus to the local economy. This will be further enhanced, locally and regionally/nationally, through the demand for services and goods by the Contractor. Local benefits may be enhanced if local companies are employed during construction and local business are promoted for use by the Contractor. Particularly, purchase of meat, vegetables, milk, and dairy products that are produced locally will stimulate the local economy and local producers' income, including herders and farmers. This Positive effect would be predominantly temporary, for the duration of the construction phase.

Overall, the sensitivity of the local economy and businesses is considered to be Medium and the magnitude of impact Medium. Therefore, a Moderate Positive effect is predicted, for the period of construction in the local area and, depending on the sourcing of services and goods, a Minor Positive effect at the wider scale. In terms of employment, the local communities and businesses are considered High to Medium sensitivity, therefore with a Low magnitude of impact, the overall effect could be Moderate positive.

In terms of livelihoods, as Project construction employment will largely be of a temporary unskilled or semi-skilled nature, therefore salaries are likely to be comparable to sector averages. Construction of the Project will provide workers with the opportunity to up-skill, both through obligatory induction training included in the ESMMP and through more applied short courses in excavating, levelling, compacting and vehicle and equipment use. This training, and the subsequent experience of working on the Project, will increase the transferable skill base and future income generating prospects of employed construction workers.

In the Project Area, unemployment is generally highest amongst the young (aged 16-34) therefore the livelihood opportunities of Project construction represent significant benefits, particularly, and most directly, for Project workers and their families for whom improved financial security, extended skills and experience will be relatively quickly realised. However, the extent to which this is beneficial will depend on how many local people are employed and, overall, this impact is for the construction phase only. Receptor sensitivity is Medium due to unemployment levels and the high dependency on herding for livelihoods in the Project Area. The likely magnitude of impact during the construction phase is Medium, therefore potential effects on livelihoods will be Moderate Positive.

As identified under section 10.10.1 above, during construction herders may have temporary restricted access to pasturelands during construction. However, as livestock grazing is usually undertaken over a wide area, it is considered that herders should be able to find alternative land for the period of time during which access is restricted, and therefore no significant adverse effects on their livelihoods are anticipated.

The loss of the area under the OHTL route, where the route passes through mining concessions, will not directly affect livelihoods or employment, as these licences are exploratory and are therefore not currently generating an income. It is possible that the loss of access to this land could affect the potential for *future* economic impacts from an operational mine; however, this assumes that there are viable deposits within the RoW that would then not be accessible as a result of the Project. No applications for operational mines on these sites have been identified. Given the small area of land that would be permanently affected, overall at most a Minor effect on future income could be predicted, if there was evidence that the land to be lost would directly affect a viable deposit. For all other scenarios, a Negligible effect is predicted.

10.10.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effects are set out in Table 10-14.

Table 10-14. Economy, employment and livelihoods mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effects
Employment and economy	• A Labour Management Plan shall be prepared by the Contractor to manage labour processes.	**Moderate Positive (direct effects on the local economy and employment).**

Potential impact	Mitigation measures	Residual effects
	• Contractor shall develop a local procurement and recruitment policy that enhances purchase of local content, use of local workers and women, and promotes the use of local goods and services. • Contractor shall ensure their recruitment process is fully disclosed to the public and open to all people locally of working age and ability, including women. The process should be based on appointment by merit rather than by any political, clan, or class affiliation but should be affirmative with regard to promoting opportunities to less advantaged and more vulnerable people locally. • Contractor shall collaborate with local authorities to reduce discrimination against local workers in the community. • Contractor shall procure goods locally wherever possible, including perishable goods provided by local agricultural product producers (herder and farmers) adversely affected by the Project.	Receptor (local communities and businesses) sensitivity is high to medium and the impact can be enhanced through the proposed mitigation measures such as employing the local workforce and youth. **Minor to Moderate Positive (indirect effects on the local economy and employment).** Receptor (local businesses) sensitivity is medium. The potential indirect effects could be enhanced if local companies are employed during construction and local business are promoted for use by contractors. **Minor Positive (direct and indirect effects on the wider economy and employment).** The national receptors are of lower sensitivity and less goods are likely to be procured from sources outside the Project Area, therefore overall benefits at regional and national scales is considered minor during construction.
Livelihoods	• Contractor shall ensure employment and training of the local workforce. • Contractor shall consider possibilities of purchasing local content (preferably from the affected herder households). • A Grievance Mechanism shall be established during the construction phase to ensure that local communities and stakeholders have an adequate channel to voice concerns. This will also cover any unforeseen impacts on herder livelihoods.	**Moderate Positive (local communities).** The potential effects on livelihoods will be positive during the construction period. Through the implementation of the mitigation measures, in particular employing local people and purchasing local goods, the overall positive effect can be enhanced. **Negligible (mining).** Adverse economic impacts on Concession holders are not anticipated as a result of the Project. **Negligible (herder households).** Adverse livelihood impacts on herders (or other groups) are not anticipated as a result of Project construction.

10.11. Community Health, Safety and Security

10.11.1. Scope of Assessment

The scope of this assessment includes:

- Community health, safety and security.

For this topic, the AoI equates to people and groups directly affected by the Project (such as displacement) as well as potential effects extending to the local area in relation to construction works sites and associated facilities during construction.

10.11.2. Sources of Impact

Sources of impact during construction include:

- Construction employment;
- Construction sites and works;
- Movement of construction-related vehicles and equipment;
- Influx of construction workers; and
- Use of power, water and local services e.g. health services.

10.11.3. Potentially Sensitive Receptors

Sensitive receptors during construction include:

- Communities living near the substations and the OHTL route in the seven soums;
- Herder households within the 6 km buffer zone of OHTL;

- Users of summer pastures from other soums and neighbouring aimags;
- Livestock;
- Local road users;
- Local services; and
- Local businesses.

10.11.4. Impact Assessment

There are a number of public health, safety and security risks and impacts that need to be considered during construction, including public injuries as a result of, for example; increased road traffic; construction materials and equipment being dropped; unprotected tower base excavations (risk to children and livestock in particular); and, machinery or operator loss of control. There are also elevated risks to public health as a specific result of increased construction traffic and equipment use, including, respiratory damage from protracted vehicle idling; dust arising from clearance of the RoW; delayed treatment e.g. at local hospitals as a result of reduced emergency response times due to an increased (construction) demand on existing services; as well as increases in noise and dust levels.

As site construction works will be restricted access areas, the main source of risk of injury will be from construction traffic. These potential traffic impacts will be associated mainly with the soum communities living in close proximity to main road and near Choir substation (there are no settlements close to the proposed Sainshand substation), as it is likely that at least some equipment will be transported along the main road to reach construction work fronts; as well as herders. The Choir - Sainshand road is a national main road and therefore, increased in traffic also poses a risk of nuisance and potential accidents with all road users. Transport accidents already account for around 90% of all local accidents. Finally, livestock of herders in the rural areas around the OHTL route roam freely, providing an additional source of potential collision risk with construction traffic, depending on haul routes selected.

The impact magnitude on community health and safety is considered Medium during construction. Local communities are considered Low sensitive receptors due to their distance from the proposed works, but herders are High sensitive receptors; therefore, the significance of the effect pre-mitigation is anticipated to be Minor and Major Adverse, respectively.

The locations of temporary construction camps and roads are not yet defined however, these are unlikely to be close to the soum settlements and therefore, it is anticipated that any impacts would affect herders. The Contractor will be required to locate the construction camps and access roads across the pastureland at least 500 m from herders shelters/camps . Where possible as well, the design optimisation of the route itself and construction activities should be arranged to be at least 350 m and preferably 500 m from the nearest shelter/camp.

The movement of construction vehicles along the OHTL and along temporary tracks could also result in an increase in dust and noise, which could have an adverse effect mainly on herders. These impacts are considered in the Air Quality and Noise assessments, respectively.

In relation to safety and security, the presence of the construction workforce may lead to risks associated with ‘local influx’ if expat/or inter-regional workers move to the Project area for jobs. The number of construction workers will be employed during the construction period is not currently known, neither is the ratio between contractors and local staff. It is expected that any non-local workforce will be accommodated in temporary construction camps. Differences in access to job opportunities on the Project and access to pasturelands may also lead to discrimination, harassment, and resentments.

An influx of non-local workers could potentially cause local discomfort and nuisance, in particular presenting a risk of increased gender-based violence risks, especially to women and young girls. Workers may spend spare time on recreational activities in shops and restaurants in the Project *soums*, creating potential conflicts with local people. An influx of temporary workers and the interaction between the construction workforce and local communities may also increase occurrence of communicable diseases. This raises the risk of contracting HIV/AIDs or other STIs and the dangers this poses for the carrier’s health and that of unwitting current or future partners. The sensitivity of the local population to health impacts is Medium to High (Youth and transit populations, especially those located in larger *soums*, experience the highest incidence of STIs and incidences in the two aimags is higher than the national average, even though Govi-Sumber is ranked as the second *aimag* in the country with the least cases of STIs. In Dornogovi *aimag* STIs account for 54-55% of all infectious diseases) and the overall influx is likely to be Low, therefore the overall significance of effect is considered to be Minor Adverse.

An influx can also result in rapid changes in local demographics and put further pressure on social structures and local services, increased disturbance and pressure on natural resources due to construction activities. Given the local service facilities in the Project Area (hospitals, fire service, police), the sensitivity of these services is considered Medium and the impact Low to Medium. Overall the significance of effect on services could be Minor to Moderate Adverse.

No information on security personnel to be used by the Contractor is currently available. In the case that security personnel are deployed at construction workers camps and/or at works sites, the Contractor will be required to ensure that any private security service providers comply with Mongolian Law and have been vetted. It is recommended that a due diligence investigation for all security personnel, where used, is conducted to make sure they have appropriate licensing, experience and training for security contractors.

10.11.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effects are set out in Table 10-15.

Table 10-15. Community health, safety and security mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effects

Community health, safety and security	• Contractor shall prepare a detailed Community Health, Safety and Security Plan and a Traffic Management Plan that covers on and off construction site areas. It should include as a minimum:
	  ○ Management of haul roads, access roads and haul traffic.
	  ○ Construction vehicles to keep to agreed access routes, minimise risk and disruption road users and herders, and adhere to speed limits.
	  ○ Appropriate management of interaction of construction traffic with public road users, such as use of traffic marshals/flagmen.
	  ○ Complex traffic control to be coordinated in liaison with the Road Police.
	  ○ Construction sites and camps will be fenced off.
	  ○ Access to construction sites and facilities will be restricted to authorised personnel only.
	  ○ Equipment and materials will be properly secured. When not in use, machinery will be stored in compounds of guarded.
	  ○ Tower base excavations will be clearly marked and made inaccessible to the public.
	• Speed limits shall be imposed on construction traffic to minimise risk of accidents, especially where construction traffic is using the public road and at entrance/egress points onto the public road; and along access roads.
	• Contractor shall undertake community liaison in advance of works to ensure that the local community and road users are aware of the constructions works and associated risks. Warning signs will be erected at appropriate sites near local access roads and bagh centres.
	• All Contractor employees will be issued with a Code of Conduct addressing expectations and punitive measures concerning their discipline and behaviour (including for inappropriate sexual fraternisation) in project-affected communities.
	• Employee awareness and responsibility training (that includes instruction on sexual harassment, exploitation and abuse, conduct, and health, gender and local culture and traditions) will be included as part of the induction programme for all Contractor workers.
	• Contractor will be required to locate the construction camps and access tracks at least 500 m from herders shelters/camps in unpopulated rural areas.
	• Contractor will be required to undertake a due diligence investigation for all security personnel and organisations to be used.
	• Contractor and Project will develop and implement a fully coordinated community grievance mechanism. This will provide
		Minor Adverse (health and safety).
		With awareness programmes in place and appropriate mitigation measures to address air emissions, noise, traffic, etc. which will reduce the impact, the significance of the adverse effect will be reduced.
		Minor Adverse (safety and security).
		Even with mitigation such as the Code of Conduct and training and awareness campaigns (local communities and contractors/workers), there remains a risk in large infrastructure projects for conflict with the local community and the spread of STIs. The residual effect on the local community in terms of safety and security is Minor Adverse.
		Minor Adverse (health and demand on local services).
		The Contractor will work with local services to manage demand during the construction phase; whilst this should help manage demand on local services, inevitably there will remain an increased demand during the construction phase.

Potential impact	Mitigation measures	Residual effects
	a simple complaints and reporting procedure. This shall be widely disclosed, publicised and accessible to all community members to support the reporting and redress of any transgressions, sexual or otherwise as well as other Project grievances. • An emergency response plan will be prepared, that will take into account impacts on local communities and how local communities may need to respond in the case of an emergency. • Contractor will be required to undertake a due diligence investigation for all security personnel and organisations to be used.	

10.12. Labour and Working Conditions

10.12.1. Scope of Assessment

The scope of this assessment includes:

- Labour;
- Working conditions; and
- Occupational health and security (OHS).

For this topic, the AoI equates to employees of the Contractor and any Third Party Supply Chains.

10.12.2. Sources of Impact

Sources of impact during construction include:

- Construction employment;
- Construction sites and works; and
- Movement of construction-related vehicles and equipment.

10.12.3. Potentially Sensitive Receptors

Sensitive receptors during construction include:

- Construction workers; and
- Third party suppliers.

10.12.4. Impact Assessment

Details about the labour procedures and management, and construction camps, are not yet known. However, it is expected that the Contractor will comply with the Mongolian Labour Code and GIP and will ensure that all employees, permanent and temporary, will be provided with a contract. It is also expected that the Project will be in compliance with the Labour Code on working hours, working condition, occupational health and safety and management of non-employee relations and grievances. Where the Labour Code does not cover the full range of working conditions, GIP will be followed. If not managed in accordance with the legislation and GIP, there could be significant impacts associated with labour grievances, supply chain issues, occupational health and safety, child and forced labour.

