

Sainshand – Tsagaan Suvarga Transmission Line Project

Environmental and Social Impact Assessment

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Sainshand – Tsagaan Suvarga Transmission Line Project

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7 Air Quality

7.1 Introduction

7.1.1 This chapter presents the likely significant effects of the Project on local air quality. The chapter presents the effects screened in as part of the ESIA scoping report. This is limited to construction phase emissions as no impacts during operation are anticipated.

7.2 Legislative Framework, Policy and Guidance

7.2.1 **Table 7-1** summarises the legislation, policy and guidance of relevance to this assessment.

Table 7-1 Summary of Legislation, Policy and Guidance relevant to Air Quality

Level	Key legislation / policy / guidance
International	<p>EBRD PR1 Assessment and management of environmental and social risks and impacts</p> <p>EBRD PR3 Resource efficiency and pollution prevention</p> <p>EBRD PR4 Health, Safety and Security</p> <p>Directive 2011/92/EU (Environmental Impact Assessment - EIA Directive)¹</p> <p>Design Manual for Roads and Bridges (DMRB) LA105 Air Quality Standard²</p> <p>Institute of Air Quality Management (2024) Guidance on the assessment of dust from demolition and construction³</p>
National Law	<p>Law on Environmental Protection 1995, amended 2012 (REF)</p> <p>Law on Air 1995, amended 2012 (REF)</p>
National Standards	<p>National Air Quality Standards MNS 4585:2016 Air quality⁴. General technical requirements</p> <p>National Air Quality Standards MNS 6063:2010 Acceptable concentration of pollutant elements for atmospheric air in public area⁵.</p>

¹ Available at: European Union. (2011, December 13). *Access to European Union Law*. Retrieved from eur-lex: <https://eur-lex.europa.eu/eli/dir/2011/92/oj/eng>

² National Highways. (2020, 03 31). *Design Manual for Roads and Bridges (DMRB)*. Retrieved from National Highways: [https://nationalhighways.co.uk/suppliers/design-standards-and-specifications/design-manual-for-roads-and-bridges-dmr/](https://nationalhighways.co.uk/suppliers/design-standards-and-specifications/design-manual-for-roads-and-bridges-dmr/2011/92/oj/eng)

³ IAQM. (2024, January 1). *Guidance*. Retrieved from IAQM: <https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf>

⁴ Mongolia Laws. (2016). *MNS 4585:2016*. Retrieved from Mongolia Laws: <https://www.mongolialaws.org/p-210893-mns-45852016.aspx>

⁵ Mongolia Laws. (2010). *MNS 6063:2010*. Retrieved from MongoliaLaws: <https://www.mongolialaws.org/p-215998-mns-60632010.aspx?>

7.2.2 The National Air Quality Standards MNS 4585:2016 of Mongolia set out a range of Limit Values (LVs) for different pollutants including nitrogen dioxide (NO₂), particulate matter less than 10 microns in diameter (PM₁₀) and particulate matter less than 2.5 microns in diameter (PM_{2.5}), the key traffic related pollutants. Sulphur dioxide (SO₂) LVs have also been included. Whilst SO₂ is not a key traffic related pollutant in the UK, the sulphur content in fuel in Mongolia is higher and has therefore been considered in this assessment. The air quality thresholds relevant to this assessment are presented in **Table 7-2**. LVs set out in EU Directive 2024/2881⁶ on ambient air quality and cleaner air for Europe have also been included, as these thresholds are lower.

7.2.3 The World Health Organization's 2021 air quality guidelines⁷ are also a consideration. Although the guidelines are neither standards nor legally binding criteria, they are designed to offer guidance in reducing the health impacts of air pollution based on expert evaluation of current scientific evidence. These guidelines incorporate scientific evidence from multiple countries, which makes them relevant to the diverse conditions around the world and capable of supporting a broad range of policy options for air quality management. They have historically been set at aspirational levels which are typically below those implemented by the EU.

Table 7-2 Air Quality Thresholds Relevant for the Assessment

Pollutant	Averaging Period	Mongolian Limit Value (µg/m ³)* MNS4585:2016	EU Limit Value** (µg/m ³)	WHO Guidelines
NO ₂	annual	40	20	10
	24-hour	50	50 (not to be exceeded more than 18 times per year)	25
	1-hour	-	200 (not to be exceeded more than 3 times per year)	-
PM ₁₀	annual	50	20	15
	24-hour	100	45 (not to be exceeded more than 18 times per year)	45
PM _{2.5}	annual	25	10	5
	24-hour	50	25 (not to be exceeded more than 18 times per year)	15
SO ₂	annual	20	20	-
	24-hour	50	50 (not to be exceeded more than 18 times per year)	40
	1-hour	-	350 (not to be exceeded more than 3 times per year)	-
	20-minute	450	-	-
*Mongolian Limit Values from MNS 4585:2016 **Air quality requirements from Directive (EU) 2024/2881 of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe.				

⁶ European Union. (2024). *Directive (EU) 2024/2881*. Retrieved from EUR-Lex: <https://eur-lex.europa.eu/eli/dir/2024/2881/oj/eng>

⁷ WHO. (2021). WHO global air quality guidelines. Retrieved from World Health Organisation: <https://iris.who.int/handle/10665/345329#:~:text=World%20Health%20Organization.%20%28%E2%80%8E2021%29%E2%80%8E.%20WHO%20global%20air%20quality,3.0%20IGO%20xxi%2C%20273%20p.%20xxi%2C%20273%20p.>

7.2.4 The air quality assessment has been undertaken with due regard to the following pieces of guidance in lieu of local guidance:

- Design Manual for Roads and Bridges (DMRB)⁸ LA 105 Air Quality Standards – to screen construction phase and operational phase traffic against.
- Institute of Air Quality Management (IAQM) Assessment of dust from demolition and construction – to inform the methodology for a construction dust risk assessment which seeks to identify proportionate mitigation measures to implemented during the construction phase as a means of controlling emissions during construction⁹.

7.3 Assessment Methodology

Scope

7.3.1 The construction phase of the Project has the potential to result in temporary air quality impacts due to construction vehicles and dust emissions. The operational phase of the Project may also affect air quality due to vehicle emissions.

7.3.2 National Highways DMRB LA105 states that assessment of vehicle emissions can be scoped out if none of the following flow-based criteria are met:

- Change in Annual Average Daily Traffic (AADT) of 1000 or more,
- Change in Heavy Duty Vehicle (HDV) AADT of 200 or more,

⁸ National Highways. (2020, 03 31). *Design Manual for Roads and Bridges (DMRB)*. Retrieved from National Highways: <https://nationalhighways.co.uk/suppliers/design-standards-and-specifications/design-manual-for-roads-and-bridges-dmr/>

⁹ IAQM. (2024, January 1). *Guidance*. Retrieved from IAQM: <https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf>

- 7.3.3 Based on similar projects, it is expected that both construction and operational Project flows will not exceed these metrics. Therefore, emissions from vehicles are scoped out for both phases.
- 7.3.4 For construction phase dust emissions, the IAQM's construction dust guidance has been utilised to produce a construction dust risk assessment and a schedule of proposed mitigation measures that would seek to minimise emissions from construction activities such as earthworks, trackout (the unintentional transfer of dirt, mud, or other debris onto a paved surface) during the construction phase. The purpose of the dust risk assessment is to provide a proportionate and risk-based approach to the mitigation that should be applied to the Project in terms of dust control.
- 7.3.5 It is understood that no demolition is required as part of the Project, therefore this aspect of the IAQM's methodology has been excluded.
- 7.3.6 No significant air quality impacts are expected during the operation of the Project, therefore the assessment of operational impacts has been screened out.

Study Area

- 7.3.7 A construction dust risk assessment was undertaken to establish the requisite level of mitigation required in order to control dust during construction. The IAQM construction dust guidance provides the relevant assessment methodology for undertaking the dust risk assessment.
- 7.3.8 In accordance with the IAQM construction dust guidance, the Study Area for the construction phase dust risk assessment is:
- Up to 250m from the locations of construction and earthworks activities for human receptors and up to 50m for ecological receptors.
 - Up to 50m from the edge of the roads used by construction vehicles on the public highway, up to 250 m along the road from the point where the vehicle leaves an unpaved track or haul road.

Methodology

Construction stage

- 7.3.9 The method for defining the unmitigated level of dust risk (and corresponding control measures) is qualitative and depends largely on the practitioner collating construction related information and applying professional judgement.
- 7.3.10 The IAQM prompts the practitioner to evaluate the unmitigated dust emission magnitude for construction, demolition, trackout and earthworks associated with a given development, tying this to the sensitivity of the area being assessed. This allows dust risk for each activity to be determined; these risk levels are then used as the basis for informing proportionate mitigation measures which are to be adopted throughout the construction period.
- 7.3.11 The sensitivity of the area to dust impacts, can be defined as low, medium, or high sensitivity, in accordance with IAQM construction dust guidance. The influencing factors to define receptor sensitivity to dust impacts are as follows:
- High – where human receptors are expected to be present continuously for extended periods of time e.g. residential properties, herding camps.
 - Medium – where users would expect to enjoy a reasonable level of amenity and value could be diminished by dust soiling e.g. parks and places of work. designated ecological sites.
 - Low – where enjoyment of amenity would not reasonably be expected and exposure would be for limited periods e.g. footpaths, shopping streets and car parks. Locally designated ecological sites.
- 7.3.12 The scale and nature of the works determines the magnitude of dust arising as small, medium or large. The relevant criteria to define the potential magnitude of dust emissions includes the following factors:
- Small – demolition volume under 12,000m³, demolition activities less than 6m above ground level, total site area less than 18,000m², soil type with large grain size, total building volume less than 12,000m³, construction material with low potential for dust release, less than 20 HDV trips per day, unpaved road length less than 50m, etc.
 - Medium – demolition volume 12,000m³ - 75,000m³, demolition activities between 6m – 12m above ground level, total site area 18,000m² – 110,000m², moderately dusty soil type, potentially dusty construction material, total building volume 12,000m³ - 75,000m³, 20 to 50 HDV trips per day, unpaved road length 50 – 100m, etc.
 - Large – on-site crushing and screening, demolition volume greater than 75,000m³, demolition activities greater than 12m above ground level, total site area greater than 110,000m², more than 10 heavy earth moving vehicles active at any one-time, total building volume greater than 75,000m³, on site concrete batching, sandblasting, more than 50 HDV trips per day, unpaved road length greater than 100m, etc.

7.3.13 Dust risk for each activity (i.e. construction, earthworks and demolition) is defined by qualitatively considering the dust emission magnitude in the context of the sensitivity of area. Mitigation measures commensurate with the dust risk for each activity are then identified.

Sensitive Receptors

7.3.14 Sensitive receptors are defined as the following in the IAQM construction guidance:

- A 'human receptor' is referred by the IAQM as any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM over a time period relevant to the air quality objectives. In the project area this is likely to include permanent residences such as houses, or seasonal residences such as herding camps.
- An 'ecological receptor' is referred to by the IAQM as any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats). Given that the area affected by the Project is desert by nature, it is considered that the flora and fauna will be well-adapted to dusty environments and not as sensitive to the transient dust soiling as ecological receptors based in the UK (where the IAQM guidance is intended to directly apply).

7.3.15 **Table 7-3** summarises the human receptors which have been identified to lie within 250m of the OHTL, where the dust generating activities are likely to take place. The number of gers at each Household ID point was established by use of historic satellite mapping on Google Earth. Analysis showed that the number of gers at a number of the locations varied over time between 2020 and 2025.

Table 7-3 Summary of Sensitive Receptors within the Air Quality Study Area

Household ID	Distance from OTL route (m)	Soum Name	Bagh Name	Type of settlement
HH01	207	Sainshand	Chandmani Bagh	Winter camp 1-2 Gers, Livestock winter shelter, locked barn, broken car
HH02	151	Sainshand	Chandmani Bagh	Winter camp, Livestock winter shelter, barn with wheels, ger
HH03	232	Sainshand	Chandmani Bagh	Winter camp, Truck, broken barn, barn, ger, small ger
HH04	810	Sainshand	Chandmani Bagh	Ger, block fence
HH05	932	Sainshand	Dalaishand Bagh	Winter camp, Ger, kiosk, livestock winter shelter
HH06	716	Sainshand	Dalaishand Bagh	Winter camp, Livestock block winter shelter, barn, solar panel, Ger
HH07	543	Sainshand	Dalaishand Bagh	Winter camp, Livestock winter shelter, broken car wrecks, kiosk
HH08	652	Sainshand	Khaikhhan Bagh	Summer camp, House, solar panel, kiosk, livestock fence-2 Car, Motorcycle

Household ID	Distance from OTL route (m)	Soum Name	Bagh Name	Type of settlement
HH09	525	Sainshand	Khairkhan Bagh	Winter camp, Kiosk, car wreck, livestock winter shelter
HH10	346	Sainshand	Zuunbayan Bagh	Winter camp, Water container, fence made with wheels
HH11	558	Sainshand	Zuunbayan Bagh	Winter camp, A broken bus, 2 kiosk, a winter shelter, and a large water container
HH12	140	Sainshand	Zuunbayan Bagh	Winter camp, Ger, camel fence, water container
SCSWS01	692	Sainshand	Chandmani Bagh	Summer Camp, Ger, livestock fence
SCSWS02	854	Sainshand	Chandmani Bagh	Summer Camp, Ger, livestock winter shelter
SCSWS03	210	Sainshand	Dalaishand Bagh	Summer Camp, Ger
SCSWS04	1125	Ulaanbadrakh	Argalant Bagh	Summer Camp, Ger, car, livestock moving fence
SCS02	1,100	Sainshand	Sainshand	Autumn camp – no structures identified

Significance Criteria

Construction stage

- 7.3.16 The IAQM construction dust guidance categorises the unmitigated risk of dust impacts on human health and amenity (rather than ascribe a significance of effect) as a means of identifying the level of dust emissions mitigation required to ensure that residual effects are 'not significant'. A higher dust risk rating requires more stringent mitigation measures to limit or eliminate residual effects. The risk of dust impact categories are presented in **Table B1-6 to Table B1-8 in Appendix B Construction Dust Risk Assessment Methodology**. A higher dust risk rating requires more stringent mitigation measures to limit or eliminate residual effects.
- 7.3.17 The application of mitigation measures within the ESMP, to be submitted in support of the ESIA, would be applied in a proportionate manner based on the risk criteria set out in the IAQM guidance. For example, in areas where there are no receptors within 250m of works there would be a much lower risk from dust impacts and as such the mitigation would be applied in a suitable manner based on risk and proximity to identified receptors.

Limitations and Assumptions

- 7.3.18 The following assumptions apply to the air quality assessment presented:
- It is assumed that dust emissions would occur along the alignment of the proposed OHTL, therefore the receptors within 250m of this point are identified and included in the assessment.
 - It is assumed that demolition is not proposed and therefore not assessed in the construction dust risk assessment.
 - It is assumed that ecological receptors are not a material consideration in terms of being sensitive receptors as the study area is a large arid and windy area of the Gobi Desert where the flora and fauna are highly adapted to such an environment. The project ecologist has confirmed this position. Further detail on the biodiversity impact of the Project is provided in **Chapter 9: Biodiversity, Flora and Fauna**.
 - It is assumed that the number of construction phase movements along any given road utilised in the construction of the Project would not exceed an annual average daily traffic flow of 1000 vehicles, or 200 HDVs (as an AADT).
- 7.3.19 The following limitations apply to the air quality assessment presented:
- The study area is arid and windy, which in combination contribute to a naturally dusty environment. The IAQM dust guidance is intended for use and application in the UK, which is a temperate and wet climate, where dust concentrations are low. Therefore, the guidance is likely to be considered precautionary when being applied to such a dusty environment. However, the purpose of the dust risk assessment is to identify the level and extent of dust mitigation measures, a number of which can be easily implemented to ensure that the Project is constructed in a responsible manner.
 - There is no information on designated off-road routes to the OHTL alignment. As such it is recommended that a separation distance of 100m is maintained between identified receptors and construction related vehicles and NRMM.

7.4 Baseline Conditions

Existing Data

Climatic conditions relevant to air quality

- 7.4.1 The Study Area is located in the Gobi Desert, which has large flat and sparsely vegetated areas. Strong dust storms significantly reduce visibility, which can negatively impact the safety of construction activities and traffic. Prolonged dust storms can also be detrimental to respiratory health.
- 7.4.2 The majority of dust storms occur in spring when humidity is low, and before the summer rains when soil moisture is low. The Study Area lies in desert steppe across areas that may have up to 180 dusty days per year as shown in **Figure 7-1**.

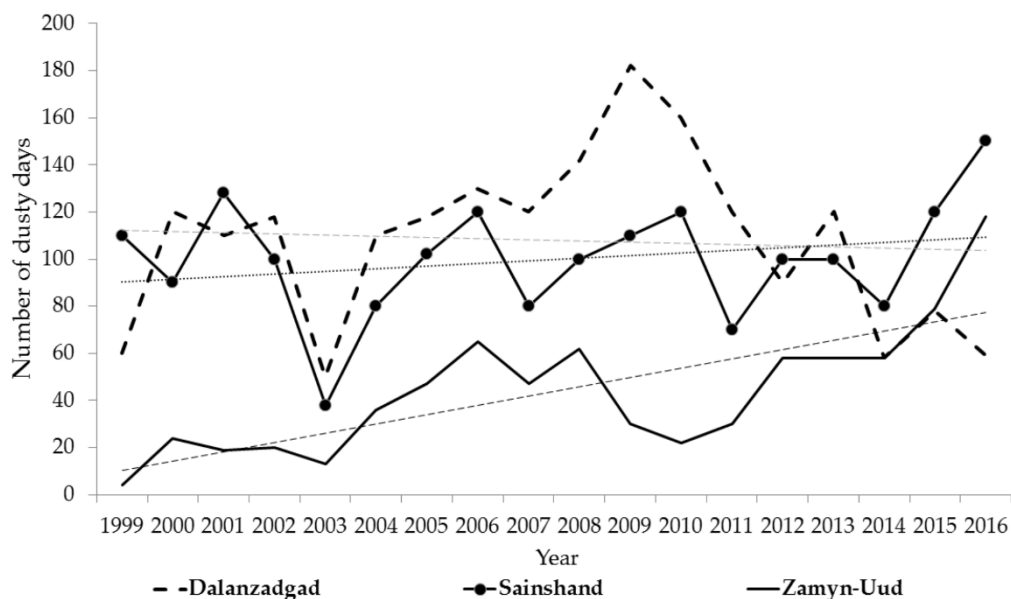


Figure 7-1 Number of dusty days at Dalanzadgad, Sainshand, and Zamyn-Uud between 1999–2016

- 7.4.3 In accordance with Mongolian National Standard, MNS4585:2016, dusty days are those that exceed $PM_{2.5}$ -50 $\mu g/m^3$ and PM_{10} -100 $\mu g/m^3$ as a 24-hour average. These events, in the arid and semi-arid areas of Mongolia, have increased since 1999.

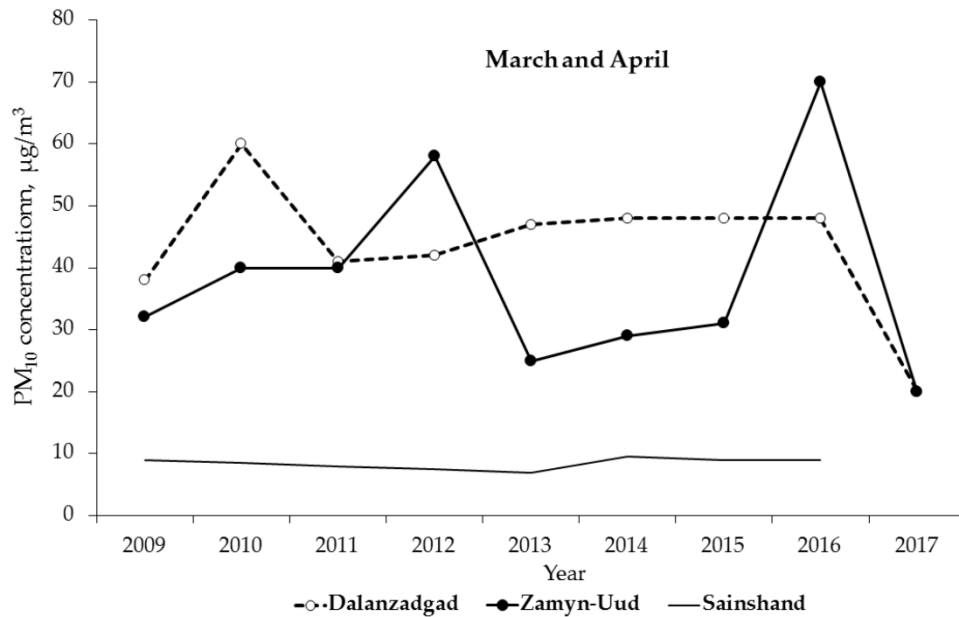


Figure 7-2 Monthly average datasets of PM₁₀ at Dalanzadgad, Sainshand, and Zamyn-Uud in March and April between 2009–2017

7.4.4 Dust storm frequency is higher during March and April than in the other months in Mongolia. The monthly average concentration of PM₁₀ at Dalanzadgad, Sainshand, and Zamyn-Uud were higher in March and April between 2009–2017 (**Figure 7-2**). The higher dust storm frequencies and higher concentrations of PM₁₀ are most likely correlated.

Existing Air Quality Monitoring

7.4.5 There is an automatic air quality monitor located in the centre of Sainshand city (what3words ///starlet.foliage.survives) and is located approximately 4.4km to the north of the OHTL running south of Sainshand. This monitor samples a number of different pollutants and is hosted on the AQI.in website¹⁰. Available recent data for each of NO₂, SO₂, PM₁₀ and PM_{2.5} is summarised in **Table 7-4**.

Table 7-4 Recent air quality monitoring concentrations reported in Sainshand for relevant pollutants

Pollutant	Sampling period	Average Concentration (µg/m³)
NO ₂	01/05/2024-31/12/2024	17
	01/01/2025-30/06/2025	16
SO ₂	01/05/2024-31/12/2024	11
	01/01/2025-30/06/2025	7
PM ₁₀	01/01/2022-31/12/2022	33
	01/01/2023-31/12/2023	20
	01/01/2024-31/12/2024	35

¹⁰ AQI.In. (2025). Saynshand Air Quality Index. Retrieved from AQI: <https://www.aqi.in/dashboard/mongolia/dornogovi/saynshand/saynshand>

Pollutant	Sampling period	Average Concentration (µg/m³)
	01/01/2025-30/06/2025	58
PM _{2.5}	01/01/2022-31/12/2022	30
	01/01/2023-31/12/2023	17
	01/01/2024-31/12/2024	21
	01/01/2025-30/06/2025	20

- 7.4.6 **Table 7-4** shows that NO₂ and SO₂ concentrations in Sainshand are below the annual Mongolian and EU Limit values.
- 7.4.7 PM₁₀ concentrations in Sainshand city have been in exceedance of the annual mean EU Limit Value of 20µg/m³ since PM₁₀ monitoring began in 2022. 2025 appears to be a particularly poor year (to date, July 2025) as it is only the year in which the Mongolian annual mean Limit Value of 50µg/m³ is exceeded.
- 7.4.8 PM_{2.5} concentrations have been in exceedance of the annual mean EU Limit Value of 10µg/m³ since PM_{2.5} monitoring began in 2022. The Mongolian annual mean Limit Value for PM_{2.5} was exceeded in 2022 only.
- 7.4.9 The monitoring results at the Sainshand city monitor indicate that particulate (both PM₁₀ and PM_{2.5}) concentrations are variable year to year and do not show any clear trend. This is likely attributable to weather conditions in the years presented, creating dustier conditions through accelerated re-suspension in drier and windier conditions.

Project Specific Monitoring

- 7.4.10 Project specific air quality monitoring has been undertaken to outline the current state of air quality in the surrounding area of the Project. Monitoring was carried out at six locations selected to represent sensitive receptors potentially affected during the construction of the Project. Measurements were carried out using an Aeroqual Series 500 portable monitoring device. At each location, concentrations of PM₁₀ and PM_{2.5} were continuously recorded over a 24-hour period.
- 7.4.11 The PM_{2.5} and PM₁₀ monitoring results are presented in **Table 7-5** and the monitoring locations are displayed in **Figure 7-3** below.

Table 7-5 Project Specific Monitoring PM₁₀ and PM_{2.5} Concentrations

Site ID	Site Description	Coordinates, Decimal degree		PM ₁₀		PM _{2.5}	
		N°	E°	Average Concentration (24-hour measurement), µg/m³	Maximum Value (24-hour measurement), µg/m³	Average Concentration (24-hour measurement), µg/m³	Maximum Value (24-hour measurement), µg/m³
AQ1	Site for building the	44.93	110.20	8.9	33	5	11

Site ID	Site Description	Coordinates, Decimal degree		PM ₁₀		PM _{2.5}	
		N°	E°	Average Concentration (24-hour measurement), µg/m ³	Maximum Value (24-hour measurement), µg/m ³	Average Concentration (24-hour measurement), µg/m ³	Maximum Value (24-hour measurement), µg/m ³
	Sainshand substation						
AQ2	Approximately 12 km from the OTL route (from Sainshand), outside a household	44.85	110.14	7.4	22	4.7	9
AQ3	Approximately 22 km along the OTL route (from Sainshand), behind Jirem well	44.81	110.02	16.7	84	6.1	8.6
AQ4	Approximately 67 km along the OTL route, to the east of Modon Shand well	44.52	109.66	15.4	98	5.4	41
AQ5	Approximately 141 km along the OTL route, in front of a household	44.16	108.90	7.5	59	4.5	11
AQ6	Behind the Tsagaansuurga substation site	43.88	108.34	8.1	87	4.6	17

7.4.12 **Table 7-5** demonstrates that the monitored PM₁₀ and PM_{2.5} concentrations over the 24-hour monitoring period are below the limits set by Mongolia's National Air Quality Standard and WHO presented in **Table 7-2**. Given that the region experiences frequent and intense dust storms throughout the year, and project specific monitoring has only been conducted over a 24-hour period, it can be assumed this data is not reflective of an annual average comparable with annual average limit values.

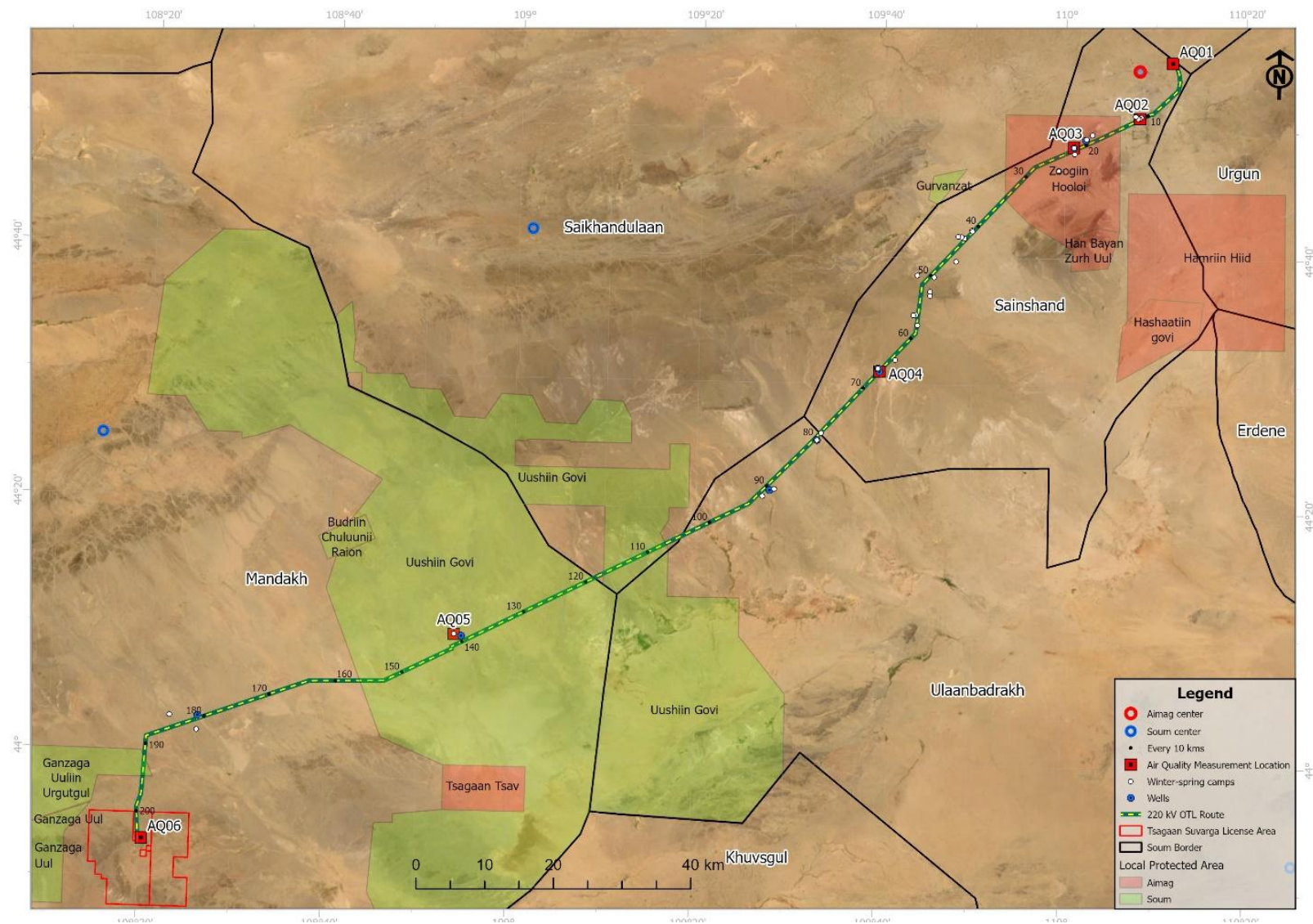


Figure 7-3 Air Quality Monitoring Locations

7.5 Potential Impacts and Effects

Construction Phase

- 7.5.1 The construction dust risk assessment and methodology are set out in **Appendix B Construction Dust Risk Assessment Methodology**. The construction dust assessment has been undertaken in accordance with the IAQM construction dust guidance which advocates a worst-case approach applying the highest sensitivity and risk classifications based on the information available. The IAQM guidance is primarily targeted towards controlling emissions on discrete construction sites, therefore professional judgement has been applied to account for the transitory nature of the construction phase of the Project (i.e. working on several towers at a time, then moving to the next set of towers).
- 7.5.2 The overall construction period is expected to be two years in duration, across a sparsely populated area, and the length of time that any construction activities are to fall within 250m of any receptors is likely to be minimal as the proposed construction activities are transient both geographically and temporally.

Dust Emissions Magnitude

- 7.5.3 The potential dust emission magnitudes have been determined in accordance with the IAQM construction dust guidance for the following construction activities; earthworks, construction and trackout. No demolition activities are proposed for the Project; therefore this has not been considered further in the assessment. **Table 7-6** below summaries the dust emission magnitudes for earthworks, construction and trackout.

Table 7-6 Construction Dust – Magnitude of Emissions

Activity	Dust Emission Magnitude
Demolition	No demolition proposed – not considered further
Earthworks	Small
Construction	Small
Trackout	Medium

- 7.5.4 The unmitigated dust emissions magnitude was categorised as small for earthworks. This is justified as the total site area subject to earthworks will be relatively small in any given locality and will primarily involve levelling and excavation of tower foundations. It is unlikely that the number of heavy earth moving vehicles active within 250m of any receptor at one time will be greater than five.
- 7.5.5 Construction activities (i.e. the erection of structures) are considered to be small in magnitude. This is justified based on the OHTL towers being of metal construction, which is a material with low potential for dust release. It is assumed that any concrete foundations will be pre-fabricated. The duration of build at any given tower site is likely to be relatively brief given the number of towers which need to be erected, and the two-year construction phase.

- 7.5.6 The unmitigated dust emissions magnitude for trackout is considered to be medium. This is justified based on the dusty, dry and unvegetated nature of the surface material around the OHTL alignment. It is not known how many outward HDV movements would be required at any given worksite, however it is unlikely to be more than 20 HDVs in a given day along the alignment.

Sensitivity of Area

- 7.5.7 Sensitivity of area is based on the type, number and distance of receptor(s) which fall within the study area. The most sensitive receptors are residences (i.e. the *gers*).

Table 7-7 Summary of the Sensitivity of the Surrounding Area

Potential Impact	Sensitivity of the surrounding area			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	N/A	Low Sensitivity	Low Sensitivity	Low Sensitivity
Human health	N/A	Low Sensitivity	Low Sensitivity	Low Sensitivity

- 7.5.8 In any given location, the number of receptors within 250m of the OHTL alignment, or within 50m of haul routes is expected to be less than 10, and in most cases less than five. The majority of the receptors are located more between 100-250m from the OHTL alignment and therefore the risk is lower than if the receptors were located closer.
- 7.5.9 It is considered that the sensitivity of area (as defined in the guidance) is low for both dust soiling and impacts on human health as a result of the large distances to receptors and the low density of the receptors themselves.
- 7.5.10 For trackout, the haul routes are not yet known. As there are no paved roads connecting the OHTL route with the main highways, it is assumed that the vehicles may move in an uncoordinated manner across the largely uninhabited and uncultivated land and pass within 20m of receptors. It is recommended that setback distances for haul roads/routes are maintained for each receptor to avoid trackout emissions, maintaining a separation distance of 100m or more where possible.

Calculated unmitigated dust risk

- 7.5.11 The unmitigated dust risk is low for all activities. Therefore, general mitigation measures and those specific to earthworks, construction and trackout commensurate with a low-risk project should be adopted to ensure that dust impacts are not significant. This is likely to be a conservative position as vast swathes of the OHTL alignment do not have any receptors within 250m. The mitigation measures are presented in section 7.6 Mitigation and Enhancement Measures.

Table 7-8 Summary of the Risk of the Study Area

Potential Impact	Potential Risk			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	N/A	Low Risk	Low Risk	Low Risk
Human health	N/A	Low Risk	Low Risk	Low Risk

- 7.5.12 A common-sense approach to construction mitigation should be adopted given the relatively unconstrained nature of the study area. In those areas where there are no receptors which could be affected (i.e. no receptors within 250m of relevant construction activities), then there is no obligation to apply any mitigation measures beyond those legally required. However, in addition to following the construction norms that apply to the energy sector, it is recommended that the measures be implemented as best practice and as a means of protecting the workforce and reducing their exposure to dust.

7.6 Mitigation and Enhancement Measures

Construction Phase

- 7.6.1 Mitigation measures as recommended by the IAQM construction dust guidance for a low-risk site are presented in **Table 7-9**. As the guidance is intended for use in the UK which is a very different environment from Mongolia's Gobi Desert, a number of impractical or unachievable measures have been removed.

Table 7-9 Proposed Dust Mitigation Measures based on the IAQM Construction Dust Guidance

Mitigation Measure	Medium Risk Measures. H=Highly Recommended. D=Desirable
Communications	
Develop and implement a stakeholder communications plan with communities and nearby herder camps within 250m of proposed works.	D
Site Management	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	H
Maintain a log of dust-based complaints	H
Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.	H
Monitoring	
Undertake inspections where receptors (including roads) are nearby, to monitor dust, record inspection results.	D
Carry out regular site inspections to monitor compliance with the schedule of mitigation measures	H
Preparing and maintaining the site	
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H
Erect solid screens or barriers around dusty activities or the site boundary so that are at least as high as any stockpiles on site if the construction activity is prolonged and there are receptors nearby.	H
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site, cover as described below.	D
Cover, seed or fence stockpiles to prevent wind whipping.	D
Operating vehicle/machinery and sustainable travel	
Ensure all vehicles switch off engines when stationary - no idling vehicles.	H

Mitigation Measure	Medium Risk Measures. H=Highly Recommended. D=Desirable
Operations	
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays	H
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H
Use enclosed chutes and covered waste or materials containers.	H
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	D
Waste Management	
Avoid bonfires and burning of waste materials.	H
Construction	
Avoid scabbling (roughening of concrete surfaces) if possible.	D
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	D
Trackout	
Avoid dry sweeping of large areas.	D
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	D
A separation distance of 100m is maintained between gers and construction related vehicles and NRMM.	D

7.7 Residual Effects

- 7.7.1 Assuming the relevant mitigation measures outlined in **Table 7-9** are implemented, the residual effect from all dust generating activities is predicted to change from a low risk to **not significant**.

8 Noise and Vibration

8.1 Introduction

- 8.1.1 This chapter presents the likely significant effects of the Project resulting from noise and vibration. The chapter presents the potential effects created during both the construction and operational phases of the Project.

8.2 Legislative Framework, Policy and Guidance

- 8.2.1 **Table 8-1** summarises the legislation, policy and guidance of relevance to this assessment.

Table 8-1 Summary of Legislation, Policy and Guidance relevant to Noise and Vibration

Level	Key legislation / policy / guidance
International	<p>World Health Organization (WHO) Guidelines for Community Noise (1999)</p> <p>WHO Night Noise Guidelines (2009)</p> <p>International Finance Corporation (IFC) World Bank Group, Environmental, Health, and Safety (EHS) Guidelines (2007)</p> <p>European Union (EU) EIA Directive (2014/52/EU)</p> <p>European Bank for Reconstruction and Development (EBRD) Performance Requirement 1 (PR1): Assessment and Management of Environmental and Social Impacts and Issues</p> <p>EBRD PR3: Resource Efficiency and Pollution Prevention and Control</p> <p>EBRD PR4: Community Health, Safety and Security</p> <p>British Standards Institution: (BSI) BS 5228-1 2009 (+A1:2014): Code of practice for noise and vibration control on construction and open sites: Part 1 Noise</p>
Mongolian National Law	<p>Law on Environmental Protection 1995, amended 2012</p> <p>Law on Air 1995, amended 2012</p> <p>Law on Environmental Impact Assessment 1998, amended 2002 and 2012</p>
Mongolian National Standards	<p>MNS 4585:2016: Air Quality. General Technical Requirements</p> <p>MNS 5003:2000. General Requirements for the Measurements of Noise</p> <p>MNS 5002:2000. Occupational Safety and Health. Noise. Requirements for General Safety.</p>

8.3 Assessment Methodology

Scope

- 8.3.1 The scope of the noise and vibration assessment covers:

Construction

- The Project has the potential to result in temporary noise impacts due to noise generating equipment and noise from construction works.

- Vibration levels from typical mobile construction equipment and CFA piling operations are generally imperceptible at distances greater than around 20m from the source. It is expected that vibration generating equipment will not be located at distances less than 20m from any noise sensitive receptor for any prolonged period of time. On this basis there are no anticipated significant adverse effects from construction vibration.

Operational

Noise and vibration from additional operational plant from the Tsagaan Suvarga substation

- The operation of additional transformers and other electrical plant that are likely to be required to accommodate the new OHTL into the grid at the Tsagaan Suvarga substation may give rise to noise impacts at the closest noise sensitive receptors.
- Effects from vibration from additional operational plant has been scoped out of this assessment.

Corona noise

- Consideration has been given to current advice from other electricity utility companies including the National Grid in the United Kingdom (UK), and studies undertaken considering the issue of Corona noise. Corona noise is the breakdown of air into charged particles caused by the electrical field at the surface of conductors and manifests as a crackling or hissing sound.
- Specifically, the current National Grid advise that operational audible noise from electricity OHTLs occurs at a conductor surface voltage gradient or electrical stress level of approximately 17 to 20 kilovolts per centimetre (kV/cm). The electrical stresses on a 220kV circuit would be significantly lower than 17 to 20 kV/cm, and as such, these circuits would virtually never produce noise.
- Furthermore, empirical measurement studies undertaken by RPS (EirGrid Evidence Based Environmental Studies Study 8: Noise, May 2016) concluded that *“The results from the 110kV and 220kV overhead line surveys present strong evidence that these lines are not likely to result in a significant noise impact in their vicinity. On this basis, the planning of 110kV and 220kV lines should not be significantly constrained on the basis of potential noise issues”*. The document was produced with the intention *“for use by professionals working in the area if environmental impact assessment for transmission lines”* and was *“intended to inform best practice in future planning of this infrastructure”*.
- As the Project is a 220kV OHTL it is reasonable to conclude, that in any environment, and in conjunction with the advice of UK National Grid, that this facet of the assessment can be scoped out, with no assessment being required to be undertaken of OHTL generated noise.

Study Area

- 8.3.2 The study area has been determined based on the extent of the area where changes in noise over existing ambient levels could affect noise sensitive receptors.
- 8.3.3 Noise sensitive receptors that have been identified are stated in **Table 8-2** below.

Methodology

Construction

- 8.3.4 Potential noise impacts during construction have been considered in accordance with British Standard (BS) 5228:2009 (+A1:2014): Code of practice for noise and vibration control on construction and open sites; Part 1 Noise.
- 8.3.5 At the time of undertaking this assessment there is no specific detailed construction information (duration, programme, construction locations, detailed operating arrangements, etc.) relating to the Project available upon which to base a detailed assessment of impacts from noise generated during the construction phase.
- 8.3.6 However, **Section 2.8** of this ESIA lists the general types of equipment that could be required by the Construction Contractor for a project of this nature, based on similar projects in Mongolia and the UK, and this has therefore been used as a basis for the construction noise assessment for the Project.

Operation

- 8.3.7 Operational impact significance is defined in accordance with the more stringent night-time noise limits as set out in the Mongolian noise standard document Ambient Air Quality Standards *MNS 4585:2016 Air Quality. General Technical Requirements* and the International Finance Corporation (IFC) General Environmental, Health, and Safety (EHS) Guidelines¹¹.
- 8.3.8 At the time of undertaking this assessment, there is no specific detailed transformer source noise level information to base an assessment of impacts from operational noise. However, based on upon experience on similar schemes in the UK as GIP, it is reasonable to assume this type of plant would be in the region of 85 dB(A) at a distance of 1m. As such, the operational assessment is based on this figure.

Sensitive Receptors

- 8.3.9 A desk-based review using satellite imagery has been carried out in order to identify noise sensitive receptors along the length of the proposed Project, which has been verified by the local ESIA Team on the ground. In general, the route proposed for the transmission line is sparsely populated and has desert vegetation characteristics of the Gobi desert through which the transmission line crosses.
- 8.3.10 Potential receptors which are considered as sensitive with regards to noise (camps), include:

¹¹ Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, World Health Organization (WHO), 1999

Table 8-2 Details of Identified Noise Sensitive Receptors

Receptor Number	Receptor Type (Camp)	Approx. distance to the Project OHTL	Co-ordinates (Northing and Eastern) - WGS 84 / Pseudo-Mercator Projection ESPG:3857)	Receptor Number	Receptor Type (Camp)	Approx. distance to the Project OHTL	Co-ordinates (Northing and Eastern) - WGS 84 / Pseudo-Mercator Projection ESPG:3857)
HH01	Winter	0.2	44°51'14.76" N 110°08'21.91" E	HH11	Winter	0.5	44°31'55.61" N 109°41'33.11" E
HH02	Winter	0.1	44°51'08.18" N 110°08'09.56" E	HH12	Winter	0.1	44°26'08.09" N 109°33'20.84" E
HH03	Winter	0.2	44°51'08.18" N 110°08'01.00" E	SCSWS01	Summer	0.5	44°51'30.71" N 110°08'17.84" E
HH05	Winter	0.9	44°49'48.63" N 110°02'59.89" E	SCSWS02	Summer	0.6	44°51'34.56" N 110°08'11.94" E
HH06	Winter	0.7	44°49'28.38" N 110°02'19.72" E	SCSWS03	Summer	0.2	44°42'12.24" N 109°49'49.19" E
HH07	Winter	0.6	44°48'17.98" N 110°01'01.45" E	HH08	Summer	0.6	44°41'40.50" N 109°48'40.25" E
HH09	Winter	0.6	44°38'28.36" N 109°45'42.91" E	SCSWS04	Summer	1.1	44°21'39.00" N 109°28'31.62" E
HH10	Winter	0.2	44°35'29.57" N 109°43'44.47" E	SCS02	Autumn	1.0	44°41'42.29" N 109°48'17.78" E

- 8.3.11 It should be noted that there is the potential that some of the more transient Summer/ Autumn camps are no longer situated the exact locations as specified in the above table. It is also possible that there may some additional camps in which residents have settled in the locality since the desk-based review and local ESIA Team household survey was taken.
- 8.3.12 Despite these limitations it is evident that the area through which the OHTL will pass is sparsely populated with many of the dwellings (mainly camps including gers) having the capability to relocate to another area should the residents choose.

Significance Criteria

Construction Stage

- 8.3.13 Construction impact significance is defined in accordance with Mongolian noise standards set out in the document Ambient Air Quality Standards *MNS 4585:2016 Air Quality. General Technical Requirements*. Significant effects are therefore defined as occurring where the Mongolian limits for noise during the daytime are reached or exceeded:
- Daytime between 07:00 and 22:00 (15hr) at 60 dB or above.

8.3.14 In the absence of specific information available at the time of this assessment it is assumed that construction activities will be limited to take place during the daytime period only (07:00 – 19:00).

8.3.15 In addition to the determination of significance based upon the Mongolian standard as set out above consideration has also been given to the threshold of significance for construction noise, based on the UK guidance within BS 5228:2009 (+A1:2014), which is provided in the table below. Following this UK guidance, the threshold would be defined in accordance with the 'ABC Method' of BS5228:2009 (+A1:2014) which is suitable for the consideration of impacts upon residential receptors.

Table 8-3 Threshold of significant effect at dwellings from construction noise (BS 5228-1:2009+A1:2014)

Assessment Category and Threshold Value Period	Threshold Value, in decibels (dB)		
	Category A ^{A)}	Category B ^{B)}	Category C ^{C)}
Night time (23:00 – 07:00)	45	50	55
Evenings and weekends ^{D)}	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

A) Category A is the threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

B) Category B is the threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.

C) Category C is the threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.

D) 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays

8.3.16 In accordance with the UK's BS5228 'ABC Method' for defining construction noise thresholds and applying the measured baseline sound levels obtained from the survey undertaken which is presented in **Section 8.4**, the following limits apply:

- Appropriate thresholds for construction defined against the baseline noise climate along the Project conclude Category A criteria would be specified, which for the daytime construction period specifies a limit of 65 dB(A) at or above which is deemed to be a significant effect.

8.3.17 With reflection of Significant Effects determined through the application of the Mongolian standards and the UK's BS5228 ABC Method it is concluded that assessment against the Mongolian standards presents an absolute worst-case assumption with regard to the potential limits between the hours of (07:00 – 19:00) and as such it is adopted to define significant effects for the assessment presented in this chapter.

Operational Stage

8.3.18 Significant effects are defined where the Mongolian limits (which also accord with the IFC General EHS Guidelines) for noise during the night-time period are exceeded:

- night-time between 22:00 and 07:00 (9hr) at 45 dB.



- 8.3.19 It should be noted that in accordance with the above stated standards and guidance the significance criteria for the night-time, which has a higher sensitivity, is more stringent than the daytime significance criteria. Therefore, in meeting the more stringent night-time criteria significant effects will not occur during the daytime by default. As such it is only necessary to consider the night-time criteria in this assessment.

Limitations and Assumptions

- 8.3.20 The following assumptions and limitations underpin the noise assessment of the Project:
- Construction activities would occur during the daytime period only (between 07:00 – 19:00) with no construction work taking place outside of these times.
 - The assessment of the Project in this Chapter is based upon the desk-based review using satellite imagery complemented by information on the gathered on the ground by the local ESIA Team; the consideration is also made that all identified receptors are sensitive relating to noise.
 - Other than the receptors identified in
 -
 -
 - Table 8-2 no other sensitive receptors (such as schools, colleges, medical facilities etc.) have been identified.

8.4 Baseline Conditions

- 8.4.1 A baseline noise survey was undertaken by EcoTrend at representative locations to establish the existing noise environment along the 204km double circuit 220 kV OHTL route alignment between 22 and 28 June 2025.
- 8.4.2 Measurements were taken at six monitoring locations selected to be representative of sensitive receptors along the proposed route of the OHTL. Unattended measurements were taken over a continuous 24-hour period to obtain data for a daytime (07:00 – 23:00) period and a night-time (23:00 – 07:00) period. During the 24-hour monitoring period at each location measurements were taken as continuous 10-minute intervals.
- 8.4.3 Weather conditions were also monitored during the survey so that any measurements taken during periods of strong winds (over 5m/s) and heavy rain could be removed from the data gathered when processed after the survey. Measurements are only valid where:
- Wind speed is below 5m/s;
 - Existing roads are dry; and
 - There is no rain.



- 8.4.4 During the noise monitoring, wind speeds fluctuated between 0.4 and 2.7m/s, and air temperatures ranged from a low of 26.0°C to a high of 40.1°C and there was no rain. As such it was not necessary to eliminate any data from the survey.
- 8.4.5 The 24-hour noise monitoring was undertaken at six locations referenced as N01 – N06. The grid coordinates for each monitoring location are provided in Table 8-4 below and their location indicated on **Figure 8-1**.

Table 8-4 Coordinates of Noise Monitoring Points

Ref. No.	Co-ordinates (Northing and Eastern) - WGS 84 / Pseudo-Mercator Projection ESPG:3857		Description
	N	E	
N01	44°55'30.11" N	110°11'47.62" E	Situated at the proposed Sainshand substation construction site.
N02	44°51'07.92" N	110°08'11.76" E	Situated approximately 12km from the OHTL route extending from Sainshand, in close proximity to a herder household.
N03	44°48'47.88" N	110°00'58.48" E	Situated approximately 22km along the OHTL route from Sainshand, positioned behind Jirem well.
N04	44°31'00.41" N	109°39'50.98" E	Situated approximately 67km from Sainshand along the OHTL route, positioned to the east of Modon Shand well.
N05	44°09'41.44" N	108°53'49.24" E	Situated approximately 141km along the OHTL route from Sainshand, positioned directly in front of a household.
N06	43°52'59.41" N	108°20'22.78" E	Situated in the proximity of the Tsagaan Suvarga substation site.

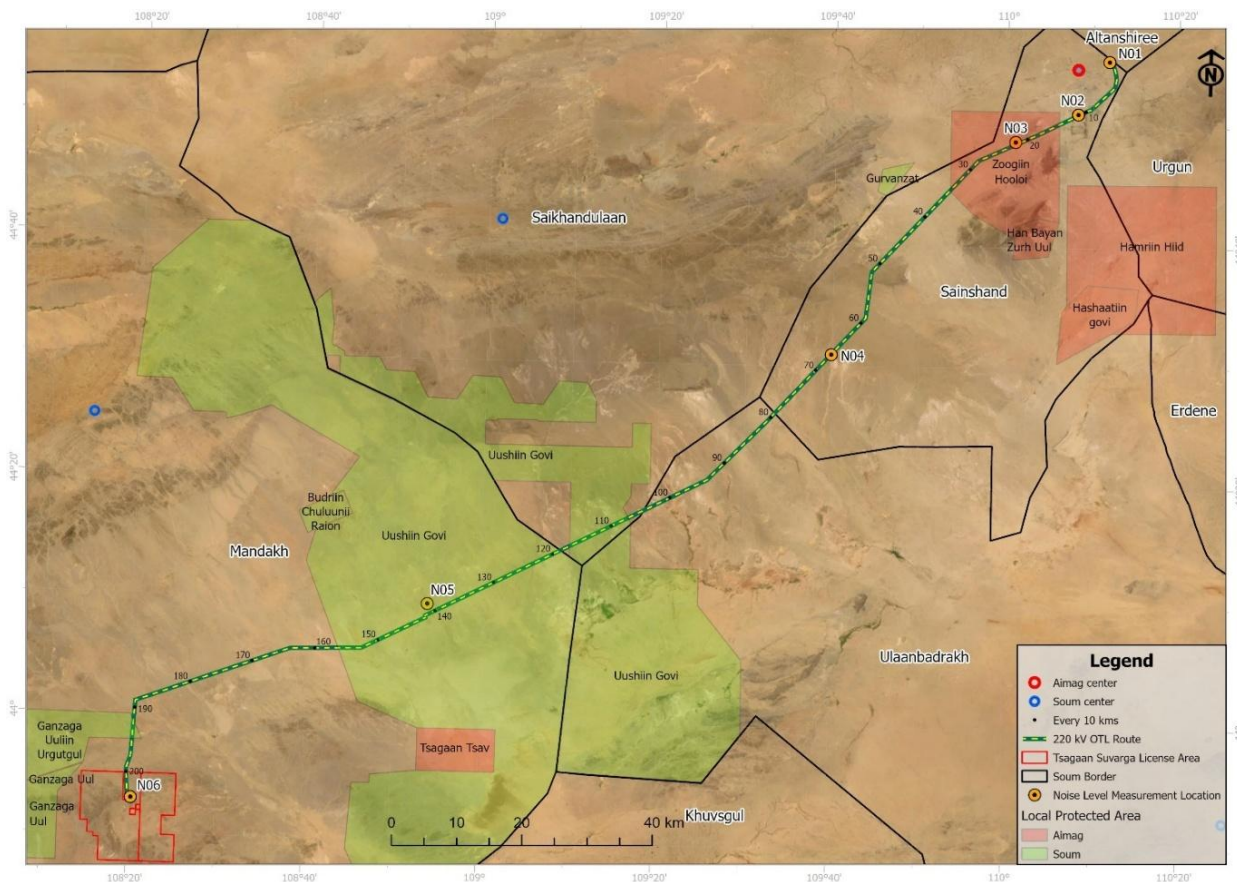


Figure 8-1 Location of Noise Monitoring Locations

8.4.6 Table 8-5 and Table 8-6 below show the noise measurements from the 24-hour monitoring locations.

Table 8-5 Noise Monitoring Results for the Daytime Period (07:00 – 23:00)

Ref. No.	24-hour survey Date and Start Time	24-hour survey Date and Finish Time	Measurements Daytime dB(A) Min	Measurements Daytime dB(A) Max	Measurements Daytime Log Average (22:00-07:00) dB(A)
N01	14:11 (22.06.25)	14:11 (23.06.25)	32.6	54.6	44.1
N02	14:47 (23.06.25)	14:47 (24.06.25)	34.3	57.1	44.8
N03	15:21 (24.06.25)	15:11 (25.06.25)	34.9	59.1	44.1
N04	16:15 (25.06.25)	16:15 (26.06.25)	32.7	51.2	42.5
N05	17:53 (26.06.25)	17:53 (27.06.25)	30.3	47.8	42.1
N06	19:26 (27.06.25)	19:26 (28.06.25)	35.8	55.0	47.1

Table 8-6 Noise Monitoring Results for the Night-time Period (23:00 – 07:00)

Ref. No.	24-hour survey Date and Start Time	24-hour survey Date and Finish Time	Measurements Night-time dB(A) Min	Measurements Night-time dB(A) Max	Measurements Night-time Log Average (22:00-07:00) dB(A)
N01	14:11 (22.06.25)	14:11 (23.06.25)	31.5	44.8	39.1
N02	14:47 (23.06.25)	14:47 (24.06.25)	31.8	45.4	38.5
N03	15:21 (24.06.25)	15:11 (25.06.25)	31.7	45.5	38.4
N04	16:15 (25.06.25)	16:15 (26.06.25)	31.4	44.8	38.8
N05	17:53 (26.06.25)	17:53 (27.06.25)	29.4	44.0	36.8
N06	19:26 (27.06.25)	19:26 (28.06.25)	36.2	48.6	44.2

8.4.7 The baseline noise measurements conducted at the six, 24-hour monitoring locations, N01 to N06, reveal that both daytime and night-time noise levels are consistently below the permissible limits set by the Mongolian National Air Quality Standard MNS 4585:2016 and the IFC General EHS Guidelines.

8.5 Potential Impacts and Effects

Construction Phase

8.5.1 The scope of the construction noise assessment covers the potential for adverse effects from noise-generating equipment and construction activities on noise sensitive receptors, relating to:

- Earthworks and foundations;
- Erection of towers and poles; and,
- Consideration of vibration impacts associated with construction activities.

8.5.2 The construction noise study area represents the extent over which changes in noise relative to existing ambient noise levels and defined construction noise thresholds could adversely affect noise sensitive receptors. The construction noise study area during the daytime is expected to be limited to within 300 m of proposed construction activities.

8.5.3 Noise impacts on fauna and construction workers (occupational health and safety) are considered outside of the scope of this Chapter and are contained within the relevant sections of this ESIA.

Construction Activities

8.5.4 Typical plant and equipment that may be employed within the construction of a overhead transmission line project such as this (**Section 2.8**), and the corresponding noise levels from BS 5228-1 2009 (+A1:2014)¹², are shown below in **Table 8-7**.

8.5.5 The percentage of the assessment period for which each plant item is operational has been considered based upon experience of the assessment of the construction of similar projects in the UK. From previous experience on similar schemes in the region an on-time of 25% is assumed for all plant/activities within this appraisal, to account for the intermittent nature of such activities.

Table 8-7 List of typical activities, construction plant, and associated noise level

Construction plant	BS5228 Table Reference	Activity equivalent continuous sound pressure level, dB at 10m
Earthworks and foundations		
Tracked Excavator	Table C.2 (3)	72.0
Dumper	Table C.4 (8)	50.0
Generator	Table C.4 (76)	55.0
Compressor	Table C.3 (19)	69.0
Ride On Roller	Table C.5 (20)	69.0
Ramax Roller	Table C.2 (41)	74.0
Whacker Plate (Excavator)	Table C.2 (42)	72.0
Continuous Flight Auger Piling (Soilmec CM45)	Table C.12 (42)	71.0
Earthworks and foundations (Total)		78.6
Erection of towers and poles		
Telescopic handler	Table C.4 (54)	73.0

¹² British Standard BS5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*

Construction plant	BS5228 Table Reference	Activity equivalent continuous sound pressure level, dB at 10m
Wheeled mobile telescopic crane (400t)	Table C.4 (38)	72.0
Erection of towers and poles (Total)		75.5

8.5.6 **Table 8-8** below presents the indicative construction activity noise levels over a range of distances (assuming hard ground and no effective screening between construction activity and noise sensitive receptor, to represent a reasonable worst-case assessment).

8.5.7 The noise levels presented assume free-field and enable consideration against the appropriate noise limits defined in the Mongolian guidance. **Table 8-8** indicates that at distances of up to 90m the Mongolian day time threshold of 60 dB could potentially be exceeded and appropriate Best Practicable Means (BPM) mitigation considered and implemented.

Table 8-8 Indicative construction activity and associated noise level over varying distances

Construction Activity	Construction Activity noise level dB $L_{Aeq,T}$ at receiver (m)									
	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
Earthworks and foundations	78.6	72.6	69.1	66.6	64.6	63.1	61.7	60.6	59.5	58.6
Erection of towers and poles	75.5	69.5	66.0	63.5	61.5	60.0	58.6	57.5	56.4	55.5
Construction Activity	Construction Activity noise level dB $L_{Aeq,T}$ at receiver (m)									
	125m	150m	175m	200m	225m	250m	275m	300m	325m	350m
Earthworks and foundations	56.7	55.1	53.8	52.6	51.6	50.7	49.8	49.1	48.4	47.7
Erection of towers and poles	53.6	52.0	50.7	49.5	48.5	47.6	46.7	46.0	45.3	44.6

Construction Noise Impact Assessment

8.5.8 Whilst prediction methods are available to determine the level of noise during construction activities, the precision of any such predictions is limited by the information available at the time.

8.5.9 At the time of undertaking this assessment, the Construction Contractor has yet to be appointed, therefore specific details on the construction plant, methodologies and programme are not available. However, based on similar projects, a qualitative/quantitative assessment has undertaken to consider the potential for temporary noise impacts from construction works. It is reiterated that this consideration is based entirely upon the available information at the time of writing, previous similar experience, and professional judgement.



- 8.5.10 Temporary noise effects will occur as a result of the use of equipment, earthworks, and the movement of materials/personnel. Indicative plant and construction activity noise levels are presented in **Table 8-7** above. The noisiest construction activities will be earthworks for the tower foundations.
- 8.5.11 Where materials need to be transported to or from sites, the effects of the additional traffic along existing roads and routes are likely to extend beyond the immediate construction corridor; however, it is anticipated that most construction traffic will use the Project footprint and therefore the works area and haul road will be the same in many areas.
- 8.5.12 Noise impacts are not expected from quarrying operations, as the use of pre-fabricated concrete foundations eliminates the need for quarrying (see **paragraph 2.8.15**).
- 8.5.13** The proposed route of the OHTL predominantly runs through very sparsely populated desert areas where there are some nomadic camps inhabiting the area along the route (
- 8.5.14**
- 8.5.15**
- 8.5.16 Table 8-2). The temporary nature of the works means that the potential for disturbance is likely to be limited as a result of timings and distances.
- 8.5.17 Taking into account the significance value defined in **Section 8.3**, and the levels identified in **Table 8-8** as a guide, an exceedance of 60 dB is possible within 90 m of activities, depending on the construction machinery to be used. The predicted construction noise levels therefore have the potential for significant adverse effects on receptors within approximately 90 m distance from the noisy activities associated with construction.
- 8.5.18 No noise sensitive receptors have been identified within 90m (0.09 km) of the route alignment within which a significant effect from construction noise is likely to occur. Taking account of the nomadic nature of those living in the area, and the portability of the camps and gers, it is possible there may be some additional inhabitants within 90m of the OHTL that have located there since the information was gathered on the ground by the local ESIA Team that would likely be subject to significant effects from construction noise. Should that be the case, although the number cannot be determined precisely, the number if any, can reasonably expected to be very low.

Operational Phase

- 8.5.19 Prediction methods are available to determine the level of noise from the operational plant, however, the precision of any such predictions is limited by the information available at the time.
- 8.5.20 As per the construction noise impact assessment, a qualitative/quantitative assessment has been undertaken to consider the potential for noise impacts from additional transformers at the Tsagaan Suvarga substation. It is reiterated that this consideration is based entirely upon the available information at the time of writing, previous similar experience, and professional judgement.

- 8.5.21 Assuming the source noise level as 85 dB (A) at 1m, and assuming one extra point source transformer propagating as such, anything within approximately 100 m of the assumed source noise would potentially be subject to a significant effect at night-time noise level of greater than 45 dB. It should be noted however, that no sensitive receptors have been identified within this distance at the time of undertaking this assessment, with the nearest receptor being over 2 km away from the substation.

8.6 Mitigation and Enhancement Measures

Construction Phase

- 8.6.1 As detailed within **Section 8.5**, the qualitative/quantitative assessment of construction noise based upon the assumptions embodied within the scope of this assessment (**Section 8.3**) concludes that there is a potential for significant effects to occur at sensitive receptors during the construction of the Project, and as such the conclusion is drawn that mitigation specific to noise will need to be considered. Generally, the mitigation would be defined under the principles of BPM and would be specified to reduce noise and vibration levels as far as reasonably possible.
- 8.6.2 During the construction phase, the following mitigation measures will be implemented:
- The construction machinery and equipment specified, purchased, and used should produce noise and vibration within the permissible levels of relevant standards; or be equipped with noise reduction devices where necessary to ensure noise emission levels of vehicles and machineries comply to national standards.
 - Regular inspection of vehicle noise emission and timely maintenance to prevent noise emissions from increasing due to poor maintenance.
 - Conduct regular noise monitoring at active construction sites to consider the noise generation against the appropriate local standards.
 - Communication will be undertaken with the local herder households along the route to notify in advance of activities with the potential to generate higher levels of noise and/or vibration and the measures implemented to control noise and/or vibration. A dedicated grievance mechanism will be in place as outlined in **Chapter 6** of this ESIA, to allow local residents to contact the site easily relating to concerns.
 - Construction operational hours will be used as a primary methodology for the control of significant noise effects, limiting construction activities to daytime periods only defined as:
 - Monday to Friday 07:00 – 19:00.



Operational Phase

- 8.6.3 The Tsagaan Suvarga substation will be designed relevant standards.
- 8.6.4 It is noted that there is some activity and buildings in the general area of the Tsagaan Suvarga substation some of which is associated with the mining works. It is recommended any future accommodation that may be introduced into the locality will be located such that noise levels for future receptors are compliant with the permissible night-time limits (and by default daytime levels) set by the Mongolian National Air Quality Standard MNS 4585:2016 and the IFC General EHS Guidelines. This can be achieved by location any new accommodation at a distance of approximately 100m or greater from the Tsagaan Suvarga substation.



8.7 Residual Effects

Construction Phase

- 8.7.1 Subject to the implementation of BPM mitigation, which can reduce construction noise levels by up to 20dB for specific activities and up to 10dB for general construction activities, construction noise and vibration can be suitably controlled to remove all significant adverse effects.

Operational Phase

- 8.7.2 Subject to the implementation of mitigation as detailed in **Section 8.6**, operational noise and vibration can be suitably controlled to remove all significant adverse effects.
- 8.7.3 It is recommended that any future accommodation is located at least 100m from the substation to avoid the potential for significant effects.

9 Biodiversity, Flora and Fauna

9.1 Introduction

- 9.1.1 This chapter presents the potential impacts of the Project on ecology and biodiversity during both the construction and operational stage. The key biodiversity, flora and fauna features assessed within this chapter include designated sites, habitats and species. To inform this assessment, both desk-based research and site surveys were conducted.
- 9.1.2 Potential effects on biodiversity receptors were outlined within the ESIA Scoping Report along with proposed survey methodology to inform a detailed ESIA, which is presented here.

9.2 Legislative Framework, Policy and Guidance

- 9.2.1 **Table 8-19-1** summarises the legislation, policy and guidance of relevance to this assessment.

Table 9-1 Summary of Legislation, Policy and Guidance relevant to Biodiversity, Flora and Fauna

Level	Key Legislation / Policy / Guidance
International	<p>EBRD PR1 Assessment and management of environmental and social risks and impacts</p> <p>EBRD PR6 Biodiversity Conservation and Sustainable Management of Living Natural Resource</p> <p>Directive 2011/92/EU (Environmental Impact Assessment - EIA Directive)</p> <p>Directive 2000/60/EU (Water Framework Directive)</p> <p>Directive 2009/147/EC (Birds Directive)</p> <p>Directive 92/43/EEC (Habitats Directive)</p> <p>Aarhus Convention</p> <p>Espoo Convention</p>
National Law	<p>Law on Environmental Protection (1995, amended 2012)</p> <p>Law on Environmental Impact Assessment (1998, amended 2012)</p> <p>Law on Special Protected Areas (1994, amended 2004)</p> <p>Law on Fauna (2000, amended 2012)</p> <p>Law on Natural Plants (1995, amended 2015)</p> <p>Law on Soil Protection and Prevention from Desertification (2012)</p> <p>Law on Water (various amendments)</p>
National Standards	<p>MNS 6515:2015: Includes specific guidance for constructing wildlife crossings along roads and railways in steppe and Gobi regions to mitigate habitat fragmentation and protect biodiversity.</p>

Level	Key Legislation / Policy / Guidance
	MNS standards on soil, water, and air quality: Indirectly support biodiversity by maintaining the quality of ecosystems critical for the survival of various species.

9.3 Methodology

Scope

- 9.3.1 The scope of this assessment relates to the potential ecological and biodiversity related impacts resulting from both the construction and operation of the proposed OHTL.

Study Area

- 9.3.2 As part of the desk study, designated sites within Dornogovi aimag were identified, with the exception of locally designated sites and habitats which were restricted to a 5km Study Area. The desk study also considered floral and faunal species that are likely to occur within Dornogovi aimag.
- 9.3.3 The Area of Influence (AoI) varies, dependent on impact pathways associated with the works and the ecological receptors. However, in general, the AoI is considered to be the footprint of the Project (OHTL route and associated working areas), and habitats in the immediate vicinity (to approximately 250 - 500m). Therefore, survey effort was focused within this AoI and is referred to as the Survey Area within this chapter. The Survey Area for highly mobile species, including wide roaming ungulates and birds, was extended to a 5km buffer.

Methodology

Data Collection

- 9.3.4 To inform this ESIA, baseline data on the ecological and biodiversity receptors which could potentially be impacted by the Project were collected. The Study and Survey Area for baseline data collection is presented above.
- 9.3.5 Baseline data were compiled using a range of data sources, including both desk-based research and site-based surveys.

Desk Study

- 9.3.6 The desk study used both publicly available data and data held by Ecotrend (the appointed in-country ecological consultancy). The following publications were consulted:
- Mongolian Law on Special Protected Areas (1994) *Law on Special Protected Areas*. Available at: <https://faolex.fao.org/docs/pdf/mon77268E.pdf> (Accessed: June 2025).
 - Conservation Standards (2021) *Protected Area Planning Guidance for Mongolia*. Available at: <https://www.conservationstandards.org/2021/03/01/protected-area-planning-guidance-for-mongolia/> (Accessed: May 2025).

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- Terbish, K., Clark, K., Monks, J., Munkhbaatar, E., Borkin, J., Samiya, N. and Semenov, R. (2006). *Mongolian Red List of Reptiles and Amphibians*. Available at: <https://documents1.worldbank.org/curated/en/294121468061495033/pdf/627660WP0Mong00Box0361493B0PUBLIC0.pdf> (Accessed Aug. 2025).
- European Bank of Reconstruction and Development (2014) *Environmental and Social Policy, EBRD Performance Requirement 6, Paragraph 14*. (Accessed: July 2025).
- International Finance Corporation (2014, updated 2019) Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. (Accessed: July 2025).
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- Professional Biological Society of Mongolia (2019). *Tavan Tolgoi Power Plant Project Biodiversity Baseline Survey*. (Accessed: July 2025).
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Site Surveys

- 9.3.7 Site surveys were also conducted to inform this ESIA. These included a scoping walkover (reconnaissance) survey to identify impact pathways of the proposed OHTL and dedicated surveys for both flora (including habitats) and fauna.
- 9.3.8 The reconnaissance survey was undertaken to identify the overall habitat composition in the Survey Area and identify potential impact pathways associated with the Project. This was conducted by Richard Anderton MSc MCIEEM, accompanied by Ecotrend ecologists in May 2025. These surveys were necessary to identify which ecological features require further assessment for the Project development.
- 9.3.9 Dedicated surveys to identify habitats, flora and fauna within the Survey Area were conducted by EcoTrend ecologists. Habitat, flora and fauna surveys were conducted between 22 June to 29 June 2025. The purpose of these surveys was to obtain detailed qualitative data on flora and fauna species, ecological assemblages, and habitat types present within the Survey Area.

Habitat and Flora Survey

- 9.3.10 The habitat and flora surveys were timed to coincide with the growing season of the local flora, ensuring optimal visibility and identification, and representative samples were collected across different vegetation zones and microhabitats.
- 9.3.11 Twenty-three sampling plots (10m x 10m in area) were identified to be representative of the major vegetation units found within the Survey Area. These areas are shown in **Figure 9-1** below. Of these, twenty-two plots were positioned along the OHTL corridor, while the additional plot was located at the proposed site of the Sainshand substation. The approximate extent of vegetation communities between the sampling plots was mapped during the fieldwork.
- 9.3.12 At each of the survey plots, data was collected from the quadrats to describe baseline conditions. Data collected at each quadrat includes the following:
- 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 1x1m small plots selected to describe;
 - Key groups such as shrubs, sedges, and forbs;
 - Plant biomass (refers to the total dry weight of organic matter produced by plants per unit area and time);
 - 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.

- 9.3.13 In addition, within each 10m x 10m plot, a 1m x 1m subplot was selected for collecting plant biomass samples as shown in **Plate 9-1** below. The biomass samples were dried in a laboratory drying oven at 60°C for 48 hours, and the total dry weight was then determined.

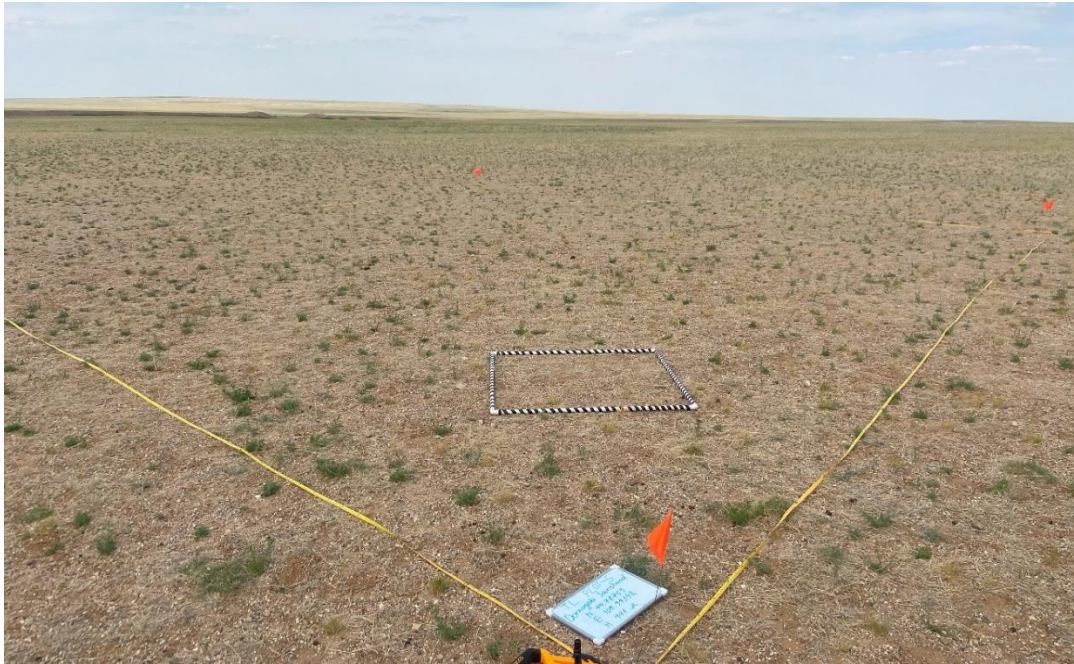


Plate 9-1 Vegetation Survey Plot Example

- 9.3.14 The abundance of plant species recorded in each quadrat was assessed using Drude's scale. The classification of this scale is shown in the table below (**Table 9-2**).

Table 9-2 Drude's Abundance Scale

Abundance Classifications	Descriptions
Un +	Species is represented by a unique individual
Rr<1	Species is very rare (solitary individual or a few individuals), covering a negligible area
Sol 1	Species is present in small numbers, covering a very small area (less than 1%)
Sp (1-10%)	Species covers between 1% to 10% of the area
Cop1 (10-25%)	Species covers between 10% and 25% of the area
Cop2 (25-50%)	Species covers between 25% and 50% of the area
Cop3 (50-100%)	Species covers between 50% and 100% of the area
Soc (100%)	Species covers up to 100%



9.3.15 The vegetation condition at the 23 surveyed plots was assessed using the Keighery (1994) scale shown on **Table 9-3**.

Table 9-3 Vegetation Condition Scale as Developed by Keighery (1994)

Condition Scale	Description
Pristine (1)	Pristine or nearly so. No obvious signs of disturbance.
Excellent (2)	Vegetation structure is intact. Disturbance (if present) only affecting individual species. Weeds (if present) are non-aggressive species.
Very Good (3)	Vegetation structure altered. Obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of aggressive weeds, soil pathogens, logging or grazing.
Good (4)	Vegetation structure significantly altered by obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback, logging or grazing.
Degraded (5)	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by frequent fires, the presence of very aggressive weeds, partial clearing, dieback, logging or grazing.
Completely Degraded (6)	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as "parkland cleared" with flora comprising weed or crop species with isolated native trees or shrubs.

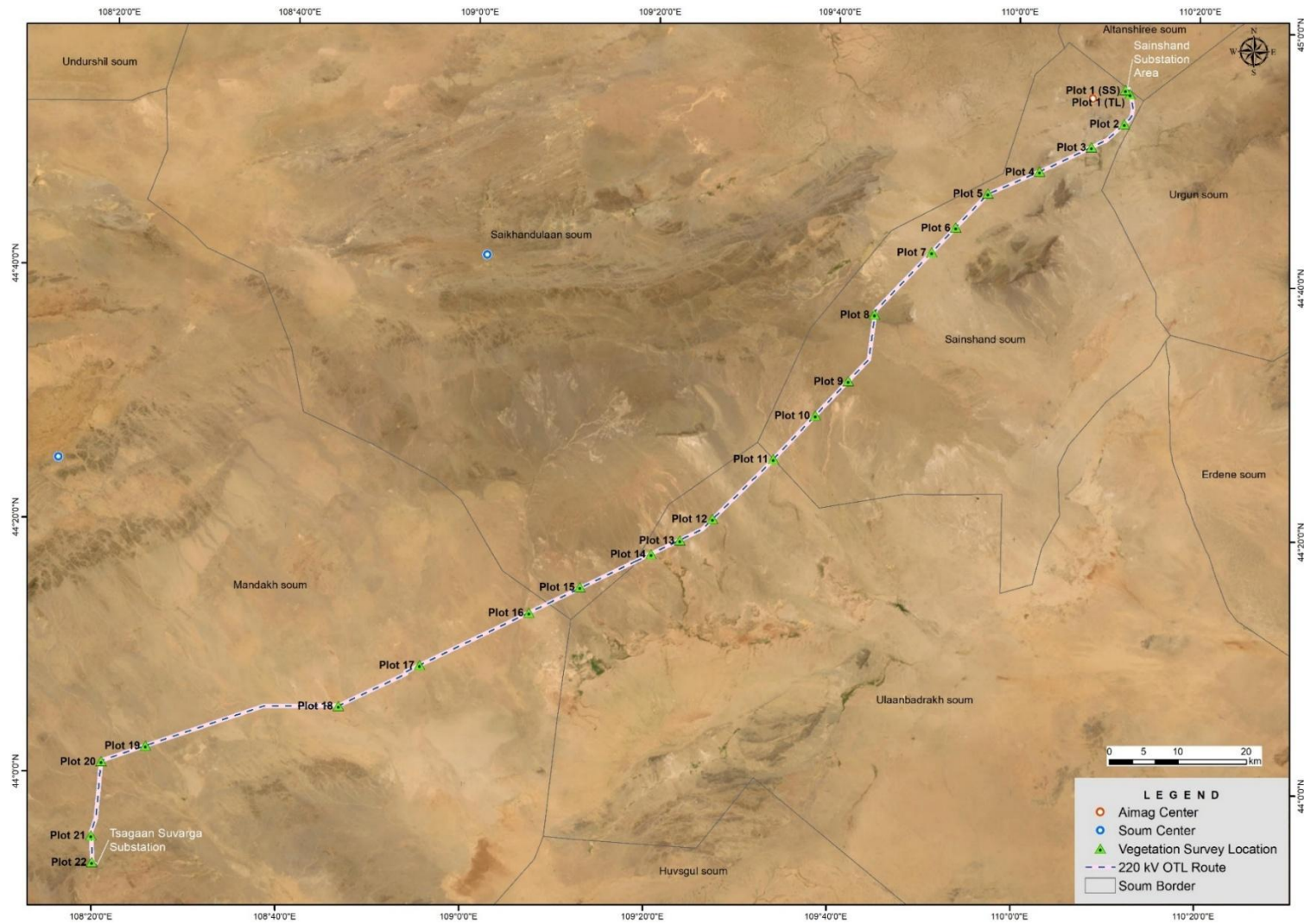


Figure 9-1 Locations of Flora Sampling Plot

Fauna Survey

- 9.3.16 A field survey focusing on fauna receptors was also conducted. The baseline fauna surveys provide an overview of the species diversity, distribution, habitat characteristics and ecological significance of the animal populations along the proposed OHTL and associated infrastructure areas likely to be disturbed. It also marks the locations and abundance of all fauna species with high conservation value such as the IUCN and regional Red Listed species or species commonly recognised by broad stakeholders to be noted. The collected data supports an impact assessment and informs ecological protection measures. Below are the specific methods used to collect data for each animal group, and the locations of these is further illustrated in **Figure 9-2**.