In Central Asia, there have been cases of child labour and forced labour, which arises mainly due to the lack of supply chain monitoring. According to EBRD PR2, the Project should ensure that any risk associated with child labour or forced labour will be reduced through implementation of a series of mitigation measures.

The potential impacts on employment, labour and working conditions could be Medium risk to Project development outcomes prior to implementation of mitigation measures, resulting in a Moderate to Major Adverse effect if adverse impacts materialise. However, with mitigation in place the risks will be reduced significantly. Furthermore, female participation in the labour market is much higher than the national average of female labour force participation rate in Govi-Sumer *aimag* and therefore there are opportunities to maximise gender equality.

In relation to the workers' camps, it is expected that these will be set up and managed in compliance with EBRD/IFC *Guidance Note: Workers' accommodation: processes and standards*[176]. The conditions of the camps will be monitored regularly by the MoE/PIU. Overall, assuming that this guidance is implemented, no adverse impacts on workers' health and safety are anticipated.

In relation to occupational health and safety (OHS), it is assumed that the Contractor will have sufficient workforce and equipment to deliver the Project. However, as with all construction sites, there is a potential that workers could be exposed to an additional level of personal safety risk relating to workplace activities. The Contractor will be required to develop management arrangements and procedures to avoid hazards and, where this is not possible, mitigate the risks to workforce health and safety in accordance with the hierarchy of risk management.

The sensitivity of workers to hazards is high and the magnitude of the potential risk of the hazard occurring, prior to mitigation, is Medium to High. Should a hazard cause harm to a worker (or member of the public), the overall significance of the effect is considered Major Adverse.

10.12.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effects are set out in Table 10-16.

Table 10-16. Labour, working conditions and OHS mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effects
Labour conditions	• Contractor shall adopt Project ESMMP in line with applicable national labour laws and EBRD PR2, PR4 and general GIP. • Contractor shall prepare a detailed HR policy and Labour Management Plan, to be approved by MoE/PIU. • Contractor's HR policy and Labour Management Plan will be readily available and understandable to all employees, and set out its approach to managing employees, including rights under Mongolian labour and employment law, and employee rights to join worker organisations and bargain collectively. • Opportunities to maximise gender equality should be taken where possible by the Contractor. • A Formal Project and contractor Project labour grievance mechanism will be set up and maintained. Reporting of grievances and resolutions proposed to be reported to MoE/PIU as a minimum in monthly reports.	**Minor Adverse.** It is expected that the Contractor will be in compliance with the Labour Code on working hours, working condition, occupational health and safety and management of non-employee relations and grievances. The Contractor will also be required to ensure that labour conditions, working procedures, camp conditions and supply chain is undertaken in accordance with EBRD PR2, and this compliance will be monitored by the MoE/PIU.
Workers' camps	• Worker camps will be established in accordance with EBRD/IFC guidance: Workers' accommodation: processes and standards[177]. The Contractor will prepare for approval by PIU a Camp Management Plan prior to construction. • Code of Conduct will include measures for construction camp living. • Security shall be hired to guard camps and shall be available for prompt communication with workers. • Ensure food safety, drinking water quality and hygiene at the worker camps and impose regular control.	As above

Occupational health and safety	• Contractor management systems will follow the Project ESMS and be aligned with international standard ISO 45001 and developed in alignment with EBRD PR2 – Labour and Working conditions and PR4.
	• Contractor will provide, implement and disseminate a detailed OHS plan. Requirements to include (but not to be limited to):
	  ○ Site Rules
	  ○ Job and task specific hazard analysis and controls for all activities.
	  ○ Requirements for and enforcement of PPE use.
		Minor Adverse.
		The sensitivity of the workers to increased OHS risks is high; with mitigation measures in place, the risk should be reduced to Minor. However, in the event that an accident does occur, the effect could still be significant.

[176] EBRD/IFC (August 2009), Workers' accommodation: processes and standards. A guidance note by IFC and EBRD. Available at: https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_gpn_workersaccommodation
[177] Ibid.

Potential impact	Mitigation measures	Residual effects
	○ Safety training for personnel. ○ Develop and implement an emergency response procedure. ○ Maintain statistics of total work hours, lost time, incidents, injuries, near misses etc. ○ Toolbox talks to share information on risks, accident prevention, etc. ○ Ensure no prohibited materials such as asbestos containing materials (e.g. pipes) are procured or used. • Contractor will provide, implement and disseminate a detailed Emergency Preparedness and Response Plan detailing preventative measures for all types of incidents covered in the plan. This plan should be developed and implemented in liaison with local community members, authorities and emergency services, and cover the requirements of PR4. This Plan be in place prior to construction commences on site. It should include as a minimum: ○ Identification of potential emergencies and risk assessments e.g. spills, fires, collisions, worker injury ○ Roles and responsibilities ○ Development of procedures to respond to identified emergencies ○ Equipment required e.g. first aid facilities, firefighting equipment, etc. ○ Testing and inspection regimes for emergency equipment ○ Muster points. evacuation routes ○ Training requirements ○ Communication protocols to workers, public and other affected parties ○ Location of nearest medical facilities ○ Update and review cycle	

10.13. Cultural Heritage

10.13.1. Scope of Assessment

The scope of social impacts assessment includes:

- Cultural heritage.

For this topic, the AoI equates to the 6 km buffer zone around the OHTL route.

10.13.2. Sources of Impact

Sources of impact during construction include:

- Footprint requirements of the project;
- Construction working areas including any temporary or permanent access roads; and
- Movement of construction-related vehicles, equipment and personnel.

10.13.3. Potentially Sensitive Receptors

Sensitive receptors during construction include:

- Tangible cultural heritage (known and unknown); and
- Intangible Cultural Heritage.

10.13.4. Impact Assessment

Tangible Cultural Heritage

Physical impacts include, among others, the partial or total removal of a cultural heritage receptor, damage to a cultural heritage receptor from construction related vibration or the burial of a receptor under spoil created by construction. Physical impacts are typically irreversible and are largely contained within the footprint of the

Project. However, construction vibration can affect cultural heritage receptors at a distance from the construction site and any haul routes.

All Project works that involve earthworks may potentially result in physical damage to previously identified or unidentified tangible cultural heritage sites (both archaeological objects and sacred sites), and (or) loss or limitation of access to sacred sites.

Potential physical damage to both identified and unidentified tangible cultural heritage can be also caused by the presence of non-local workforce during transmission line construction, for example through accidental damage, moving of machinery or HGVs in non-designated areas, etc.

Identified tangible cultural heritage

The ESIA team identified one tomb/burial place of unknown age within the Project Area that could potentially be affected by the footprint or proposed temporary works areas; further survey is required by a specialist to confirm the nature of this feature and any mitigation measures required.

Five locally protected sites are located 3-4 km away from the OHTL route centreline, and therefore are considered to not be affected by the Project. However, this will depend on the siting of haul roads and other temporary land take requirements, that should avoid these sites.

These sites of tangible cultural heritage are considered to be of Medium sensitivity and subject to Low risk of impact, therefore the significance of the effect on known tangible cultural heritage is considered to be Minor Adverse; this would, however, need to be reviewed following survey of the burial place identified.

Unidentified tangible cultural heritage

A detailed survey of the entire OHTL route has not been undertaken. Since unidentified buried objects or features of cultural significance might potentially be found during the construction works, a Cultural Heritage Chance Finds Procedure will be implemented for all areas where earthworks will take place. This procedure will provide detailed step-by-step guidelines in case unexpected identification of any previously unidentified buried objects or features of cultural significance.

The overall effect on unidentified buried tangible cultural heritage is considered likely to be Minor Adverse, provided that a Chance Finds Procedure is followed. However, as a detailed survey has not been undertaken, this would need to be reviewed following survey.

Intangible Cultural Heritage

Intangible cultural heritage is a practice, representation, expression, knowledge, or skill, as well as the instruments, objects, artefacts, and cultural spaces that are considered to be part of a place's cultural heritage. Intangible cultural heritage in the context of the Project could be affected by the disturbance to traditional lifestyles due to the influx of non-local workforce during the construction works. This could potentially lead to tensions/conflicts between workers and the host population, especially nomadic herders. However, in the scope of the Project, the presence of significant intangible cultural heritage is Low and therefore the effect on intangible cultural heritage is considered to be Minor Adverse.

10.13.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effects are set out in Table 10-17.

Table 10-17. Cultural heritage mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effects
Cultural heritage	• Hire professional organization to conduct archaeological and paleontological survey prior to construction, including burial place identified. For any sites identified, the measures proposed by the professional organization will be implemented; this may include optimisation of the route to avoid the site; or if this is not possible, removal/relocation of the object in liaison with the relevant parties. • Contractor will put in place a Chance Finds Procedure and conduct training in its implementation. • Code of Conduct will include prohibiting worker interaction with cultural heritage. • If chance finds occur construction works shall be stopped immediately, and the *soum* Governor, the police and the	**Minor Adverse.** Whilst the unanticipated discovery of previously unknown cultural resources during construction could have a permanent impact, this will be mitigated through survey work and implementation of the Chance Finds Procedure.

Potential impact	Mitigation measures	Residual effects
	relevant authorities notified; and hire professionals to identify the findings. • Contractor will organize training among construction workers and supervisors to raise awareness on cultural heritage. • Contractor will fence off any areas that require protection during construction works, with access provided for locals where applicable. • Contractor will minimise publication of details on known cultural heritage resources to prevent theft or damage to sites, unless based on the advice of specialists.	

11. Operation Impacts and Mitigation Measures

11.1. Introduction

This Chapter presents the potential operation impacts, effects and proposed mitigation measures for significant adverse effects. The majority of impacts during operation will be positive since the Project aims to ensure reliable energy supply, extend the power transmission network to meet the growing electricity demand in the south-east region of the country, improve access to renewable electricity supply, and ensure the development of other sectors in the Project Area.

For each topic, the following is discussed:

- Scope of assessment;
- Sources of impact;
- Potentially sensitive receptors;
- Potential impacts; and
- Mitigation measures and residual effects.

11.2. Terrestrial Biodiversity, Flora and Fauna

11.2.1. Scope of Assessment

This scope of this assessment covers:

- Indirect potential impacts to large mammal species from the OHTL operation; and
- Collision and electrocution impacts to bird species during OHTL operation.

Impacts to vegetation species are scoped out of the operation assessment. The only potential impact from the operation is the occasional clearance of vegetation and disturbance from access for O&M activities, however, given that the area is currently grazed by livestock any O&M activities are considered to be indistinguishable from the baseline condition.

11.2.2. Sources of Impact

The operation activities that could potentially impact large mammal and bird species include:

- Presence of linear infrastructure; and
- Presence of high voltage OHTL in the landscape.

11.2.3. Potentially Sensitive Receptors

Sensitive receptors during operation include:

Mammals:

- Goitered gazelle (*Gazella subgutturosa*). Both IUCN and Mongolian Red List ‘Vulnerable’ category species; and
- Mongolian gazelle (*Procapra gutturosa*). Mongolian Red List ‘Endangered’ category species.

Birds:

- Swan goose (*Anser cygnoid*). IUCN Red List ‘Vulnerable’ category species;
- Great bustard (*Otis tarda*). IUCN Red List ‘Vulnerable’ category species;
- Steppe eagle (*Aquila nipalensis*). IUCN Red List ‘Endangered’ category species;
- Saker falcon (*Falco cherrug*). IUCN listed ‘Endangered’ and Mongolian Red List ‘Vulnerable’ category species;

- Cinereous vulture (*Aegypius monachus*). IUCN Red List 'Near-threatened' category species; prone to OHTL collision and electrocution and present in high numbers;
- Tree pipit (*Anthus trivialis*). Mongolian regulatory designated 'Rare' bird;
- Pallas's sandgrouse (*Syrrhaptes paradoxus*). Most common and vulnerable species to OHTL collision in the Project Area; and
- Oriental plovers (*Charadius veredus*). Species of socio-economic value. Prone to OHTL collision.

11.2.4. Impact Assessment

11.2.4.1. Large Mammals

Linear infrastructure can result in the fragmentation of habitats for large mammals, either by serving as physical barrier. For example, the barbed fenced trans-Mongolian railway in the Project Area acts as complete physical barrier to many steppe ungulate species such as Mongolian gazelle, Goitered gazelle and Asiatic wild ass (Payne and Kaczensky 2016). Increased access to wildlife habitats that are enabled by infrastructure development projects can also create direct or indirect potential impacts such as increased hunting/gathering or habitat avoidance by wildlife.

A total of 663 tower are planned to be constructed along the 220.2 km powerline and the average distance between adjacent towers will be about 325 m depending on the distance between wires, which will be determined to meet the minimum clearance distance of at least 7.5 m to account for wire sag. Wildlife may avoid crossing the powerline corridor initially due to the presence of new infrastructures and potential noise from live conductors, but over time they will get used to it and cross the area, as it has been the case for steppe ungulates in Mongolia. In addition, the Project landscape is relatively flat with traffic access from all directions, therefore any permanent maintenance roads maintained for the operation period are unlikely to create a barrier to movement or result in increased disturbance.

Based on the current land use and existing infrastructure presence in the Project Area, it is considered that the operation of the Project will have a Negligible impact on habitat fragmentation and habitat avoidance for sensitive mammal receptor species, thus no mitigation actions are required.

11.2.4.2. Bird collision and electrocution risk

Impacts to birds during Project operation will mainly be limited to collision and potential electrocution with the overhead line. Bird mortality due to collision with powerlines and electrocution by powerlines has been well documented globally (Bernardino et al. 2018) and in Mongolia over the years (Dixon et al. 2013; Dixon et al. 2017; Dixon et al. 2018; Nyambayar et al. 2019).