Mammals

- 9.3.17 The following five methods were used to survey for mammals:
- Camera traps
 - Pitfall traps
 - Spot lighting
 - Elliot traps
 - Walked transects
- 9.3.18 Two camera traps were deployed within the Survey Area, primarily for the recording of large mammals. One of the camera traps was deployed in the Uushiin Gobi Local Protected Area (LPA). This location was selected because the LPA was originally established for wildlife conservation, offering suitable habitat for ungulates such as the Goitered Gazelle (*Gazella subgutturosa*), Mongolian Gazelle (*Procapra gutturosa*), and Asiatic Wild Ass (*Equus hemionus*). The second camera trap was installed at the bottom of a hill at the Tsagaan Suvarga end of the proposed OHTL (**Plate 9-2**). They were deployed on Day 1 of the survey work and retrieved at the end of the survey period. The survey locations were in remoter areas, away from herder camps, livestock movements, and other potential sources of disturbance.



Plate 9-2 Camera Trap Location Example

- 9.3.19 Pitfall traps were used to detect small mammals such as Campbell's Hamster (*Phodopus campbelli*) and Mid-day Gerbil (*Meriones meridianus*). Two locations were selected for pitfall traps: a dry riverbed with elm (*Ulmus* sp.) trees at the 65km mark, and another with almond shrubs between the 122 to 123km mark (**Plate 9-3**) of the proposed OHTL route. Pit traps were used in conjunction with drift fences that direct animal movement towards pits and increase the likelihood of capture. A drift fence consists of flywire as barrier, running over, or in line with, the centre of a pit, linking together several equidistantly spaced pits. Drift fences were set at 20 to 30cm high and buried at the base using local substrate. The base substrate was flush with the pit opening to ensure there are no gaps that would divert fauna from the pit.



Plate 9-3 Pitfall Trap Location Example

- 9.3.20 Walked transect surveys were used to record migratory species such as the Goitered Gazelle, Mongolian Gazelle and the Asiatic Wild Ass. They involved walking along transects to capture photographs and record individual numbers.
- 9.3.21 Spot lighting was conducted on foot (**Plate 9-4**). Crepuscular and nocturnal species such as the jerboas, hares, foxes and hedgehogs can be observed using handheld spotlights during night surveys. This technique relies on detecting eye reflections and movements in desert and steppe habitats.



Plate 9-4 Plate Spot Lighting Survey

- 9.3.22 Five Elliot traps were placed at selected representative habitat locations within the Survey Area (**Plate 9-5**). They were deployed in the evening and checked the next morning. The trapping locations are shown in **Figure 9-2**. Any small mammals trapped were documented, identified and then released.



Plate 9-5 Elliot Trap Location Example

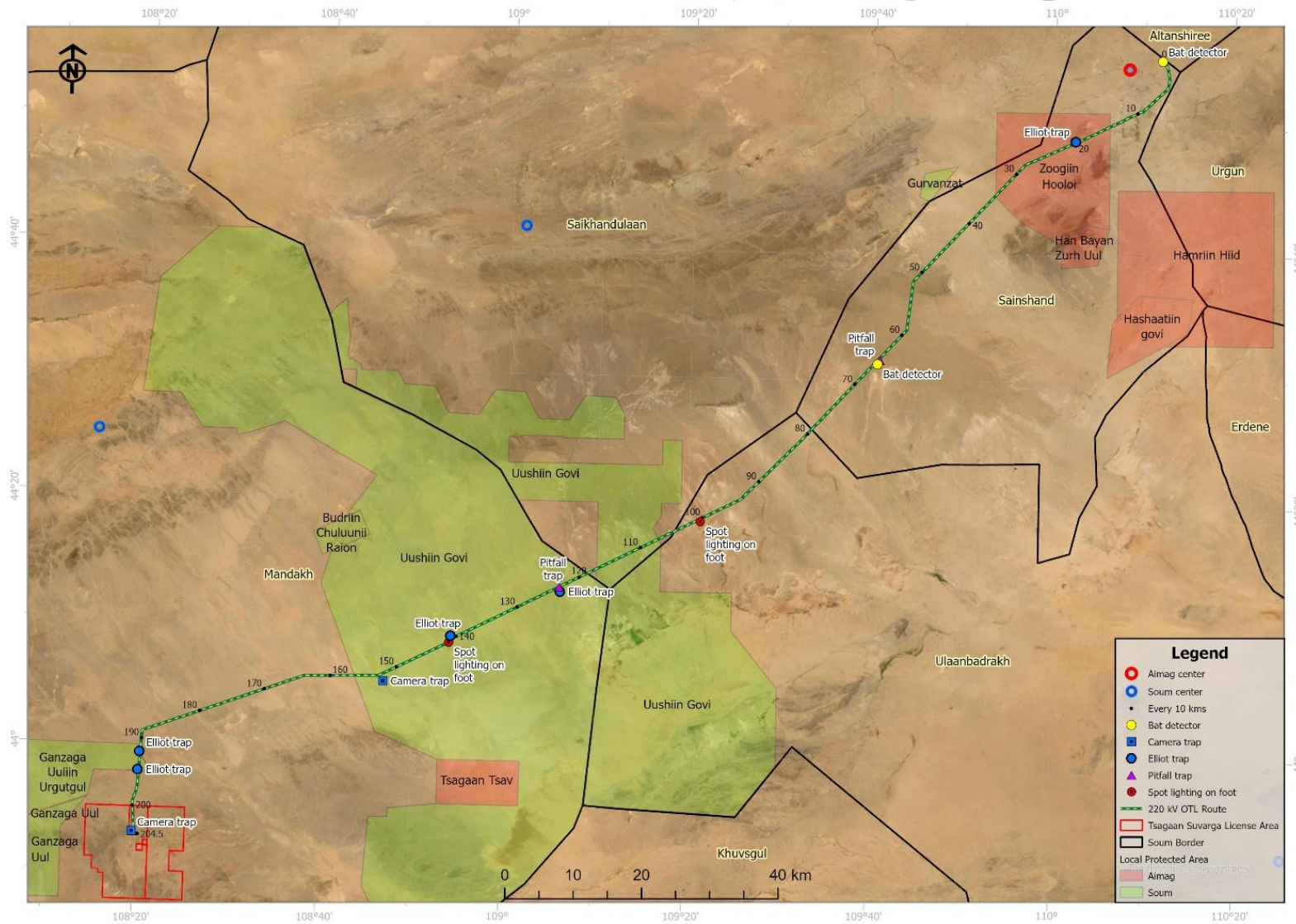


Figure 9-2 Fauna Trap Locations

Bats

- 9.3.23 Acoustic Surveys were carried out to identify the presence/absence of bats. Bat audios were recorded using a Mini Bat 2 device, capturing frequencies ranging from 8 to 120 kHz. This sound detector was deployed in two locations. The first was deployed at the proposed Sainshand substation on 22 June 2025 (**Plate 9-6**), and the second was mounted on an elm tree growing in a dry riverbed at approximately 65km along the proposed OHTL route on 23 June 2025. The bat detector was left overnight in one location and moved to a new location the following day. Audio recordings were analysed using Kaleidoscope Pro Software.



Plate 9-6 Bat Detector Deployed Location Example

Birds

- 9.3.24 Vantage Point (VP) Surveys were completed over a spring (Sustainability East Asia (SEA) and Wildlife Science and Conservation Center of Mongolia (WSCCM), 2022) and autumn (Arcadis, 2024) migration season to determine bird movements, flight heights and collision risk during these times. Methodology for these surveys is provided in the corresponding reports.
- 9.3.25 During the spring and autumn surveys, potential habitat for the Asian Houbara Bustard (*Chlamydotis macqueenii*) was identified. As the species is a summer visitor, vulnerable to collision with overhead lines, assessed as Vulnerable by IUCN Global Red List, and is also listed as such in the Mongolian Red List for Birds (2011), it was recommended breeding bird surveys targeting this species were completed.



- 9.3.26 The potential habitat for this species was identified between VPs 4 and 5 (used during the autumn bird survey). Breeding bird transects were completed across this habitat early in the morning and in the evening before sunset, as high temperatures were experienced during the middle of the day. Temperatures reached 34°C during the day; animals tend to be inactive during such heat. The locations of potential habitat for Asian Houbara Bustard are illustrated in **Figure 9-3** below.
- 9.3.27 Evidence of breeding bird activity was also recorded during transects across other areas of the Survey Area. Particular attention was paid to birds nesting in wet areas or within elm trees or large shrubs around dry riverbeds.

Reptiles and Amphibians

- 9.3.28 The pitfall trapping described above was also used to survey for reptiles and amphibians, while survey data was also supplemented by general observations of these species during walked transect surveys. The GPS location of any amphibian or reptile observed was logged and mapped.

Invertebrates

- 9.3.29 Similarly to amphibians and reptiles, a combination of the pitfall trapping and general observations were used to record invertebrates.

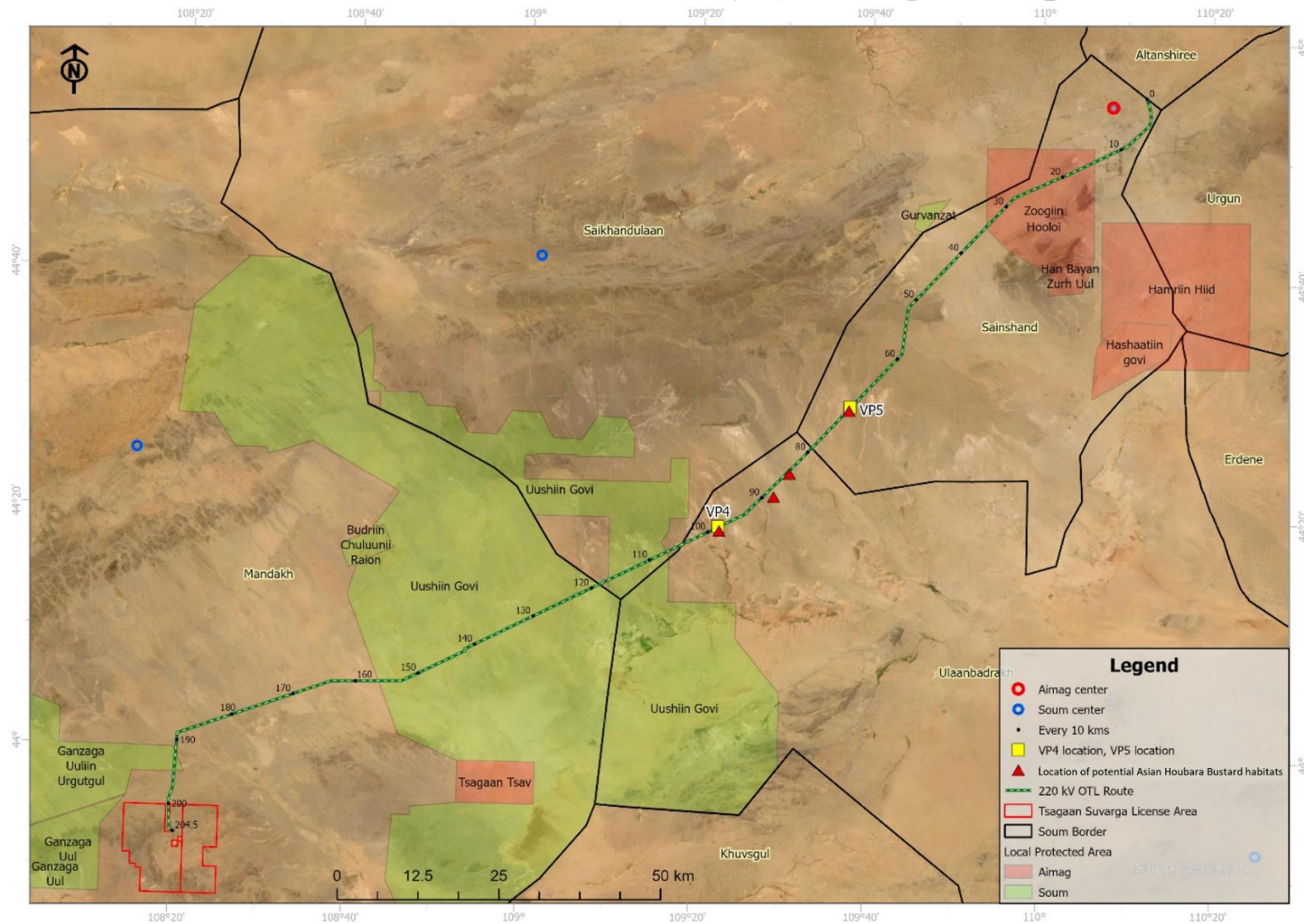


Figure 9-3 Asian Houbara Bustard Survey Locations

9.3.30 **Table 9-4** presents a breakdown of the primary and supplementary techniques used during field surveys for all fauna groups. Primary techniques collect reliable presence and abundance data, and supplementary techniques refine and enhance these results.

Table 9-4 Key Techniques for Detecting Fauna Groups

Fauna Group	Pitfall Traps	Elliot Trap	Walked Transects	Spot Lighting on Foot	Searching for Field Signs	Acoustic Surveys	Camera Traps
Small mammals	X	X	X	S	S		S
Large mammals			X	S	S		X
Bats						X	
Birds			X		S		S
Reptiles and Amphibians	X		X		S		
Invertebrates	X		X				
Note: Primary detection techniques are denoted by "X", while supplementary techniques are denoted by "S".							

Assessment Methodology

9.3.31 This section outlines the approach used to assess the potential impact of the Project on identified ecological and biodiversity receptors.

9.3.32 The baseline data collected above was used to define a list of important ecological features. These are features considered to be of value and to have potential to be impacted by the project. These important ecological features have been considered within the ESIA.

9.3.33 In line with accepted approaches to impact assessment for ecological receptors, first it is necessary to identify the value of each of the receptors. For ecological receptors, this is generally identified at a geographical scale. The criteria used to determine receptor value (sensitivity), magnitude of impact, and significance of effect in assessing the project's impact on ecological and biodiversity receptors during construction and operation are presented in **Table 9-5** to **Table 9-7**. Within this assessment, the design of the transmission line towers, average size of each tower footprint, substation details and construction methodology have all been considered.

9.3.34 In order to describe and assess potential ecological impacts and effects the following characteristics of an impact have been considered:

- Positive or negative
- Extent
- Magnitude
- Duration
- Frequency and timing
- Reversibility

9.3.35 These characteristics are taken from: CIEEM (2018) - Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.3. Chartered Institute of Ecology and Environmental Management, Winchester. Although this is a UK guidance document the general approach to identifying and assessing ecological impacts is robust and provides a logical process for considering potential impacts to ecological receptors. Each of these aspects is considered in order to quantify qualitatively the magnitude of impact upon each of the receptors. This is presented in **Table 9-6**.

9.3.36 Once the ecological receptors had been identified and valued, and the nature and magnitude of potential impacts quantified, the overall significance was identified based upon the Matrix shown in **Table 9-7**.

Table 9-5 Receptor Value (Sensitivity) and Descriptions

Value (Sensitivity) of Receptor	Typical Description
Very High	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution.
Low / Negligible	Low or medium importance and rarity, local scale; Very low importance and rarity, local scale.

Table 9-6 Magnitude of Impact and Descriptions

Magnitude		Typical 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 extends to regional level.
	Beneficial	Medium benefit to or addition of key characteristics or features; impact extends 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.
Very Low	Adverse	No change to the current situation.
	Beneficial	

Table 9-7 Significance Matrix

Magnitude of Impact	Receptor Sensitivity			
	Very High	High	Medium	Low
High	Major	Major	Major	Moderate
Medium	Major	Major	Moderate	Minor
Low	Major	Moderate	Minor	Negligible
Very Low	Moderate	Minor	Negligible	Negligible

- 9.3.37 Once the potential impact in the absence of any additional mitigation and enhancement measures had been identified, within this impact assessment, additional mitigation and opportunity for enhancement was identified. The residual impact of the Project once this had been applied is then presented.

Construction Stage

- 9.3.38 In order to identify the potential impacts upon ecological and biodiversity receptors during the construction stage a number of approaches were undertaken. The routes of existing power lines in the area were driven to determine the likely effects of construction on habitats and species, and the tolerance of these to disturbance.
- 9.3.39 In addition, the in-country consultants, EcoTrend held discussions with community leaders along the route, to discuss the potential impacts that they are aware of resulting from construction. These identified the following potential impacts/concerns during construction:
- Environmental impacts such as dust, debris and soil degradation.
- 9.3.40 A review of the proposed plans and likely construction methods was carried out to determine potential impacts. These were further supported by information gathered from meetings between Arcadis consultants and the Mongolian Ministry of Energy, as well as Project Engineers.
- 9.3.41 Where appropriate, documents such as the designated site listings, reports such as the Convention on Biological Diversity 5th National Report of Mongolia (Ministry of Environment and Green Development, 2014) and Mongolian red lists were studied to identify the key pressures for sensitive receptors within Mongolia and therefore identify potential impact pathways on these receptors during the construction of the project.

Operational Stage

- 9.3.42 The in-country consultants, EcoTrend, again held discussions with community leaders and used their local knowledge to advise on operational stage potential impacts. Community leaders expressed biodiversity concerns around long-term impacts on wildlife migration. This is due to the unique migratory species present in the Gobi desert, including birds. The main concern was bird fatalities from electrocution on the power lines.
- 9.3.43 A review of the proposed OHTL design was carried out to determine potential impacts. These were further supported by information gathered from meetings between Arcadis consultants and the Mongolian Ministry of Energy, as well as Project Engineers.

- 9.3.44 Documents such as the designated site listings and Mongolian red lists were studied to identify the key pressures for sensitive receptors within Mongolia and therefore identify potential impact pathways on these receptors during operation, as well as further research on previous similar projects and impacts occurred.

Limitations and Assumptions

- 9.3.45 The field surveys were undertaken within a limited period of time and were only conducted at discrete locations along the OHTL route. However, the landscape in the Survey Area was generally homogenous and therefore results are considered to provide a good representation of the flora and fauna across the entire route of the OHTL. Furthermore, these surveys were conducted during growing season of local flora for easier identification, and the fauna of the area is well understood. As such, the surveys are considered sufficient to provide a robust baseline for this ESIA.

9.4 Baseline Conditions

Designated Sites

Internationally Protected Sites

- 9.4.1 The Project does not traverse any internationally protected sites such as Ramsar Convention sites or the East Asian-Australasian Flyway and network sites.
- 9.4.2 An Important Bird Area (IBA) is present within the Study Area, namely Ikh Nartiin Chuluu (commonly known as Ikh Nart) which is also designated as a Nature Reserve (state protected rather than internationally protected) (BirdLife International, 2013). It is situated approximately 120km north-west of Sainshand. This IBA spreads across Dalanjargalan and Airag, with a smaller, separated area located in Gurvansaikhan (smaller area not depicted in map). The location of Ikh Nart is shown in **Figure 9-4**.

State Protected Areas

- 9.4.3 All nationally protected areas are called 'State Special Protected Areas', and these are divided into four categories of protection (Mongolian Law on Special Protected Areas, 1994; Conservation Standards, 2021):
- Strictly Protected Areas, which represent the strongest level of protection;
 - National Parks;
 - Nature Reserves; and
 - Natural Monuments, which represent the lowest level of protection.
- 9.4.4 Within Dornogovi aimag, a total of eight State Special Protected Areas have been designated: one Strictly Protected Area, six Nature Reserves, and one Natural Monument. The OHTL does not pass through any of these sites and the majority are over 50km from the OHTL. Details of the two sites within 50km are given in **Table 9-8**. All State Protected Areas within Dornogovi aimag are shown in **Figure 9-4**.

Table 9-8 State Protected Areas within Dornogovi aimag

State Protected Area	Total Area (ha)	Distance to OHTL (km)	Classification	Location	Reason for Designation
Suikhent Uul	4827.35	33.4	Natural Monument Resolution No. 43 of the State Great Khural in 1996.	Located within the territory of Mandakh soum, Dornogovi Province.	Suikhent is a rare natural site where fossilized wood is found, not commonly seen in Mongolia. Some of the trees are up to 4 meters long, and the stumps have diameters of 76-189 cm. The remains of the fossilized wood in Sukhent are small in quantity, but in recent years, the transportation of these materials to provincial and sum centres has increased, to reducing the reserves.
Arvannaimiin Bogd Uul	25670.29	23.0	Nature Reserve Parliamentary Resolution No. 04 of 2011.	Located within the territory of Mandakh soum, Dornogovi Province.	To preserve the natural state and ecological balance of Bogd Mountain and its surrounding area, and to ensure favourable conditions for the reproduction of rare and endangered wildlife. Designated as a State Special Protected Area under the category of Natural Reserve by Parliamentary Resolution No. 04 of 2011.
Source: <i>National SPA Database</i>					

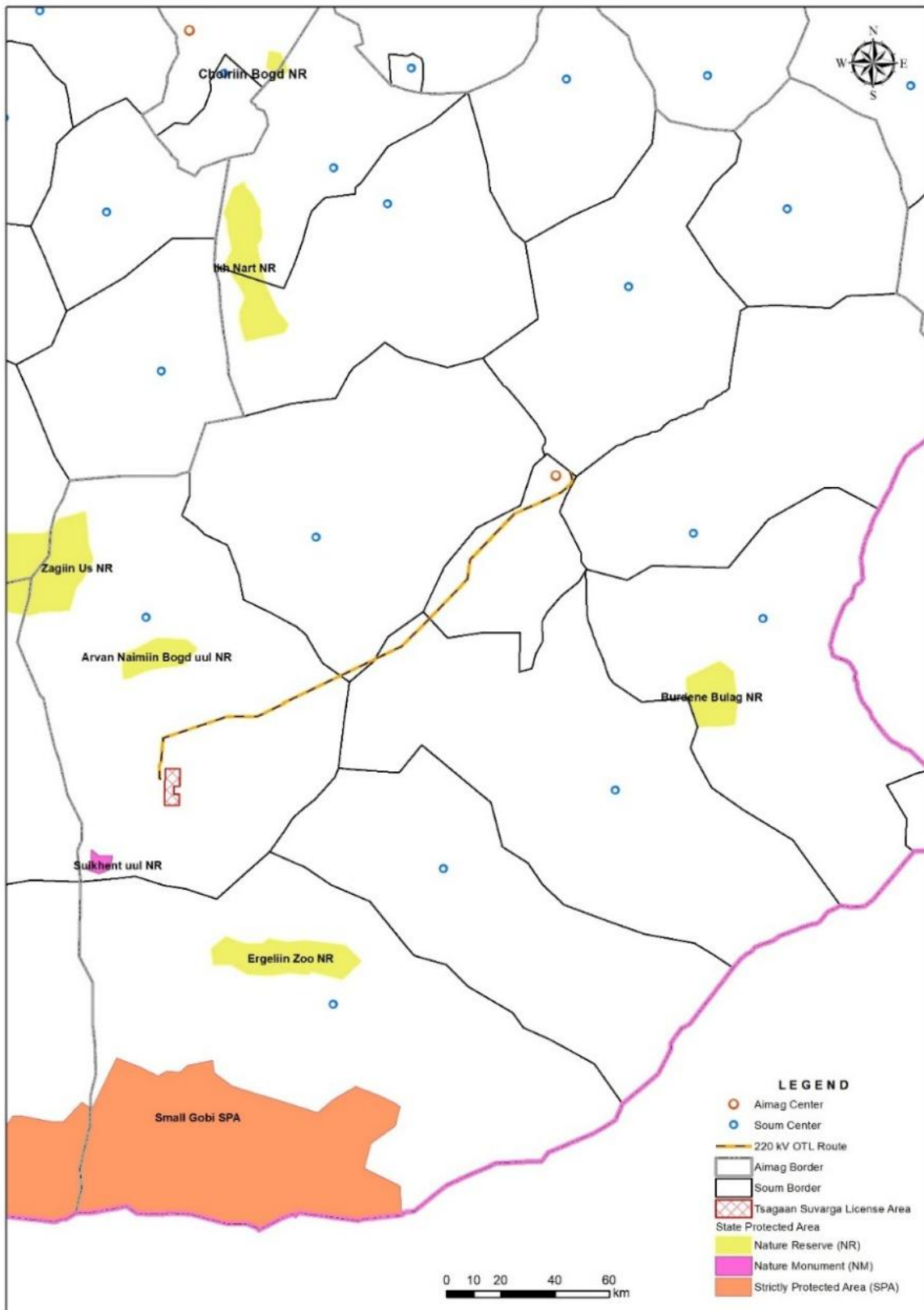


Figure 9-4 Nature Reserves, Natural Monuments and Strictly Protected Areas in Dornogovi Province

Priority Conservation Areas

- 9.4.5 The “National Program on Special Protected Areas” approved by the State Ikh Khural (Parliament) in 1998, as well as Resolution No. 13 of 2008 by the State Ikh Khural, set a goal to place up to 30% of Mongolia’s territory under special protection. In support of this goal, an Ecological Regionally Assessment was conducted by the international organisation, The Nature Conservancy (TNC). The assessment aimed to identify priority areas for conservation and address existing protection gaps. As a result of the assessment, areas in need of future protection were identified.
- 9.4.6 The area along the OHTL falls within the ecological region of the Southern Gobi Ecological Region of Mongolia, and according to the TNC organisation, this region contains 195,000 km² of land requiring future protection, and as such this area was deemed a Priority Conservation Area (PCA). The extent of the PCA is shown in **Figure 9-5**.
- 9.4.7 The identification of a PCA resulted in the designation of two Locally Protected Areas (LPAs) on ecological grounds within the Study Area, namely Uushiin Gobi and Ganzaga Uuliin Urgutgul. These LPAs are discussed further below.

Local Protected Areas

- 9.4.8 Three locally protected areas (LPAs) were identified within 5km of the Project (**Figure 9-6**), and the OHTL passes through all these areas. These LPAs consist of Zoogiin Hooloi, Uushiin Gobi and Ganzaga Uuliin Urgutgul. Some sections of these LPAs have been released from protection as outlined below.
- 9.4.9 **Zoogiin Kholoi** is an LPA under provincial protection, designated by the resolution of the Dornogovi Provincial Citizens’ Representative Khural (Resolution No. 10/11 dated April 08, 2019). The area covers 27,756.77 hectares, and 32.8 kilometres of the OHTL route passes through it. The justification for its protection is not clearly stated in the resolution however the LPA was placed under protection as a historical and cultural heritage site (rather than ecological). According to the information on the website of the Environmental Information Center of Mongolia, this LPA was designated on July 30, 2014, and was released from protection on July 30, 2019. The reason for this release is not available.
- 9.4.10 **Uushiin Gobi** is an LPA due to being included in a PCA identified in the ecoregional assessment conducted by the TNC. Due to consisting of moderately elevated hills and sheltered terrain, it was considered suitable habitat for migratory ungulates such as the Goitered Gazelle, Mongolian Gazelle, and Asiatic Wild Ass. For this reason, the area was designated as protected under the resolutions of the Citizens’ Representative Khurals of Khovsgol soum (Resolution No. 07/02, dated January 23, 2018) and Mandakh soum (Resolution No. 06/3, dated January 5, 2018) of Dornogovi aimag. It encompasses territories within the soums of Khuvsgol, Mandakh, Saikhandulaan, and Ulaanbadrakh in Dornogovi aimag. The total area spans 468,076.27 ha, distributed as follows:
- Saikhandulaan soum – 46,666.94 ha (Resolution No. 04/03, dated February 9, 2017)
 - Ulaanbadrakh soum – 78,588.43 ha (Resolution No. 79, dated July 5, 2016)
 - Mandakh soum – 275,715.62 ha (Resolution No. 06/03, dated January 5, 2018)
 - Khuvsgul soum – 67,105.28 ha (Resolution No. 07/02, dated January 3, 2018)



- 9.4.11 A total of four Uushiin Govi LPA units have been established, two of which are intersected by the proposed OHTL route:
- Saikhandulaan soum – 10 km of the OHTL passes through the protected area
 - Mandakh soum – 38 km of the OHTL passes through the protected area
- 9.4.12 Parts of this LPA have since been released from protection. For instance, the section in Saikhandulaan soum was excluded from protection in 2022, while the date of ending for the section in Ulaanbadrakh soum is unclear. The reasons for the release from protection are also unknown. Mandakh soum is however still part of the active LPA.
- 9.4.13 The **Ganzaga Uuliin Urgutgul** is the extension of Ganzaga Mountain. This extended area was designated as an LPA by Resolution No. 2/10 of the Mandakh Soum Citizens' Representative Khural on December 15, 2016, and it covers a total of 52,315.62 ha, with 2.7km of the OHTL route passing through it. The protection period for this LPA is 20 years, and it is planned to be released from protection in 2036. It is designated as a protected area due to being located within a priority conservation area identified in the ecoregional assessment conducted by TNC. It also is designated as a site of significant environmental and ecological importance by The Mandah soum (Resolution No. 2/10 of the Citizens' Representative Khural of Mandakh soum, Dornogovi province, dated December 10, 2016).
- 9.4.14 LPAs do not have separate administrative bodies or designated buffer zones. Although the protection regime for LPAs is determined by the aimag and soum Citizens' Representative Khurals, no specific regime has been established for these areas to date.

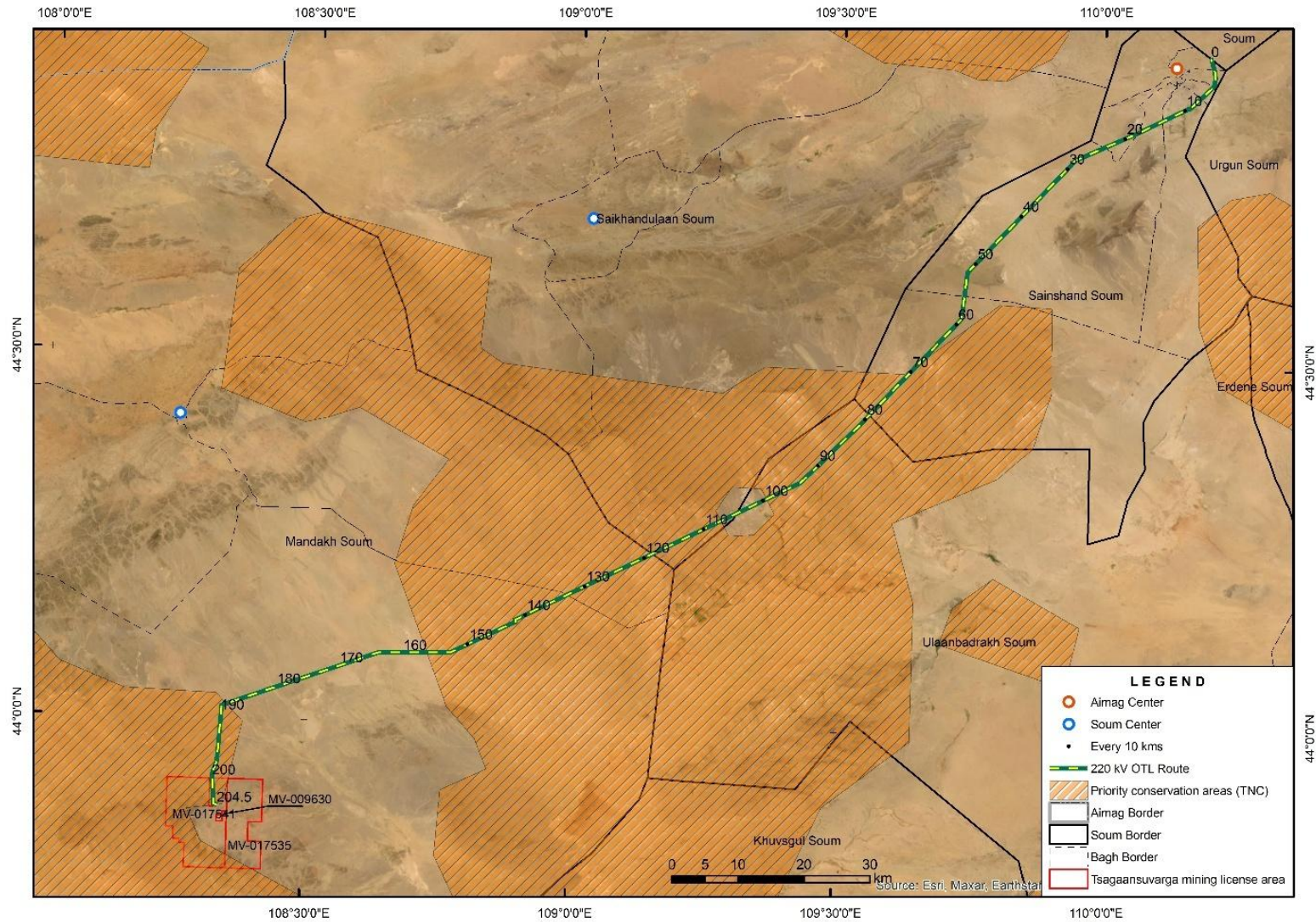


Figure 9-5 Priority Conservation Areas

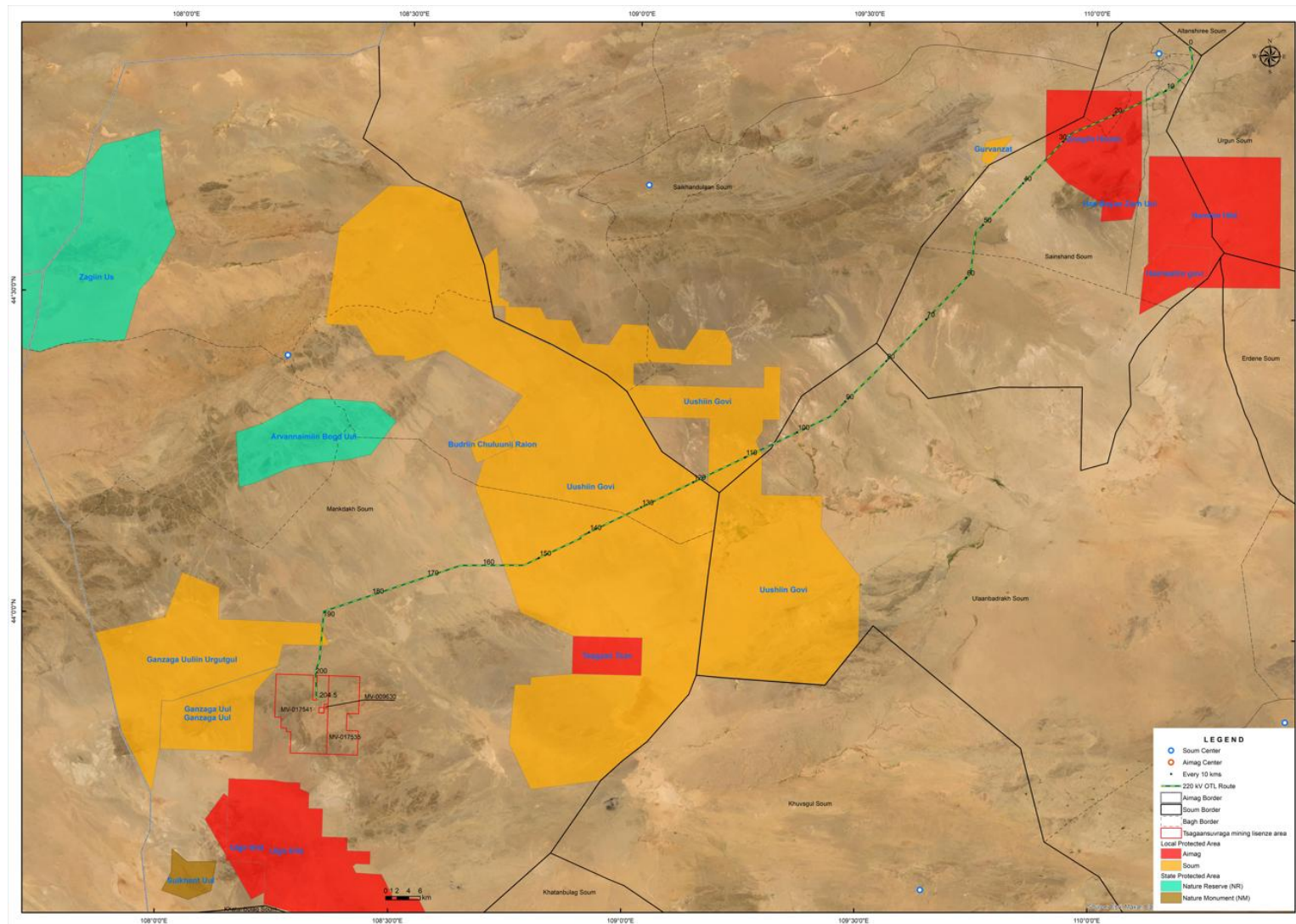


Figure 9-6 Local Protected Areas crossed by the OHTL route, and other State Protected Areas within Dornogovi Province

Habitats and Flora

Overview of Mongolian Gobi Habitats

- 9.4.15 Mongolia has a varied biodiversity landscape where the Siberian taiga forest, Central Asian steppe, Altai Mountains and Gobi Desert meet. There are over 5,682 plant species recorded in Mongolia, including 2,950 vascular plant species, 445 moss species, 999 lichen species, and 1,288 algae species (Ministry of Environment and Green Development, 2014).
- 9.4.16 The Mongolian Gobi covers one-third (32%) of Mongolia's total territory, encompassing an area of 510,000 square kilometers in the southeastern part of the country. This eco-region is classified as a cool desert with a harsh continental climate, characterized by long, cold winters. In the extremely arid desert of the Altai-Uvur Gobi, annual precipitation does not exceed 40mm, while in the bordering Gobi-Altai Mountains, it can exceed 200mm. However, the amount of annual precipitation varies greatly, with some areas receiving no rainfall at all. The long-term average air temperature is colder than -20°C in January and exceeds 33°C in July (The Nature Conservancy Mongolia program, 2013).
- 9.4.17 The Survey Area belongs to the Eastern Gobi region (as defined by the zoo-geographical regions of Mongolia) which can be defined as a semi-desert steppe zone according to the phytogeographical regions of Mongolia (**Figure 9-7**). This classification is based on the ecological regions outlined in the Red Book of Mammals of Mongolia (2006) and the Red Book of Birds of Mongolia (2011). This arid Gobi region is characterized by its dry climate with low, undulating hills and sparse vegetation.

Botanical Desk Study

- 9.4.18 Key plant species within the Eastern Gobi region consist of drought tolerant shrub species such as Shrubby Ajanian (*Ajanian fruticulosa*), Anabasis (*Anabasis brevifolia*), Siberian peashrub (*Caragana leucophloea*), Narrow leaved shrub (*Caragana stenophylla*), Gobi needlegrass (*Stipa gobica*), Leek (*Allium pollyrizum*), Gray sparrow's saltbush (*Salsola passerina*), and Dzungarian reaumuria (*Reaumuria soongorica*), which are adapted to the arid Gobi-desert region.
- 9.4.19 Rare plant species that have the potential to be present in the Eastern Gobi include Potanin's Beancaper (*Zygophyllum Potaninii*), Grubovii huundii (*Spongiocarpella grubovii*), Bluebeard (*Caryopteris mongolica*), Desert cistanche (*Cistanche deserticola*), Mongolian almond (*Amygdala mongolica*) and Spotted Arnebia (*Arnebia gutata*), which are listed as Very Rare by Mongolian regulations (Legal Info Mongolia, 2012).

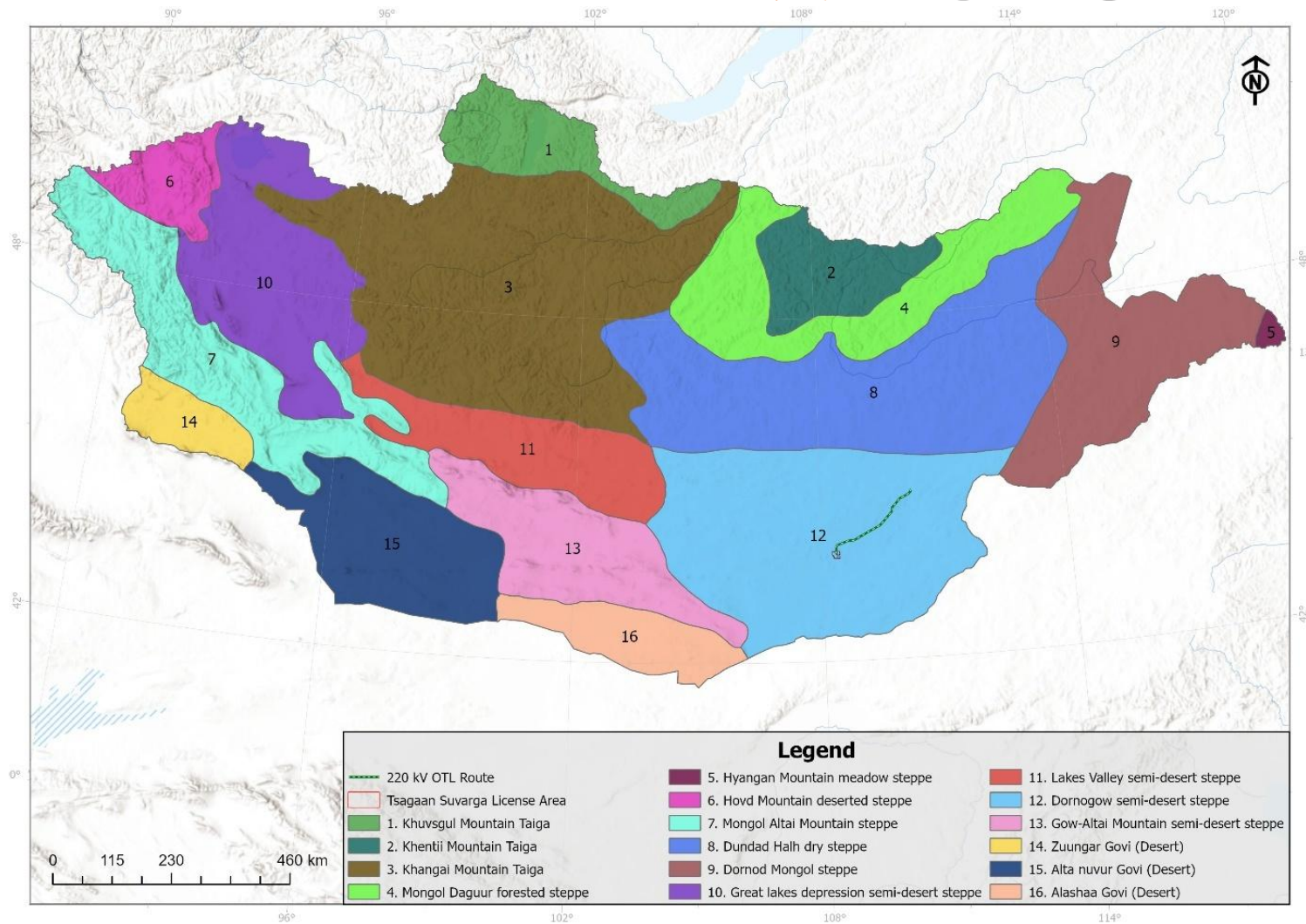


Figure 9-7 Phytogeographical Regions of Mongolia & Proposed Overhead Transmission Line Route

Reconnaissance Visit

- 9.4.20 During the reconnaissance visit, notes on the broad habitats were made. Typical for this region, the primary habitat was grassland, showing a moderate percentage of bare ground due to the arid conditions. Small shrub coverage varied along the route but was generally more dominant on lower ground where old dry riverbeds and floodplains were present. Small, stunted elm trees were also rarely recorded in these areas. The grass and herb coverage generally lowered as the surveyor moved south-west along the route, with sandy dune areas also noted.
- 9.4.21 Habitats of note included a marshy area present south of Sainshand, situated on the west side of a road which the OHTL crosses. This appeared relatively polluted at the time of survey, and further desk based aerial analysis has shown this water appears to be discharged from a wastewater facility further to the north. Dry river beds, with small shrubs and stunted trees were also present along the route. Although not visited during the reconnaissance visit, what appeared to be an ephemeral pond was located on aerial imagery approximately 100m south of the OHTL. These habitats were highlighted for further assessment during the habitat surveys.
- 9.4.22 A rare plant species was observed, *Cynomorium songaricum*, which is listed as Rare in both the Mongolian Red Book (2014) and by Government Resolution No. 165 of 2004. Additionally, the species is listed as Vulnerable in the Mongolian Red List of Plants (2019, second edition). An endangered species was also recorded, Spotted Arnebia (*Arnebia guttata*). Spotted Arnebia is included in the List of Endangered Plants in the Annex of the Law on Natural Plants of Mongolia (Legal Info Mongolia, 1995). However, the species is listed as Least Concern in the Mongolian Red List of Plants (2012, first edition).
- 9.4.23 A total of 18 arid steppe grassland/sandy dune floral species were recorded: *Stipa glareosa*, *Enneapogon borealis*, *Rheum nanum*, *Artemisia glauca*, *Agropyron cristatum*, *Allium polyrrhizum*, *Astragalus monophyllus*, *Corispermum mongolicum*, *Salsola pestifera*, *Peganum nigellastrum*, *Dontostemon crassifolius*, *Allium mongolicum*, *Chloris virgata*, *Ferula Bungeania*, *Cleistogenes squarrosa*, *Echinops Gmelinii*, and *Heteropappus hispidus*.
- 9.4.24 A total of 10 shrub/small tree species were recorded: *Oxytropis aciphylla*, *Eurotia ceratoides*, *Caragana stenophylla*, *Potaninia mongolica*, *Kalidium gracile*, *Zygophyllum xanthoxylum*, *Haloxylon ammodendron*, *Anabasis brevifolia*, *Artemisia xerophytica*, and *Ulmus pumila*.

Detailed Habitat and Flora Survey

- 9.4.25 During the habitat and flora survey, eleven plant communities were identified forming distinct habitats, as shown within **Table 9-9**, and corresponding distribution maps have been produced to illustrate their spatial patterns across the Survey Area (see **Figures 9-9 and 9-10**). These communities are typical of the semi-desert steppe region.

Table 9-9 Vegetation Communities and Habitats within the Survey Area

Vegetation Communities Name	Habitat
<i>Artemisia - Convolvulus ammanii</i>	Flat plain (Sainshand substation area and starting point of OHTL). Typical of sandy/gravelly soils within dry steppe. Can form low shrublands.
<i>Anabasis brevifolia - Artemisia sp. - Cleistogenes squarrosa - Reaumuria soongorica</i>	Typical of flat, wind-swept plains with sandy / gravelly soils, dry steppe with sparse vegetation.
<i>Reaumuria soongorica - Nitraria sibirica - Achnatherum splendens</i>	Marshy area due to discharge from a wastewater facility or run-off from Sainshand infrastructure. Typical of sandy soils with seasonal water availability.
<i>Xanthium sibiricum</i>	Marshy area due to discharge from a wastewater facility or run-off from Sainshand infrastructure. Typical of disturbed soils near seasonal water sources. Sandy / clay soils and sparse vegetation.
<i>Reaumuria soongorica - Anabasis brevifolia - Cleistogenes squarrosa</i>	Typical of flat, sandy/gravel plains, dry steppe with coarse soils, low rainfall and sparse vegetation.
<i>Stipa gobica - Cleistogenes squarrosa - Reaumuria soongorica</i>	Typical of flat plain and low hills, dry steppes, with gravelly / coarse soils, strong winds and sparse vegetation.
<i>Zygophyllum xanthoxylon - Caragana microphylla - Caragana stenophylla - Reaumuria soongorica</i>	Typical of sandy valleys with dry, wind-swept conditions and minimal rainfall.
<i>Eurotia ceratoides - Anabasis brevifolia - Cleistogenes squarrosa</i>	Typical of arid steppe, gravelly/coarse plains with dry, wind-swept conditions and minimal rainfall.
<i>Zygophyllum xanthoxylon - Potaninia Mongolica - Anabasis brevifolia</i>	Typical of sandy/rocky shrublands within dry, wind-swept valleys.
<i>Nitraria sibirica - Artemisia - Anabasis brevifolia - Reaumuria soongorica</i>	Typical of moist valley with sandy/gravelly soils, and sparse vegetation. Ephemeral pond located in this area.
<i>Anabasis brevifolia - Arnebia guttata</i>	Typical of low hills/valleys with dry, sandy plains and minimal rainfall.

9.4.26 The habitats identified for further assessment during the reconnaissance visit have been included in the mapping. The marshy area was present at Plot 3, dry river beds at Plot 9 and 16, with the ephemeral pond within the vicinity of Plot 18. Although plants associated with damp conditions were noted at the marshy area, species diversity was low and water quality was poor as the water source is from a wastewater facility. As this is not a natural water source, it is not considered to be a permanent water feature. An aerial picture of this habitat is provided in **Plate 9-7**. It was noted during the survey, further distribution of marshy plant species were present across the eastern side of the noted road from Sainshand (as shown in **Plate 9-9**). Standing water was not present, and although the wastewater facility discharge doesn't flow into this area, it is apparent run-off from other Sainshand infrastructure does run into this area during periods of rain, therefore it is likely this area also contains pollutants.



Plate 9-7 Marshy Area alongside Sainshand Road (picture taken facing south)

- 9.4.27 With regards to natural features that could hold water, it is considered the dry river beds have been dry for some time, although groundwater may be close to the surface due to the presence of shrubs and small trees. Aerial imagery of these habitats is provided in **Plates 9-8 and 9-9**. The ephemeral pond was considered to remain dry unless there was periods of heavy, prolonged rainfall. Aerial imagery of this habitat is provided in **Plate 9-10**.

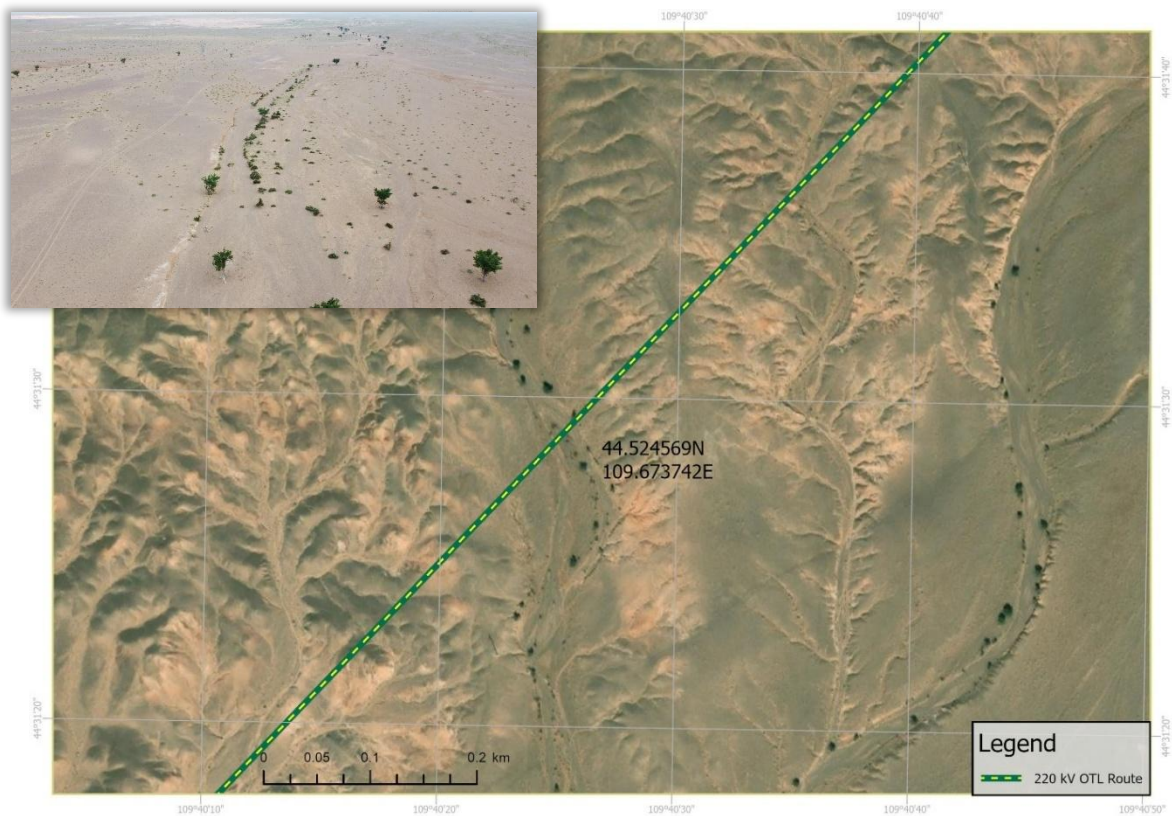


Plate 9-8 Aerial Imagery of Dry River Bed at Plot 9

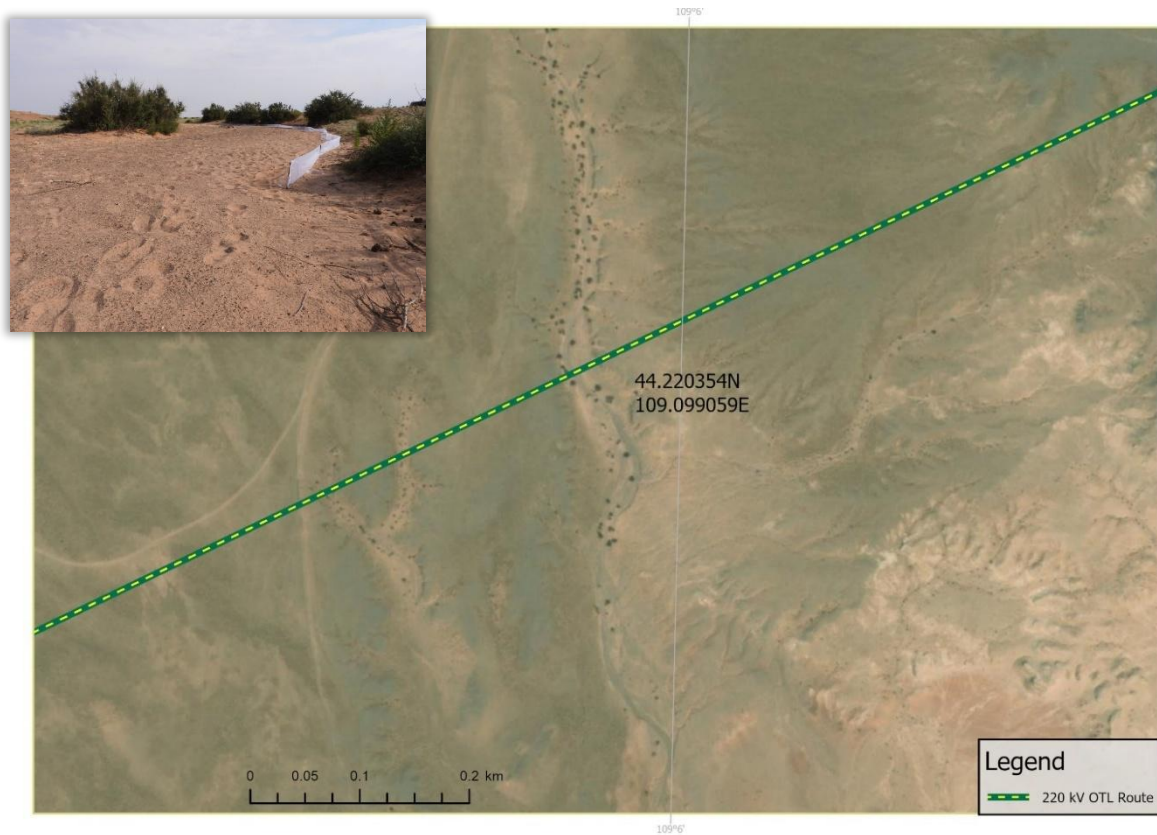


Plate 9-9 Aerial Imagery of Dry River Bed at Plot 18



Plate 9-10 Aerial Imagery of Ephemeral Pond

9.4.28 The survey results showed that 69.6% (16 / 23 Plots) of the vegetation sites were in good condition, 26.1% (6 / 23 Plots) were degraded, and 4.3% (1 / 23 Plots) were severely degraded. The severely degraded plot was considered due to overgrazing and human activity (due to its location and land use of the area). This is presented in **Table 9-10**.

Table 9-10 Condition of Vegetation along Route

Plot No.	Plot Description	Vegetation Condition
Plot1 (TL)	A valley between hills, near horse racing grounds	Completely Degraded
Plot1 (SS)	The gentle slope of a hill	Degraded
Plot2	A gravelly flat plain	Degraded
Plot3	A valley with salt-rich soil and feather grass	Good
Plot4	The gentle slope of a hill's side	Good
Plot5	A stony plain in the steppe	Degraded
Plot6	Hill top	Good
Plot7	A broad valley between hills	Degraded
Plot8	Among gently rounded hills	Good
Plot9	The slope of rolling hills	Good
Plot10	Steppe	Good
Plot11	A sandy valley with shrub vegetation	Good
Plot12	A hilly area with stony soil	Good
Plot13	<i>Haloxylon Ammodendron-Nitraria Sibirica</i> dominant valley	Good
Plot14	A stony valley plain	Good
Plot15	<i>Zygophyllum xanthoxylon-Brachanthenium gobica-Reaumuria soongorica</i> valley plain	Good
Plot16	A hill slope	Good
Plot17	Stony semi-desert plain with sandy soil	Good
Plot18	Hillside slope	Good
Plot19	Flat plain	Good
Plot20	A valley with stony soil	Good
Plot21	Foot and slope of hillside	Degraded
Plot22	The slope between hills	Degraded

- 9.4.29 The plant biomass samples collected from the 1x1 m subplots were dried in a laboratory setting to determine their dry weight. The average dry biomass across the 23 plots was 12.3 g/m², with a maximum of 28 g/m² and a minimum of 5 g/m². This is represented in **Figure 9-8** below.

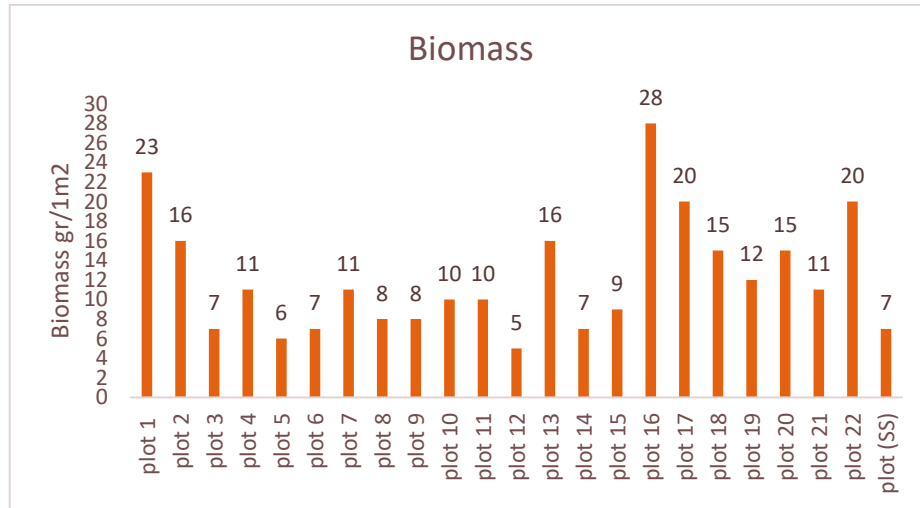


Figure 9-8 Dry Weight of Plant Biomass per Plot

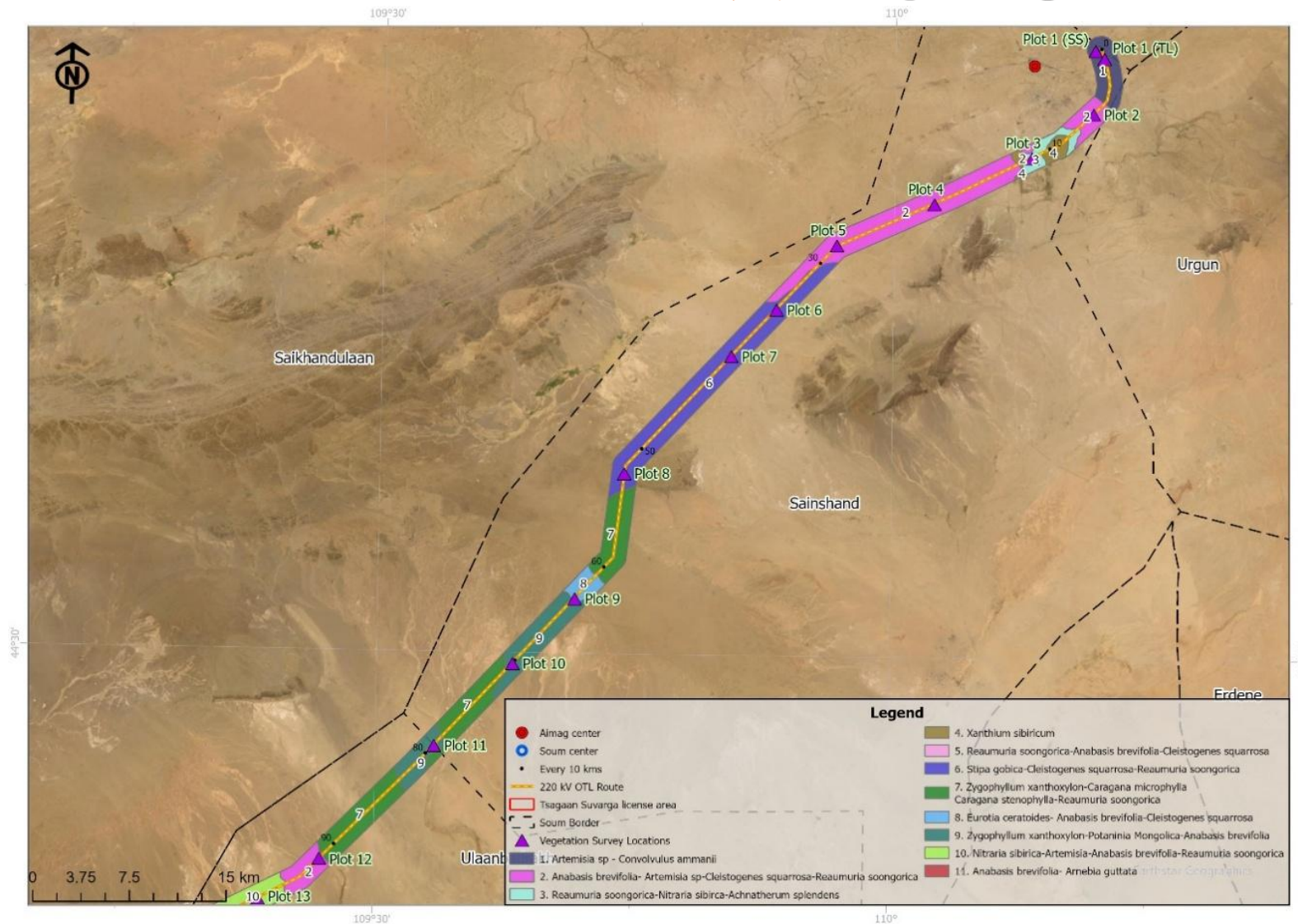


Figure 9-9 Vegetation Communities of the Survey Area (Part 1)

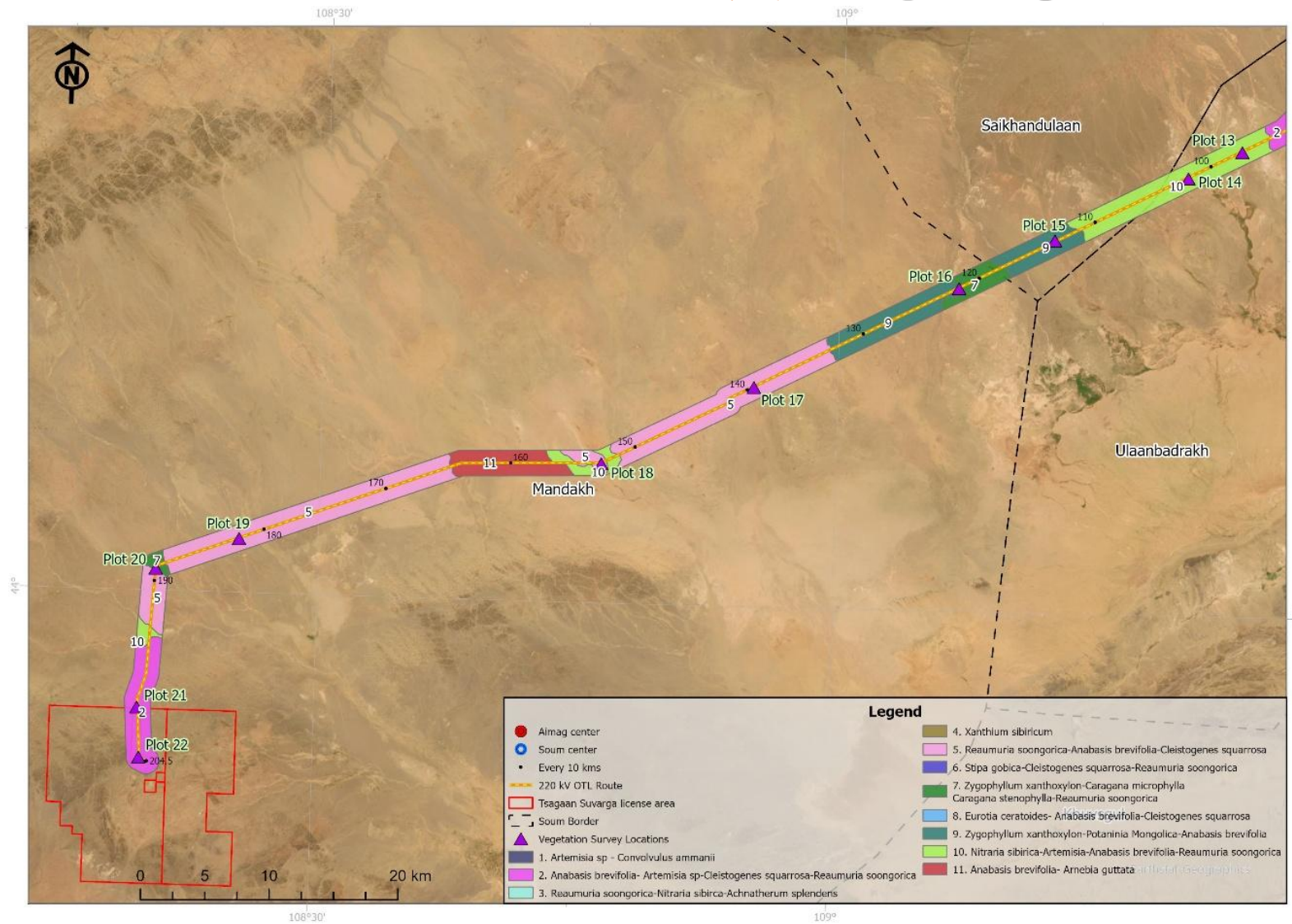


Figure 9-10 Vegetation Communities of Survey Area (Part 2)

- 9.4.30 A total of 58 plant species were recorded in the Survey Area, including two classified as Endangered: *Brachanthemum gobica* (Plate 9-11) and Spotted Arnebia (Plate 9-12), and four listed as Rare nationally: *Cynomorium songaricum* (Plate 9-13), *Potaninia Mongolica* (Plate 9-14), *Oxytropis aciphylla* (Plate 9-15) and *Phragmites communis* (Plate 9-16). This includes the rare species observed during the reconnaissance visit. A full botanical species list is given in Table 9-11.

Table 9-11 Full Botanical List

Scientific Name	Functional Groups					
	Shrub	Forb	Grass	Sedge	Wood	Parasite
<i>Achnatherum splendens</i>			+			
<i>Ajania achileodes</i>		+				
<i>Allium polyrrhizum</i>		+				
<i>Anabasis brevifolia</i>	+					
<i>Arnebia fimbriata</i>		+				
<i>Arnebia guttata</i>		+				
<i>Artemisia frigida</i>	+					
<i>Artemisia rutifolia</i>		+				
<i>Artemisia scoparia</i>		+				
<i>Asparagus gobicus</i>	+					
<i>Astragalus galactites</i>		+				
<i>Astragalus monophyllus</i>		+				
<i>Atraphaxis frutescens</i>		+				
<i>Bassia dasyphylla</i>		+				
<i>Brachanthemum gobicum</i>		+				
<i>Calligonum mongolicum</i>	+					
<i>Caragana microphylla</i>	+					
<i>Caragana spinosa</i>	+					
<i>Caragana stenophylla</i>	+					
<i>Carex duriuscula</i>				+		
<i>Cleistogenes squarrosa</i>			+			
<i>Convolvulus ammanii</i>		+				
<i>Convolvulus arvensis</i>		+				
<i>Crepis flexuosa</i>		+				
<i>Cynomorium songaricum</i>						+
<i>Dontostemon crassifolius</i>		+				
<i>Dracocephalum foetidum</i>		+				
<i>Echinops gmelinii</i>		+				
<i>Eridium tibetanum</i>		+				
<i>Erigeron minor</i>			+			
<i>Eurotia ceratoides</i>	+					

Scientific Name	Functional Groups					
	Shrub	Forb	Grass	Sedge	Wood	Parasite
<i>Ferula bungeana</i>		+				
<i>Gypsophila desertorum</i>		+				
<i>Haloxyton ammodendron</i>					+	
<i>Haplopyllum dauricum</i>		+				
<i>Halogeton glomeratus</i>		+				
<i>Heteropappus altaicus</i>		+				
<i>Kalidium foliatum</i>	+					
<i>Kalidium gracile</i>	+					
<i>Lappula intermedia</i>		+				
<i>Nitraria sibirica</i>	+					
<i>Olgeae leucophylla</i>	+					
<i>Orobancha coerulescens</i>						+
<i>Oxytropis aciphylla</i>	+					
<i>Panzeria lanata</i>		+				
<i>Peganum nigellastrum</i>		+				
<i>Phragmites communis</i>			+			
<i>Potania mongolica</i>	+					
<i>Reaumuria soongorica</i>	+					
<i>Rheum nanum</i>		+				
<i>Salsola passerina</i>	+					
<i>Scorzenera pseudodivaticata</i>		+				
<i>Stipa glareosa</i>			+			
<i>Stipa gobica</i>			+			
<i>Ulmus Pumila</i>					+	
<i>Xanthium sibiricum</i>		+				
<i>Zygophyllum pterocarpus</i>		+				
<i>Zygophyllum xanthoxylon</i>	+					
Total number	17	30	6	1	2	2
Source: Abbreviated List of Vascular Plants of Mongolia, 2011, Green gold project https://github.com/inaturalist/inaturalist						

- 9.4.31 The two Endangered species are included in the list of Endangered plants in the annex of the Law on Natural Plants of Mongolia (1995), and the four Rare species are included in the list of Rare plants in the annexes of Government Resolutions No. 153 of 1995 and No. 165 of 2004.
- 9.4.32 Most plant species in Mongolia have not yet been assessed for the IUCN Red List. Among the Endangered and Rare species recorded in the Survey Area, only *Phragmites communis* has been assessed by the IUCN and is classified as Least Concern. Additionally, *Phragmites communis* is not listed in the Red List of Plants of Mongolia. In the Red List of Mongolian Plants, Spotted Arnebia and *Oxytropis aciphylla* are classified as Least Concern, *Potania mongolica* and *Brachanthemum gobicum* as Near Threatened, and *Cynomorium songaricum* as Vulnerable. Locations of these Rare / Endangered plant species are shown in **Figure 9-12**.
- 9.4.34 The plant species recorded in the Survey Area were classified into functional groups: six grass species, one sedge species, thirty forb species, seventeen shrub species, two tree species, and two parasitic plant species. According to Drude's scale classification, 44.8% of the total species were sparse (Sp), 19.0% were occasional (Cop1), 13.8% abundant (Cop2), 6.9% very abundant (Cop3), 8.6% rare (Sol), and 6.9% had a unique (Un+) abundance (**Figure 9-11**).

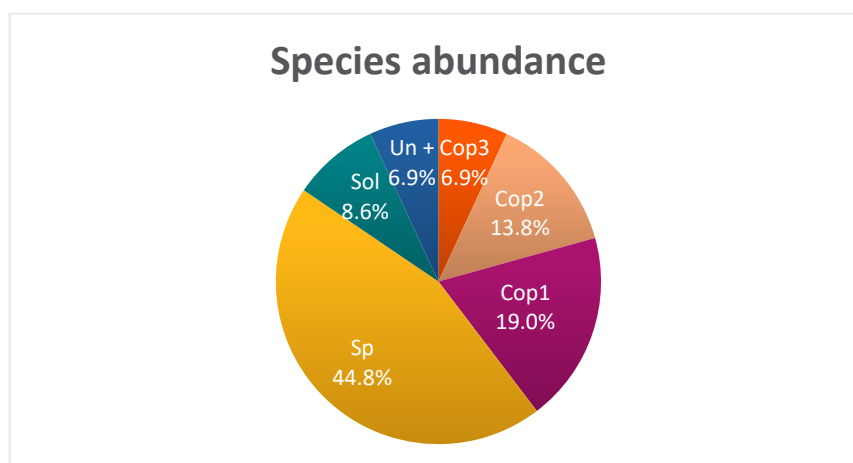


Figure 9-11 Species Abundance by Drude's Scale

- 9.4.35 As can be seen in **Figure 9-12**, Spotted Arnebia is found within the Tsagaan Suvarga licence area, with two other records along the OHTL route, while *Branchanthemum gobica* was recorded only within the Uushiin Govi soum (very abundant where present). Rare plant species are spread out along the planned OHTL route, mostly in Sp or Cop2 abundance, with three sites of *Oxytropis aciphylla* presenting Un abundance.



Plate 9-11 Brachanthemum gobica



Plate 9-12 Spotted Arnebia



Plate 9-13 Cynomorium songaricum



Plate 9-14 Phragmites communis



Plate 9-15 Oxytropis aciphylla



Plate 9-16 Phragmites communis

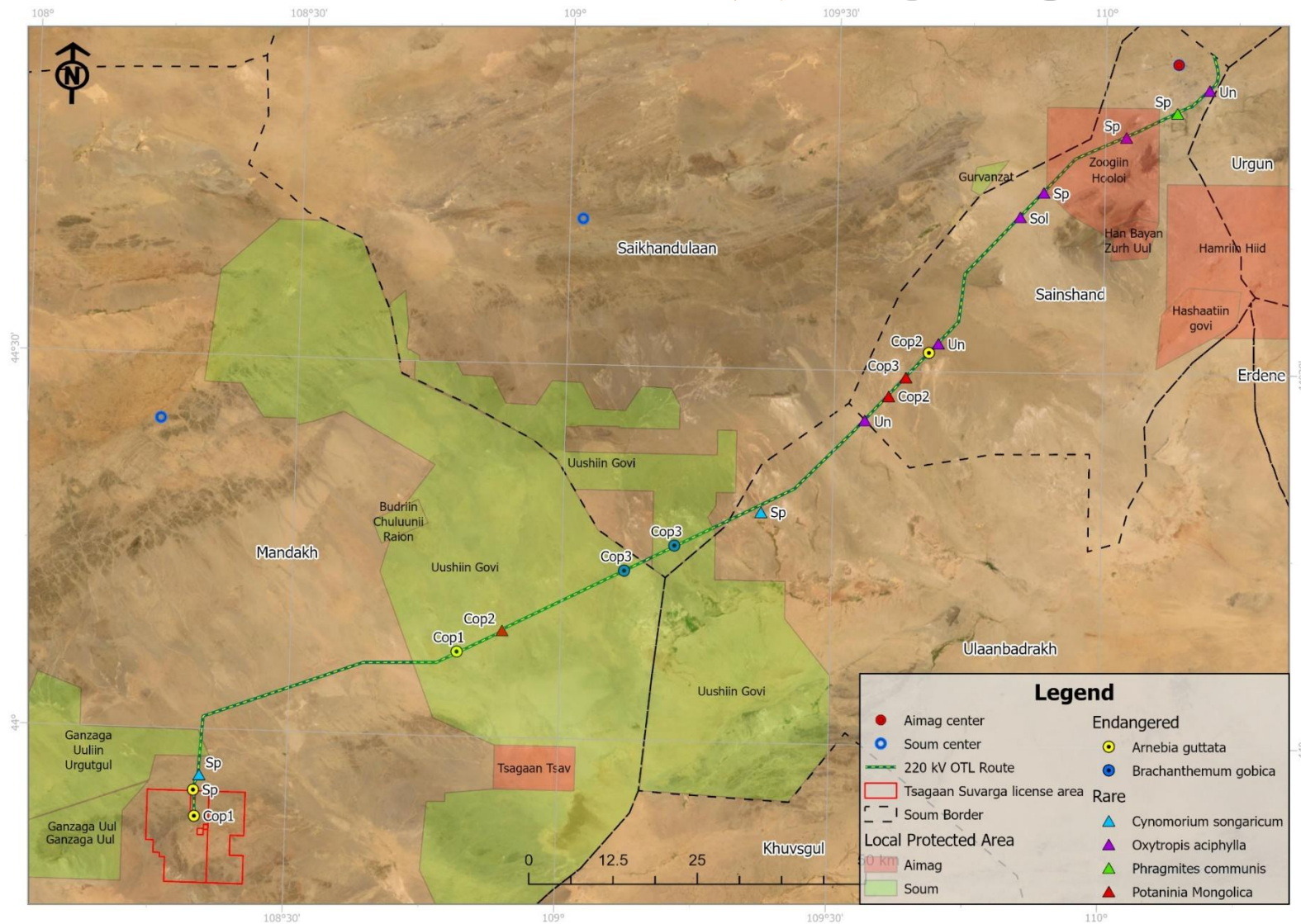


Figure 9-12 Locations of Endangered and Rare plants in Survey Area

Large and Small Mammals

Desk Study

- 9.4.36 Following a desk study, it was identified that regional large mammal species that could occur in the Survey Area include Goitered Gazelle, Mongolian Gazelle, Asiatic Wild Ass, wild Bactrian Camel (*Camelus ferus*), Red Fox (*Vulpes sp.*), Corsac Fox (*Vulpes corsac*) and Grey Wolf (*Canis lupus*). According to the Mongolian Red List of Mammals, 2006, the wild Bactrian Camel, Mongolian Gazelle and Asiatic Wild Ass are listed as Endangered, the Goitered Gazelle are listed as Vulnerable and the Red fox, Corsac Fox and Grey Wolf are listed as Near Threatened. In the global IUCN list, wild Bactrian Camels are Critically Endangered, Goitered Gazelle are Vulnerable, Asiatic Wild Ass are Near Threatened, and Mongolian Gazelle, Red Fox, Corsac Fox and Grey Wolf are considered Least Concern.
- 9.4.37 Small mammals that have the potential to be present in the Survey Area include Tolai Hare (*Lepus tolai*), Marbled Polecat (*Vormella peregusna*), Steppe Polecat (*Mustela eversmanni*), Mongolian Jerboa/ Andrew's Three-toed Jerboa (*Stylodipus andrewsi*), Thick-tailed Pygmy Jerboa (*Saplingotus crassicauda*), Kozlov's Pygmy Jerboa (*Salpingotus Kozlovi*), Red-cheeked Ground Squirrel (*Spermophilus erythrogenys*), Long-eared Hedgehog (*Hemiechinus auritus*), Siberian Jerboa/ Mongolian Five-toed Jerboa (*Allactaga sibirica*), Gobi Jerboa and Long-eared Jerboa (*Euchoreutes naso*).
- 9.4.38 The IUCN Red List classifies all these species globally as Least Concern, while the Mongolian Red list of Mammals regionally classifies most as Least Concern, other than the Long-eared Jerboa, which is classified as Vulnerable, while the Marbled Polecat, Thick-tailed Pygmy Jerboa, Kozlov's Pygmy Jerboa, and Gobi Jerboa are classified as Data Deficient.

Reconnaissance Visit

- 9.4.39 Feral populations of the Bactrian Camel (*Camelus bactrianus*) and, Goitered and Mongolian Gazelle were sighted several times during the Reconnaissance visit. The domestic Bactrian Camels and are widespread in the area. No small mammals were sighted during the reconnaissance visit.

Detailed Mammal Survey

- 9.4.40 A total of eight mammal species were recorded within the Survey Area. These included: three species of migratory ungulate, three species of rodent, one species of lagomorph and one species of hedgehog.
- 9.4.41 The migratory ungulates observed were Goitered Gazelle (**Plate 9-17**), Asiatic Wild Ass (**Plate 9-18**) and the Mongolian Gazelle (**Plate 9-19**). The Goitered Gazelle and Asiatic Ass were frequently observed (forty-eight and twenty sightings respectively), primarily within the Uushiin Govi and Ganzaga Uuliin Urgutgul LPAs as shown within **Figure 9-16** and **Figure 9-17**. The highest number of Goitered Gazelles sighted together was nine, with the highest count of Asiatic Wild Ass being thirteen. Just a single observation of a Mongolian Gazelle was made at the 122km point of the OHTL (within Uushiin Govi LPA) as shown in **Figure 9-18**.



Plate 9-17 Goitered Gazelle



Plate 9-18 Asiatic Wild Ass



Plate 9-19 Mongolian Gazelle

- 9.4.42 The conservation status of these three ungulates are outlined in **Table 9-11**. The Goitered Gazelle is assessed as Vulnerable on both the global and regional Red Lists. The Asiatic Wild Ass is assessed as Near Threatened on the IUCN Red List, and was assessed as Largely Depleted in the Green Status Assessment on July 17, 2024. The Green Status assesses the impact of past, current and future conservation success and actual or potential recovery of the taxon. The Mongolian Gazelle is assessed as Least Concern on the IUCN Red List (2025.01), while it is assessed as Endangered on the Regional Red List (2006). The basis for the regional assessment (2006) of this species is as follows: This species qualifies as Endangered under Criterion A4cde, as it is estimated that the causes of decline will result in a greater than 50% population reduction between 1996 and 2011. The assessment remains unchanged following the application of regional criteria, as there is no significant immigration from adjacent countries (Mongolian Red List of Mammals, 2006).
- 9.4.43 The Goitered Gazelle and the Asiatic Wild Ass are listed in Annex 1 of Resolution No. 7 of 2012 by the Government of Mongolia, titled "List of Rare Animals." Both species are also included in the Mongolian Red Book (2014). Additionally, the Asiatic Wild Ass is listed in Appendix II of both CITES and CMS. The Mongolian Gazelle and the Goitered Gazelle are listed in Appendix II of the CMS. Furthermore, neither mammal species are included in the List of Endangered Species under the Law on Animals (2012).
- 9.4.44 The Goitered Gazelle, Mongolian Gazelle and Asiatic Wild Ass are wide roaming species and have extensive distributions, as shown in **Figures 9-13, 9-14 and 9-15**.

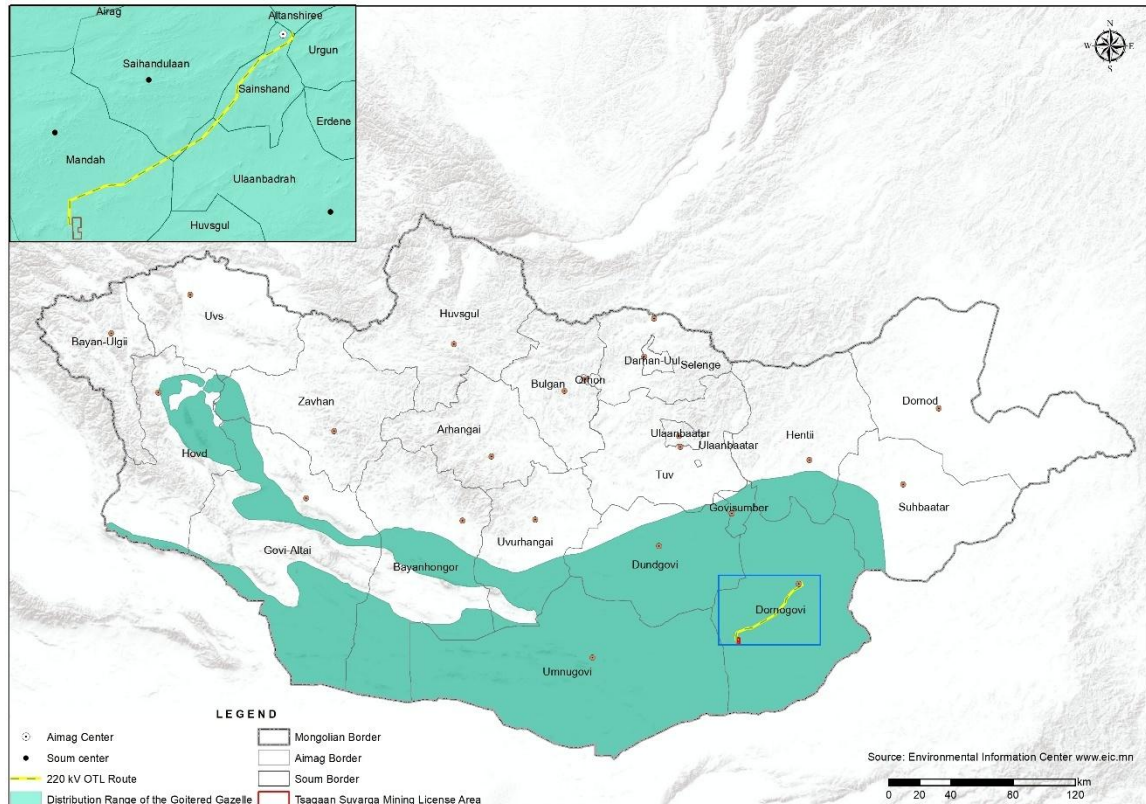


Figure 9-13 Distribution Map of Goitered Gazelle

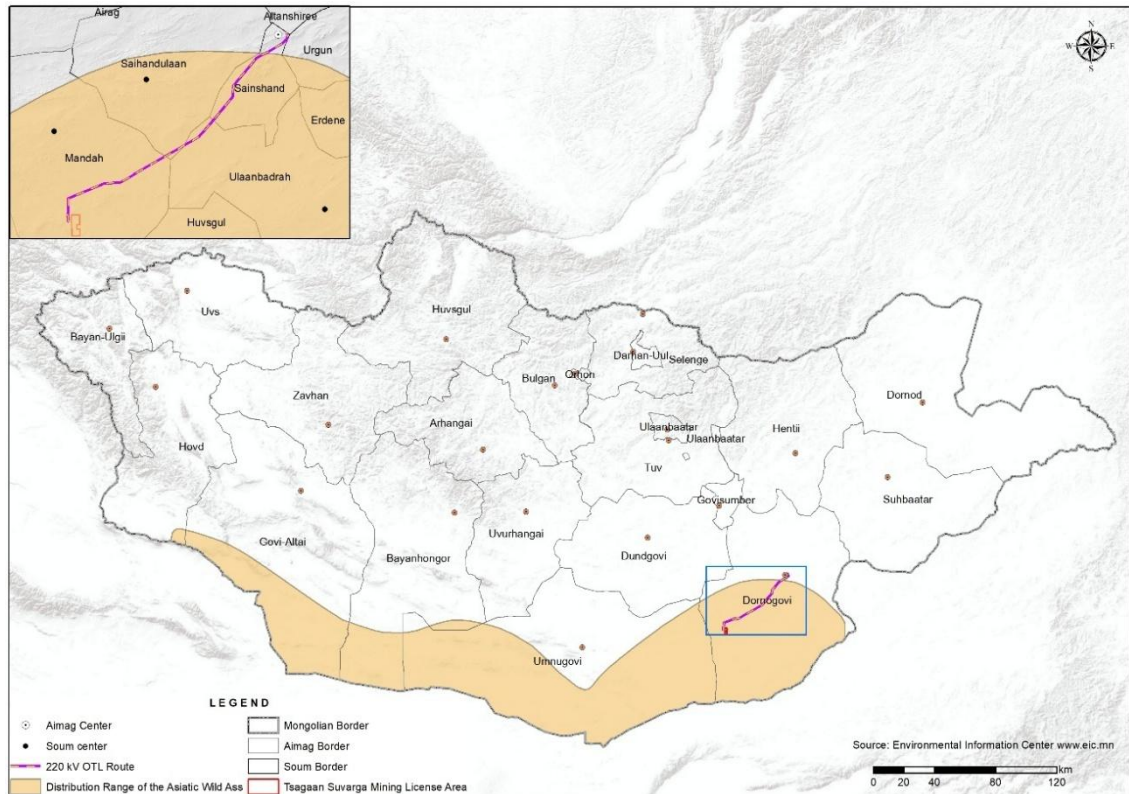


Figure 9-14 Distribution Map of Mongolian Gazelle

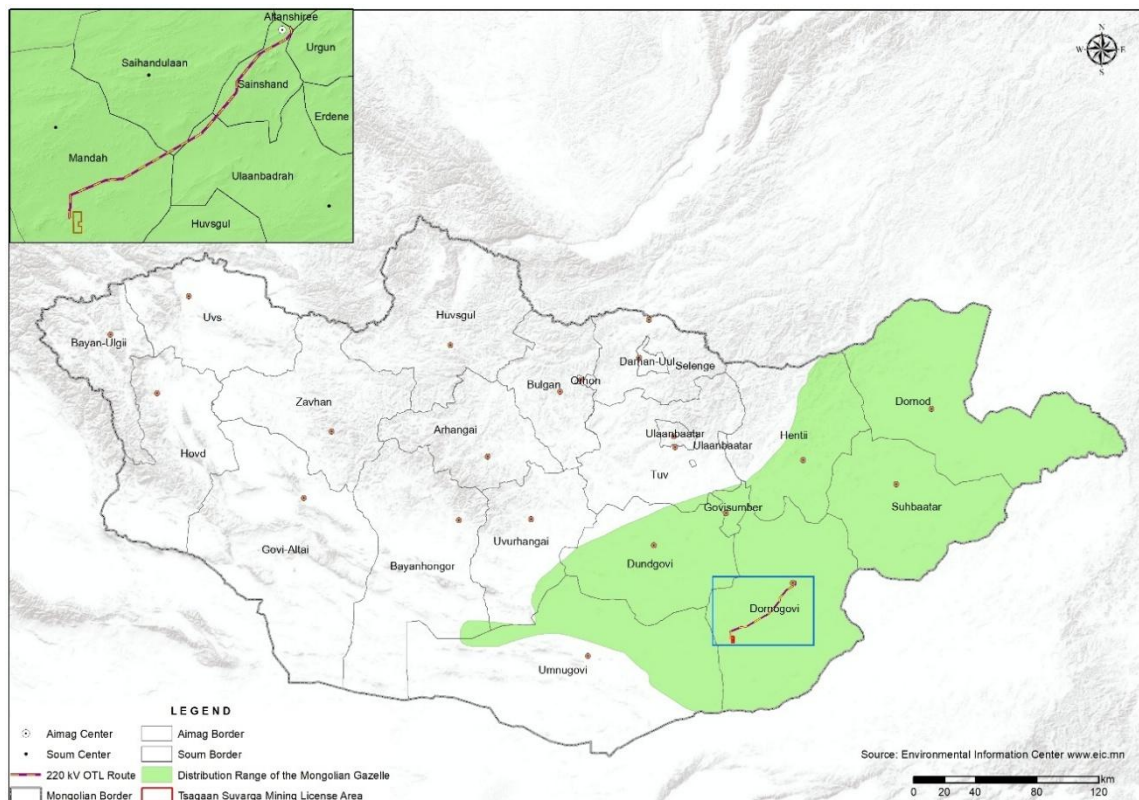


Figure 9-15 Distribution Map of Asiatic Wild Ass

- 9.4.45 Small mammals were recorded across the Survey Area (**Figure 9-18**). The Gobi Jerboa, a nocturnal rodent, was observed during spot lighting surveys conducted on foot (**Plate 9-20**). Two other rodent species, Campbell's Hamster and the Mid-day Gerbil, were recorded using the pitfall trap method (**Plates 9-21, 9-22**). A Tolai Hare was observed during a walked transect survey (**Plate 9-23**), and the skin of a Long-eared Hedgehog was also recorded (**Plate 9-24**). All these species are of Least Concern globally (IUCN) and of Least Concern nationally (Mongolia Red Book of Mammals, 2014), other than the Gobi Jerboa which is classified as Data Deficient nationally. All mammals (large and small) recorded are listed on **Table 9-12**.



Plate 9-20 Gobi Jerboa



Plate 9-21 Campbell's Hamster



Plate 9-22 Mid-day Gerbil



Plate 9-23 Tolai Hare



Plate 9-24 Skin of a Long-eared Hedgehog

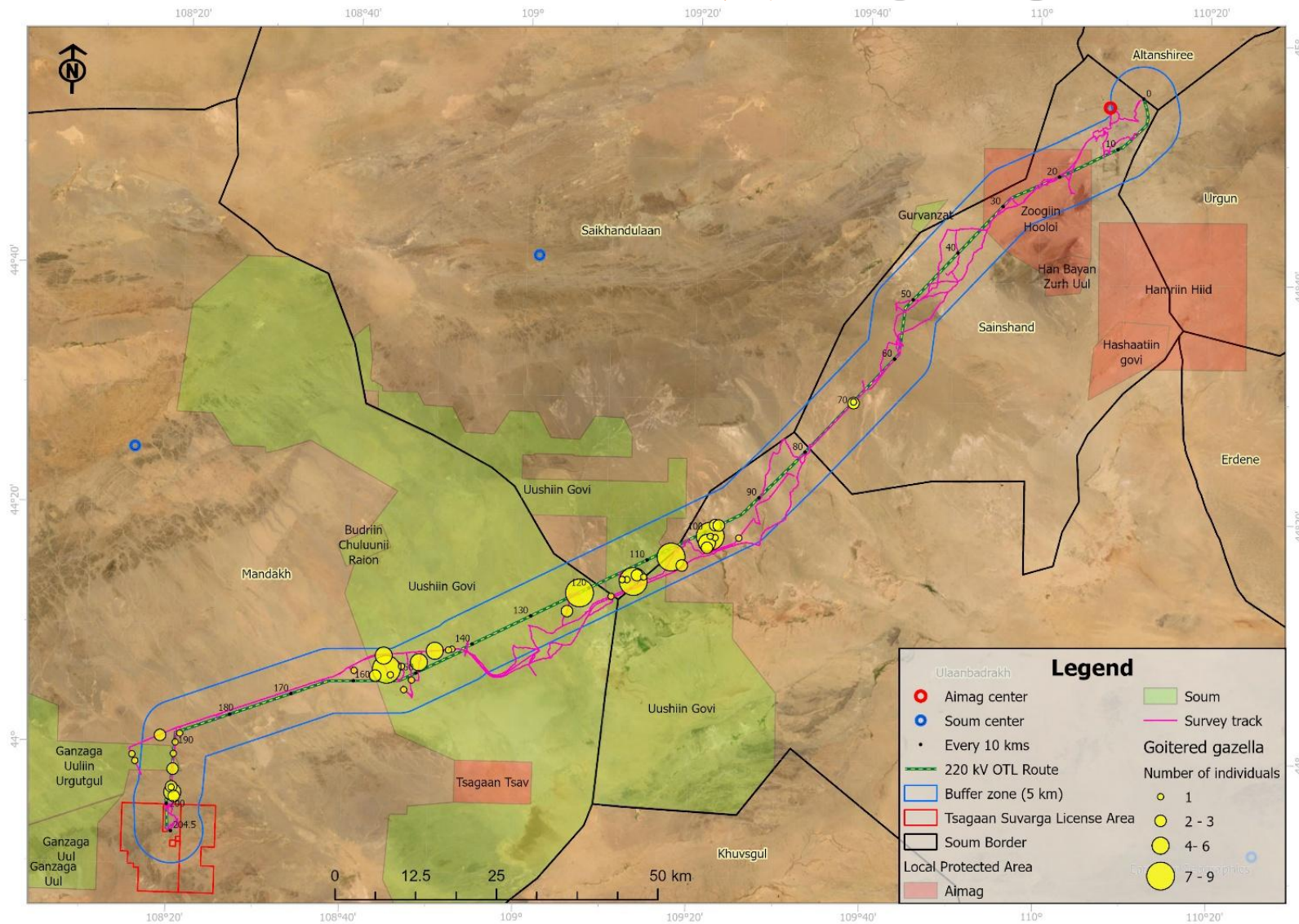


Figure 9-16 Records of Goitered Gazelle

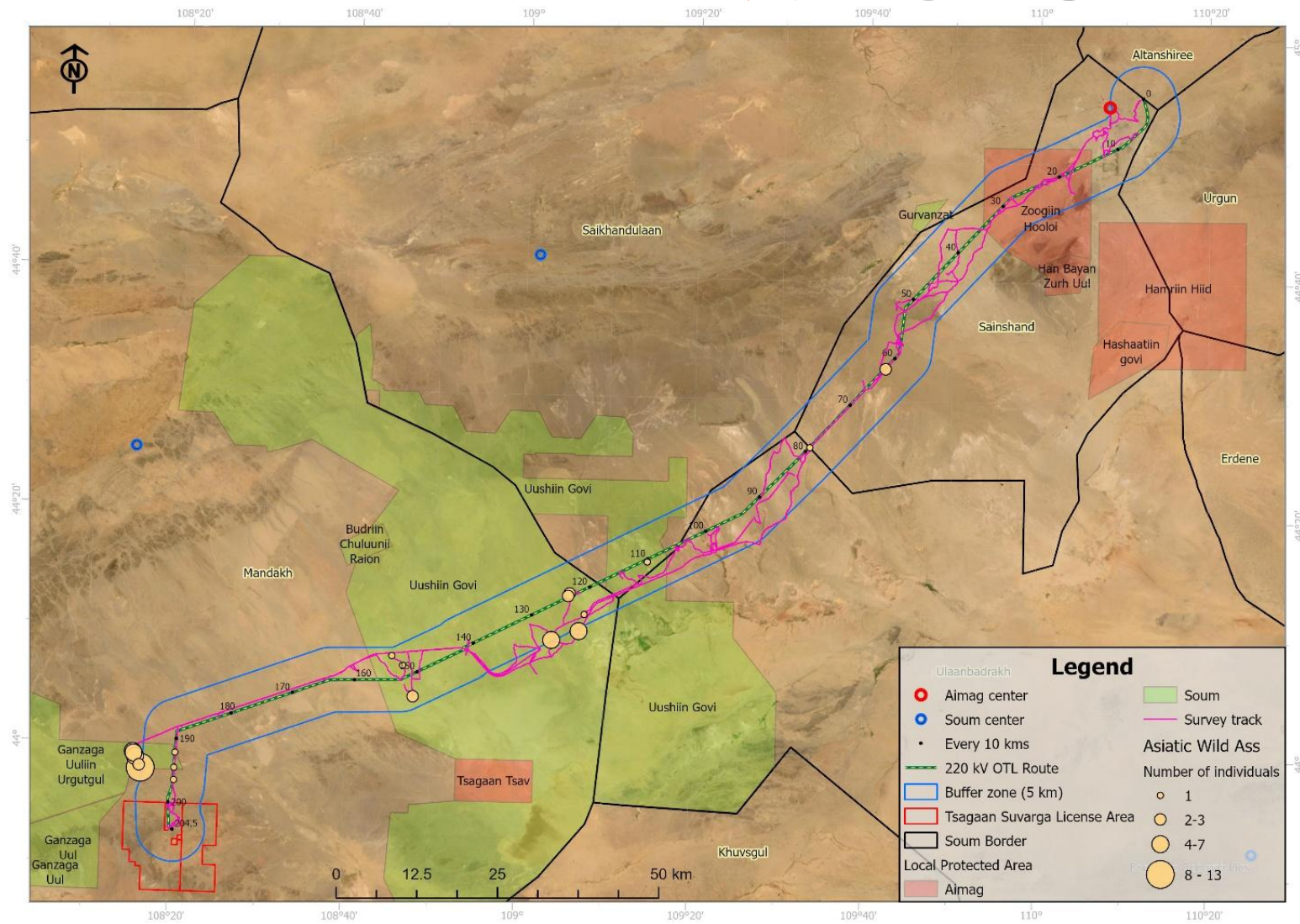


Figure 9-17 Records of Asiatic Wild Ass

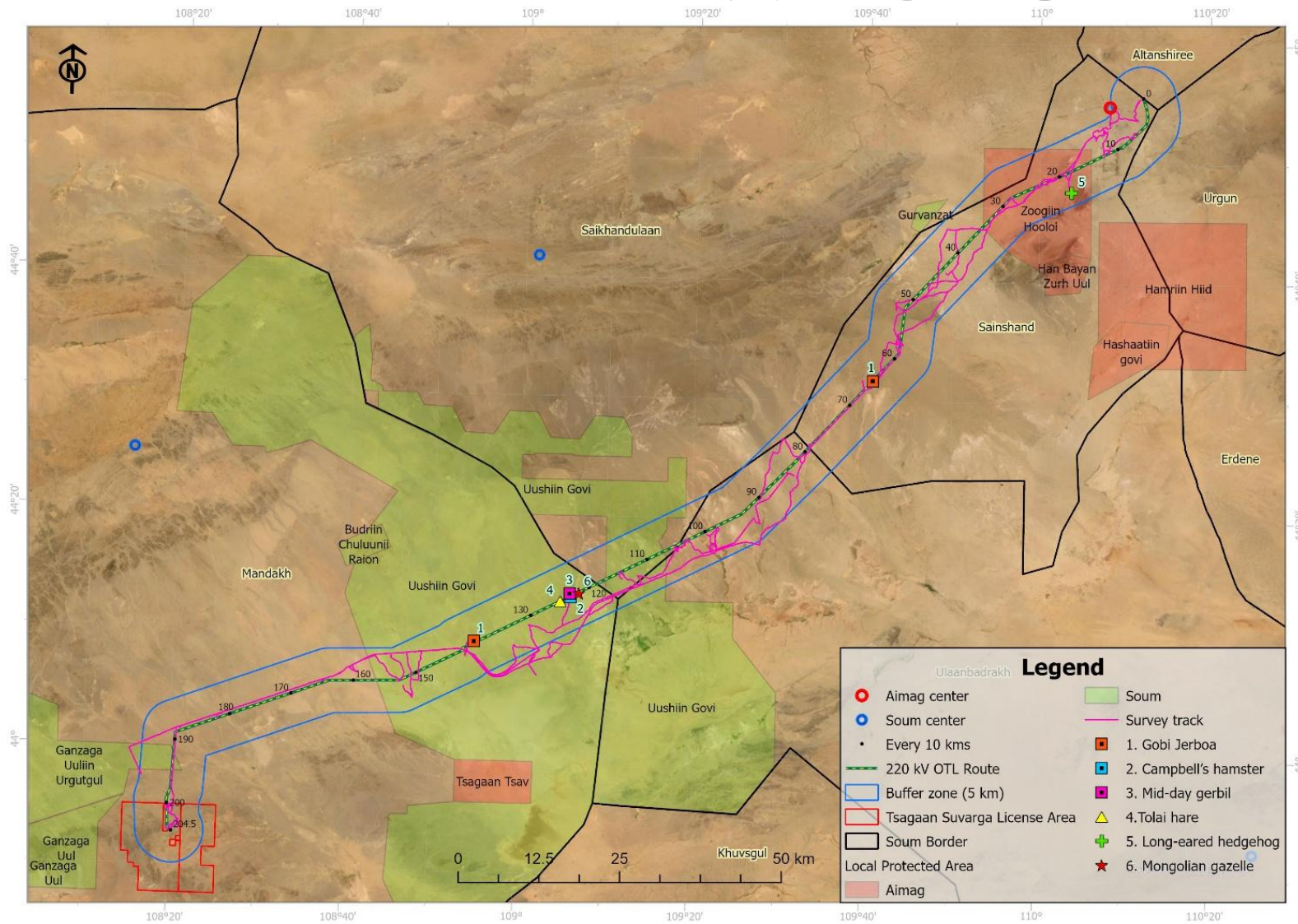


Figure 9-18 Mammal Survey Records

Table 9-12 Mammal Conservation Status and Survey Results

Mammal Species Name	Conservation Status						Number of Sightings	Max Count
	Annex 1 of Government Resolution No. 7 of 2012. List of Rare Animals	Mongolian Redbook, 2014	Red List		CITES I, II, III	CMS I, II		
			Global (IUCN Red List, 2025.01)	Regional (Mongolian Red List of Mammals, 2006)				
Gobi Jerboa <i>Allactaga bullata</i>	-	-	LC	DD			2	1
Campbell's Hamster <i>Phodopus campbelli</i>	-	-	LC	LC			1	2
Mid-day Gerbil <i>Meriones meridianus</i>	-	-	LC	LC			1	1
Tolai Hare <i>Lepus tolai</i>	-	-	LC	LC			1	1
Long-eared Hedgehog <i>Hemiechinus auritus</i>	-	-	LC	LC			1	2
Goitered Gazelle <i>Gazella subgutturosa</i>	Rare	+	VU	VU		II	48	9
Asiatic Wild Ass <i>Equus hemionus</i>	Rare	+	NT (Red List Assessment)	EN	II	II	20	13
			LD (Green Status Assessment)					
Mongolian Gazelle <i>Procapra gutturosa</i>	-	-	LC	EN		II	1	1

Bats

Desk Study

- 9.4.46 Bat species that could occur in the region include Gobi Big Brown Bat (*Eptesicus gobiensis*), Whiskered Bat (*Myotis mystacinus*), Kozlov's Long-eared Bat (*Plecotus kozlovi*) and Particoloured Bat (*Vespertilio murinus*). These species are all of Least Concern globally (IUCN), and also of Least Concern regionally (Mongolian Red List of Mammals), apart from Kozlov's Long-eared Bats, which are regionally assessed as Data Deficient due to insufficient information on its distribution, population size and trends, and the extent of potential threats.

Reconnaissance Visit

- 9.4.47 Potential bat roosting features were not identified within the vicinity of the proposed OHTL due to the open homogenous nature of the landscape. The presence of foraging and commuting bats could not however be ruled out. The ESIA Scoping Report outlined bat collision with OHTL as a potential effect, and as such, bat activity surveys were conducted to through static bat detectors.



Detailed Bat Survey

- 9.4.48 Across the survey period, just two bat calls were recorded. A single Kozlov's Long-eared Bat call was recorded at the Sainshand Substation bat detector location and a single Gobi Big Brown Bat call was recorded at the second location (65 - 66 km along the OHTL). These are shown in **Table 9-13** and **Figure 9-19**. The Survey Area is within the eastern edge of the distribution for both these species as shown within **Table 9-14**.
- 9.4.49 The Gobi Big Brown Bat roosts alone or in small groups, in shaded areas such as crevices in rocks, buildings and sometimes caves, but not in trees. In contrast, Kozlov's Long-eared Bat likely roosts in rock crevices. In the Mongolian Red List of Mammals (2006), it is named as 'Grey Long-eared bat', as this source was published before genetic analysis (Spitzenberger et al., 2006) which now lists Kozlov's Long-eared Bat as a separate species, rather than a subspecies. No endangered or rare species were observed during the survey.

Table 9-13 Results of Audio Analysis (Kaleidoscope Pro)

Common and Scientific Name	Date	Recorded Time	Location	Red List	
				Global (IUCN Red List, 2025.01)	Regional (Mongolian Red List of Mammals, 2006)
Kozlov's Long-eared Bat <i>Plecotus kozlovi</i>	6/22/2025	22:10:20	Sainshand Substation (44.925194, 110.196941)	LC	DD
Gobi Big Brown Bat <i>Eptesicus gobiensis</i>	6/24/2025	22:19:14	OHTL 65-66km (44.526443, 109.678931)	LC	LC

Table 9-14 Global and Regional Distributions of the Detected Bat Species

Bat Species-Common Name	Scientific Name	Distribution	
		*Global	**Regional
Kozlov's Long-eared Bat	<i>Plecotus kozlovi</i>	*** Mongolia (mainly Gobi Altai, Gobi Lakes Valley, Transaltai Gobi Desert, Dzungarian Basin and Great Lakes basin north ward to Khyargas Nuur and Khara Khoto), Kashgar in Xinjiang Uygur and the arid Qaidam basin in Qinghai, China.	Mongol Altai Mountain Range, Dzungarian Gobi Desert, Trans Altai Gobi Desert, Gobi Altai Mountain Range, Great Lakes Depression, Valley of the Lakes, Alashan' Gobi Desert, and western parts of Eastern Gobi . 
Gobi Big Brown Bat	<i>Eptesicus gobiensis</i>	Russian Federation, Afghanistan, Pakistan, China (Xinjiang and Xizang), India, Mongolia.	Mongol Altai Mountain Range, Great Lakes Depression, Valley of the Lakes, Gobi Altai Mountain Range, southern Hangai Mountain Range, southern Middle Halh Steppe, Northern Gobi, Eastern Gobi , Dzungarian Gobi Desert, Trans Altai Gobi Desert, and Alashan' Gobi Desert. 
Sources: *IUCN 2025. The IUCN Red List of Threatened Species. Version 2025-1. https://www.iucnredlist.org **Clark, E. L., Munkhbat, J., Dulamtseren, S., Baillie, J. E. M., Batsaikhan, N., Samiya, R. and Stubbe, M. (compilers and editors) (2006). Mongolian Red List of Mammals. Regional Red List Series Vol. 1. Zoological Society of London ***Spitzenberger et al. 2006, Dolch et al. 2007, Kruskop et al. in press			

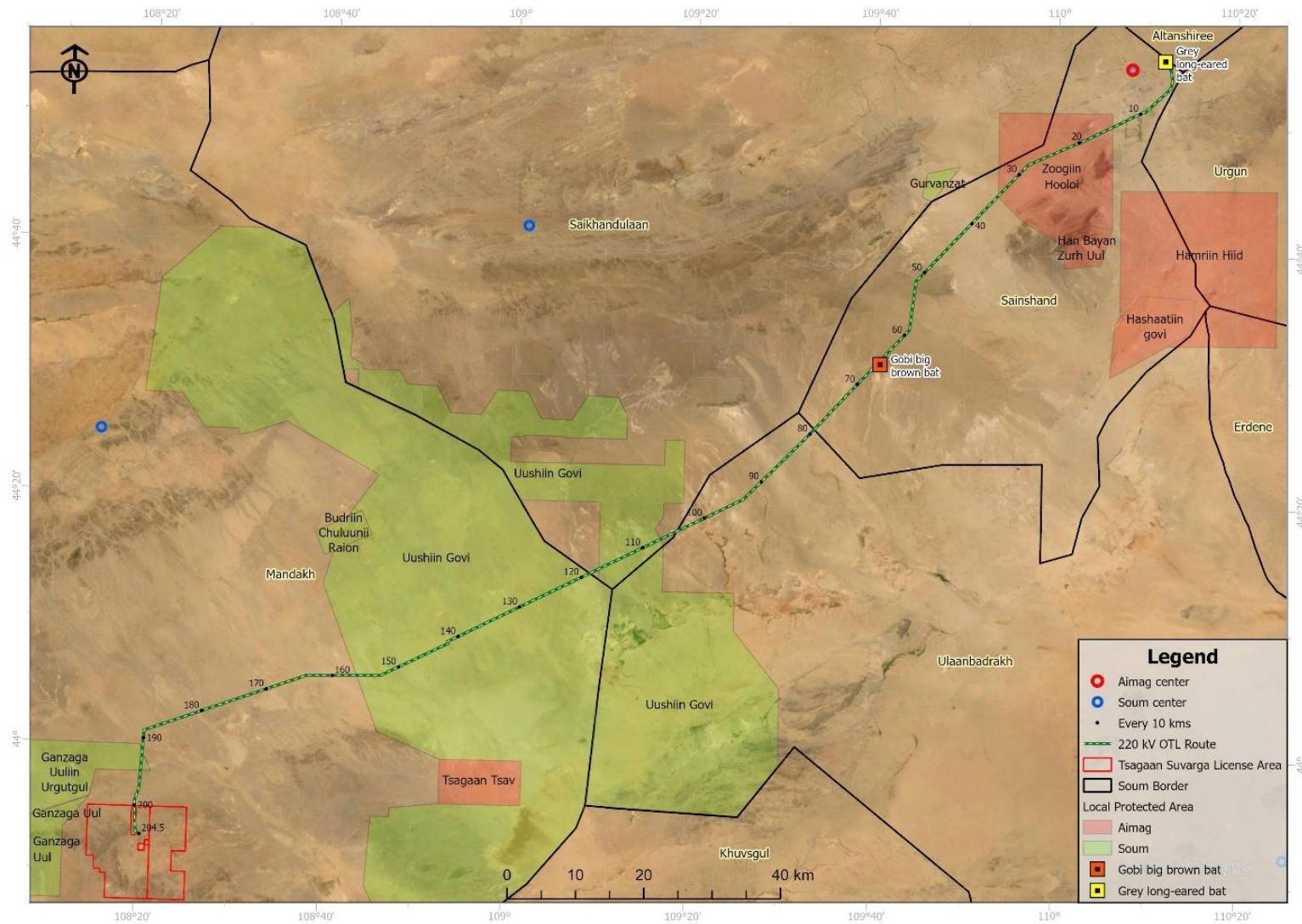


Figure 9-19 Bat Recording Location

Birds

Desk Study

- 9.4.50 As stated previously, spring and autumn passage bird surveys have previously been undertaken across the Survey Area. A spring bird survey was conducted in 2022 by Sustainability East Asia (SEA) and Wildlife Science and Conservation Centre of Mongolia (WSCCM) and an autumn and early winter bird survey was conducted in 2024 by Arcadis and EcoTrend. These provide the most relevant information regarding bird records in the area.
- 9.4.51 Results from the 2022 survey recorded a total of 128 bird species. Of these, 90 species were passage migrants, 22 species were resident breeders, and 14 species were breeding visitors. Species occurrence varied significantly, with passage migrants comprising 17% of the total occasions recorded, while resident breeders accounted for the highest proportion with 48%, followed by breeding visitors with 35%. The most frequently encountered species included Common Raven (*Corvus corax*), Pallas's Sandgrouse (*Syrrhaptes paradoxus*), Rook (*Corvus frugilegus*) and Cinereous Vulture (*Aegypius monachus*).
- 9.4.52 Results from the 2024 autumn and early winter survey recorded a total of 37 bird species across the Survey Area. Notable species included Saker Falcon (*Falco cherrug*), Cinereous Vulture, Northern Lapwing (*Vanellus Vanellus*), and Golden Eagle (*Aquila chrysaetos*).
- 9.4.53 The species identified across both surveys that are considered internationally and regionally threatened according to the IUCN and National (Mongolian) Red List are outlined in **Table 9-15**. For further details on the bird species recorded during these surveys, please refer to the spring (WSCCM, 2022) and autumn (Arcadis 2024) bird reports.

Table 9-15 Threatened Bird Species Previously Recorded in Survey Area from 2022 and 2024 Surveys

Species	IUCN Red List Status	National Red List Status	Years Recorded
Saker Falcon	EN	VU	2022 & 2024
Steppe Eagle	EN	LC	2022 & 2024
Swan Goose	EN	NT	2022
Common Pochard	VU	LC	2022
European Turtle Dove	VU	DD	2022
Ferruginous Duck	NT	VU	2022
Cinereous Vulture	NT	LC	2022 & 2024
Eurasian Curlew	NT	LC	2022
Black-tailed Godwit	NT	LC	2022
Northern Lapwing	NT	LC	2022 & 2024
Common Crane	LC	NT	2022

Species	IUCN Red List Status	National Red List Status	Years Recorded
Saxaul Sparrow	LC	NT	2022 & 2024
Mongolian Ground Jay	LC	VU	2022 & 2024
Falcated Duck	LC	NT	2022

Reconnaissance Visit

- 9.4.54 During the reconnaissance visit, evidence of nesting was observed along the OHTL route, with two corvid nests seen on existing pylons, as well as a third at the Tsagaan Suvarga substation. A pair of small raptors, believed to be Common Kestrel (*Falco tinnunculus*) were also recorded as a possible breeder at the substation due to extensive calling and flight interaction. Several Ruddy Shelduck (*Tadorna ferruginea*) were recorded at the marshy area (as detailed in the habitat and flora section); this was considered suitable breeding habitat for this species, and as such were also classified as possible breeders. A Saker Falcon was also observed around the 195 km point on the OHTL route, the bird was in flight and perched on the line, although breeding evidence was not observed.

Detailed Breeding Bird Survey

- 9.4.55 As discussed in the methodology section, the breeding bird survey was primarily focussed on identifying breeding Asian Houbara Bustard. This species was not however encountered during the survey work.
- 9.4.56 During the breeding bird transects (and other fauna survey transects), a total of thirty-three bird species were recorded. The Asian Short-toed Lark (*Alaudala cheleensis*), Pallas's Sandgrouse, and Desert Wheatear (*Oenanthe deserti*) were the most frequently observed in the Survey Area. These species were considered to be breeding. **Figures 9-20** and **9-21** display the locations of recorded species along the OHTL route.
- 9.4.57 A Cinereous Vulture was found to be nesting within an elm tree along a dry river bed. Photographs of this nesting behaviour is given in **Plates 9-25 and 9-26** below. Upland buzzards were also found to be nesting, with one nest found on an existing pylon structure, seen in **Plate 9-27**. Locations of these nests can also be found in **Figures 9-20 and 9-21**.
- 9.4.58 This survey was conducted between 22 and 29 June 2025, a period during which the peak migration season for birds had already passed, therefore birds recorded were considered to be either resident breeders or summer visitor breeding birds. They therefore have the potential to breed within the Survey Area or the surrounding area. Species with large territories, could be foraging within the Survey Area only.



Plate 9-25 Cinereous Vulture Nest



Plate 9-26 Cinereous vulture Nest with Chick



Plate 9-27 Upland Buzzard Nest

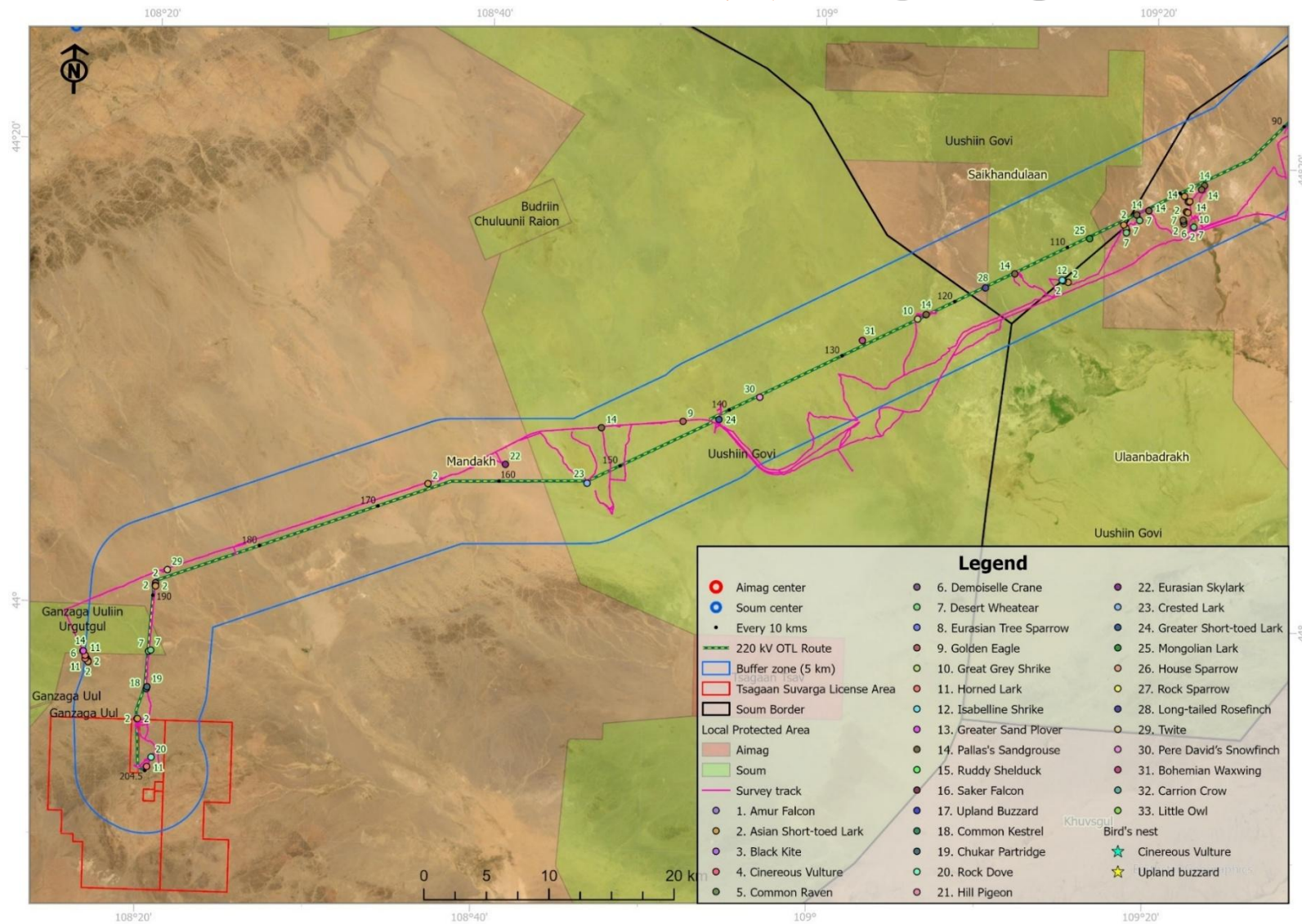


Figure 9-20 Bird Species Tracking (Part 1)

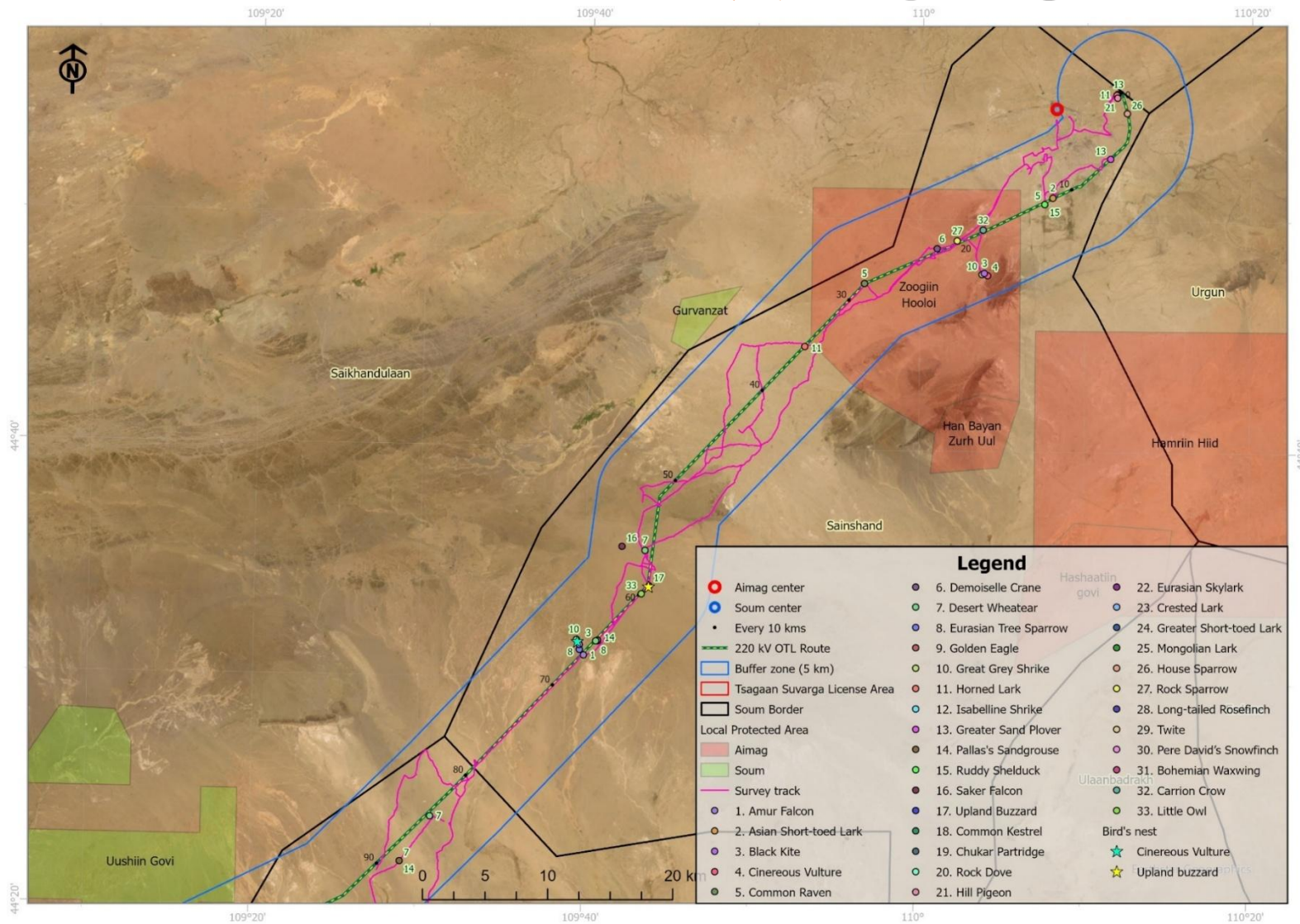


Figure 9-21 Bird Species Tracking (Part 2)

- 9.4.59 The Saker Falcon is listed as Endangered (EN) on the IUCN Red List (2025.01) and as Vulnerable (VU) on the Regional Red List (2011). The Cinereous Vulture is assessed as Near Threatened (NT) on the IUCN Red List and as Least Concern (LC) on the Regional Red List (**Table 9-16**). The remaining 31 bird species are classified as Least Concern on both the IUCN and Regional Red Lists. No species are listed as “Very Rare” under Mongolia’s Law on Fauna (2012) or as “Rare” under Government Resolution No. 7 were recorded. Additionally, none of the species are included in Mongolia’s Red Book (2014), or in Appendices I, II, or III of CITES, or Appendices I or II of CMS.

Table 9-16 Conservation Status and Bird Records during 2025 Breeding Bird Surveys

Common and Latin Name	Red Lists		Number of Sightings	Max Count
	Global (IUCN Red List, 2025.01)	Regional (Mongolian Red List of Birds, 2011)		
Amur Falcon <i>Falco amurensis</i>	LC	LC	1	6
Saker Falcon <i>Falco cherrug</i>	EN	VU	1	1
Common Kestrel <i>Falco tinnunculus</i>	LC	LC	1	1
Chukar Partridge <i>Alectoris chukar</i>	LC	LC	1	2
Rock Dove <i>Columba livia</i>	LC	LC	1	3
Hill Pigeon <i>Columba rupestris</i>	LC	LC	1	2
Little Owl <i>Athene noctua</i>	LC	LC	1	1
Black Kite <i>Milvus migrans</i>	LC	LC	4	2
Cinereous Vulture <i>Aegypius monachus</i>	NT	LC	1	1
Golden Eagle <i>Aquila chrysaetos</i>	LC	LC	1	1
Upland Buzzard <i>Buteo hemilasius</i>	LC	LC	2	1
Eurasian Skylark <i>Alauda arvensis</i>	LC	LC	1	1
Crested Lark <i>Galerida cristata</i>	LC	LC	1	1
Greater Short-toed Lark <i>Calandrella brachydactyla</i>	LC	LC	1	2
Mongolian Lark <i>Melanocorypha mongolica</i>	LC	LC	1	3
Rock Sparrow <i>Petronia petronia</i>	LC	LC	1	2
House Sparrow <i>Passer domesticus</i>	LC	LC	1	2
Eurasian Tree Sparrow <i>Passer montanus</i>	LC	LC	2	4
Pallas's Sandgrouse <i>Syrhaptes paradoxus</i>	LC	LC	16	9
Asian Short-toed Lark <i>Alaudala cheleensis</i>	LC	LC	20	7
Horned Lark <i>Eremophila alpestris</i>	LC	LC	6	3
Long-tailed Rosefinch <i>Uragus sibiricus</i>	LC	LC	1	1

Common and Latin Name	Red Lists		Number of Sightings	Max Count
	Global (IUCN Red List, 2025.01)	Regional (Mongolian Red List of Birds, 2011)		
Twite <i>Linaria flavirostris</i>	LC	LC	1	2
Pere David's Snow Finch <i>Pyrgilauda davidiana</i>	LC	LC	1	1
Bohemian Waxwing <i>Bombycilla garrulus</i>	LC	LC	1	1
Greater Sand Plover <i>Charadrius leschenaultii</i>	LC	LC	3	10
Desert Wheatear <i>Oenanthe deserti</i>	LC	LC	14	4
Isabelline Shrike <i>Lanius isabellinus</i>	LC	LC	1	1
Great Grey Shrike <i>Lanius excubitor</i>	LC	LC	4	6
Common Raven <i>Corvus corax</i>	LC	LC	2	5
Carrion Crow <i>Corvus corone</i>	LC	LC	1	2
Ruddy Shelduck <i>Tadorna ferruginea</i>	LC	LC	1	2
Demoiselle Crane <i>Anthropoides virgo</i>	LC	LC	3	2

Reptiles and Amphibians

Desk Study

- 9.4.60 An amphibian species that could occur in the region is the Mongolian Toad (*Strauchbufo raddei*). This species is of Least Concern on the IUCN Red List. It is adapted to steppe and semi-desert conditions and is tolerant of arid conditions.
- 9.4.61 Regional studies (Professional Biological Society of Mongolia, 2019) in south-east Mongolia indicate more than 10 species of reptiles, with the common species being Toad-headed Agama (*Phrynocephalus versicolor*), Multi-ocellated Racerunner (*Eremias multiocellata*), Gobi Racerunner (*Eremias przewalskii*) and Venomous Pitviper (*Gloydius halys*). No IUCN and Mongolian Red Listed threatened reptile species are recorded in the regional studies (Mongolian Red List of Reptiles and Amphibians, 2006).

Reconnaissance Visit

- 9.4.62 During the reconnaissance visit, Toad-headed Agama was recorded regularly in sandy habitats. No further amphibians or reptiles were identified.

Detailed Reptile Survey

- 9.4.63 During the baseline surveys, Multi-ocellated Racerunner (**Plate 9-28**) and Tuvan Toad-headed Agama (**Plate 9-29**) were recorded within the Survey Area, as shown below in **Figure 9-22**. The Tuva toad-headed Agama was spotted along the entire route, across fifteen different locations, with an average of two animals sighted per location, while the Multi-ocellated Racerunner was recorded in only one instance, with one individual present (**Table 9-17**). No amphibians were recorded during the survey.
- 9.4.64 Both recorded reptile species are classified as Least Concern (LC) according to the IUCN Red List (IUCN, 2025) and the Mongolian Red List of Reptiles and Amphibians (2006). Furthermore, neither species is included in the List of Endangered Species under the Law on Animals (2012), nor in Annex 1 of Government Resolution No. 7 of 2012, titled "List of Rare Animals".



Plate 9-28 Multi-Ocellated Racerunner



Plate 9-29 Tuva Toad-headed Agama

Table 9-17 Recorded Reptiles During the Survey

Species Name	Red List		Number of Sightings	Max Count
	Global (IUCN Red List, 2025.01)	Regional (Mongolian Red List of Reptiles 2006)		
Tuva Toad-headed Agama <i>Phrynocephalus versicolor</i>	LC	LC	15	4
Multi-ocellated Racerunner <i>Eremias multiocellata</i>	LC	LC	1	1

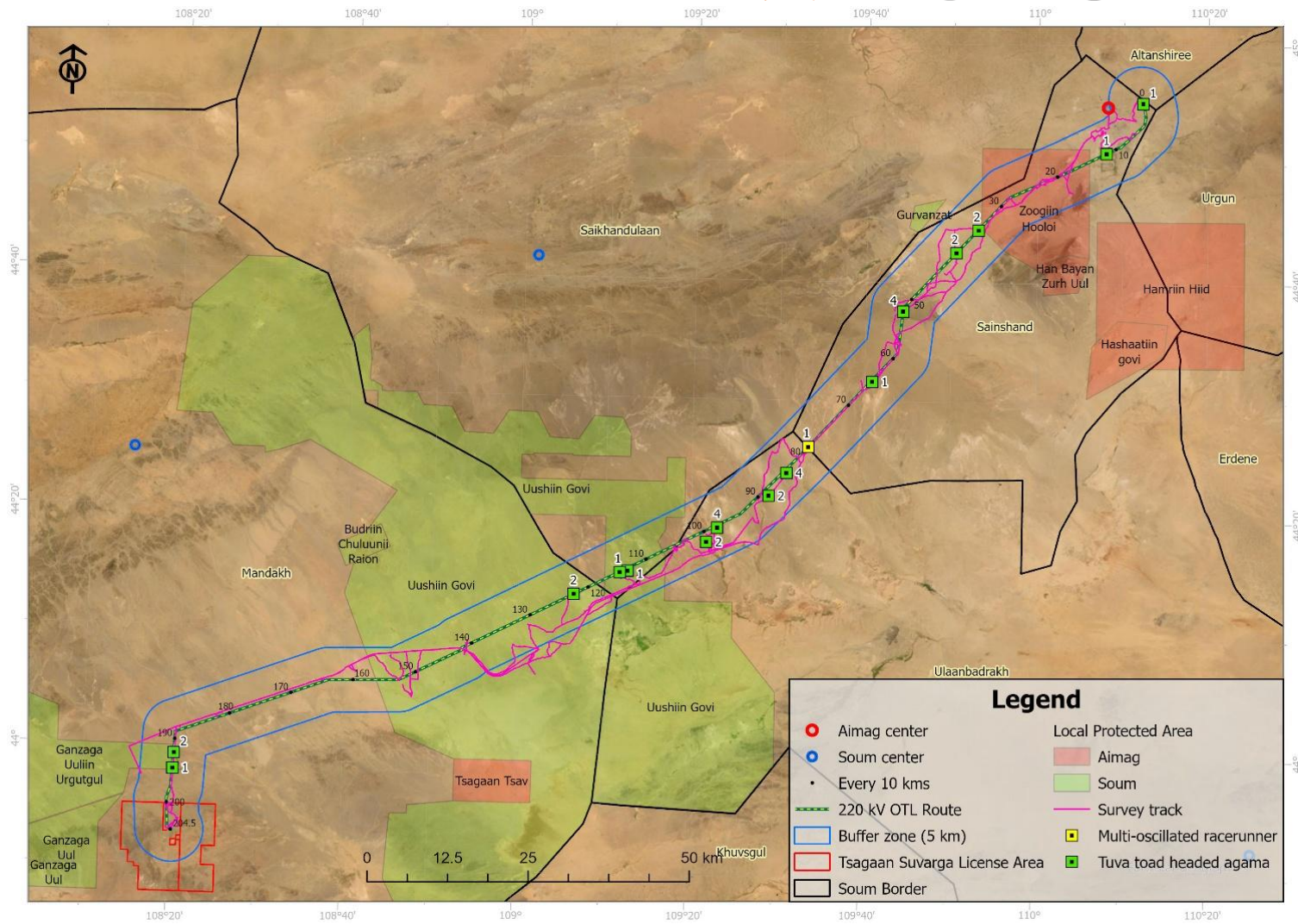


Figure 9-22 Reptile Location Map

Invertebrates

Desk Study

- 9.4.65 Over 340 species of invertebrates have been recorded in the Gobi Desert (McCarthy *et al.*, 2022). Therefore, further surveys were recommended to determine the invertebrate assemblage within the survey area.

Detailed Invertebrate Survey

- 9.4.66 A total of six invertebrate genera were recorded during the survey. Of these, two beetles and one insect larva were detected using the pitfall trap method. One grasshopper, one robber fly, and one black beetle were observed incidentally during other wildlife surveys. These invertebrates were not found to be of conservation concern in Mongolia.

9.5 Future Baseline

- 9.5.1 In the absence of the Project, it is considered likely that the future baseline of the Survey Area would be broadly comparable to the current baseline, although a warming climate may extend arid conditions and herding pressure could degrade habitats. Future baseline is likely to consist of the following:
- Flora and habitats along the proposed OHTL route and access tracks would remain undisturbed, however ongoing pressures such as grazing, desertification, and human activities may degrade habitats.
 - Plants would not be exposed to increased dust generated by construction activities, which could otherwise hinder photosynthesis and growth.
 - The introduction and spread of invasive species, which could outcompete native flora, would be very unlikely.
 - The soil supporting vegetation would remain unaffected by heavy machinery and construction activities, preserving the natural ability of plants to root and access nutrients.
 - Undisturbed ecosystems may have better chances of adapting to climate change, as habitat destruction reduces their resilience.
 - Higher temperatures, reduced precipitation and extreme weather events may degrade soil quality, reduce groundwater levels, and reduce vegetation cover, increasing vulnerability to desertification.
 - Native flora may struggle to adapt to shifting climatic conditions, while invasive species may thrive, altering ecological balance.
 - Climate change could exacerbate the vulnerability of rare plants, potentially leading to their extinction.

9.6 Identification of Important Ecological Receptors

- 9.6.1 To conduct a comprehensive assessment of potential impacts, key ecological receptors were identified that have the potential to be impacted by the project. By preparing this list of receptors it is possible to focus on key impact pathways.

Designated Sites

- 9.6.2 No international or national designated sites have the potential to be adversely impacted by the Project as they are all situated over 20km from the OHTL.
- 9.6.3 The OHTL does however pass through two active LPAs, designated after the identification of a PCA; these LPAs are Uushiin Govi and Ganzaga Uuliin Urgutgul. The Zoogiin Kholoi LPA was not ecologically designated and was released from protection in 2019 and so is not considered further.
- 9.6.4 Uushiin Govi (not including the Saikhandulaan soum which has been released from protection) is a relatively intact area of steppe with shrubland habitats. During the fauna surveys, it was found to be the main area of ungulate sightings, which are species for which the LPA is designated. It is assessed as a Medium value receptor, of regional significance with limited potential for substitution.
- 9.6.5 Ganzaga Uuliin Urgutgul was found to support a diversity of mammals (particularly ungulates) and birds. It is therefore assessed as a Medium value receptor, of regional importance with limited potential for substitution.

Critical Habitats

- 9.6.6 A Critical Habitat is defined as an area of high biodiversity value that is important for the survival of certain species, ecosystems, or evolutionary processes (European Bank of Reconstruction and Development, 2014; International Finance Corporation, 2019). An area can qualify as a Critical Habitat if it meets any of the following criteria:

1. Critically Endangered (CR) or Endangered (EN) Species

- a) Areas that support globally important concentrations of an IUCN Red-listed EN or CR species ($\geq 0.5\%$ 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 Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds above.
- c) As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.

2. Endemic and Restricted-range Species

- a) Areas that regularly hold $\geq 10\%$ of the global population size AND ≥ 10 reproductive units of a species.

3. Migratory and Congregatory Species

- 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.

4. Highly Threatened or Unique Ecosystems

- a) Areas representing $\geq 5\%$ 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.

5. Key Evolutionary Processes

a) In summary, this is defined as the structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation, and combinations of these variables, can influence the evolutionary processes that give rise to regional configurations of species and ecological properties.

9.6.7 The Survey Area, spanning Mandakh, Ulaanbadrakh, Saikhandulaan, and Sainshand soums, intersects with habitats that support several species of conservation concern. However, based on current data, none of these areas are expected to trigger Critical Habitat Assessment (CHA) thresholds, as detailed in **Table 9-18** below. Therefore, a Critical Habitat receptor is not assessed within the impact assessment.

Table 9-18 Summary of Critical Habitat Criteria Status

Critical Habitat Criteria	Site Status and Justification
1. Critically Endangered or Endangered Species	
a) Areas that support globally important concentrations of an IUCN Red-listed EN or CR species ($\geq 0.5\%$ of the global population AND ≥ 5 reproductive units of a CR or EN species).	<p>Criteria not met</p> <p>No CR species recorded. The only EN species on the IUCN Global Red List recorded during the survey work were Saker Falcon and Steppe Eagle, however a max count of one bird was made for each species and as such, their numbers do not meet the threshold for CHA.</p>
b) Areas that support globally important concentrations of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR and meet the thresholds above.	<p>Criteria not met</p> <p>The VU species on the IUCN Global Red List recorded during the survey work included Goitered Gazelle (9), Common Pochard (1) and European Turtle Dove (1). Max counts of these species are included in brackets. The low numbers of the species do not meet the threshold for CHA.</p>
c) As appropriate, areas containing important concentrations of a nationally or regionally listed EN or CR species.	<p>Criteria not met</p> <p>Although <i>Brachanthemum gobica</i> and Spotted Arnebia were recorded during the survey work, which are listed in the annex of the Law on Natural Plants of Mongolia (1995) and EN, they are listed as Near Threatened and Least Concern in the Red List of Mongolian Plants. Therefore, there is differing information on their conservation status in Mongolia. In addition, the distribution of these species is not assessed as 'important concentrations'.</p> <p>Asiatic Wild Ass (13) and Mongolian Gazelle (1) were recorded during the survey work, and both are listed as EN on the Mongolian Red List of Mammals. Max counts of these species are included in brackets. The low numbers of the species are not assessed as 'important concentrations'.</p>
2. Endemic and Restricted-range Species	

Critical Habitat Criteria	Site Status and Justification
a) Areas that regularly hold $\geq 10\%$ of the global population size AND ≥ 10 reproductive units of a species.	Criteria not met No endemic or restricted-range species were encountered during the survey work.
3. Migratory and Congregatory Species	
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.	Criteria not met Migratory ungulates and birds were recorded during the survey work, however not at numbers reaching the threshold for CHA. No international important bird areas are present within the vicinity of the OHTL.
b) Areas that predictably support ≥ 10 percent of the global population of a species during periods of environmental stress.	Criteria not met No habitats considered to be important in supporting migratory or congregatory species during times of stress were noted during the survey work. In an arid environment, this could have included permanent / semi-permanent water bodies in periods of particularly hot, dry weather. Such waterbodies were not present. No international important bird areas which could provide important habitat during such events were present within the vicinity of the OHTL. In addition, species counts were negligible against global populations.
4. Highly Threatened or Unique Ecosystems	
a) Areas representing $\geq 5\%$ of the global extent of an ecosystem type meeting the criteria for IUCN status of CR or EN.	Criteria not met Mongolian ecosystems have not yet been assessed by IUCN criteria.
b) Other areas not yet assessed by IUCN but determined to be of high priority for conservation by regional or national systematic conservation planning.	Criteria not met No international or national designated sites are present within the Survey Area or within 20km. The identification of PCAs resulted in the designation of two active LPAs within the Survey Area, however these have a limited protection period and are local designations, rather than protecting higher value ecosystems of national value. Uushiin Govi is designated for its ungulate populations rather than describing a highly threatened or unique ecosystem, and while limited information on the Ganzaga Uuliin Urgutgul designation reasons are available, it supports similar habitat and species to Uushiin Govi. In addition, the habitats within the LPA are broadly similar to those outside the LPA, and therefore are not considered unique for the area. The ungulate species (for which the LPA is designated) recorded during survey work has an extensive distribution and maximum counts of these species were low in the context of their overall population.
5. Key Evolutionary Processes	
a) Defined as the structural attributes of a region, such as its topography, geology, soil, temperature, and vegetation, and combinations of these variables, can influence the	Criteria not met The Survey Area is not considered to provide a representation of the spatial features associated with evolutionary processes, which are given as examples for this criterion within the IFC Guidance Note.

Critical Habitat Criteria	Site Status and Justification
evolutionary processes that give rise to regional configurations of species and ecological properties.	

Habitats and Flora

- 9.6.8 The habitats recorded along the OHTL were found to be typical of arid steppe, semi-desert conditions. No habitats of notably high conservation concern have been highlighted during the survey work. The majority of the habitats are however in good condition (69.6%) and provide a good representation of phytogeographical region. The habitats also support a number of fauna species as demonstrated during surveys. Therefore, habitats are considered a Medium value receptor, of regional importance with limited potential for substitution.
- 9.6.9 Most plant species recorded along the route are considered to be relatively common and are considered Medium receptors (included within the habitat impact assessment as these species are the main components of the habitats present). However, two species are classified as Endangered (*Brachanthemum gobica* and Spotted Arnebia), and four listed as Rare (*Cynomorium songaricum*, *Potaninia Mongolica*, *Oxytropis aciphylla*, *Phragmites communis*). These six species are considered to be a High value receptor with importance/rarity at a national scale, and limited potential for substitution.

Fauna

- 9.6.10 A range of animals were recorded along the Survey Area. Notable mammals recorded include the Goitered Gazelle, which is assessed as Vulnerable on both the global and regional Red Lists; the Asiatic Wild Ass, which is assessed as Near Threatened on the IUCN Red List, and assessed as Largely Depleted in the Green Status Assessment on July 17, 2024; and the Mongolian Gazelle, which is assessed as Least Concern on the IUCN Red List (2025.01), while also assessed as Endangered on the Regional Red List (2006). Both the Goitered Gazelle and the Asiatic Wild Ass are also included in the Mongolian Red Book (2014). Additionally, the Asiatic Wild Ass is listed in Appendix II of both CITES and CMS. The Mongolian Gazelle and the Goitered Gazelle are listed in Appendix II of the CMS. Therefore, these mammal species are considered to be a High value receptor with importance/rarity at a national scale, and limited potential for substitution. The small mammals recorded are not of conservation concern and are locally common, therefore they have been assessed as Low value receptors due to their importance at a local scale only.
- 9.6.11 A diversity of bird species were recorded during spring and autumn migration surveys as well as breeding bird surveys. The main impact pathways to birds is collision risk, particularly to larger species which are not manoeuvrable in flight such as waterfowl, waders, cranes and birds of prey. It is largely accepted passerines have a low risk of collision with OHTLs. Therefore a particular focus was given to these collision vulnerable species groups. Bird species within these groups which are of conservation concern (globally or regionally) were considered the highest value receptors, these include Saker Falcon, Swan Goose, Common Pochard, Ferruginous Duck, Cinerous Vulture, Eurasian Curlew, Black-tailed Godwit, Northern Lapwing, Common Crane and Falcated Duck (see the results section for the conservation status of these species). These species are considered to be a High value receptor with importance/rarity at a national scale, and limited potential for substitution. The bird

species not considered to be of conservation concern and/or do not fall within the species groups vulnerable to collision are classed as a Medium value receptor, of regional importance with limited potential for substitution.

- 9.6.12 Two bat species, two reptile species and six invertebrate genera were recorded during the survey work. No species of conservation concern were however recorded. The reptile species are relatively common, while the invertebrate results do not suggest an important assemblage will be present. The bat species were recorded on single occasions, likely due to the fact the Survey Area is on the limits of their distribution, and a lack of roosting opportunities in the area. Therefore these species groups have been assessed as Low value receptors due to their importance at a local scale only.
- 9.6.13 The ecological receptors are summarised in **Table 9-19** below. The important receptors are considered to be those of Medium and High value.

Table 9-19 Summary of Receptors and their Sensitivity

Receptor	Value
Designated Sites	
Uushiin Govi LPA	Medium
Ganzaga Uuliin Urgutgul LPA	Medium
Habitats & Flora	
Habitats (and common flora)	Medium
Rare / Endangered Flora	High
Fauna	
Large Mammal Assemblage	High
Small Mammal Assemblage	Low
Bats	Low
Birds of Conservation Concern (and within species group vulnerable to collision)	High
Birds not of Conservation Concern (or not within a species group vulnerable to collision)	Medium
Reptiles	Low
Invertebrates	Low

9.7 Potential Impacts and Effects

Construction Phase

9.7.1 The following are the key potential impact pathways during the construction phase (explained in detail in **'Impact Assessment'** section):

- Habitat and flora destruction and degradation during construction.
- Animal mortality through vegetation clearance and vehicle collisions.
- Visual and noise disturbance to animals in the area during construction.
- Pollution events during construction effecting air quality and ground water.
- Detrimental impacts from human pressures including:
 - Poaching by road construction staff.
 - Gathering of rare plants.
 - Introduction of invasive species.
 - Littering by road construction staff (including food waste).
- Increased risk of wildfires.

Operation Phase

9.7.2 During the operational phase the following are the key potential impact pathways:

- Habitat and flora destruction and degradation through maintenance tracks.
- Bird and bat casualties from collisions with overhead power lines.
- Animal mortality during maintenance activities through vehicle collisions and removal of bird nests from power lines.
- Fragmentation of habitats through creation of a dispersal barrier.
- Visual and noise disturbance of animals during maintenance activities.
- Pollution events during maintenance activities.
- Changes to hydrology through creation of permanent structures.
- Detrimental impacts from human pressures including:
 - Poaching by road construction staff.
 - Gathering of rare plants.
 - Introduction of invasive species.
 - Littering by road construction staff (including food waste).
- Increased risk of wildfires.

9.8 Impact Assessment

9.8.1 This section of this ESIA assesses each of the potential impacts on the important ecological features identified in relation to the Project. The assessment is made in the absence of mitigation.

Construction Phase

Habitat and Flora Destruction and Degradation

- 9.8.2 Direct loss and degradation of habitats and flora along the proposed OHTL route could occur during construction activities through vehicle use, compaction of ground and excavation for the installation of the towers. Despite this, the construction footprint for OHTL schemes is relatively small, and will comprise an insignificant area of the habitats present in the surrounding area for this Project. Existing towers the same size as those proposed within this Project were inspected during the reconnaissance visit. It was evident excavations are limited to the four feet of the pylons and vegetation had recovered well around the pylons. In addition, there was no evidence of long-term habitat loss or degradation along the lines or around the pylons through working areas. Habitats had recovered well in these areas; even maintenance tracks were barely visible due to this regeneration (where away from other multi-use tracks). Despite this, the initial magnitude of impact is assessed as Medium (adverse). This would result in a Moderate Adverse effect prior to mitigation for habitats and common fauna.
- 9.8.3 Although for habitats and most flora, the magnitude of impact is considered to be Low, for Endangered and Rare plants, due to their limited distribution and high sensitivity, direct loss during construction works could mean they are permanently lost from the local area as regeneration from a wider population is less likely. In addition, habitat loss and degradation is considered the main threat to Red List plants of Mongolia. Therefore, magnitude of impact on Rare and Endangered flora is assessed as High (adverse). This would result in a Major Adverse effect prior to mitigation for Endangered and Rare plants.
- 9.8.4 The destruction and degradation of habitats can also impact the fauna it supports, including all the fauna species found during the survey work for this study. Habitat loss is listed a major threat to large mammals, including the ungulate species of conservation concern found here. Despite this, as outlined above, the construction footprint for OHTL schemes is relatively small, and will comprise an insignificant area of the habitats present in the surrounding area for this Project, with natural long-term recovery expected. Therefore, the magnitude of impact for these species is assessed as Low (adverse). Overall, the effect of destruction and degradation of habitats on fauna will be Moderate Adverse prior to mitigation.

Animal Mortality

- 9.8.5 Animal mortality through vegetation clearance could occur to animals with low mobility and/or that are tied to an area. The species that are posed with the highest risk through this activity are nesting birds, particularly ground nesting birds as nests may be present within an area of clearance. Of the High value bird receptors recorded, only Cinerous Vulture was recorded nesting. Due to the species conservation status, the loss of a Cinerous Vulture nest during construction is considered to result in a High magnitude of impact. This would result in a Major Adverse effect prior to mitigation. The loss of nests of bird species not of conservation concern is considered to result in a Medium magnitude of impact. This would result in a Minor Adverse effect prior to mitigation.
- 9.8.6 Mortality of small mammals, reptiles and invertebrates could also occur during vegetation clearance. These species are however mobile and will likely move away from construction activities naturally. Therefore, the magnitude of impact for these species is assessed as Low (adverse). This would result in a Negligible effect prior to mitigation.

- 9.8.7 Vehicle collisions with wildlife along access roads and construction zones could impact large mammal receptors, notably species of conservation concern including Goitered Gazelle, Mongolian Gazelle and Asiatic Wild Ass are known to be present across the area. Despite this, the areas in which these species are present, are accessed by informal, offroad tracks. Therefore, the speed of vehicles in this area will be low. In addition, it was evident during survey work that these species move away from vehicles well before they are approached. Night working could be a time of increased mortality, however no night working is proposed. Therefore, the magnitude of impact for these species is assessed as Low (adverse) and the overall effect is Moderate Adverse prior to mitigation.

Disturbance

- 9.8.8 Visual and noise disturbance could occur to fauna receptors during construction activities. **Chapter 8: Noise and Vibration** states noise and vibration impacts could occur during earthworks (excavations) and erection of towers, the noisiest of these being earthworks for tower foundations. Full modelling can be found within the Noise and Vibration Chapter but the predicted noise levels during earthworks at a 100m buffer is modelled at 58.6 dB, down to 47.7 dB at 350m (max distance of modelling). The latter number is broadly considered low.
- 9.8.9 The highest sensitivity for this impact is considered to occur to nesting birds of prey which may have nests in a previously quiet landscape during the breeding season. Birds of prey can abandon nests if disturbance levels are high. Of the High value bird receptors recorded, only Cinerous Vulture was recorded nesting. Despite the modelling showing noise levels at 350m would be low, previous studies on disturbance of nesting Cinerous Vulture have shown they are highly sensitive and can be disturbed up to 500m away from construction works of similar magnitude to those proposed here. The Cinerous Vulture nest recorded is approximately 1km from the OHTL and therefore falls outside this distance. However, due to the species conservation status, the disturbance and abandonment of a Cinerous Vulture nest during construction is considered to result in a High impact magnitude and an overall Major Adverse effect. Passerine species are less likely to abandon nests due to disturbance, however the failure of nest due to disturbance cannot be ruled out. The disturbance and abandonment of Medium value bird receptors is considered to result in a Medium impact magnitude. This would result in a Moderate Adverse effect prior to mitigation.
- 9.8.10 The habitats across the Survey Area and surrounding landscape are broadly homogenous, while the distribution of the species recorded are widespread. Therefore, the construction works are not considered to push animals (non-bird) out of discreet important areas through visual and noise / vibration disturbance. There is an extensive landscape of suitable habitat surrounding the Project to support these animals. It is anticipated large mammals for example will naturally disperse to alternative habitat further than the 350m noise buffer modelled. Therefore, the magnitude of impact for disturbance on non-bird fauna is assessed as Low (adverse) and the overall effect as Moderate Adverse to Negligible, depending on the fauna.

Pollution Events

- 9.8.11 The dust assessment within **Chapter 7: Air Quality Chapter** has been reviewed. The dust magnitude assessment concluded magnitude as Low for earthworks and construction works and vehicle movements along tracks as Medium. The sensitivity of receptors within 250m of the OHTL was however considered Low. This semi-desert habitat is windy, and as such, sand and dust is blown around naturally on a regular basis. The flora present across the habitats present have evolved to tolerate such conditions. The calculated unmitigated dust risk within the chapter concluded a Low

Risk, which is also the magnitude presented here.

- 9.8.12 Oil and fuel spills could occur if refuelling of vehicles/machinery occurs while on site rather than refuelling at a station. This has the potential to negatively impact habitats and flora in the vicinity as well as ground water. It is unlikely however a major oil/fuel spill would occur based on the construction activities proposed. Therefore, the magnitude of impact is assessed as Medium (adverse), resulting a Moderate Adverse effect for habitats and Major Adverse for Rare / Endangered Flora.