Some species are more vulnerable to powerline collision than the others due to their body size and flight behaviour. A survey in 2019 on nationwide avian collisions with powerline in Mongolia shows different species mortality in various geographical region in the country. According to this study the species most vulnerable to powerline collision were small passerines and sandgrouse in the open steppe areas in south-east and eastern of Mongolia (Nyambayar et al. 2019). It is known that large bird species are susceptible to collision due to their large body size and low manoeuvrability (Avian Power Line Interaction Committee, 2012). The observed high rates of collision with powerlines by small bird species in Mongolia are attributed to the seasonal abundance and flight behaviour (Nyambayar et al. 2019). For example, about 5,000-7,000 individuals of Pallas's sandgrouse were estimated to be killed in 2019 (Nyambayar et al. 2019) from medium voltage (i.e. 15 kV) distribution powerline collisions in the Dalanjargalan *soum* alone, which the Project crosses.

Bird collision mortality rate also varies across different powerline types and seasons in Mongolia. For example, 220 kV lines had the highest mortality rate per km distance during both spring (0.056 collision/km) and autumn (0.326 collision/km) seasons compared to 35 kV and 110 kV powerlines collision rates that ranged 0.004 to 0.032 collisions per km (Nyambayar et al. 2019).

The nationwide survey in Mongolia also observed that Saker falcon, a sensitive bird species for this assessment, was the third common bird species to nest on high voltage powerlines after common raven and upland buzzard (Nyambayar et al. 2019). Increased nesting of birds on the powerline may also result in collision risks as nesting birds are likely to spend more time close to the powerlines than birds that do not nest close by.

Vulnerable bird species to collision for the Project include Oriental plover, due to its unusual display flight; and Pallas's sandgrouse, due to their abundance in the Project Area and their behaviour of flying at low altitudes in large groups. Collison mortality risks involving Saker falcon, Steppe eagle, Cinereous vulture, Oriental plover and Tree pipit are not reported by the available studies in Mongolia. Powerline collision risks to the sensitive

receptor bird species, without mitigation measures, could potentially cause measurable loss of the regional population, thus the impact magnitude is considered Medium.

High sensitivity is assigned to Saker falcon and Steppe eagle due to these species having Endangered status in IUCN Red List. All other sensitive bird species (Swan goose, Great bustard, Pallas's sandgrouse, Oriental plover, Cinereous vulture and Tree pipit) are given a Medium sensitivity due to their national designation as rare or stakeholder perception considering their vulnerability to powerline collision. Without appropriate mitigation measures in place the Project could cause Moderate (Swan goose, Great bustard, Pallas's sandgrouse, Oriental plover, Cinereous vulture and Tree pipit) to Major (Saker falcon, Steppe eagle) Adverse impacts to the sensitive bird species.

The spring bird survey observed only one individual each of the IUCN EN category (Saker falcon and Steppe eagle) species, at VP6 and VP17 respectively. A total of four species of regionally and/or globally threatened species were recorded during the autumn bird survey (Saker falcon and Steppe eagle (IUCN EN category), Swan goose (IUCN VU category) and Great bustard (IUCN VU category)) were recorded. Detailed information is given on each threatened species as follows:

Saker Falcon (*Falco cherrug*)

A total of six individuals were recorded on six occasions at VP6, VP11, VP12 and VP18. Three birds' flight height was recorded between 0-10 m, while two birds' flight height was recorded between 30-40 m and one bird was seen while perching on the ground.

Steppe Eagle (*Aquila nipalensis*)

A total of seven individuals were recorded on seven occasions at VP10, VP11, VP14, VP15 and VP16. Almost all birds' flight height was recorded above 50 m, while one bird's flight height was recorded between 10-20 m. This species is regarded as a passage migrant for the Project Area.

Swan Goose (*Anser cygnoid*)

A flock of 41 individuals were observed flying south-east above 50 m flight height at VP8. Although three other occasions of migrating geese (n=130) were observed during the autumn field survey, it was too far to identify them to species level. These were also flying south-east above 50 m flight height.

Great Bustard (*Otis tarda*)

A single male individual was seen at a location (N 46.05075/E 108.52874) 1.5 km from the proposed 220 kV transmission line route and 3.5 km from VP4 to the south during non-vantage point effort. This bird was doing its southward migration and stopping over at the location. No other Great bustards were sighted during the entire survey. This suggests that this species passes through the study area in low numbers.

The spring bird survey estimated flight heights of 810 individual birds from 35 species for 406 occasions. According to this estimate, over two third (68%) of the total observed bird flights recorded were up to 25 height from ground surface, while about one fifth (21%) were recorded flying at 25-50 m. The number of birds observed flying more than 50 m height was lower, about 11% of the total observations. About three quarters (74%) of the non-passerine birds' flight height was up to 25 m, while nearly all (93%) of the passerine birds were observed flying in the same height category (Figure 11-2). Raptors species flight heights recorded in all flight height bands without such high variation, however it should be noted that only five individual raptor species were recorded.

The vast majority of Pallas's sandgrouse flight heights were recorded between 0-24m height (90%), while most of Cinereous vulture flight heights were recorded above 50 m (55%). For Oriental plover, most flight heights were recorded between 25-50 m (same level as the power line).

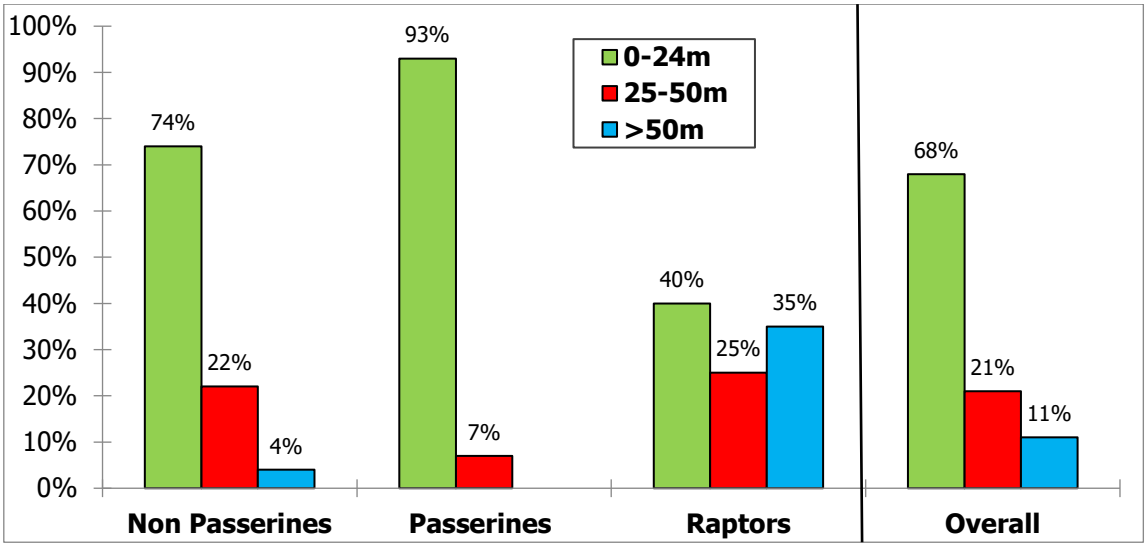

Figure 11-1. Flight height analysis of recorded birds (2020 Spring survey)

During the autumn bird survey, flight heights of a total of 3,776 individual birds from 28 species at 400 occasions were estimated. Compared to the Spring bird survey results, the number of occasions was similar, whereas there was a large difference in the total number of individual birds observed. This dramatic increase was caused by several species, such as Pallas's sandgrouse, Mongolian lark and Horned lark, that formed relatively large flocks in post-breeding season.

For all species, 33% (n=131) of the total birds' flight height were recorded between 0-10 m height, 42% (n=170) of the total birds' flight height were recorded between 10-40 m (three height bands combined) and remaining 25% (n=98) of the total birds' flight height were recorded between 40-50 m and above 50 m.

For non-passerine[178] and passerine species, the majority of the birds' flight height was recorded between 0-10 m height making up 42% (n=26) and 35% (n=77) respectively, while the most flight heights of raptors were recorded above 50 m. Overall, 58% of the birds' flight height was recorded below and above projected power line wire height, while 42% of the birds' flight height was recorded in 10-40 m or at the same level with the power line.

The majority of Pallas's sandgrouse flight heights were recorded between 0-10 m height (51%), while most of Cinereous vulture flight heights were recorded above 50 m (56%).

[178] Non-passerine refers to all other species except passerines and raptors.

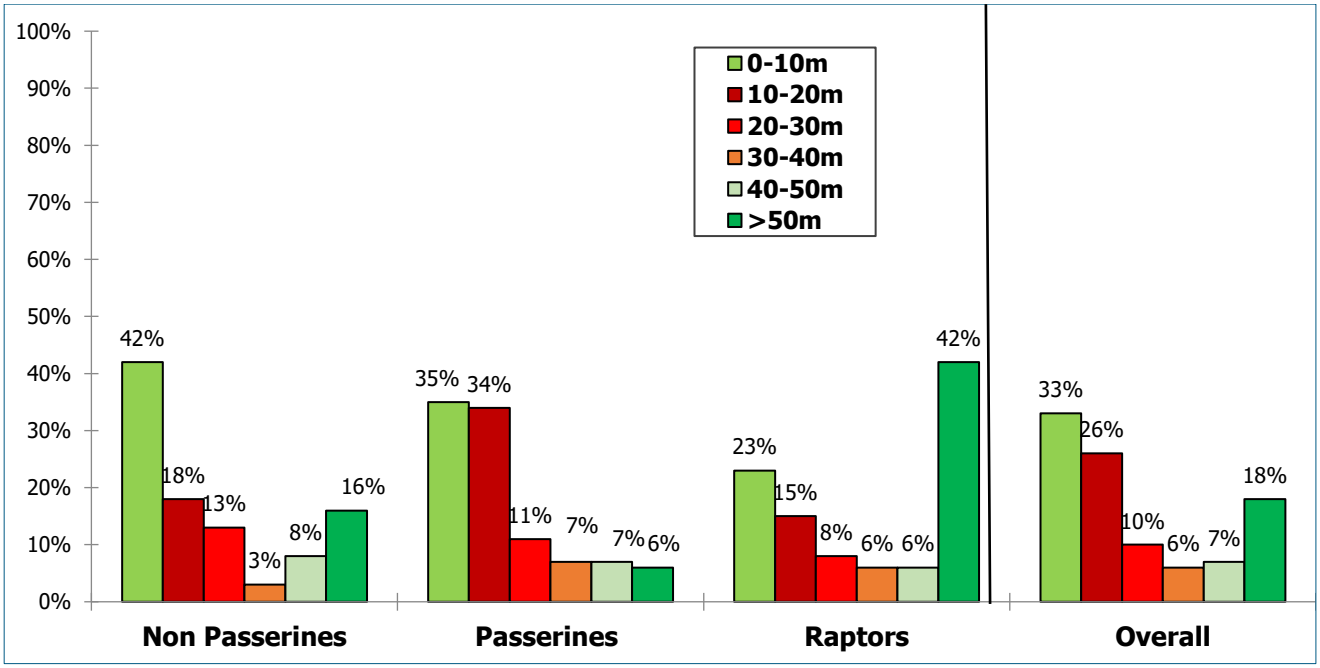

Figure 11-2. Flight height analysis of recorded birds (2020 autumn survey)

Heights of the various powerline tower conductor wires are estimated[179] to range between 10.5 m and 41 m (Figure 11-3). The OHTL will use OPGW-09A4 type earthing wires with 11 mm diameter and LGJ400/50 type conductor wires with 28 mm diameter. The earthing wire height zone will 32-41 m and this height interval is considered a high risk collision zone as earth wires have been shown to account for the majority of collisions involving transmission lines. For example, of a total of 208 bird collisions observed through systematic observations of flight behaviour, 84% involved earth wires and only 16% involved conductors (Bernardino et al. 2018). Experimental evidence demonstrates that removal of earth wires reduces bird collision by 48-78% demonstrating the relative risk of earth wires posed to birds (Bernardino et al. 2018). Reasons for this high percentage of collision risk involving earth wire are believed to be due to the relative thinness of the earthing wire compared to wider diameter conductor wires reducing the bird species detection ability.