Construction Worker Pressures

- 9.8.13 The Mongolian Red List of Mammals explains that the key conservation pressure on the mammals identified in the Survey Area, which includes intentional mortality through poaching. Illegal hunting and trade particularly impacts the Asiatic Wild Ass population, although this has reduced over the past years due to increased law enforcement. Such activities performed by construction workers brought to the OHTL route cannot be ruled out. The magnitude of this impact is assessed as Low (adverse), resulting a Moderate Adverse effect.
- 9.8.14 Unauthorized gathering of rare plants could be increased from baseline levels due to the presence of construction workers and improved access tracks used during the construction phase facilitating access to the wider environment. Human harvesting of plants is a threat to Rare plants on the Red List Plants of Mongolia, however not to the same extent of habitat loss/degradation. In addition, the OHTL is in a remote region reducing the likelihood of illegal harvesting, and as such, the magnitude of this impact is assessed as Low (adverse), resulting a Moderate Adverse effect.
- 9.8.15 The presence of construction workers and vehicles could cause the introduction of invasive plant species, which can outcompete native flora. This could occur due to accidental transfer of invasive plant seeds/material from clothes/boots or from the vehicle. No existing invasive species were recorded during the survey work which could see a spread in their distribution through construction works. The introduction of new invasive species is however considered unlikely, and the magnitude of this impact is assessed as Low (adverse), resulting in a Negligible effect.
- 9.8.16 If waste, in particular food waste, from the construction workforce is not securely managed and disposed of, it may lead to animals being attracted to working areas and resulting human wildlife conflicts. The magnitude of this impact is assessed as Low (adverse), resulting in a Minor to Moderate Adverse effect, depending on the receptor.
- 9.8.17 There is considered to be an increased risk of fire due to personnel smoking, preparing food and providing heat sources. Smoking is relatively common in Mongolia and the country experiences relatively frequent wildfires which have the potential to cause extensive environmental damage. The arid, semi-desert environment with warm conditions, windy conditions and often dry woody vegetation suggests if a naked flame is accidentally released, the likelihood of a wildfire establishing is high. In the event of a fire, the whole ecosystem could be impacted including habitats flora and fauna. The magnitude of this impact is assessed as High (adverse), resulting in a Major to Moderate Adverse effect, depending on the receptor.

Operation Phase

Habitat and Flora Destruction and Degradation

- 9.8.18 A maintenance track will be required along the OHTL once operational. Along existing OHTLs observed during the reconnaissance visit, these are informal tracks and although vegetation does not grow along tyre tracks, it is established either side and between the tracks. The habitats present have a high percentage of bare ground due to the arid conditions (reported as typically between 70 – 90% bare ground within **Chapter 12: Soils and Natural Hazards**, and therefore the presence of such a maintenance track is considered insignificant. A maintenance working area may be required around towers, however as existing towers/pylons show good regeneration of habitats around the base of pylons (and no obvious detrimental impacts from maintenance activities), the magnitude of impact is assessed as Low (adverse), resulting in a Minor Adverse effect.
- 9.8.19 Once a maintenance track is established, it is considered highly unlikely Endangered or Rare plants will establish with this area (as existing tyre tracks remain clear of vegetation). As maintenance working areas are likely to be sporadic and in specific areas where a maintenance problem arises, it is not possible to rule out the presence of Endangered or Rare plants in these areas in the future. However, maintenance works are not considered to be as disruptive as construction works, and the regularity of such events is considered low. Therefore, magnitude of impact on Rare and Endangered flora is assessed as Medium (adverse) and a Major Adverse effect.
- 9.8.20 With regards to habitat availability to fauna, particularly large mammals, the operational footprint of the OHTL will be insignificant in comparison to the availability of surrounding habitats, while the habitats in working areas are to recover well as described previously. Improving access to areas can threaten large mammals, as this leads to increases in livestock to areas resulting in overgrazing of habitats which reduces the soil's fertility and leads to erosion, so that the land is less resilient to severe droughts and other environmental stressors brought upon by climate change. Despite this, the access track, will be an unsurfaced track, similar to those seen along existing lines, while sharing of some sections of existing track is likely to occur. Therefore, the Project is not considered to result in an increase in grazing to the area from baseline levels. The magnitude of impact of habitat loss/degradation on fauna species is assessed as Very Low, resulting in a Minor Adverse effect.

Collision Mortality

- 9.8.21 The spring, autumn and breeding bird surveys have been completed to determine the collision risk of birds with the proposed OHTL. In general, the survey results have shown low occurrence of bird flights at collision risk height with the spring and autumn surveys reporting 12% and 21% of flights at this height respectively. The High value receptor species are outlined in the receptor section above. Records of these birds were primarily single (or very low) observations, with the exception of Cinereous Vulture. This species was recorded regularly during spring surveys and forty-nine observations were made during the autumn, with 26% of flight observations at collision risk height. The autumn report concluded total time at collision risk height for Cinereous Vulture was 14 minutes which is low when considering total survey time. This figure is also related to a wide 2km surveying arc, while the airspace of proposed overhead lines will cover a small area of this. Additionally, birds will naturally avoid OHTLs in flight, particularly those associated with large pylons (as proposed within this Project). The majority of collisions occur where smaller OHTLs are positioned close to wetlands (which draws waterbirds and other bird species in), and poor/misty weather obscures the lines.

Therefore, when avoidance behaviour is factored into the assessment, despite the regularity of Cinereous Vulture sightings, the collision risk, and magnitude of impact is assessed as Low (adverse), resulting in a Moderate Adverse effect.

- 9.8.22 The majority of bird species recorded have been categorised as Medium value receptors due to their low conservation status and/or their lower risk of collision. Of these, the species recorded at the greatest amount of time at collision risk height was Pallas's Sandgrouse at 11 minutes. This is lower than the time recorded by Cinereous Vulture and when considering avoidance behaviour, the magnitude of impact is assessed as Low (adverse) for these species also, resulting in a Minor Adverse effect.
- 9.8.23 Existing OHTLs smaller than those proposed within this Project are present across the landscape, and therefore a cumulative effect is considered here. It is understood the OHTLs will be spaced at least 50m apart. Spacing at this distance (and potentially further) is considered to be beneficial to allow birds time to adjust flight heights and navigate between cables of differing heights. As the landscape is open with low-lying ground, it is considered the OHTLs are clearly visible (in good weather) which further reduces any cumulative effect. As such, no adjustment to the magnitude of impact is considered necessary for cumulative effects.
- 9.8.24 The spring and autumn reports did highlight areas/habitats where bird activity was higher than other areas of the Project. Those that correspond with the current design (one area within the spring report is situated >3km from the OHTL) need to be considered as part of any mitigation strategy. They include:
1. Hilly Area (N 43.940135, E 108.338126) – situated to the north of Tsagaan Suvarga (between 195km and 200km along the OHTL). Several species were recorded including Cinereous Vulture.
 2. Ephemeral Pond (N 44.09575, E 108.76141) – previously described within this report (between 153km and 155km). Although not holding water during survey work, and as such notable bird numbers were not present, it does have the potential to draw in waterbirds and other species during times of wet weather, thereby increasing collision risk in this area. An ephemeral pond outside the Survey Area (>3km from the OHTL) during the spring surveys was found to support good numbers of waterbirds during passage, supporting this prediction.
 3. Dry Riverbed (N 44.524569, E 109.673742) – previously described within this report (between 65km and 66km). Several species recorded here and includes site of the Cinereous Vulture nest. Highest Cinereous flight activity recorded at this location.
 4. Hilly Area (N 44.636039, E 109.746701) – situated around low hills (between 50km and 54km). Notable area for Cinereous Vulture, with highest length of time at collision risk height here.
 5. Marshy Area (N 44.855439, E 110.148310) – situated south of Sainshand, previously mentioned in this report (between 5km and 13km). Marshy conditions have attracted Ruddy Shelduck and could draw in other waterbirds. Highlighted as a good stopover site for migrant birds. Cinereous Vulture present.

- 9.8.25 The other species group that is at risk of collision with OHTL is bats. During the survey work, just two bat calls were recorded. There is a lack of roosting features for bats in the vicinity of the OHTL which suggests bats are unlikely to be foraging in the Survey Area in notable numbers; this assessment is supported by the lack of observations during the survey. In addition, bats are likely to forage at a range of heights, and avoid collision with structures through echolocation, therefore collision by irregularly occurring bats is unlikely. The magnitude of impact is therefore assessed as Low (adverse), resulting in a Negligible effect.

Animal Mortality

- 9.8.26 Vehicle collision impacts are broadly similar to those described within the construction section, although the numbers and regularity of vehicles used during maintenance compared to construction will be lower. The magnitude of impact is assessed as Low (adverse), resulting in a Negligible to Moderate Adverse effect depending on the species.
- 9.8.27 Several bird species (particularly raptors and corvids) occasionally nest on pylons, with a particular preference for lattice towers as proposed within this Project. During maintenance operations, it has been known for active bird nests to be removed from pylons, causing a loss of eggs/nestlings. If this occurs to High value bird receptors, which are of conservation concern, it is considered to result in a High adverse effect, resulting in a Major Adverse effect. The loss of nests of bird species not of conservation concern is considered to result in a Medium adverse effect, resulting in a Moderate Adverse effect.

Fragmentation

- 9.8.28 In some circumstances, the installation of an OHTL can cause a dispersal barrier between two areas, and as such, fragment habitats. Bird flight behaviours is discussed extensively within the spring and autumn bird reports as well as within the collision risk section above. As noted, the majority of bird flights observed were at heights below or above the proposed cable array. In addition, the landscape is open, and the habitats are largely homogenous, and as such, the presence of an OHTL is not considered to segregate/cut-off important areas of habitat. The spring and autumn migration surveys have shown collision risk is low, and as such, no dispersal barrier to migratory birds is considered to occur (Very Low on magnitude scale), resulting in a Minor Adverse to Negligible effect.
- 9.8.29 Migratory ungulates are sensitive to fragmentation, this is primarily due to the construction of roads with limited or no wildlife corridors, isolating migrating animals. However, large mammals can move freely below OHTLs. The existing OHTLs in the area do not cause a dispersal barrier to the large mammals observed during the survey and the addition of the proposed OHTL is not considered to change this. Therefore, no dispersal barrier to large mammals is considered to occur (Very Low on magnitude scale), resulting in a Minor Adverse effect.

Disturbance

- 9.8.30 Visual and noise disturbance could occur to fauna receptors during maintenance activities, although the **Chapter 8: Noise and Vibration Chapter** suggests noise and vibration will be minor during operation and primarily limited to vehicles.
- 9.8.31 Nesting birds of prey have the potential to nest on towers during the breeding season. As described previously, birds of prey can abandon nests if disturbance levels are high. A vehicle pass during

maintenance is not considered to cause an impact, however prolonged maintenance works around a nest site does have the potential to cause disturbance. Where this occurs to High value bird receptors, the magnitude of impact is assessed as High (adverse) resulting in a Major Adverse effect, whereas Medium value bird receptors, the magnitude of impact is assessed as Medium (adverse), resulting in a Moderate Adverse effect.

- 9.8.32 The maintenance activity disturbance impacts with regards to animals (non-bird) are broadly similar to those described within the construction section. The habitats across the Survey Area and surrounding landscape are broadly homogenous, while the distribution of the species recorded are widespread. Maintenance works are not considered to push animals (non-bird) out of discreet important areas through visual and noise disturbance. There is an extensive landscape of suitable habitat surrounding the Project to support these animals. Therefore, the magnitude of impact for disturbance on non-bird fauna is assessed as Low (adverse), resulting in a generally Negligible effect though Moderate Adverse for some species.

Pollution Events

- 9.8.33 The impacts of operational dust creation are not considered within **Chapter 7: Air Quality**, likely due to the very low risk of activity. The vehicle use (and size of vehicles) during maintenance will be significantly lower than during construction. This consideration, combined with the tolerance of the habitats and flora to airborne sand, suggest the use of maintenance vehicles will not have an impact on these habitats through dust (Very Low on magnitude scale).
- 9.8.34 Similarly, the potential for oil and fuel spills during maintenance operations is considered to be lower than during construction, although the potential impacts in the event of a spill would remain the same. The magnitude of impact is assessed as Low (adverse), resulting in Minor to Moderate Adverse effects.

Hydrology

- 9.8.35 Changes in water drainage patterns may affect water availability for habitats and flora. Infrastructure such as towers have potential to increase impermeable land cover which could lead to increase in rates / volume of runoff in response to rainfall. Despite this, no extensive hardstanding platforms are proposed and the land take from pylon feet are insignificant considering the extent of the surrounding landscape. Therefore, the magnitude of impact on hydrology has been assessed as Very Low, resulting in Minor Adverse to Negligible effects.

Maintenance Worker Pressures

- 9.8.36 The maintenance worker pressures are broadly similar to those described within the construction section. The workforce size during maintenance works is however expected to be lower and maintenance checks are likely to be infrequent. With the exception of wildfires, the magnitude of impacts associated with maintenance worker pressures are assessed as Low (adverse). Despite the infrequent visits for maintenance checks, the magnitude of wildfire impacts is assessed as High (adverse), resulting in Major Adverse to Negligible effects, depending on the receptor.

9.9 Mitigation and Enhancement Measures

- 9.9.1 This section details the mitigation and enhancement measures necessary in order to ensure that significant ecological effects on important ecological features are minimised and therefore prevents them from being significant.
- 9.9.2 The Project will follow a mitigation hierarchy (avoid, reduce, restore, and offset) to protect important ecological receptors effectively. By integrating these measures into project implementation, it can reduce adverse impacts and promote biodiversity conservation in the region.
- 9.9.3 A Biodiversity Management Plan (BMP) will be produced detailing the mitigation plan. This will be implemented throughout the Project lifecycle (including construction and operational phases). Regular monitoring and adaptive management will ensure the effectiveness of these measures.

Project Design

- 9.9.4 At the western end of the OHTL (between 165km and 190km approximately), the proposed route runs alongside a newly constructed rail line. The habitat between the route and the rail line (not included in the vegetation plot analysis) is severely degraded from the construction activities associated with rail line construction, and the area is continued to be used as a regular access route. The OHTL runs along the edge of this degraded habitat and as such, the overall impacts to habitats and flora in this area is considered low, and the existing access track can be used during the OHTL construction, reducing impacts on surrounding vegetation still in good condition.
- 9.9.5 The OHTL does however deviate from the rail line for approximately 22km, taking the route through habitat of good condition and within 100m of the ephemeral pond discussed previously within this report. The first step of the mitigation hierarchy is to avoid impact therefore, it is recommended these good condition habitats (which also form part of Uushiin Govi LPA) are avoided. This can be achieved through adjusting the OHTL to continue following the rail line and the severely degraded habitats associated with it, until a crossing of the rail line is required. The alternative route is demonstrated in **Figure 9-23** below, between pylon numbers 139 and 210; this alternative does not result in additional turning points or cable length (it is also 22km in length).
- 9.9.6 As well as avoiding good condition habitat and flora, this adjustment avoids the ephemeral pond which was also highlighted for its potential to support high numbers of birds (when wet) within the collision risk assessment. Therefore, collision risk associated with this feature will be avoided.

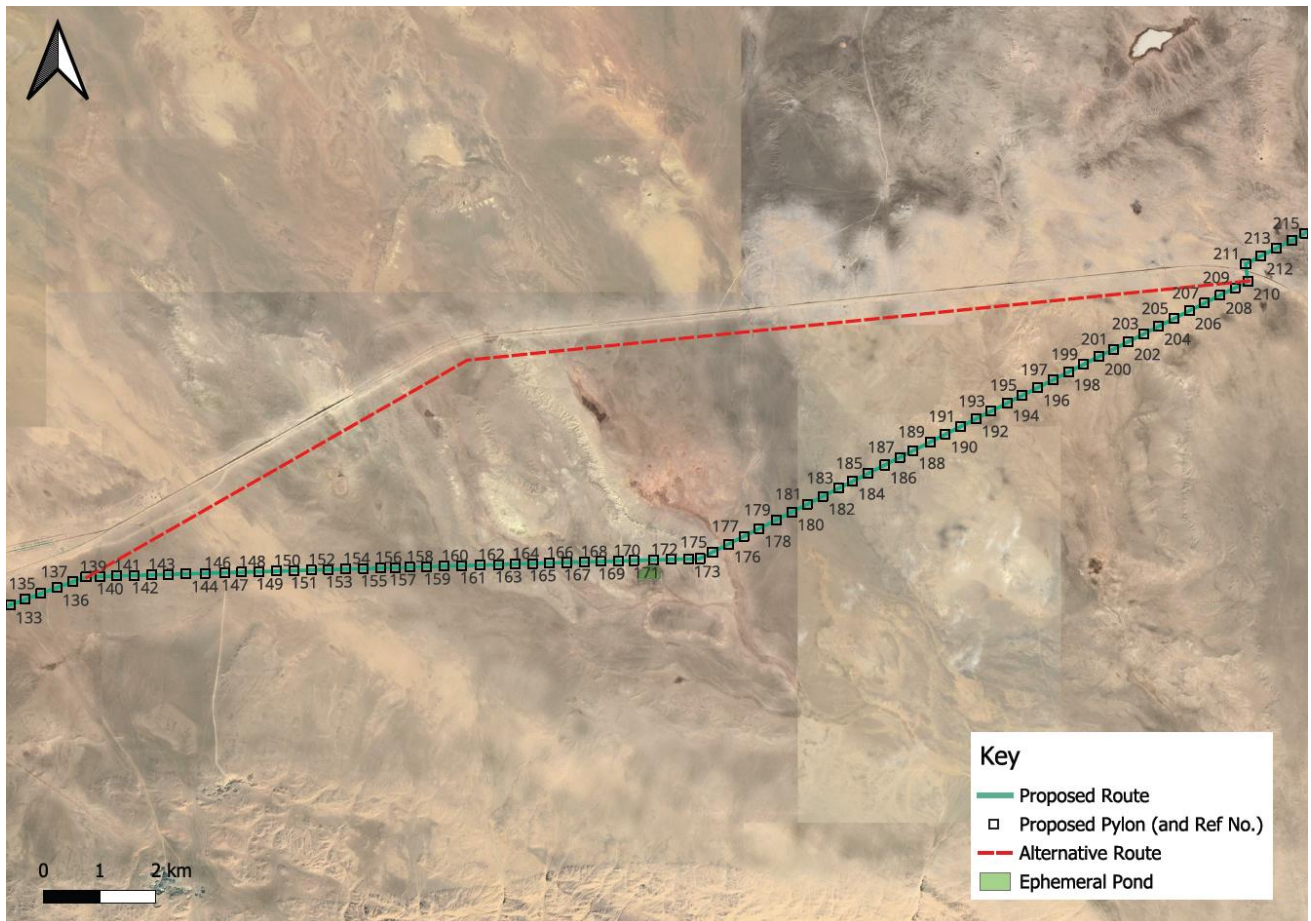


Figure 9-23 Recommended Route Adjustment

Construction Phase

Habitat & Flora Mitigation Measures

- 9.9.7 During the construction phase it will be necessary to implement the following measures to reduce the effects of construction activities on habitats and flora:
- Use of low-impact construction methods and vehicles, for example, plant/machinery with spread load to preserve surrounding vegetation and prevent ground compaction.
 - Sensitively locate site construction compounds/lay-down areas and access routes to avoid undisturbed habitat and flora wherever possible. This could include utilising existing tracks across the landscape.
 - It is understood micro-siting of pylons will be applied during construction, therefore towers should be positioned where the lowest impact on habitats and Rare / Endangered Flora will occur within the limits of deviation available.
 - Follow mitigation measures outlined within **Chapter 12: Soils and Natural Hazards**, which includes the implementation of a Soil Management Plan, and is designed to reduce adverse impacts through erosion, deterioration, compaction and contamination.

- The Soils and Natural Hazards Chapter also outlines measures for soil reinstatement. This should be applied to any habitats degraded by construction works (working areas, compounds / lay-down area and temporary access routes). The existing habitats have a large percentage of bare ground (a typical feature of habitats in this area), therefore rather than re-seeding, it is anticipated if the soil reinstatement is followed, the habitat will re-establish naturally (as shown along existing OHTLs).
- While working in the marshy area and dry riverbeds (where groundwater could be close to the surface), follow the mitigation measures outlined within **Chapter 11: Water**, which includes the implementation of a Water, Wastewater and Drainage Management Plan. This includes details of maintaining natural drainage patterns.
- Designated refuelling stations should be established with suitable ground protection and spill kits on site. Contamination mitigation measures are also presented in the Soil Management Plan.
- Follow mitigation measures outlined within **Chapter 7: Air Quality**, to reduce impacts from dust (includes dust suppression techniques) and vehicle emissions.
- Sensitivity site pylons and construction activities to avoid Rare and Endangered flora. This should include marking out known locations and applying no-works buffer zones (of approximately 2m) around known plants.
- Where impact to Rare and Endangered plants is unavoidable, translocation of plants should be completed by competent and experienced professionals.
- Brief construction workers on likely presence and identification of Rare and Endangered flora to ensure any additional locations of these plants which haven't been found in this study, can be identified and protected.
- Ensure no herbicides are used.
- Monitor unauthorized activities, such as gathering of plants, and enforce strict penalties for violations. Educate construction workers and ensure strict enforcement of policies against unauthorized gathering of rare plants.
- Inspect and clean construction equipment and clothing to prevent the introduction of invasive plant species. Monitor for invasive species during and post-construction and implement immediate removal strategies if detected.
- Fire prevention and management controls should be enforced, including segregated and monitored smoking and cooking zones with appropriate disposal facilities for cigarettes and lighting equipment, and maintenance of plant with increased security and surveillance.
- Construction workforce should be briefed on the risks of wildfires and enforcement measures should be put in place for those not following the safe working protocol.
- During construction workforce onboarding, a zero-tolerance policy for littering should be made clear and a waste management programme should be exercised. Appropriate disposal facilities should also be provided and include segregation, secure storage, and timely disposal of waste. This should be monitored and remedial litter picking conducted as required.

Mammal Mitigation Measures

9.9.8 During the construction phase it will be necessary to implement the following measures to reduce the effects of construction activities on mammals:

- Prior to any vegetation clearance or excavation, the area will be walked to flush mammals (and other fauna such as reptiles and invertebrates) out of the clearance area. The clearance will then be completed in a systematic way (i.e. working from one side to the other), to allow further movement of animals away from the area of works.

- Excavations should avoid any animal burrows noted in the area.
- Low speed limits for vehicles should be enforced to reduce the probability of animal collisions.
- No nighttime working is proposed, and so artificial light to allow such works will not be required. If this changes, an appropriate method of works will need to be put in place to ensure light spill does not disturb surrounding mammals. This is likely to include directional lighting of low lux levels, as well as a strategy for nighttime driving.
- Mammals are likely to move away from a working area naturally, utilising other areas of the landscape as an alternative. However, to reduce noise and vibration impacts, the mitigation recommendations set out in the **Chapter 8: Noise and Vibration** should be followed.
- If on approaching an area of works at the start of the working day, large mammals are found to be using a water source to drink, the construction activities should be suspended until these animals naturally move off. Similarly, if large mammals start to approach working areas to access a nearby water source, construction activities should be suspended until these animals naturally disperse to at least 350m. This approach is especially important at Uushiin Govi and Ganzaga Uuliin Urgutgul LPA where the main distribution of Red Listed large mammals were found during survey work (Uushiin Govi LPA is also designated as it supports populations of these species).
- Brief construction workers on likely presence of fauna (particularly large mammals) and what procedures to take if they are found.
- A strict ban on poaching should be enforced. This should be made clear during construction worker onboarding procedures. A site manager should be assigned the task of enforcing and monitoring this ban.

Bird Mitigation Measures

9.9.9 During the construction phase it will be necessary to implement the following measures to reduce the effects of construction activities on birds:

- The elm trees which support nesting Cinereous Vulture should be retained.
- Clearance of low vegetation should ideally avoid the bird breeding season (March to August inclusive), especially around important features like the ephemeral pond, the marshy areas and known nest sites.
- If this is not possible, the area of vegetation clearance should be walked prior to clearance to check for bird nests. If an active nest is found (being built / attended by adult / contains eggs or young), then a no-works buffer zone of at least 20m around the nest should be applied until all chicks have fledged the nest. This buffer should be clearly marked out. Vegetation removal outside a 20m buffer of an active nest can continue, however the vegetation and nest can only be removed once the bird has finished the nesting cycle.
- Construction activities with high levels of noise, as outlined in **Chapter 8: Noise and Vibration** (excavation and erection of towers), should ideally be avoided within a 500m buffer of any raptor nest (particularly species of conservation concern, of which Cinereous Vulture was recorded nesting) while the nest is active. A nest site of this species is located outside this 500m buffer, however any new nests or additional High value raptor species noted should have the 500m buffer applied. Appropriate demarcation and signage should be applied around this buffer. Once nesting is complete, works can continue within the buffer area.
- If it is essential to carry out work within this 500m buffer during construction works, then a suitably qualified and experienced ecologist should be contacted to monitor the nest and ensure no significant levels of distress or disturbance occurs to the bird. Limits of works may also be applied by the ecologist within this 500m buffer.

- The mitigation recommendations set out in the **Chapter 8: Noise and Vibration** should be followed to further reduce noise and vibration impacts to nesting birds.

Operation Phase

- 9.9.10 As discussed within the impact assessment, the use of vehicles for maintenance checks of the line are generally considered to result in Low (adverse) magnitude impacts across ecological receptors. Whereas repair/maintenance works requiring additional vehicles and working areas, have the potential to cause a higher magnitude effect.
- 9.9.11 It is recommended the mitigation measures outlined within the construction phase mitigation section are also applied to operational phase maintenance works where appropriate. This operational phase mitigation is therefore primarily focussed on impacts unique to the operational phase.

Bird Mitigation Measures

Collision Risk

- 9.9.12 Collision mortality is the primary operational impact that needs to be considered here. Community leaders have expressed concerns around bird fatalities as a result of the Project, with bird fatalities seen as a result of other schemes, therefore a mitigation strategy is recommended.
- 9.9.13 As discussed within the impact assessment, the collision risk is considered to be low based on survey results, however five areas have been highlighted as having higher aggregations of birds (including High value receptors) than other areas, and as such, are considered as part of this mitigation strategy.
- 9.9.14 **Area 2** (as defined in section 9.8.24) includes the ephemeral pond. It is recommended the proposed route adjustment of the OHTL outlined above (as an avoidance measure through project design) is implemented to avoid collision risk of birds associated with this feature (likely to attract bird aggregations when wet).
- 9.9.15 There are no feasible options for repositioning of the OHTL to avoid the habitats at **Areas 1, 3, 4 and 5**, therefore bird diverters are proposed to reduce the collision risk. The easiest bird diverters to install which also require very little/no maintenance, are coloured line spacers. If line spaces are included in the specification of the OHTL, then this would be the recommended option for bird diverters. Alternative bird diverters include coils, hanging 'flags' and globes, often attached the earth wire of the OHTL. Coil diverters are perhaps most appropriate for Gobi conditions due to their durability, while globes can be seen on existing OHTLs in Mongolia where they pass over roads. In order to cover the full extent of sensitive areas, bird diverters would need to be installed and spaced in line with best practice (typically every 10m) between the following pylons:
- **Area 1** – Pylon No. 18 to 32
 - **Area 3** – Pylon No. 462 to 472
 - **Area 4** – Pylon No. 513 to 526
 - **Area 5** – Pylon No. 643 to 667

9.9.16 A map showing the location of each of these areas, along with the extent of bird diverters, is **given** in **Figure 9-24** below.

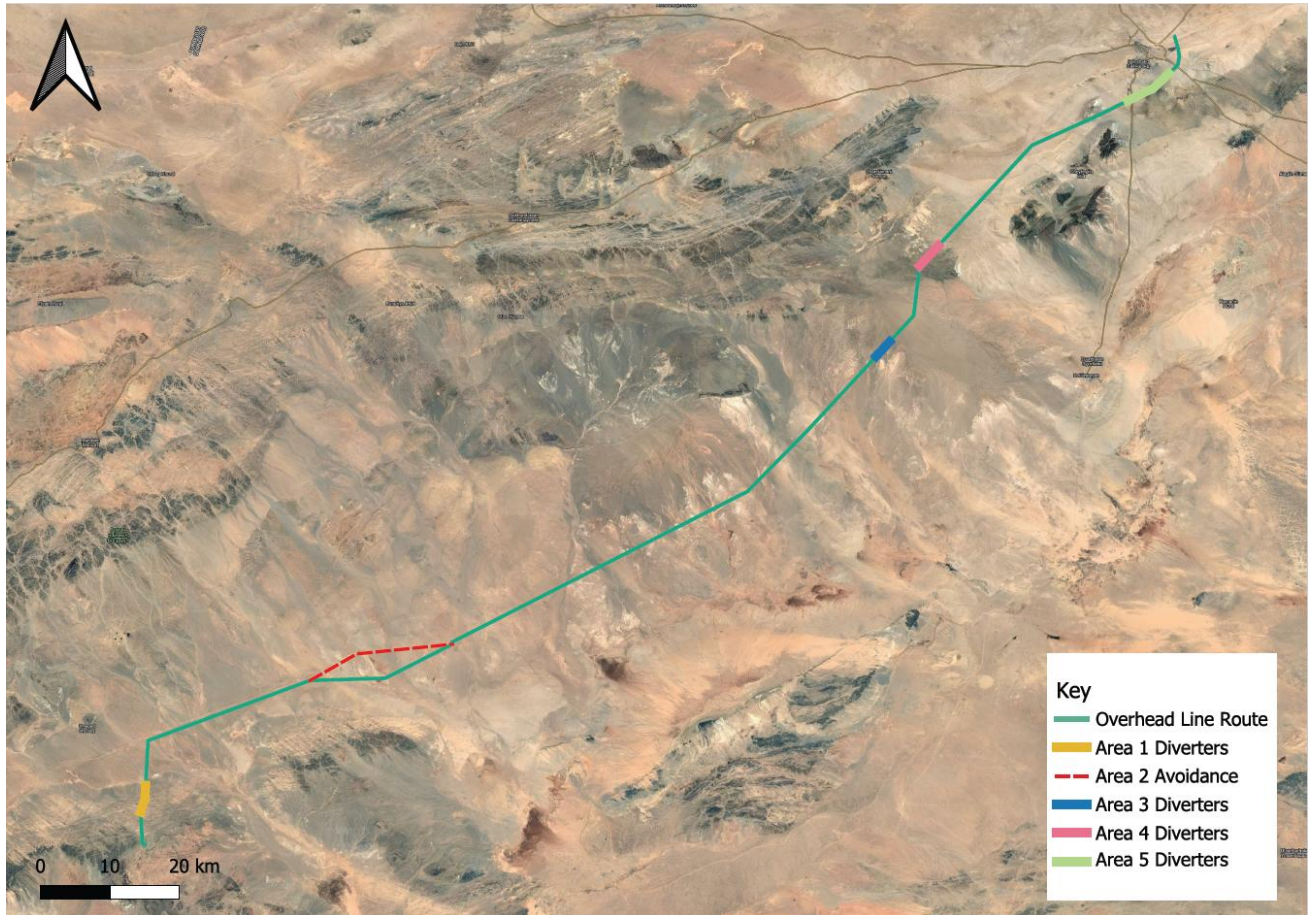


Figure 9-24 Recommended Route Adjustment

Nest Site Mortality

9.9.17 There is a risk active bird nests built on towers could be removed during maintenance operations. Several steps can be taken to reduce the likelihood of this occurrence. Initially, OHTL maintenance workers should be briefed and educated on the importance of not removing or disturbing such nests, as well as the appropriate steps to take if they are found. Ideally any maintenance works should be timed to avoid the breeding season (March to August inclusive). If this is not possible, any active nests observed during preliminary pre-works checks, should be left in place and undisturbed until all chicks have fledged the nest. Only once this occurs, can the maintenance works take place and the nest be removed (if required). Appropriate no-works buffers around these nests should be put in place in line with buffers described in the construction mitigation.



9.10 Residual Effects

- 9.10.1 The residual effects show the significance of effects following the application of mitigation for the construction and operational phases. These are summarised in **Table 9-20**. As shown within this table, the residual effects following mitigation are considered to be **Minor** or **Negligible**. The proposed mitigation has therefore greatly reduced the significance of effect for all receptors.
- 9.10.2 The designated site receptors, Uushiin Govi and Ganzaga Uuliin Urgutgul LPA, are not included within this table, as information on their designation is limited (although Uushiin Govi does include information on ungulates). In addition, it is likely they are designated due to a combination of the habitats / terrain and fauna they support. Therefore Table 1-19 is considered to cover the receptors integral to these LPAs. Therefore, the residual effect to these LPAs considered no greater than **Minor** following the implementation of mitigation.
- 9.10.3 The implementation of mitigation measures during construction and operation phases will significantly minimise ecological impacts. The full mitigation plan can be found within the BMP which also includes details of monitoring and adaptive management.

Table 9-20 Residual Effects Summary

Receptor	Receptor Value	Phase	Potential Impact	Magnitude of Impact	Significance of Effect (without Mitigation)	Mitigation Summary	Magnitude of Impact (after Mitigation)	Residual Effect (with Mitigation)
Habitats (including LPAs)	Medium	Construction	Direct loss and degradation	Medium	Moderate	<ul style="list-style-type: none"> Avoidance of habitats in vicinity of ephemeral pond Infrastructure micro-siting Receptor protection measures Worker briefings & best practice / precautionary working measures 	Low	Minor
			Pollution events	Medium	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 	Very Low	Negligible
			Construction worker pressures	High*	Major	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Negligible
		Operational	Direct loss and degradation	Low	Minor	<ul style="list-style-type: none"> Receptor protection measures Worker briefings & best practice / precautionary working measures 	Very Low	Negligible
			Pollution events	Low	Minor	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 	Very Low	Negligible
			Water drainage changes	Very Low	Negligible	-	-	-
			Maintenance worker pressures	High	Major	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Negligible
	High	Construction	Direct loss and degradation	High	Major	<ul style="list-style-type: none"> Infrastructure micro-siting Receptor protection measures Translocation (last resort) 	Very Low	Minor

Receptor	Receptor Value	Phase	Potential Impact	Magnitude of Impact	Significance of Effect (without Mitigation)	Mitigation Summary	Magnitude of Impact (after Mitigation)	Residual Effect (with Mitigation)
Rare / Endangered Flora						<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 		
			Pollution events	Medium	Major	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Construction worker pressures	High*	Major	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Minor
		Operational	Direct loss and degradation	Medium	Major	<ul style="list-style-type: none"> Receptor protection measures Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Pollution Events	Low	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Water drainage changes	Very Low	Minor	-	-	-
			Maintenance worker pressures	High	Major	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Minor
Large Mammals	High	Construction	Habitat loss and degradation	Low	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Animal mortality	Low	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Disturbance	Low	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 	Very Low	Minor

Receptor	Receptor Value	Phase	Potential Impact	Magnitude of Impact	Significance of Effect (without Mitigation)	Mitigation Summary	Magnitude of Impact (after Mitigation)	Residual Effect (with Mitigation)
			Construction worker pressures	High*	Major	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Minor
		Operational	Habitat loss and degradation	Very Low	Minor	-	-	-
			Animal mortality	Low	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Habitat fragmentation	Very Low	Minor	-		
			Disturbance	Low	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Maintenance worker pressures	High	Major	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Minor
Small Mammals	Low	Construction	Habitat loss and degradation	Low	Negligible	-	-	-
			Animal mortality	Low	Negligible	-	-	-
			Disturbance	Low	Negligible	-	-	-
			Construction worker pressures	High*	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Negligible
		Operational	Habitat loss and degradation	Very Low	Negligible	-	-	-

Receptor	Receptor Value	Phase	Potential Impact	Magnitude of Impact	Significance of Effect (without Mitigation)	Mitigation Summary	Magnitude of Impact (after Mitigation)	Residual Effect (with Mitigation)
			Disturbance	Low	Negligible	-	-	-
			Maintenance worker pressures	High	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Negligible
Bats	Low	Operational	Collision mortality	Low	Negligible	-	-	-
Birds of Conservation Concern	High	Construction	Habitat loss and degradation	Low	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Animal mortality	High	Major	<ul style="list-style-type: none"> Pre-works checks Receptor protection measures Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Disturbance	High	Major	<ul style="list-style-type: none"> Pre-works checks Receptor protection measures Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Construction worker pressures	High*	Major	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Minor
		Operational	Habitat loss and degradation	Very Low	Minor	-	-	-
			Collision mortality	Low	Moderate	<ul style="list-style-type: none"> Avoidance of habitats with high bird abundance Installation of bird diverters in locations of high bird abundance 	Very Low	Minor

Receptor	Receptor Value	Phase	Potential Impact	Magnitude of Impact	Significance of Effect (without Mitigation)	Mitigation Summary	Magnitude of Impact (after Mitigation)	Residual Effect (with Mitigation)
			Nesting mortality	High	Major	<ul style="list-style-type: none"> Pre-works checks Receptor protection measures Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Habitat fragmentation	Very Low	Minor	-	-	-
			Disturbance	High	Major	<ul style="list-style-type: none"> Pre-works checks Receptor protection measures Worker briefings & best practice / precautionary working measures 	Very Low	Minor
			Maintenance worker pressures	High	Major	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Minor
Birds not of Conservation Concern	Medium	Construction	Habitat loss and degradation	Low	Minor	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures 	Very Low	Negligible
			Animal mortality	Medium	Moderate	<ul style="list-style-type: none"> Pre-works checks Receptor protection measures Worker briefings & best practice / precautionary working measures 	Very Low	Negligible
			Disturbance	Medium	Moderate	<ul style="list-style-type: none"> Pre-works checks Receptor protection measures Worker briefings & best practice / precautionary working measures 	Very Low	Negligible
			Construction worker pressures	High*	Major	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Negligible

Receptor	Receptor Value	Phase	Potential Impact	Magnitude of Impact	Significance of Effect (without Mitigation)	Mitigation Summary	Magnitude of Impact (after Mitigation)	Residual Effect (with Mitigation)
		Operational	Habitat loss and degradation	Very Low	Negligible	-	-	-
			Collision mortality	Low	Minor	<ul style="list-style-type: none"> Avoidance of habitats with high bird abundance Installation of bird diverters in locations of high bird abundance 	Very Low	Negligible
			Nesting mortality	Medium	Moderate	<ul style="list-style-type: none"> Pre-works checks Receptor protection measures Worker briefings & best practice / precautionary working measures 	Very Low	Negligible
			Habitat fragmentation	Very Low	Negligible	-	-	-
			Disturbance	Medium	Moderate	<ul style="list-style-type: none"> Pre-works checks Receptor protection measures Worker briefings & best practice / precautionary working measures 	Very Low	Negligible
			Maintenance worker pressures	High	Major	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Negligible
Reptiles	Low	Construction	Habitat loss and degradation	Low	Negligible	-	-	-
			Animal mortality	Low	Negligible	-	-	-
			Disturbance	Low	Negligible	-	-	-

Receptor	Receptor Value	Phase	Potential Impact	Magnitude of Impact	Significance of Effect (without Mitigation)	Mitigation Summary	Magnitude of Impact (after Mitigation)	Residual Effect (with Mitigation)
		Operational	Construction worker pressures	High*	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Negligible
			Habitat loss and degradation	Very Low	Negligible	-	-	-
			Disturbance	Low	Negligible	-	-	-
			Maintenance worker pressures	High	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Negligible
Invertebrates	Low	Construction	Habitat loss and degradation	Low	Negligible	-	-	-
			Animal mortality	Low	Negligible	-	-	-
			Construction worker pressures	High*	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Negligible
		Operational	Habitat loss and degradation	Very Low	Negligible	-	-	-
			Maintenance worker pressures	High	Moderate	<ul style="list-style-type: none"> Worker briefings & best practice / precautionary working measures Monitoring of activities 	Very Low	Negligible

* worst case used

10 Cultural Heritage

10.1 Introduction

- 10.1.1** This chapter presents the potential impacts of the Project on cultural heritage receptors during both its construction and operational stages. The key cultural heritage receptors assessed within this chapter include cultural heritage monuments/sites, objects and intangible cultural heritage. To inform this assessment, desk-based research was carried out.

10.2 Legislative Framework, Policy and Guidance

- 10.2.1** Table 8-1 summarises the legislation, policy and guidance of relevance to this assessment.

Table 10-1 Summary of Legislation, Policy and Guidance relevant to Cultural Heritage

Level	Key legislation / policy / guidance
International	<p>Convention concerning the Protection of the World Cultural and Natural Heritage - The Convention concerning the Protection of the World Cultural and Natural Heritage was Adopted by the UN 1972. It was Accepted by Mongolia in 1990. The Convention forms the basis for the establishment of World Heritage Sites. The Convention requires countries to protect, conserve and present cultural and natural heritage by: adopting policies for the protection of heritage; enact appropriate legal, scientific, financial and administrative measures; to set up agencies to fulfil the aforementioned goals; to develop studies to counteract risks to heritage; and to foster the establishment of centres for training in the protection and conservation of cultural heritage.</p> <p>Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property 1970 - The Convention was Adopted by the UN in 1970 and was Accepted by Mongolia in 1991. The Convention requires state parties to enact laws to protect the illegal sale and transfer of cultural property, establish and maintain a national inventory of protected property, organise supervision of archaeological excavations and ensuring preservation in situ of cultural property.</p> <p>The 2005 Convention on the Protection and Promotion of the Diversity of Cultural Expressions – the Convention was Adopted by the UN in 2007 and achieved Accession in Mongolia in the same year. The Convention includes a variety of objectives, including: protection and promotion of diversity of cultural expression; to affirm the importance of the link between culture and development, particularly for developing countries; to give recognition to the distinctive nature of cultural activities, goods and services and vehicles of identity, values and meaning; and to affirm the rights of states to maintain and enact policies for the protection and promotion of the diversity of cultural expressions on their territory.</p> <p>The 2003 Convention for the Safeguarding of the Intangible Cultural Heritage - The Convention was Adopted by the UN in 2003 and provides and national objectives for state parties to ensure the safeguarding of intangible cultural heritage. At an international level, the Convention promotes cooperation between states to exchange information and experience as well as to undertake joint initiatives.</p> <p>The Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas (2005) - The Xi'an Declaration was adopted by the General Assembly of the International</p>

Level	Key legislation / policy / guidance
	<p>Council of Monuments and Sites (ICOMOS) in 2005. The Declaration consist of a series of principles and recommendations, the purpose of which is to:</p> <ul style="list-style-type: none"> • Acknowledge the contribution of setting to the significance of heritage monuments, sites, and areas; • Understand, document, and interpret the settings in diverse contexts; • Develop planning tools and practices to conserve and manage settings; • Monitor and manage change affecting settings; and • Work with local, interdisciplinary, and international communities for co-operation and awareness in conserving and managing settings <p>EBRD PR 8 Cultural Heritage</p> <p>International Council on Monuments and Sites (ICOMOS) 'Guidance and Toolkit for Impact Assessments in a World Heritage Context' 2022</p>
National Law	<p>Law on Protection of Cultural Heritage (2016). Paragraph 27.8 states "Preliminary prospecting and research shall be carried out by professional paleontological, archaeological or ethnological scientific organizations for the assessment, prior to issuing land for purposes of economic activity associated with settlement, construction, paving new roads, establishing hydro power plants, conducting agriculture, mine prospecting and exploitation."</p> <p>Law on Culture (2021)</p> <p>Law on Museum (2021)</p>
National Standards	<p>MNS 5634:2006 Items of art and handicrafts Requirements and services museum</p> <p>MNS 6981:2022 Customer service. Cultural Center and Palace of Culture. Environment and general requirements for services</p>

10.2.2 EBRD PR8 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.
- Stupa, which is a religious monument/worship location made of bricks, mud, wood and other materials.

ICOMOS Guidance

- 10.2.3 In 2024 ICOMOS published the *'International Charter and guidance on sites with intangible cultural heritage'*. Its purpose is to advocate for the recognition of intangible cultural heritage as an integral part of site-based heritage and to support and guide ICOMOS members to a more integrated tangible-intangible heritage practice and to align their work with the 2003 Convention for Safeguarding of the Intangible Cultural Heritage. The Charter is a reminder that intangible cultural heritage often co-exists with aspects of tangible heritage. Intangible cultural heritage includes practices, representations, expressions, knowledge systems, skills and associated objects, archives and documents. The value of such living cultural expressions is related to identity; memory and remembrance; belief and symbolism; nature and the environment; knowledge systems and sites. Such intangible cultural heritage is enacted, transmitted and revived within communities in response to their environment, their interaction with nature and their history. Communities may move elsewhere, maintaining a continuity of their intangible cultural heritage expressions at a site in another location. Often these sites are shared spaces between different cultural groups.
- 10.2.4 The International Council on Monuments and Sites (ICOMOS) published the *'Guidance and Toolkit for Impact Assessments in a World Heritage Context'* in 2022, updating their earlier 2011 guidance. This document provides several useful definitions relating to heritage, which are utilised in this assessment. Principally, this includes the description of how the importance of a cultural heritage receptor is formed by its heritage values. Heritage values can include (but are not limited to): aesthetic, architectural, biological, ecological, historic, geological, social and spiritual.
- 10.2.5 ICOMOS previously published the superseded 2011 *'Guidance on Heritage Impact Assessments for Cultural World Heritage Properties'*. That document contains a useful table for describing the importance of cultural heritage receptors that are not World Heritage Sites. This document is not reproduced in the 2022 updated document. However, due to their usefulness its contents are used in this ESIA and are shown in **Table 10-2** and **Table 10-3** further below.

Setting Guidance

- 10.2.6 How setting may contribute to the importance of a cultural heritage receptor has been assessed within this report using current English guidance, in the absence of Mongolian guidance on the topic. This report uses the guidance set out in Historic England's *'Historic Environment Good Practice Advice in Planning Note 3 (Second Edition): The Setting of Heritage Assets'* (hereafter, 'GPA 3').
- 10.2.7 In determining the contribution of setting to importance, GPA3 advocates the clear articulation of "*what matters and why*". The guidance includes a (non-exhaustive) checklist of elements of the physical surroundings of an asset that might be considered when undertaking the assessment including, among other things: topography, other heritage receptors, green space, functional relationships and degree of change over time.
- 10.2.8 GPA3 also sets out factors associated with the experience of the receptor which might be considered during an assessment, including views, intentional intervisibility, tranquillity, sense of enclosure, accessibility, rarity and land use.

10.2.9 In GPA3, a stepped approach is set out:

- Step 1 is to identify which cultural heritage receptors and their settings are affected.
- Step 2 is to assess whether, how and to what degree settings make a contribution to the importance of the receptors or allow their importance to be appreciated.
- Step 3 is to assess the effect of the proposed development on the significance of the receptor(s).
- Step 4 is to explore ways to 'maximise enhancement and minimise harm'.
- Step 5 is to 'make and document the decision and monitor outcomes'.

10.2.10 Step 5 can be undertaken outside the confines of a cultural heritage report, as part of or following the planning application process.

Other Literature

10.2.11 The following literature has also been consulted:

- Enkhbat, G., & Davaatseren, B. (2010). Historical and cultural immovable monuments in Mongolia: Volume IV, Dornogovi Province (G. Soyol-Erdene & A. Munguntsog, Illus.; B. Altansukh, Design; B. Tsolmon, Trans.). Center of Cultural Heritage. ISBN 978-99929-61-32-5
- Dornogovi Province Department of Culture, Arts, Tourism, and Youth. (2025, June 4). *Cultural heritage assessment for the Sainshand–Tsagaan Suvarga 220 kV transmission line and substation expansion project* (No. 114).

10.3 Assessment Methodology

Scope

10.3.1 The scope of this assessment relates to the potential impacts to cultural heritage receptors resulting from both the construction and operation of the Project. The construction phase of the Project has the potential to result in permanent physical impacts to cultural heritage receptors. The operational phase of the Project could result in permanent non-physical impacts to cultural heritage receptors as a result of adverse change to their setting (their surroundings) that affects their importance.

Study Area

10.3.2 The study area covers Dornogovi *aimag* and the Aol includes an area of 500m either side of the OHTL route.

Methodology

10.3.3 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.

- Palaeontological sites, defined as areas or objects with palaeontological value. These may be immovable historical and cultural memorials under Mongolian law. The permission to excavate palaeontological sites is regulated by the central and provincial governments.
- 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.

Intangible Cultural Heritage

10.3.4 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. It is a requirement of the EBRD performance requirements to recognise the importance on intangible cultural heritage and to avoid significant impacts on this resource. A few examples of intangible cultural heritage recognised by UNESCO include¹³:

- **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 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.
- **Mongolian traditional art of Khöömei (2010):** Khöömei is a form of singing originating in western Mongolia, in the Altai mountains. The performer imitates sounds of nature, simultaneously emitting two distinct vocal sounds: along with a continuous drone, the singer produces a melody of harmonics. Khöömei literally means pharynx, and it is believed to have been learned from birds, whose spirits are central to shamanic practices. The multitude of Khöömei techniques in Mongolia are grouped within two main styles: the *kharkhira* (deep Khöömei) and *isgere* Khöömei (whistled Khöömei). In *kharkhira* the singer sings a drone in a normal voice, while emphasizing the undertone or subharmonic one octave below. In *isgere* Khöömei, it is the overtones above the fundamental note of the drone that are emphasized, creating a higher-pitched whistle. In both cases, the drone is produced with very taut vocal cords, and the melody is created by modulating

¹³ Available at: [https://ich.unesco.org/en/lists?text=&country\[\]=00147&multinational=3#tabs](https://ich.unesco.org/en/lists?text=&country[]=00147&multinational=3#tabs).

the size and shape of the mouth cavity, opening and closing the lips and moving the tongue. Khöömei is performed by Mongolian nomads in a variety of social occasions, from grand state ceremonies to festive household events. Khöömei is also sung during herding, and inside the yurt to lull babies to sleep. Traditionally, Khöömei is transmitted orally from bearer to learner, or via master-to-apprentice.

- **Naadam, Mongolian traditional festival (2010):** Naadam is a national festival celebrated every year from 11 to 13 July across Mongolia that focuses on three traditional games: horseracing, wrestling and archery. Mongolian Naadam is inseparably connected to the nomadic civilization of the Mongols, who have long practiced pastoralism on Central Asia's vast steppe. Oral traditions, performing arts, national cuisine, craftsmanship, and cultural forms such as long song, Khöömei overtone singing, Bie biyelgee dance and Morin khuur fiddle also feature prominently during Naadam. Mongolians follow special rituals and practices during the festival, such as wearing unique costumes and using distinctive tools and sporting items. Festival participants revere the sportsmen, sportswomen, and children who compete, and winners are rewarded titles for their achievements. Ritual praise songs and poems are dedicated to the contestants in the events. Everyone is allowed and encouraged to participate in Naadam, thus nurturing community involvement and togetherness. The three types of sports are directly linked with the lifestyles and living conditions of the Mongols and their transmission is traditionally undertaken through home-schooling by family members, although formalized training regimens have recently developed for wrestling and archery. The rituals and customs of Naadam also accentuate respect for nature and the environment.
- **Traditional craftsmanship of the Mongol Ger and its associated customs (2013):** Craftsmanship of the Mongol Ger is a traditional enterprise involving the labour of a household or group, with men carving the wood and both women and men engaged in painting, sewing and stitching, and felt-making. The Ger is a round structure of walls, poles and a peaked roof covered with canvas and felt, and tightened with ropes. It is light enough for nomads to carry; flexible enough to fold and pack; and sturdy enough to be dismantled and reassembled. The Ger can withstand Mongolia's fierce spring winds. The structure is the same across the country: a wooden frame painted and decorated with traditional ornamentation, covers made of white felt and canvas, ropes of animal hair, flooring and carpets of hand-sewn felt, and furniture. Traditional craftsmanship is taught to the younger generations, principally through mentoring by a senior craftsman. Dismantling and reassembling the Ger are always family operations, with children learning by watching their elders. Cutting and preparing sheep's wool, making felt, stitching canvas and preparing woodwork are usually communal endeavours. As a traditional dwelling, the Mongol Ger plays an important social and cultural role for nomadic families and its makers are highly respected.
- **Mongolian knuckle-bone shooting (2014):** Mongolians revere certain parts of bones of their domestic livestock and use them in religious rites, plays and traditional games. One such popular team-based game is knuckle-bone shooting. Teams of six to eight players flick thirty domino-like marble tablets on a smooth wooden surface towards a target of sheep knuckle-bones, aiming to knock them into a target zone, while shooters sing traditional knuckle-bone shooting melodies and songs. Each shooter possesses individually crafted shooting tools and instruments, and wears costumes embossed with distinguished characteristics depending on their rank and merits. Team members are tied by close bonds and follow ethical rules of mutual respect and dignity. The rituals, knowledge, skills, technique and expertise associated with knuckle-bone shooting, as well as the craftsmanship of tools, accessories and equipment, are transmitted through apprenticeship. Knuckle-bone shooting provides a favourable environment in which each member contributes to

the team's success, social well-being and development by supporting and learning from others. The tradition brings team members from different backgrounds closer together, encourages their interaction and respect towards elders and one another, and improves their social cohesion.

- **Falconry, a living human heritage (2021):** (multinational nomination). Falconry is the traditional art and practice of training and flying falcons (and sometimes eagles, hawks, buzzards and other birds of prey). It has been practised for over 4000 years. The practice of falconry in early and medieval periods of history is documented in many parts of the world. Originally a means of obtaining food, falconry has acquired other values over time and has been integrated into communities as a social and recreational practice and as a way of connecting with nature. Today, falconry is practised by people of all ages in many countries. As an important cultural symbol in many of those countries, it is transmitted from generation to generation through a variety of means, including through mentoring, within families or in training clubs. The modern practice of falconry focuses on safeguarding falcons, quarry and habitats, as well as the practice itself. And while falconers come from different backgrounds, they share universal values, traditions and practices, including the methods of breeding, training and caring for birds, the equipment used and the bonds between the falconer and the bird. The falconry community includes supporting entities such as falcon hospitals, breeding centres, conservation agencies and traditional equipment makers.
- **Mongol nomad migration and its associated practices (2024):** Mongolian nomadic culture is a way of life that is rooted in the interdependence between pastures, livestock and herders. To ensure the well-being of the livestock and the sustainability of the herders, proper pasture use is crucial. The families move between pastures, which are categorized based on factors such as amount of grass available, geography, climate and season. This approach has been passed down for generations as a means of giving the earth time to rejuvenate. The head of the household selects the date to relocate, and rituals are performed by all family members to prepare for the migration. This includes cleaning the area, disposing of waste, building carts, and preparing the animals. During the migration phase, the wife dresses in her finest clothes and leads the way to show her gratitude and respect for Mother Nature. Children start learning crucial skills for their nomadic lifestyle from a young age. This includes taking care of and selecting livestock, learning migration routes, and assembling and disassembling yurts. Every member of the family participates. The customs and routines of this nomadic culture facilitate communication and cultivate a strong sense of community amongst the herders. They also promote environmental stewardship, knowledge dissemination and peaceful coexistence.

Archaeological Surveys

- 10.3.5 This assessment has not been informed by archaeological surveys. On June 4, 2025, the PIU received a correspondence from Dornogovi aimag Department of Culture, Arts, Tourism, and Youth which identified that the aimag had reviewed the Project route to determine whether any historical or cultural immovable monuments are registered in the cultural heritage database near the route. The review confirmed that there are currently no registered historical or cultural immovable monuments within the vicinity of the proposed route.
- 10.3.6 However, it is noted that prior to any further project activities, compliance with Article 27, Clause 27.8 of the Law on Cultural Heritage Protection is required. Article 27.8 states: *preliminary prospecting and research shall be carried out and the assessment thereto shall be issued by professional paleontological, archaeological or ethnological scientific organizations for the assessment, prior to issuing land for purposes of economic activity associated with settlement, construction, paving new*

roads, establishing hydro power plants, conducting crop farming, mine prospecting and exploitation. As per the Article 27.8, the MoE is responsible for hiring a professional organisation to conduct paleontological, archaeological or ethnological surveys. As such, a survey has not been undertaken as part of this ESIA. The mitigation measures arising from these surveys shall be incorporated into the construction methods on site.

Project Identifier Numbers (Project ID)

- 10.3.7 Nationally designated Archaeological Sites and Monuments have been assigned a Project ID number by Arcadis for the purpose of this report. These are numeric identifiers with the prefix 'AM', e.g. AM01, AM02, etc.
- 10.3.8 This assessment follows the overarching ESIA Methodology set out in **Chapter 5: Approach to the ESIA**, drawing on ICOMOS guidance for impact assessment and English guidance for the assessment of the setting of heritage assets (in the absence of equivalent guidance for Mongolia).
- 10.3.9 The “importance” of cultural heritage receptors has been considered, as shown in **Table 10-2**. The importance of a receptor is articulated using its values (e.g. aesthetic, architectural, biological, ecological, historic, geological, social and spiritual, etc.).

Table 10-2 Importance of Cultural Heritage Receptors

Importance	Archaeology and Palaeontology	Built heritage	Historic Landscape	Intangible Cultural Heritage or Associations
Very High	<p>Sites of acknowledged international importance inscribed as World Heritage (WH) property.</p> <p>Individual attributes that convey Outstanding Universal Value (OUV) of the WH property.</p> <p>Assets that can contribute significantly to acknowledged international research objectives.</p>	<p>Sites or structures of acknowledged international importance inscribed as of universal importance as WH property.</p> <p>Individual attributes that convey OUV of the WH property.</p> <p>Other buildings or urban landscapes of recognised international importance.</p>	<p>Landscapes of acknowledged international importance inscribed as WH property.</p> <p>Individual attributes that convey OUV of the WH property.</p> <p>Historic landscapes of international value, whether designated or not.</p> <p>Extremely well-preserved historic landscapes with exceptional coherence, time-depth, or other critical factors.</p>	<p>Areas associated with Intangible Cultural Heritage activities as evidenced by the national register.</p> <p>Associations with particular innovations, technical or scientific developments or movements of global significance.</p> <p>Associations with particular individuals of global importance</p>
High	Nationally designated Archaeological Monuments protected by the State Party's laws.	Nationally designated structures with standing remains.	Nationally designated historic landscape of outstanding interest.	Nationally designated areas or activities associated with globally important

Importance	Archaeology and Palaeontology	Built heritage	Historic Landscape	Intangible Cultural Heritage or Associations
	<p>Undesignated sites of the quality and importance to be designated.</p> <p>Assets that can contribute significantly to acknowledged national research objectives.</p>	<p>Other buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected by their level legal protection.</p> <p>Undesignated structures of clear national importance.</p>	<p>Undesignated landscapes of outstanding interest.</p> <p>Undesignated landscapes of high quality and importance, and of demonstrable national value.</p> <p>Well preserved historic landscapes, exhibiting considerable coherence, time-depth or other critical factors.</p>	<p>Intangible Cultural Heritage activities.</p> <p>Associations with particular innovations, technical or scientific developments or movements of national significance.</p> <p>Associations with particular individuals of national importance.</p>
Medium	<p>Designated or undesignated assets that can contribute significantly to regional research objectives.</p>	<p>Regionally designated buildings.</p> <p>Historic (unlisted) buildings that can be shown to have qualities or historical associations equivalent to a regionally designated building.</p>	<p>Designated special historic landscapes.</p> <p>Undesignated historic landscapes that would justify special historic landscape designation.</p> <p>Landscapes of regional value.</p> <p>Averagely well preserved historic landscapes with reasonable coherence, time-depth or other critical factors.</p>	<p>Areas associated with Intangible Cultural heritage activities as evidenced by local registers.</p> <p>Associations with particular innovations or developments of regional or local importance.</p> <p>Associations with particular individuals of regional importance.</p>
Low	<p>Designated or undesignated assets of local importance.</p> <p>Assets compromised by poor preservation and/or poor survival of contextual associations.</p> <p>Assets of limited value, but with potential to contribute to local research objectives.</p>	<p>Locally designated buildings.</p> <p>Historic (unlisted) buildings of modest quality in their fabric or historical associations.</p>	<p>Robust undesignated historic landscapes.</p> <p>Historic landscapes with importance to local interest groups.</p> <p>Historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations.</p>	<p>Intangible cultural heritage activities of local importance.</p> <p>Associations with particular individuals of local importance.</p> <p>Poor survival of physical areas in which activities occur or are associated.</p>

Importance	Archaeology and Palaeontology	Built heritage	Historic Landscape	Intangible Cultural Heritage or Associations
Negligible	Assets with little or no surviving archaeological interest.	Buildings or urban landscapes of no architectural or historical merit; buildings of an intrusive character.	Landscapes little or no historical interest.	Few associations or intangible cultural heritage vestiges surviving.
Unknown potential	The importance of the asset has not been ascertained.	Buildings with some hidden (i.e. inaccessible) potential for historic importance.	n/a	Little is known or recorded about ICH of the area.

10.3.10 The following table derived from 2011 ICOMOS guidance has been used, along with professional judgement, to establish the magnitude of impact to cultural heritage receptors.

Table 10-3 Guide for assessing magnitude of impact to cultural heritage receptors

Magnitude of Impact	Archaeology	Built heritage	Historic Landscape	Intangible Cultural Heritage (ICH) or Associations
Major	Changes to attributes that convey the OUV of WH properties. Most or all key archaeological materials, including those that contribute to OUV such that the resource is totally altered. Comprehensive changes to setting that greatly affect or remove the importance of the asset.	Change to key historic building elements that contribute to OUV, such that the resource is totally altered. Comprehensive changes to the setting that greatly affect or remove the importance of the asset.	Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit and loss of OUV.	Major changes to area that affect the ICH activities or associations or visual links and cultural appreciation.
Moderate	Changes to many key archaeological materials, such that the resource is clearly modified. Considerable changes to setting that affect the importance of the asset.	Changes to many key historic building elements, such that the resource is greatly modified. Changes to the setting of an historic building, such that it is greatly modified.	Change to many key historic landscape elements, parcels or components; visual change to many key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable changes to	Considerable changes to area that affect the ICH activities or associations or visual links and cultural appreciation.

Magnitude of Impact	Archaeology	Built heritage	Historic Landscape	Intangible Cultural Heritage (ICH) or Associations
			use or access; resulting in moderate changes to historic landscape character.	
Minor	<p>Changes to key archaeological materials, such that the importance of the asset is slightly altered.</p> <p>Changes to setting that slightly affect the importance of the asset.</p>	<p>Change to key historic building elements, such that the importance of the asset is slightly reduced.</p> <p>Change to setting of an historic building, such that its importance is slightly reduced.</p>	<p>Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of historic landscape; limited changes to noise levels or sound quality; slight changes to use or access; resulting in limited change to historic landscape character.</p>	<p>Changes to area that affect the ICH activities or associations or visual links and cultural appreciation.</p>
Negligible	<p>Very minor changes to key archaeological materials or setting.</p>	<p>Slight changes to historic building elements or setting that hardly affect its importance.</p>	<p>Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character.</p>	<p>Very minor changes to area that affect the ICH activities or associations or visual links and cultural appreciation.</p>
No change	<p>No change. Change to setting that does not affect importance.</p>	<p>No change to fabric or setting. Change to setting that does not affect importance.</p>	<p>No change to elements, parcels or components; no visual or audible changes; no changes in amenity or community factors.</p>	<p>No change.</p>

Sensitive Receptors

- 10.3.11 Sensitive receptors include tangible cultural heritage receptors and intangible cultural heritage. To date, 22 cultural heritage receptors have been identified within the soums that the OHTL passes through. The vast majority of these receptors are not considered sensitive due to the distance from the OHTL. Only one receptor, the Hiimoriin Ovoo, is located within 1km of the OHTL. This number may increase following the results of the MoE-commissioned surveys, discussed in more detail below.

Significance Criteria

- 10.3.12 The magnitude of impact to cultural heritage receptors has been assigned using **Table 10-3** and professional judgement. The significance of effect has then been identified utilising **Table 5-3** in **Chapter 5**.

Limitations and Assumptions

- 10.3.13 At the time of writing, no archaeological or palaeontological or ethnological surveys have been carried out, as these will be carried out by state licensed organisations (Faculty of Anthropology and Archaeology of Mongolian National University, Archaeological Institute, Paleontological Institute, and History and Institute of History and Ethnology etc.) commissioned by the MoE, in accordance with the Law on Cultural Heritage, Article 27.8 and the Law on Land, Article 31.4 which requires that, prior to providing land for the purpose of construction, research and exploration shall be conducted by professional organisations, specialized in palaeontology, archaeology and ethnography and a permission shall be obtained.
- 10.3.14 Currently, only desk-based information has been used that has been supplemented by stakeholder engagement in the field. Therefore, it is possible that currently unidentified archaeological, intangible heritage or palaeontological receptors are present, that could be impacted upon by the construction of the Project.

10.4 Baseline Conditions

- 10.4.1 The south-eastern region of Dornogovi aimag including the soums of Ulaanbadrakh, Sainshand, Mandakh, and Saikhandulaan is home to a rich and varied cultural landscape. Scattered across the steppe are the remains of ancient monasteries, burial sites from the Bronze and Iron Ages, rock carvings, and early settlement structures. These sites reflect the spiritual beliefs, social organization, and artistic traditions of the region's past inhabitants. Presented below is a summary of those key cultural heritage sites across the four soums in closest proximity to the Project, based on local knowledge.
- 10.4.2 As identified above, according to the Dornogovi aimag, there are currently no registered historical or cultural immovable monuments within the vicinity of the proposed route (whilst not specific area of coverage was stated, engagement with the aimag representative by the ESIA team indicated that this would typically cover a minimum of 1km from the route, and generally up to 10km from the route. The

ESIA team (not including a cultural heritage specialist) has also undertaken a site reconnaissance visit along the route and has not identified any features within the route or its RoW. Through the HHS and KIs at the soum level, receptors have been identified, which are described below.

World Heritage Sites

- 10.4.3 At a national level, Mongolia hosts six sites that are listed on the United Nations Education, Scientific and Cultural Organisation's (UNESCO) World Heritage List. None of these sites are located within Dornogovi *aimag*, and, therefore, close proximity to the Aol. However, Khanbayanzurkh Mountain falls under the UNESCO Tentative List as part of the Sacred Mountains of Mongolia. Khanbayanzurkh Mountain is located in Sainshand soum, approximately 34km south-west of Sainshand and 13km to the south-east of the Aol, 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 Mongolia¹⁴.
- 10.4.4 The Mongolian section of the Great Tea Route was added to UNESCO's Tentative List in April 2025¹⁵. This historically important route connected China to Europe, running through Mongolia. Of the locations along the route listed by UNESCO the Khukh us (Khukh ders) transport station is located closest to the Project Area, approximately 30km north of Sainshand.
- 10.4.5 The Mongolian Gobi Desert is the largest dinosaur fossil reservoir in the world, particularly for Cretaceous period fossils. This is recognised by the inclusion of Cretaceous Dinosaur Fossil Sites in the Mongolian Gobi on the UNESCO's Tentative List¹⁶. The Khongil Tsav palaeontological site, part of the Tentative World Heritage Site, is located c.2km to the east of the Aol. Khongil Tsav is one of the areas where the richest dinosaur fossil sites are frequently found. The fossils here date generally date to the Late Cretaceous period.

Land Use, Topography and Geology of the Site

- 10.4.6 The area surrounding the Project site is situated within the East Gobi Depression Zone of the Greater Gobi region, as delineated by Mongolia's physical geographic classification. This landscape is characterized primarily by expansive plains lying below 1,000 meters in elevation, interspersed with gently rising low hills typically ranging from 1,000 to 1,100 meters. Mountainous features in the region tend to exhibit dome-shaped tops, while the surrounding slopes are deeply incised by ravines, underscoring the area's diverse and rugged topography.
- 10.4.7 The distinctive landscape of the Mongolian Gobi Desert is principally shaped by its elevation above sea level, the encircling mountains, and its considerable remoteness from oceanic influences. These geographic and climatic conditions give rise to an extreme continental arid climate, marked by low summer precipitation levels and frequent occurrences of storms.

¹⁴ UNESCO. 2015. Sacred Mountains of Mongolia. Available at: <https://whc.unesco.org/fr/listesindicatives/6068/>

¹⁵ UNESCO. 2025. The Mongolian section of the Great Tea Route. Available at: <https://whc.unesco.org/fr/listesindicatives/6817/>

¹⁶ UNESCO. 2024. Cretaceous Dinosaur Fossil Sites in the Mongolian Gobi. Available at: <https://whc.unesco.org/en/tentativelists/5944/> <https://whc.unesco.org/fr/listesindicatives/6817/>

- 10.4.8 The Gobi zone extends south of the steppe zone, forming a broad band that stretches from the western Great Lakes Depression and the Valley of the Lakes to Mongolia's eastern national border. This region is predominantly composed of semi-desert landscapes that collectively define the wider Gobi environment. Characterized by features of both steppe and desert ecosystems, the Gobi represents a transitional landscape zone. While originally associated with arid, desert-like conditions, in contemporary geographic terms, the "Gobi" is best understood as an independent natural zone-occupying a unique ecological position north of the true desert belt.
- 10.4.9 The Project Area encompasses a number of low mountain ranges, including Khaalgyad Mountain (1,060.8m), Uneged Mountain (986m), Khuuvriin Ulaan Mountain (1,069m), Suuriin Khuren Mountain (1,015.4m), Ugalzat Tolgoi (1,010.5m), Olon Shand Mountain (1,011.7m), and Ulziit Mountain (1,069.8m). These landforms exhibit relative elevations typically ranging from 40 to 100m above the surrounding plains. Geomorphologically, several of these mountains are marked by eroded rocky outcrops, while others display smoothly contoured, sand-covered tops, reflecting varying degrees of weathering and aeolian influence.

Consultation

- 10.4.10 Engagement to date with local communities has identified the following receptors:
- Several sacred mountains, namely Choilin Mountain and Monastery in Sainshand soum; Khaalga Mountain in Sainshand soum, sacred cairns of Ikh-Uziit, and Baga-Ulziit mountains in Ulaanshoroot Bagh of Saihandulaan soum.
 - Khaalga Spring; Khaala Spring is located within a provincially (Aimag) protected area named Zoogiin Khooloi located, approximately 18-19 km southwest of Sainshand, the provincial capital.
 - Khamriin Khiid.
 - Palaeontological sites in Ulaanbadrakh soum -Two-elephant /Хоёр зааны in Mongolian/paleontological monument site. By Order No. A/161 of the Minister of Education, Culture, Science and Sports dated March 30, 2020, it was included in the list of immovable historical and cultural monuments protected at the provincial and capital level as an appendix to the order /<https://ncch.gov.mn/>.

Palaeontology

- 10.4.11 As stated above, the Cretaceous Dinosaur Fossil Sites in the Mongolian Gobi on the UNESCO's Tentative List is located c. 104km to the south of the Project. There may be potential for palaeontological receptors to be present within the Project Area that could be impacted upon by the construction of the Project. Palaeontological surveys have not been carried out. Palaeontological surveys of the OHTL route and 500m study area should be carried out to inform final tower siting and to inform mitigation. The exact scope and methodology of these will be designed by the specialist organisations as indicated earlier in this chapter, in accordance with national legislation.

Archaeological Surveys

- 10.4.12 Archaeological surveys have not been carried out. Archaeological surveys of the OHTL route and

500m study area should be carried out to inform final tower siting and to inform archaeological mitigation. The exact scope and methodology of these will be designed by the specialist organisations as indicated earlier in this chapter, in accordance with national legislation.

Tangible Cultural Heritage Receptors

10.4.13 Based on field surveys and local knowledge, immovable monuments of history and culture (Archaeological Sites and Monuments) identified in the Project Area are listed in **Table 10-4** and shown in **Figure 10-1** below.

Table 10-4 Archaeological Sites and Monuments in the wider region around the Project Site

No.	Soums	Archaeological Site and Monument Name	Approximate Distance from Project (km)
AM07	Sainshand	Khiimoriin Ovoo	0.8
-	Sainshand	Choilin Mountain and Monastery	5.2
-	Sainshand	Khaalga Mountain	5.2
AM08	Mandakh	Tumen Ulzii Ovoo	6.2
AM04	Saikhandulaan	The stone monuments of Khoshootiin Khooloi	18
AM02	Mandakh	The Khavtsgain Am rock carvings	20.5
AM06	Sainshand	The Khongil Tsav paleontological site	20.4
-	Sainshand	Dechinlundeov ovoo	24.6
AM01	Mandakh	Temeetiin toirom burials site	28.2
AM03	Saikhandulaan	Olon Khuree Monastery ruins site	28.5
	Saihandulaan	Baga Dulaan Ovoo	56.5
-	Mandakh	Ulgii Monastery Ruins	32.7
AM05	Sainshand	Khamar Monastery ruins site	32.2
-	Saihandulaan	Ikh Ulziit Mountain	37.9
-	Mandakh	Petrified wood and petroglyph of the Suikhent Mountain	38.2
-	Saihandulaan	The Shine Us Well palaeontological site	41.3
-	Ulaanbadrakh	Shar Zag	41.4
-	Saihandulaan	Buural Mountain/Zagal Ovoo	48.4
-	Saihandulaan	Ikh Dulaan ovoo	51.9



No.	Soums	Archaeological Site and Monument Name	Approximate Distance from Project (km)
-	Ulaanbadrakh	Takhiat Mountain	58.5
-	Ulaanbadrakh	Argalant Mountain	62.6
-	Saihandulaan	Bayan ovoo	71.1

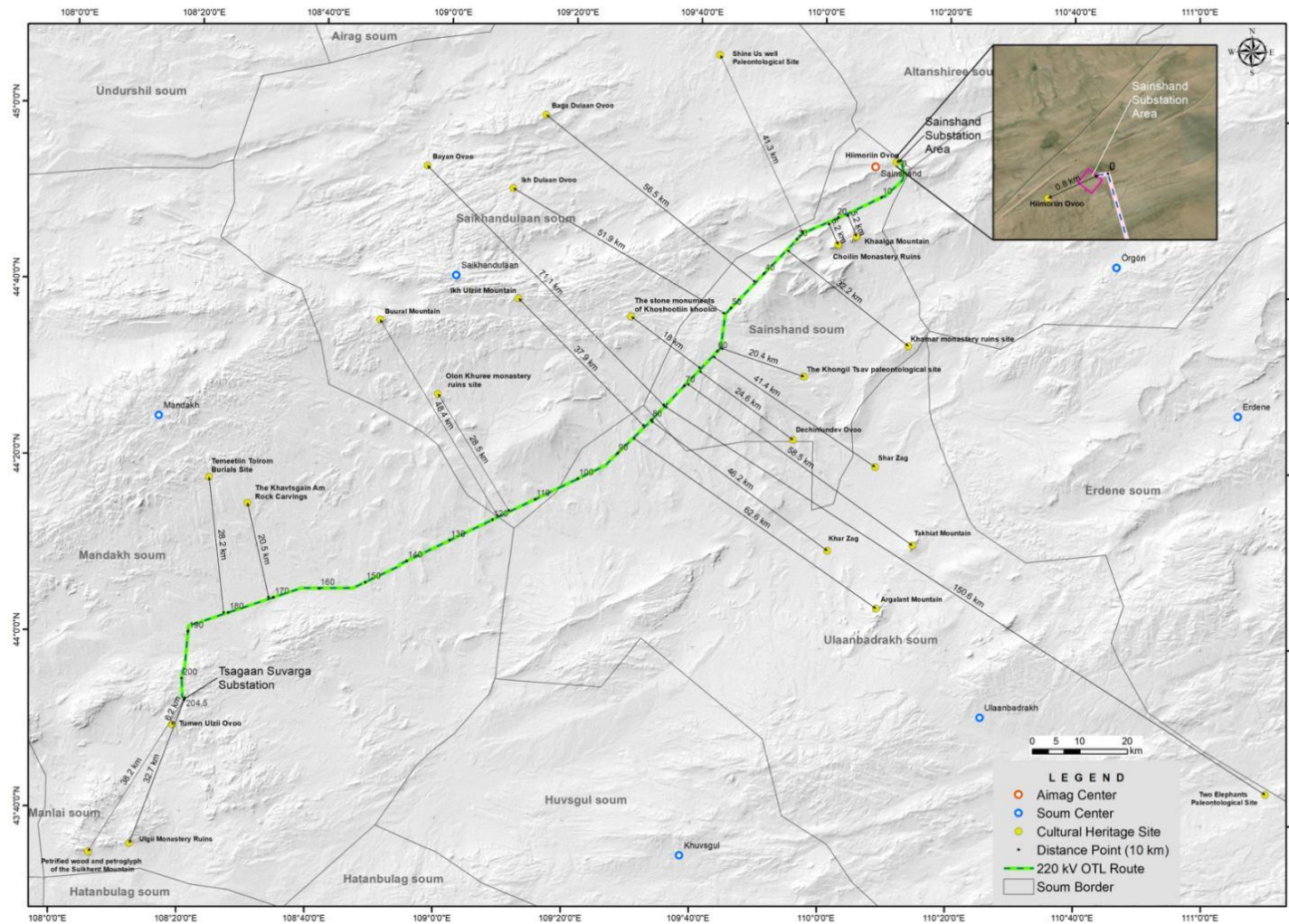


Figure 10.1 Map of Cultural Heritage Sites Near Project Route

Mandakh Soum

- 10.4.14 Two cultural heritage sites have been identified in Mandakh soum in the Project Area. The Temeetiin Toirom burial site is located approximately 28km from the OHTL route, while the Khavtsgaiin Am rock carvings are situated about 20km away. These sites are significant for understanding the region's ancient burial practices and early artistic expression.

Temeetiin Toirom burials (AM01)

- 10.4.15 Approximately 6 to 7km south of the soum centre, in a place known as Temeetiin Toirom, there are a few ancient burial sites. This burial complex is located about 28km from the Project OHTL route.



Plate 10-1 Temeetiin toirom burials (viewed from the east)



Plate 10-2 Temeetiin toirom burials (viewed from the south)

The Khavtsgaiin Am rock carvings (AM02)

- 10.4.16 Approximately 22km southeast of the soum centre, on the eastern bank of Khavtsgaiin Am, there is a smooth rock surface facing west that bears ancient petroglyphs. These carvings depict vivid scenes such as people hunting, engaging in combat, a snow leopard chasing deer, and herds of gazelles and antelope in motion.