[179] Estimated from technical drawings provided by the Project Feasibility study team

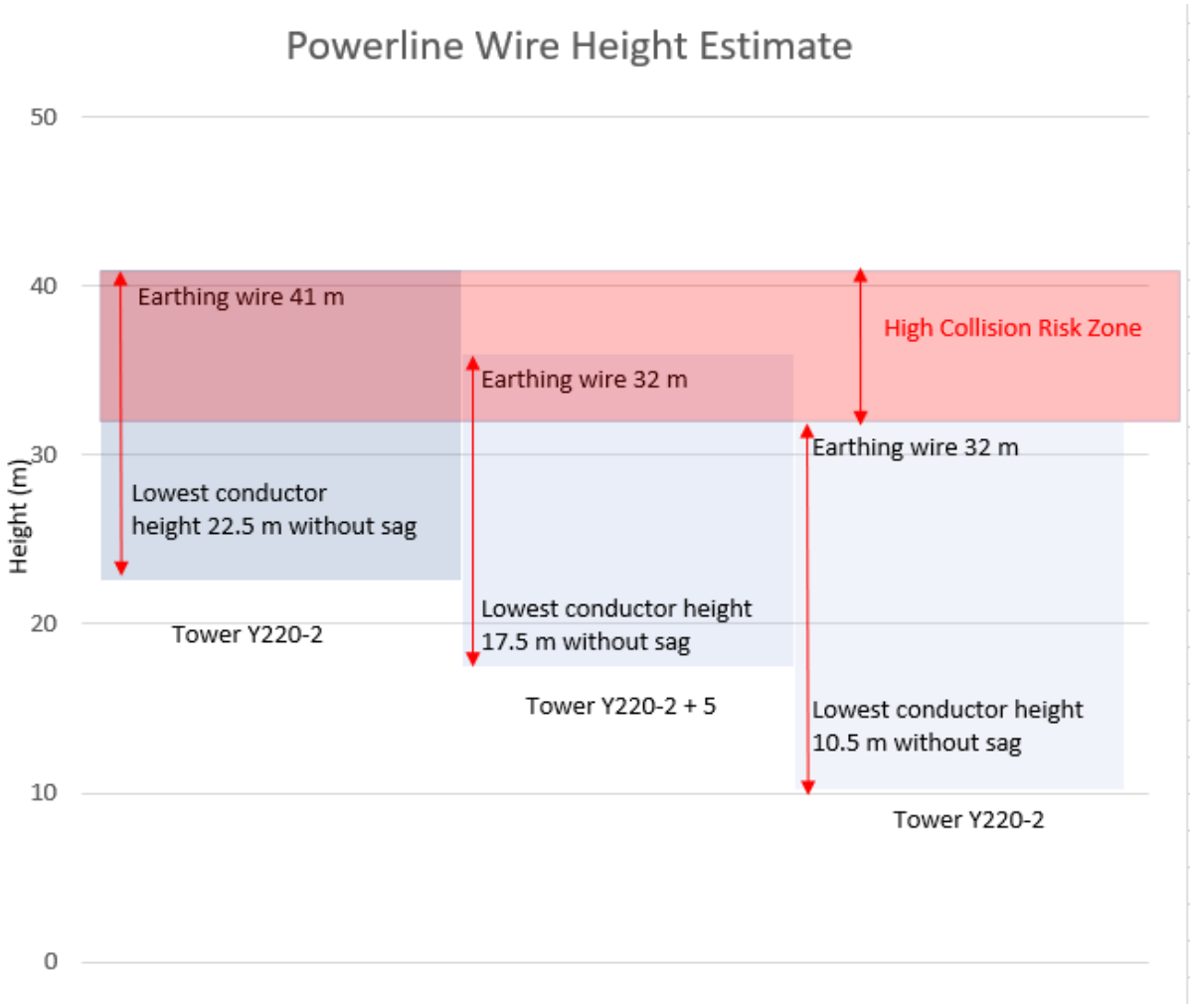

Figure 11-3. Wires heights of proposed OHTL towers

Heights of the planned towers' conductor wires and the observed flight heights of the common bird species overlap under the 50 m zone (i.e. within the 25-50 m flight height band used in the spring bid survey and the 30-50 m flight height band used in the autumn bird survey), including the high risk earth wire zone, and it is likely that there will be a collision risk associated with the OHTL during operation.

Therefore, the spring bird survey result suggests that impacts due to collisions with overhead wires at 25-50 m could occur to 21% of all observed species, 7% of passerines, 22% of non-passerines requiring appropriate mitigations measures. Key areas where this is of higher concern are Oriental plover display sites (VP2, VP6, VP14-VP17) and areas with high number of Pallas's sandgrouse (VP5-VP7, VP10-VP12, VP15-17).

The autumn bird survey results suggest that impacts due to collisions with overhead wires at 30-40 m could occur to 13% of all observed species, 14% of passerines and 11% of non-passerines; requiring appropriate mitigations measures. Key areas where this is of higher concern are areas with high numbers of Oriental plover (VP16), Pallas's sandgrouse (VP6, VP8, VP11, VP16-18, VP20 and VP22) and migrating/foraging Cinereous vulture (VP6, VP10, VP12 and VP16) have been recorded.

Impacts during both spring and autumn could be worse during times of low visibility (such as dust storms) and at night time.

Overall, the areas which are considered to be sensitive in terms of potential collision with overhead powerlines, due to the presence of IUCN globally threatened species, Oriental plover display sites and high numbers of species prone to OHTL collision are VP6, VP8, VP10-12, VP14-18, VP20 and VP22.

Whilst bird collision is a particular risk associated with high voltage transmission powerlines, the low voltage distribution powerlines (i.e. 6 kV, 10 kV and 15 kV distribution lines) pose a higher electrocution risk to bird species in Mongolia. For example, concrete poles with grounded crossarms and older wooden poles with earthing had higher rate of electrocution in Mongolia than other safer designs such as suspended insulators (Harness et al. 2008). Dixon et al. (2013) noted that the upright pin-insulators on earthed crossarms and the use of jump wires that passed over crossarms via pin insulators on anchor poles on the low voltage powerlines were the main design flaws for raptor electrocution in China and Mongolia. Instances of electrocution of birds along power lines due to simultaneous contact with conductors is avoidable by spacing conductors sufficiently far apart. Other sources of electrocution can also be avoided by implementing modern design and construction methods (e.g., Dixon et al. 2018). The electrocution risk from the proposed 220 kV power line is considered to be Negligible due to the design proposed, that provides sufficient distance between the live wires and earthing of the line.

11.2.5. Mitigation Measures and Residual Effects

Various visual structures (known as bird flight diverters) can be placed on the OHTL wires to divert birds from a collision path of flight. The most common visual markers are large PVC ‘spirals’, while 'flappers' provide both visual and auditory deterrent. PVC spirals alone have been shown to reduce bird collision mortality by up to 81% (Guyonne and Ferrer, 1998), flappers on their own have been shown to reduce bird collision mortality by 60-63% (Brown et al. 1995 and Yee 2008), and flappers added to spirals have been shown to reduce bird collision mortality by an additional 52% (Anderson 2002).

Spiral type diverters are more suitable in Mongolian condition in terms of failure rate than the flapper type as it has been observed on 220 kV powerlines in similar environmental conditions (Dashnyam B et al. 2016). The use of diverters will reduce the collision risks, however, it is unlikely to eliminate the risks completely.

It is important to identify priority areas where the bird diverters will be most efficient to avoid sensitive bird species collision with the OHTL, instead of installing diverters along the entire line length. For the Project, it is tentatively proposed to provide spiral diverters, flappers and deflectors to mitigate the collision risk.

From the spring survey, areas around the VP02, VP06, VP14 - VP17 and three areas between VP5-VP7, VP10-VP12, VP15-17 were identified as for potential collision risk areas for Oriental plovers and Pallas’s sandgrouse, respectively. The autumn survey identified potential collision risk areas for Oriental plovers and Pallas sandgrouse at VP8, VP16-18, VP20 and VP22. Additional potential collision risk areas for were identified at VP6, VP10, VP11-12 and VP14-15. See Table 11-1 for a list of the high risk areas and the sensitive species and season present.

Table 11-1. High risk areas and species/season present

High risk areas	Species / season
VP06	Oriental plover (spring); Saker falcon (spring/autumn); Cinereous vulture (autumn)
VP08	Pallas’s sandgrouse (spring/autumn); Swan goose (autumn)
VP10	Steppe eagle (autumn); Cinereous vulture (autumn)
VP11	Saker falcon (autumn); Steppe eagle (autumn)
VP12	Pallas’s sandgrouse (spring); Saker falcon (autumn); Cinereous vulture (spring/autumn)
VP14	Oriental plover (spring); Steppe eagle (autumn); Cinereous vulture (spring)
VP15	Oriental plover (spring)
VP16	Oriental plover (spring/autumn); Pallas’s sandgrouse (autumn); Steppe eagle (autumn); Cinereous vulture (spring/autumn)
VP17	Oriental plover (spring); Pallas’s sandgrouse (autumn); Steppe eagle (spring)
VP18	Pallas’s sandgrouse (autumn); Saker falcon (autumn)
VP20	Pallas’s sandgrouse (spring/autumn)
VP22	Pallas’s sandgrouse (autumn)

Future monitoring will be required to assess the effectiveness of the mitigation actions and revise if necessary.

A summary of the mitigation measures and residual effects for collision risk are provided in Table 11-2.

Table 11-2. Bird collision impact mitigation measures and residual effects

Potential impact	Additional Mitigation measures	Residual Effect
Bird collision	• Provision of best-design bird flight diverters on conductors and earth wires following manufacturers recommendations for spacing. Current locations proposed for these are: ○ Oriental plover display sites (VP02, VP06, VP14-VP17); ○ Pallas sandgrouse habitat areas (VP5-VP7, VP8, VP10-VP12, VP15-18, VP20, VP22); ○ Saker falcon sensitive sites (VP6, VP11-12, VP18); ○ Steppe eagle sensitive sites (VP10-11, VP14, VP16-17); ○ Cinereous vulture sensitive sites (VP6, VP10, VP12, VP14, VP16); and ○ Swan goose sensitive sites (VP8). • Engage with qualified bird specialists to undertake routine monitoring of powerlines for bird carcasses and to design alternative adaptive management measures to increase bird diverter placement or other measures in areas with high mortality rates. • Monitor Saker falcon and Steppe eagle species nests on the powerline towers and construct alternative structures for nesting if the nests on the OHTL become a collision risk issue.	**Minor to Moderate Adverse.** Whilst the measures will result in a reduced risk of collision, studies show that these can be effective to around 80%. Therefore, there remains a risk of bird collision as a result of the Project.

11.3. Noise and Vibration

11.3.1. Scope of Assessment

The scope of the noise and vibration assessment covers:

- Potential noise effects on NSRs during operation from OHTL and substation operation.

The AoI has been determined based on the extent of the area where changes in noise and vibration over existing ambient levels of noise and vibration could affect NSRs.

11.3.2. Sources of Impact

Noise can be generated from the Project from the following sources:

- Overhead line operation;
- Wind blowing through conductors and other structures;
- Substation equipment; and
- Routine and non-routine maintenance.

11.3.3. Potentially Sensitive Receptors

NSRs during operation include:

- Herder households who camp near the OHTL corridor on a permanent or seasonal basis;
- Flora and fauna, including livestock; and
- Businesses near Choir substation (no businesses or local community are located within proximity to the Sainshand substation).

11.3.4. Impact Assessment

Under certain conditions, the localized electric field near energized components and conductors can produce an electric discharge that causes the surrounding air molecules to ionize and be subject to a localized change of electric charge (called the “corona effect”[180]). The Corona effect can result in localised noise effects, though

[180] For the avoidance of doubt, this has no relation to the COVID-19 virus, also referred to as the Corona Virus.

Utility companies try to reduce the amount of corona because in addition to the noise that results, corona is a power loss, and in extreme cases, it can damage system components over time.

Conductors are designed to operate below the inception level for corona discharge; however, surface contamination or accidental damage to a conductor can cause local enhancement of electrical stress, leading to the discharge activity and subsequent generation of noise.

The corona effect depends on the voltage, density and humidity of the air, spacing and diameter of conductors, and smoothness of the conductor surface. Corona discharge occurs on all types of overhead lines, but it becomes more noticeable at higher voltages. In a review of previous measurement studies, Al-Faraj *et al* (1997)[181] presented data from surveys on 345 kV and above test lines. The results of the study, and of similar studies demonstrates that at 15-20 m from the conductors the noise level is well below 50 dB(A) and corona noise only becomes a noticeable phenomenon at approximately 350 kV and above.

Along the OHTL, the only NSRs are herder households and their livestock. However, the noise produced by the corona effect is not considered significant for the Project, provided that the design of the OHTL will adopt the best available techniques to prevent and minimise the corona effect.

Aeolian noise appears with high wind blowing at very specific angles of incidence and it is caused by the pressure fluctuations from the separation of vortexes in the vicinity of an obstacle having certain geometric properties. The noise produced is typically a pure tone of relatively low frequency.

The conditions that give rise to aeolian noise will in most instances also mask the aeolian noise. Aeolian noise is not generally not been perceived as a significant source of noise impact, however, in specific circumstances, which include areas with frequent high wind conditions (above 10 m/s) and presence of sensitive receptors, it may cause significant impacts and require the adoption of mitigation measures such as using spiral rods instead of the standard straight rods or dampeners attached to line. Along the OHTL, the only NSRs are herder households and their livestock. Assuming the design takes these considerations into account, no significant effect on noise from aeolian noise are considered likely.

At the substations several equipment may produce audible noise effects, in particular the transformers. Transformers emit low frequency tonal noise subharmonics of 50 Hz which could be cause of annoyance to nearby NSRs. If receptors are located < 100 m from the substation boundary, noise level caused by the transformers should be verified and if necessary mitigated. However, as Choir is an existing substation and as GIP will be used for the new Sainshand substation, and the nearest NSR is xx km away, no significant adverse effects are anticipated.

11.3.5. Mitigation Measures and Residual Effects

The supplementary mitigation measures and resulting residual effects are set out in Table 11-2.

Table 11-3. Noise management mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effect
Noise impacts	• Design of the substation and OHTL to GIP. Equipment should be chosen to comply with national and international WHO noise regulations. Any generators should be fitted with silencers. Other noise emitting equipment should be fitted with silencers or housed appropriately to avoid excessive noise emissions. • If noise complaints are received in relation to the substations, the noise level caused by the transformers should be verified and, if necessary, mitigated e.g. through noise control at source or at the NSR. • Equipment should be kept well maintained and in good working order.	**Negligible.** Assuming design to GIP and the location of NSRs in relation to the operational infrastructure, no significant adverse effects on NRSs are anticipated.

11.4. Waste Management

11.4.1. Scope of Assessment

The scope of assessment includes:

- Potential waste streams likely to be generated during O&M; and

[181] Available at: https://ieeexplore.ieee.org/abstract/document/656748. Accessed May 2020.

- Impacts associated with waste management, including disposal and capacity of existing waste management facilities.

The AoI for waste in operation is substations, OHTL line and the landfill sites and hazardous waste facilities to account for any potential facilities receiving waste from O&M activities.

11.4.2. Sources of Impact

During operation, the source of impact will be O&M activities, mainly at the substations.

11.4.3. Potentially Sensitive Receptors

Potentially sensitive receptors include:

- O&M workers;
- Project and third-party waste facilities;
- Herder households along the OHTL route;
- Flora and fauna (including livestock);
- Surface water bodies and ground water; and
- Soils.

11.4.4. Impact Assessment

The nature of routine O&M and repair works during the operational phase is unknown at this stage, therefore the volume of expected operational waste cannot be calculated.