Plate 10-3 The Khavtsgaiin Am rock carvings (viewed from the west)



Plate 10-4 The Khavtsgaiin Am rock carvings



Plate 10-5 The Khavtsgaiin Am rock carvings



Plate 10-6 The Khavtsgaiin Am rock carvings

Saikhandulaan soum

- 10.4.17 Two cultural heritage sites have been identified in Saikhandulaan soum in the Project Area. The Olon Khuree Monastery ruins, a historically significant religious complex, are located approximately 28.5km from the Project OHTL route. The stone monuments of Khosootiin Khooloi, which include ancient commemorative structures, are situated about 18km away. These sites reflect the region's deep spiritual and cultural traditions and are important for both historical research and heritage preservation.

Olon Khuree monastery ruins site (AM03)

- 10.4.18 Over 20km southwest of the soum centre and 26.5km northwest of the Project OHTL route, lie the ruins of the Olon Khuree Monastery. In later periods, the site was heavily disturbed and damaged by extensive human excavation.



*Plate 10-7 The ruins of Olon Khuree monastery
(viewed from the south)*



*Plate 10-8 The ruins of Olon Khuree monastery
(viewed from the south)*

The stone monuments of Khoshootiin Khooloi (AM04)

- 10.4.19 Over 30km southeast of the soum centre and 18km northwest of the Project OHTL route, on the western bank of Khoshootiin Khooloi, stands a stone monument. This stele, which bears no visible carvings or symbols on its surface, was later re-erected upside down.



Plate 10-9 The stone monuments of Khoshootiin Khooloi (viewed from the west)

Sainshand soum

- 10.4.20 Sainshand soum is a culturally and scientifically significant area, featuring key heritage sites such as the Khamar Monastery ruins (32.2km southeast of the OHTL route) and the Khongil Tsav paleontological site (20.4km southeast). These landmarks highlight the region's rich historical, spiritual, and natural legacy.

Khamar monastery ruins site (AM05)

- 10.4.21 About 40km south of the provincial centre and 32.2km southeast of the Project OHTL route lies Khamar Monastery, founded by the revered Gobi mystic and noble lama Danzanravjaa. The monastery was closed in the late 1930s, but in the early 1990s, with the support of residents, its religious activities were revived. Today, efforts are underway to rebuild the temples, prayer halls, and stupas of Khamar Monastery.



Plate 10-10 Newly built temple (viewed from the southwest)



Plate 10-11 Ruins of the "Saran Khukhuu" Theater (viewed from the south)



Plate 10-12 Newly built stupa (viewed from the south)

The Khongil Tsav paleontological site (AM06)

- 10.4.22 The Khongil Tsav paleontological site is located about 12km northwest of the former centre of Zuunbayan soum and 20.4km southeast of the project OHTL route.



*Plate 10-13 The Khongil Tsav paleontological site
(viewed from the east)*



*Plate 10-14 The Khongil Tsav paleontological site
(viewed from the west)*

Ulaanbadrakh soum

- 10.4.23 No cultural heritage sites have been identified in close proximity to the OHTL within Ulaanbadrakh soum.

10.5 Potential Impacts and Effects

Construction Phase

- 10.5.1 Construction activities have the potential to cause adverse permanent physical impacts to cultural heritage assets, including buried archaeology, built heritage and historic landscape features. This could be through direct physical destruction, truncation (removal of part) or through associated impacts including ground movement and vibration.
- 10.5.2 All works that involve earthworks/groundworks could potentially result in physical damage to previously identified or unidentified cultural heritage assets. This includes construction of the OHTL and accommodation camps. Potential physical damage to both known and currently unknown cultural heritage can be also caused by the presence of non-local workforce during the construction of the OHTL, for example through accidental damage.
- 10.5.3 Due to the distance of the eight identified assets from the Project OHTL route, no direct or indirect impacts are anticipated. Therefore no significant adverse effects are anticipated to the cultural heritage resource.

- 10.5.4 Once the archaeological and palaeontological surveys (and potentially also an ethnographical study) have been conducted, a review will need to be undertaken as to whether additional measures are required to avoid significant adverse effects. In line with PR 8: Cultural Heritage (para 12. Avoiding impacts) *'If potential impacts are identified at the early stages of project development, preference should be given to avoiding adverse impacts during the design and site selection phases.'*
- 10.5.5 Should such features be identified, additional protection measures during construction would need to be designed to protect such assets from accidental damage such as protective fencing or barriers, which would be detailed in a Cultural Heritage Management Plan that would need to be prepared by the MoE/PIU/their specialised consultants. For cultural heritage receptors that do not require preservation in situ, appropriate archaeological/palaeontological excavation and recording should be carried out with the appropriate government permissions. The Cultural Heritage Management Plan will form part of the CESMP and any contractor contracts will include a requirement to comply with the Cultural Heritage Management Plan.

Operation Phase

- 10.5.6 During the operation phase of the Project the impacts will remain as those identified in relation to the construction phase. No additional physical impacts will occur and the changes to setting of assets will become permanent, as a result of the presence of the OHTL (although no such assets have currently been identified).

10.6 Mitigation and Enhancement Measures

Construction Phase

- 10.6.1 Based on our current understanding of the Project and the Project location, it has been assessed that there will be no adverse impacts to the known cultural heritage resource. Therefore, no mitigation is required. Should the Project design change, or new assets be identified during the course of additional surveys, this assessment may be subject to change.
- 10.6.2 Should any archaeological/palaeontological assets be identified within the Project route during the course of further survey, the preferred method of mitigation would be avoidance. If the impacts to any identified archaeological/palaeontological assets cannot be avoided and design mitigation is not successful, a phase of archaeological/palaeontological recording and excavation would be required to remove the assets. The detail of these measures would be included in a specific Cultural Heritage Management Plan and Chance Finds Procedure to be developed by the MoE/their specialised consultants. The Chance Finds Procedure must comply fully with 'EBRD Performance Requirement 8: Cultural Heritage'. The Cultural Heritage Management Plan and Chance Finds Procedure will form part of the CESMP and the PIU will include the need to comply with these plans in all contracts with contractors.
- 10.6.3 The Cultural Heritage Management Plan will set out clear procedures to avoid impacts to intangible cultural heritage during the construction and O&M stages of the project. This should include, for example: measures to avoid noise impacts to tranquil areas; ensuring that important routes or areas

are not blocked at important times (e.g. festivals); and avoiding placement of construction or accommodation camps in areas which are important for intangible heritage.

- 10.6.4 The Chance Finds Procedure must be in place during construction and during any ground disturbance and intrusive works. Prior to the start of such works, the Construction Contractor will ensure that training is provided on the Plan and the Procedure by a Cultural Heritage specialist. This may include, for example, toolbox talks to construction staff. A watching brief will be in place, in line with the Chance Finds Procedure, during any ground disturbance works.
- 10.6.5 Any chance finds discovered will be managed in accordance with the Chance Finds Procedure by a Cultural Heritage specialist. This may include stopping works until the appropriate approach to managing the find is agreed. All consultation must be carried out in accordance with the Stakeholder Engagement Plan (SEP) and be carried out using gender-inclusive methods. All meetings undertaken will be recorded and, where necessary, approvals will be documented.
- 10.6.6 If ownership/use of the chance find is clear, engagement will be undertaken directly with the owner. Specific measures will be employed in line with the SEP if the owners or users of the find are vulnerable, such as meetings held at locations suitable to those individuals.
- 10.6.7 Where relevant, engagement will be undertaken at the bagh level, with the local bagh leader and, if required and agreed (with the owner of the find, as relevant), disclosed to the local community at baghs meetings such as Citizens' Representative Meetings.
- 10.6.8 Where meetings are required with other relevant cultural heritage stakeholders, such as aimag specialists and NGOs, this will be carried out on a targeted basis.
- 10.6.9 Chance Finds will be documented in accordance with the Chance Finds Procedure and reported by the Construction Contractor to the PIU as part of weekly, monthly and annual reporting. This will include, as appropriate, registering chance finds at the national level. The Chance Find Procedure will fully detail the process to be followed.

Operation Phase

- 10.6.10 During the operation phase physical impacts have not been considered, as they would have occurred during the construction phase and cannot be repeated as the heritage asset would have already been partially or completely removed. Any protection measures detailed in the Cultural Heritage Management Plan will still be in place.

10.7 Residual Effects

Construction Phase

- 10.7.1 No residual effects are currently anticipated in relation to the known cultural heritage receptors identified in this chapter. However, following archaeological and palaeontological surveys (and ethnographic studies, as required) that will be undertaken by the MoE, there is potential for impacts



to be identified.

Operation Phase

- 10.7.2 No operation phase residual effects are anticipated. However, following an ethnographic study that will be undertaken, there is potential for impacts to be identified.

11 Landscape and Visual

11.1 Introduction

- 11.1.1 This chapter presents the likely effects of both the construction and operation phases of the Project on landscape and visual receptors. The landscape and visual receptors assessed within this chapter include the character of the landscape surrounding the Project and the visual amenity of those living, visiting and traveling through it.

11.2 Legislative Framework, Policy and Guidance

- 11.2.1 **Table 11-1** summarises the legislation, policy and guidance of relevance to this assessment.

Table 11-1 Summary of Legislation, Policy and Guidance relevant to Landscape and Visual matters

Level	Key legislation / policy / guidance
International	<p>The European Landscape Convention, 2004¹⁷ defines 'landscape' in Article 1 as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.' The convention recognises, in its preamble that 'the landscape is an important part of the quality of life for people everywhere; in urban areas and in the countryside, in degraded areas as well as in areas of high quality, in areas recognised as being of outstanding beauty as well as everyday areas.'</p> <p>It also defines, in Article 1, 'landscape protection' as 'actions to conserve and maintain the significant or characteristic features of a landscape, justified by its heritage value derived from its natural configuration and/or from human activity.'</p>
Mongolian National Law	<p>Law on Special Protected Areas, 1994 (amended last in 2023)</p> <p>The purpose of this legislation is to regulate the utilisation and designation of areas under special protection, ensuring the preservation and protection of natural landscapes in Mongolia. The law aims to maintain unique features of natural zones, protect rare and endangered fauna and flora, safeguard historical and cultural sites, and conserve natural sightseeing locations.</p> <p>The law classifies state special protected areas into four categories: strictly protected areas, national park, natural reserves, and national monument areas. This classification ensures a comprehensive approach to preserving the nation's valuable natural and cultural heritage.</p> <p>Law on Environmental Impact Assessment, 2012 (amended last in 2024)</p> <p>The purpose of this law is to implement Article 16.2 of the Constitutional Law of Mongolia, i.e. to protect the environment, prevent ecological imbalance caused by human activities, exploit mineral resources with minimal adverse impact on the environment, assess the environmental impact of development policies, plans, programs, and projects, and make decisions and</p>

¹⁷ The European Landscape Convention, 2004, <https://www.coe.int/en/web/conventions/full-list?module=treaty-detail&treaty-num=176> (Accessed 16/07/2025)

Level	Key legislation / policy / guidance
	conclusions on whether to implement them. It also aims to arrange coordination among stakeholders.
	<p>Law on Land, 2002 (last amended 2024)</p> <p>The purpose of this law is to regulate the possession and use of land by citizens, entities and organizations and other relevant issues.</p> <p>The legislation consists of several key legal documents, including the Constitution of Mongolia, the Civil Code, this specific law, and other related legislative acts. Furthermore, any issues regarding the use and protection of natural resources such as underground resources, forests, water, air, flora, and fauna are governed by relevant legislative acts, ensuring that all aspects of land use and environmental protection are covered.</p>

11.3 Assessment Methodology

Scope

- 11.3.1 The scope of this chapter concerns the assessment of the potential effects to landscape character and visual amenity receptors resulting from both the construction and operation of the Project.

Study Area

- 11.3.2 The Study Area refers to the spatial zone within which data has been collected to assess the effects of the Project on landscape and visual receptors. The Study Area for this assessment covers Dornogovi aimag.
- 11.3.3 The Area of Influence (Aol) includes all areas within the Study Area in which significant effects have the potential to occur, taking into account the physical extent of the proposed works (defined by the boundary limits of land to be acquired or used temporarily or permanently by the Project), and the nature of the baseline environment.
- 11.3.4 In order to determine an Aol for a landscape and visual assessment Zone of Theoretical Visibility (ZTV) plans of a proposed development are often produced. Given, however, the relatively large-scale and simplicity of the Study Area's landscape, the uniformity of the proposed OHTL, plus the relatively long distance most visual receptors are anticipated to be from it, the preparation of ZTV plans has not been undertaken.
- 11.3.5 The Aol for the landscape and visual assessment has therefore been determined from precedent studies supplemented by site studies and assessment experience.
- 11.3.6 Firstly, given that there is no local guidance on such matters, an initial broad Aol was derived from the work carried out in the UK by Natural Resources Wales (in their publication: 'GN46: Using LANDMAP

in *Landscape and Visual Impact Assessments*¹⁸) which states that, as a starting point, a suitable Aol for OHTL towers (pylons) between 26m to 49m above ground levels should range between 2km to 5km on either side of its centre-line.

- 11.3.7 Given the relative openness of the Study Area's landscape, and the frequency of taller landforms surrounding the OHTL's proposed course through Dornogovi aimag, the largest of the distances in the range given in the *GN46* publication, i.e. 5km on either side of the centre-line of the OHTL, has been selected as the Aol.
- 11.3.8 From this distance the tallest of the Project's OHTL towers (i.e. those that rise to 45m above ground levels) would have an 'apparent height' of approximately 5.5mm when observed by a visual receptor (a fact determined by using the formula within the UK guidance document: '*Wind Turbines & Pylons - Guidance on the Application of Separation Distances from Residential Properties*'¹⁹ (published in 2014), and as such are unlikely to bring about a significant effect.
- 11.3.9 The effects on receptors of particularly high sensitivity, however, between 5-10km from the OHTL have been additionally assessed where it was considered that there was the potential for significant effects to arise.

Methodology

- 11.3.10 The methodology for this assessment is based on the guidance set out in the Guidelines for Landscape & Visual Impact Assessment – Third Edition (GLVIA3)²⁰.
- 11.3.11 Using the guidance set out in GLVIA3, a methodology that is proportionate to the scale and nature of likely effects has been developed.
- 11.3.12 This firstly entailed desktop and field-based studies to understand the likely landscape and visual receptors to the Project.
- 11.3.13 As there are no published landscape character assessments of the Study Area at a national, regional or local level, the desktop study involved gathering information from existing, broader geographic publications and mapping such as the 'Mongolian National Atlas'²¹, the 'Physical Geography of

¹⁸ Using LANDMAP in Landscape and Visual Assessments GN46 (updated 2024)

<https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/evidence-to-inform-development-planning/using-landmap-in-landscape-and-visual-impact-assessments-gn46/?lang=en> (Accessed 16/07/2025)

¹⁹ 'Cyngor Sir Ynys Mon / Isle of Anglesey County Council, Cyngor Gwynedd / Gwynedd Council and Parc Cenedlaethol Eryri / Eryri National Park (2014). Wind Turbines & Pylons - Guidance on the Application of Separation Distances from Residential Properties'. [https://www.gwynedd.llyw.cymru/en/Council/Documents---Council/Strategies-and-policies/Environment-and-planning/Planning-policy/Supporting-documents/Wind-Turbines-and-Pylons---Separation-Guidance-\(DC.019\).pdf](https://www.gwynedd.llyw.cymru/en/Council/Documents---Council/Strategies-and-policies/Environment-and-planning/Planning-policy/Supporting-documents/Wind-Turbines-and-Pylons---Separation-Guidance-(DC.019).pdf) (Accessed 16/07/2025)

²⁰ Guidelines for Landscape and Visual Impact Assessment - Third Edition (2013). <https://www.routledge.com/Guidelines-for-Landscape-and-Visual-Impact-Assessment/LandscapeInstitute-IEMA/p/book/9780415680042> (Accessed 16/07/2025)

²¹ Mongolian National Atlas Mongolian (2009). Academy of Sciences, Institute of Geography.

Mongolia'²², and the 'Digital National Atlas of Mongolia'²³, as well as the baseline studies of similar assessments (such as that of the Choir-Sainshand transmission line²⁴).

- 11.3.14 The information collected included identification of general topography, other natural features, settlements, permanent camps (*gers*), and existing infrastructure (such as railways, other OHTL, solar farms, wind farms, and paved and 'improved' roads).
- 11.3.15 Field work was undertaken in June 2025. This involved travel through the Study Area by environmental professionals (guided remotely by landscape architects) in order to gain a more detailed understanding of its landscape characteristics and identify visual receptors. Photographs were collected: at the proposed location of key parts of the Project (i.e. at the points of its connection into existing and proposed substations); where the line of the proposed OHTL crosses existing infrastructure (such as roads, railways or other OHTL); where a distinct change of character was observed; and from locations nearby to certain sensitive visual receptors such as sacred sites and recreational areas.
- 11.3.16 Given the scale of the Project and relative uncomplicated character of the Study Area's landscape, photographs were collected, at most, every 40km along its route. In order to provide as wide an understanding of the landscape as possible, most of the photographs were collected using drones from heights between 50-250m.

Sensitivity/Value of Receptors

- 11.3.17 The term *receptors* has been used to describe characteristics of the Aol landscape and those groups of people (i.e. residential communities, visitors to locations where appreciation of the landscape is part of the reason for them visiting and travellers through the Aol) that may be affected by the Project.
- 11.3.18 In accordance with GLIVA3, the sensitivity of such receptors has been determined by combining their susceptibility to change and their value. The categories of sensitivity applied, and an illustrative description of these, are shown in **Table 11-2** and **Table 11-3**.

Table 11-2 The Sensitivity of Landscape Receptors

Sensitivity of Receptor	Illustrative Description
High	The key characteristics and qualities of the landscape are highly susceptible to change from the type and scale of the project being assessed; and/or the landscape is highly valued. Key landscape characteristics are highly vulnerable and unable to accommodate the project without significant consequences for character.

²² The Physical Geography of Mongolia (2021), Batchuluun Yembuu et al, Springer International Publishing, Springer Cham, Switzerland

²³ Digital National Atlas of Mongolia (2025), Institute of Geography and Geoecology (MAS), <https://www.mongolianatlas.ac.mn/en/atlas/nature/environment> (Accessed 16/07/2025)

²⁴ Choir-Sainshand transmission line - Environmental and Social Impact Assessment (2021), European Bank for Reconstruction and Development (EBRD) <https://www.ebrd.com/home/work-with-us/projects/psd/51505.html#customtab-581f58ec6d-item-3df621d45d-tab> (Accessed 16/07/2025)

Sensitivity of Receptor	Illustrative Description
Medium	Some of the key characteristics and qualities of the landscape are susceptible to change from the type and scale of the project being assessed; and/or the landscape is moderately valued. Although the landscape may be able to absorb some development if sensitively sited and designed, it may introduce new inappropriate characteristics or result in a change in character. The landscape may have potential to accommodate the project in some defined situations without significant character change or adverse effects.
Low	Key characteristics and qualities of the landscape are robust or degraded and are not susceptible to change; and/or the landscape has a low value. The landscape is unlikely to be adversely affected by the type and scale of the project being assessed.

Table 11-3 The Sensitivity of Visual Receptors

Sensitivity of Receptor	Illustrative Description
Very High	Visitors and / or communities at locations which provide key: static and / or sustained kinetic; well frequented, promoted and well known views in areas / at sites / on trails of international value where views are the paramount part of the experience of the landscape / contribute significantly to a community's setting.
High	Visitors and / or communities at locations which provide: static and / or sustained kinetic; well frequented, promoted and well known, views in areas / at sites / on trails of national value where views are an important part of the experience of the landscape / contribute largely to a community's setting.
Medium	Visitors and / or communities at locations which provide static and / or sustained kinetic views in areas / at sites / on trails of regional value where views are a moderately important part of the experience of the landscape / contribute moderately to a community's setting.
Low	Visitors and / or communities at locations which provide some static and / or sustained kinetic views in areas / at sites / on trails of local value, and/or where people have a limited opportunity to enjoy the view due either to the speed of travel or because their attention is elsewhere.
Very Low	Visitors and / or communities at locations which provide few static and / or sustained kinetic views and are in areas / at sites / on trails of very low value, and/or where people have a limited opportunity to enjoy the view due either to the speed of travel or because their attention is elsewhere.

Magnitude of Change

- 11.3.19 This involves determining the nature of the change that is likely to occur to the landscape and visual receptors as a result of the Project, with any mitigation measures embedded in place, and whether such changes are beneficial or adverse.
- 11.3.20 In accordance with GLVIA3, the magnitude of change to receptors is determined by consideration of its size and scale, its geographical extent, and its duration and reversibility. Judgements on these

attributes are considered together to derive an overall predicted magnitude of change for each receptor guided by the indicative criteria set out in **Table 11-4** and **Table 11-5**.

Table 11-4 Magnitude of change to Landscape Receptors

Magnitude	Illustrative description
Large	Considerable change to the landscape receptor over a wide area, or an intensive change over a limited area with dramatic consequences for the elements, character and quality of the baseline.
Medium-Large	The project will form a dominant element, and the baseline situation will be fundamentally changed, potentially creating a different landscape character.
Medium	Substantial change to the landscape receptor over a wide area, or a considerable change over a limited area, with consequences for the elements, character and quality of the baseline.
Medium-Small	The Project will form a prominent landscape element and the baseline situation will be substantially changed.
Small	Noticeable change to the landscape receptor over a wide area, or a conspicuous change over a limited area, with some consequences for the elements, character and quality of the baseline.
Negligible	Slight change to the landscape receptor over a wide area or a just noticeable change over a limited area, with few consequences for the elements, character and quality of the baseline landscape
No Change	Barely noticeable change to the landscape receptor over a wide area with no material consequences for the elements, character and quality of the baseline landscape.

Table 11-5 Magnitude of change to Visual Receptors

Magnitude	Illustrative description
Large	<p>The Project would form the dominant element in receptors' visual experience and result in a dramatic change to the character and quality of the existing views.</p> <p>Typically, this would be where a Project would be seen in very close proximity with a large proportion of the views affected by no or minimal screening/filtering or backclothing of views.</p> <p>The Project would dominate typical views and may also be long-term in duration and seen by many people.</p>
Medium-Large	<p>The Project would be a prominent feature in receptors' existing visual experience and result in a substantial change to the character and quality of existing views.</p> <p>Typically, this would be where a Project would be seen in close proximity with a large proportion of views affected and only a small degree of screening / filtering / backclothing.</p> <p>The Project would affect the main focus of typical views and may also be long-term in duration and seen by many people.</p>
Medium	The Project would be a conspicuous element in receptor's visual experience and result in a noticeable change to the character and quality of the existing views.

Magnitude	Illustrative description
	<p>Typically, this would be where a Project would be seen at a relative moderate distance, in views where a moderate proportion of them is affected, and a moderate degree of screening / filtering / backclothing.</p> <p>The Project would be clearly visible and well-defined. It may be also medium-term in duration and seen by a relative moderate number of people.</p>
Medium-Small	<p>The Project would form a small part of receptors' visual experience and result in a slight change to the character and quality of the existing views.</p> <p>Typically, this would be where a Project would be seen in distant views, where only a small proportion of the view is affected, where there is a relative high degree of filtering / screening / backclothing.</p> <p>The project would be visible but indistinct and / or partially obscured. It would be seen only briefly and by few people.</p>
Small	<p>The Project would be a perceptible part in receptors' visual experience but result in a relatively inconspicuous change to existing views.</p> <p>Typically, this would be where the Project would form a part of a long-distance panoramic views and / or where a very small proportion of views are affected, and / or where there is a relative high degree of filtering / screening / backclothing.</p> <p>The Project would be just discernible and / or partially obscured. It would be seen only briefly and by few people.</p>
Negligible	<p>Almost indiscernible change to receptors' visual experience, with no consequences for the character and quality of the existing views.</p> <p>The Project would be barely perceptible and post development, the baseline view would appear predominantly unchanged.</p>
No Change	Where no visual change is anticipated.

11.3.21 With regards to the duration of a change (or impact), **Chapter 5** of this ESIA defines that:

- very short term: Less than 2 years
- short term: 2 to 5 years
- medium term: 5 to 10 years
- long term: 10 to 15 years
- very long term: More than 15 years

Mitigation

11.3.22 To prevent or reduce adverse impacts and so satisfy EBRD and GIP requirements mitigation measures will be considered in line with the following hierarchy:

- **Avoid** - 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.

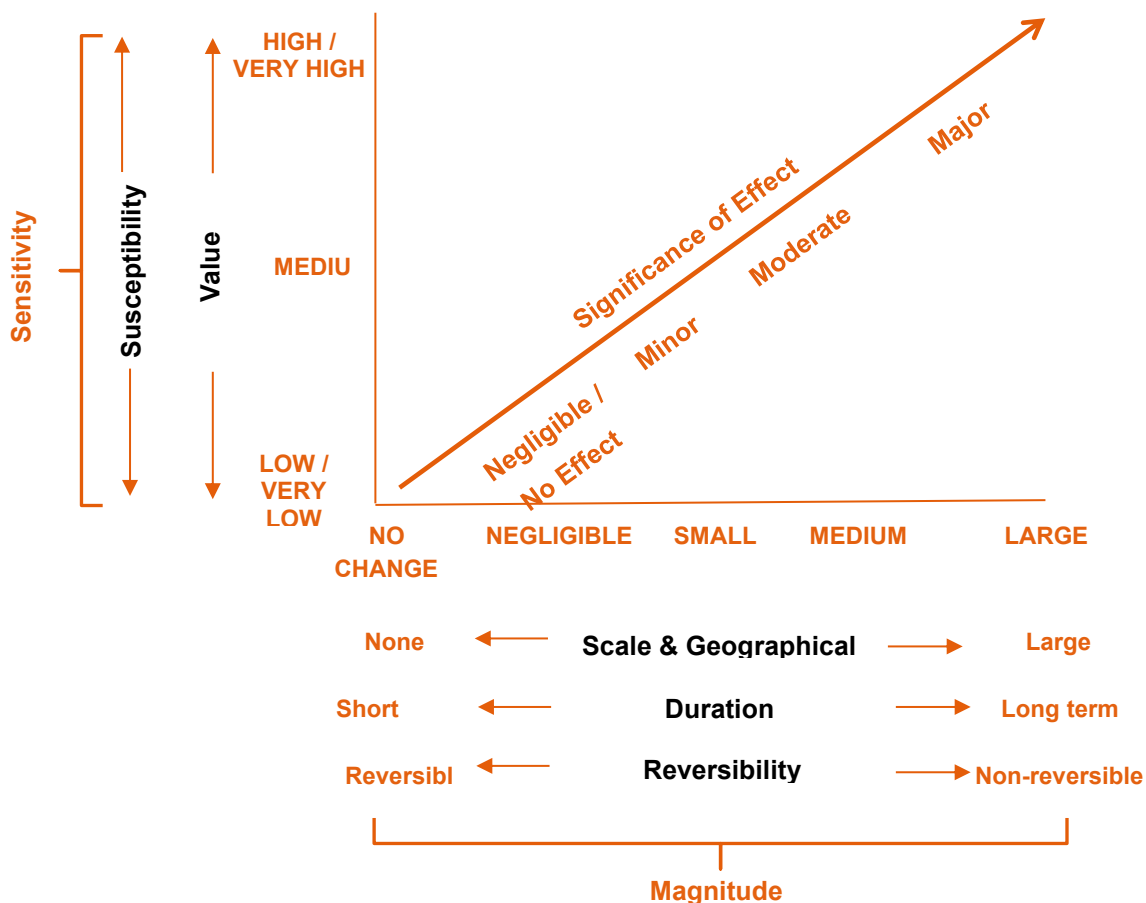
- **Compensate/offset** - where avoidance or reduction measures are not available, it may be appropriate to provide compensatory/offsetting measures. It should be noted that compensatory measures do not eliminate the original adverse effect, they merely seek to offset it with a comparable positive one.
- **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.

Determining Significance of Effects

11.3.23 Determining the significance of effects has been undertaken by considering the magnitude of change alongside the sensitivity of the receptor, as shown in **Diagram 11-1**, with the mitigation measures in place.

11.3.24 This determines the effects of the Project, and forms the basis for the development of the stand-alone ESMP that should be followed so that impacts are satisfactorily mitigated.

Diagram 11-1 Significance of Effect



- 11.3.25 As indicatively demonstrated in **Diagram 11-1** the effects are categorised as ‘major’, ‘moderate’, ‘minor or negligible’/‘no effect’ (or immediate grades between them).
- 11.3.26 ‘Major’ and ‘Major/Moderate’ effects are those generally, but not exclusively, associated with receptors of international or national importance that are likely to suffer a most damaging impact and loss of resource integrity – and so would be ‘significant’, especially if they are long term, permanent and/or not reversible.
- 11.3.27 ‘Moderate/Minor’, ‘Minor’ are those effects that may be raised as local factors and are unlikely to be critical in the decision-making process. Along with ‘Negligible’/‘No Effects’ effects, these are considered as ‘not significant’.
- 11.3.28 Moderate effects that those considered to be important, but which may or may not be key in the decision-making process. Reasoned professional judgement is therefore used to determine if these are considered ‘significant’ on ‘not significant’.
- 11.3.29 The nature of all effects would be described as positive (beneficial), negative (adverse) or neutral (where the positive and negative effects of the Project equalise).

Limitations and Assumptions

- 11.3.30 The following limitations and assumptions are relevant to the assessment:
- The assessment has been undertaken based on the design information available at this time.
 - All assessment work has applied a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.
 - The assessment assumes that the proposed towers and overhead lines have not been fully erected at the point in time that the impacts of the construction phase are considered. Instead, it is assumed that construction phase impacts have arisen from the presence of temporary construction site compounds (including vehicular parking and material storage), haul roads, and working areas (including the presence and movement of plant).
 - The assessment of construction phase effects assumes the worst-case scenario whereby the peak level of the Project’s construction activity is taking place closest to the receptor being assessed.
 - Given the relative large-scale and simplicity of the Study Area’s landscape, the uniformity of the proposed OHTL, plus the relatively long distance many visual receptors are anticipated to be from it, the preparation of ZTV plans has not been undertaken.
 - Given that the field work was undertaken by non-landscape environmental specialists, no viewpoints (i.e. locations that are representative of the kind of views experienced by visual receptors) were collected. The drone-photography (included in this report) that was collected is, however, considered sufficient for the assessment of the visual impact upon such receptors.
 - Consideration of the Project’s effects upon the integrity and setting of any heritage assets where visual receptors have been identified in this chapter, is set out **Chapter 10: Cultural Heritage**.
 - No existing published landscape character assessments of the Study Area at a national, regional or local levels have been identified.
 - The assessment assumes that the Choir-Sainshand OHTL and the Sainshand Substation are likely to be in place before the potential construction of the Project is begun.

- No additional land-take is required outside of the footprint of the existing Tsagaan Suvarga substation and the proposed Sainshand substation in order for the Project to make a connection to them. The Project would only necessitate the placement of some additional transformers and related equipment within these.

11.4 Baseline Conditions

The Study Area

- 11.4.1 The Study Area is located within the wide area of the 'East Gobi Depression Zone' – part of the 'Greater Gobi' semi-desert / steppe region, as delineated by Mongolia's physical geographic classification (see **Figure 11-1**).

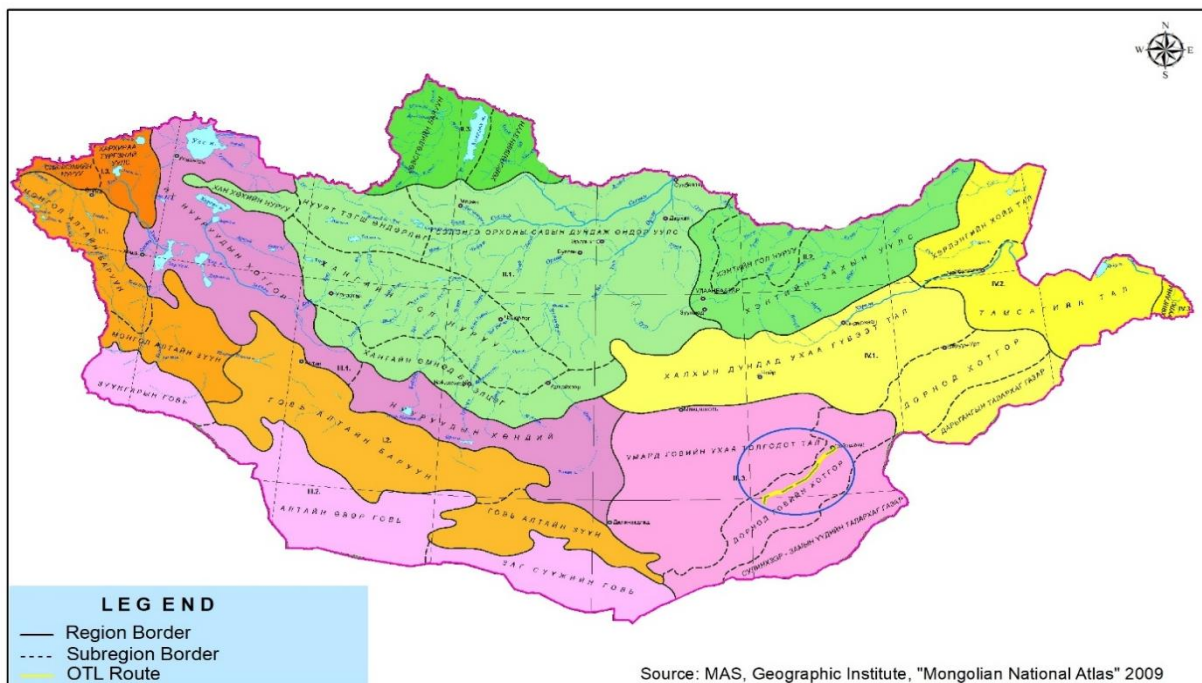


Figure 11-1 Map of Mongolia's Physical Geography Zones and the Location of the OHTL Route (yellow line)

- 11.4.2 The broad landscape is characterised by expansive plains lying just below 1,000m in elevation. The plains are generally open, arid steppe with very little surface water, trees or other vegetation. These are interspersed with ranges of low landforms rising to up to, at most, 400m above the plains. These are often rounded sandy hills or eroded rocky outcrops generally aligned north-east to south-west, which then rise in height towards the central southern part of Mongolia (part of the Gobi-Altai mountains), and towards the south, into the People's Republic of China (see **Figure 11-2**).

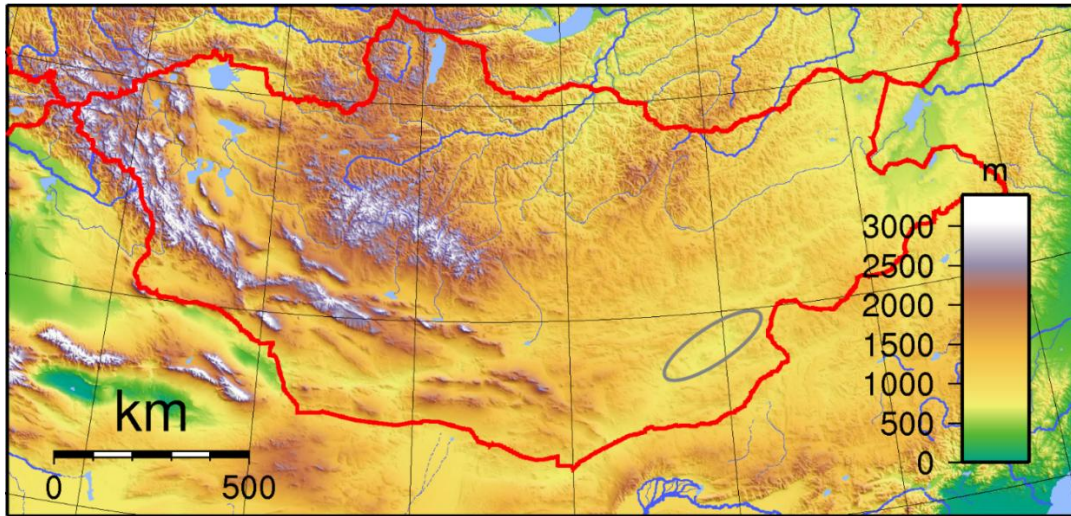


Figure 11-2 Broad topography of Mongolia (source https://en.m.wikipedia.org/wiki/File:Mongolia_Topography.png), Project area shown by grey oval

11.4.3 The Study Area also occupies a north-east to south-west aligned topographical band within this landscape (see **Figure 11-3**).

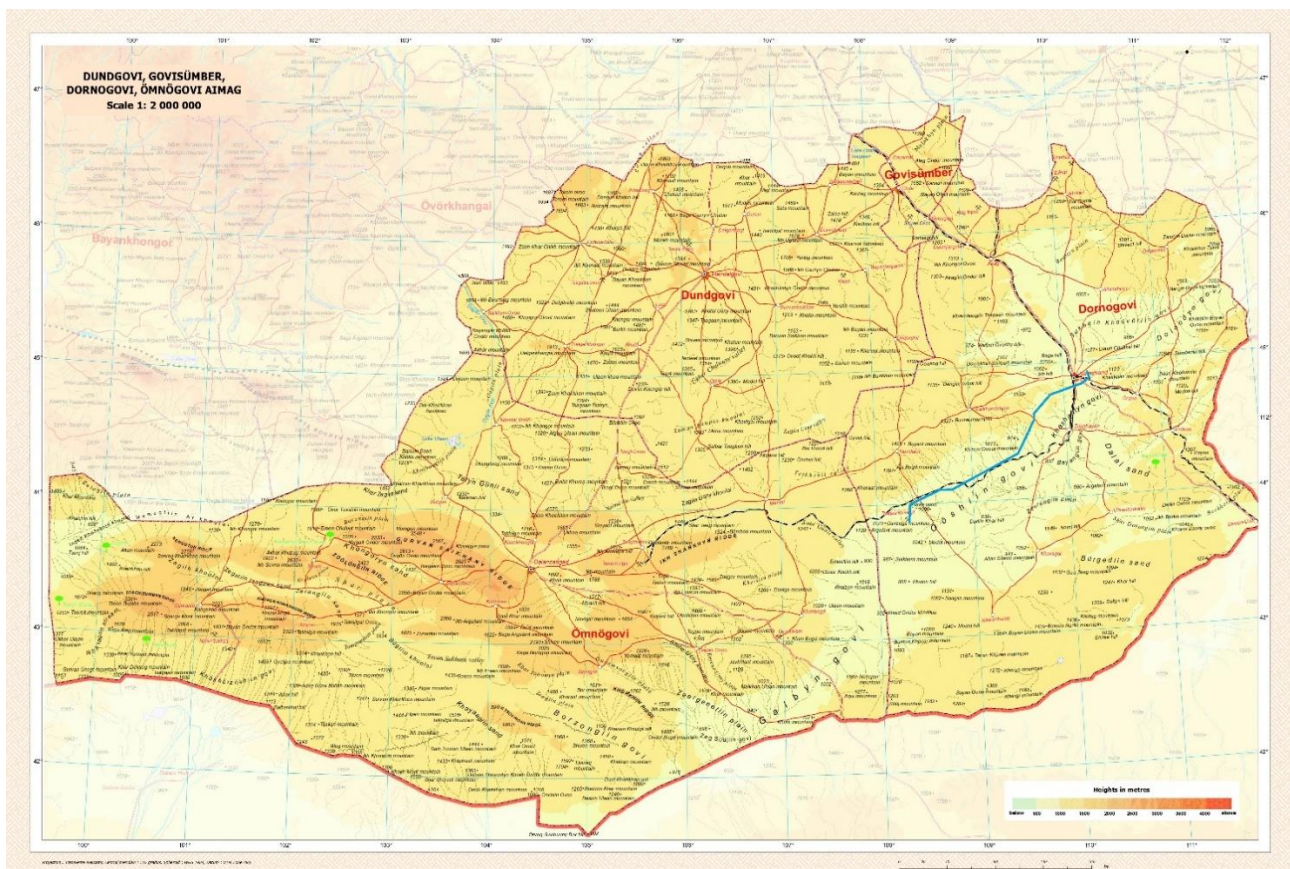


Figure 11-3 Regional topography, settlements, landscape features, roads and railways of the Dundgovi, Govisumber, Dornogovi and Omnogovi aimags (source: Digital National Atlas of Mongolia (2025), (Project shown with blue line

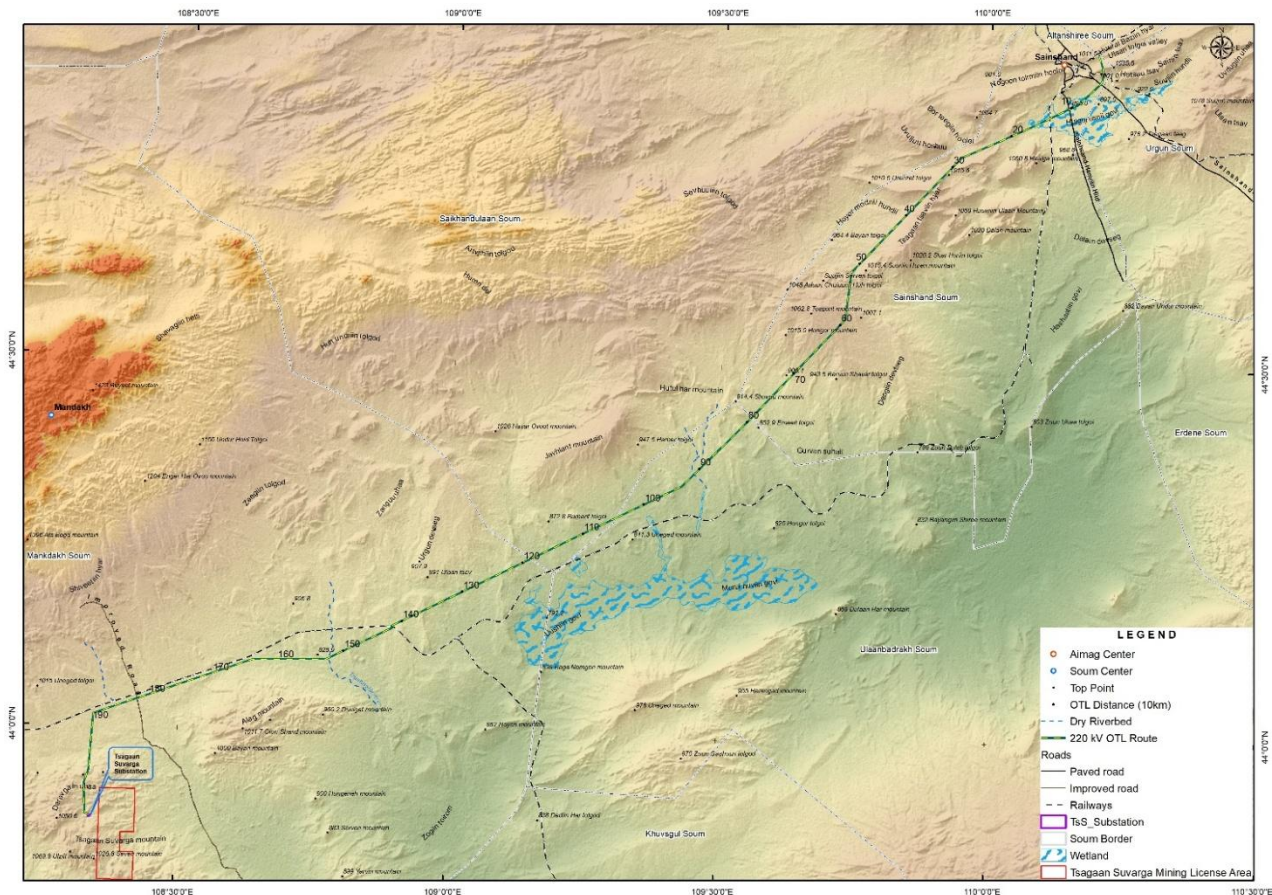


Figure 11-4 Local topography of the Study Area, with the route of the 204km OHTL shown in green

11.4.4 The Project's eastern extents begin upon a series of low, but distinct sand-topped gentle ridges that rise to between, approximately, 950-1,050m above sea level, and which separate the Sukhain Khoovoriin govi from the Khashaатыn govi. Being within approximately 4.4km of the edge of the settlement of Sainshand, the landscape of this area is additionally characterised by layers of human development (see **Figure 11-5**), notably the:

- 66ha Gobi Solar Power Plant;
- The Sainshand Wind Farm, which comprises of 25no. 140m high (to the rotor tip) turbines;
- Overhead powerlines emanating from the solar plant and wind farm;
- The main line and branches of the Trans-Mongolian Railway;
- Stretches of the Asian Highway 3 (which connects Mongolia's northern border with Russia at Altanbulag and southern border with the People's Republic of China at Zamyn- Üüd);
- Other more minor roads radiating from this towards the centre of Sainshand; and
- Sporadic ribbon development along these roads, such as petrol stations.

- 11.4.5 Further to the north of the town is Sainshand Airport (approximately 7.3km away), and further to the east is the Mongol Oil Refinery (approximately 13.4km away).
- 11.4.6 As set out in the 'Limitations and Assumptions' section of this chapter the assessment assumes that the approved, but yet un-built, 220kV powerlines and substation at the very southern part of the Choir-Sainshand OHTL link, will have also be constructed in this area. The 6.3ha substation will be located at Khuurai Bazyn Khyar (at around 1,010m above sea level), see **Figure 11-5**.

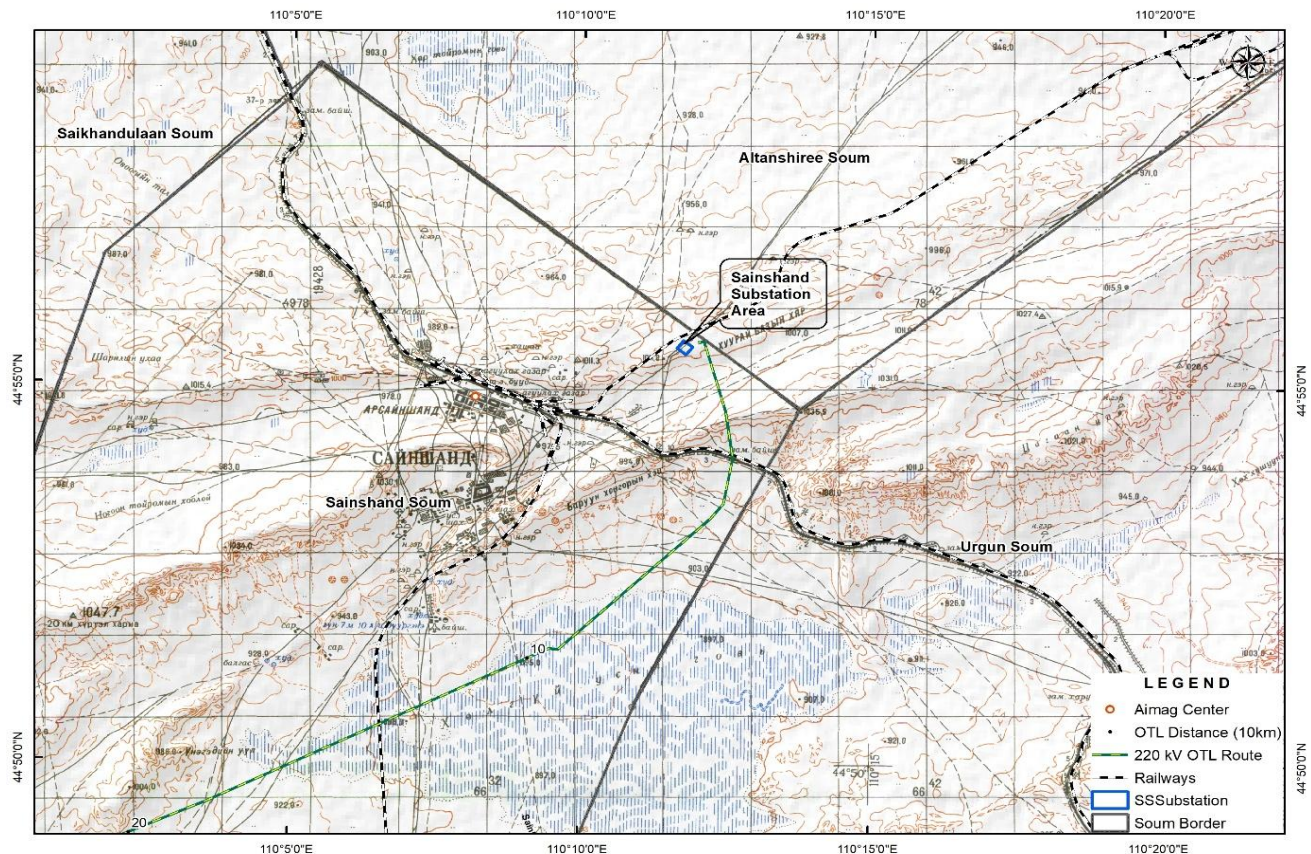


Figure 11-5 Topography, landscape and settlement surrounding the north-eastern extents of the Project (shown in green).

- 11.4.7 To the west of the proposed Sainshand substation site lies Khiimoriin Ovoo (see **Plate 11-1**), a sacred site to local herders and horse trainers, and the gentle valley to its south (named Ulaan Tolgoi) is regularly used for Sainshand soum's traditional racehorse competitions and for parts of the Dornogovi aimag regional Naadam sports festival.



Plate 11-1 View Looking East Toward Khiimoriin Ovoo (with wind farm on the right hand of the horizon)



Plate 11-2 Drone view of the planned Sainshand Substation area – with the settlement of Sainshand in the distance



Plate 11-3 Surface level view from the planned Sainshand Substation area towards Sainshand, in the distance

- 11.4.8 From the site of the planned Sainshand substation, the proposed OHTL heads south into the Ulaan tolgoi valley and up to the next ridge (at a height of approximately 1,035m) before descending and crossing the Trans-Mongolian Railway (some of which is sited on a raised embankment through the landscape).
- 11.4.9 The OHTL then arcs clockwise around the south-east edge of the settlement of Sainshand (remaining c.4.4km away from its built-up edge) before crossing the Sainshand – Zamiin-Uud highway and the small scale overhead power lines in this area, before then aligning itself in a west-south-westerly direction.



Plate 11-4 Drone view looking northeast at the location where the proposed OHTL crosses over the Sainshand-Zamiin-Uud road and Trans-Mongolian railway (partially sited on a raised embankment), at approximately km 5 from its start at the planned Sainshand Substation, with the solar and wind farms in the mid-ground / distance.

11.4.10 The route of the proposed OHTL next crosses the Khulgui usnii govi semi-wetland area (at approximately km 10 from its start), the Sainshand – Khamariin Khiid and Sainshand - Zuunbayan roads and the railway line (also running south to Zuunbayan) – all at about 900m above sea level. This area appears predominantly uninhabited apart from possible seasonal camps such as that at Enkujn (latitude 44.852350, longitude 110.13490) which is approximately 150m south of the proposed OHTL, and another 1.7km to the south (latitude 44.84800, longitude 110.14741).



Plate 11-5 Drone view looking north-west at the location where the proposed OHTL crosses over the Sainshand – Zuunbayan road, at approximately km 11, with the Khulgui usnii govi semi-wetland area and Enkujn seasonal camp in the mid ground.

- 11.4.11 Between km 17-35, the proposed OHTL enters the remote and uninhabited Khaalyn Uul valley (rising approximate by 920-1,060m from east to west). The valley is closely surrounding by a number of individual low landforms and ridges – containing generally domed sand topped hills (reaching between 960-1,040m to the north) and eroded rocky outcrops reaching the same height to the south. The landforms to the south include the sacred site of Khan bayanzurkh mountain (latitude 44.694109, Longitude 110.04488) 13km to south east of the nearest point of the OHTL.



Plate 11-6 Drone view looking south-west at approximately km 13 along the proposed OHTL route, where it crosses the Sainshand-Zuunbayan railway (with existing overhead powerlines either side), with the Haalga and Khan bayanzurkh mountains in the distance

- 11.4.12 At approximately 28km from the start, the proposed OHTL turns to a more south-westerly direction before cresting a small ridge (at approximately 1,070m above sea level) and entering a remote and uninhabited wide valley area, dissected by seasonal streams, named Hoynor modnii hundi, but already containing a line of overhead electricity transmission poles and towers.



Plate 11-7 Drone view looking south-west at approximately km 28 along the proposed OHTL route, where it changes slight direction, and with the existing electricity transmission overhead poles in the mid-ground and distance.

11.4.13 The Tsagaan Tsav ridge (which reaches a maximum height of approximately 1,060m) rises up by between 20-50m to the immediate south-east of the next part of the proposed OHTL. At approximately 52km from the start, the OHTL crosses the lower western tail of the ridge (along with an existing line of overhead electricity transmission poles and towers) near Suuriin Huren (approximately 1,015m), before turning southwards for 8km across onto a moderately raised large plateau. Halfway across the plateau, at km 59 the line of the proposed OHTL returns to a south-westerly alignment and follows the line of existing overhead electricity transmission poles and towers. Between km 65 and 70 it then descends from the plateau into a valley with a height of approximately 875m above sea level.



Plate 11-8 Drone view looking south-west at approximately km 52 along the proposed OHTL route, where it changes slight direction, with the lower western tail of the Tsagaan Tsav ridge, near Suuriin Hure, in the mid-ground, and with the existing electricity transmission overhead towers and poles in the foreground, mid-ground and distance



Plate 11-9 Drone view looking south-west at approximately km 59 along the proposed OHTL route, where it changes slight direction, and crosses the large, raised plateau, and with the existing overhead electricity transmission poles in the mid-ground and distance.

- 11.4.14 The proposed route of OHTL then tracks along a wide remote and uninhabited slightly undulating desert valley (except for occasional mine working areas) north of Uushiin Sand within the Ooshiin govi, and between the Javhlant and Uneged mountain ranges (to the north and south respectively), for a further approximate 85km. Through this section, the proposed OHTL route changes to a slightly more west-south-westerly direction at about km 94 and then to a more westerly alignment at about km 153.
- 11.4.15 At km 165 the OHTL reverts to a west-south-west alignment and runs closely parallel to the Sainshand – Tsogttsetsii railway line (some of which is constructed on a raised embankment), before turning generally south at km 189 towards the Tsagaan Suvarga mining area.



Plate 11-10 Drone view looking south-west at approximately km 78 along the proposed OHTL route, where it crosses the desert valley north of Uushiin Sand within the Ooshiin govi – showing a dry river bed in the foreground



Plate 11-11 Drone view looking south-west at approximately km 94 along the proposed OHTL route, where it changes direction slightly and continues to cross the desert valley north of Uushiin Sand within the Ooshiin gobi



Plate 11-12 Drone view looking south-west at approximately km 118 along the proposed OHTL route, as it continues to cross the desert valley north of Uushiin Sand within the Ooshiin gobi



Plate 11-13 Drone view looking south-west at approximately km 142 along the proposed OHTL route, where it crosses the Sainshand – Tsogttsetsii railway line – some of which is on a raised embankment

- 11.4.16 Between km 142-175 the proposed OHTL route traverses the remote and uninhabited desert valley north of Argalant Uul / Alag mountain, gradually ascending from 860 to 900m. Around km 153, it crosses Tsuurait River - a dry channel most of the year but seasonally wet during heavy summer rains. Between km 175-189, it passes through a further remote and uninhabited desert valley north of Tsagaan Suvarga mining area, with slightly elevated terrain (900–920m).



Plate 11-14 Drone view looking south-west at approximately km 153 along the proposed OHTL route, where it crosses the dry channel of the Tsuurait River



Plate 11-15-16 Drone view looking south-west at approximately km 164 along the proposed OHTL route, where it changes slight direction



Plate 11-17 Drone view looking south at approximately at km 182 along the proposed OTL route, where it crosses the improved road between Mandakh and Khatanbulag

11.4.17 At km 189 the proposed OHTL route turns sharply southwards toward the Tsagaan Suvarga mining area. The terrain descends slightly from 920 to 912m before the route crosses a series of low hills of eroded rocky outcrops (rising to between 950-975m) where the route passes by some of the built infrastructure outside of the mine (such as a line of electricity transmission overhead towers and poles, a runway, an 'improved road', and storage areas).



Plate 11-18 Drone view looking south at approximately at km 182 along the proposed OTL route towards the existing Tsagaan Suvarga substation, with the existing overhead electricity transmission poles in the foreground, mid-ground and distance.



Plate 11-19 Drone view looking north along the line of the proposed OHTL from the existing Tsagaan Suvarga substation, with the existing overhead electricity transmission towers and poles in the mid-ground and distance

11.4.18 The proposed OHTL route reaches its termination point at the existing Tsagaan Suvarga substation (approximately 960m above sea level), on the north-western edge of the wider built-up mining area.



Plate 11-20 The existing Tsagaan Suvarga substation and wider built-up mining area, with the existing overhead electricity transmission towers and poles (including the 22kV line from Khanbogd) in the foreground

11.4.19 The landscape surrounding the substation and mining area consists of low hills rising between 1,000 and 1,05m, dissected by narrow ravines eroded by seasonal streams. The relative elevation of the hills ranges from 20 to 60m.

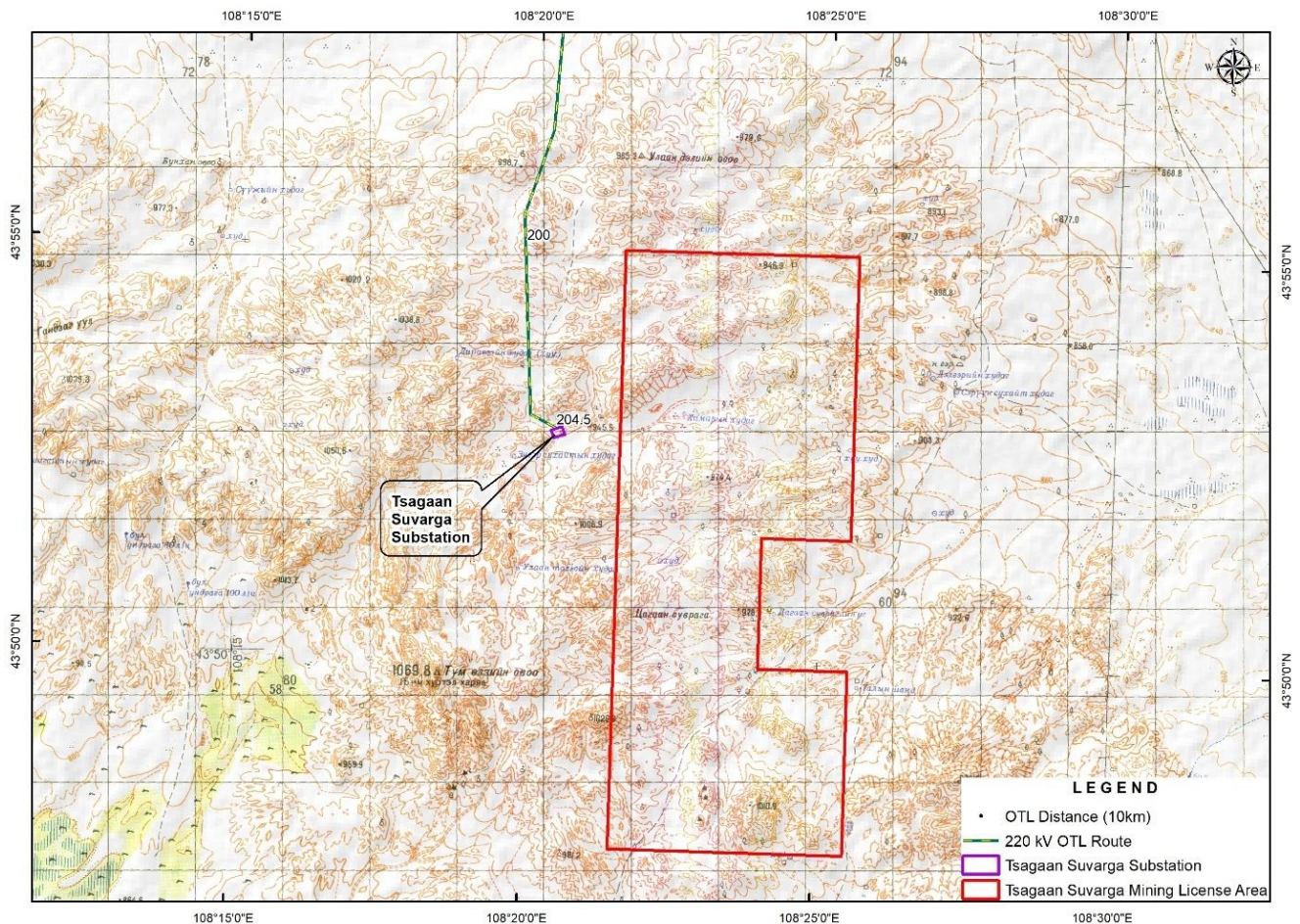


Figure 11-6 Topographic Overview of the Tsagaan Suvarga Substation Site and Its vicinity, with the Project shown in green

Landscape Character Receptor

11.4.20 No existing published landscape character assessments of the Study Area at a national, regional or local levels have been identified. Therefore, following the analysis of the Study Area, set out above, its valued characteristics that are susceptible to change brought about by the Project are:

- The relative remoteness and tranquillity of the semi-desert steppe landscape with very few artificial light sources, disturbed by occasional elements of built form;
- The openness and vastness of the semi-desert steppe landscape, comprising flat wide valleys set between gently sloping domed sand-topped hills and eroded rocky outcrops, disturbed only occasionally by built elements;
- Long panoramic views along open valleys and from hilltops, that are occasionally interrupted and/or disturbed by built development in the form of vertical linear energy transmission infrastructure, renewable energy development and settlements.

- Areas of occasional seasonal wetland and watercourse, which, despite the predominant arid climate, help shape the form of hillsides and some valley floors and which provide vital water sources for the sparse vegetation and wildlife.
- A few locations of local cultural and social significance i.e. Khiimoriin ovoo and the adjacent part of the Ulaan Tolgoi valley racehorse competition/regional sports area.

Visual Receptors

- 11.4.21 Following the analysis of the Study Area, set out above, the visual receptors who have the potential to experience significant effects as a result of the Project are described below:

Residential communities

- 11.4.22 It has been established that the Aol is sparsely populated, and large parts are wholly uninhabited. The only permanent settlement whose community can be considered sensitive to the Project is that of Sainshand.
- 11.4.23 Its community is likely to observe the Project from the eastern and southern edges of the settlement (where it would lie approximately 4.4km away) and from the crest of the ridges that lie at a south-west to north-east alignment through the town.
- 11.4.24 The other nearest permanent communities i.e. those in Dzüübayan and Mandakh are located approximately 26km and 44km away respectively from the Project, and so are scoped out of the assessment on the basis that the Project would be imperceptible from them.
- 11.4.25 Those residing in the Student Military Training Centre near Dzüübayan (22km from the Project) and visitors to the Orshuulgyn gazar Cemetery (17km from the Project) are also scoped out for the same reason.
- 11.4.26 Those living temporarily at the Tsagaan Suvarga mining area are also scoped out as their attention is generally focused on their work activities and because of the visual presence of existing built infrastructure, which is similar in nature to the Project.
- 11.4.27 There does not appear to be any permanent herders' camps within the Aol. Those residing in temporary/seasonal camps (such as the *gers* – see **Chapter 3: Project Description** and **Plate 11-5**) have not been scoped into the assessment given the temporary nature of impacts upon them.

Visitors to Recreational, Social and Cultural sites

- 11.4.28 It has already been identified that Khiimoriin Ovoo (see **Plate 11-1**) is a sacred site to local herders and horse trainers, and the adjacent part of the Ulaan Tolgoi valley, to its south, is regularly used for Sainshand soum's traditional racehorse competitions and as part of the regional Dornogovi aimag naadam sports festival. Visitors to these areas would observe the Project at a distance of between approximately 100-500m.

- 11.4.29 The crest of the northern-most of the ridges through Sainshand contains Tanktai ovoo (translated as 'tank pile', at Latitude 44.902937, Longitude 110.13482). This is a public area containing a memorial and monument of a tank used in the second world war. The location, as the name 'ovoo' suggests, is a valued location for cultural and religious significance where people visit. The public area of Tanktai ovoo has views over the landscape to the south of the town. The route of the proposed OHTL, from km 0 to approximately km 20, located between 4.75-15km away, would be seen from this location with the built-up area of Sainshand in the foreground and midground.
- 11.4.30 There would not be views of the Project from the centre of Sainshand, such as the well visited Shand Plaza public open space, as this lies between the ridges that run through the town.
- 11.4.31 A further sacred and popular worship destination for pilgrims and tourists (according to contemporary studies such as that carried out by the Japan International Cooperation Agency in 2021²⁵) is Khan bayanzurkh mountain or Khan Bayanzurkh Khaikhan (Latitude 44.694109, Longitude 110.04488) located approximately 34km south-west of Sainshand. From the stone pile ('ovoo') at its summit, where visitors congregate after climbing from the car-park at its base, two moderately small sections of the Project would be visible:
- that between km 0 and 10, to the north-east, approximately 20-28km away and
 - that between km 32 and 40, to the north-west, approximately 13km away.
- 11.4.32 All other views from the summit of Khan bayanzurkh mountain would be obscured by intervening areas of landform i.e. those in the same range of hills that border the south of the Khaalyn Uul valley. The visitor car park at the mountain's base, the stairs/paths leading to its summit and temples on its slopes are all located on the south side of the landform, so visitors here would not experience views to the Project.
- 11.4.33 There are not expected to be views to the Project from the other sacred and well visited locations nearby such as the Khamariin Khiid Monastery, Buddhist temple and 'World Energy Centre', the Byasalgayn aguin kheseg caves, or the tourist camps at the cross roads of the Sainshand - Zuunbayan Road and the Khamariin Monastery Road that provide accommodation for visitors to these sites. These are located between 20-25km from the Project, and are mostly separated from it by the Khan bayanzurkh mountain landform.
- 11.4.34 Likewise there are not expected to be any views to the Project from the sacred and well visited Ölögey Hiid / Ölgii khiid Buddhist temple/monastery, being located 31km to the south west of the Tsagaan Suvarga Mine, and separated from it by tall landforms.
- 11.4.35 Additionally, the Tsagaan Suvarga Mine area is located approximately 200km from the valued, and much visited site of Tsagaan Suvarga (White Stupa).

²⁵ Data Collection Survey on Sustainable Tourism Development in Mongolia, Japan International Cooperation Agency (2021), <https://openjicareport.jica.go.jp/pdf/12366928.pdf> (Accessed 16/07/2025)

Users of recreational routes

- 11.4.36 There are no known national, regional or local recreational trails through or surrounding the Aol.

Users of roads and railways

- 11.4.37 The only railway lines in the Aol that carry passengers (and therefore contains users whose visual amenity may be affected by the Project) are the Trans-Mongolian Railway, that heads north-west-south-east through Sainshand, and the branch lines from Sainshand to Zuunbayan and Sainshand to the Mongol Oil Refinery (see **Figure 11-5** and **Figure 11-7**). The third line (between Zuunbayan and Tavantolgoi / Tavan Tolgoi mine), which would be crossed twice by the Project's OHTL and would also run closely parallel to it for approximately 90km, serves freight traffic only.
- 11.4.38 **Figure 11-7** also show the key roads in the Aol. These are the Asian Highway 3, the Sainshand – Khamariin Khiid / Zuunbayan road and the improved roads between Mandakh and Tsagaan Suurga Mine and Khatanbulag. Other un-paved roads exist in the Aol between Sainshand and the Uneget mining area and between Sainshand and Khan bayanzurkh mountain.
- 11.4.39 Given that users of these railways and roads would move past the Project fleetingly, and because their attention is not wholly focused upon the landscape around them, the effects on their visual amenity has been scoped out of the assessment.

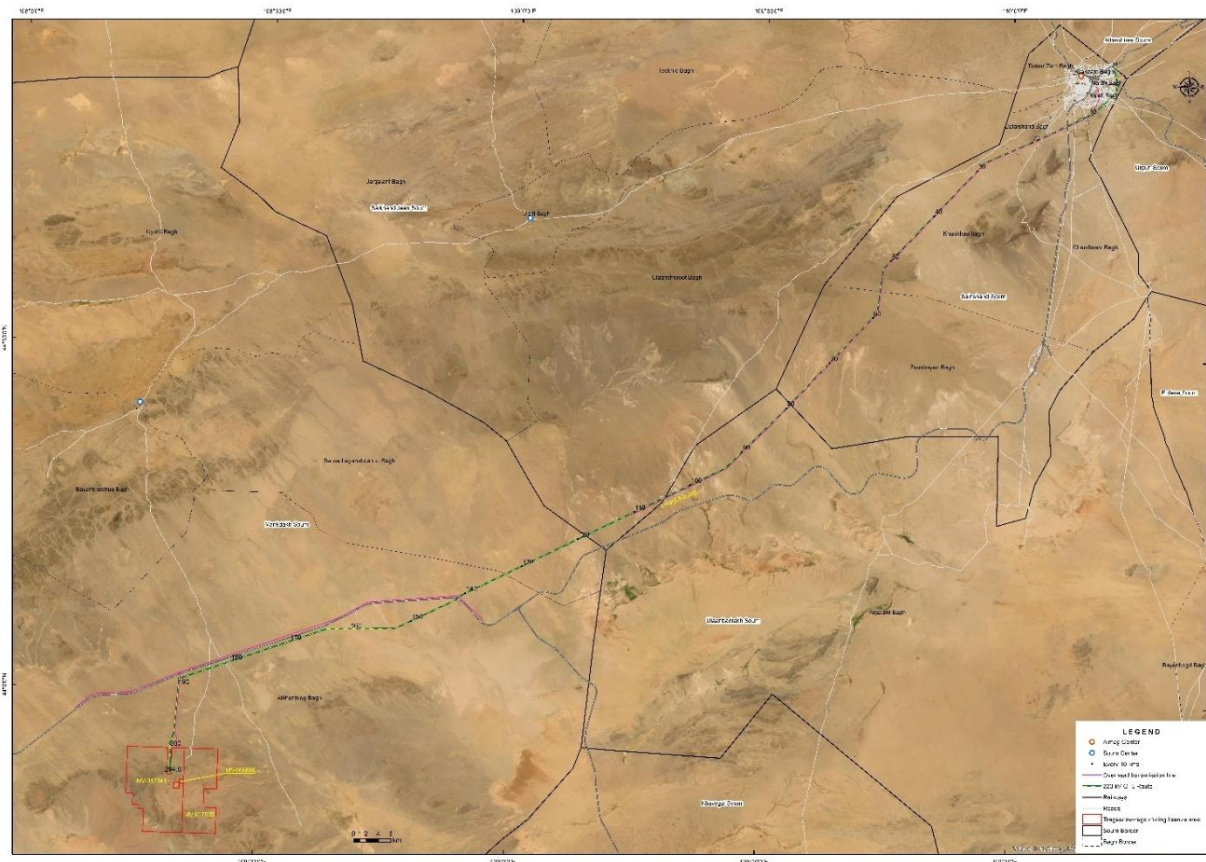


Figure 11-7 Location of existing roads, railways and overhead powerlines

11.4.41 **Figure 11-9** shows the location of the Arvan Naimyn Bogd mountain Natural Area in relation to the Project. It also shows the 'Local Protected Areas' crossed by and close to the proposed route of OHTL. These Locally Protected Areas are primarily designated for the ecological and cultural value. The visual amenity of visitors to places of social and cultural value within these have been identified and assessed for inclusion within the assessment. The only place where it is considered visual amenity may be significantly affected by the Project is the at the Khan bayanzurkh mountain, which is located in the Han Bayan Zurh Uul Local Protected Area).

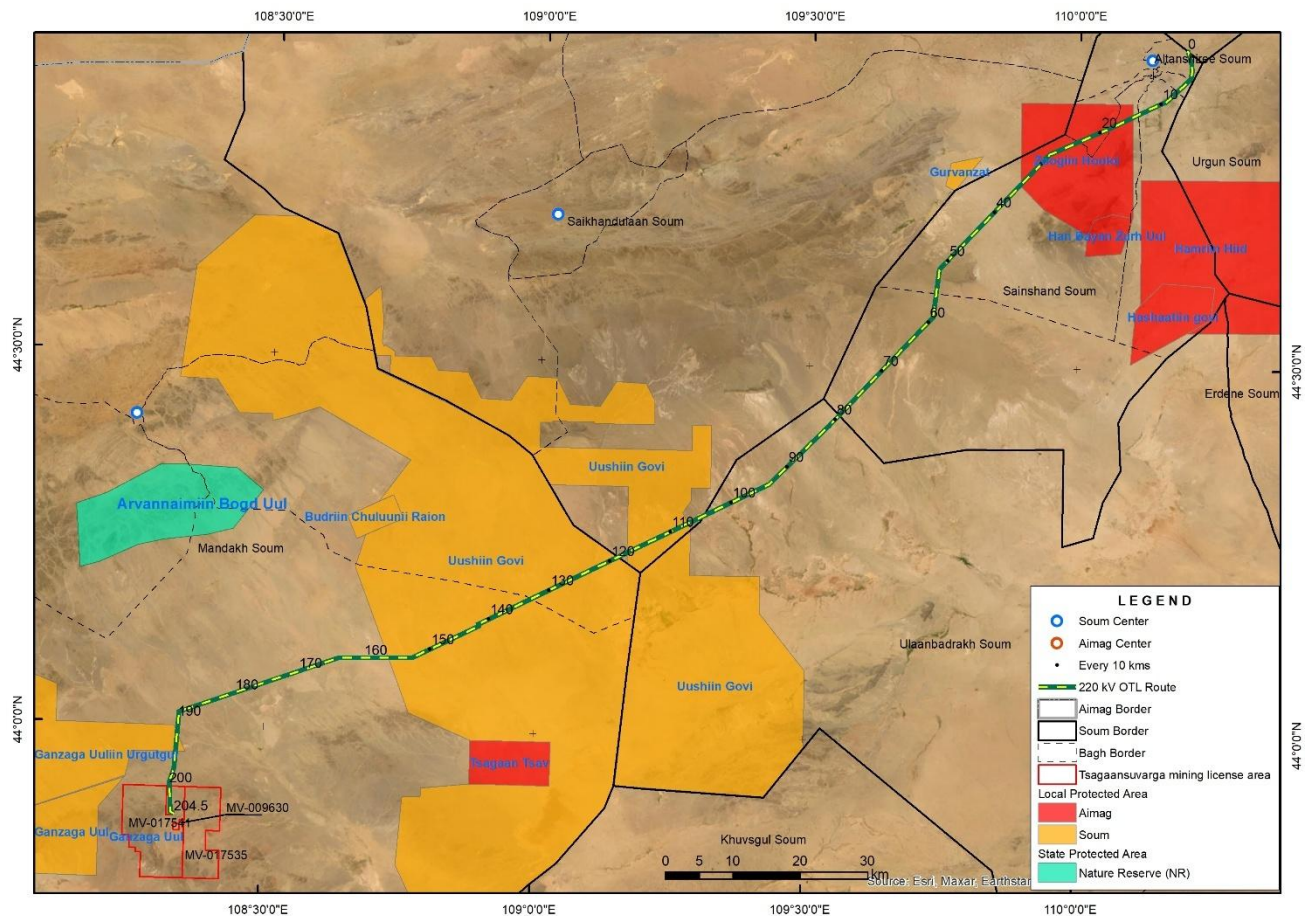


Figure 11-9 State and Local Protected Areas

11.5 Potential Impacts and Effects

11.5.1 Analysis of the Aol's baseline determined that the following receptors should be taken forward into the assessment:

Landscape Character Receptor:

- The overall landscape character of the Aol, comprising:
 - The relative remoteness and tranquillity of the semi-desert steppe landscape with very few artificial light sources, disturbed by occasional elements of built form;
 - The openness and vastness of the semi-desert steppe landscape, comprising flat wide valleys set between gently sloping domed sand-topped hills and eroded rocky outcrops, disturbed only occasionally by built elements;

- Long panoramic views along open valleys and from hilltops, that are occasionally interrupted and / or disturbed by built development in the form of vertical linear energy transmission infrastructure, renewable energy development and settlements.
- Areas of occasional seasonal wetland and watercourse, which, despite the predominant arid climate, help shape the form of hillsides and some valley floors and which provide vital water sources for the sparse vegetation and wildlife.
- A few locations of local/regional cultural and social significance i.e. Khiimoriin ovoo and the adjacent part of the Ulaan Tolgoi valley racehorse competition area.

Visual Amenity Receptors:

- The community of Sainshand (i.e. residents and visitors), including those using Tanktai ovoo.
- Visitors to Khan bayanzurkh mountain top.
- Users and visitors to Khiimoriin ovoo and the adjacent part of the Ulaan Tolgoi valley race horse competition area.

11.5.2 The following section describes the:

- sensitivity of each of these receptors;
- the likely magnitude of change on them that the construction and operation of the Project is anticipated to have; and
- the resultant effect on them all.

Receptor Sensitivity

Landscape Character Receptor

- 11.5.3 Neither the landscape character of the Aol, or its immediate surrounds, are protected by any landscape designation, in the way other parts of the Mongolian desert-steppe are. Added to this, the area only contains a few sites of valued landscape cultural/social importance (i.e. Khan bayanzurkh mountain, and Khiimoriin ovoo and the adjacent part of the Ulaan Tolgoi valley race horse competition area).
- 11.5.4 The key characteristics and qualities of the desert-steppe in this area that have been identified (i.e. the sense of remoteness and tranquillity, and its vastness and openness) are nonetheless valued attributes which are susceptible to the kind of changes brought about by new overhead electricity transmission lines in the form proposed by the Project.
- 11.5.5 The landscape of the Aol, however, has been able to absorb, without marked detriment to these characteristics and qualities, other linear development – such as railway lines, improved and paved roads. and other overhead electricity transmission lines and substations. Relative to areas/sites of mining and material processing (which can alter landform and create intensive areas of audible and visual activity), such linear development, if properly sited, can comparatively harmonise with this landscape.
- 11.5.6 The landscape of the Aol is considered sufficiently robust in scale, form and condition to integrate further linear development of this type.
- 11.5.7 Consequently the landscape character of the Aol is considered to have **medium/low sensitivity**.