Solid wastes may arise during O&M of the overhead lines in the form of vegetative matter (occasional clearance of the RoW), packaging materials, damaged or broken cables, conductors and insulators. Accidental spills may also occur of oil, fuel or paints.

The operation of the substations will generate wastes including transformer oils, waste materials from site maintenance and domestic waste including paper and food waste. Accidental spills may also occur of oil, fuel or paints.

There are potentially a number of risks to human health and the environment that may be associated with the handling, storage and disposal of waste, or lack of collection of waste. Incorrect handling and storage could result in possible cross contamination, wind-blown litter, and contamination of air, soil and water resources; as well as direct and indirect effects on human health (workers and the local community) and fauna (including livestock).

As identified for construction, there are no licensed landfills or hazardous waste management facilities in the Project Area, and therefore wastes will need to be disposed of to a designated site approved by local authority (permit shall be obtained as necessary).

The generation of wastes from the overhead lines is considered to be minimal, however, taking into account wastes from the substations and that humans are considered to be receptors of High sensitivity and the environment, Medium, without appropriate mitigation measured in place, the magnitude of the impact could be Low Medium, resulting in a Minor (Environment) through to Major (Humans) Adverse effect without mitigation.

11.4.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effects are set out in Table 11-3.

Table 11-4. Waste management mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effects

O&M wastes	• Development and implementation of an O&M Plan that addresses waste management from maintenance activities.
	• Waste management procedures for O&M should include:
	  ○ provision of regular training for staff on recycling and waste reduction and the practices necessary to minimise waste and facilitate good practice waste management.
	  ○ Provision of a dedicated area for the storage of hazardous waste arisings.
		Minor Adverse.
		With appropriate storage, handling and disposal options in place, the overall effect should be Minor.

Potential impact	Mitigation measures	Residual effects
	○ Recycling of vehicle and plant maintenance waste i.e. oil or grease contaminated filters and recycling or re-use of empty chemical containers or bags. • Removal of hazardous waste by a specialist licensed company.	

11.5. Land Use

11.5.1. Scope of Assessment

The scope of the assessment includes:

- Land use.

Land tenure and displacement impacts were considered in Chapter 10.

The AoI for the operation phase covers people and groups directly affected by changes in land uses as a result of the Project, covering land uses within the 25 m RoW from the centreline and an additional buffer zone of 6 km.

11.5.2. Sources of Impact

Sources of impact on land use during operation include:

- Permanent footprint of the Project, including the RoW; and
- O&M activities such as clearance of the RoW.

11.5.3. Potentially Sensitive Receptors

Sensitive receptors during construction include:

- Communities living near the substations in Choir and Sainshand cities and the OHTL route in the seven soums, in particular communities in Bagh IV in Sumber soum of Govi-Sumber aimag, Bagh II in Shiveegovi soum of Govi-Sumber aimag; Bagh V in Dalanjargalan soum of Dornogovi aimag; Baghs I and III in Airag soum, in Dornogovi aimag; Bagh III in Saikhandulaan soum of Dornogovi aimag; Bagh III in Altanshiree soum in Dornogovi aimag; Bagh IV in Sainshand soum of Dornogovi aimag;
- Herder households with permanent structures in the 6 km buffer zone of the OHTL;
- Users of summer pastures from other *soums* and neighbour *aimags*; and
- Mining concessionaires.

11.5.4. Impact Assessment

The Project will result in a permanent change of land use for eight mining concession licences where the licenced land falls within the OHTL RoW. The permanent loss of land use under the OHTL route, where the route passes through mining concessions, will not directly affect the whole area of the licence. The overall significance of effect on this land use is considered Negligible given the small area of land affected and given that there are no operational licences in place or under application and that agreements have been reached with the concessionaires.

The Project will also result in a permanent loss of land within two locally protected areas, Togootliin Khonkhor and Bornuruu; however, the total footprint area of the towers is considered very low and therefore the overall significance of effect on this land use is considered Negligible.

No permanent structures will be allowed to be erected in the RoW, however grazing of livestock is permitted within the RoW, and therefore, no adverse effects on grazing land uses are anticipated. Occasional clearance of the RoW may be undertaken, which could affect access temporarily.

During the stakeholder engagement, it was identified that there is a shortage of pastures in the Project Area due to overgrazing, lack of water supply points and the sharing of pastures and there is concern locally that the Project will provide a reliable source of energy for the region, to support further mining and other heavy industries at the expense of herders. Overall, the percent of area in the *soums* allocated to pastureland (agriculture) is significant as a percent of the *soum* land area. However, it is recognised that it is possible that the Project could, in the long term, indirectly contribute to a change in land uses that could adversely affect

herders. However, given the scale of development identified in the Project Area, focused around the cities, the effect is considered to be insignificant (Negligible to Minor Adverse over time).

From a positive perspective, the Project will contribute to the provision of a more reliable transmission of energy that will facilitate a number of developments that have been identified in the Project Area, mainly around Sainshand and Choir cities; and future developments.

11.5.5. Mitigation Measures and Residual Effects

No mitigation measures have been identified as necessary. The residual effects are therefore the same as above, and are summarised in Table 11-4.

Table 11-5. Land use mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effects
Land use	• None proposed	**Negligible.** A Negligible effect on mining land uses is anticipated. A small area of the overall exploration licenced areas will be affected. There are no operational mines affected. A Negligible effect on the designated sites is anticipated, given the small area affected permanently **Moderate Positive.** The provision of a more reliable transmission network will indirectly support developments in land use in the Project Area.

11.6. Economy, Employment and Livelihoods

11.6.1. Scope of Assessment

The scope of the socio-economic assessment for operation includes:

- Economy and employment; and
- Livelihoods.

For these topics, the AoI equates to people and groups directly affected by the Project (herders, local communities and businesses) as well as potential economic effects (e.g. reliability of electricity supply, O&M activities) extending to the local, regional and national levels during operation.

11.6.2. Sources of Impact

Sources of impact on the economy, employment and livelihoods include:

- Provision of a more reliable transmission network;
- O&M employment; and
- Demand for O&M services and products.

11.6.3. Potentially Sensitive Receptors

Sensitive receptors during construction include:

- National, regional and local government and administrations;
- Communities living near the substations and OHTL route in the seven soums;
- Herder households within the 6 km buffer zone of OHTL;
- Users of summer pastures from other soums and neighbouring aimags;
- Local business and business organizations; and
- O&M contractors.

11.6.4. Impact Assessment

During operation, the Project will have a direct positive impact on the national, regional, and local economy. As the region accommodates a number of mining companies and industrial businesses, the Project will contribute to the CES meeting current growing and future demand for electricity through improving transmission capacity of the network. An improved transmission service can also stimulate development of new businesses in the Project Area, as identified in Chapter 2, which will have knock on effects in the local economic (demand for services) and provide revenue at the regional and national level.

The Project will contribute directly to the Government's Energy Strategy and in so doing, the Project provides integral infrastructure to achieve the Government's long-term development agenda of economic growth through providing reliable energy supply to industry in the region. It is presumed that there will be an increased demand for power generation as a result of the use of the transmission line. Therefore, in the long term, power generation will need to meet local demand; Government policy indicates a drive towards more renewable forms of energy, however, it is impossible to currently predict the future power supply for the Project.

The sensitivity of the local and regional economy and businesses is considered to be Medium and the potential magnitude of impact Medium, therefore a Moderate Positive effect on the provision of infrastructure that contributes to supporting the economy is anticipated. As part of the wider development of the energy sector, this could result in a Major Positive effect in the longer term.

After construction, there would be relatively limited employment opportunities for O&M of the OHTL; though staff will be required for the new substation. O&M staff requirements are likely to be serviced both from within the NPTG and through contracts with O&M contractors; and there may be opportunities for women within the NPTG. At this stage it is not known if additional workforce would be required therefore overall, the sensitivity of the local community and businesses is considered to be Medium and the magnitude of impact Low, resulting a Minor Positive effect.

Potential impacts on livelihoods will in the main be positive. Overall, an improvement in transmission will result in an improvement in energy supply, which will contribute to the local economy, which in turn will have a positive effect on livelihoods. As identified earlier, no permanent adverse effects on herder livelihoods are anticipated. Local communities are considered to be of Medium sensitivity and the magnitude of impact, albeit indirect, Medium, therefore a Moderate Positive effect is predicted.

11.6.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effects are set out in Table 11-5.

Table 11-6. Economy, employment and livelihoods mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effects
Economy and employment	• Use of local supplies and contractors for O&M activities.	**Moderate Positive.** Local and regional economic is considered to of medium sensitivity and, given the role energy plays in the economy, especially in this region, is considered to be medium therefore a Moderate Positive effect is predicted. Improved and more reliable energy transmission may also stimulate the development of economic activities in the *aimags* with positive knock on effects on spend in the local economy.
Livelihoods	• Recruiting from the local community where feasible.	**Moderate Positive.** Local community sensitivity is medium and the overall magnitude should be a medium. Improved and more reliable energy transmission should also stimulate the development of businesses with increased employment opportunities, contributing to local livelihoods.

11.7. Community Health, Safety and Security

11.7.1. Scope of Assessment

The scope of this assessment includes:

- Community health, safety and security; and
- EMFs.

For this topic, the AoI equates to people and groups within the vicinity of the substations and the OHTL, as well as any O&M access roads.

11.7.2. Sources of Impact

Sources of impact during operation include:

- Presence of the OHTL infrastructure;
- Operation of a high tension line;
- Operation of the substations; and
- Movement of O&M vehicles and equipment.

11.7.3. Potentially Sensitive Receptors

Sensitive receptors during construction include:

- Communities living near the substations and OHTL route in seven soums (as identified in section 9.1.2.3 above)
- Herder households within the 6 km buffer zone of OHTL;
- Users of summer pastures from other soums and neighbouring aimags;
- Livestock;
- Local road users;
- Local services; and
- Local businesses.

11.7.4. Impact Assessment

Risks to the general public include: risk of electrocutions, fire generation from falling overhead lines and from lightening; falling and/or swinging objects; falling of live electrical conductor due to mechanical failure of an insulator string or snapping of the conductor itself; and potential collapse of poles/towers; and EMFs. The presence, storage and use of oils, fuels and other flammable products on the premises of the substations may give rise to fire outbreaks.

The design of the OHTL will include for appropriate health and safety measures. All structures will be adequately earthed and earthing cables used. Signs, fencing and other barriers such as anti-climb barriers or barbed wire will be used. The substations will be fenced and made secure from the public, with authorized access only permitted.

O&M activities could result in disturbances locally (noise, dust and vibration), especially for herders near the OHTL. Overall, given the likely controls in place, the overall effect is considered to be Minor Adverse, based on a High sensitivity of herders and Medium sensitivity for the local community and business, and a Low risk of health and safety impacts during operation. However, should an accident occur, the effect could be Major e.g. risk of life. No specific additional risks are identified in relation to vulnerable people as a result of the operation of the Project.

Electric overhead lines are considered a source of power frequency, electric and magnetic fields, which may have a perceived health effect. The design of the OHTL will need to ensure that EMF levels are within accepted guidelines for occupational and human health exposure. Based on the research presented in Chapter 2 (which is based on a transmission line at 275kV and not 220kV adopted by the Project and therefore precautionary), the proposed transmission may pose potential health risks limited to areas where the distance from the centreline are limited to 20 m. Therefore, no adverse effects of EMFs are anticipated in the *soum* centres, due to their distance from the line. It is also unlikely, given the location of herder household structures, that any EMF effects will arise. However, any herders will remain for more than 4 hours per day within the 20 m zone, the levels of EMF should be verified. Verification requires modelling the levels of exposure given the boundary conditions e.g. geometry of the site and conductors, current flows. A bi-dimensional model would suffice in most of the cases. In the case of the presence of other parallel or crossing lines, or if the line is deviating from a straight line, in the vicinity of the receptor, a three-dimensional model may be required. No ozone or corona are anticipated due Project. As EMFs are not generally understood by the general public and there may be a perceived adverse impact of the overhead lines that will require an awareness campaign in the local community.

11.7.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effects are set out in Table 11-6.

Table 11-7. Community health, safety and security mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effects
Community health, safety and security	• Appropriate design and ongoing maintenance to ensure reduction in EMFs – where necessary additional measures could be employed such as shielding with specific metal alloys; modifications to size, spacing and configuration of towers to address any localised issues. • Appropriate design and ongoing maintenance to reduce health and safety risks e.g. adequately earthed and earthing cable, signs, fencing and other barriers such as anti climb barriers of barbed wire will be used. • Capacity building and awareness campaigns will be undertaken by the MoE to enable local communities to be aware of the risks associated with higher voltage lines. Education/public outreach in the neighboring communities to inform and refresh local people's knowledge regarding restriction zone requirements. • The substations will be made secure at all times and unauthorized persons will be kept away from the premises. Security officers shall man the substations at all times to ensure security and report all incidents that might be out of the ordinary for prompt action. • Appropriate firefighting facilities will be available at the substations. The use of fire within the RoW will not permitted.	**Minor Adverse (local community safety and security).** There will be a low residual effect on communities, including herder households.
EMFs	• Design of the OHTL to ensure that EMF levels are within accepted guidelines for occupational and human health exposure. • If considered necessary (e.g. complaints), NPTG model the levels of exposure given the boundary conditions e.g. geometry of the site and conductors, current flows. A bi-dimensional model would suffice in most of the cases. In the case of the presence of other parallel or crossing lines, or if the line is deviating from a straight line, in the vicinity of the receptor, a three-dimensional model may be required.	**Negligible.** No residential structures are within the 20 m guidance distance and it is unlikely that a herder will stay stationary within this zone for more than 4 hours.

11.8. Labour and Working Conditions including Occupational Health and Safety

11.8.1. Scope of Assessment

The scope of this assessment includes:

- Labour;
- Working conditions;
- OHS; and
- EMFs.

For this topic, the AoI equates to employees of NPTG and any Third Party Supply Chains.