Visual Receptors

The community of Sainshand

- 11.5.8 The views experienced by the community of Sainshand (i.e. residents and visitors) are considered to be predominantly of no greater than local value, i.e. of value to the aimag and soum residents only. Whilst the view from Tanktai ovoo has slightly greater social and cultural worth, it appears that most other views do not have any wider importance to the region or country.
- 11.5.9 The views that are experienced include: those along the built-up streets where urban form and the movement of people and traffic dominate; and those out from its edges and from the highpoints of the two ridges that Sainshand spans, across the wider landscape. Those that experience such outward views currently observe a mixture of low density urban-fringe development (industry and housing), a network of paved/improved roads, the railway, overhead electricity transmission lines and, to the east, the Gobi Solar Power Plant and Sainshand Wind Farm (as well as the approved, but yet un-built, 220kV powerlines and substation, at the very southern part of the Choir-Sainshand OHTL link), plus the open desert-steppe and the occasional eroded rocky-outcrop mountain on the horizon. Subsequently, the receptors have a relatively low visual susceptibility to new built-form, of the kind proposed, in most views.
- 11.5.10 Consequently the visual amenity of the community of Sainshand is considered to be of **medium/low sensitivity**.

Visitors to Khan bayanzurkh mountain top

- 11.5.11 The views experienced by visitors to Khan bayanzurkh mountain top are considered to have regional value. The views are part of the reason for visiting and the location appears to be well visited and promoted as both a destination for local people as much for tourists, and has clear cultural and social worth.
- 11.5.12 The views from the mountain top are long reaching in every direction. Apart from: the carpark (at the base of the mountain); the paths and steps used to access the site; and the temples and shrines on mountain slopes (all on the south side of the mountain), no other built development is perceptible. Taking into consideration, as well, the distance the proposed OHTL is from this location (i.e. 13km at its closest), the receptors here are reasoned to have a moderate/low visual susceptibility to new built-form, of the kind proposed.
- 11.5.13 Consequently the visual amenity of visitors to Khan bayanzurkh mountain top is considered to be of **medium/high sensitivity**.

Users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area

- 11.5.14 The views experienced by users and visitors to Khiimoriin ovoo and the adjacent part of the Ulaan Tolgoi valley are considered to have a mixture of local and regional value. Whilst the ovoo is not one that appears promoted as a destination for local people and tourists in the same way that Khan bayanzurkh mountain is, the adjacent part of the Ulaan Tolgoi valley appears to be used as a location

for regional Dornogovi aimag events (including horseraces and for parts of the annual naadam sports festival).

- 11.5.15 Additionally, it is considered that whilst views of their surrounds are considered relatively important to those visiting the Khiimoriin ovoo, they are not so important to those using the adjacent part of the Ulaan Tolgoi valley – i.e. horse races and sporting gatherings still occur despite the clear existing visual presence of the Gobi Solar Power Plant, Sainshand Wind Farm and the related existing overhead powerlines (including those of the approved, but yet un-built, 220kV powerlines and substation, at the very southern part of the Choir-Sainshand OHTL link).
- 11.5.16 Consequently the visual amenity of users and visitors of Khiimoriin ovoo and the adjacent part of the Ulaan Tolgoi valley is considered to be of **medium sensitivity**.

Magnitude of change

Construction Phase

- 11.5.17 The Project's construction phase would temporarily introduce:
- construction compounds and lay down areas, with some artificial lighting;
 - material stockpiles;
 - vehicle movement;
 - temporary earthworks (e.g. excavation for OHTL tower foundations, the creation of spoil mounds, and the re-grading of levels upon completion);
 - access/construction roads, with signage;
 - workers' accommodation camps, with some artificial lighting; and
 - erection of towers and poles and stringing of overhead lines.
- 11.5.18 The construction phase is expected to commence in 2026 and last approximately 24 months including mobilisation, enabling works, testing and commissioning.
- 11.5.19 Work is not expected to be present along the whole of the route throughout this period, but instead start and one end and pass along until the other end.
- 11.5.20 All construction-related elements (apart from the part constructed OHTL towers) would be removed upon completion of the phase, and affected areas would be largely reinstated to their original condition.

Landscape Character

- 11.5.21 Given its relative openness, the construction activity would become a new element of the Aol's landscape. Its presence (as well as the expected visual and audible activity emanating from it) would additionally disturb the relative remoteness and tranquillity of the Aol.
- 11.5.22 Whilst adverse in nature, these changes would: only occur to a limited part of the Aol at any one time; would be temporary; reversible; last for a short duration; and would occur in a landscape that already contains elements of occasional built form.



- 11.5.23 The characteristics of: long panoramic views along open valleys and from hilltops; and areas of occasional seasonal wetland and watercourse would largely remain unaffected.
- 11.5.24 The locations of regional/local cultural and social significance, i.e. Khiimoriin ovoo and the adjacent part of the Ulaan Tolgoi valley racehorse competition area, could avoid being directly harmed through considerate alignment of the OHTL and, therefore, its construction activity.
- 11.5.25 Given that harm would occur to only some the Aol's landscape characteristics (and that others would be largely unaffected), and that the changes would be temporary, reversible and short-term in nature, **the magnitude of change to the landscape character receptor during construction is considered to be Small and adverse.**

Visual Amenity

The community of Sainshand

- 11.5.26 Parts of the Project's construction activity would be visible to the community of Sainshand in views east, south and south-east from its edge, and from the publicly accessible areas of ridges through the town (such as at Tanktai ovoo). The Project's construction, however, would not be visible to all other parts of the community, including the majority of residential areas the town centre and Shand Plaza.
- 11.5.27 The activity would be located approximately 2km at its closest point from the edge of the town (i.e. between km 1 and 4 of the proposed OHTL). At this distance, and given intervening landform and existing infrastructure, receptors would not experience clear views to the construction activity, but instead would observe intermittent sights of it, particularly during the assembly of the towers. In addition, much of the activity would be seen through views of other existing energy infrastructure and backclothed by landform in the distance.
- 11.5.28 As such, it is considered that the Project would be perceptible in only a small part of receptors' overall visual experience, and would be relatively inconspicuous. In addition, the change would be temporary in nature, reversible, last for a short duration.
- 11.5.29 Consequently the magnitude of change to the visual amenity of the Sainshand community during construction is considered to be Small and adverse.

Visitors to Khan bayanzurkh mountain top

- 11.5.30 Parts of the Project's construction activity would be visible to the visitors to the Khan bayanzurkh mountain top in views north-west and north-east. The activity would be approximately 13km and 20-28km away respectively in these prospects. The Project's construction, however, would not be visible to visitors on the other publicly frequented parts of the mountain, such as the car park at the mountain's base, the stairs/paths leading to its summit and temples on its slopes, as these are all located on the opposite side of the landform from the Project.
- 11.5.31 At the distances it would be observed, the construction activity would be only just discernible, and would only form a very small part of receptors' overall visual experience. In addition, the change would be temporary in nature, reversible, last for a short duration. On this basis the Project is anticipated to



have minimal consequences on the character and quality of the existing views.

- 11.5.32 Consequently the magnitude of change to the visual amenity of visitors to Khan bayanzurkh mountain top during construction is considered to be Negligible and adverse.

Users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area

- 11.5.33 With the proposed line of the Project's OHTL tracking between the Khiimoriin ovoo and Ulaan Tolgoi valley race horse competition area, and the general openness of the landscape here, construction activity would be clearly visible at close quarters to users of the locations.
- 11.5.34 The construction activity would not however impact all of the available views from these areas, and when it is visible, much of the activity would be seen against a backcloth of other existing energy infrastructure and occasional landform. In addition, the change would be temporary in nature, reversible, last for a short duration.
- 11.5.35 Consequently the magnitude of change to the visual amenity of users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area during construction is considered to be Medium and adverse.

Operation Phase

- 11.5.36 The Project's operational phase would introduce:
- 690no. OHTL towers, varying in height between 36-45m and located approximately 280m apart across a total Project length of 204km from the planned Sainshand substation (yet to be constructed by the approved Choir-Sainshand OHTL link) to the Tsagaan Suvarga mine substation.
 - Periodic refurbishment of the towers and overhead lines in order to maintain the network, including replacement of the insulation of sections of the overhead line; treatment of rust and re-painting of tower components; inspection and maintenance of switchgears and protection systems, etc.

Landscape Character

- 11.5.37 Given its relative openness, the proposed OHTL would become a new permanent, but static, element of some parts of the Aol's landscape and impinge upon its relative remoteness and tranquillity.
- 11.5.38 In many other parts, where there is existing energy infrastructure (such as east of Sainshand, alongside the Sainshand - Zuunbayan and the Zuunbayan Tavantolgoi/Tavan Tolgoi mine railways, and surrounding the Tsagaan Suvarga mine) and linear infrastructure (such as: the Trans-Mongolian Railway; the railway lines from Sainshand to Zuunbayan, Sainshand to the Mongol Oil Refinery and between Zuunbayan and Tavantolgoi / Tavan Tolgoi mine; Asian Highway 3; Sainshand – Khamariin Khiid / Zuunbayan road; and the improved road between Mandakh and Khatanbulag) the change brought about by the Project's presence would be much less.
- 11.5.39 Due to the large scale and simplicity of the receiving landscape and the relative slenderness of the OHTL and its towers, the characteristic of long panoramic views along open valleys and from hilltops

would largely remain unaffected. Additionally the areas of occasional seasonal wetland and watercourse would remain intact.

- 11.5.40 Added to this, the locations of regional/local cultural and social significance, i.e. Khiimoriin ovoo and the adjacent part of the Ulaan Tolgoi valley racehorse competition area, could avoid being directly harmed through considerate alignment of the OHTL and placement of its towers.
- 11.5.41 Given the large-scale and simple nature of this landscape, its resultant demonstrable ability to accept well-planned linear infrastructure (i.e. existing railways, roads and renewable energy schemes), and that most noticeable change would only occur to moderately small parts of the AoI, the **magnitude of change to the landscape character receptor during its operational phase is considered to be Medium and adverse**.

Visual Amenity

The community of Sainshand

- 11.5.42 Parts of the proposed OHTL would be permanently visible to the community of Sainshand in views east, south and south-east from its edge, and from the publicly accessible areas of ridges through the town (such as at Tanktai ovoo). They would not be visible, however, to all other parts of the community, including the majority of residential areas, the town centre and Shand Plaza.
- 11.5.43 The OHTL would be located approximately 2km at its closest point from the edge of the town (i.e. between km 1 and 4 from the start of the OHTL). At this distance, and given intervening landform and existing infrastructure, and the relative slenderness and transparency of the proposed metal lattice structures, receptors would not experience clear views to it, but instead observe intermittent sights, and mainly to the top of the towers only. In addition, much of the visible OHTL would be seen through views of other existing energy infrastructure and against a backcloth of landform in the distance.
- 11.5.44 As such, it is considered that the Project would be perceptible in only a small part of receptors' overall visual experience, and would be relatively inconspicuous.
- 11.5.45 Consequently the magnitude of change to the visual amenity of the Sainshand community during its operational phase is considered to be Small and adverse.

Visitors to Khan bayanzurkh mountain top

- 11.5.46 Parts of the proposed OHTL would be permanently visible to the visitors to the Khan bayanzurkh mountain top in views north-west and north-east. They would, however, be approximately 13km and 20-28km away respectively in these prospects and would not at all be visible to visitors on the other publicly frequented parts of the mountain such, as the car park at the mountain's base, the stairs/paths leading to its summit and temples on its slopes, as these are all located on the opposite side of the landform from the Project.
- 11.5.47 At the distances it would be observed, and given the relative slenderness and transparency of the proposed metal lattice structures, the OHTL would be only just discernible, and would only form a very small part of receptors' overall visual experience. On this basis the Project is anticipated to have

minimal consequences on the character and quality of the existing views.

- 11.5.48 Consequently the magnitude of change to the visual amenity of visitors to Khan bayanzurkh mountain top during its operational phase is considered to be Negligible and adverse.

Users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area

- 11.5.49 With the proposed line of the Project's tracking between the Khiimoriin ovoo and Ulaan Tolgoi valley race horse competition area, and the general openness of the landscape here, the proposed OHTL would be clearly visible at close quarters to users of the locations.
- 11.5.50 The Project would not however impact all of the available views from these areas, and when it is visible, most of the structures would be seen against a backcloth of other existing energy infrastructure (including other OHTLs) and occasional landform.
- 11.5.51 Consequently the magnitude of change to the visual amenity of users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area during the Project's operational phase is considered to be Medium/small and adverse.

11.6 Mitigation and Enhancement Measures

- 11.6.1 The Project's current design features a number of embedded mitigation measures to avoid and minimise the adverse impacts to landscape and visual receptors that have been identified.
- 11.6.2 These measures are mostly based upon the guidance set out in documents such as the Holford Rules published by the UK's National Grid (and others such as the Australian Energy Regulator and the United States's Federal Energy Regulatory Commission) which predominantly focus on minimising visual impact, avoiding sensitive landscapes, and considering the overall landscape context, including the presence of other infrastructure.
- 11.6.3 The aspects of these guidance documents that have been applied to the current design of the Project include:
- avoidance the region's protected areas (e.g. National Parks and Natural Areas) and other places of high amenity value (such as settlements and most areas of recognised cultural and social worth), and routing through landscapes that are the least inhabited;
 - preventing the proposed OHTL becoming a prominent feature on skylines by avoiding routing along ridgelines and by traversing slopes obliquely;
 - routing sufficiently close to landforms (such as the Tsagaan Tsav ridge, the Javhlant and Uneged mountain ranges, and those either side of the Khaalyn Uul valley) to benefit from their ability to backcloth the proposed OHTL in long views of the project;
 - choosing a relatively direct route between the Projects beginning and end points, so minimising the overall length of proposed OHTL and the number of towers, avoiding visually adverse sharp changes in direction along its length, and reducing the number of 'angle towers' (which are often larger than others); and

- aligning with other linear infrastructure were possible (e.g. the Zuunbayan and Tavantolgoi / Tavan Tolgoi mine for approximately 90km of the overall 204km).

11.6.4 It is expected that the subsequent stages of design would include the following further mitigation measures:

Construction Phase:

- programming the most intense parts of the construction activity that occurs near to areas of identified cultural and social value (i.e. Khiimoriin ovoo and the adjacent part of the Ulaan Tolgoi valley that is used for horseraces and parts of the annual naadam sports festival) to avoid those times of year that they are most visited/considered important;
- considerate placement of particularly visually incongruous elements of the construction, i.e. compounds, stockpiles of materials, worker accommodation areas, so that they cover the minimum area required and are located away from the areas used by sensitive receptors (i.e. Khiimoriin ovoo and residential areas in Sainshand);
- restrictions that limit the use of lighting to the minimum quantity and illumination necessary to ensure safety, and so to minimise light spillage, sky glow and to minimise glare to surrounding sensitive receptors; and
- re-contouring of disturbed land to original formations, where appropriate.

Operational Phase:

- detailed routing of the proposed OHTL that avoids the creation of 'wirescape' impacts where it crosses existing overhead lines; and
- micro-siting of proposed towers away from the locations where sensitive receptors reside / visit (i.e. residential areas in Sainshand, Khiimoriin ovoo and the adjacent part of the Ulaan Tolgoi valley that is used for horseraces and parts of the annual naadam sports festival).

11.7 Residual Effects

11.7.1 Following the identification of the receptors' sensitivity and the consideration of the magnitude of change the Project would have upon them, and taking into account the embedded and planned mitigation measures outlined above, the effect on each receptor can be determined using **Diagram 11-1** and professional judgement.

Construction Phase

Landscape Character

- 11.7.2 The **sensitivity** of the Aol's landscape character was identified as '**medium-low**' on the basis that it was sufficiently robust in scale, form and condition to integrate further linear development of the type proposed, without marked detriment to its characteristics and qualities.
- 11.7.3 The **magnitude of change** was considered to be **adverse**, but '**small**' on the basis that harm would occur to only some the Aol's landscape characteristics (and that others would be largely unaffected), and that the change would be temporary, reversible and short-term in nature.
- 11.7.4 Consequently, the Project is judged to have a **minor adverse significance of effect** on the landscape

character of the Aol during construction.

Visual Amenity

The community of Sainshand

- 11.7.5 The **sensitivity** of the community of Sainshand was identified as '**medium/low**' on the basis that receptors have a relatively low visual susceptibility to new built-form of the kind proposed in most views, and that there were now views of more than local value.
- 11.7.6 The **magnitude of change** was considered to be **adverse**, but '**small**' on the basis that that the Project would be perceptible in only a small part of receptors' overall visual experience and relatively inconspicuous. In addition, the change would be temporary in nature, reversible, last for a short duration.
- 11.7.7 Consequently, the Project is judged to have a **minor adverse significance of effect** on the community of Sainshand during construction.

Visitors to Khan bayanzurkh mountain top

- 11.7.8 The **sensitivity** of visitors to Khan bayanzurkh mountain top was identified as '**medium/high**' on the basis that the location was regionally valued, well frequented, but a considerable distance from the Aol.
- 11.7.9 The **magnitude of change** was considered to be **adverse**, but '**negligible**' on the basis that, at the distances it would be observed, the construction activity would be only just discernible, and would only form a very small part of receptors' overall visual experience. In addition, the change would be temporary in nature, reversible, last for a short duration.
- 11.7.10 Consequently, the Project is judged to have a **minor adverse significance of effect** on the Visitors to Khan bayanzurkh mountain top during construction.

Users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area

- 11.7.11 The **sensitivity** of users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area was identified as '**medium**' on the basis that the location was in part locally and regionally valued, but that not all receptors were there for the appreciation of the landscape, and that all receptors had visual familiarity with considerable existing energy infrastructure.
- 11.7.12 The **magnitude of change** was considered to be **adverse**, and '**medium**' on the basis that the construction activity would not impact all of the available views and when it is visible, much would be seen against a backcloth of other existing energy infrastructure and occasional landform. In addition, the change would be temporary in nature, reversible, last for a short duration.
- 11.7.13 Consequently the Project is judged to have a medium adverse significance of effect on the users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area during construction. This is considered to be 'non-significant' on the basis that the most intense parts

of the proposed construction activity, that occurs near to these locations, can be programmed to avoid those times of year that they are most visited/considered important by receptors.

Operation Phase

Landscape Character

- 11.7.14 The **sensitivity** of the Aol's landscape character was identified as '**medium-low**' on the basis that it was sufficiently robust in scale, form and condition to integrate further linear development of the type proposed, without marked detriment to its characteristics and qualities.
- 11.7.15 The **magnitude of change** was considered to be **adverse**, and '**medium/low**' given the large-scale and simple nature of this landscape, its resultant demonstrable ability to accept well-planned linear infrastructure, and that most noticeable change would only occur to a moderately small part of the Aol.
- 11.7.16 Consequently, the Project is judged to have a **minor/moderate adverse significance of effect** on the landscape character of the Aol during operation.
- 11.7.17 The assessment shows that there would, unavoidably, be an adverse impact resulting from the introduction of over 200km of overhead transmission line and almost 700 steel lattice towers to an area of intrinsic remoteness and tranquillity. The receiving landscape, however, has been found to be sufficiently robust in scale, form and condition to allow the integration of the construction and operation of the Project without marked detriment to its characteristics and qualities, such that the effect would be at worst, minor/moderate, adverse and not-significant.
- 11.7.18 The mitigation measures embedded into the routing of the OHTL have meant avoidance of the region's protected areas (e.g. the Arvan Naimyn Bogd mountain Natural Area) and other places of high amenity value such as settlements (e.g. Sainshand, Zuunbayan and Mankdakh) and areas of cultural and social value (e.g. Khamariin Khiid Monastery and its associated areas).
- 11.7.19 They have also prevented the OHTL becoming a prominent feature on skylines by avoiding routing along ridgelines and by traversing slopes obliquely. Additionally other landforms (such as the Tsagaan Tsav ridge, the Javhlant and Uneged mountain ranges, and those either side of the Khaalyn Uul valley) have been used to backcloth the proposed OHTL in long views of the Project.
- 11.7.20 By choosing a relatively direct route between the site of the planned Sainshand substation and the existing Tsagaan Suvarga mine substation, the Project positively avoids visually adverse sharp changes in direction, and so helpfully minimises the overall length of OHTL and the number of towers. Finally, by aligning the OHTL with other linear infrastructure, where possible, (e.g. the railway between Zuunbayan and Tavantolgoi/Tavan Tolgoi mine for approximately 90km of the overall 204km) the breadth of impact is contained and the Project can comparatively harmonise with this landscape.

Visual Amenity

The community of Sainshand

- 11.7.21 The **sensitivity** of the community of Sainshand was identified as '**medium/low**' on the basis that receptors have a relatively low visual susceptibility to new built-form, of the kind proposed, in most views.
- 11.7.22 The **magnitude of change** was considered to be **adverse**, but '**small**' on the basis that that the Project would be perceptible in only a small part of receptors' overall visual experience and relatively inconspicuous.
- 11.7.23 Consequently, the Project is judged to have a **minor adverse significance of effect** on the community of Sainshand during operation.

Visitors to Khan bayanzurkh mountain top

- 11.7.24 The **sensitivity** of visitors to Khan bayanzurkh mountain top was identified as '**medium/high**' on the basis that the location was regionally valued, well frequented but a considerable distance from the Aol.
- 11.7.25 The **magnitude of change** was considered to be **adverse**, but '**negligible**' on the basis that, at the distances it would be observed, the relative slenderness and transparency of the proposed metal lattice structures would make the OHTL only just discernible, and they would only form a very small part of receptors' overall visual experience.
- 11.7.26 Consequently, the Project is judged to have a **minor adverse significance of effect** on the Visitors to Khan bayanzurkh mountain top during operation.

Users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area

- 11.7.27 The **sensitivity** of users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area was identified as '**medium**' on the basis that the location was in part locally and regionally valued, but that not all receptors were there for the appreciation of the landscape, and that all receptors had visual familiarity with considerable existing energy infrastructure.
- 11.7.28 The **magnitude of change** was considered to be **adverse**, and '**medium**' on the basis that the Project would not impact all of the available views from these areas, and when it is visible, most of the structures would be seen against a backcloth of other existing energy infrastructure (including other OHTL) and occasional landform.
- 11.7.29 Consequently the Project is judged to have a **medium adverse significance of effect** on the users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area during operation. This is considered to be 'non-significant' on the basis that the placement of towers through this area can be micro-sited to avoid direct impact upon the key views from these areas and also avoid intense 'wirescape' occurring with other existing energy infrastructure.



- 11.7.30 The assessment above indicates that there would, inescapably, be an adverse impact on the visual amenity of some of the area's inhabitants and visitors. It was identified, however, that this would generally be localised to a few locations around the edge of Sainshand and from the Khan bayanzurkh mountain top.
- 11.7.31 Most receptors' views, however, already contain a degree of energy infrastructure (i.e. overhead transmission lines, wind and solar farms) and the Project would be positioned far enough away from it for it not to become a dominating or overwhelming part of their visual experience. Where the visual effect was found to be at its greatest – i.e. in views experienced by users and visitors to Khiimoriin ovoo and the adjacent part of Ulaan Tolgoi valley race horse competition area, the proposed mitigation (i.e. the micro-siting of towers to avoid direct effects) limits this harm to acceptable levels.

12 Soils and Natural Hazards

12.1 Introduction

- 12.1.1 This chapter presents details on the legislation, policy, soil baseline information, assessment methodology, and likely significant effects of the Project on soils and natural hazards; and presents mitigation measures for significant adverse effects.
- 12.1.2 In this chapter, the term ‘soils’ refers to soils (and land) supporting agriculture and natural habitats. It excludes the materials associated with dirt roads within the Project route as the original material used for the construction of these is unknown and there is a risk these materials may be contaminated or comprise made ground.

12.2 Legislative Framework, Policy and Guidance

- 12.2.1 **Table 12-1** summarises the legislation, policy and guidance of relevance to this assessment.

Table 12-1 Summary of Legislation, Policy and Guidance relevant to Soils and Natural Hazards

Level	Key legislation / policy / guidance
International	<p>The EU Soil Strategy for 2030²⁶ sets out a framework for measures to protect and restore soils and ensure that they are used sustainably. It sets a vision and objectives to achieve healthy soils by 2050, with concrete actions by 2030.</p> <p>The Environmental Impact Assessment Directive (Directive 2011/92/EU as amended by 2014/52/EU)²⁷ sets out the following requirements for soils in Environmental Impact Assessment (EIA) reports for the Developer under Article 5 and Annex IV of the EIA Directive.</p> <ul style="list-style-type: none"> • “Box 4: Directive 2011/92/EU as amended by Directive 2014/52/EU <ul style="list-style-type: none"> ○ The information to be provided by the developer shall include at least [...] a description of the project comprising information on the site, design, size and other relevant features of the project..... ○ an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operation phases. • Box 5: In practice – 2014 amendments to the Project description. <ul style="list-style-type: none"> ○ The list of expected residue and emission estimates is no longer exhaustive, and subsoil has been added as type of pollution; • Box 8: Types of data to be considered for the Baseline scenario

²⁶ European Commission, Brussels, 17.11.2021 COM (2021) 699 final. EU Soil Strategy for 2030, Reaping the benefits of healthy soils for people, food, nature and climate.

²⁷ European Commission: Directorate-General for Environment, COWI, Milieu, McGuinn, J., Lukacova, Z. et al., *Environmental impact assessment of projects – Guidance on the preparation of the environmental impact assessment report (Directive 2011/92/EU as amended by 2014/52/EU)*, Publications Office, 2017, <https://data.europa.eu/doi/10.2779/41362> [Accessed 21/07/25]

Level	Key legislation / policy / guidance
	<ul style="list-style-type: none"> ○ Physical: topography, geology, soil types and quality, surface, ground and coastal water quality, pollution levels, meteorological conditions, climate trends, etc. • Box 12: Directive 2011/92/EU as amended by Directive 2014/52/EU <ul style="list-style-type: none"> ○ The list of expected residue and emission estimates is no longer exhaustive, and subsoil has been added as type of pollution; • Article 3 <ul style="list-style-type: none"> ○ The environmental impact assessment shall identify, describe, and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors: ... (c) land, soil, water, air and climate; <p>Box 21: Directive 2011/92/EU as amended by Directive 2014/52/EU</p> <ul style="list-style-type: none"> • Annex IV point 1(c) • Description of the project, including in particular: <ul style="list-style-type: none"> (c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used; • Annex IV point 5(b) <ul style="list-style-type: none"> A description of the likely significant effects of the project on the environment resulting from, inter alia: (b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;". <p>PR 3: Resource Efficiency and Pollution Prevention and Control sets out the following requirements:</p> <p><i>"The environmental and social assessment process will identify opportunities and alternatives for resource efficiency relating to the project in accordance with GIP. In doing so, the client will adopt technically and financially feasible and cost effective measures for minimising its consumption and improving efficiency in its use of energy, water and other resources and material inputs as well as for recovering, reusing or repurposing waste materials in implementing the project.</i></p> <p><i>The client will integrate resource efficiency measures and the principles of cleaner production into product design and production processes with the objective of conserving raw materials, energy and water and avoiding and reducing the generation of waste materials."</i></p> <p>PR 3 also indicates that the pollution prevention includes soils (Footnote 31).</p>
National Law	<p>Law of Soil Protection and Prevention from Desertification - establishes regulations on soil protection from degradation, soils restoration, and desertification prevention.</p> <p>Law on Land - governs the possession and use of land.</p> <p>Environmental Protection Law - regulates the protection and proper use of natural resources including soils, and the restoration of available resources.</p> <p>Environmental Impact Assessment Law - sets out the process and requirement on EIA.</p>
National Standards	<p>MNS 6522:2015. Overhead transmission lines for 35-750kV. General requirements for construction.</p>

Level	Key legislation / policy / guidance
	<p>MNS 3236:1989. Technical Requirements for Reinforced Concrete Structures of Outdoor Distribution Facilities with a Capacity of 35-500 kW.</p> <p>MNS IEC TS 61463:2022. Bushings-Seismic qualification.</p> <p>MNS IEC 62305-4:2022. Protection against lightning. Part 4: Electrical and electronic systems within structures (IDT).</p> <p>MNS IEC 62305-2:2023. Protection against lightning – Part 2: Risk management.</p> <p>Regulations on the Installation of Electrical Engineering Facilities under Annex 2 to Ministerial Order No. 5 of 2014 issued by the Minister of Energy.</p> <p>Safety Regulations for the Installation of Electrical Engineering Facilities under Annex to Ministerial Order No. A/124 dated June 2, 2025, issued by the Minister of Energy.</p> <p>Technological Work Card for Measuring Grounding Resistance of Overhead Transmission Lines and Substations under Annex 3 to Ministerial Order No. A/194 of 2022 issued by the Minister of Energy.</p>

12.3 Assessment Methodology

Scope

- 12.3.1 The soil and natural hazards assessment covers the approach to soil and natural hazards data collection, the establishment of assessment criteria, the presentation of soil and natural hazards baseline information, and the identification of likely significant effects and soil/natural hazard mitigation measures associated with the construction and operation of the Project.

Study Area

- 12.3.2 The Study Area for soils comprises the Project Footprint, as defined in **Chapter 5: Approach to the ESIA**. There is no additional Area of Influence defined since there will be no impact on soils beyond the physical extent of the proposed works.
- 12.3.3 The proposed route is approximately 204km long. Infrastructure along that route comprises 690 towers holding overhead transmission lines. There are anticipated to be five types of towers used in the project, using different types to enable changes in direction and elevation (further details as described in **Chapter 2: Project Description**).
- 12.3.4 The substations at each end of the OHTL do not form part of the soil assessment, with one being built as part of a separate project (Sainshand) and one already existing (Tsagaan Suvarga).
- 12.3.5 Natural hazards (such as flooding and dust storms) may originate outside the Project Footprint and as such the Study Area for natural hazards covers the Dornogovi aimag (province).

Methodology

Construction stage

- 12.3.6 The soil baseline information was established through a desk-based study and field surveys. A review of available national soil maps was conducted to identify the major soil types along the project route and to determine locations for a reconnaissance soil survey.
- 12.3.7 A detailed field survey was conducted at 12 locations within the major soil types along the Project route, including one location at each substation and ten along the transmission line route. Photographs were taken, descriptions made, and samples were collected and analysed to obtain information including:
- land use and vegetation cover;
 - soil profile descriptions; and
 - laboratory analysis for chemical attributes including pH, available nutrient concentrations, organic matter content and the presence of heavy metals.
- 12.3.8 The natural hazards baseline information was established through a desk-based study, including a review of Ministry data and online articles. Whilst mainly an engineering issue, the assessment covers a broad review of potential impacts of natural hazards on the Project; the potential impact of the Project on climate is considered in **Chapter 18: Climate**. The potential impact in relation to floods is addressed in **Chapter 13: Water Environment**.

Operational Stage

- 12.3.9 There may be potential for pollution of soils from rust treatment and painting of towers; and for hydrocarbons and oils to enter soil at substation sites; however, these impacts are not considered likely to be significant and were scoped out of the assessment at the scoping stage. No significant operational impacts on soils are anticipated as a direct result of the Project; therefore, no assessment methodology for the operational stage is defined.
- 12.3.10 As above for construction, the assessment related to natural hazards covers a broad review of potential operational impacts of natural hazards on the Project; the potential impact of the Project on climate is considered in **Chapter 18: Climate**. The potential impact in relation to floods is addressed in **Chapter 13: Water Environment**.

Sensitive Receptors

- 12.3.11 The soil receptor identified with respect to this Project comprises the soils (and land) supporting agriculture and natural habitats. Further detail about baseline soil conditions is provided in **Section 12.5 'Baseline Conditions'**.
- 12.3.12 Sensitive receptors in relation to natural hazards include the Project itself, as well as construction and O&M staff; and any knock-on effects for local communities or herders that could potentially be affected by exacerbated natural hazards as a result of the Project.

Significance Criteria

Construction stage

- 12.3.13 The criteria used to determine value (sensitivity), magnitude of impact, and significance of effects in assessing the project's impact on soils during construction is as presented in **Chapter 5, Section 8** 'Approach to Impact Assessment'.
- 12.3.14 As mentioned above, a broader discussion has been applied to the assessment of effects from natural hazards.

Operational Stage

- 12.3.15 No significant operational impacts on soils are anticipated as a direct result of the Project, therefore no significance criteria for the operational stage are defined.
- 12.3.16 As mentioned above, a broader discussion has been applied to the assessment of effects from natural hazards.

Limitations and Assumptions

- 12.3.17 The soil baseline was established using large-scale regional and national soil maps and a reconnaissance soil survey. As such, there may be additional variance in soil types and conditions at a smaller scale that has not been picked up in the assessment.
- 12.3.18 Natural hazards data has been compiled from multiple sources; there is no single reference data available. It is also assumed that site-specific natural hazards have been fully accounted for in the design and that they will be addressed in terms of further data collection (e.g. detailed soil surveys) and micro-siting during construction.

12.4 Baseline Conditions

Existing Data

Soils

- 12.4.1 The World Reference Base for Soil Resources describes the soils present within the Study Area as predominantly Gypsisols (soils with a layer of gypsum within 100cm of the surface), Calcic (lime-rich) Gypsisols, and Calcisols (lime-rich soils occurring in arid locations; **Figure 12-1**). These types of soils are called 'Desert Soils' in the Russian regional classification system and they occur in semi-arid regions where precipitation is considerably exceeded by evapotranspiration. Depending on where in the soil profile the gypsum layer is, and how high the gypsum/lime concentrations are, it is possible to use these soils for growing crops if irrigation is supplied; however, these areas are more usually used for grazing.

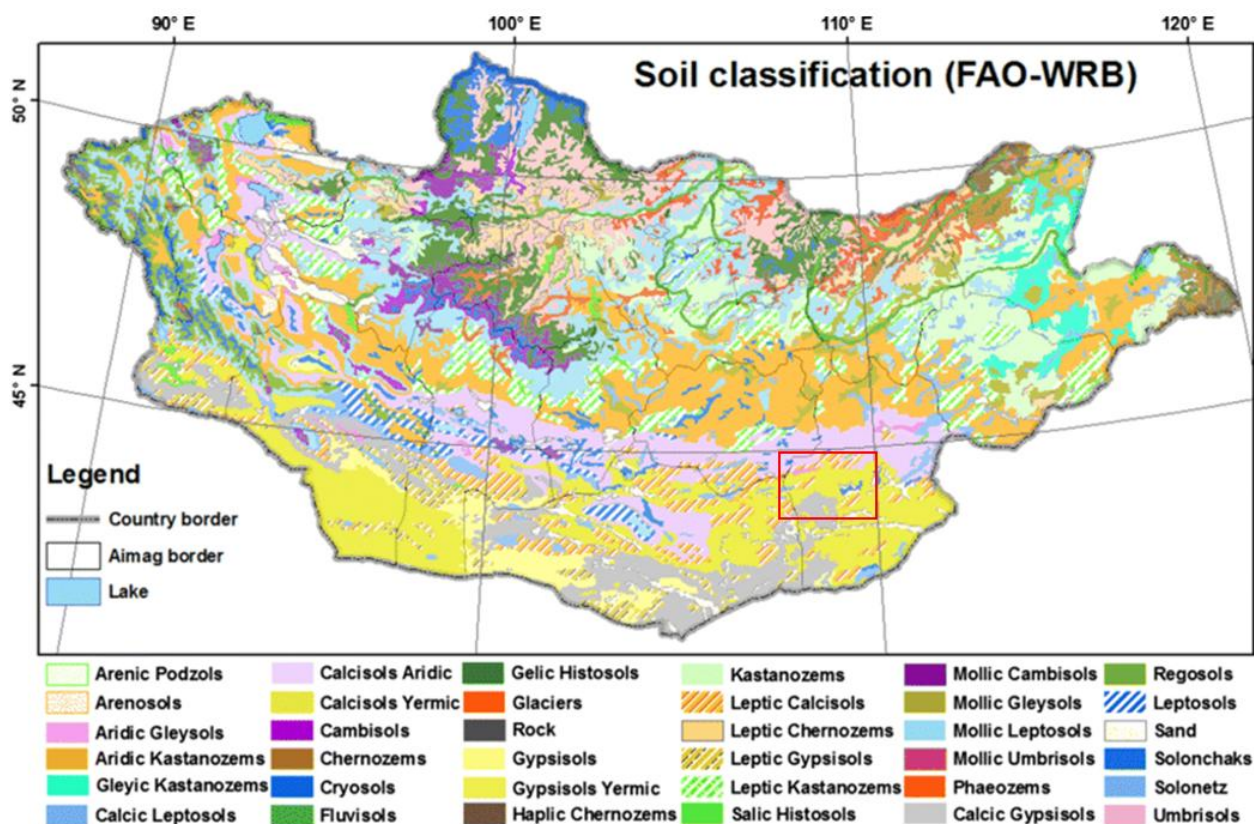


Figure 12-1 Soil Regional Map. Red box indicates approximate project area.

- 12.4.2 Available information sources and mapping indicate that the Project is located in an area comprising very dry, stony soils which are unlikely to be suitable for growing crops, due to their high salt content and poor structure combined with the arid climate.
- 12.4.3 These soils can have high erosion potential, especially where poorly vegetated and where snow-melt poses a risk of increased surface runoff. Available aerial photographs show clear evidence of sediment mobilisation and deposition.
- 12.4.4 Land within the Project Study Area comprises mainly flat plains, with some marshy areas, low hills and sandy valley and steepe. Overall, six grass species, one sedge species, 30 forb species, 17 shrub species, two tree species, and two parasitic plant species were identified (see **Chapter 9: Biodiversity, Flora and Fauna**) and land use is predominantly extensive pastoral grazing; with some areas identified under mining licence (see **Chapter 3: Project Description**).

Natural Hazards

- 12.4.5 Mongolia is vulnerable to a wide range of natural hazards, including floods, dust storms, droughts, wildfires and earthquakes. The country is in a seismically active zone. Notable hazards that have affected Mongolia in recent years include snow and dust storms, thunderstorms, floods, earthquakes,

drought, steppe and forest fires, infectious diseases, and dzud²⁸. Dzuds, droughts, and wildfires have caused catastrophic damage due to their complex interaction with steppe ecosystems and livelihoods. Flood risk is addressed in **Chapter 13: Water Environment**.

12.4.6 Over the past decade, Mongolia recorded 1,212 weather-related disasters, 41.3% due to heavy rain and floods causing 54 deaths, damage to over 4,200 homes, loss of 51,000 livestock, and 44.4 million MNT in damages.

12.4.7 A summary of natural hazards and changes observed in the last 10 years is provided in **Table 12-2**.

Table 12-2 Changes in Natural Hazards in the last 10 years compared to the 30-year Average

Meteorological phenomena	Changes observed over the past 10 years compared to the 30-year average
Heavy snow, rain, down pour or heavy rain	<p>The number of rainy days (including days with showers) increased by 2–5 days, and the number of snowy days increased by 1–3 days.</p> <p>At most, there were 36 days with rain and showers, and 39 days with snowfall.</p> <p>The highest annual precipitation recorded was 243.3 mm in Sainshand in 2024, and 267.6 mm in Mandakh station in 1998.</p> <p>The highest daily precipitation was 52.8 mm in both Sainshand and Mandakh, and 70.4 mm in the Saikhandulaan area.</p>
Hail, lightning and thunder	<p>Although heavy precipitation has increased, the number of days with hail has remained nearly unchanged, rising by only one day. The number of days with thunderstorms increased by 1-2 days in Saikhandulaan and Sainshand, and by 3 days in Mandakh soum. At most, there were 13-29 days with thunderstorms and 3 days with hail.</p>
Spring snowmelt and flash floods, soil thawing	<p>The increase in the number of days with heavy rainfall raises the risk of flash floods. This leads to a sharp rise in soil moisture. The standard depth of soil freezing ranges from 1.99 to 3.07 meters, depending on soil type and location.</p>
Strong winds, dust storms, snowstorms, and fog	<p>The number of days with snowstorms increased by 3 to 4 days, and the number of days with dust storms rose by 1 to 2 days. At most, there were 12 to 23 days with snowstorms, 17 to 65 days with dust storms, and 11 to 33 days with strong winds. Additionally, wind speeds reaches 25 to 40 meters per second.</p>
Ice storm	<p>In this region, there is typically 1 day with wet snow, 1 day with frost, and 1 to 2 days with observed icing.</p>
Cold	<p>Between November and March, the project area experiences the highest number of days with temperatures at or below -25°C. Recorded lows include -41.4°C in Sainshand, -34.6°C in Mandakh, and -35.5°C in Saikhandulaan.</p>

Source: Based on the stations in Sainshand, Mandakh station, and Saikhanduulan post in Dornogovi aimag²⁹

²⁸ A dzud is a multi-faceted event characterized by a summer drought, in which insufficient fodder is available for stockpiling, followed by heavy winter snow and abnormally low temperatures.

²⁹ Data from: FNC-2024, Mongolia: Fourth National Communication on Climate Change Assessment, Ministry of Environment and Tourism, Ulaanbaatar, 2024; Jambaajamts, Climate of Mongolia, State Publishing House, Ulaanbaatar, 1989; Jugder, M. Tsoozol, Ya. Otgonsuren, Marketing and Economic Efficiency of Meteorological Services, NUM

- 12.4.8 In recent years, Dornogovi aimag has experienced an intensifying pattern of weather-related hazards, particularly in the form of snowstorms, dust storms, and destructive winds. According to meteorological records from 2023 and 2024, the region has seen multiple prolonged snowstorms, some lasting over 24 hours with wind speeds frequently surpassing hazardous thresholds of 25 to 30 meters per second. These events have dramatically reduced visibility, disrupted transportation, and posed serious challenges to both public safety and infrastructure integrity.
- 12.4.9 According to the report on hazardous and disastrous weather events that occurred in Dornogovi Aimag in 2023:³⁰
- On 4 and 5 November 2023, snowfall reached a total of 16.7mm in Dornogovi aimag. Wind speeds ranged from 10 to 19m/s, with snowstorms persisting for up to 29 hours and 26 minutes, and 24 hours and 32 minutes of which were recorded in Delgerekh soum of Dornogovi aimag. Visibility dropped to 500m, reaching the threshold for a hazardous weather event.
 - On March 21 2023, wind speeds intensified across Dornogovi aimag, reaching 18-27 m/s and occasionally up to 28-31 m/s, leading to strong dust storms. Between March 21 and 22 2023, wind speeds reached 16-22m/s, at times peaking at 24-26m/s, accompanied by 1-9mm of snowfall. Snowstorms lasted between 1 and 10 hours, qualifying as hazardous conditions.
 - From May 18 to 19 2023, wind speeds in Dornogovi aimag ranged from 16 to 24m/s, at times reaching 26-32m/s, causing strong winds and dust storms classified as hazardous weather events. Overnight from 18 to 19 May 2023, similar conditions persisted, and on 19 May 2023, wind speeds again reached 16-26m/s, occasionally up to 32m/s, sustaining the hazardous status.
- 12.4.10 In 2024, based on reports of hazardous and disastrous weather events in Dornogovi Aimag:³¹
- In March 2024, the National Agency for Meteorology and Environmental Monitoring issued warnings for strong winds and dust storms in southern Gobi provinces, including Dornogovi, with wind speeds exceeding 17m/s (61km/h).
 - On 13 April 2024, average wind speeds ranged from 18 to 25m/s, with gusts up to 31m/s, resulting in dust storms and hazardous weather conditions across the Aimag.
- 12.4.11 While less frequent in Dornogovi compared to other regions, grassland fires can still occur, especially during dry periods. These fires can destroy vegetation, leading to soil erosion and increased susceptibility to dust storms. The occurrence of grassland fires and dust events may be superimposed or mutually reinforcing, leading to additional severe cascading disasters.

Publishing House, Ulaanbaatar, 2006; Tsoozol, S. Erdenesukh, Meteorology and Climate Practicum, NUM Publishing House, Ulaanbaatar, 2003.

³⁰ Available at: <https://namem.gov.mn/d/danger/283>

³¹ Available at: <https://namem.gov.mn/d/news/160>

Soil Survey

Vegetation Cover

- 12.4.12 Vegetation cover in the Study Area is sparse due to low annual precipitation. Although vegetation cover is low (typically between 5% and 30%), the presence of shrub species will play an important role in locally stabilising the sandy soils and reducing wind erosion (e.g. **Plate 12-1**).



Plate 12-1 Photograph from soil survey, showing sand-accumulated surface area and shrub species.

Soils

- 12.4.13 A soil survey in the Study Area was undertaken during June 2025, and the full report is presented in **Appendix E**. **Figure 12-2** shows the location of sampling points along the OHTL route. A summary of the information determined is presented in the following sections.
- 12.4.14 The land along the OHTL corridor predominantly comprised sand and/or gravel. The surveyors also noted that a hardened granular crust of sand, gravel, and pebbles up to 1cm thick had formed along much of the route. This layer has formed due to the long-term action of wind and rain on the surface and comprises a distinct component of the soil structure. Its presence protects the soil to some extent from wind and water erosion and potentially reduces water loss via evaporation.

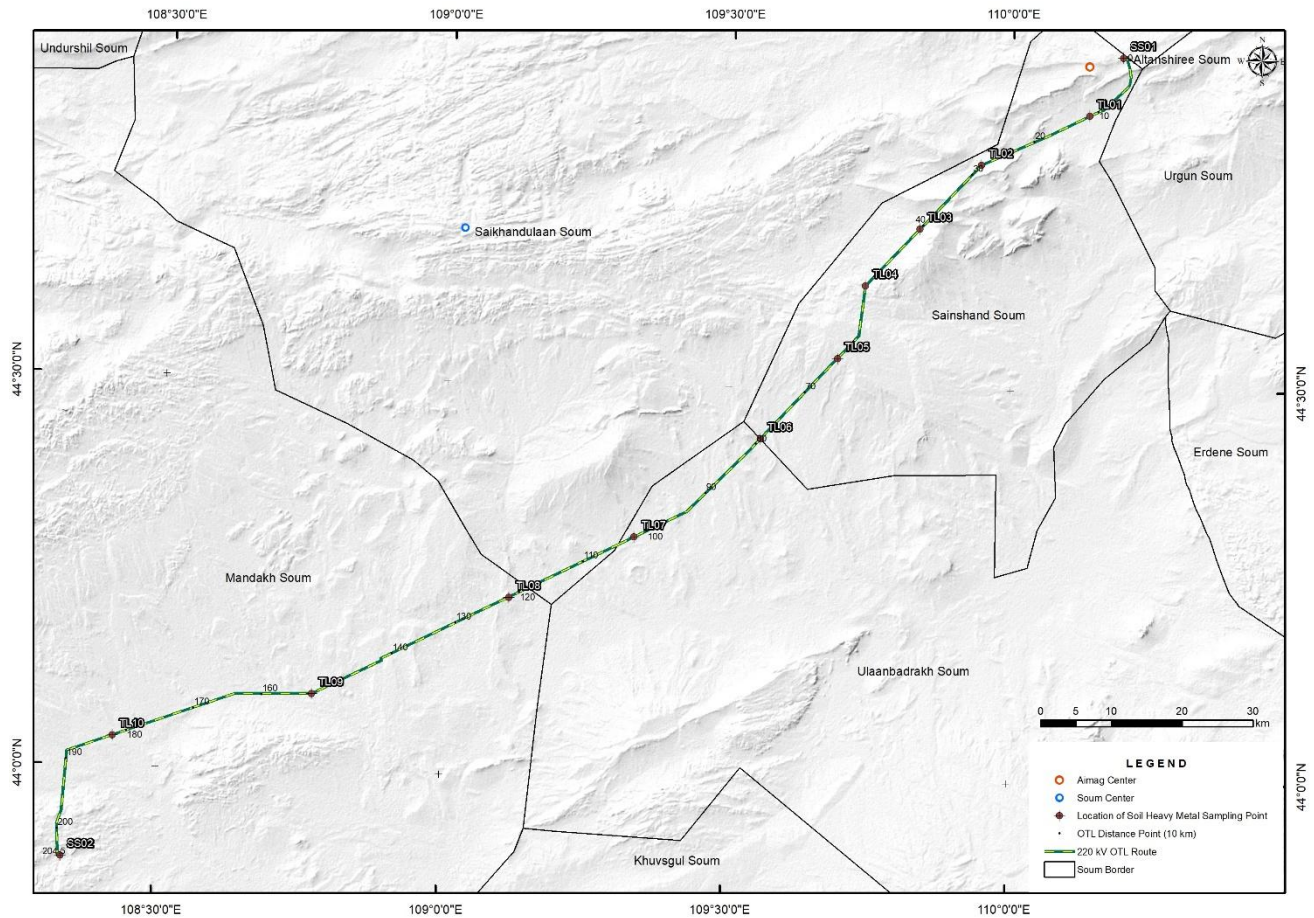


Figure 12-2 Location of soil survey points along the proposed transmission line route

Soil Profile Descriptions

12.4.15 The soil profiles recorded are strongly influenced by the movement of sediment carried by intense summer rains, and by sand transported by strong winds, which accumulate in low-lying areas.

12.4.16 The survey identified ten subtypes of soil cover in the Study Area, belonging to three major soil categories. These include:

- Semi-desert brown soils:
 - Sandy loam typical brown soil
 - Saline marsh soil
 - Gravelly thin brown soil
 - Typical brown soil with sand cover
- Semi-desert light brown soil:
 - Stony thin light brown soil
 - Sandy loam light brown soil
 - Light brown soil with sand cover
 - Gravelly thin light brown soil
- Desert grey-brown soil:
 - Typical grey-brown soil
 - Thin grey-brown soil.

- 12.4.17 All three major soil categories were represented long the OHTL route, and mostly comprised thin, sandy loam or sand soils, some with rock fragments.
- 12.4.18 Sample point TL01 (**Plate 12-2**) was located on saline marsh soil, which is different from the sandy soils in that it was described in the field as comprising compact clay loam with no rock fragments, and had around 50% vegetation cover. Although the particle size distribution analysis showed that his soil is defined as sandy loam, it has a considerably higher silt content than all the other soils, which is likely to increase the water-holding capacity and therefore the potential to support plant growth.

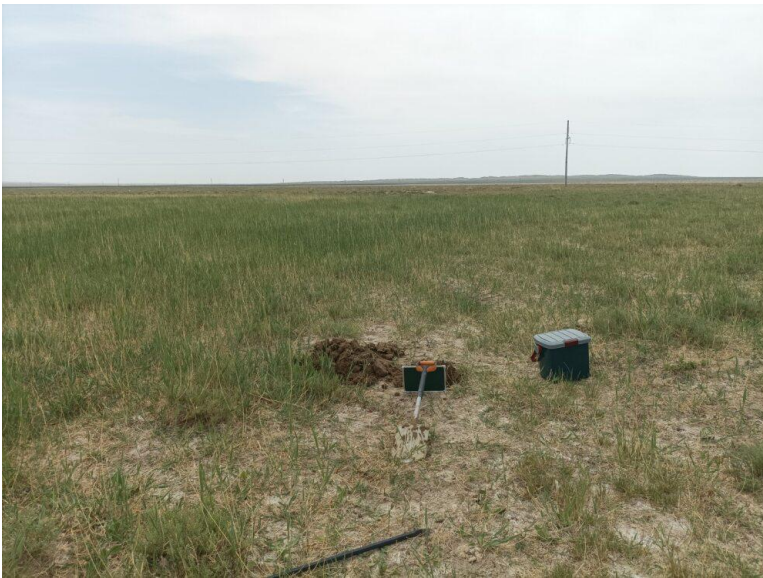


Plate 12-2 From soil survey: land surface and soil profile at TL01 sampling site

12.4.19 Soil at survey location TL03 was a typical brown soil with sand cover, one of the semi-desert brown soils. Plant roots were present in the 2-13cm layer, which was a dry, sandy loam (**Plate 12-3**).



Plate 12-3 From soil survey: land surface and soil profile at TL03

12.4.20 Semi-desert light brown soil was located approximately 51km to 165km along the OHTL route and included gravelly thin light brown soil at TL04 (**Plate 12-4**). This was described in the field as a porous clay loam layer with rocky fragments.



Plate 12-4 From soil survey: land surface and soil profile at TL04

- 12.4.21 The desert grey-brown soils occurred at approximately 165km to 205km along the OHTL route and included typical grey-brown, and thin grey-brown soils. TL10 (**Plate 12-5**) was recorded as a typical grey-brown soil: porous, flaky and dry.



Plate 12-5 From soil survey: land surface and soil profile at TL10

Analytical Results

- 12.4.22 Laboratory analysis confirmed that the texture of all 12 soils was sand or sandy loam (noting that TL01 comprised a higher quantity of silt compared to other profiles).
- 12.4.23 Results of chemical analyses of the soil samples are presented in



12.4.24 **Table 12-3.** Organic matter (“humus”) concentrations in topsoil layers were low (0.2% to 1.4%), pH was high to very high (8.45 to 9.95).

12.4.25 Exchangeable phosphorus (P_2O_5) and potassium (K_2O) concentrations provide an estimate of the amount of each nutrient available to plants. Although the extraction methods used in the Mongolian laboratory are unlikely to match those used in the UK, the concentrations identified from the soil survey (



12.4.26 **Table 12-3)** represent values that would likely be in the range of approximately Index 0 for P_2O_5 and Index 1 for K_2O ; Index 2 is the recommended range for crop growing in the UK³².

12.4.27 Laboratory results confirm the low-nutrient, alkaline soil environment that was identified through the desk study.

³² AHDB Nutrient Management Guide, RB209 (2023)

Table 12-3 Results of Laboratory Analysis for all 12 Soil Samples

No.	Profile ID	Depth (cm)	pH _{H2O} (1:2.5)	CaCO ₃ (%)	Humus (%)	EC _{2,5} (dS/m)	Exchangeable (mg/100g soil)	
							P ₂ O ₅	K ₂ O
1	TL01	0-5	9.07	3.47	1.020	13.2	0.72	12.9
2	TL02	0-5	8.76	0.00	1.447	0.259	0.83	13.7
3	TL03	0-13	8.88	0.00	0.533	0.100	0.57	11.1
4	TL04	0-3	8.99	1.40	0.881	0.157	0.69	12.5
5	TL05	0-7	8.93	0.00	0.571	0.100	0.62	11.6
6	TL06	0-12	9.00	0.00	0.544	0.074	0.54	10.9
7	TL07	0-6	9.95	4.93	0.365	0.363	0.37	8.1
8	TL08	0-15	9.21	1.52	0.251	0.110	0.30	7.6
9	TL09	0-5	8.45	4.85	0.245	1.062	0.25	5.4
10	TL10	0-10	9.16	1.49	0.425	0.140	0.75	8.4
11	SS01	0-12	8.72	0.00	1.093	0.101	0.34	12.8
12	SS02	0-8	9.49	4.13	0.252	0.170	0.44	7.5

12.5 Potential Impacts and Effects

Construction Phase

Soils

- 12.5.1 Potential impacts on soils are associated with the building of the towers and stringing the OHTL. Potential impacts comprise:
- temporary use of land for project facilities (e.g. temporary access roads and main and ancillary compounds/camps);
 - land permanently removed from grazing; and
 - soil permanently excavated to provide foundations for the towers.
- 12.5.2 Temporary soil disturbance is anticipated in areas where Project facilities will be located, resulting from soil stripping for compound and access route footprints and stockpiling. Resilience of the soils in the Study Area relies in part on the presence of scrubby vegetation and the naturally-formed hardened granular crust (**paragraph 12.4.14**) which reduce erosion risk. Once these factors are disturbed or removed, the sandy texture and low organic matter content of the soils will mean that they are vulnerable to both wind and water erosion. The ability of these soils to naturally recover from disturbance is limited by their low nutrient content and low *overall* rainfall in the region, which limits vegetation growth, and the time required for the natural soil crust to form.
- 12.5.3 Anticipated adverse impacts during the construction phase include:
- erosion – where soils have been stripped, stockpiled and potentially reinstated, particularly where vegetation cover is sparse. Strong winds and heavy rain may result in erosion of soil;

- deterioration – excavation for tower foundations could result in damage to and deterioration of soils;
- compaction – the presence of a temporary workers' camp (if required), and any additional access routes, may result in localised soil compaction; and
- contamination – contamination of soils may occur from accidental spills of oils or chemicals as a result of use, storage or re-fuelling of construction plant and equipment in combination with poor pollution prevention and control measures.

- 12.5.4 Satellite imagery identified land use within the Study Area to be predominately grassland, likely to be used for grazing. The soil survey confirmed the presence of relatively sparse scrubby vegetation. Soils impacted by the Project have been confirmed by survey and laboratory analysis to be dry, low nutrient, high pH soils which are therefore not likely to support healthy crop growth. As such, they are considered to be of “low quality”, and survey and desk study data suggest that there is potential for substitution locally. Therefore, as set out in **Table 5-2** ‘Illustrative example for determining receptor sensitivity’ in **Chapter 5**, the land and its associated soils within the Project route is considered to have low sensitivity.
- 12.5.5 Detailed footprint dimensions of all five tower types are not yet known, however from available information provided in **Chapter 2**, an estimate of 10m x 10m has been used to account for the area of land underneath each tower and a worst-case scenario has been assessed where it is assumed all land beneath the towers could become inaccessible in relation to grazing. Based on a total of 690 towers the worst-case total permanent land-take is therefore estimated to be approximately 6.9ha.
- 12.5.6 The above estimate of 6.9ha permanent loss of land and its associated soils is approximately 0.0006% of the total of 1.13 million ha (in 2021, the year for which most recent values are available) of agricultural land within Mongolia³³. Any soils excavated for tower construction would be reused, where practicable, likely as additional topsoil added to land adjacent to the Project route, meaning the soils would continue to provide soil ecosystem services within close proximity to their origin. Therefore, the magnitude of the impact from the Project is considered to be adverse, low.
- 12.5.7 Based on the low sensitivity of the soils within the Project route and low magnitude of impact from the project, the effect from the project on soils is **negligible**, which is **not significant**.

Natural Hazards

- 12.5.8 General impacts related to key meteorological phenomena as identified in **Table 12-2** above are highlighted in **Table 12-4**. The main impact during construction is related to natural hazards that could affect construction activities, including access to site, ability to dig tower foundations and the health and safety of construction workers; particularly given the open nature of the terrain in the Study Area (see also **Chapter 17: Labour and Working Conditions**). It is anticipated that construction would occur in Summer months, avoiding potential impacts associated with snowfall and spring melt. The specific risk or magnitude of the impact will depend on the individual event and the measures in place to manage them during construction; however, hazards could result in significant adverse effects on construction workers if not managed correctly.

³³ Available at: <https://data.worldbank.org/indicator/AG.LND.AGRI.K2?locations=MN> [Accessed 30/06/25]

Table 12-4 Potential impacts of Natural Hazards

Meteorological phenomena	Indicators and impacts
Heavy snow, rain, down pour or heavy rain	If snowfall exceeds 7mm or rainfall exceeds 15mm in continuous twelve (12) hour period, it reduces visibility, obstructs and damages roads and open areas, causes loss of working hours, and hinders the operation of project machinery and equipment.
Hail, lightning and thunder	Heavy rain and hail reduces visibility and damages roads and open areas, restricts the movement of machinery, and can cause significant disruption to project construction activities. Lightning is the most hazardous phenomenon for power transmission lines and substations.
Spring snowmelt and flash floods, soil thawing	If the soil is saturated with moisture at depths of 35cm for clay soil, 25-28cm for brown soil, 16-18cm for dark topsoil, and 27cm for silty sand, vehicles may become stuck, which would also create difficulties for construction works. Additionally, mudflows can have a negative impact and cause damage to power transmission and distribution lines.
Strong winds, dust storms, snowstorms, and fog	When wind speeds exceed 15m/s, visibility is significantly reduced during snowstorms, dust storms, and fog, making it difficult to see roads and work areas. This leads to delays in construction activities and, in some cases, causes accidents involving heavy machinery. It can also result in the collapse of power distribution poles and cause damage to substations.
Ice storm	A light snowfall on icy roads hampers traffic flow (resulting in loss of working hours). In some cases, it increases braking distances and may lead to accidents. During periods of icing, frost, and wet snow, electrical insulation may fail, power losses can increase, and the added weight on transmission lines can cause them to collapse.
Cold	Temperatures at or below -25°C have a negative impact on technical operations. Extremely cold conditions also lead to an increase in energy consumption.

Source: Based on the stations in Sainshand, Mandakh station, and Saikhanduulan post in Dornogovi aimag³⁴

Operation Phase

Soils

- 12.5.9 All land used during the operation phase will have been removed from its baseline state during construction. Therefore, no additional impact on land use will occur during the operational phase.
- 12.5.10 There may be some potential for pollution of soils from rust treatment and painting of towers; and for hydrocarbons and oils to enter soil at substation sites. However, these impacts are not considered likely to be significant and were scoped out of the assessment at the scoping stage.
- 12.5.11 No significant operational impacts on soils are anticipated as a direct result of the project.

³⁴ Data from: FNC-2024, Mongolia: Fourth National Communication on Climate Change Assessment, Ministry of Environment and Tourism, Ulaanbaatar, 2024; Jambaajamts, Climate of Mongolia, State Publishing House, Ulaanbaatar, 1989; Jugder, M. Tsoozol, Ya. Otgonsuren, Marketing and Economic Efficiency of Meteorological Services, NUM Publishing House, Ulaanbaatar, 2006; Tsoozol, S. Erdenesukh, Meteorology and Climate Practicum, NUM Publishing House, Ulaanbaatar, 2003.

Natural Hazards

- 12.5.12 As identified in **Table 12-4** above, there are a number of events that could specifically have an impact on the Project infrastructure, including:
- Impacts on the operation of project machinery and equipment e.g. extreme cold affecting equipment operation
 - Collapse of transmission lines e.g. due to heavy snowfall, wind speeds
- 12.5.13 It is noted in the 21 March 2024 event, wind speeds resulted in the collapse of the 32nd tower of the 220 kV Mandalgovi–Tavantolgoi transmission line; with some of the other poles sustaining damage.
- 12.5.14 As well as having a direct potential adverse effect on Project infrastructure, the collapse of towers can result in a health and safety risk to local communities/herders as well as the O&M staff charged with responding to the damage. Furthermore, these hazards pose a risk to O&M staff working at the substations or undertaking routine maintenance, if the events are not anticipated.

12.6 Mitigation and Enhancement Measures

Construction Phase

Soils

- 12.6.1 The field soil survey indicates that the soils within the Study Area are mostly sandy, low-organic, low nutrient, alkaline soils, with the presence of a hardened crust and scrubby vegetation actively reducing risks from both erosion by wind or water. Although the effect on soils from the Project has been determined to be low, soil protection measures should be used during the construction phase to ensure any impact on soil is minimised. Preventing the degradation of soil quality, avoiding soil waste, and enabling reuse will be necessary and will be the primary soil mitigation objectives for the Project.
- 12.6.2 The following points outline the soil handling measures required during the construction to protect soil quality. While there is no standard guidance on soil protection in the EU and Mongolia, the requirements below align with the EU Soil Strategy for 2030 and Mongolian Law on Soil Protection and Prevention of Desertification.
- Preconstruction planning
 - preparation of a **Soil Storage and Reinstatement Plan** before the construction work commencement; and
 - training to Site Manager or delegated agent from Soil Scientist.
 - Site Preparation
 - construction sites should be properly organized. This will reduce the area of soil potentially degraded;
 - vegetation clearance from topsoil; and
 - layout of access routes, compounds and stockpile areas.
 - Soil Stripping

- soils to be stripped according to the thickness of soil horizons and soil types as described in **Appendix E**, and with minimum mixing of horizons;
- no soil stripping during rain or wet ground conditions; and
- minimisation of dust and silt-laden runoff generation.
- Soil Stockpiling
 - stockpiles to be located in appropriate locations to avoid increased flood risk, watercourses and topographic depressions;
 - soils to be stockpiled in designated stockpile area according to temporary work design; and
 - topsoil and subsoil materials to be stockpiled separately and clearly labelled according to **Appendix E**.
- Soil Stockpile Maintenance
 - given the high risk of erosion by wind in the Study Area, the time for which soils are stockpiled should be minimised;
 - where practicable, stockpiles to be seeded with low maintenance grass mix to minimise risk of soil erosion and dust spread over adjacent grazing grass.
- Soil reconditioning
 - where required, soils should be reconditioned before reinstatement and reuse so they are in a suitable condition for the intended re-use.
- Soil contamination
 - erect signs on access roads to ensure that heavy vehicles strictly follow approved deviation tracks to avoid creating multiple tracks.
 - create designated collection points for domestic and hazardous waste. Construction materials and domestic wastes should be disposed of at approved places.
 - maintenance of machinery and equipment used in tower construction shall be conducted in a designated area where the work does not adversely impact the soil and the environment.
 - oil storage and distribution activities shall adhere to the relevant domestic standards such as “Petroleum product supply technology and operating procedures MNS 4633: 2006” and “General technical requirements for Petrol Station and equipment MNS 4633: 2006”.
- Soil Reinstatement
 - soils from temporary land take should be reinstated to previous conditions after the completion of construction.
- Soil reuse
 - surplus topsoil should be reused to maximise its value and potential such as landscaping.

Natural Hazards

12.6.3 In line with the requirements also identified in **Chapter 17: Labour and Working Conditions** and **Chapter 18: Climate**, the following measures are recommended:

- The Construction Contractor will develop, implement and maintain an **Emergency Preparedness and Response Plan**.
- The Construction Contractor will monitor weather forecasts prior to undertaking work and reschedule works where possible.
- Construction staff will be provisioned with appropriate PPE to mitigate risks of overheating, including lightweight, breathable, and moisture-wicking fabrics. UV exposure should be limited

through UV-protected clothing, shading, and sun screen, and sufficient potable water should be provided to prevent risks associated with dehydration.

- Health and safety training will be delivered to all construction staff prior to beginning work, and should include information on the signs of heat exhaustion and related health impacts; natural hazards; and fire prevention and suppression, including information on how to avoid health and safety impacts should a wildfire occur.
- The Construction Contractor will ensure that any flammable materials are stored away from areas frequently used by workers to reduce risk of fire spread. Remove any flammable vegetation or materials from these areas and provide fire suppression equipment to staff.
- Before work begins, the Construction Contractor will conduct a thorough risk assessment. This will include consideration of natural hazards.

Operation Phase

Soils

- 12.6.4 Occasional maintenance work may be required, which could potentially involve pollution of soils from rust treatment and painting of towers; and for hydrocarbons and oils to enter soil at substation sites. However, this impact is expected to be negligible and good practice with respect to storage and handling of such materials is expected to be in place during the maintenance work.
- 12.6.5 There will be a need to refurbish towers and overhead lines periodically through their lifetime, as well as the potential for emergency maintenance to deal with unplanned events associated with towers and OHTL. These activities may cause soil disturbance, however they are likely to be small-scale (for example it is anticipated that 10% of towers should undergo thorough examination each year) and of short duration. Impacts on soil will be mitigated by employing good practice in soil handling (based on those listed in Section 12.6) where soils are impacted.

Natural Hazards

- 12.6.6 In line with the requirements also identified in **Chapter 17: Labour and Working Conditions** and **Chapter 18: Climate**, the following measures are recommended:
- The final design will be developed in accordance with relevant regulations and norms, especially those with reference to weather conditions.
 - The final design should consider the following:
 - Increasing the tension of the transmission line to reduce wind-induced oscillation.
 - Windbreaks may also be utilised in higher risk areas to reduce potential impacts associated with windblown debris.
 - Sag monitoring techniques, such as infrared laser systems, photographic monitoring, or numerical modelling, should be used regularly to assess sag and proactively maintain the OHTL.
 - Utilising hydrophobic coatings and other low-ice adhesion materials to reduce ice and snow accumulation on conductors. Line monitoring systems can also be utilised to monitor and address accumulation early.
 - Installing current-limited fuses to allow for automatic interruption of power flow to prevent arcing, minimising fire risk.

- Ensure that surface drainage is regularly maintained to reduce water accumulation on paved surfaces, reducing the risk of freeze-thaw. Consider elevating substations and installing water pumps or other drainage infrastructure to reduce the risk of water attenuation. Hydrophobic coatings and other low-ice adhesion materials may also be used to reduce the risk of water ingress to power lines and conductors, further reducing the risk of electrical fires.
- O&M should consider:
 - A risk assessment that can be incorporated into the O&M ESMP, which covers consideration of natural hazards.
 - A proactive maintenance regime to ensure that potential faults are identified and repaired early.
 - Avoid carrying out maintenance works during periods of high wind speed or other high risk weather events, particularly tasks that require staff to work at height.
 - Ensuring that vegetation is heat and fire resistant and regularly maintained to reduce the volume of flammable material near assets.
 - Staff should be provisioned with appropriate PPE to mitigate risks of overheating, including lightweight, breathable, and moisture-wicking fabrics. UV exposure should be limited through UV-protected clothing, shading, and sun screen, and sufficient potable water should be provided to prevent risks associated with dehydration.
 - Health and safety training should be delivered to all staff prior to beginning work, and should include information on the signs of heat exhaustion and related health impacts.
- A Project-specific **O&M Emergency Preparedness and Response Plan** should be developed and implemented by NPTG. This should include monitoring of weather forecasts prior to undertaking work and reschedule works where possible.

12.7 Residual Effects

Construction Phase

Soils

- 12.7.1 The effect from the Project on soils remain **negligible** after the application of soil mitigation measures.

Natural Hazards

- 12.7.2 Proactive measures will reduce the potential effect of natural hazards on the Project and its workforce during construction. The specific risk or magnitude of the impact will depend on the individual event however, with appropriate risk measures in place it is considered that this will reduce the effect to **not significant**.

Operation Phase

Soils

- 12.7.3 No residual effect on soils has been identified.



Natural Hazards

- 12.7.4 Appropriate design and proactive O&M measures will reduce the potential effect of natural hazards on the Project and its workforce during construction. The specific risk or magnitude of the impact will depend on the final design, however, there remains an inherent risk associated with OHTLs and certain natural hazards therefore it is considered that there could be a **significant** effect associated with natural hazards (depending on the final design and O&M regime).

13 Water Environment

13.1 Introduction

- 13.1.1 This chapter details the potentially significant effects of the Project on the water environment, during construction and operation, considering water quality, hydromorphology, land drainage, groundwater, flood risk and existing water interests (water supplies).
- 13.1.2 As detailed in **Chapter 2: Project Description**, there are no specific plans to decommission the project as a whole and therefore this aspect has been scoped out of the environmental assessment.

13.2 Legislative Framework, Policy and Guidance

- 13.2.1 Details of relevant legislation, policy and guidance is set out in Chapter 4: Standards, Legislative and Policy Context. **Table 13-1** below summaries those of relevance to this assessment.

Table 13-1 Summary of Legislation, Policy and Guidance relevant to the Water Environment

Level	Key legislation / policy / guidance
International	PR3: Resource Efficiency and Pollution Prevention and Control EU Directive 2000/60/EU Water Framework Directive
National Law	Environmental and Social Laws of Mongolia “Law on Water” Environmental and Social Laws of Mongolia “Law on Waste” Environmental and Social Laws of Mongolia “Law on Water Pollutant Fee”
National Standards	MNS 17.1.1.10:1979. Water. Water use and protection. Terms and definitions. MNS 17.1.1.14:1980. Hydrosphere. Classification of water use. General requirement MNS 4047:1988. Hydrosphere. Procedure for monitoring surface water quality MNS 4586:1998. Water quality. General requirements MNS ISO 5667-14:2000. Guidance on quality assurance of environmental water sampling and handling MNS ISO 5667-3:1999. Water quality. Sampling. Part 3: Guidance on processing and storage of samples MNS ISO 5667-11:2000. Water quality. Sampling. Part 4: Guidance on sampling of groundwater MNS ISO 5667-6:2001. Environment. Water quality. Part 6: Guidance on sampling of rivers and streams MNS 6148:2010. Water Quality – Maximum Allowable Concentrations of Groundwater Pollutants MNS 0900:2018. Drinking Water – Hygiene Requirements, Quality, and Safety Assessment MNS 0900:2005. Drinking Water. Hygienic requirements, and assessment of quality and safety

13.3 Assessment Methodology

Scope

- 13.3.1 The assessment scope has been defined to include consideration of the potential for impacts on hydrology (rainfall runoff regimes, drainage and channel morphology), flood risk, water quality, groundwater resources and existing water interests.
- 13.3.2 The assessment determines if the impacts of the Project, following the implementation of mitigation measures, are likely to be positive, negative, or neutral, together with predicting if effects are likely to be significant.

Study Area

- 13.3.3 The Study Area for the water environment assessment includes the proposed OHTL line and associated towers, as detailed in **Chapter 2**, and extends to the Area of Influence (AoI) of approximately 1km buffer around all Project Footprint. This is considered an appropriate Study Area based on the nature of the Project construction and operation activities and technical knowledge of similar schemes. The study area for the water environment is shown in **Figure 13-1**.

Methodology

- 13.3.4 This assessment follows the overarching ESIA Methodology set out in **Chapter 5: Approach to the ESIA**, drawing on UK guidance set out in the Design Manual for Roads and Bridges (DMRB) LA 113: Road Drainage and the Water Environment³⁵, which is the UK standard for assessing the effects of road projects on water receptors. Whilst this methodology has been formulated for road projects it is also suitable for other linear infrastructure projects and has been applied to the environmental impact assessment of numerous energy transmission projects in the UK.
- 13.3.5 The baseline water environment has been characterised by data collected from a desk study and a site visit in June 2025. The desk study was undertaken to identify dry riverbeds through the analysis of the topography of the region, identification of any surface water features, groundwater wells and their usage and characterisation of the geology of the Study Area. During the site visit, surface water features were visited, with dry watercourses identified and photographed. Each groundwater source was visited and when available a water sample was taken in order to establish the baseline water quality. It is noted that a sample of the wetland was intended but due to it being completely dry during the site visit, this was not possible.

³⁵ Highways 2020, DMRB LA 113 Road drainage and the water environment, accessed at: <https://www.standardsforhighways.co.uk/tses/attachments/d6388f5f-2694-4986-ac46-b17b62c21727?inline=true>

Sensitive Receptors

- 13.3.6 Water environment features within the Study Area have been identified and the attributes and the services that these provide have been characterised using the baseline data sets collected (for more details see **Section 0** below). This information has been used to assign the water features a value (sensitivity) defined in **Table 13-2**. These values are based on Table 3.70 of DMRB LA 113.

Table 13-2 Criteria for determining receptor sensitivity.

Receptor Sensitivity	Examples
Very High	<p>Water body with permanent flow.</p> <p>Water body supporting a public potable water supply.</p> <p>Water body of high amenity value, including areas for bathing and where water emersion sports are regularly practiced.</p> <p>Areas which are highly vulnerable to flooding.</p> <p>Aquifer used for potable water supply</p>
High	<p>Water body with seasonal flow.</p> <p>Water body of moderate amenity value including public parks, boating, non-contact water sports, popular footpaths adjacent to watercourses, or watercourses running through housing developments/town centres.</p> <p>Areas which are more vulnerable to flooding.</p> <p>Aquifer used for non-potable water i.e. animals.</p>
Medium	<p>Water body only flowing during extreme rainfall events.</p> <p>Water body with no or only local social interest. Water body of low amenity value with only casual access.</p> <p>Areas which are 'less vulnerable' to flooding or 'water compatible'.</p> <p>Aquifer used for agricultural or industrial use with limited connection to surface water.</p>
Low	<p>Water body of no social interest.</p> <p>Areas which are not at risk of flooding.</p> <p>Unproductive strata.</p>

Impact Severity

- 13.3.7 The criteria for measuring the magnitude of impact and significance of an effect have been consistently applied to both the construction and operational stages of the Project. The criteria used to determine impact magnitude are set out in **Table 13-3** (drawn from Table 3.71 of DMRB, LA 113), this considers the scale/ extent of the predicted change and the nature and duration of the impact.

Table 13-3 Criteria for determining magnitude of impact.

Impact Magnitude	Impact type	Criteria
Large	Adverse	Loss of attribute
	Beneficial	Major improvement to attribute quality or enhancement; impact extends to national or international level.

Impact Magnitude	Impact type	Criteria
Medium	Adverse	Loss of integrity or partial loss of attribute
	Beneficial	Moderate benefit to attribute quality or enhancement; impact extends to regional level.
Low	Adverse	Minor impact / minor reduction in attribute quality
	Beneficial	Minor benefit or addition of current asset of key quality or feature; impact extends to the local level or immediate area
Negligible	N/A	Imperceivable loss of attribute that does not affect use or integrity

Significance Criteria

13.3.8 Significance is derived using the matrix set out in **Table 13-4** below. Overall significance has been concluded for each effect, taking into consideration the potential for the Project to affect more than one attribute of a particular water body.

Table 13-4 Significance of impact magnitude.

Impact Magnitude	Receptor Sensitivity			
	Very High	High	Medium	Low
Large	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Minor	Negligible
Low	Minor	Minor	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Limitations and Assumptions

13.3.9 Uncertainty can arise from the quality and availability of baseline data, and there may also be uncertainty linked to temporal variation in these conditions over the lifetime of the Project, for example, driven by climate change. Where there is uncertainty, the assessment of the impacts on the water environment has adopted a precautionary approach, reporting on a reasonable worst case.

13.4 Baseline Conditions

Overview

- 13.4.1 The Study Area is located within the Central Asian basin, which encompasses approximately 65% of Mongolia's territory. The Central Asian Internal Drainage basin is endorheic, which means any rivers and lakes do not flow out of the region. Located within the Central Asian basin is the Gobi desert, which the Site goes through. On average, annual precipitation is 38mm, with an average annual temperature of 8.5°C. The Study Area and key river basins are shown in **Figure 13-1**.