11.8.2. Sources of Impact

Sources of impact during construction include:

- Operation of the substations;
- Operation of the OHTL; and
- Maintenance activities.

11.8.3. Potentially Sensitive Receptors

Sensitive receptors during construction include:

- Substation workers;
- OHTL O&M staff; and
- Third party suppliers.

11.8.4. Impact Assessment

As identified above, O&M staff will be required, serviced both from within the NPTG and through contracts with O&M contractors, however at this stage it is not known if additional workforce would be required.

It is expected that the NPTG and O&M Contractors will comply with the Mongolian Labour Law and will ensure that all employees, including permanent and temporary, will be provided with a contract. It is also expected that the Project will be in compliance with the Labour Law on working hours, working condition, occupational health and safety and management of non-employee relations and grievances. However, if not managed, there could be impacts associated with supply chain, occupational health and safety, child and forced labour. The potential impacts on labour and working conditions are anticipated to be Medium risk and workers of Medium sensitivity, therefore and therefore effects could be Moderate Adverse during operation without appropriate mitigation in place.

OHS hazards include risk of electrocutions; fire generation from falling overhead lines and from lightening; falling and/or swinging objects; potential collapse of poles/towers; falling from heights; EMFs; and fire risk at substations. OHS risks during operation are High to Medium, depending on the activity, and therefore appropriate training of staff will be required; it is assumed that a sufficiently trained and equipped workforce will be provided to deliver O&M activities in accordance with Mongolian law and GIP. The potential impacts on OHS are anticipated to be Medium to High risk and workers of Medium sensitivity, therefore and therefore effects could be Moderate to Major Adverse during operation without appropriate mitigation in place.

As with community health and safety above, based on the research the proposed transmission may pose potential health risks limited to areas where the distance from the centreline are limited to 20 m and where workers will remain within this area for more than 4 hours per day. It is possible that O&M activities may exceed this duration. NPTG should therefore implement the necessary provisions to ensure that the risk of exposure of the workers, especially at the substations, will be assessed and monitored. Overall, impacts are considered to be Negligible to Minor Adverse.

11.8.5. Mitigation Measures and Residual Effects

Mitigation measures and residual effects are set out in Table 11-7.

Table 11-8. Community health, safety and security mitigation measures and residual effects

Potential impact	Mitigation measures	Residual effects
Labour and working conditions	• A Labour Plan and HR policy for the O&M phase should be developed by the NPTG. Where possible, opportunities for local communities and service should be sought. • Presence of a Labour Grievance Mechanism.	**Minor Positive.** Assuming that management systems are implemented to meet Mongolian standards and EBRD PR2, this will ensure that there is an effective approach to the management of O&M staff and contractors. Overall, this is likely to have a positive effect in relation to labour aspects.
OHS	• An O&M Plan should be prepared by NPTG to manage worker risk. This should include necessary provisions to ensure that the risk of exposure of the workers, especially at the substations, is assessed, managed and monitored. • An Emergency Preparedness and Response Plan should be developed by NPTG. • Functional testing, commissioning, performance, testing and reliability testing of the complete Project should be undertaken. • NPTG should ensure that all staff are adequately trained. PPE will be provided for the workforce. Staff working near noisy machinery and power tools will be provided with earmuffs to protect them against noise-induced hearing loss damage. • Regular maintenance of equipment will reduce the risk of injury from failing equipment. • Adequate earthing of equipment to prevent shocks and malfunctioning of protection equipment. • Provision of a fire detection and protection system to international standards. • In line with Mongolia Regulations, regular inspection of the RoW to ensure non permitted land uses are not occurring.	**Negligible.** Assuming that management systems are implemented to meet Mongolian standards and EBRD PR2, this will ensure that there is an effective approach to the management of O&M staff and contractors. Overall, this is likely to avoid adverse effects arising.
EMFs	• Design of overhead line to ensure that EMF levels are within accepted guidelines for occupational exposure.	**Negligible.**

Potential impact	Mitigation measures	Residual effects
	• NPTG should implement the necessary provisions to ensure that the risk of exposure of the workers, especially at the substations, will be assessed and monitored.	Assuming appropriate design and monitoring, no adverse effects on workers are considered likely.

11.9. Infrastructure

The induction effect arising from overhead lines can result in interference of telecommunications, including radio, television and phone lines/mobiles. However, there are no telecommunication masts within the immediate vicinity of the proposed route, and no impacts on other utilities or telecommunications are anticipated. The line should however be designed specifically to minimise radio and television interference levels.

During operation, there may also be a demand of local services such as local medical facilities in the event of accidents, and/or increased policing of towers where incidences occur. However, with the right measures in place this risk is considered very low and therefore, the pressure on local services low and would be managed through liaison with the relevant services and the preparation of an O&M Emergency Preparedness and Response Plan.

12. Cumulative Impact Assessment

12.1. Introduction

This Chapter provides an assessment of the cumulative impacts of the Project. It is structured to provide:

- A definition of cumulative impacts provided on the basis of the applicable guidance;
- The Project context;
- Methodology for the assessment; and
- Cumulative impacts assessment.

The assessment of cumulative impacts is typically performed, in general terms, in a qualitative manner based on the existing information of the present or future activities taken into consideration and the judgment of the ESIA Team.

12.2. Definition

As stated in the EBRD PR1 the assessment of cumulative impacts is a requirement for ESIA. The assessment process will consider cumulative impacts of the project in combination with impacts from other relevant past, present and reasonably foreseeable developments as well as unplanned but predicable activities enabled by the project that may occur later or at a different location.[182]

The cumulative impacts considered in this assessment are those that may arise as a result of:

- Impacts of interrelationships within the same Project on a single receptor; and
- Impacts on a resource, ecosystem, or human community of that action arising from the Project in combination with other existing, planned or reasonably defined developments.

12.3. Project Context

The Project comprises the development of an approximately 216 km OHTL between Choir and Sainshand. The main associated facilities for this Project will be temporary facilities such as construction compounds, access/haul roads and, if required, quarries and borrow pits. The locations of these associated facilities will not be determined until a Construction Contractor is contracted. Cumulative impacts arising from interrelationships within the same Project on a single receptor have therefore been considered in general terms.

No major projects are currently known to be planned in the Project Area during the construction of the Project; however, a number of developments have been identified in the Project Area in the future, which are reliant on sufficient energy being provided to the Project Area. Therefore, the cumulative impacts in relation to other developments is considered mainly in terms of general effects during operation.

12.4. Methodology

For this Project cumulative impacts are assessed within the Project AoI and the wider Project Area. The AoI has been specified for each environmental and social topic in Chapters 10 and 11, but in general covers the RoW and a 6 km buffer zone around the OHTL centreline (3 km either side of the centreline).

The duration of impacts considered covers the construction and operation phases of the Project.

12.5. Cumulative Impacts

The potential cumulative effects are summarised in the Table 12-1.

[182] EBRD Performance Requirement 1 Assessment and Management of Environmental and Social Impacts and Issues 2014, p.12

Table 12-1. Summary of potential cumulative effects

Type of cumulative effect	Stage	Issue	Summary of effects
Effects of interrelationships within the same project on a single receptor	Construction	Air and dust Noise and vibration Traffic Waste management Pollution events	**Adverse cumulative effects:** The combined effects of dust, air emissions and noise on humans and flora and fauna (each individually) as single receptors will be greater than the effect of a single impact on these receptors. For example, herder households living in the vicinity of the RoW during the works could experience a combination of dust, noise and traffic impacts associated with the construction impacts, the effect of which will be greater than dust impacts alone. The same may be experienced by the businesses located within the vicinity of the substation of Choir, where the OHTL works are undertaken to connect into this existing substation. Flora and fauna adjacent to the OHTL route construction works may also be affected by a combination of noise and dust, as well as mismanaged wastes and pollution events. No other sensitive receptors are considered to experience the combined effects of several impacts.
	Construction	Displacement Air and dust Noise and vibration Traffic Waste management Pollution events	**Adverse cumulative effects:** In addition to the above, herder households as a single receptor may experience restrictions to their grazing areas (depending on the time of year construction works) which will contribute to cumulative impacts of the Project on them. The locally protected sites that are within the RoW, may also experience the cumulative effects of displacement (lack of access to the sites) as well as dust, noise, traffic impacts.
	Operation	Land Use Employment Economy	**Positive cumulative effects:** The provision of a more efficient and reliable transmission network will have an overall cumulative positive effect on the economy through a combination of various impacts, including the encouragement of the provision of more renewable energy sources and development locally, which will in turn improve employment opportunities and the local economy.
	Operation	Land Use Air and dust Noise and vibration Traffic Waste management Pollution events	**Adverse cumulative effects:** The provision of a more reliable electricity source could result in further development in the Project Area which could have an negative cumulative effect on the environment, pasture degradation and ultimately a decrease in traditional livelihoods.
Effects on a resource, ecosystem, or human community of that action arising from the Project in combination with other existing, planned or reasonable	Construction	Air and dust Noise and vibration Traffic Waste management	**Adverse cumulative effects:** Whilst considered unlikely, should construction of another development take place in the vicinity of the Project at the same time, combined effects of dust, air emissions and noise, and waste management on local communities, in particular herder households, could be greater than the effect of the Project alone.
		Influx Construction camps	**Adverse cumulative effects:** In the event that works are undertaken at the same time for other large infrastructure developments, the number of construction camps and influx of people could increase, which

Type of cumulative effect	Stage	Issue	Summary of effects
defined developments		Demand for resources	could place greater pressure on the local communities than a single project.
		Waste management Construction activities	**Adverse cumulative effects:** The overall effect on waste will be an increased generation of construction wastes and therefore demand on landfill space and disposal of hazardous wastes.
		Land take	**Adverse effects:** The combined impacts on displaced persons could be greater than the effect of a single Project, which could, cumulatively, affect livelihoods.
		Socio-economics	**Positive effects:** The combined total of direct and indirect impacts on the economy, employment and livelihoods could be greater if other developments are constructed at the same time as the Project. Overall, there would be increased potential for employment opportunities and increased revenue due to the demand for construction personnel, raw materials, equipment and goods and services.
	Operation	Land Use Employment Economy	**Positive cumulative effects:** The provision of a more efficient and reliable transmission network will have an overall cumulative positive effect on the economy through a combination of various impacts, including the encouragement of the provision of more renewable energy sources and development locally, which will in turn improve employment opportunities and the local economy. These developments, in combination, will have a cumulative positive effect in the Project Area on job opportunities, livelihoods and local economies.

13. Conclusion

The EBRD is considering providing a sovereign loan to the Government of Mongolia to finance the construction of a 216.6 km double circuit 220 kV OHTL between Choir and Sainshand and construction of a new 220/110/35 kV substation in Sainshand.

The EBRD has assigned the Phase II works as a Category A, which means that a comprehensive ESIA of the Project must be undertaken. This document presents the ESIA Report. It forms one of several documents prepared to meet EBRD disclosure requirements as follows:

- Non-Technical Summary (NTS);
- Stakeholder Engagement Plan (SEP);
- Environmental and Social Mitigation and Management Plan (ESMMP);
- Land Acquisition and Resettlement Framework (LARF); and
- Environmental and Social Action Plan (ESAP).

Overall the conclusion of the ESIA is that the impacts of the Project are manageable, and construction and operation of the Project will not result in irreversible, unacceptable risks to people or the environment.

The Project has been identified as a top priority project by the Ministry of Energy. It has been on the Government's Action Plan since 2008 and the approved State Policy on Energy for 2015-2030 has outlined the priority areas and strategic goals for Mongolian power sector that can be divided into three main groups aimed at improvement of efficiency, safety, and environment protection.

The main benefits of the Project include:

- Provision of a more efficient and reliable transmission network in the two aimags, with consequent reductions in energy losses;
- Extension of the power transmission network to meet the growing electricity demand in the south-east region of the country;
- Increase the potential for the production share of renewables and reduce negative environmental impact from traditional power generation and greenhouse gases;
- Facilitate the development of industry, tourism and economic growth in the two Project *aimags*; and
- Provision of employment opportunities and skills training; and knock on effects for demand for goods and services, mainly in construction.

For the construction phase, the assessment identified a number of Moderate to Major Adverse effects as a result of the proposed works **without** mitigation in place. These include general nuisance and construction impacts associated with all construction sites, such as dust (Major Adverse for the herder households closest to the RoW), gaseous emissions (Moderate Adverse), noise and vibration effects (Major Adverse for the herder households closest to the RoW); impacts to soils such as loss of topsoils (Major Adverse), compaction and accidental spills affecting soils (Moderate Adverse); waste management (Moderate Adverse); water demand and accessibility constraints (especially to groundwater resources and herder wells – Major Adverse) and potential for pollution to water resources (Major Adverse); and flood risk from heavy rainfalls activating ephemeral streams (Major Adverse). Other Minor adverse effects include traffic nuisance, impacts on hydrology of ephemeral streams and materials use.

With appropriate mitigation in place through a Project ESMS and ESMMP, the majority of these impacts are anticipated to be reduced to Minor Adverse and are, for the most part, temporary i.e. occurring for the period of the construction works only; with the exception of potential dust impacts that may be difficult to control as dust is already considered an issue by local communities (Minor to Moderate Adverse following mitigation depending on location of works in relation to winter camps), noise for closest herder households to the RoW (Minor to Moderate Adverse depending on location of works in relation to winter camps), water demand (even with efficient measures in place, water will still be required for construction and therefore Minor to Moderate

Adverse effects are predicted depending on final water demand and source of construction water) and waste impacts (Minor to Moderate Adverse as construction will result in an increased generation of waste).

In relation to biodiversity, there are sensitive flora, mammals and birds in the Project Area. Without appropriate imagination, a Major/Moderate Adverse effect could occur to vegetative species Shardalan and Cistanche. The Project will require a Land Disturbance Permit for all vegetation clearing activities, including pre-construction works surveys. With mitigation in place, Minor Adverse effect on sensitive floral species is anticipated.