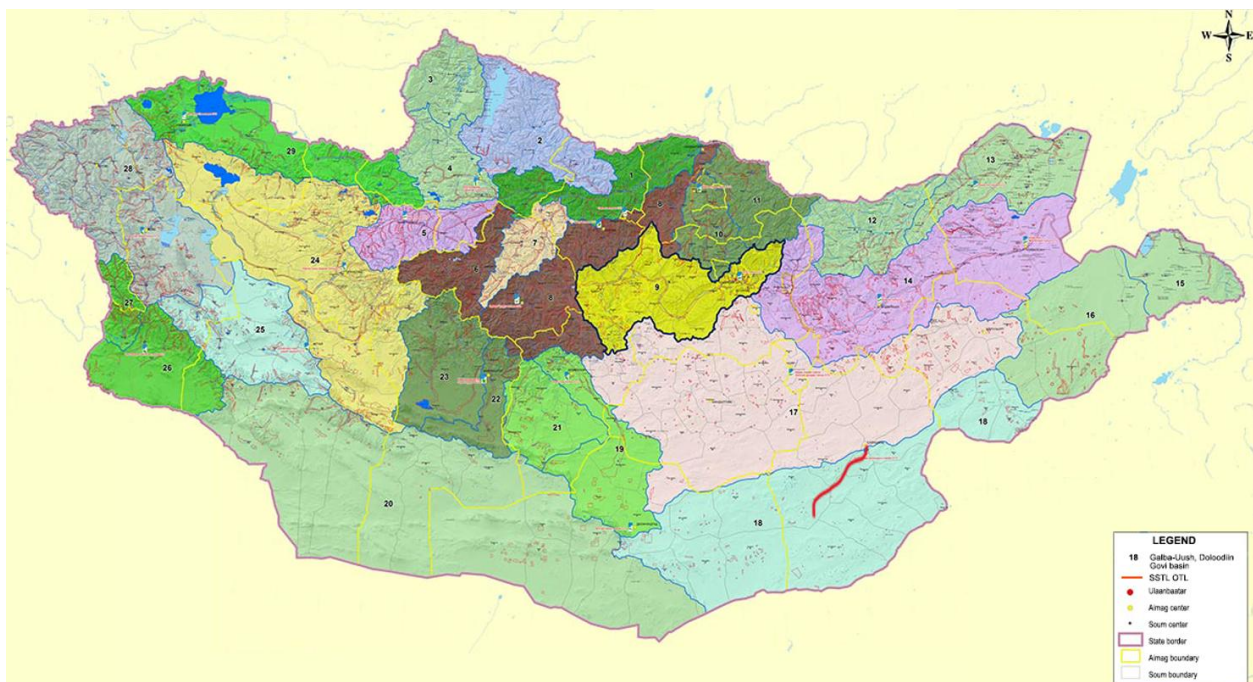


Figure 13-1 SSTS OHTL route and Galba-Uush, Doloodiin basin

Surface Water Features

- 13.4.2 As shown in **Figure 13-1**, the proposed OHTL route spans across one river basin. Several water features are located within the Study Area, dry riverbeds, human drinking water wells and the wetland. Due to the riverbeds being dry, as per **Table 13-2** a sensitivity of Medium has been assigned. Since the drinking water wells are for human consumption and the wetland has amenity value both of these features have been assigned a sensitivity of Very High. A summary of the features and assigned sensitivity are shown in **Table 13-5** below.

Table 13-5 Surface water features and receptor sensitivity.

Water Feature	Receptor Sensitivity
Dry riverbeds	Medium
Human drinking water wells*	Very High
Wetland	Very High

* During the site visit a number of wells were identified, but the purpose was not known. It has been assumed that these wells are also used for human consumption.

13.4.3 The Project crosses more than 14 dry riverbeds as shown in **Figure 13-2**, with widths ranging between 5 and 80km. These rivers are predominantly dry, but they can support flow or become flooded in response to heavy rainfall and they serve a land drainage function to the region. There is a wetland, located near the city of Sainshand, within the Study Area, which is believed to be sustained by groundwater. During the site visit, due to the prolonged dry period, the region within the wetland was dry. For more details on the wetland see **Chapter 9: Biodiversity, Flora and Fauna**.



Figure 13-2 Location of dry riverbeds

Water Resources

13.4.4 There are currently nine wells located within the Study Area, as shown in **Figure 13-3**. A summary of the wells and the water uses they support is given in

13.4.5

13.4.6 **Table 13-6.**

Table 13-6 Name and function of wells

No.	Name of Well	Latitude	Longitude	Distance from the OHTL route (m)	Function
1	Well01	44.81299	110.01580	953 m	Drinking water and livestock.
2	Well02	44.51672	109.66397	959 m	Drinking water and livestock.
3	Well03	44.51675	109.66381	960 m	
4	Well04	44.52088	109.66157	973 m	Unknown- Site owner was not present at the time of the survey.
5	Well05	44.425652	109.55187	842 m	Drinking water and livestock
6	Well06	44.35902	109.46652	825 m	Unknown- Site owner was not present at the time of the survey.
7	Well07	44.15948	108.91027	859 m	Unknown- Site owner was not present at the time of the survey.
8	Well08	44.04614	108.43514	902 m	Unknown- Site owner was not present at the time of the survey.
9	Well09	44.82330	110.03775	Unknown	Unknown- Site owner was not present at the time of the survey.

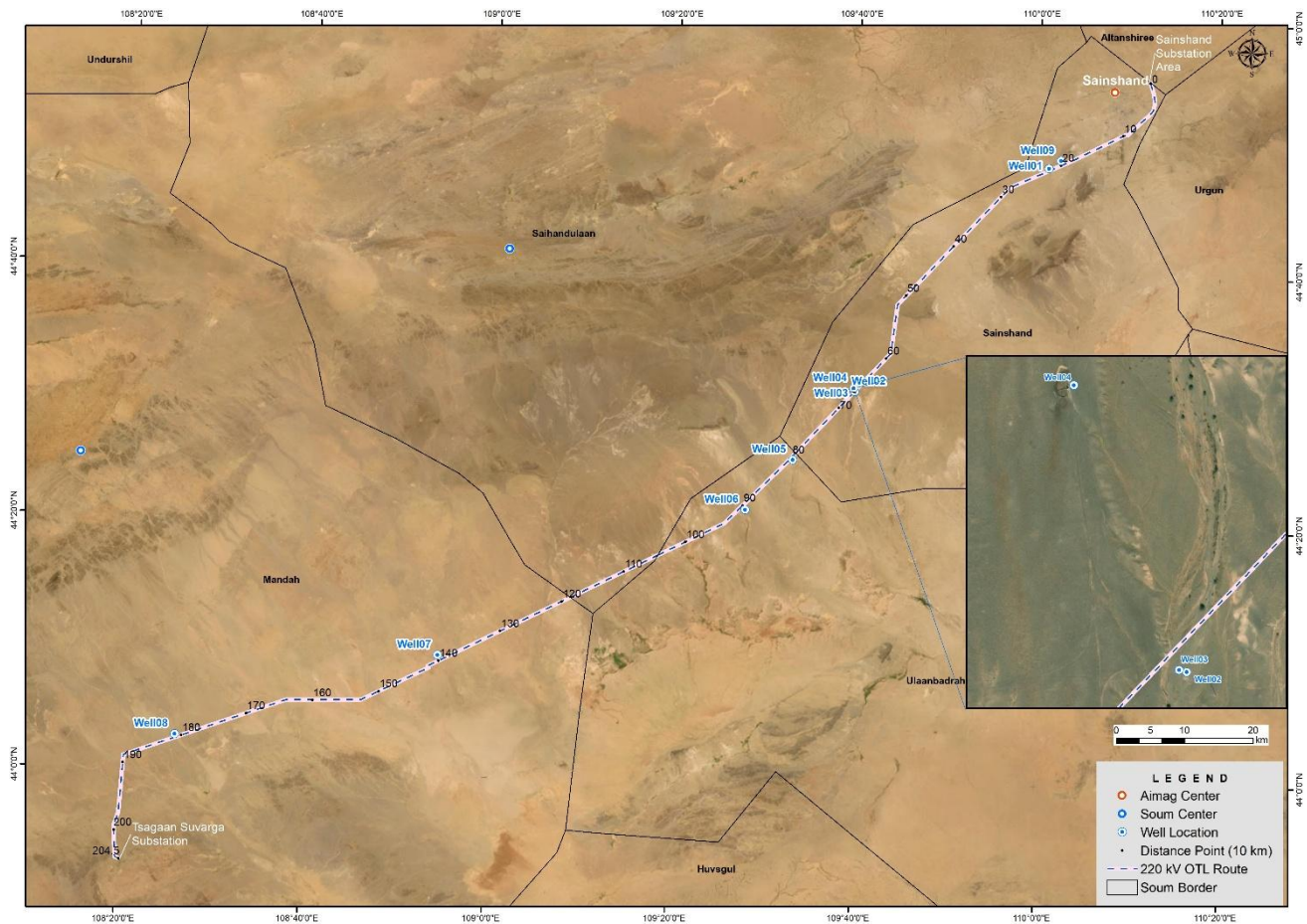


Figure 13-3 Location of Wells within the Study Area

Flood Risk and Drainage

- 13.4.7 Over the past 10 years, Mongolia has experienced approximately 501 officially documented flood events. It is believed that changes in river basin ecosystems, such as soil and vegetation degradation and desertification have become key factors in amplifying surface water runoff and flood risks.³⁶
- 13.4.8 Currently there are dirt tracks and natural ground along the proposed OHTL route. Rainfall either infiltrates into the ground or, when the ground is saturated or rainfall is very intense, forms runoff that follows the existing topography, including the dry riverbeds. Hence the risk of surface water flooding will be associated with these flow paths and topographical low points.
- 13.4.9 Currently the dry riverbeds have seasonal flow, following rainfall events. Flooding from these riverbeds will predominately occur after large quick rainfall events, which has the potential to cause out of bank flows, hence the risk from these features is considered to be High. Mongolia is a landlocked country, at an average elevation of 1,528 metres above sea level, with the ocean located over 900km to the

³⁶ Montsame 2025, Heavy rains and flooding account for 41.3 percent of all water and climate disasters, accessed at: <https://montsame.mn/mn/read/373599>

east of the site, hence it is not at risk of flooding from the sea.

- 13.4.10 Groundwater flooding occurs when groundwater rises to the ground surface. This may occur during winter and/or after prolonged or heavy rainstorms. There are generally two forms of groundwater flooding (i) 'clearwater flooding' associated with the water table rising to the surface in areas of permeable bedrock such as chalk; and (ii) 'river-groundwater interaction' where river baseflow interact with permeable superficial deposits within river valleys, flooding areas far from the river without overtopping raised riverbanks. The geology of the region consists of Cretaceous Mesozoic sedimentary rocks, which predominately include materials such as sandstone, limestone and shale. Since there are no flowing rivers located along the route, river-groundwater interaction flooding it is not expected to occur within the Study Area.
- 13.4.11 The risk of reservoir flooding is associated with large, embanked reservoirs failing and releasing water downstream. There are no permanent reservoirs or ponds located within the study area. It is noted some of the dry riverbeds will form shallow lakes as opposed to flow following heavy rainfall events. No other artificial sources, such as canals, water transfer infrastructure or sewers that could pose a flood risk have been identified in the Study Area.

Water Quality

- 13.4.12 Water quality data was obtained from samples collected from the three wells during the site visit undertaken in July 2025. A single sample was taken at each of the locations. The data obtained from the site visit included pH, electrical conductivity and total dissolved solids data and, when applicable, compared with the MNS 0900:2018 (Drinking Water – Hygiene Requirements, Quality, and Safety Assessment) and MNS 6148:2010 (Water Quality – Maximum Allowable Concentrations of Groundwater Pollutants) national standards. The data are given in **Table 13-7** below.

Table 13-7 Key water quality parameters for the wells

Parameters	Units	Monitoring Locations			National Standards	
		Well05	Well03	Well01	MNS 0900:2018	MNS 6148:2010
pH	-	8.10	7.97	7.63	6.5-8.5	6.5-8.5
Electrical conductivity	µS/cm	740	1100	1760	-	-
TDS	ppm	445	660	1056	-	-

13.4.13 Samples were also analysed for a suite of metals. The majority of the determinants sampled had concentrations that were at, or close to, the laboratory limit of detection. The metals recorded in higher concentrations are summarised in **Table 13-8**, along with environmental quality standards detailed in MNS 0900:2018 (Drinking Water – Hygiene Requirements, Quality, and Safety Assessment).

Table 13-8 Table of metal determinants and MNS Standards

Element	Units	Monitoring Locations			National Standards
		Well05	Well03	Well01	MNS 0900:2018
Arsenic (As)	mg/L	0.02	0.01	0.07	0.01
Iron (Fe)	mg/L	0.08	0.09	1.79	0.30
Manganese (Mn)	mg/L	0.02	0.02	0.19	0.10
Molybdenum (Mo)	mg/L	0.01	0.01	0.14	0.07
Sodium (Na)	mg/L	208	138	300	200
Lead (Pb)	mg/L	<0.02	<0.02	0.15	0.01

* Values in red exceed the national standard.

13.4.14 The results show that Well05 and Well02 water belongs to the hydrocarbonate type, sodium group and is classified as Type 1. With the majority of the key chemical indicators meet the requirements specified in the MNS 0900:2018 National Standards. Whilst Well01 water belongs to the mixed type, sodium group, and is classified as Type I. With the mineral and sodium ion concentration exceed the limits specified in the MNS 0900:2018 National Standards.

13.4.15 Since the groundwater supplied drinking water, the receptor sensitivity for groundwater quality has been assigned as Very High.

13.4.16 During the site visit the wetland was observed to be dry and so water quality samples could not be taken.

Hydromorphology

13.4.17 None of the dry riverbed watercourses or the wetland in the Study Area have been subject to modifications for the purposes of land drainage or flood defence, but have the potential to flood during seasonal events. Their sensitivity for hydromorphology is classified as Medium.

13.5 Potential Impacts and Effects

Construction Phase

Flood Risk and Land Drainage

- 13.5.1 The land drainage regime is currently governed by the topography and the permeability of the soils and underlying geology. During construction there is the potential for impacts on current land drainage systems and on current rainfall runoff regimes.
- 13.5.2 Land clearing, earthworks and construction of towers have the potential to increase impermeable land cover which could lead to an increase in the rates and volumes of surface water runoff that are generated in response to rainfall. Uncontrolled discharges of surface water during construction activities do not have the potential to increase flood risk downstream. Whilst it is acknowledged that annual rainfall averages are low, flash floods are known to occur within the Study Area. Therefore, construction materials should not be stored in, or near to, the dry watercourse.
- 13.5.3 Each dry riverbed is considered to be a receptor with a Medium sensitivity for the attributes outlined above. Prior to mitigation, the magnitude of the impact is considered to be Medium adverse, with an overall effect of **Minor adverse** significance.
- 13.5.4 Construction of temporary in-channel structures to facilitate construction access crossings of dry riverbeds can also act as an impediment to flow which may cause local changes in flow velocities, scour and increased flood risk upstream. Founding a tower in an unknown dry stream may reduce the tower's structural integrity and impact on the surface water hydromorphology.
- 13.5.5 Prior to mitigation, the impacts of new in channel structures (permanent or temporary), the temporary blockages/ change to overland flow paths and an increase in impermeable ground cover and construction activities, is considered to be Large (adverse). Combined with the Medium sensitivity of water receptors, prior to mitigation the effects of the Project on these attributes is assessed as **Minor Adverse**.

Water Quality

- 13.5.6 Crossing of the dry riverbeds is proposed. This will most likely require in channel works, which if not appropriately managed can lead to water quality detriment due to the release of pollutants such as metals or chemicals and/or spread invasive non-native species (INNS).
- 13.5.7 The daily presence of construction workers and compounds will result in the generation of wastewater and communal waste, with the potential for these to enter the wetland, groundwater table or dry riverbeds, impacting on water quality. Uncontrolled discharges of contaminated water may lead to surface and groundwater quality degradation, which has the potential to impact the integrity of the existing drinking water wells and the wetland.
- 13.5.8 Use of construction plant has the potential to lead to contaminated runoff seeping into the wetland, dry riverbeds, and/or ground. This risk is increased during periods of high rainfall.

- 13.5.9 Potential impacts also include contamination from storage and use of oil and chemicals and from accidental spills of these, providing a potential pollution pathway, entering surface waters directly, in runoff (from land or road) or percolating into groundwater, influencing surface water and wetland quality or drinking water wells.
- 13.5.10 The water quality attributes of the groundwater table and associated drinking water wells are assigned a Very High sensitivity, the wetland is assigned a High sensitivity and the dry riverbeds are assigned a Low sensitivity. A wide range of construction activities have the potential to cause pollution of these receptors, with a magnitude of impact prior to mitigation assessed as Large, with consequent **Major to Minor Adverse effects**.

Water Resources

- 13.5.11 During construction, water will be required for the construction workforce, to supply welfare facilities at any temporary camps and construction activities such as concrete mixing and water dousing for dust suppression. Detailed project water use information is not currently available, but depending on climate and weather conditions could be between 80 to 180 litres per person per day of potable water. Estimates vary on the water requirements of construction activities; however, key water demand will be for mixing concrete (e.g. 250 litres per m³)³⁷, filling materials and for water dousing. It is currently understood that pre-fabricated concrete foundations will be transported to the site, reducing the requirement for on-site water.
- 13.5.12 The Construction Contractor will be required to consider water use efficiency as part of a wider environmental management plan. Given the volumes of water required, the Project will likely meet its water needs from available surface or ground water supplies, under permit conditions from relevant authorities.
- 13.5.13 During construction, construction activities near to any drinking water wells or the increased usage of groundwater has the potential to cause accidental damage to the well infrastructure, potentially impacting access to groundwater supplies.
- 13.5.14 Existing water resources are assigned Very High sensitivity. Prior to mitigation impacts of the Project, in terms of a reduction in drinking water availability and quality is considered to be Large adverse. Thus, overall effects are assessed as **Major Adverse**.

Hydromorphology

- 13.5.15 During construction of the Project, there is the potential for temporary physical disturbances to the beds or banks of the dry riverbeds during crossing construction. Temporary culverting of any dry watercourses could lead to changes in the hydromorphology features of the watercourse. In-channel structures can also act as a barrier to flow which may cause local changes in velocities and cause increased erosional and depositional processes.

³⁷ CivilSir 2025, Water requirement for concrete mixing, accessed at: <https://civilsir.com/how-much-water-do-i-need-for-1m3-of-m15-m20-m25-concrete/>



- 13.5.16 The hydromorphological attributes of the dry watercourses in the Study Area are of Medium sensitivity. Prior to mitigation, impacts due to temporary physical disturbances during construction of watercourse crossings and the culverting of any flowing watercourses, are assigned as Medium magnitude, with overall a **Minor Adverse** effect.

Operation Phase

- 13.5.17 As per the Sainshand – Tsagaan Suvarga ESIA Scoping report (Appendix A), the following operational impacts on water environment receptors have been scoped out.
- Increase in flood risk to the dry watercourses from the overhead lines.
 - Changes to the land drainage and hydromorphology of the dry.
- 13.5.18 Those impacts scoped in are assessed below.

Flood Risk

- 13.5.19 Towers located in or nearby watercourses have the potential to change the hydrological regime following a flood. Potentially changing the route of floodwaters to impact nearby herder households or settlements further downstream.
- 13.5.20 During operation of the Project, flood water displacement associated with the location of the towers are of Medium sensitivity. Prior to mitigation, the impacts are assigned as a High magnitude, with overall a **Minor Adverse** effect.

Water Quality

- 13.5.21 During operation of the Project, pollution impact pathways to surface watercourses and groundwater would be relatively limited. This is because land would be reinstated following completion of construction works and there would be no operational discharges to surfaces watercourses from the OHTL.
- 13.5.22 During operation there is a risk of accidental spillage of oils and fuels from maintenance vehicles and activities, which could lead to risk of pollution of drinking water wells or the wetland.
- 13.5.23 During operation of the Project, the groundwater sources that could be subject to polluted runoff have a Very High sensitivity. The impact from the project on water quality is Large as it has the potential to impact drinking water quality, the overall effect is classified as **Major Adverse**.

13.6 Mitigation and Enhancement Measures

- 13.6.1 A number of mitigation measures suggested below would be adopted to avoid or reduce the effects that would be experienced during construction and operation of the Project. These would fall into one of three categories; embedded mitigation measures, good practice mitigation measures and additional mitigation measures.

Construction Phase

- 13.6.2 Prior to the start of the construction phase, the Construction Contractor will elaborate the ESMP for the Project, this will include all of the good practice measures listed in the following sections.

Flood Risk and Land Drainage

- 13.6.3 To mitigate the risk of in-channel works increasing flood risk the following mitigation measures are recommended:
- A detailed **Water, Wastewater and Drainage Management Plan** will be prepared and implemented to manage wastewater and surface water runoff sources and pathways.
 - The construction manager will regularly monitor weather forecasts in order to ensure there is enough time to evacuate if a flash flood is expected to occur.
 - Temporary drainage systems would be implemented to alleviate localised surface water flood risk and prevent obstruction of existing surface runoff pathways.
 - Flood protection trenches (construction drainage) will be installed around all sites liable to be subject to surface water and/or flooding.
 - Natural drainage patterns should be maintained and not obstructed where practicable. This includes in the siting of any construction workers' accommodation camp(s) or laydown areas which should provide enough time to evacuate following a warning of a potential flash flood.
 - Any temporary crossings will be constructed in such following a flood warning can be demountable or if swept away not cause a risk to downstream.

Water Resources

- 13.6.4 To mitigate the risk of impacts on drinking water wells the following mitigation measures are recommended:
- A detailed **Water, Wastewater and Drainage Management Plan** should be prepared for the works, identifying existing water sources, providing calculations for Project water demand and promoting water use efficiency onsite. No surface or groundwater will be used without prior permissions in place, including from regulatory authorities and/or local communities / well owners, where applicable. Construction workers will be provided with potable water from approved sources. The plan should include measures to minimise water usage and explore opportunities for water reuse where possible, with the promotion of water efficiency through training. Local herder wells within Project footprint and/or adjacent to Project works will be mapped. Any local herders' wells adjacent to construction works will be demarcated and protected from damage. Any loss of wells used by local herders will be replaced and water will be trucked in for use if damage results in the loss of local water supplies until such repairs are made.

Water Quality

- 13.6.5 To mitigate the risk from construction activities to water quality, the following mitigation measures are recommended:
- Appropriate water quality monitoring when working near the wetland/existing water supply wells. No direct or indirect discharge from the site to ground or surface water features would be permitted, with wastewater to be tankered off site.

- Securing relevant environmental permits and consents for all qualifying works.
- Spill kits made readily available to allow for the rapid clean up of any accidental spills.
- Fuels, oils, flammable liquids and chemicals stored responsibly, away from sensitive water receptors. All refuelling, oiling and use of chemicals would use suitable drip trays and in the event of a spill be cleaned up immediately.
- Wash down of vehicles and wheels will be in designated areas, such that wash water would be prevented from passing untreated into dry riverbeds or infiltrate into the ground.
- An **Emergency Preparedness and Response Plan** would be developed for the construction phase which would outline procedures to be implemented in case of unplanned events, including but not limited to extreme weather events and pollution incidents.
- Ensure any on site toilets are lined with water-absorbing material and are located outside of areas that could spill into the wetland, infiltrate into the ground near the wells or the dry riverbeds.

Hydromorphology

13.6.6 The following mitigation measures are suggested to reduce the risk of construction activities impacting on the hydromorphology of watercourses:

- Heavy machinery will not cross smaller riverbeds except at formal temporary crossing locations.
- Channels shall be restored if altered by temporary construction activities.

Operation Phase

Flood Risk

13.6.7 The following mitigation measures are recommended to reduce the risk to the water quality of the water environment:

- The towers will not be located near a nearby watercourse, or have the ability to reroute flows to other areas.

Water Quality

13.6.8 The following mitigation measures are recommended to reduce the risk to the water quality of the water environment:

- Post-construction monitoring of water quality at public water supply wells for an agreed period to compare against pre-Project baseline conditions.
- Suitable measures would be in place to reduce the risk of spills from maintenance vehicles, with appropriate spill kits and any refuelling if required away from the dry watercourses, wells or wetland.

13.7 Residual Effects

Construction Phase

13.7.1 The following residual effects are expected to remain following implementation of the above mitigation and enhancement measures:

- Flood Risk and Land Drainage – effects on the dry riverbeds from the receipt of runoff from the construction working areas will be reduced from **Minor Adverse** (Significant) to **Negligible** (Not Significant).
- Flood Risk and Land Drainage – effects from new in channel structures, the potential for temporary blockages/ changes to overland flow paths and an increase in impermeable ground cover from land clearing and construction activities will be reduced from **Minor Adverse** (Significant) to **Negligible** (Not Significant).
- Water Quality – effects will be reduced from **Major to Minor Adverse** (Significant) to **Negligible** (Not Significant).
- Water Resources – effects will be reduced from **Major Adverse** (Significant) to **Minor Adverse** (Not Significant).
- Hydromorphology – effects will remain as **Minor Adverse** (Not Significant).

Operation Phase

13.7.2 The following residual effects are expected to remain following implementation of the above mitigation and enhancement measures:

- Flood Risk – effects will be reduced from **Minor Adverse** (Significant) to **Negligible** (Not Significant).
- Water Quality – effects will be reduced from **Major Adverse** (Significant) to **Negligible** (Not Significant).

14 Social and Community

14.1 Introduction

14.1.1 This chapter presents the likely significant effects of the project on social and community aspects. The chapter presents the impacts of both construction and operational phases.

14.2 Legislative Framework, Policy and Guidance

14.2.1 **Table 8-1** summarises the legislation, policy and guidance of relevance to this assessment.

Table 14-1 Summary of Legislation, Policy and Guidance relevant to Social and Community

Level	Key legislation / policy / guidance
International	EBRD PR4 Health, Safety and Security EBRD Strategy for the Promotion of Gender Equality 2021-2025 EBRD PR10 Information Disclosure and Stakeholder Engagement Guiding Principles on Business, United Nations, and Human Rights (2011)
National Law	Civil Code, 2002 Labour Code, revised version, 2021 Law on Occupational Health and Safety, 2008 Law on Health, 2011 General Law on Social Insurance, 2023 Law on Pastureland Management and Conservation Law on ensuring gender equity, 2011 Law on combating domestic violence, 2016 Law on human rights of persons with disabilities, 2016 Action Plan for the Protection of Human Rights in Business Activities, the Prevention of Human Rights Violations, and the Restoration of Violations (2023-2027)" (Parliament Resolution No. 231, June 14, 2023)

14.3 Assessment Methodology

Scope

14.3.1 In terms of temporal scope, this impact assessment covers the construction and operational phases of the Project.

14.3.2 In terms of technical scope, given the vast range of potential socio-economic dimensions and parameters that can be included as part of the process of socio-economic profiling, the socio-economic baseline presented here focuses on those socio-economic dimensions and parameters that were anticipated to be most likely impacted (positively or negatively) by the proposed project and, therefore,

necessitated for coverage based on providing relevant context for the assessment and indicators for future monitoring. The assessment includes impacts on:

- Health and wellbeing, including amongst other topics, traffic safety;
- Community safety and security; and
- Social infrastructure and services.

14.3.3 The following topics are covered in other chapters of this ESIA Report:

- **Chapter 15** covers impacts on the economy, employment and livelihoods.
- **Chapter 16** covers impacts land uses and tenure, and physical and economic displacement.
- **Chapter 17** covers Labour and Working Conditions.

14.3.4 Specifically, worker influx and gender-based violence and harassment (GBVH) in relation to the local community are addressed in this chapter; GBVH in relation to labour issues and the construction and O&M workforce are addressed in **Chapter 17**.

Study Area

14.3.5 The Project area includes Dornogovi aimag and the Central Energy System (CES) to which the OHTL will connect into. The AoI includes the footprint of all Project activities and the RoW, which is 25m either side of the centre line of the OHTL route in rural areas and 6m either side in urban areas for a 220 kV overhead line; and 25m around substations.

Methodology

Identification of potential impacts

14.3.6 In line with the methodology set out in **Chapter 5**, the socio-economic impact assessment process comprises the following main steps: (i) Identification of the impact of the Project on receptors; (ii) Evaluation of the significance of the impact; (iii) Development of mitigation measures; and (iv) prediction of the significance of residual effects.

14.3.7 An overarching framework for the assessment of socio-economic impacts, based on these steps, is provided below to reflect; international best practice; professional judgement; comparison with topic-specific regulations or standards; and comparison with experience on other similar projects and consultation with stakeholders.

14.3.8 Determining whether an impact is significant has been decided upon through professional judgement, based on the criteria set out in the following tables. Where available, comparison with regulations and standards, comparison with experience on other similar projects, criteria and thresholds, has been used to assist this judgement.

Receptor Sensitivity

14.3.9 The sensitivity of a receptor for all social assessments (this chapter, Chapter 15 and Chapter 16) has been identified in accordance with **Table 14-2**.

Table 14-2 Illustrative example for determining receptor sensitivity

Sensitivity of Receptor	Example of sensitivity of receptors
High	<p>A community depends on the affected resource(s) and there are no nearby alternatives.</p> <p>Total permanent loss of access lands which will affect local livelihood and income to an unacceptable extent (permanent loss of jobs and income with no alternative resources/income).</p> <p>Significant permanent and unrecoverable environmental, health and safety and social impacts affecting the project area and wider region (e.g. groundwater contamination leading to major human illnesses/deaths as evident by health department).</p> <p>A high level of concern was expressed about the impact by many stakeholders in most of the affected areas /communities.</p> <p>Breach of national and international environmental limits, legal established sanitary boundaries where impacts would be felt higher by vulnerable groups including people with health issues, the disadvantaged and elderly.</p>
High	<p>A community depends on the affected resource, however there are nearby alternatives.</p> <p>Loss of access to lands which will result in loss of local income and livelihood (affecting more than 10-20 households).</p> <p>Some households and business owners/operators perceive that a change will affect their ability to maintain their livelihood, store of resources or quality for a significant time period (> 3 years).</p> <p>Long-term risks to health and wellbeing, local nuisance posed by Project-induced changes (increased traffic, trenches, noise, air and groundwater, access rights limitation, odour) understood by all adults, and challenging to be recovered.</p>
Medium	<p>A community depends on the affected resource, however there are nearby alternatives.</p> <p>Partial loss of access to residential and farming lands which will temporarily result in loss local income or livelihood.</p> <p>Some households and business owners/operators perceive that a change will affect their ability to maintain their livelihood, store of resources or quality for a temporary time period (2-3 years).</p> <p>Some households may feel threatened by labour influx and perceive construction workers' accommodation as sources of anti-social behaviour and conflicts.</p> <p>Intermediate risks to health and wellbeing, local nuisance posed by Project-induced changes (increased traffic, trenches, noise, air and groundwater, access rights limitation, odour) understood by all adults, but recoverable within a time period.</p>
Low	<p>Individuals or households (HH) or communities that use affected resource(s) have access to nearby alternatives, the use of which may cause limited adverse indirect impacts.</p> <p>Low level risks to health and wellbeing and local nuisance which are felt during certain periods and will be recovered in a short period of time (1 year).</p> <p>Few stakeholders expressed concern about the impact in affected communities.</p>

Impact Severity

14.3.10 The severity of the impact is a function of the magnitude, duration, and likelihood. The table below provides guidance for severity measurement taking account of these parameters.

Table 14-3 Illustrative determination of impact severity

Sensitivity of Receptor	Example of sensitivity of receptors
Very High Adverse	<p>Permanent reduction in the ability of landowners and users to exploit their land, such that economic displacement affects more than 30 individuals or households in a Project Affected Community.</p> <p>Households/individuals may not be able to adapt to the new situation.</p> <p>Physical displacement of more than 20 households.</p> <p>An undesired event that results in multiple fatalities.</p>
Very High Beneficial	<p>Large scale or major improvement of socio-economic condition of community at national level; major improvement in infrastructure and access to better services, large scale job opportunities for local people.</p>
High Adverse	<p>Permanent reduction in the ability of landowners and users to exploit their land, such that economic displacement affects more than 20 to 30 individuals or households.</p> <p>Labour influx (more than 1,000 international workers) as a result of construction workers' accommodations adjacent to residential areas (less than 300m).</p> <p>Households/individuals may be able to adapt, but it will take long time.</p> <p>An undesired event that results in a fatality or permanent disability.</p>
High Beneficial	<p>Improvement of socio-economic condition of community at regional level; regional improvement in infrastructure and access to better services, job opportunities for local people at regional level.</p>
Medium Adverse	<p>Permanent reduction in the ability of landowners and users to exploit their land, such that economic displacement affects a few households (up to 5).</p> <p>Households and individuals may be able to adapt to the loss or change of use of land, but the transition period will be difficult for some households/individuals (up to 5).</p> <p>Large labour influx (less than 1,000 employees) as a result of construction workers' accommodations within distance (more than 500m) from any settlements.</p> <p>An undesired event that results in temporary disability or greater than 5-day of lost time due to an incident.</p>
Medium Beneficial	<p>Minor benefit in terms of socio-economic conditions and job opportunities at small scale.</p>
Minor Adverse	<p>Temporary (<1 year) or intermittent negative changes to some aspects of the ability of landowners and users to exploit their land or other resources that do affect the livelihoods, economic opportunities or options for improvement of the standard of living, but to which most individuals/households are expected to be able to adapt relatively easily.</p> <p>An undesired event that results in 1 day to 5-day of lost time due to an incident.</p>

Sensitivity of Receptor	Example of sensitivity of receptors
Minor Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No Change	No change to the current socio-economic environment associated with the Project (no change). No lost time due to an incident.

Sensitive Receptors

14.3.11 Potentially sensitive receptors include:

- Herders and their camps and water wells
- Project affected communities
- Social and other infrastructure
- Customers of CES
- Women and vulnerable people/groups

14.3.12 These features, and their location in relation to the Project route, are discussed in more detail in section 14.4 below and in **Chapter 16 Land Uses, Tenure and Physical and Economic Displacement**.

Significance Criteria

14.3.13 The significance of each effect has been determined by considering the severity of the impact in combination with the importance / sensitivity of the resource / receptor, as set out in Chapter 5.

Limitations and Assumptions

14.3.14 At the time of writing this assessment, Construction Contractors have not been appointed and information related to contractor requirements such as construction camps and management plans are not available for review. Consequently, little was known about the number, type and location of construction plant, access routes, vehicle numbers, workforce numbers, accommodation arrangements, or construction material suppliers, that might be used. As such, a predominantly qualitative, and qualified, assessment of the proposed Project has been made, based on available information and professional judgement.

14.3.15 As identified in section 2.10.2-2.10.8 in **Chapter 2**, and outlined in the ESMP, the Construction Contractor will be required to undertake the following to address the potential impacts once further information is available on temporary work site areas and compounds:

- Undertake environmental and social screening of any temporary sites (e.g., workers' accommodation camp, lay down areas, etc.), to the approval of MoE/PIU and EBRD, in line with the E&S Screening Tool provided in the ESMP;

- Develop land entry and land exit procedures/protocols to facilitate land/site hand-over at the end of construction;
- Undertake pre-construction surveys, as outlined in the ESMP, including a pre-construction survey to capture video/photo description of any sensitive receptors; and
- Develop a detailed set of management plans that form the Construction ESMP (CESMP), incorporating any additional measures that arise from the above environmental and social screening of temporary site locations.

14.4 Baseline Conditions

14.4.1 The social and community baseline has been collated from secondary data sources (as listed in the text), including the National Statistical Office (NSO) of Mongolia and aimag level statistical data, as well as primary data sources, including social surveys and stakeholder engagement, as follows:

- ESIA ESIA Baseline/Impact Engagement (23-28 June and 7-8 July, 2025);
- Household Surveys (23-28 June).

14.4.2 The NSO data is maintained on a website, provided in Mongolian and English: [Үндэсний статистикийн хороо](#). The data is maintained up-to-date however, often data is aggregated to the soum or even aimag level rather than bagh level. Data available is generally for the year 2024 and prior years, with the exception of some data that was based on the last census in 2020. Aimag or soum level statistical data varies significantly between regions; where data are available for 2024 and previous years, this has been used to help provide the local context. Note that data are provided for the Project aimag, soums and baghs. Data does not include other soums that fall within Dornogovi aimag or other baghs outwith the Project route siting.

14.4.3 During the ESIA, the following activities took place:

- Key Informant Interviews (KIIs) and meetings with local government officials in Sainshand, Saikhandulaan, Ulaanbadrakh and Mandakh soums were completed from 23-28 June 2025;
- FGDs held with women, elderly people, small business owners and other stakeholders in the four Project soums; and
- 10 household surveys (HHS).

14.4.4 Further details on engagement are provided in **Chapter 6: Stakeholder Engagement**. Further details of the survey process and sample profile are contained in **Appendix F and G**.

Governance and Administrative Structure

14.4.5 Mongolia is a parliamentary republic. Governance of the administrative and territorial units of Mongolia is organised on the basis of a combination of the principles of self-governance and central government. At the national level is the State Great Khural. The self-governing bodies at the aimag (province), and soum (district) levels are called Citizens Representative Khurals (CRK), or *hurals*. At the bagh level (sub-district), the self-governing body is called the Bagh General Meeting. The mandate of the soum and district CRK includes *“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.*³⁸

- 14.4.6 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 Governor is the representative of the State and directly reports to the respective higher-level Governors. The Governor's Office in each *aimag* consists of the following departments, in addition to the Governor and Vice Governor and the Head of the Governor's office: State Administrative Management Department (with a State Service Information Centre); Law and Legal Department, Regional and Local Investment, Policy and Planning Department; Sectoral Control and Regulation Department; Finance and Treasury Department; Monitoring and Evaluation Department; and Social Policy Department.³⁹
- 14.4.7 The maximum number of local government officers in the aimag Governor's Office are set by the Government Resolution at 41, 51 and 57 for different aimags depending on local characteristics such as territorial size, population, economy, and scale of production.
- 14.4.8 There are also numerous agencies under the governor responsible for matters like environment, agriculture and food, land management, labour and social welfare, health, education, tax, veterinary services, statistics; state registration; emergency, police; state procurement among others.
- 14.4.9 At the soum level, the number of soum governor's office depends on soum's population, size of the territory, and the number of households, businesses, and organizations served. Accordingly, the maximum number of staff in the soum Governor/s office is set at 13 for soums with a population of up to 1,500, 15 for soums with a population of 1,501-3,000, 16 for soums with a population of 3,001-5,000, 18 for soums with a population of 5,001-10,000, 21 for soums with a population of 10,001-20,000, and 23 for soums with a population of over 2,000⁴⁰. Typical positions at the soum administration level include staff in charge of finance; treasury; social policy; SME, trade and services; environment; labour; agriculture; legal specialist; human resources; and archives, and Governor, Deputy Governor, and Head of the Governor's Office.
- 14.4.10 At the bagh level there is a bagh governor, and section leaders. Bagh's budget is included in respective soum's budget.
- 14.4.11 The Project is located in Dornogovi aimag, in south-east of Mongolia, in the central region, and covers an area of 109,500 km². The aimag centre is Sainshand city.
- 14.4.12 Dornogovi aimag comprises of 14 soums, which are divided into 65 baghs. The soums are Airag, Altanshiree, Dalanjargalan, Delgerekh, Ikkhet, Zamyn-Uud, Mandakh, Urgan, Sainshand, Saikhandulaan, Khatanbulag, Khuvsgul, Ulaanbadrakh, and Erdene. Sainshand, Ulaanbadrakh, Saikhandulaan and Mandakh soums are in the Project Aol.
- 14.4.13 **Table 14-4** shows the administrative boundaries are shown in relation to the Project. Sainshand soum is divided into eight baghs, of which seven are in the Aol; Ulaanbadrakh soum has four baghs, of which one is within the Project Aol; Saikhandulaan soum has four baghs, of which one is in the Aol;

³⁸ Responsibilities of Citizens' Representatives Khural. <http://www.khural.mn/en-us/n/8xyy>.

³⁹ Government Resolution #37. 29 January 2025.

⁴⁰ Government Resolution #13, 14 January, 2009. Amended in 2017 and 2018.

and Mandakh soum has five baghs, of which two are in the Aol.

Table 14-4 Project administrative boundaries

Aimag	Soum	Bagh
Dornogovi	Sainshand	Dalaishand Chandmani Yalalt Ganzam Zuunbayan Khairkhan Naran
	Ulaanbadrakh	Argalant
	Saikhandulaan	Ulaanshoroot
	Mandakh	Servenbayankhoshuu Alagteeg

14.4.14 There are no informal governance processes in Mongolia. Overall, non-government organisation (NGO) activity is weak. Youth-focused civic participation NGOs are more active however, environmental NGOs operate sporadically and are often centred around one person, lacking institutional structure⁴¹.

Demography

Population Density

14.4.15 The broad geographic features and population density of the Project aimag and soums are summarised in **Table 14-5**. In 2024, the population density in Dornogovi aimag was 0.7 people per square kilometre (km²) typical of desert and semi-desert regions in southeastern Mongolia. In 2024, the population density in Sainshand soum was 12.2 people per 1 km², considerably higher than Ulaanbadrakh, Saikhandulaan and Mandakh soums. Sainshand soum stands out as the only urban centre. This reflects its role as the provincial capital and the primary hub for economic activity and public services. It is also the largest soum in terms of administrative subdivisions, with eight baghs.

14.4.16 In contrast, Ulaanbadrakh, Saikhandulaan, and Mandakh soums are sparsely populated rural areas, each with population densities of only 0.1 persons per km², indicating an extremely scattered settlement pattern. These soums also have fewer baghs (4–5 each) and cover vast land areas.

⁴¹ KII, Head of Dornogovi aimag Tourism Association. 23 June 2025.

Table 14-5 Size of Dornogovi aimag and soums in the Project Area and population density, 2024

Aimag/Soums	Number of baghs	Size (km ²)	Population density (Number of persons per km ²)
Total, Dornogovi aimag	65	109,500	0.7
Sainshand soum	8	28,492	12.2
Ulaanbadrakh soum	4	11,400	0.1
Saikhandulaan soum	4	9,558	0.1
Mandakh soum	5	12,6601	0.1

Source: NSO. www.1212.mn

Population

14.4.17 The resident population of the Project aimag and soums is shown in **Table 14-6**. The resident population of Dornogovi aimag was 71,969 (2024), of whom 51% were male. The population of Sainshand soum was 28,492 in 2024, of whom 47.8 were male. Saikhandulaan soum population was 1,358 in 2024, of whom 539% were male. Ulaanbadrakh soum population was 1,476 in 2024, of whom 51.4% were male. Mandakh soum population was 1,654 in 2024, of whom 58.3 % were male.

Table 14-6 Population⁴² at aimag and soum level, by sex, 2020-2024

Administrator unit	2020	2021	2022	2023	2024
Dornogovi aimag					
Total	71,233	72,113	71,812	71,414	71,969
Male	35,856	36,449	36,213	36,372	36,664
Female	35,377	35,664	35,599	35,042	35,305
Sainshand soum					
Total	26,558	27,405	28,097	28,194	28,492
Male	12,820	13,222	13,541	13,488	13,635
Female	13,738	14,183	14,556	14,706	14,857
Mandakh soum					
Total	1,573	1,550	1,536	1,523	1,654
Male	811	809	809	832	964
Female	762	741	727	691	690
Saikhandulaan soum					
Total	1,384	1,411	1,404	1,396	1,358
Male	750	757	760	753	733
Female	634	654	644	643	625

⁴² NSO definition 2024: Resident population of Mongolia is the total number of usual residents of Mongolia that include Mongolian citizens, foreign citizens and stateless persons usually residing in Mongolia for more than 183 days or 6 months.

Administrator unit	2020	2021	2022	2023	2024
Ulaanbadrakh soum					
Total	1,509	1,519	1,504	1,453	1,476
Male	775	787	784	766	774
Female	734	732	720	687	702

Source: www.1212.mn

14.4.18 In the last 5 years, Dornogovi aimag's population has increased by 736 persons or 1.03% (**Table 14-7**). However, a notable gender disparity was observed: while the male population increased by 808 individuals (+2.25%), the female population slightly declined by 72 individuals (-0.2%).

14.4.19 At the soum level, Sainshand soum exhibited the most significant population growth in the aimag, with an increase of 1,934 persons (+7.29%). Both genders contributed to this growth: males by 6.37% and females by 8.15%. Meanwhile, Mandakh soum showed an increase of 81 persons (+5.15%), but the gender distribution was highly imbalanced; the male population grew by 18.88%, while the female population declined by 9.45%.

14.4.20 By contrast, Saikhandulaan and Ulaanbadrakh soums both experienced population declines, at -1.88% and -2.19%, respectively. While the male population in these soums remained relatively stable (or saw only minor decreases), the female population declined more sharply, particularly in Ulaanbadrakh (-4.36%) and its Bagh III, Argalant (-18.06%), suggesting outmigration of women to more urbanized areas.

Table 14-7 Population Change by Administrative Unit and Sex (2020–2024)

Administrator unit	Pop 2020	Pop 2024	Change (number)	Change (%)	Male (number)	Male change (%)	Female (number)	Female change (%)
Mongolia	3253283	3441598	188315	+5.79%	93568	+5.83	94747	+5.74
Dornogovi aimag	71233	71969	736	+1.03%	808	+2.25	-72	-0.2
Sainshand soum	26558	28492	1934	+7.29%	815	+6.37	1119	+8.15
Dalaishand bagh	3982	4393	411	+10.32%	138	+7.4	273	+12.91
Chandmani bagh	5337	5626	289	+5.42%	174	+7.01	115	+4.03
Yalalt bagh	3484	3774	290	+8.32%	134	+8.27	156	+8.37
Ganzam bagh	2804	2831	27	+0.96%	12	+0.85	15	+1.08
Zuunbayan bagh	2006	1820	-186	-9.27%	-103	-9.67	-83	-8.82
Khairkhan bagh	3189	3549	360	+11.29%	174	+11.14	186	+11.41
Naran bagh	3062	3670	608	+19.85%	222	+15.26	386	+24.03
Mandakh soum	1573	1654	81	+5.15%	153	+18.88	-72	-9.45
Alkhanteeg bagh	247	365	118	+47.77%	130	+95.59	-12	-10.81
Serven Bayankhoshuu bagh	273	237	-36	-13.19%	1	+0.78	-37	-25.52
Saikhandulaan soum	1384	1358	-26	-1.88%	-17	-2.27	-9	-1.42
Ulaanshoroot	412	404	-8	-1.94%	-1	-0.44	-7	-3.78

Administrator unit	Pop 2020	Pop 2024	Change (number)	Change (%)	Male (number)	Male change (%)	Female (number)	Female change (%)
Ulaanbadrakh soum	1509	1476	-33	-2.19%	-1	-0.13	-32	-4.36
Argalant	295	261	-34	-11.53%	-8	-5.3	-26	-18.06

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

14.4.21 At the bagh level, significant variation exists across and within soums. Within Sainshand soum, the most substantial growth was recorded in Naran Bagh with a +19.85% increase in total population, +24.03% among females, far outpacing male growth (+15.26%). Other Sainshand baghs such as Khairkhan Bagh and Dalaishand Bagh also saw robust population increases of +11.29% and +10.32%, respectively, with both sexes contributing. Conversely, Zuunbayan Bagh experienced a sharp decline of -9.27%, affecting both males and females. In Mandakh soum, Alkhanteeg Bagh saw the highest relative growth of any bagh in the dataset, at +47.77%, driven almost entirely by a +95.59% increase in males, while the female population actually decreased (-10.81%). In contrast, Serven Bayankhoshuu Bagh declined by -13.19%, driven entirely by a female loss (-25.52%). In Saikhandulaan soum, Ulaanshoroot Bagh experienced a minimal population decline (-1.94%), with a relatively balanced gender distribution in this change.

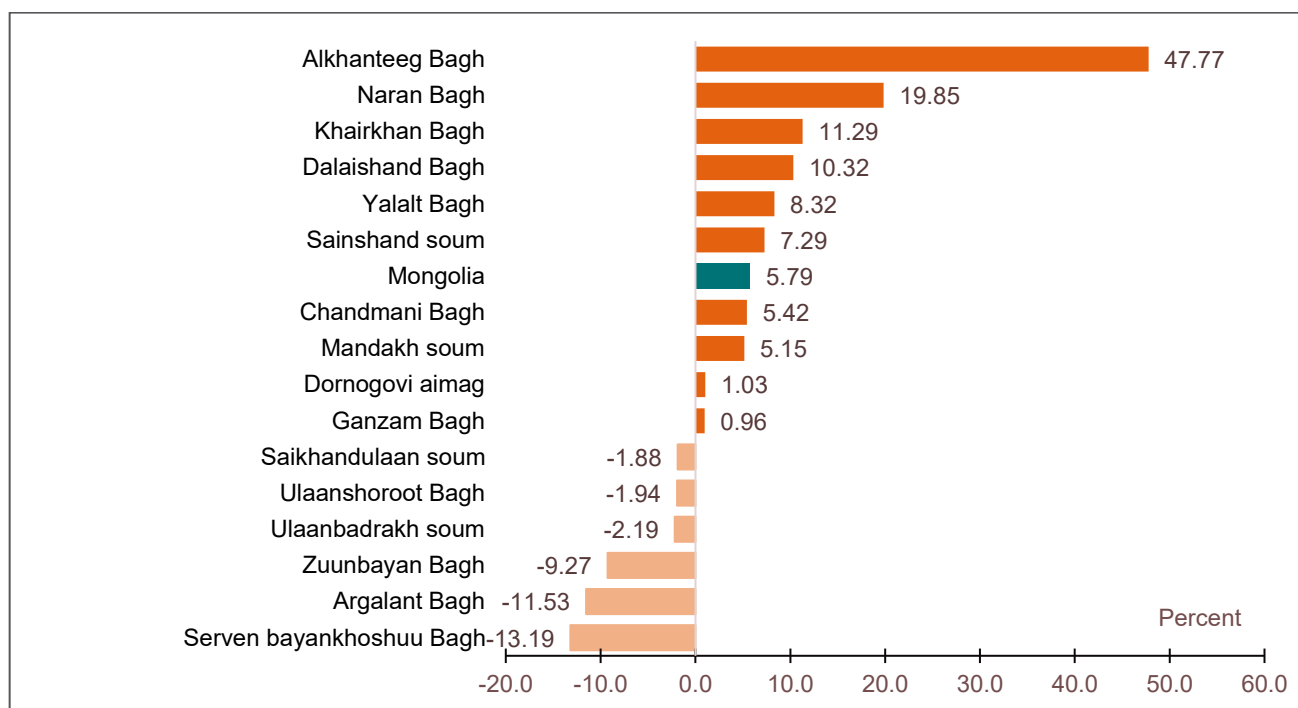


Figure 14-1 Percentage Change in Total Population by Administrative Unit (2020–2024)⁴³Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

⁴³ This horizontal bar chart shows the percentage change in total population across selected administrative units in Dornogovi aimag and Mongolia between 2020 and 2024. Positive values indicate growth, while negative values indicate population decline.

Sex Ratio

14.4.22 Between 2020 and 2024, Mongolia's national sex ratio remained largely stable, increasing marginally from 97.17 to 97.3 (+0.1) but maintaining a slight female predominance in the population structure. In contrast, Dornogovi aimag exhibited a consistently higher and increasing sex ratio, rising from 101.4 in 2020 to 103.8 in 2024 (+2.5). This persistent deviation from the national average indicates a demographic structure that is relatively more male-dominant, reflecting regional population dynamics that diverge from the national norm (**Table 14-8**).

Table 14-8 Sex ratio, Mongolia, Dornogovi aimag and selected Project soums and baghs (%)

Administrator unit	2020	2021	2022	2023	2024	Change (2020–2024)
Mongolia	97.2	97.2	97.0	97.3	97.3	+0.1
Dornogovi aimag	101.4	102.2	101.7	103.8	103.8	+2.5
Sainshand soum	93.3	93.2	93.0	91.7	91.8	-1.5
Dalaishand bagh	88.4	90.4	85.4	84.0	84.0	-4.3
Chandmani bagh	86.9	85.5	86.0	86.9	89.4	+2.5
Yalalt bagh	87.0	88.0	87.8	86.5	86.9	-0.1
Ganzam bagh	101.0	103.3	112.8	106.1	100.8	-0.2
Zuunbayan bagh	113.2	111.6	108.3	113.9	112.1	-1.1
Khairkhan bagh	95.9	94.0	95.9	92.7	95.6	-0.2
Naran bagh	90.5	90.5	87.8	85.9	84.1	-6.4
Mandakh soum	106.4	109.2	111.3	120.4	139.7	+33.3
Alkhanteeg bagh	122.5	128.7	135.2	186.3	268.7	+146.2
Serven bayankhoshuu bagh	88.3	95.6	100.8	106.9	119.4	+31.2
Saikhandulaan soum	118.3	115.7	118.0	117.1	117.3	-1.0
Ulaanshoroot bagh	122.7	119.1	123.4	121.6	127.0	+4.3
Ulaanbadrakh soum	105.6	107.5	108.9	111.5	110.3	+4.7
Argalant bagh	104.9	104.9	112.8	123.1	121.2	+16.3

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

14.4.23 At the soum level, a marked contrast is observed between the aimag centre and the surrounding rural areas. In Sainshand soum, the sex ratio decreased from 93.3 males per 100 females in 2020 to 91.8 in 2024. In contrast, rural soums exhibited relatively high and increasing sex ratios. In Mandakh soum, the number of males per 100 females increased significantly from 106.4 to 139.7 (+33.3). Saikhandulaan soum maintained a high ratio, with a slight decrease from 118.3 to 117.3, while Ulaanbadrakh soum experienced a moderate rise from 105.6 to 110.3. These patterns indicate that the sex composition in rural areas has become increasingly imbalanced, with males accounting for a growing share of the population.

14.4.24 These soum-level dynamics are further emphasized at the bagh level, where more localized differences are evident. In Sainshand soum, most baghs continued to report fewer males than females throughout the five-year period. For example, Dalaishand bagh saw a decline from 88.4 to 84.0 males per 100 females. Conversely, Zuunbayan bagh consistently recorded more males, with a ratio of 113.2 in 2020 and 112.1 in 2024.

14.4.25 In rural areas, several baghs exhibited notable shifts toward increasingly male-dominated sex ratios over the past five years. The most dramatic change occurred in the Alkhanteeg bagh of Mandakh soum, where the sex ratio more than doubled—from 122.5 males per 100 females in 2020 to 268.7 in 2024—resulting in a striking increase of +146.2. In the same soum, the Serven Bayankhoshuu bagh saw its sex ratio rise from 88.3 to 119.4, reflecting a significant increase of +31.1. Likewise, the Argalant bagh of Ulaanbadrakh soum experienced a change of +16.3, with the sex ratio rising from 104.9 to 121.2. The Ulaanshoroot bagh in Saikhandulaan soum also recorded a moderate increase of +4.3, moving from 122.7 to 127.0.

Population Age Structure

14.4.26 Between 2020 and 2024, Mongolia's age structure showed signs of gradual demographic aging (**Figure 14-2**). The proportion of children aged 0–14 declined from 32.5% in 2020 to 31.6% in 2024, while the share of the elderly population aged 65+ increased from 4.4% to 5.5%. Consequently, the aging index (number of people aged 65+ per 100 children) rose significantly from 13.6 to 17.3. The mean and median ages also increased steadily, from 28.5 to 29.6 and from 27.7 to 28.5, respectively, reflecting a slowly aging population.

14.4.27 In Dornogovi aimag, a similar aging trend is observed, although the pace is slightly slower than the national level. The child population declined from 32.2% to 30.6%, and the elderly population rose from 3.8% to 5.0%. The aging index increased from 11.8 to 16.3 over the five years. Notably, the working-age population (15–64) in Dornogovi remained more stable and slightly higher than the national level (64.4% in 2024 versus 62.9% nationally). The rise in mean age (from 28.3 to 29.6) and median age (from 27.5 to 28.8) in Dornogovi suggests a parallel but slightly younger demographic profile than the national average.

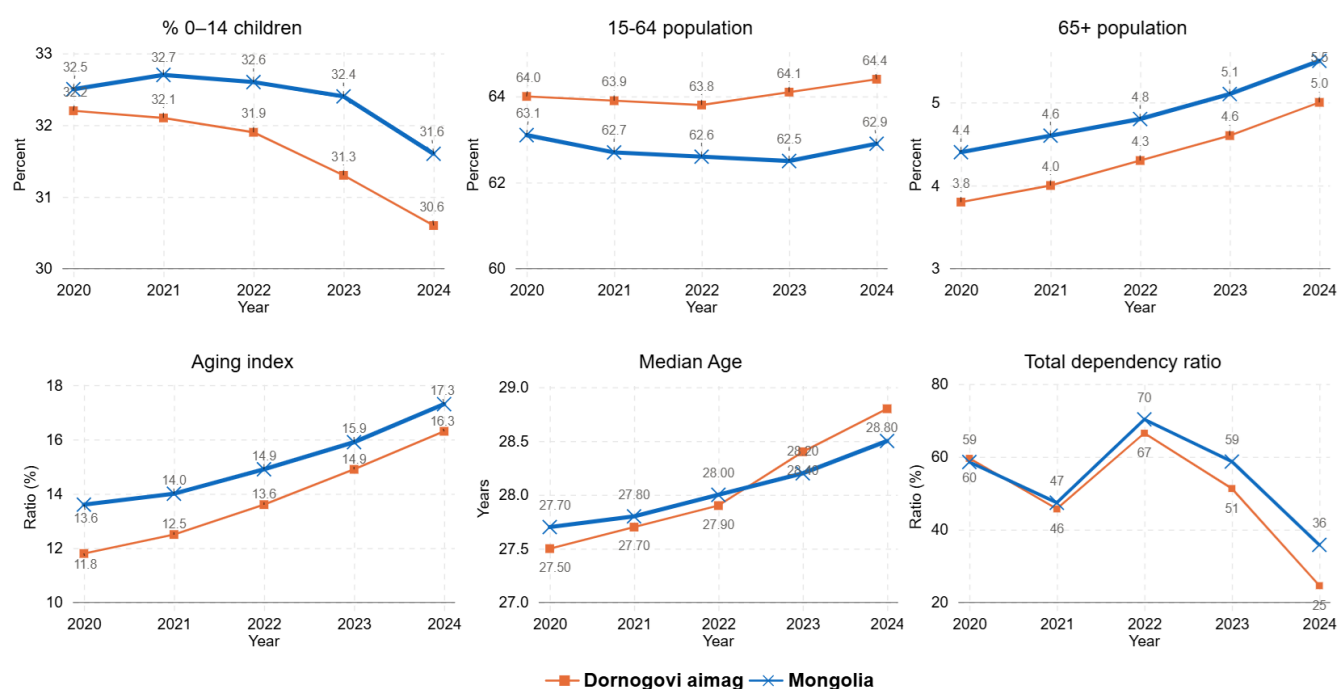


Figure 14-2 Trends in Key Population Age Structure Indicators in Mongolia and Dornogovi Aimag (2020–2024)

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

14.4.28 Soum level trends are shown in **Table 14-9** and described below.

Table 14-9 Changes in Key Age Structure Indicators, Mongolia, Dornogovi aimag and Project selected soums and baghs (2020-2024)

Administrator unit	% aged 0–14	% aged 65+	Aging Index	Total Dependency	Median Age
Mongolia	32.5 ↘ 31.6	4.4 ↗ 5.5	13.6 ↗ 17.3	58.6 ↗ 59.0	27.7 ↗ 28.5
Dornogovi aimag	32.2 ↘ 30.6	3.8 ↗ 5.0	11.8 ↗ 16.3	56.3 → 55.4	27.5 ↗ 28.8
Sainshand soum	33.7 ↘ 33.0	4.4 ↗ 5.8	13.1 ↗ 17.5	61.7 ↗ 63.4	26.8 ↗ 27.6
Mandakh soum	28.7 ↘ 23.3	6.0 ↗ 6.7	20.9 ↗ 28.8	53.0 ↘ 42.8	28.6 ↗ 29.4
Saikhandulaan soum	30.7 ↘ 29.9	3.8 ↗ 4.6	12.2 ↗ 15.5	52.6 ↗ 52.8	27.0 ↗ 27.8
Ulaanbadrakh soum	27.4 ↘ 26.3	6.3 ↗ 7.9	22.9 ↗ 29.9	50.9 ↗ 51.9	29.8 ↗ 30.6
Dalaishand bagh	33.9 ↗ 35.7	4.8 ↗ 5.6	14.3 ↗ 15.6	63.3 ↗ 70.3	26.4 ↗ 27.2
Chandmani bagh	34.7 ↘ 32.7	5.2 ↗ 6.6	15.1 ↗ 20.0	66.5 ↘ 64.7	27.0 ↗ 27.8
Yalalt bagh	35.3 ↘ 35.2	5.2 ↗ 5.5	14.8 ↗ 15.6	68.0 ↗ 68.7	27.4 ↗ 28.2
Ganzam bagh	27.5 → 27.5	7.1 → 7.1	25.9 → 25.9	53.0 ↘ 53.0	28.0 ↗ 28.8
Zuunbayan bagh	28.1 → 28.1	5.5 ↗ 5.6	19.7 ↗ 19.8	50.7 → 50.7	28.2 ↗ 29.0
Khairkhan bagh	32.8 → 32.8	5.0 → 5.0	15.2 ↗ 15.3	60.9 ↘ 60.8	27.6 ↗ 28.4
Naran bagh	36.3 → 36.3	5.3 ↘ 5.2	14.6 ↘ 14.4	71.2 ↘ 71.1	26.5 ↗ 27.3
Alkhanteeg bagh	15.6 → 15.6	4.1 → 4.1	26.3 → 26.3	24.5 ↗ 24.6	32.1 ↗ 32.9
Serven Bayankhoshuu bagh	24.1 → 24.1	6.7 ↗ 6.8	27.9 ↗ 28.1	44.5 ↗ 44.6	28.4 ↗ 29.2
Ulaanshoroot bagh	26.2 → 26.2	5.5 → 5.5	21.0 ↘ 20.8	46.5 ↘ 46.4	28.7 ↗ 29.5
Argalant bagh	22.6 → 22.6	10.3 → 10.3	45.6 ↗ 45.8	49.0 ↗ 49.1	30.9 ↗ 31.7

Note: Directional arrows indicate increase ↗, decrease ↘, or no change →

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

14.4.29 **Sainshand soum** retained the youngest demographic structure throughout 2020–2024. The child population (aged 0–14) remained stable at a high level—rising slightly from 33.7% in 2020 to 33.9% in 2022, then levelling off at 33.0% in 2024, which is the highest share among all soums. The working-age population (15–64) fluctuated narrowly around 61.0–61.9%, while the elderly share steadily increased from 4.4% to 5.8%, contributing to a notable rise in the aging index from 13.1 to 17.5. Both the mean age (28.1 → 28.9) and median age (26.8 → 27.6) showed a modest upward trend, suggesting a gradually aging yet relatively youthful population. Total dependency increased from 61.7 to 63.4, primarily driven by elder dependency, which rose from 7.2 to 9.4. The child dependency ratio remained relatively high, from 54.5 to 53.9, indicating sustained fertility and continued demographic renewal capacity in the urban centre.

14.4.30 **Mandakh soum** exhibited the most pronounced aging pattern across the project region. The child population share plummeted from 28.7% in 2020 to 23.3% in 2024, representing a 5.4 percentage point drop. Meanwhile, the elderly population remained significantly high - peaking at 7.5% in 2021 and 2023, before declining slightly to 6.7% in 2024. As a result, the aging index soared from 20.9 to 28.8, the second highest in Dornogovi aimag after Ulaanbadrakh. The working-age population rose steadily from 65.3% to 70.0%, signaling potential youth out-migration and low fertility. Correspondingly, child dependency dropped sharply from 43.9 to 33.3, while elder dependency fluctuated but remained high. The mean age increased from 30.0 to 30.8, and median age from 28.6 to 29.4, marking Mandakh as one of the oldest and most demographically imbalanced soums, with a

shrinking base of young dependents.

- 14.4.31 **Saikhandulaan soum** underwent moderate demographic aging. The proportion of children aged 0–14 declined slightly from 30.7% in 2020 to 29.9% in 2024, while the elderly share increased from 3.8% to 4.6%. The aging index rose from 12.2 to 15.5, indicating gradual demographic aging but remaining below the levels observed in Mandakh or Ulaanbadrakh. The working-age population hovered around 64.7–65.5% across the five-year period. The total dependency ratio remained nearly constant (from 52.6 to 52.8), reflecting demographic stability. Both mean and median ages rose modestly (28.4 → 29.2; 27.0 → 27.8), and the elder dependency ratio peaked in 2023 at 9.4 before falling to 7.1 in 2024. Overall, Saikhandulaan presents a relatively balanced age structure with early signs of aging.
- 14.4.32 **Ulaanbadrakh soum** experienced the sharpest increase in aging indicators among all soums. The elderly population rose markedly from 6.3% to 7.9%, while the child population decreased from 27.4% to 26.3%, contributing to a substantial jump in the aging index from 22.9 to 29.9 - the highest in the region by 2024. The mean age climbed from 31.2 to 32.0, and median age from 29.8 to 30.6, confirming the soum's status as the most aged in the aimag. The elder dependency ratio rose from 9.5 to 11.9, while the child dependency ratio fell below 40 for the first time (39.9 in 2024). These trends reflect both increasing longevity and likely youth out-migration, resulting in a contracting younger base and an aging population pyramid.
- 14.4.33 Across the baghs of the Project Area (**Table 14-9 above**), several common demographic trends are evident. Most baghs maintained relatively young population structures throughout the five-year period 2020–24, with high shares of children aged 0–14 and relatively low aging indices. This pattern was particularly evident in Dalaishand Yalalt, and Naran baghs, where the proportion of children consistently exceeded 35%, and the aging index remained low.
- 14.4.34 Aging tendencies were more visible in baghs such as Chandmani and Ganzam baghs. In Chandmani bagh, the elderly share gradually rose, pushing the aging index from 15.1 in 2020 to 20.0 in 2024. The Ganzam bagh consistently recorded one of the highest aging indices among all baghs, reaching 25.9 in both 2020 and 2024, accompanied by a relatively low child population share around 27–28%.
- 14.4.35 Among the exceptional cases, Alkhanteeg bagh stood out with a significantly high median age of 32.9 in 2024 and a persistently low share of children (15.6%). The aging index in this bagh exceeded 26, reflecting a sharply imbalanced age structure and limited generational renewal. Similarly, Argalant bagh showed consistently high elderly proportions (around 10%) and the highest aging index of all baghs—reaching 45.8 in 2024—indicating a deeply aged population base.
- 14.4.36 Zuunbayan and Khairkhan baghs maintained stable and relatively balanced age structures. Both baghs exhibited consistent child population shares above 28%, aging indices below 20, and minimal year-to-year fluctuation in median age. These areas reflect demographic equilibrium, with neither extreme youthfulness nor advanced aging.
- 14.4.37 Overall, the bagh-level data indicate a mixed demographic picture across the project area. While urban and central baghs tend to retain younger age profiles, some smaller or more remote baghs are entering or already experiencing of population aging. This variation has implications for local service needs, workforce composition, and long-term development planning.

Dependency Ratio

14.4.38 Population dependency is a key demographic indicator reflecting the proportion of dependents-children (0–14) and the elderly (65+)- relative to the working-age population (15–64). It influences the demand for social services, education, healthcare, and labor force sustainability. Understanding how child and elder dependency evolve over time is essential for effective planning and targeted interventions.

14.4.39 Over the past five years (2020-24), Mongolia has exhibited a stable total dependency ratio that remained unchanged at approximately 59 dependents per 100 working-age individuals. However, this apparent stability conceals significant structural demographic shifts occurring within the dependency composition (**Table 14-10**). The child dependency ratio declined from 52 to 50, representing a 4.0% reduction that signals Mongolia's ongoing demographic transition toward lower fertility rates. Simultaneously, the aged dependency ratio increased from 7 to 9, marking a 28.6% rise that indicates the early stages of population aging. This dual trend reflects Mongolia's progression through the demographic dividend window, where declining birth rates and increasing life expectancy create both opportunities and challenges. The country's median age of 26.9 years positions it as a relatively young society, yet the acceleration of aging trends suggests preparation for future demographic pressures is critical. Mongolia's life expectancy reaching 70.91 years in 2025 contributes to the gradual increase in elderly dependency, while urbanization and socioeconomic changes drive fertility decline.

Table 14-10 Changes in Dependency Ratio by type, Mongolia, Dornogovi aimag and Project selected soums and baghs (2020-2024)

Administrator unit	Δ Child Dep. (pp)	Δ Elder Dep. (pp)	Δ Total Dep. (pp)
Mongolia	-1.3	1.7	0.4
Dornogovi aimag	-2.8	1.9	-0.9
Sainshand soum	-0.6	2.2	1.7
Dalaishand bagh	5.4	1.6	7
Chandmani bagh	-3.9	2.1	-1.8
Yalalt bagh	0.2	0.5	0.7
Ganzam bagh	0	0	0
Zuunbayan bagh	-0.1	0.1	0
Khairkhan bagh	-0.1	0	-0.1
Naran bagh	0	0	-0.1
Mandakh soum	-10.6	0.5	-10.2
Alkhanteeg bagh	0.1	0	0.1
Serven bayankhoshuu bagh	0	0.1	0.1
Saikhandulaan soum	-1.2	1.4	0.2
Ulaanshoroot bagh	0	-0.1	-0.1
Ulaanbadrakh soum	-1.5	2.4	1
Argalant bagh	0	0.1	0.1

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

- 14.4.40 Dornogovi aimag child dependency ratio decreased from 50 to 48 (**Table 4-10** above) while the aged dependency ratio increased from 6 to 8, maintaining pace with national aging trends. Significant demographic divergence emerges at the soum level, with Sainshand showing a moderate increase in total dependency ratio from 62 to 63 (1.6% growth), while Mandakh experienced a dramatic decline from 53 to 43 (18.9% reduction). Sainshand's urban centre maintains higher child dependency ratios (54-56) with increasing elderly dependency (7 to 9). Rural soums display contrasting patterns: Mandakh's child dependency ratio plummeted from 44 to 33 (25% decrease), indicating substantial youth outmigration, while Saikhandulaan soum maintained remarkable stability (total dependency unchanged at 53). Ulaanbadrakh soum shows minimal overall change but exhibits the highest elderly dependency ratio (increasing from 10 to 12) among Project soums, suggesting selective outmigration of working-age residents while elderly populations remain.
- 14.4.41 At the bagh level, demographic dependency trends reveal highly localized patterns reflecting specific community dynamics and migration flows (**Table 4-10** above). Urban baghs in Sainshand soum generally maintain higher child dependency ratios (54-62) alongside moderate elderly dependency increases, consistent with urban family concentration patterns. Dalaishand bagh exhibits the most intensive dependency increase while rural baghs demonstrate extreme variations, with Serven bayankhoshuu in Mandakh experiencing catastrophic demographic contraction with dependency ratios dropping from 49 to 25. Conversely, Argalant in Ulaanbadrakh maintained complete stability.

Urban and Rural Population

- 14.4.42 Between 2020 and 2024, Mongolia experienced an accelerated urbanisation process, with the national urban population share increasing from 68.02% to 70.33%. In contrast, Dornogovi aimag showed a more modest increase in urban population share from 64.12% to 65.10%. This divergence reflects differences in development patterns between the capital-dominated national level and provincial regions such as Dornogovi.
- 14.4.43 At the national level, the urban population grew by 9.38% over five years (2020-24), while the rural population declined by 1.86%. Dornogovi aimag exhibited a 2.58% increase in urban population and a 1.73% decrease in rural population (**Table 14-11**). These trends demonstrate that national urban growth significantly outpaced that of Dornogovi, both in terms of percentage point changes in population share and absolute growth.

Table 14-11 Urban-Rural Population Trends Comparison (2020-2024)

Administrative Level	2020 Urban %	2024 Urban %	Urban Change (pp)	2020 Rural %	2024 Rural %	Rural Change (pp)	Urban Pop Growth %	Rural Pop Growth %	Total Pop Growth %
Mongolia	68.02	70.33	+2.31	31.98	29.67	-2.31	9.38	-1.86	5.79
Dornogovi aimag	64.12	65.10	+0.98	35.88	34.90	-0.98	2.58	-1.73	1.03

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

Migrant Population

- 14.4.44 Between 2020 and 2024, internal migration in Mongolia showed a relatively steady upward trend. In 2020, 59,563 people moved, increasing to 62,627 in 2024, marking a 5.1% growth. However, a sharp decline occurred in 2021, when the number dropped to 44,023, likely due to the impact of the COVID-19 pandemic. Migration levels gradually recovered afterward, reaching their peak in 2024. On average, 55,438 people migrated per year at the national level, which corresponds to approximately 1.6% of the total population. This level of mobility reflects the characteristics of a developing country, driven by factors such as economic transition, urbanization, and demand for education.
- 14.4.45 Analysis of internal migration in 2024 (**Table 14-12**) confirms that economic motivations remain the primary driver. Gendered differences are evident, with men showing greater mobility due to job seeking, income generation, and official assignments. Specifically, men accounted for 70.3% of migrations for official duty, 66.1% for working in their professional field, and 65.4% for improving living conditions- the largest migration category at 23.5% of all cases. In contrast, women were more likely to migrate for caregiving (65.0%) and education (55.0%), reflecting traditional gender roles in household and academic settings. A significant 73.0% of all migration cases fell under the category “Other reasons,” which likely includes marriage, housing changes, access to healthcare, environmental displacement, and family reunification.

Table 14-12 Sex Distribution by Reason for Internal Migration, Mongolia, 2024

Reason	Total		Female		Male	
	Count	%	Count	%	Count	%
To improve living conditions	55,490	23.5	19,199	34.6	36,291	65.4
To work in profession	3,544	1.5	1,201	33.9	2,343	66.1
Work assignment	1,820	0.8	538	29.6	1,282	70.4
To provide care	1,607	0.7	940	58.5	667	41.5
To pursue/complete education	806	0.3	387	48.1	419	51.9
To enroll in school	339	0.1	174	51.6	165	48.4
Other reasons	172,778	73.1	80,687	46.7	92,091	53.3
Total	236,384	100.0	103,126	43.6	133,258	56.4

Source: Calculated using migration data from www.dornogovi.gov.mn

Dornogovi aimag

- 14.4.46 Over the past five years (2020-2024), Dornogovi aimag has undergone a notable transformation in its internal migration patterns, shifting from a region of high net out-migration to one approaching demographic equilibrium (**Table 14-13**). This transition reflects a convergence of infrastructure investments, cross-border trade expansion, and economic diversification- particularly in the transport and mining sectors. Between 2020 and 2024, out-migration declined by 8.4% (from 2,071 to 1,898 people), while in-migration increased by 70.7% (from 992 to 1,693 people). The most rapid increase in in-migration was observed between 2023 and 2024. As a result, the aimag's net migration loss fell from 1,079 people in 2020 to only 205 in 2024- an 80% reduction.

Table 14-13 Migration Efficiency Ratio of Dornogovi Aimag, 2020–2024

Year	Out-migration	In-migration	Net Migration	Total Migration	MER (%)
2020	2,071	992	–1,079	3,063	–35.2%
2021	1,887	1,011	–876	2,898	–30.2%
2022	2,099	805	–1,294	2,904	–44.6%
2023	2,035	1,539	–496	3,574	–13.9%
2024	1,898	1,693	–205	3,591	–5.7%

Source: Calculated using migration data from www.dornogovi.gov.mn

14.4.47 These shifts are reflected in the migration efficiency ratio (MER), which improved steadily from -35.2% in 2020 to -5.7% in 2024. The lowest efficiency was recorded in 2022 (-44.6%), driven by a temporary dip in in-migration (**Figure 14-3**). However, by 2023 and 2024, increased inflows and reduced outflows signalled a move toward balanced population exchange.

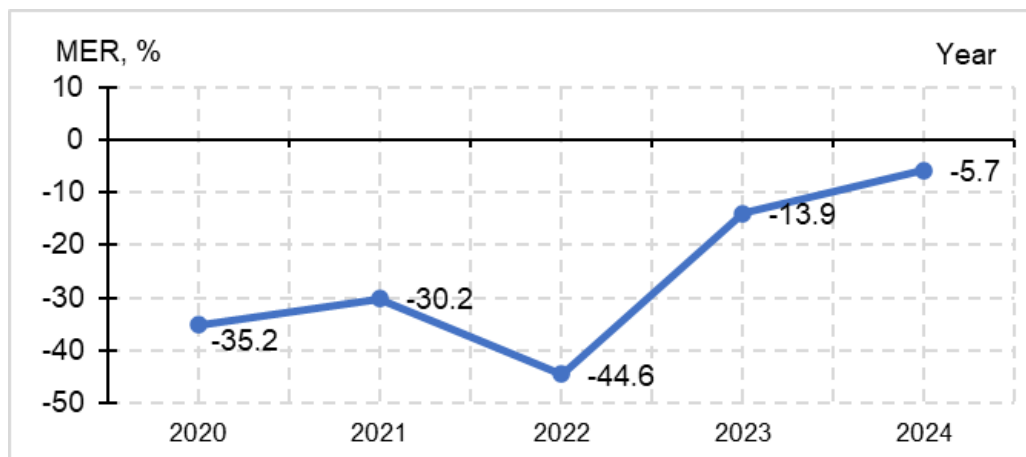


Figure 14-3 Migration Efficiency Ratio in Dornogovi Aimag (2020–2024)

Source: Calculated using migration data from www.dornogovi.gov.mn

- 14.4.48 The positive trend is largely attributed to strategic investments in the Tavantolgoi–Zuunbayan railway corridor and enhanced border trade infrastructure at Zamyn-Uud and Khangai ports. These developments have strengthened Dornogovi aimag's position as a key logistics and industrial hub in southeastern Mongolia.
- 14.4.49 In terms of spatial distribution, 2024 data show that 44.3% of in-migrants came from Ulaanbaatar and 10.2% from Sukhbaatar aimag. Similarly, 37% of out-migrants moved to Ulaanbaatar, with 5-7% relocating to Sukhbaatar and Selenge aimags. These flows demonstrate Dornogovi aimag's close demographic and economic linkages with both the capital and surrounding regions. Age-disaggregated data reveal that children aged 0–14 accounted for the largest share of in-migrants (39.0%), suggesting family-driven relocation. Meanwhile, individuals aged 15–34 comprised the largest group of out-migrants (35.8%), reflecting youth migration motivated by education and employment opportunities in larger urban areas. Adults aged 35 and above made up smaller proportions of both inflows and outflows, with limited evidence of return migration or elderly resettlement.

Project soums

- 14.4.50 In 2024, internal migration patterns in the four Project soums of Dornogovi aimag reflected significant contrasts in population movement volume and age-specific flows. Sainshand soum, as the provincial capital, recorded the highest migration turnover, with 701 out-migrants and 544 in-migrants, resulting in a net loss of 157 people. Meanwhile, rural soums experienced lower volumes but more extreme disparities in migration efficiency. These figures are summarized in **Table 14-4**.