A Moderate to Major Adverse effect on mammal species is possible however, with mitigation in place and given their extensive ranges, overall a Negligible to Minor Adverse effect is predicted.

Potential impacts to bird species from construction activities include potential habitat loss under the Project footprint and disturbance from human activities resulting in habitat avoidance, destruction of nests or nesting habitats, disruption of breeding behaviour and nest abandonment, and collision with powerline wires as the wires are strung. A Minor Adverse effect is predicted prior to mitigation and negligible to Minor Adverse with mitigation in place.

There is also the potential for an increase in the collection of threatened flora and fauna species by the construction workforce, which will be managed through the Code of Conduct, toolbox talks and punitive measures.

In relation to social impacts, given the remote location of the Project overall few displacement impacts are identified. There were no herder winter camps within the RoW or herder wells in the RoW recorded in the surveys in June 2020 or in the walkover survey of the new alignment in May 2021; however, herder winter camps are transient. The overall significance of effect on herder land uses and access to land during construction is considered to be Negligible to Minor Adverse. The RoW will however cross five mining concession licences (Negligible) and two locally protected sites (long term significance of effect will be Negligible to Minor Adverse). Additional effects may be recorded once the sites of Construction Contractor facilities are known. A LARF has been prepared to identify the gaps in the process to date with EBRD PR5 and a LARP will be prepared to address those gaps.

Construction impacts on the economy, employment and livelihoods are anticipated to result in a Moderate Positive effect for the period of construction in the local area and, depending on the sourcing of services and goods, a Minor Positive effect at the wider scale. With targeted procurement and employment strategies, these effects could result in Moderate Positive effects locally.

There are a number of public health, safety and security risks and impacts that need to be considered during construction, including public injuries as a result of, for example; increased road traffic; construction materials and equipment being dropped; unprotected tower base excavations (risk to children and livestock in particular); and, machinery or operator loss of control. There are also elevated risks to public health as a specific result of increased construction traffic and equipment use, including, respiratory damage from protracted vehicle idling; dust arising from clearance of the RoW; delayed treatment e.g. at local hospitals as a result of reduced emergency response times due to an increased (construction) demand on existing services; as well as increases in noise and dust levels. The significance of the effect pre-mitigation is anticipated to be Minor and Major Adverse. Even with mitigation in place, such as the Code of Conduct and training and awareness campaigns, there remains a risk therefore the residual effect is considered to be Minor Adverse.

In relation to labour, working conditions and OHS, it is expected that the Construction Contractor will be in compliance with the Labour Code, EBRD PR2 and GIP which will manage risks. The sensitivity of the workers to increased OHS risks remains high; with mitigation measures in place, the risk should be reduced to Minor Adverse; however, in the event that an accident does occur, the effect could be significant.

Impacts on cultural heritage are considered to be Minor Adverse, with a requirement for a more detailed survey to be undertaken prior to construction works. A chance Finds Procedure will be put in place during construction.

During operation, no Moderate or Major Adverse effects are anticipated **prior to** mitigation expect for potential impacts on community and occupational H&S; wastes; and potential impacts on birds (Moderate Adverse).

Risks to the general public include: risk of electrocutions, fire generation from falling overhead lines and from lightening; falling and/or swinging objects; falling of live electrical conductor due to mechanical failure of an insulator string or snapping of the conductor itself; and potential collapse of poles/towers; and EMFs. The presence, storage and use of oils, fuels and other flammable products on the premises of the substations may give rise to fire outbreaks. The design of the OHTL will include for appropriate health and safety measures. All structures will be adequately earthed and earthing cables used. Signs, fencing and other barriers such as anti-climb barriers or barbed wire will be used. The substations will be fenced and made secure from the public, with

authorized access only permitted. OHS hazards include risk of electrocutions; fire generation from falling overhead lines and from lightening; falling and/or swinging objects; potential collapse of poles/towers; falling from heights; EMFs; and fire risk at substations. However, it is expected that the NPTG and O&M Contractors will comply with the Mongolian Labour Law and will ensure that all employees, including permanent and temporary, will be provided with a contract. With appropriate mitigation measures in place, the community and occupational H&S risks will be reduced to Minor Adverse.

In relation to EMFs and their potential effect on local communities and/or workers, based on the research the proposed transmission may pose potential health risks limited to areas where the distance from the centreline are limited to 20 m and where individuals will remain within this area for more than 4 hours per day. There are no herder households within this zone and it is considered unlikely a herder would remain for 4 hours within this 20 m zone. It is possible that O&M activities may exceed this duration. NPTG should therefore implement the necessary provisions to ensure that the risk of exposure of the workers, especially at the substations, will be assessed and monitored. Overall, impacts are considered to be Negligible to Minor Adverse.

The induction effect arising from overhead lines can result in interference of telecommunications, including radio, television and phone lines/mobiles. However, there are no telecommunication masts within the immediate vicinity of the proposed route, and no impacts on other utilities or telecommunications are anticipated. The line should however be designed specifically to minimise radio and television interference levels.

Along the OHTL, the only noise sensitive receptors are herder households and their livestock. However, the noise produced by the corona effect or aeolian noise is not considered significant for the Project, provided that the design of the OHTL will adopt the best available techniques to prevent and minimise the corona effect. At the substations several equipment may produce audible noise effects, in particular the transformers. However, as Choir is an existing substation and as GIP will be used for the new Sainshand substation, no significant adverse effects are anticipated.

The generation of wastes from the overhead lines is considered to be minimal, however, wastes including hazardous wastes will inevitably be produced at the substation. With mitigation in place, a Minor Adverse residual effect will remain.

The presence of the OHTL could have a significant adverse effect on sensitive bird species. From current data, no significant impact of electrocutions is anticipated, however, collision risk could result in Major Adverse effects to Steppe eagle and Saker falcon (both Endangered on IUCN list and Least Concern/Vulnerable respectively on the Mongolia Red List), and Moderate Adverse effects to Oriental plover and Pallas's sandgrouse (both Least Concern on IUCN and Mongolia Red List), Swan goose (Vulnerable on IUCN and Near-threatened on Mongolia Red List), Great bustard (Vulnerable on IUCN and Mongolia Red List, and designated as 'Rare' by the Mongolian Law on Fauna (2012)), Cinereous vulture (Near-threatened on IUCN and Least Concern on Mongolia Red List) and Tree pipit (Least Concern on IUCN and Near-threatened on the Mongolia Red List, and designated as 'Rare' by the Mongolian Law on Fauna (2012)). With mitigation such as flight diverters, a Minor to Moderate Adverse effect is predicted.

In relation to land uses, the Project will result in a permanent change of land use for five mining concession licences where the licenced land falls within the OHTL RoW; and two locally protected areas. Given the scale of the permanent footprint (ie. relatively small), the effect is considered to be insignificant (Negligible to Minor Adverse). As identified above, the Project will also have a Positive effect on the provision of reliable energy to the two aimags and provide a basis for future economic growth in the region. As part of the wider development of the energy sector, the Project could result in a Moderate to Major Positive effect in the longer term.

The environmental and social impacts of the Project will be managed through a Project ESMS to be developed by the MoE/PIU, which will include updating the ESMMP and SEP prepared for ESIA disclosure. The MoE/PIU may also need to develop a RAP and/or LRP, based on the final design and therefore displacement impacts of the Project. The Construction Contractor, likewise, will need to develop, for MoE/PIU approval, and implement a detailed Construction ESMMP and SEP. The performance of the Contractor during construction will be overseen by the MoE/PIU. During operation, an O&M ESMMP will be prepared and its implementation will be managed by the NPTG.

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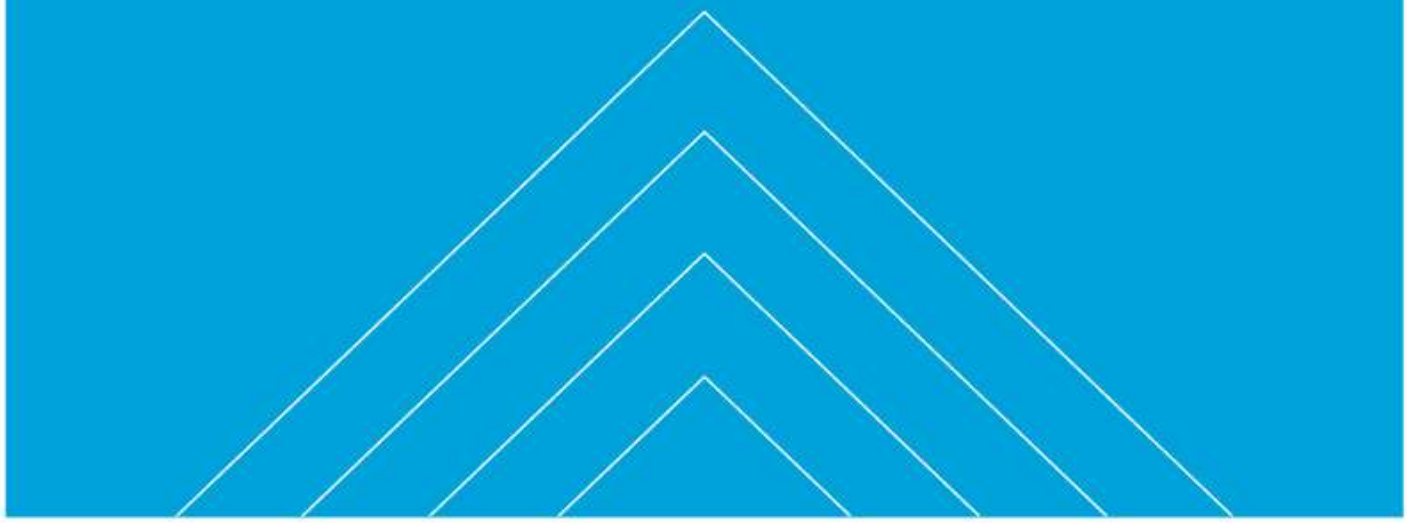
Appendices



Appendix A. Minutes of Meeting with Working Group

Appendix B. Traffic Data

Appendix C. KIIs and Household Survey Sheets

Appendix D. List of Tangible Cultural Heritage sites of memorial value, as defined by the Cultural Heritage Centre (2020)

№	Name of the memorial place	*Aimag*	*Soum*	Description
1	Zaraa Tolgoi tomb	Govi-Sumber	Sumber	Engraved rock painting
2	Sansar mountain	Govi-Sumber	Sumber	Sacrificial facility - ovoo
3	Children's Ovoo	Govi-Sumber	Sumber	Sacrificial facility - ovoo
4	Choir mountain	Govi-Sumber	Sumber	Sacrificial facility - ovoo
5	Choir mountain, Dund mountain tomb	Govi-Sumber	Sumber	Durvuliin Tomb (x3)
6	Khirgisuur, located in Alag aduu	Govi-Sumber	Sumber	Monument of tomb
7	Khirgisuur and zel stones behind Children's Ovoo	Govi-Sumber	Sumber	Monument of tomb (x3)
8	Khirgisuur, NW of 5th bagh	Govi-Sumber	Sumber	Monument of tomb
9	Dagvasundel	Govi-Sumber	Sumber	Monument
10	Khirgisuur on Choir mountain	Govi-Sumber	Sumber	Monument of tomb (x2)
11	Zaraa Tolgoi tomb khirgisuur	Govi-Sumber	Sumber	Monument of tomb (x20)
12	Baga zaraa second tomb	Govi-Sumber	Sumber	Monument of tomb (x6)
13	Russian soldier's monument	Govi-Sumber	Sumber	Monument
14	To the Star and Earth monument	Govi-Sumber	Sumber	Monument
15	Tsagaan ereg tomb	Govi-Sumber	Sumber	Durvuliin Tomb
16	5th bagh khirgisuur	Govi-Sumber	Sumber	Monument of tomb (x10)
17	Intersection bridge	Govi-Sumber	Sumber	Memorial of architecture
18	Khushuut khar undur tomb	Govi-Sumber	Sumber	Tomb
19	Zel stone	Govi-Sumber	Sumber	Monument of tomb
20	Choir monastery ruins	Govi-Sumber	Sumber	Monastery ruins
21	Tomb east of Chingil rock	Govi-Sumber	Sumber	Tomb
22	Khirgisuur on south side of Sansar mountain	Govi-Sumber	Sumber	Monument of tomb
23	Uulzvar river khirgisuur	Govi-Sumber	Sumber	Monument of tomb (x39)
24	Tomb by Sansar camp	Govi-Sumber	Sumber	Durvuliin Tomb (x21)
25	Khirgisuur on west side of Sansar mountain	Govi-Sumber	Sumber	Monument of tomb (x7)
26	Sumber mountain	Govi-Sumber	Sumber	Sacrificial facility - ovoo
27	Tomb and khirgisuur of Chingil rock	Govi-Sumber	Sumber	Monument of tomb (x2)
28	Road stone statue	Govi-Sumber	Sumber	Monument
29	Tomb and khirgisuur of Zaraa rock	Govi-Sumber	Sumber	Monument of tomb (x22)

30	Tomb and khirgisuur south of Chingil rock	Govi-Sumber	Sumber	Durvuliin Tomb (x10)
31	Yellow Rock tomb	Govi-Sumber	Sumber	Durvuliin Tomb (x2)
32	Tomb of winter camp by Yellow Rock	Govi-Sumber	Sumber	Durvuliin Tomb (x3)
33	Turk tomb on west side of Sansar mountain	Govi-Sumber	Sumber	Turk Tomb (x5)
34	Badamt khirgisuur	Govi-Sumber	Sumber	Monument of tomb
35	Tomb of the Golden Yellow Rock	Govi-Sumber	Sumber	Durvuliin Tomb (x8)
36	Tomb of Malh mountain	Govi-Sumber	Sumber	Turk Tomb (x68)
37	Red headed tomb	Govi-Sumber	Sumber	Turk Tomb (x4)
38	Bayan bulag sacred ovoo	Govi-Sumber	Sumber	Sacrificial facility - ovoo
39	Bayan bulag stone statue	Govi-Sumber	Sumber	Sacrificial facility
40	The human stone of Zaraa	Govi-Sumber	Sumber	Monument
41	Altat firm	Govi-Sumber	Sumber	Memorial of architecture - settlement
42	Crow rock tomb	Govi-Sumber	Sumber	Durvuliin Tomb (x9)
43	Tomb and khirgisuur of Ar delger mountain	Govi-Sumber	Sumber	Monument of tomb (x4)
44	Golden treasure house in front Sumt ulaan khairkhan	Govi-Sumber	Sumber	Monastery ruins
45	Khirgisuur of Uvur delger maihan mountain	Govi-Sumber	Sumber	Monument of tomb (x17)
46	Ereen ruins	Govi-Sumber	Shiveegovi	Memorial of architecture – settlement
47	Roadside tomb	Govi-Sumber	Shiveegovi	Monument of tomb
48	Hayalga khirgisuur	Govi-Sumber	Shiveegovi	Monument of tomb
49	Belh mountain	Govi-Sumber	Shiveegovi	Sacrificial facility
50	Zuumai	Govi-Sumber	Shiveegovi	Monument
51	Tomb of west Havalag ovoo	Govi-Sumber	Shiveegovi	Monument of tomb
52	Zel stone of Huren undur	Dornogovi	Airag	Sacrificial facility
53	Huren under tomb	Dornogovi	Airag	Tomb
54	Tomb	Dornogovi	Airag	Tomb
55	Bronze age petroglyphs	Dornogovi	Airag	Rock art
56	Nuden hailan ruins	Dornogovi	Airag	Monastery ruins
57	Nuden ovoo tomb	Dornogovi	Airag	Tomb
58	Budar monastery ruins	Dornogovi	Airag	Monastery ruins
59	Budar rock tomb	Dornogovi	Airag	Tomb
60	Bayan Uul palaeontological monument	Dornogovi	Airag	Palaeontological site
61	Unknown	Dornogovi	Airag	Tomb
62	Stone statue	Dornogovi	Airag	Monument
63	Bagan nart tomb	Dornogovi	Airag	Tomb
64	White rock tomb	Dornogovi	Airag	Tomb
65	Lamt ovoo tomb	Dornogovi	Airag	Tomb
66	Dai mountain tomb	Dornogovi	Airag	Tomb
67	Ikh us petroglyphs	Dornogovi	Airag	Rock art
68	Tomb of ikh khongor, a sacred mountain	Dornogovi	Airag	Tomb
69	Ikh us monastery ruins	Dornogovi	Airag	Monastery ruins

70	Builakh Khar Undur khirgisuur and tomb	Dornogovi	Airag	Tomb
71	Khailan ruins	Dornogovi	Airag	Monastery ruins
72	Bagan nart monastery ruins	Dornogovi	Airag	Monastery ruins
73	Jargalant monastery ruin	Dornogovi	Airag	Monastery ruins
74	Uzuur ulaan jaltsai	Dornogovi	Altanshiree	Palaeontological site
75	Dersene bulag monastery ruin	Dornogovi	Altanshiree	Monastery ruins
76	White marble of Dersene us	Dornogovi	Altanshiree	Sacrificial facility
77	Tomb of Kholboo mountain	Dornogovi	Altanshiree	Durvuliin tomb
78	Kholboo mountain khirgisuur	Dornogovi	Altanshiree	Monument of tomb (x5)
79	Bayanbuural ovoo	Dornogovi	Altanshiree	Sacrificial facility - ovoo
80	Livestock statue	Dornogovi	Altanshiree	Monument - statue
81	Tomb	Dornogovi	Altanshiree	Tomb
82	Chandmani sacred ovoo	Dornogovi	Altanshiree	Sacrificial facility - ovoo
83	Tuimert tomb	Dornogovi	Altanshiree	Tomb
84	Baruun Tsaaan undur khirgisuur	Dornogovi	Altanshiree	Monument of tomb (x2)
85	Olon ovoo tombs	Dornogovi	Altanshiree	Tomb
86	Rock art of Baruun hanan	Dornogovi	Altanshiree	Rock art
87	Zel stone of Baruun honhor straw	Dornogovi	Altanshiree	Sacrificial facility
88	Zel stone of Baruun honhor straw - tomb	Dornogovi	Altanshiree	Tomb
89	Khirgisuur, Zuun honhor straw	Dornogovi	Altanshiree	Monument of tomb (x3)
90	Arslant petroglyph	Dornogovi	Altanshiree	Rock art
91	Shine us rock tomb	Dornogovi	Altanshiree	Tomb
92	Senjit rock	Dornogovi	Altanshiree	Sacrificial facility
93	Stone statue of nine elm, Tsagaan undur	Dornogovi	Altanshiree	Monument
94	Zel stone	Dornogovi	Altanshiree	Sacrificial facility
95	Rock spa	Dornogovi	Altanshiree	Sacrificial facility
96	Stone statue of huh khoshuu, har Tolgoi	Dornogovi	Altanshiree	Sacrificial facility
97	Huh khoshuu tomb	Dornogovi	Altanshiree	Tomb
98	Dund stone statue	Dornogovi	Altanshiree	Sacrificial facility
99	Erdenetsogt ovoo	Dornogovi	Altanshiree	Sacrificial facility – ovoo
100	Ar sacrificial facility	Dornogovi	Altanshiree	Sacrificial facility
101	Zel stone of Tsagaan chuluu horoo	Dornogovi	Altanshiree	Sacrificial facility
102	Dund bayan tomb	Dornogovi	Altanshiree	Tomb (x13)
103	Dund bayan tomb	Dornogovi	Altanshiree	Tomb (x3)
104	Maihan del khirgisuur	Dornogovi	Altanshiree	Monument of tomb (x6)
105	Maihan del tomb	Dornogovi	Altanshiree	Tomb (x3)
106	Elgene rock tomb	Dornogovi	Altanshiree	Tomb (x3)
107	Elgene rock tomb	Dornogovi	Altanshiree	Tomb (x4)
108	Elgene rock tomb	Dornogovi	Altanshiree	Tomb (x3)
109	Elgene rock tomb	Dornogovi	Altanshiree	Tomb (x3)
110	Jargalant tomb khirgisuur	Dornogovi	Altanshiree	Monument of tomb (x7)
111	Jargalant tomb	Dornogovi	Altanshiree	Tomb (x3)
112	Zadgait ulaan ovoo tomb	Dornogovi	Altanshiree	Tomb (x3)

113	Zel stone of Baruun honhor straw	Dornogovi	Altanshiree	Sacrificial facility
114	Holboo monastery ruin	Dornogovi	Altanshiree	Monastery ruin (x5)
115	Group of tombs in Baruun Tsagaan undur	Dornogovi	Altanshiree	Tomb (x14)
116	Tsagaan del monastery ruin	Dornogovi	Altanshiree	Monastery ruin (x120)
117	Zel stone of Bayanbuural	Dornogovi	Altanshiree	Sacrificial facility
118	Group of tombs in Dund bayan	Dornogovi	Altanshiree	Tomb (x14)
119	Elgene rock tomb	Dornogovi	Altanshiree	Tomb (x8)
120	Zaraa monastery ruin	Dornogovi	Altanshiree	Monastery ruin
121	Nart monastery statue stone	Dornogovi	Dalanjargal	Monument
122	Rock art image of the White Old Man	Dornogovi	Dalanjargal	Rock art
123	Zel stone of Ikh Nart rock	Dornogovi	Dalanjargal	Sacrificial facility
124	Statue of Bichigt rock	Dornogovi	Dalanjargal	Monument
125	Bichigt rock tomb (Ikh Nart)	Dornogovi	Dalanjargal	Tomb
126	Bichigt petroglyphs	Dornogovi	Dalanjargal	Rock art
127	Gun us sacrificial facility	Dornogovi	Dalanjargal	Sacrificial facility
128	Gants rock tomb	Dornogovi	Dalanjargal	Tomb
129	Stone tomb with petroglyphs	Dornogovi	Dalanjargal	Tomb
130	Tomb (Argal center)	Dornogovi	Dalanjargal	Tomb
131	Khirgisuur (Argal center)	Dornogovi	Dalanjargal	Monument of tomb
132	Zel stone of Khushuut buuts	Dornogovi	Dalanjargal	Sacrificial facility
133	Zel stone of Guren ovoo	Dornogovi	Dalanjargal	Sacrificial facility
134	Alag undur petroglyphs	Dornogovi	Dalanjargal	Rock art
135	Petroglyphs of White sacred rock	Dornogovi	Dalanjargal	Rock art
136	Murt rock	Dornogovi	Dalanjargal	Rock art
137	Durvuliin tomb	Dornogovi	Dalanjargal	Durvuliin tomb (x5)
138	Rock art of Nukhnii buuts rock	Dornogovi	Dalanjargal	Rock art
139	Ikh jargalant khirgisuur	Dornogovi	Dalanjargal	Monument of tomb (x3)
140	Group of tombs in Sharga Undur	Dornogovi	Dalanjargal	Tomb (x8)
141	Dalanturuu tomb	Dornogovi	Dalanjargal	Tomb (x10)
142	Ikher buuts tomb	Dornogovi	Dalanjargal	Tomb
143	The white goddess	Dornogovi	Dalanjargal	Rock art
144	Rock with knife shape	Dornogovi	Dalanjargal	Rock art
145	Group of tombs in Turuugiin shovh	Dornogovi	Dalanjargal	Tomb (x5)
146	Baga jargalant	Dornogovi	Dalanjargal	Sacrificial facility
147	Khirgisuur	Dornogovi	Dalanjargal	Monument of tomb
148	Dalanturuu statue	Dornogovi	Dalanjargal	Monument – statue (1921-1990)
149	Darga ja tomb, khirgisuur	Dornogovi	Dalanjargal	Tomb (x8)
150	Khirgisuur (Argal center)	Dornogovi	Dalanjargal	Monument of tomb (x10)
151	29 tombs of the Huns	Dornogovi	Dalanjargal	Huns tomb (x29)

152	Ikh Nart monastery ruin	Dornogovi	Dalanjargal	Monastery ruin
153	Darga jas monastery ruin	Dornogovi	Dalanjargal	Monastery ruin
154	Tsagaan Khoshuu Palaeontological monument	Dornogovi	Sainshand	Palaeontological monument
155	Khanbayanzurkh mountain	Dornogovi	Sainshand	Sacrificial facility - ovoo
156	Bayangiin shire	Dornogovi	Sainshand	Palaeontological monument
157	Palaeontological monument	Dornogovi	Sainshand	Palaeontological monument
158	Uhaa ereg palaeontological monument	Dornogovi	Sainshand	Palaeontological monument
159	Meditation cave	Dornogovi	Sainshand	Architectural monument – Cave
160	Dechinlhundev ovoo	Dornogovi	Sainshand	Sacrificial facility – ovoo
161	The land of Shambala	Dornogovi	Sainshand	Sacrificial facility
162	Choilon monastery ruin	Dornogovi	Sainshand	Monastery ruin
163	Khongil tsav	Dornogovi	Sainshand	Palaeontological monument
164	Hamariin hiid (Hamar Monastery)	Dornogovi	Sainshand	Monastery ruins
165	Khan horoot	Dornogovi	Saikhandulaan	Sacrificial facility
166	Oyut uhaa tomb	Dornogovi	Saikhandulaan	Tomb
167	Baruun tsats monastery ruin	Dornogovi	Saikhandulaan	Monastery ruins
168	Khushuu river stone statue	Dornogovi	Saikhandulaan	Monument
169	Ikh Ulziit sacred mountain	Dornogovi	Saikhandulaan	Sacrificial facility – ovoo
170	Ikh Ulziit sacred mountain	Dornogovi	Saikhandulaan	Tomb (x8)
171	Zurhen mountain khirgisuur	Dornogovi	Saikhandulaan	Monument of tomb (x4)
172	Ar har ovoo petroglyphs	Dornogovi	Saikhandulaan	Rock art
173	Suugder ovoo petroglyphs	Dornogovi	Saikhandulaan	Rock art
174	Yant sacred mountain	Dornogovi	Saikhandulaan	Sacrificial facility – ovoo
175	Duulgant khirgisuur	Dornogovi	Saikhandulaan	Monument of tomb (x3)
176	Jargalant tomb	Dornogovi	Saikhandulaan	Tomb (x2)
177	Zel stone Khairkhan Khundii	Dornogovi	Saikhandulaan	Sacrificial facility
178	Khidan wall road	Dornogovi	Saikhandulaan	Architectural monument – wall road
179	Duulgant khirgisuur	Dornogovi	Saikhandulaan	Tomb (x5)
180	Ikh Dulaan sacred mountain	Dornogovi	Saikhandulaan	Sacrificial facility – ovoo
181	Group of tombs in Havtsgait	Dornogovi	Saikhandulaan	Tomb (x8)
182	Bayan-Ovoo monastery ruin	Dornogovi	Saikhandulaan	Monastery ruin (x30)
183	Bayan-Ovoo sacred mountain	Dornogovi	Saikhandulaan	Sacrificial facility – ovoo
184	Baga dulaan mountain	Dornogovi	Saikhandulaan	Sacrificial facility - ovoo
185	Eye spa	Dornogovi	Saikhandulaan	Architectural monument
186	Stomach spa in UU khutul	Dornogovi	Saikhandulaan	Sacrificial facility
187	Khar Undur tomb	Dornogovi	Saikhandulaan	Tomb

188	Khar Khutul Shine us Well	Dornogovi	Saikhandulaan	Palaeontological monument
189	Alag tsav palaeontological monument	Dornogovi	Saikhandulaan	Palaeontological monument
190	Olon khuree monastery ruin	Dornogovi	Saikhandulaan	Monastery ruin (x100)

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