Table 14-14 Migration Efficiency Ratio by Project Soum, 2024

Soum	Out-migration	In-migration	Net Migration	Total Migration	MER (%)
Sainshand	701	544	–157	1,245	–12.6%
Mandakh	18	15	–3	33	–9.1%
Saikhandulaan	14	5	–9	19	–47.4%
Ulaanbadrakh	25	7	–18	32	–56.3%

Source: Calculated using soum-level migration data, 2024. www.dornogovi.gov.mn

- 14.4.51 Sainshand's migration efficiency ratio of -12.6% indicates moderate net out-migration, primarily among the 15-34 age group, which accounted for 37.4% of out-migrants, compared to only 30% of in-migrants in this age category. This trend reflects the continued movement of educated youth toward major urban centres.
- 14.4.52 In Mandakh soum, despite modest migration numbers (18 out, 15 in), the migration efficiency ratio of -9.1% suggests relative demographic stability. A significant proportion of in-migrants (40%) were young adults aged 15-34, likely drawn by its strategic location near the Tavantolgoi–Zuunbayan railway corridor and associated infrastructure opportunities.

14.4.53 By contrast, Saikhandulaan and Ulaanbadrakh soums recorded sharp demographic losses, with migration efficiency ratios of -47.4% and -56.3%, respectively. All age groups showed net out-migration, with particular losses among children and youth. These dynamics may be linked to rural depopulation drivers such as environmental degradation, herder livelihood insecurity, and poor access to services.

14.4.54 The age structure of migrants in each soum is presented in **Figure 14-4**, highlighting the divergent patterns of age-specific inflows and outflows that underlie these overall trends.

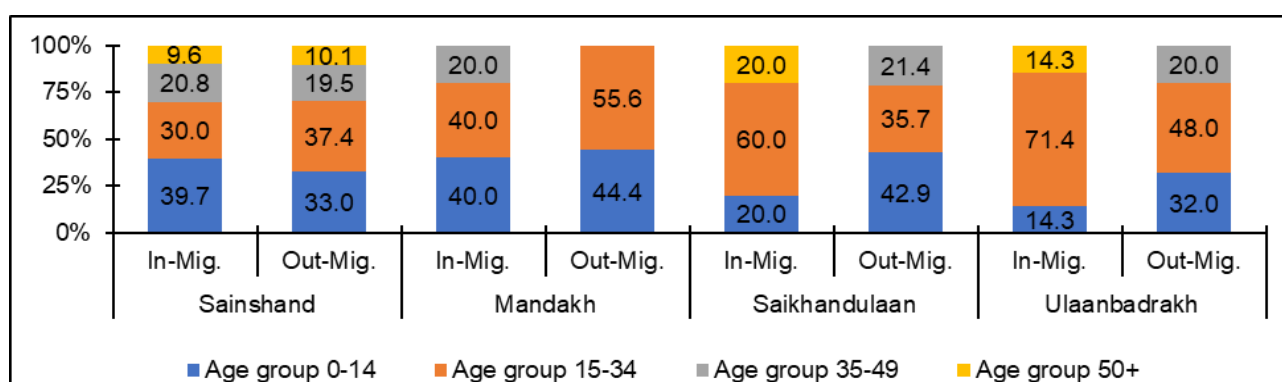


Figure 14-4 Age Distribution of In- and Out-Migration by Percentage in Selected Soums (2024)

Source: Calculated using soum-level migration data, 2024. www.dornogovi.gov.mn

Settlements

14.4.55 Between 2020 and 2024, Mongolia's overall household count increased steadily, growing from 908,712 to 997,023 households. Urban households rose from 611,670 to 691,305, while rural households grew marginally from 297,042 to 305,718 (**Table 14-15**). This reflects an ongoing trend of urban settlement expansion, where the number of households in cities and towns increased by 12.99%, compared to only 2.92% growth in rural areas over the five-year period. As a result, the national urban-to-rural household ratio rose from 2.06 in 2020 to 2.26 in 2024, demonstrating accelerated urban concentration.

Table 14-15 Urban versus Rural Household Growth in Mongolia and Dornogovi Aimag (2020–2024)

Location	2020 Urban HH	2024 Urban HH	Urban HH Growth (%)	2020 Rural HH	2024 Rural HH	Rural HH Growth (%)	2020 UR Ratio	2024 UR Ratio
Mongolia	611,670	691,305	12.99	297,042	305,718	2.92	2.06	2.26
Dornogovi aimag	12,264	13,412	9.38	8,235	8,389	1.87	1.49	1.60

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

- 14.4.56 In Dornogovi aimag, the total number of households grew from 20,499 in 2020 to 21,801 in 2024⁴⁴. Urban households increased from 12,264 to 13,412 during the same period, while rural households remained stable at 8,389 in both 2023 and 2024. This indicates that all household growth in recent years has been concentrated in urban areas of the aimag, in particular Sainshand city. Dornogovi's urban-to-rural household ratio rose from 1.49 to 1.60 between 2020 and 2024, showing moderate but continuous urbanisation. However, compared to national figures, the shift toward urban settlement in Dornogovi has progressed at a slower pace.
- 14.4.57 The spatial distribution of households within Dornogovi aimag further illustrates this pattern (**Table 14-16**). In 2020, approximately one-third of Dornogovi aimag's households resided in the aimag centre (Sainshand city), with the remaining two-thirds spread across towns, soum centres, and rural areas. By 2024, the number of households in the aimag centre increased from 6,877 to 7,920, representing a 15.2% growth. Households in towns and villages also rose from 5,385 to 5,492. In contrast, the number of households residing in soum centres declined slightly from 2,978 to 2,880, and those in rural baghs remained relatively unchanged, from 5,254 to 5,509.
- 14.4.58 Sainshand soum, which consists entirely of urban households, expanded from 7,435 to 8,471 households between 2020 and 2024. This represents a 13.9% increase in household count, confirming its status as the fastest-growing settlement in the aimag. In contrast, all other soums in the study -Mandakh, Saikhandulaan, and Ulaanbadrakh- maintained 100% rural household compositions throughout the five-year period. Mandakh soum's household count increased slightly from 500 to 511, while Saikhandulaan and Ulaanbadrakh saw minor declines or stable levels, with household numbers ranging between 460 and 533 over the period.

Table 14-16 Household Distribution by Soum in Dornogovi Aimag (2020–2024)

Soum	2020 HH	2024 HH	Urban HH 2024	Rural HH 2024	Change in HH	Growth (%)
Sainshand soum	7,435	8,471	8,471	0	+1,036	13.94
Mandakh soum	500	511	0	511	+11	2.20
Saikhandulaan soum	467	460	0	460	-7	-1.50
Ulaanbadrakh soum	520	533	0	533	+13	2.50

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

- 14.4.59 At the bagh level (**Table 14-17**), all urban baghs located within Sainshand soum -such as Dalaishand and Khairkhan- exhibited continuous household growth over the study period. For example, household numbers in Chandmani bagh increased from 1,510 in 2020 to 1,679 in 2024, and in Khairkhan bagh from 909 to 1,110. In contrast, rural baghs such as Serven Bayankhoshuu, Ulaanshoroot, and Argalant reported minimal changes, with household numbers remaining below 160 in all years.

Table 14-17 Household Growth by Selected Baghs (2020–2024)

Bagh	2020 HH	2024 HH	Δ HH	Growth (%)
Dalaishand bagh	1,117	1,245	+128	+11.5
Chandmani bagh	1,510	1,679	+169	+11.2

⁴⁴ Available at: [Статистикийн мэдээллийн нэгдсэн сан](#)

Bagh	2020 HH	2024 HH	Δ HH	Growth (%)
Yalalt bagh	963	1,125	162	+16.8
Ganzam bagh	752	820	68	+9.0
Zuunbayan bagh	558	551	-7	-1.3
Khairkhan bagh	909	1,110	+201	+22.1
Naran bagh	854	1,071	217	+25.4
Alkhanteeg bagh	80	87	7	+8.8
Serven Bayankhoshuu bagh	81	83	+2	+2.5
Ulaanshoroot bagh	148	157	+9	+6.1
Argalant bagh	117	116	-1	-0.9

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

Pastoral Households and Herdsmen

14.4.60 From 2020 to 2024, Mongolia's households with livestock increased by 7,427 (+3.1%), while herdsmen rose by 9,957 (+3.3%), reflecting modest national expansion of pastoral activity. In contrast, Dornogovi aimag saw a slight decline in pastoral households (-2.1%) and herdsmen (-6.1%), alongside a rising sex ratio (from 137.4 to 145.2 males per 100 females), a marked drop in young herdsmen aged 15–34 (-27.7%), and small gains among those aged 55+ (+10.8%).

14.4.61 **Table 14-18** presents key pastoral indicators for each soum, highlighting divergent local trends. As can be seen, soum-level patterns diverge: Sainshand's pastoral households fell by 13% and herdsmen by 25%, accompanied by a sharp loss of young herdsmen (-55% in 15–34 cohort) and a steep sex ratio rise (+20 percentage point). Mandakh maintained its household level but lost 2% of herdsmen, whereas Saikhandulaan grew herdsmen by 3% and notably increased female participation (+13%) and older herdsmen (+16%). Ulaanbadrakh saw slight household and older-herdsmen growth but a 6% drop in total herdsmen.

Table 14-18 Selected Indicators of Pastoral Household and Herdsmen Dynamics by Project Aimag and Soums (2020-2024)

Indicator	Dornogovi aimag	Sainshand	Mandakh	Saikhandulaan	Ulaanbadrakh
HH_with_livestock 2020	5653	484	388	343	376
HH_with_livestock 2024	5534	421	388	338	389
Δ HH_with_livestock	-119	-63	0	-5	+13
Herdsmen 2020	7308	480	620	464	529
Herdsmen 2024	6861	362	608	478	494
Δ Herdsmen	-447	-118	-12	+14	-35
Female 2020	3078	209	262	173	214
Female 2024	2798	145	252	195	188
Δ Female	-280	-64	-10	+22	-26
Sex Ratio 2020	137.4	129.7	136.6	168.2	147.2
Sex Ratio 2024	145.2	149.7	141.3	145.1	162.8
Δ Sex Ratio	+7.8	+20	+4.7	-23.1	+15.6
15–34 2020	2088	123	210	170	157

Indicator	Dornogovi aimag	Sainshand	Mandakh	Saikhandulaan	Ulaanbadrakh
15–34 2024	1511	55	160	133	113
Δ 15–34	–577	–68	–50	–37	–44
35–54 2020	4064	283	307	234	290
35–54 2024	4077	223	339	271	284
Δ 35–54	13	–60	+32	+37	–6
55+ 2020	1150	73	101	60	81
55+ 2024	1274	84	109	74	97
Δ 55+	124	+11	+8	+14	+16
HH size 2024	3.24	3.35	2.85	2.95	2.75

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

14.4.62 **Table 14-19** compares pastoral households and herdsmen counts for each bagh where data permit. Among baghs, most display declines in herdsmen, notably Zuunbayan (–38%), Ganzam (–43%), and Yalalt (–21%), whereas Ulaanshoroot bucked the trend with a 14% increase. Household sizes in pastoral baghs range from 2.43 to 3.42 persons, highest in Chandmani and lowest in Serven bayankhoshuu.

Table 14-19 Herdsmen Counts by Bagh (2020 → 2024)

Bagh	HH_HL 2024	Herdsmen 2020	Herdsmen 2024	Δ Herdsmen	HH size 2024
Dalaishand bagh	48	42	37	–5	3.26
Chandmani bagh	55	43	35	–8	3.42
Yalalt bagh	64	70	55	–15	3.25
Ganzam bagh	30	63	36	–27	3.20
Zuunbayan bagh	78	102	63	–39	3.28
Khairkhan bagh	66	65	54	–11	3.13
Naran bagh	56	72	59	–13	3.34
Alkhanteeg bagh	76	121	115	–6	2.68
Serven Bayankhoshuu bagh	72	133	134	+1	2.48
Ulaanshoroot bagh	121	155	177	+22	2.43
Argalant bagh	96	144	125	–19	2.61

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

- 14.4.63 As shown in **Figure 2-11 in Chapter 2**, the OHTL starts on the outskirts of the town of Sainshand, the nearest point being around 4.4km from the city at the proposed substation site. The other nearest permanent settlements i.e. those in Dzüübayan and Mandakh, are located approximately 26km and 43km away respectively from the Project route. There is a Student Military Training Centre near Dzüübayan (22km from the Project route). At the Tsagaan Suvarga substation, there are buildings associated with the development of the mine.
- 14.4.64 Along the route, a total of 16 herder camps have been identified within 1km of the route, in the soums of Sainshand (15) and Ulaanbadrakh (1). These are a mixture of winter, autumn and summer camps and are addressed in more detail in **Chapter 16: Land Use, Tenure and Displacement**. Examples of these settlements are shown in **Plate 14-1**.



Plate 14-1 Herder settlements along the Project route

Culture, Customs and Gender

- 14.4.65 Ethnic Mongols account for almost 97% of the Mongolian 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. Significant ethnic Turkic speaking Kazakhs constitute 3.9% of Mongolia's population. Ethnic distinctions among Mongol subgroups are relatively minor, and language or tribal differences are not a political or social issue.
- 14.4.66 In Dornogovi aimag, 96.5% of the resident population are Khalkha, followed by Dariganga (1.4%), Durvud (0.5%), Buriads 0.3 %), Kazakhs and Bayad (equally 0.2 %), with the rest being other ethnic groups⁴⁵.
- 14.4.67 With respect to religion, around 94% of the Mongolia population practise Tibetan Buddhism. Six percent are Sunni Muslim, mainly members of Turkic minorities. Two percent are Shamanist, following the traditional belief system of the region. There is no data available at the aimag level or lower in the population census.
- 14.4.68 According to the World Bank Mongolia Gender Assessment (2024)⁴⁶, between 2014 and 2024, Mongolia's rank in the World Economic Forum (WEF) Global Gender Gap Index fell from 42nd to 85th place (out of 146 countries) and from 4th to 7th place among 19 East Asia and Pacific countries. The Assessment states that the country's ranking declined particularly in the areas of political empowerment and economic participation and opportunity, while it remained strong on measures of educational attainment, and health and survival. The Women, Business and the Law index⁴⁷ shows improvements for Mongolia over the last five years, with the country continuing to rank higher than the global and EAP averages. Important strides have been made, for example, with updates to the Labor Law, Elections Law, and Political Party Law. While legislation is improving, supportive frameworks for women in the workplace and ensuring women's safety from violence and harassment still need to be strengthened. There is also a traditional belief that women should care for their children is still strong in Mongolian society. The average Mongolia woman spends around 28 hours a week tending to household chores.
- 14.4.69 Herding in Mongolia is often seen as "male" activity, with men much more often defined as the "main herder" in household surveys. But over 80% of women in herding households report participating in animal husbandry activities, reporting about two-thirds as many minutes per day as men. A study reported in the paper "Women herders: women's role and bargaining power in Mongolia herding households" ⁴⁸ suggests that men and women are equally likely to participate in a wide range of herding-related activities, and that women often provide more time in these shared activities than men do.
- 14.4.70 A study by the Swiss Agency for Development and Cooperation and Pasture-Green Gold found that the average daily workload of Mongolian women during the year is 11.1 hours while the workload of men is 9.2 hours⁴⁹. Despite this, women's contribution and roles appear to not be adequately recognized in other aspects of herding households, such as decision-making on major family spending and purchases, participation in community activities, and leadership. In relation to the control of household assets, properties are mostly registered under the husband's name.

14.4.71 In relation to cultural, spiritual, or heritage sites, respondents to the household survey identified Choilin Mountain and Monastery, Khaalga Mountain, Khaalga Spring, and Khamar Monastery. They also stated that other natural and historical sites—including mountains, springs, and monasteries—are considered cultural heritage by the local population. All respondents reported learning about these cultural heritage sites orally passed down from elders¹¹. None of these sites are in the immediate environs of the Project route. Further details are provided in **Chapter 10: Cultural Heritage and Chapter 11: Landscape and Visual**.

Vulnerable Groups

14.4.72 Based on the EBRD definition of vulnerable people, this category includes “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 people may include 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.

14.4.73 During the social baseline surveys, vulnerable groups and vulnerability criteria was also discussed with the local authorities. The following categories of vulnerable groups have been identified as relevant to this Project, in line with the EBRD definition and the Mongolian Law on Social Welfare adopted in 2012:

- Elderly-only households
- People with disabilities
- People with chronic illnesses
- Orphans
- Households with four and more children under 18
- Single female-headed households

14.4.74 Herders as a group are not considered vulnerable in the context of the Project AoI, unless they fall under one of the categories identified above.

The Elderly

14.4.75 The number of elderly-only households in 2024 increased in all Project soums except Mandakh since 2020 (**Table 14-20**), indicating an growing elderly population. From the household surveys, two of the ten households had elderly people in their family.

⁴⁵ Population and Housing Census 2020 in Dornogovi Aimag. Ulaanbaatar 2020.

⁴⁶ Available at: [World Bank Document](#)

⁴⁷ Women, Business, and the Law Index Score (Scale 1-100) – Mongolia (accessed June 14, 2024), accessed on June 14, 2024. Available at: <https://data.worldbank.org/indicator/SG.LAW.INDX?locations=MN>.

⁴⁸ Women herders: women's role and bargaining power in Mongolia herding households. Amarjargal A., Otgontugs B., Myagmarsuren B., Georgia Poyatzis. Central Asian Survey, Volume 41, 2022, Issue 1.

⁴⁹ Gender analysis in pastoral livestock herding in Mongolia. Swiss Agency for Development and Cooperation and Pasture-Green Gold, Ulaanbaatar, 2015.

Table 14-20 Number of elderly (60+ men, 55+ women) **only** households, project soums and baghs, 2020-2024

Soum / Bagh	2020	2021	2022	2023	2024	Change % (2020-2024)
Sainshand soum	408	372	442	545	543	+33.1
Dalaishand bagh 1	77	69	91	114	90	+16.9
Chandmani bagh 2	79	41	45	77	78	-1.3
Yalalt bagh 3	57	62	73	74	71	+24.5
Ganzam bagh 4	43	24	28	33	62	+44.1
Zuunbayan bagh 5	22	41	39	35	42	+90.9
Khairkhan bagh 6	42	35	59	56	76	+81.0
Naran bagh 8	63	66	86	85	81	+28.5
Mandakh soum	42	40	41	10	39	-7.1
Alkhanteeg bagh	2	2	2	2	2	0
Serven Bayankhoshuu bagh	9	8	6	10	8	-11.1
Saikhandulaan soum	26	30	40	10	32	+23.1
Ulaanshoroot	6	11	21	10	18	+200.0
Ulaanbadrakh soum	36	49	27	12	43	+19.4
Argalant	8	16	8	12	16	+100.0

Source: Statistical Office of Dornogovi aimag, <https://dornogovi.nso.mn/>

People with disabilities

14.4.76 In 2024, a total of 1,302, 80, 77 and 52 People with Disabilities (PWDs) were registered in Sainshand soum, Mandakh soum, Saikhandulaan soum and Ulaanbadrakh soum, respectively (Table 14-22). This was an increase in Sainshand soum and Saikhandulaan soum, though a decrease in Mandakh soum and Ulaanbadrakh soum. Fluctuations in PWDs at the bagh level were more pronounced in some baghs than others; with the Sainshand baghs recording the highest levels of PWDs.

Table 14-21 Number of PWDs, project soums and baghs, 2020-2024

Soum / Bagh	2020	2021	2022	2023	2024	Change % (2020-2024)
Sainshand soum	1020	973	1354	1341	1302	+27.6
Dalaishand bagh 1	169	152	196	200	205	+21.3
Chandmani bagh 2	181	175	284	286	295	+63.0
Yalalt bagh 3	124	127	191	183	172	+38.7
Ganzam bagh 4	112	129	150	149	130	+16.1
Zuunbayan bagh 5	89	75	86	86	72	-19.1
Khairkhan bagh 6	126	129	196	184	171	+35.7
Naran bagh 8	140	106	149	155	160	+14.2
Mandakh soum	84	79	88	84	80	-4.8
Alkhanteeg bagh	13	8	8	10	10	-23.1
Serven Bayankhoshuu bagh	6	7	8	6	6	0

Soum / Bagh	2020	2021	2022	2023	2024	Change 2024)	% (2020-
Saikhandulaan soum	61	52	77	80	77		+26.2
Ulaanshoroot	22	13	26	28	29		+31.8
Ulaanbadrakh soum	55	51	54	52	52		-5.5
Argalant	10	8	5	6	9		-10.0

Source: Statistical Office of Dornogovi aimag, <https://dornogovi.nso.mn/>

Orphans

- 14.4.77 The number of fully orphaned children is shown in **Table 14-22**; please note for these tables, only the baghs that the Project route passes through are included in the table. Some soums have more baghs and therefore, the total soum number is not the sum of the bagh data presented. The number of fully orphaned children in the Project soums of Sainshand and Mandakh has reduced since 2020, and remained stable in Saikhandulaan and Ulaanbadrakh soums, with an increase seen in 2020 in Zuunbayan bagh only. The number of half orphaned children (**Table 14-23**) however has increased, in some cases quite significantly, between 2020 and 2024 in the Project soums and baghs. The only exception to this is Serven Bayankhoshuu bagh, where the cases were low in 2021 (two) and have been reduced to one in 2024.

Table 14-22 Number of fully orphaned children, by project soums and baghs, 2020-2024

Soum / Bagh	2020	2021	2022	2023	2024
Sainshand soum	27	31	25	25	21
Dalaishand bagh	6	6	5	4	4
Chandmani bagh	4	6	4	6	5
Yalalt bagh	5	8	4	5	3
Ganzam bagh	4	3	4	4	5
Zuunbayan bagh	1	1	1	1	2
Khairkhan bagh	0	4	3	2	0
Naran bagh	3	2	2	2	2
Mandakh soum	2	2	1	1	1
Alkhanteeg bagh	0	0	0	0	0
Serven Bayankhoshuu bagh	2	2	1	1	1
Saikhandulaan soum	2	2	2	2	2
Ulaanshoroot	0	0	0	0	0
Ulaanbadrakh soum	1	1	1	1	1
Argalant	0	0	0	0	0

Source: Statistical Office of Dornogovi aimag, <https://dornogovi.nso.mn/>

Table 14-23 Number of half orphaned children, by project soums and baghs, 2020-2024

Soum / Bagh	2020	2021	2022	2023	2024
Sainshand soum	301	323	327	389	879
Dalaishand bagh	52	58	47	69	205
Chandmani bagh	46	40	55	40	106
Yalalt bagh	31	31	32	35	116
Ganzam bagh	34	41	43	44	44
Zuunbayan bagh	37	55	48	46	118
Khairkhan bagh	46	43	39	63	142
Naran bagh	26	25	33	36	72
Mandakh soum	15	11	12	8	39
Alkhanteeg bagh	0	0	0	2	4
Serven Bayankhoshuu bagh	2	0	0	0	1
Saikhandulaan soum	19	26	30	7	40
Ulaanshoroot	5	5	10	5	8
Ulaanbadrakh soum	16	17	14	3	42
Argalant	2	3	3	1	4

Source: Statistical Office of Dornogovi aimag, <https://dornogovi.nso.mn/>

Households with Four or More Children

14.4.78 The number of households with four or more children under the age of 18 is shown in **Table 14-24** for the Project soums and relevant Project baghs. This shows in all Project soums except Mandak soum, there has been an increase since 2020. At the bagh level, some baghs have shown a large increase in numbers from 2020 to 2024 (such as Dalaishand bagh and Zuunbayan bagh), whereas others have shown a decrease between 2020 to 2204 (such as Serven Bayankhoshuu bagh and Chandmani bagh).

Table 14-24 Number of Households with four and more children under 18 years of age, by project soums and baghs, 2020-2024

Soum / Bagh	2020	2021	2022	2023	2024
Sainshand soum	306	318	375	408	463
Dalaishand bagh	39	41	51	71	106
Chandmani bagh	68	78	97	91	57
Yalalt bagh	44	42	59	58	61
Ganzam bagh	29	31	25	27	31
Zuunbayan bagh	18	15	15	26	62
Khairkhan bagh	43	44	46	48	65
Naran bagh	30	30	42	41	45
Mandakh soum	24	25	24	16	19
Alkhanteeg bagh	4	4	5	2	6
Serven Bayankhoshuu bagh	12	12	11	1	1

Saikhandulaan soum	19	26	28	32	24
Ulaanshoroot	6	6	5	5	4
Ulaanbadrakh soum	13	15	16	19	25
Argalant	2	2	2	2	3

Source: Statistical Office of Dornogovi aimag, <https://dornogovi.nso.mn/>

Single Female Households

14.4.79 As **Table 14-25** shows, over the period 2020 to 2024, there has been an increase in single female households (with children under 18) in the Project soums, with the exception of Mandakh soum which saw a decrease from 30 to 19. As above, there is some variation at the Project bagh level, with some baghs showing an increase (such as Dalaishand bagh and Zuunbayan bagh), some showing a decrease over the period (such as Chandmani bagh) and some showing no change (such as Ulaanshoroot bagh).

Table 14-25 Number of Single female households with children under 18 years of age, by project soums and baghs, 2020-2024

Soum / Bagh	2020	2021	2022	2023	2024
Sainshand soum	394	390	385	454	411
Dalaishand bagh	55	60	64	80	97
Chandmani bagh	87	60	50	54	47
Yalalt bagh	51	47	50	74	53
Ganzam bagh	16	15	30	31	17
Zuunbayan bagh	43	48	51	63	54
Khairkhan bagh	67	60	56	59	60
Naran bagh	24	58	57	58	44
Mandakh soum	30	31	27	16	19
Alkhanteeg bagh	0	0	0	0	0
Serven Bayankhoshuu bagh	5	4	3	4	1
Saikhandulaan soum	19	29	23	29	23
Ulaanshoroot	4	6	5	8	4
Ulaanbadrakh soum	20	24	20	24	22
Argalant	1	1	2	1	2

Source: Statistical Office of Dornogovi aimag, <https://dornogovi.nso.mn/>

14.4.80 Three household survey respondents were elderly. One respondent was a single headed household. No other vulnerabilities were recorded.

Health and Well Being

Life Expectancy

- 14.4.81 Life expectancy at birth measures the average number of years a newborn is expected to live, assuming current mortality rates persist. It serves as a key indicator of overall population health, reflecting access to medical care, living standards, and the burden of communicable and non-communicable diseases. From 2020 to 2024, both Mongolia and Dornogovi aimag have experienced steady gains in life expectancy, with the Project Area consistently outperforming the national average.
- 14.4.82 **Table 14-26** presents total, male, and female life expectancy at birth for Mongolia and Dornogovi aimag over the five-year period. Life expectancy in Mongolia increased from 70.7 years in 2020 to 71.8 years in 2024, a gain of 1.1 years, with males rising from 66.7 to 67.9 years and females from 76.2 to 77.1 years. Dornogovi aimag maintained higher longevity, climbing from 72.0 to 73.1 years over the same period, with male and female expectancy improving from 67.4 to 68.7 years and 78.0 to 78.8 years respectively. The longevity advantage of women narrowed slightly over five years in both contexts. Nationally, the gap decreased from 9.5 years to 9.2 years, while in Dornogovi aimag it contracted from 10.6 to 10.1 years. The more pronounced reduction in the Project Area suggests greater relative improvements in male survival.

Table 14-26 Life Expectancy at Birth (Years), Mongolia vs. Dornogovi Aimag (2020 → 2024)

Unit	2020	2021	2022	2023	2024	Change (2020-2024)
Mongolia	70.7	71.0	71.3	71.5	71.8	+1.1
Dornogovi aimag	72.0	72.2	72.7	72.9	73.1	+1.1

Source: National Statistical Office (NSO), www.1212.mn

Birth Rate, Mortality Rate

- 14.4.83 Crude Birth Rate represents the annual number of live births per 1,000 people in a population. The crude death rate or Crude Death Rate indicates the number of deaths occurring during the year per 1,000 population estimated at midyear.
- 14.4.84 Between 2020 and 2024, both Mongolia and Dornogovi aimag experienced a continuous and significant decline in crude birth rates (**Figure 14-5**). Mongolia's rate dropped from 23.4 per 1,000 in 2020 to 17.1 per 1,000 in 2024, representing a 6.3 point decrease. Dornogovi aimag followed a similar trend, declining from 22.9 to 16.9 per 1,000 over the same period- a 6-point drop. This downward trend indicates a nationwide fertility decline, consistent across both national and provincial levels.

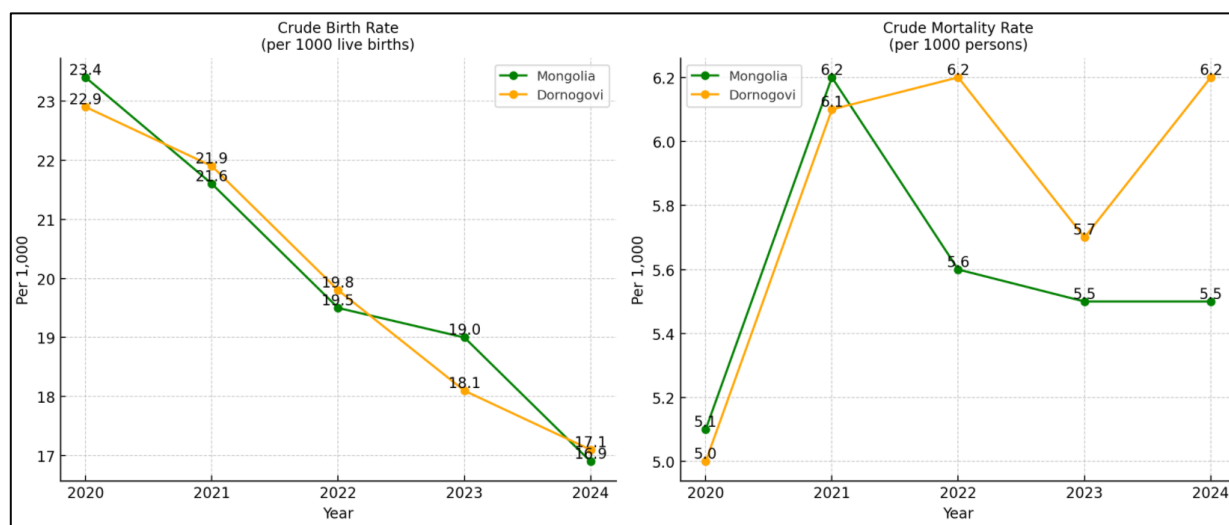


Figure 14-5 Trends in Crude Birth and Mortality Rates in Mongolia and Dornogovi Aimag, 2020–2024

Source: National Statistical Office (NSO), www.1212.mn

- 14.4.85 The crude mortality rate exhibited more fluctuation than birth rates. In Mongolia, the mortality rate increased from 5.1 in 2020 to a peak of 6.2 in 2021, likely reflecting COVID-19 impacts, before gradually declining and stabilizing at 5.5 per 1,000 in 2023 and 2024. Dornogovi showed a similar early increase, rising from 5.0 in 2020 to 6.2 in both 2021 and 2022. However, unlike the national level, the provincial mortality rate rebounded to 6.2 in 2024 after a dip to 5.7 in 2023.
- 14.4.86 **Table 14-27** below presents crude birth and death rate trends across the four Project soums, showing substantial declines in fertility alongside varied mortality patterns. All four soums experienced dramatic birth rate declines over the five-year period. Mandakh soum recorded the steepest fertility drop (–10.5 per 1,000), followed by Saikhandulaan soum (–9.4) and Sainshand soum (–7.7). Ulaanbadrakh soum, despite starting with the lowest crude birth rate in 2020, still declined by 5.2 points. Death rates showed divergent patterns: Ulaanbadrakh soum experienced a sharp mortality increase (+6.2 per 1,000), while Sainshand soum saw a modest rise (+0.9). In contrast, Mandakh soum and Saikhandulaan soum achieved mortality reductions (–0.7 and –2.2 respectively).
- 14.4.87 The Project soums mirror national fertility decline trends but show greater variability in mortality patterns. While the national death rate stabilized around 5.0 per 1,000, soum-level rates ranged from 5.7 to 8.9 per 1,000 in 2024, suggesting local factors significantly influence mortality outcomes. Sainshand soum, Mandakh soum, and Saikhandulaan soum began the period with birth rates above the national average, while Ulaanbadrakh soum started below average but converged toward similar declining trajectories.

Table 14-27 Crude Birth and Death Rate Trends by Soum (2020-2024)

Soum	CBR 2020	CBR 2024	Δ CBR	CDR 2020	CDR 2024	Δ CDR
Sainshand	25.2	17.5	–7.7	5.5	6.4	+0.9
Mandakh	25.6	15.1	–10.5	6.4	5.7	–0.7
Saikhandulaan	24.7	15.3	–9.4	8.0	5.8	–2.2
Ulaanbadrakh	16.8	11.6	–5.2	2.7	8.9	+6.2

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

Maternal and Child Health

- 14.4.88 Mongolia recorded a sharp spike in maternal mortality in 2021 (95 per 100,000 live births), followed by a steady decline to 23 by 2024. Dornogovi aimag, on the other hand, exhibited a continued increase through 2023 (93), before abruptly dropping to 0 in 2024 (**Figure 14-6**). While the 2024 figure may reflect underreporting or data anomalies, the longer-term trend still indicates concerning maternal health risks in the aimag, especially during the pandemic recovery years.
- 14.4.89 Mongolia's infant mortality rate remained stable, fluctuating narrowly between 12.0 and 12.4 per 1,000 live births. Dornogovi aimag's data shows an unusual pattern: consistent at 9.0 until 2021, a sudden drop to 0 in 2022, followed by a peak of 11.2 in 2023, and then another drops to 0 in 2024.
- 14.4.90 In Mongolia, the under-five mortality rate peaked in 2022 at 16 per 1,000 and declined slightly thereafter to 15. Dornogovi aimag showed an increase from 10 in 2020 to 14 in 2022, followed by a dip to 13 in 2023 and a subsequent rise back to 16 in 2024.

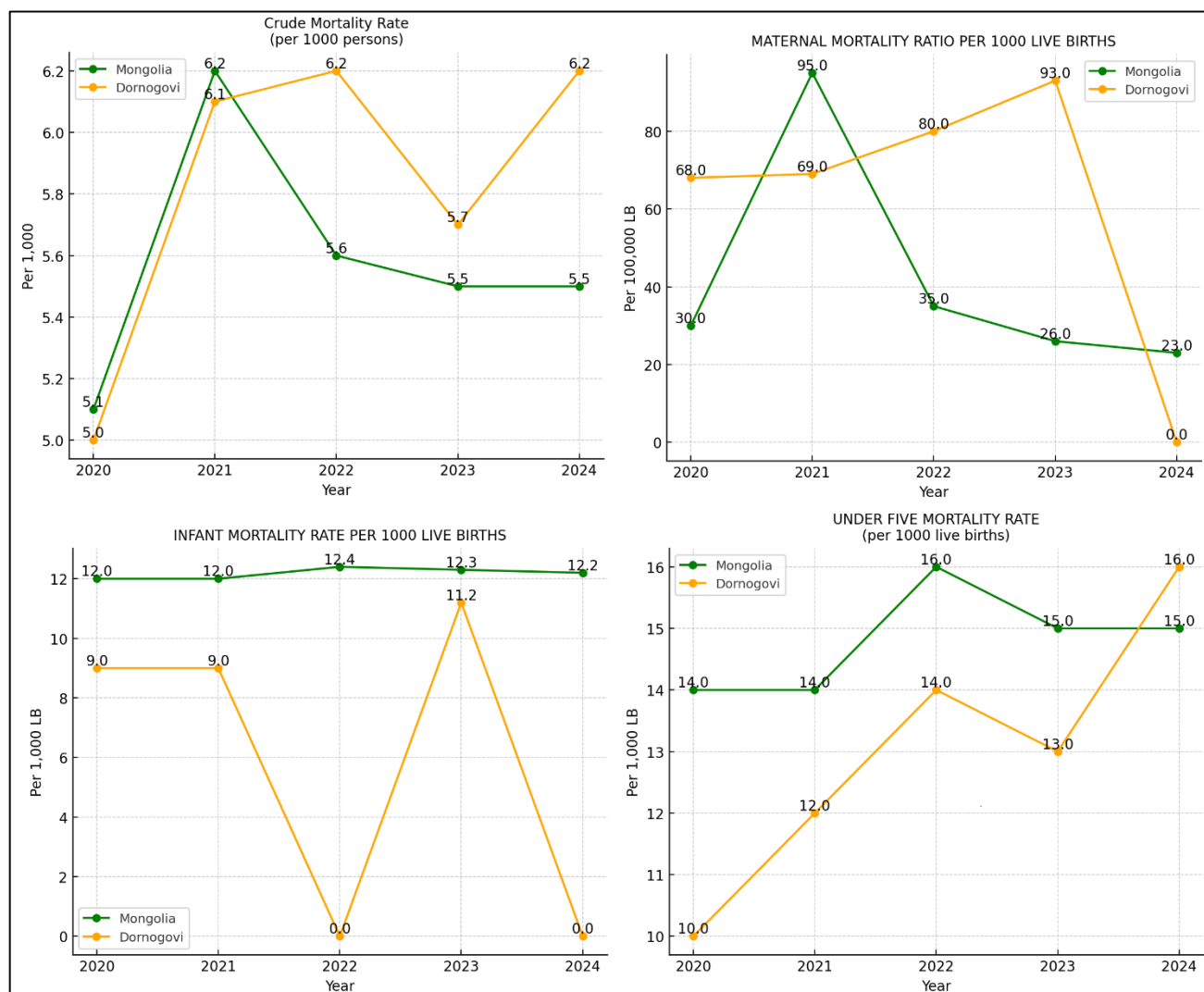


Figure 14-6 Trends in Mortality-Related Health Indicators in Mongolia and Dornogovi Aimag (2020–2024)

Source: Author's calculation based on data from the National Statistical Office of Mongolia (NSO), www.1212.mn

Cause of Mortality

14.4.91 **Table 14-28** presents total disease related mortality alongside the four leading categories such as cardiovascular diseases external causes (injury/poisoning), digestive diseases, respiratory diseases, and cancer for Mongolia and Dornogovi aimag. Between 2020 and 2024, Mongolia's overall disease mortality rose modestly by 3.6 per 10,000, driven principally by increases in respiratory diseases (+1.06) and external causes (+1.3), while cardiovascular deaths climbed by 0.7. In Dornogovi aimag, total disease mortality increased more sharply by 8.3 per 10,000. Although cardiovascular mortality fell by 3.4, the aimag suffered substantial rises in respiratory deaths (+4.01), cancer (+3.15), and digestive diseases (+1.89).

Table 14-28 Disease-Attributed Mortality Rates per 10,000 Population (2020-2024)

Indicator	Mongolia 2020	Mongolia 2024	Δ Mongolia	Dornogovi 2020	Dornogovi 2024	Δ Dornogovi
Total	49.4	53	3.6	47.2	55.5	8.3
Diseases of the cardiovascular system	16.2	16.9	0.7	12.6	9.2	-3.4
External Causes	8.5	9.8	1.3	8.1	10.7	2.6
Digestive System	3.34	3.59	0.25	4.11	6	1.89
Respiratory System	1.84	2.9	1.06	2.27	6.28	4.01
Cancer	12.9	13.3	0.43	12.05	15.2	3.15
Others	6.62	6.41	996	8.08	8.09	787

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

14.4.92 **Table 14-29** details total disease-related death rates for each soum, illustrating intra-provincial heterogeneity in trends. Sainshand soum's disease mortality increased by 9.4 per 10,000, paralleling aimag-level rises. Mandakh soum achieved a notable reduction of 7.0, reflecting successful disease-control or improved healthcare access. Saikhandulaan soum experienced a more than doubling of its disease mortality rate (+22.0), while Ulaanbadrakh soum faced the steepest absolute increase (+48.6), indicating emerging public-health crises in these rural localities that warrant urgent attention.

Table 14-29 Total Disease Mortality per 10,000 by Soum (2020-2024)

Soum	Total 2020	Total 2024	Δ Total
Sainshand	58.3	67.7	+9.4
Mandakh	44.8	37.8	-7.0
Saikhandulaan	14.3	36.3	+22.0
Ulaanbadrakh	40.2	88.8	+48.6

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

14.4.93 **Table 14-30** reveals significant variation in cause-specific mortality patterns across soums and over time. Sainshand soum consistently shows the highest total mortality rates, peaking at 81.9 per 10,000 in 2021. Mandakh soum experienced a mortality spike in 2023 (98.1 per 10,000) driven primarily by respiratory diseases (45.78 per 10,000). The rural soums of Saikhandulaan and Ulaanbadrakh show more erratic patterns, with Ulaanbadrakh experiencing a sharp increase in 2024 (88.8 per 10,000) due to elevated respiratory mortality (47.81 per 10,000).

Table 14-30 Percentage Changes 2020-2024 and 2024 Cause-Specific Mortality Rates and per 10,000 Population, by Project soum

Administrator Unit	Sainshand 2024	Change (%)	Mandakh 2024	Change (%)	Saikhandulaan 2024	Change (%)	Ulaanbadrakh 2024	Change (%)
Total Deaths per 10,000	67.7	+16.1	37.8	-15.6	36.3	-37.5	88.8	+120.9
Cardiovascular per 10,000	11.3	-27.6	12.6	-50.8	7.3	-49.7	27.3	+103.7
External Causes per 10,000	7.1	+16.4	6.3	-1.6	14.5	-50.2	0	-100.0
Digestive per 10,000	8.47	+23.5	6.3	0	7.26	0	6.83	0
Respiratory per 10,000	6.7	+59.9	12.59	+96.7	0	0	47.81	0
Cancer per 10,000	21.52	+37.7	0	-100.0	7.26	-0.1	0	-100.0
Other per 10,000	12.7	+27.9	0	0	0	-100.0	5.89	-12.1

Source: Calculated using data from the National Statistical Office of Mongolia (NSO), www.1212.mn

- 14.4.94 **Total Cause-Specific Mortality.** Sainshand soum's overall disease mortality rose modestly (+16.1%), while Ulaanbadrakh soum's more than doubled (+120.9%), indicating acute health challenges. Mandakh soum (-15.6%) and Saikhandulaan soum (-37.5%) achieved notable declines.
- 14.4.95 **Cardiovascular Deaths.** All three soums with data (Sainshand, Mandakh, Saikhandulaan) reduced cardiovascular mortality by 28–51%. Ulaanbadrakh soum diverged, with cardiovascular deaths more than doubling (+103.7%).
- 14.4.96 **External Causes.** Sainshand soum saw a 16.4% increase in injury-related deaths; Mandakh soum achieved a marginal reduction (-1.6%); Saikhandulaan soum halved its rate (-50.2%); Ulaanbadrakh soum eliminated external-cause mortality.
- 14.4.97 **Digestive Diseases.** Sainshand soum's digestive disease mortality rose by nearly a quarter (+23.5%). Mandakh soum's 2024 rate remained unchanged from 2020.
- 14.4.98 **Respiratory Diseases.** Respiratory mortality surged in both Sainshand soum (+59.9%) and Mandakh soum (+96.7%) and peaked sharply in Ulaanbadrakh soum in 2024 (47.81 per 10,000).
- 14.4.99 **Cancer.** Sainshand soum experienced a 37.7% rise in cancer mortality. Mandakh soum and Ulaanbadrakh soum report complete elimination of cancer attributed deaths in 2024, likely reflecting data anomalies or very small case numbers. Saikhandulaan soum's cancer mortality was essentially unchanged (-0.1%).
- 14.4.100 **Other Causes.** "Other" causes increased in Sainshand soum (+27.9%) and decreased slightly in Ulaanbadrakh soum (-12.1%), while Mandakh soum and Saikhandulaan soum report no other cause mortality in 2024.

Injury-Related Incidence and Mortality

14.4.101 Over the five-year period from 2020 to 2024, Dornogovi aimag experienced considerable fluctuation in the incidence of injuries from all types of accidents, expressed per 10,000 population. In 2020, the injury rate was 401.6, decreasing to 304.0 in 2021 (**Table 14-31**). The indicator rebounded significantly in 2022 to 442.4, followed by a slight decrease to 429.4 in 2023 and 420.8 in 2024. Compared to the 2020 baseline, the 2024 figure increased by 19.2 points, showing a moderate overall rise of approximately 4.8%.

14.4.102 The death rate caused by injuries and accidents at the aimag level also fluctuated. From 8.1 per 10,000 in 2020, it dropped slightly to 7.5 in 2021, before rising sharply to 10.0 in 2022, peaking at 11.9 in 2023, and then decreasing to 10.7 in 2024. This represents a net increase of 2.6 points (+32.1%) in mortality from injury over the five-year period.

Table 14-31 Injury and Accident-Related Indicators by Dornogovi Aimag and Project selected soums (2020–2024)

Selected Indicator	Aimag/soum	2020	2021	2022	2023	2024	Change % (2020-2024)
Total Injuries (per 10,000)	Dornogovi aimag	401.6	304.0	442.4	429.4	420.8	+4.8
	Sainshand soum	197.8	172.3	300.9	207.8	178.2	-9.9
	Mandakh soum	467.1	691.4	505.5	680.2	547.9	+17.3
	Saikhandulaan soum	348.8	322.1	419.0	250.0	174.3	-50.0
	Ulaanbadrakh soum	234.6	270.8	502.6	439.8	280.1	+19.4
Deaths from Injuries (per 10,000)	Dornogovi aimag	8.1	7.5	10.0	11.9	10.7	+32.9
	Sainshand soum	4.2	4.8	3.6	6.8	4.6	+9.4
	Mandakh soum	12.8	6.4	19.4	19.6	6.3	-50.8
	Saikhandulaan soum	29.1	0.0	35.5	14.3	29.0	-0.1
	Ulaanbadrakh soum	0.0	6.6	19.8	0.0	0.0	0

Source: Author's calculations, based on data of Dornogovi aimag Health Center

14.4.103 At the soum level, the incidence and mortality rates of injuries varied widely over time and across locations. In Sainshand soum, the largest urban centre, the injury rate fluctuated between 172.3 and 300.9 per 10,000. It peaked in 2022, declined again in 2023 and 2024, and ended the period with a lower rate than in 2020. Mortality from injuries ranged from 3.6 to 6.8 during the same period, with no clear increasing or decreasing trend, suggesting relatively stable trauma outcomes.

14.4.104 Mandakh soum showed the highest levels of injury incidence among all soums. Rates rose from 467.1 in 2020 to 691.4 in 2021, then fluctuated in the following years, ending at 547.9 in 2024. Although injury mortality peaked at 19.6 in 2023 and reached a high of 19.4 in 2022, it sharply declined to 6.3 in 2024, close to the 2021 level. This sharp drop may reflect either real improvements in emergency care or year-specific anomalies.

14.4.105 In Saikhandulaan soum, the injury rate started at 348.8 in 2020, dipped to 322.1 in 2021, rose to 419.0 in 2022, and dropped to 174.3 by 2024. Deaths from injuries in this soum remained critically high, with values ranging from 14.3 to 35.5, and peaking in 2022. Even in 2024, the mortality rate was 29.0, which is significantly higher than in most other soums.

14.4.106 Ulaanbadrakh soum presented less consistent trends. The injury rate grew from 234.6 in 2020 to 502.6 in 2022, followed by a drop to 280.1 in 2024. Mortality was reported only in 2021 and 2022, with 6.6 and 19.8 deaths per 10,000, respectively. In the remaining years, no injury-related deaths were registered.

14.4.107 In conclusion, injury-related health burdens remain high across Dornogovi aimag, particularly in rural soums such as Mandakh and Saikhandulaan soums, where both incidence and mortality exceeded aimag and national averages.

Road Traffic Accidents

14.4.108 Whilst the majority of the OHTL route is not serviced by existing main roads, the Construction Contractor and workers will use the local road network to transport materials to and from the construction site. The World Health Organization Global Status Report on Road Safety, 2016, estimated 499 traffic deaths in Mongolia, or 16.5 fatalities per 100,000 population.⁵⁰ Dornogovi aimag experienced a moderate increase in road traffic accident involvement, rising from 72.15 per 10,000 people in 2020 to 76.86 per 10,000 people in 2024, representing a 6.5% increase. More concerning is the substantial rise in fatality rates, which increased from 2.27 per 10,000 people in 2020 to 3.35 per 10,000 people in 2024, marking a 47.6% increase in deaths over the five-year period.

Table 14-32 Road Traffic Indicators, by Dornogovi Aimag and Project selected soums (2020–2024)

Selected Indicator	Aimag/soum	2020	2021	2022	2023	2024	Change % (2020-2024)
Involved in RTAs (per 10,000)	Dornogovi aimag	72.2	54.7	65.3	70.1	76.9	+6.5
	Sainshand soum	29.0	24.8	25.9	28.8	30.7	+6.0
	Mandakh soum	128.0	179.3	116.7	111.2	100.8	-21.3
	Saikhandulaan soum	174.4	200.4	92.3	28.6	58.1	-66.7
	Ulaanbadrakh soum	127.3	85.9	138.9	121.8	88.8	-30.3
Deaths due to RTAs (per 10,000)	Dornogovi aimag	2.3	1.7	2.4	4.5	3.3	+47.6
	Sainshand soum	1.5	1.1	0.7	1.8	0.7	-53.7
	Mandakh soum	0.0	0.0	0.0	0.0	0.0	0
	Saikhandulaan soum	7.3	0.0	0.0	0.0	7.3	-0.1
	Ulaanbadrakh soum	0.0	6.6	6.6	0.0	0.0	0

Source: Calculated using data of Dornogovi aimag Health Center

Note: RTA – Road traffic accident

14.4.109 Sainshand soum maintains the lowest accident involvement rates among all administrative units, with a slight increase from 28.97 per 10,000 people in 2020 to 30.70 per 10,000 people in 2024 (6.0% increase). Notably, this soum achieved significant improvement in road safety mortality, with deaths decreasing from 1.52 per 10,000 people in 2020 to 0.71 per 10,000 people in 2024, representing a 53.3% reduction.

14.4.110 Mandakh soum presents a unique safety profile with high accident involvement rates but zero recorded deaths throughout the entire five-year period. The soum showed improvement in accident rates, declining from 127.96 per 10,000 people in 2020 to 100.76 per 10,000 people in 2024, a 21.3%

⁵⁰ WHO. Mental Health Atlas 2020. Mongolia.

reduction.

14.4.111 Saikhandulaan soum accidents decreased from 174.42 per 10,000 people in 2020 to 58.10 per 10,000 people in 2024, representing a 66.7% reduction. However, death rates remained concerning, with virtually no change from 7.27 per 10,000 people in 2020 to 7.26 per 10,000 people in 2024.

14.4.112 Ulaanbadrakh soum showed moderate improvement in accident rates, declining from 127.35 per 10,000 people in 2020 to 88.80 per 10,000 people in 2024, a 30.3% reduction. The soum's death pattern was irregular, with concentrated fatalities in 2021-2022 but no deaths recorded in 2020, 2023, or 2024.

Suicide

14.4.113 As of 2021, the average number of suicides per 100,000 population in Mongolia was 15.0, which is higher than the global average (10.6) and higher than the regional average (10.2), making Mongolia rank 5th for suicides in the Western Pacific region⁵¹. Although suicides account for a small percentage of total deaths, the proportion varies by age group and is particularly prevalent in the younger age groups.

14.4.114 Over the five-year period from 2020 to 2024 (**Table 14-33**), Dornogovi aimag exhibited an unstable but upward trend in both suicide attempts and suicide-related mortality per 100,000 population. The rate of suicide attempts increased from 24.10 in 2020 to 39.06 in 2024, reflecting a rise of 14.96 points or approximately 62.1%. The sharpest year-on-year growth occurred between 2022 and 2024, especially after a low of 18.06 in 2022. Similarly, the suicide death rate showed fluctuations, beginning at 18.43 in 2020, decreasing to 11.16 in 2021, peaking at 22.32 in 2024. Compared to the baseline year of 2020, the suicide death rate rose by 3.89 points, indicating a 21.1% increase.

Table 14-33 Suicide Indicators by Dornogovi Aimag and Project selected soums (2020–2024)

Selected Indicator	Aimag/soum	2020	2021	2022	2023	2024	Change % (2020-2024)
Suicide Attempts (per 100,000)	Dornogovi aimag	24.10	32.09	18.06	30.72	39.06	+62.1
	Sainshand soum	3.81	22.24	3.60	10.66	14.11	+270.2
	Mandakh soum	0	0	0	65.40	62.97	0
	Saikhandulaan soum	0	0	0	0	0	0
	Ulaanbadrakh soum	0	0	132.28	0	0	0
Suicide Deaths (per 100,000)	Dornogovi aimag	18.43	11.16	22.23	16.76	22.32	+21.1
	Sainshand soum	7.62	3.71	3.60	7.11	10.58	+38.8
	Mandakh soum	63.98	64.02	129.62	130.80	62.97	0
	Saikhandulaan soum	218.02	0	71.02	142.86	72.62	-66.7
	Ulaanbadrakh soum	67.02	0	66.14	0	0	0

Source: Author's calculations, based on data of Dornogovi aimag Health Center

⁵¹ WHO. Mental Health Atlas 2020. Mongolia.

- 14.4.115 Sainshand soum showed a relatively low and stable pattern of suicide behavior. Attempt rates rose gradually from 3.81 per 100,000 in 2020 to 14.11 in 2024. Suicide deaths in Sainshand soum remained below 11 per 100,000 across all five years, with no consistent increasing or decreasing trend.
- 14.4.116 In contrast, Mandakh soum recorded no suicide attempts from 2020 to 2022, followed by a surge to 65.40 and 62.97 per 100,000 in 2023 and 2024, respectively. More notably, suicide mortality in Mandakh was consistently high, starting at 63.98 in 2020 and peaking at 130.80 in 2023. Although it dropped to 62.97 in 2024, this still reflects a persistently elevated mortality rate throughout the period.
- 14.4.117 Saikhandulaan soum presented a pattern of suicide deaths occurring without any recorded suicide attempts. The suicide mortality rate was extremely high in 2020 (218.02), absent in 2021, and then ranged between 71.02 and 142.86 in subsequent years.
- 14.4.118 Ulaanbadrakh soum followed a similar profile, with no suicide attempts recorded for any year except 2022, when the attempt rate reached 132.28 per 100,000. Suicide deaths occurred in 2020 (67.02), 2022 (66.14) but were absent in the remaining years.

Infectious Diseases and Sexually Transmitted Diseases

- 14.4.119 Between 2020 and 2024, Dornogovi aimag experienced significant fluctuations in the incidence of communicable diseases per 10,000 population (**Table 14-32**). In 2020, the total reported cases stood at 129.6 per 10,000, which then rose sharply to 2,883.2 in 2021. This surge likely reflects COVID-19-related outbreaks. In subsequent years, the incidence declined drastically, reaching 1,282.9 in 2022, 230.8 in 2023, and finally 136.3 in 2024.
- 14.4.120 Sexually transmitted infections (STIs), recorded per 10,000 persons, showed more stability with minor fluctuations. The STI rate was 62.2 in 2020, decreased significantly to 35.9 in 2021, then gradually increased to 47.1 in 2022 and 44.1 in 2024. The STD trends across soums showed consistent decline patterns, with Mandakh soum achieving the most dramatic reduction of 96.9%, effectively approaching elimination levels. Sainshand soum reduced STD rates by 58.6%, while Saikhandulaan and Ulaanbadrakh soums showed more moderate declines of 55.7% and 38.8%, respectively.

Table 14-34 Communicable Disease and STI Incidence, by Dornogovi Aimag and Project soums (2020–2024)

Selected Indicator	Aimag/soum	2020	2021	2022	2023	2024
Communicable Disease	Dornogovi aimag	129.6	2883.2	1282.9	230.8	136.3
	Sainshand soum	7.6	3138.1	1426.3	121.2	43.7
	Mandakh soum	351.9	2439.2	1795.2	104.6	81.9
	Saikhandulaan soum	0.0	2455.3	1100.9	78.6	0.0
	Ulaanbadrakh soum	6.7	2199.5	687.8	20.3	82.0
STI Incidence	Dornogovi aimag	62.2	35.9	47.1	42.5	44.1
	Sainshand soum	58.7	40.8	42.5	74.3	24.3
	Mandakh soum	51.2	25.6	32.4	19.6	12.6
	Saikhandulaan soum	65.4	35.8	7.1	28.6	29.0
	Ulaanbadrakh soum	33.5	6.6	26.5	6.8	20.5

Source: Calculated using data of Dornogovi aimag Health Centre

Crime and Social Malaise

14.4.121 A total of 44,673 cases of crime were recorded in 2024 across Mongolia (where 72% recorded crimes in Ulaanbaatar), of which the majority (87.2%) were minor cases while 12.8% were serious cases.⁵² According to 2023 police report, 4,979 crimes committed while drunk (2,165 in Ulaanbaatar and 2,814 in aimags).

14.4.122 The number of recorded crimes by Project soums is shown in **Table 14-35**. As of the end of 2024, a total of 828 crimes were recorded in Dornogovi aimag, the majority of which were minor (649, or 78%)⁵³. Approximately one third of all recorded crimes in the aimag falls on one soum, Sainshand (345 recorded cases). 239 crimes were recorded in Dornogovi aimag that were committed while drunk, one case was recorded in 2023 while intoxicated, and one case was committed by a gang⁵⁴.

Table 14-35 Number of recorded crimes, by project soums, 2020-2024

Indicator	Administrative unit	2020	2021	2022	2023	2024
Number of crimes	Dornogovi aimag, total	318	490	621	677	828
	Sainshand soum	119	193	381	198	345
	Ulaanbadrakh soum	4	5	12	122	10
	Saikhandulaan soum	10	11	not available (n/a)	39	21
	Mandakh soum	10	14	n/a	3	9
Of which: minor	Dornogovi aimag, total	244	402	520	570	649
	Sainshand soum	89	157	315	160	258
	Ulaanbadrakh soum	3	4	12	102	8
	Saikhandulaan soum	7	7	n/a	33	17
	Mandakh soum	7	8	n/a	2	7
Serious	Dornogovi aimag, total	74	88	101	107	179
	Sainshand soum	30	36	66	38	87
	Ulaanbadrakh soum	1	1	0	20	2
	Saikhandulaan soum	3	4	0	6	4
	Mandakh soum	3	6	0	1	2

Source: www.1212.mn

⁵² Available at: www.1212.mn.

⁵³ National Police Agency. Available at <https://police.gov.mn>.

⁵⁴ The State Police Agency. Crimes recorded in 2024. Available online.

14.4.123 As of 2023, a total of 238 cases of illegal use of narcotic drugs and psychotropic substances in Mongolia, of which 204 (0.8% out of all recorded crimes in 2023) cases were recorded in Ulaanbaatar and 34 in aimags. 1.3% of these crimes committed were alcohol-related, 13.9% were committed by groups, and 84.0 % while intoxicated (using drugs).⁵⁵ No data are available at the aimag or soum level.

14.4.124 The number of murders in the Project soums, where data is available, is shown on **Table 14-36**. The rates in Dornogovi aimag have risen steadily since 2020, with a slight dip between 2023-24. An increase was also seen in Sainshand soum in 2023, with a slight reduction in 2024.

Table 14-36 Number of murders in the Project soums, 2020-2024

Administrative unit	2020	2021	2022	2023	2024
Dornogovi aimag, total	5	6	3	12	11
Sainshand soum	1	2	3	8	3
Saikhandulaan soum	n/a	n/a	n/a	n/a	n/a
Ulaanbadrakh soum	1	n/a	n/a	n/a	n/a
Mandakh soum	n/a	n/a	n/a	n/a	n/a

Source: Dornogovi aimag, and Sainshand, Ulaanbadrakh, Saikhandulaan and Mandakh soums police departments

14.4.125 Given the use of the Project Area, the numbers of livestock theft reports are presented in **Table 14-37**. As can be seen, there has been an overall reduction in livestock theft reports since 2020 at the aimag level, however, a slight increase in Sainshand soum. Levels are fairly consistent in the more rural Project soums between 2020-2024.

Table 14-37 Livestock theft, by project soums, 2020-2024

Administrative unit	2020	2021	2022	2023	2024
Dornogovi aimag, total	19	12	21	18	14
Sainshand soum	3	2	3	1	5
Saikhandulaan soum	3	2	1	0	0
Mandakh soum	0	1	0	0	1
Ulaanbadrakh soum	n/a	1	1	1	2

Source: Dornogovi aimag, and Sainshand, Ulaanbadrakh, Saikhandulaan and Mandakh soums police departments.

⁵⁵ The National Police Agency. Crimes and violations recorded by the police in 2023. Ulaanbaatar 2024.

14.4.126 Aggregate statistic data on gender-based violence and harassment (GBVH) is currently unreported in Mongolia. The World Bank Mongolia Gender Assessment (2024)⁵⁶ reports that domestic violence remains the most prevalent form of violence against women in Mongolia despite recent legislation that criminalises it. It states that one in three women (35%) report having been subjected to physical, sexual, or economic violence during the last year or in their current relationship, and more than half of all women (59.7%) report experiencing such violence in their lifetime⁵⁷. One in ten women reported they had experienced abuse before they were 15 years old⁵⁸.

14.4.127 **Table 14-38** sets out the records of domestic violence at the Project aimag and soum levels. 2021 levels have previously been identified as linked to the COVID-19 period and associated periods of lock down, though this trend at the aimag level has also been reported in 2024. Overall, the number of reports is most likely unrepresented when considering the findings of the above-mentioned Mongolia Gender Assessment (2024).

Table 14-38 Domestic violence, Project soums, 2020-2024

Administrative unit	2020	2021	2022	2023	2024
Dornogovi aimag, total	1	7	7	1	5
Sainshand soum	1	3	1	4	1
Saikhandulaan soum	n/a	n/a	n/a	n/a	1
Mandakh soum	0	1	0	0	0
Ulaanbadrakh soum	n/a	n/a	1	n/a	n/a

Source: Dornogovi aimag, and Sainshand, Ulaanbadrakh, Saikhandulaan and Mandakh soums police departments.

14.4.128 According to the World Bank Mongolia Gender Assessment (2024)⁵⁹, Mongolian children are at risk of trafficking internally and internationally for the purpose of sexual exploitation. The report states that Mongolia is classified as a source country for children subjected to trafficking for sexual purposes in the immediate neighbouring countries of South Korea, Japan, and Malaysia and in other countries including Germany, Sweden, and the United States. Women and girls aged 14 years and above are identified as the most vulnerable to trafficking.

14.4.129 GBVH statistics related to workforce GBVH are reported **Chapter 17**.

⁵⁶ Available at: [World Bank Document](#)

⁵⁷ Available at: Gender Data Portal, 2022, World Bank, Washington, DC (accessed June 14, 2024), <https://genderdata.worldbank.org/en/economies/mongolia>

⁵⁸ Mongolia Gender Assessment. World Bank Group, June 2024.

⁵⁹ Available at: [World Bank Document](#)

Social Infrastructure and Services

Energy Supply

14.4.130 Dornogovi aimag is connected to the CES. Key high-voltage lines include the Baganuur–Sainshand 220 kV, Sainshand–Zamyn-Uud 110 kV, and Sainshand–Zuunbayan 35 kV lines. To support major industrial facilities, an 18.3 km 110 kV transmission line and substation are under construction to supply the oil refinery in Altanshiree soum, and a new 220 kV Choir–Sainshand overhead transmission line is planned for construction in 2026.

14.4.131 The aimag has also seen significant growth in renewable energy generation. Operational projects include the 15 MW Gegeen Solar Plant (a collaboration between Shigemitsu Shoji, Sharp Corporation, and Erchim Teeg LLC), the 30 MW Erdene Solar Plant, the 30 MW Gobi Solar Plant by Desert Solar Power One LLC, and the 55 MW Sainshand Wind Park. These facilities feed into the CES, contributing to greater system resilience and reducing long-distance transmission losses.

14.4.132 From 2020 to 2024, household electricity access in Dornogovi aimag increased slightly from 99.2% to 99.5%, reflecting sustained near-universal electrification. In Sainshand soum, access reached 100%, while in rural soums electricity coverage remained slightly lower (Mandakh - 92.0%, Saikhandulaan - 93.0%, and Ulaanbadrakh - 91.3%). These improvements were supported by grid expansion and deployment of decentralized systems such as solar PV mini-grids and wind-diesel hybrids (**Table 14-39**).

Table 14-39 Household Access to Electricity and Centralized Heating (2020–2024)

Administrative Unit	Centralized Heating 2020 (%)	Centralized Heating 2024 (%)	Change (2020-2024)	Electricity Access 2020 (%)	Electricity Access 2024 (%)	Change (2020-2024)
Sainshand	91.9	92.9	+1.0	99.8	100.0	+0.2
Mandakh	5.3	6.0	+0.7	91.4	92.0	+0.6
Saikhandulaan	6.2	6.8	+0.6	92.3	93.0	+0.7
Ulaanbadrakh	5.7	6.4	+0.7	90.5	91.3	+0.8
Aimag Average	32.1	33.8	+1.7	99.2	99.5	+0.3

Source: Calculated using 2020 census and 2021–2024 survey data. Dornogovi Statistical Office, <https://dornogovi.nso.mn/>

14.4.133 In contrast, centralised heating remains largely confined to urban centres. In 2024, 92.9% of households in Sainshand had access to district heating, while Mandakh (6.0%), Saikhandulaan (6.8%), and Ulaanbadrakh (6.4%) soums reported coverage below 7% (**Table 14-39 above**). Over the period 2020–2024, the provincial average increased modestly from 32.1% to 33.8%, but rural expansion was minimal due to high costs and infrastructure constraints. Most rural households continued to rely on traditional solid fuel combustion such as dung.

14.4.134 Electricity supply sources in 2024 highlight an urban–rural disparity (**Table 14-40**). In Sainshand, 97.5% of households were supplied via the CES, with only 1.9% using renewables and 0.4% relying on backup generators. Unserved households accounted for just 0.2%. In contrast, Mandakh (41.3%), Saikhandulaan (38.3%), and Ulaanbadrakh (44.1%) soums had a significantly higher share of renewable-supplied households, reflecting their dependence on decentralized solar and hybrid

systems. However, up to 1.0% of households in Ulaanbadrakh soum remained unserved, underscoring persistent last-mile connectivity issues.

Table 14-40 Percentage of Households by Electricity Supply Source, Dornogovi aimag average and Project selected soums (2024)

Administrative Unit	CES (%)	Renewables (%)	Generators (%)	Unserved (%)
Dornogovi	66.2	31.4	1.8	0.6
Sainshand	97.5	1.9	0.4	0.2
Mandakh	56.4	41.3	1.9	0.4
Saikhandulaan	58.7	38.3	2.3	0.7
Ulaanbadrakh	52.1	44.1	2.8	1.0

Source: Calculated using survey data. Dornogovi Statistical Office, <https://dornogovi.nso.mn/>

14.4.135 Overall, Dornogovi aimag demonstrates strong performance in electricity access but continues to face challenges in equitable heating provision. Urban households benefit from reliable, grid-based services, while rural residents remain reliant on more fragmented and less efficient energy systems.

Transport Links

14.4.136 Dornogovi aimag is connected to Ulaanbaatar by paved road A0101 and A0102, a part of the Asian highway 3 (AH3). AH3 connects Mongolia's northern border with Russia at Altanbulag and southern border with the People's Republic of China at Zamyn-Uud.

14.4.137 Over the past five years (2020–2024), the transport network in Dornogovi aimag- specifically the soums of Sainshand, Mandakh, Saikhandulaan, and Ulaanbadrakh- has seen steady improvements aimed at enhancing local connectivity and supporting economic activities. The aimag centre and soum centres all have paved roads, though the Project soums are connected to each other by a mixture of paved roads (soums along the AH3) and unpaved (earth) roads (from Sainshand to other aimag towns). There is no direct paved access to the Project (see **Figure 14-7**).

14.4.138 The Trans-Mongolian Railway connects the Trans-Siberian Railway from Ulan-Ude in Russia to Erenhot (Erlin) and Beijing in China through the capital Ulaanbaatar. The Mongolian section of this line runs for 1,110km. Sainshand is an important railways hub along the Trans-Mongolian Railway. A 27km industrial purpose railway line connects Sainshand with Altanshiree soum in Dornogovi aimag, to allow development of the Mongolian oil refinery under construction in Altanshiree soum. A new export and import gateway, the 226.9km Zuunbayan-Khangai railway line has been operating since December 2024. The Project route crosses these railways along its route, as shown in **Figure 14-7** above and reported in **Chapter 2**.

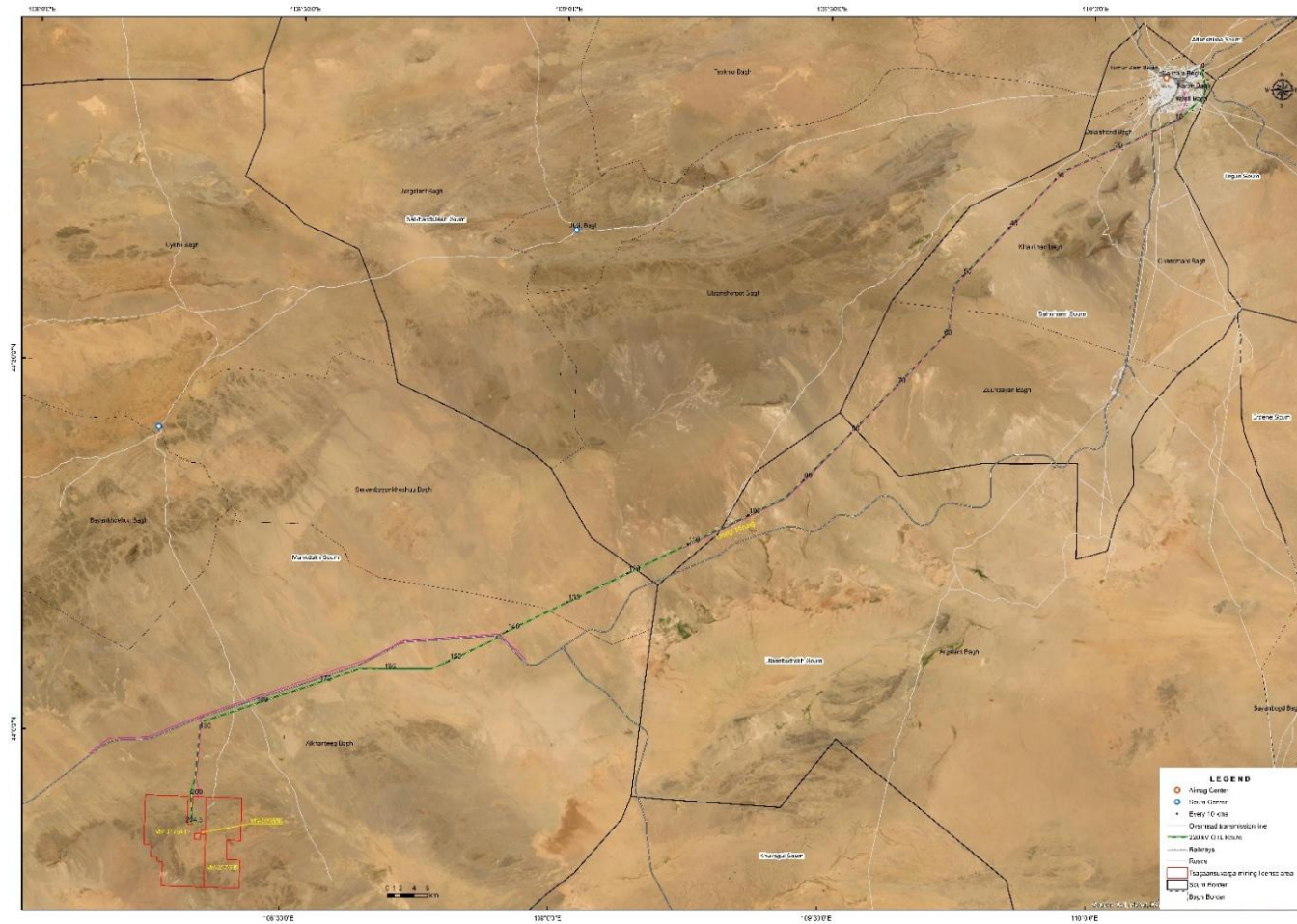


Figure 14-7 Infrastructure along the proposed OHTL route

Telecommunication

14.4.139 Telecommunication services are essential components of modern social infrastructure. In Dornogovi aimag, significant advancements were made from 2020 to 2024 in mobile phone usage and internet access. Five telecommunication services providers (Mongolian telecom, Mobicom, Skytel, Unitel and G-mobile) have 66 branches in Dornogovi aimag. All services providers have a presence in Sainshand, Mandakh and Saikhandulaan soums while four services providers have a presence in Ulaanbadrakh soum. Mobile network signal extends to all soum centres and most baghs, ensuring that even the remotest households can access at least one mobile operator. Fixed-line internet remains largely urban-centric, but mobile broadband has become the primary means of connectivity outside Sainshand.

14.4.140 Mobile phone ownership (**Table 14-41**) remains universally high, increasing from 95.4% in 2020 to 97.6% in 2024 (+2.3 percentage points). Sainshand city leads with 98.8% usage, while rural soums such as Saikhandulaan (90.7%), Mandakh (90.0%), and Ulaanbadrakh (89.0%) also maintain strong coverage. The relatively narrow gap between urban and rural soums—just 9.8 percentage points.

Table 14-41 Household Access to Telecommunication Services in Dornogovi aimag and Project soums, 2020–2024 (% of households)

Selected indicators	Administrator unit	2020	2021	2022	2023	2024	Change (2020-2024)
Mobile phone use (%)	Dornogovi	95.4	96.0	96.5	97.1	97.6	+2.3
	Sainshand	97.2	97.6	98.1	98.5	98.8	+1.6
	Mandakh	87.3	88.0	88.5	89.2	90.0	+3.1
	Saikhandulaan	88.0	88.5	89.3	90.0	90.7	+3.1
	Ulaanbadrakh	86.5	87.0	87.6	88.4	89.0	+2.9
Landline usage (%)	Dornogovi	22.3	21.5	20.7	19.8	19.1	-14.3
	Sainshand	28.6	27.3	26.1	25.0	24.2	-15.4
	Mandakh	12.0	11.5	11.0	10.4	10.0	-16.7
	Saikhandulaan	13.2	12.8	12.2	11.7	11.3	-14.4
	Ulaanbadrakh	11.8	11.2	10.7	10.2	9.8	-16.9
Radio ownership (%)	Dornogovi	50.1	49.8	49.5	48.9	48.2	-3.8
	Sainshand	53.3	52.9	52.1	51.3	50.5	-5.3
	Mandakh	41.5	41.2	41.0	40.6	40.1	-3.4
	Saikhandulaan	43.0	42.5	42.0	41.3	40.9	-4.9
	Ulaanbadrakh	42.7	42.2	41.7	41.1	40.7	-4.7
Internet access (%)	Dornogovi	91.0	94.5	90.9	98.2	92.6	+1.8
	Sainshand	78.7	80.1	81.3	82.4	83.0	+5.5
	Mandakh	31.2	32.4	33.7	34.6	35.2	+12.8
	Saikhandulaan	32.5	33.1	34.2	35.0	35.7	+9.8
	Ulaanbadrakh	29.4	30.3	31.5	32.8	33.5	+13.9

Source: Calculated using 2020 census and 2021–2024 survey data. Dornogovi Statistical Office, <https://dornogovi.nso.mn/>

- 14.4.141 Internet access, however, shows more disparity. Across the aimag, access grew moderately from 91.0% to 92.6% overall, but with significant differences between urban and rural areas. Sainshand increased from 78.7% in 2020 to 83.0% in 2024 (+4.3 percentage points), whereas Mandakh rose from 31.2% to 35.2% (+4.0), Saikhandulaan from 32.5% to 35.7% (+3.2), and Ulaanbadrakh from 29.4% to 33.5% (+4.1). As a result, an urban-rural internet access gap of 49.5 percentage points remains.
- 14.4.142 Sainshand soum has full-service coverage from all five operators and fiber-optic connections across all Project baghs, supporting high digital device ownership (79.0%) and stable internet access growth. In contrast, while Mandakh, Saikhandulaan, and Ulaanbadrakh soums also benefit from wide mobile coverage—with mobile usage between 89.0% and 90.7%—their internet access levels remain modest. Mandakh and Saikhandulaan soum have 4G coverage in the soum centres and 3G in surrounding baghs, with all five operators active, and ongoing plans to expand fiber-optic connectivity. Ulaanbadrakh soum is served by four providers, while Mongolian Telecom is currently upgrading its local infrastructure.
- 14.4.143 Traditional telecommunications infrastructure has steadily declined across Dornogovi aimag. Landline use dropped from 22.3% to 19.1% (-14.3%), with the steepest decrease seen in Ulaanbadrakh (-16.9%). This reflects a broader shift to mobile-first communication methods, including VoLTE and VoIP services. Radio ownership also declined by 3.8 percentage points (from 50.1% to 48.2%), as younger and middle-aged residents increasingly rely on mobile streaming platforms and digital media instead of traditional broadcasts.
- 14.4.144 The mobile network has become increasingly robust and accessible in all areas. The “Digital Nation” national initiative, together with funding from the Universal Service Obligation Fund, enabled the rollout of 4G networks in all soum centres by 2024. These efforts, along with subsidized device schemes, have driven smartphone uptake, particularly in rural soums like Mandakh and Saikhandulaan.
- 14.4.145 Overall, Dornogovi aimag’s telecommunications landscape in 2024 is marked by near-universal mobile phone access, moderate internet expansion, and a gradual decline in legacy systems such as landlines and radios. While mobile service availability is relatively equal across the aimag, bridging the persistent urban-rural digital divide in internet access remains a critical priority for inclusive development.

Emergency Services

Police

- 14.4.146 Each soum has one police station, as indicated in **Table 14-42**. The location of these facilities is shown in **Figure 14-8**.

Table 14-42 Police stations in the Study Area

No.	Administrative unit	Distance from OHTL	Structure	Number	Remark
1	Sainshand city/Soum/Dornogovi Province center	4.4km from the substation	Provincial Headquarter/Department	1	Headquarter

No.	Administrative unit	Distance from OHTL	Structure	Number	Remark
		location			
2	Ulaanbadrakh soum	93km	Soum Level Police Unit	1	One (1) soum level unit representative, (2) one police officer, two (2) officers in total
3	Saikhandulaan soum	50.6km	Soum Level Police Unit	1	One (1) soum level unit representative, (2) one police officer, two (2) officers in total
4	Mandakh soum	44km	Soum Level Police Unit	1	One (1) soum level unit representative, (2) one police officer, two (2) officers in total
5	Zuunbayan bagh	26km	Bagh Level Police Unit	1	One (1) bagh level unit police inspector

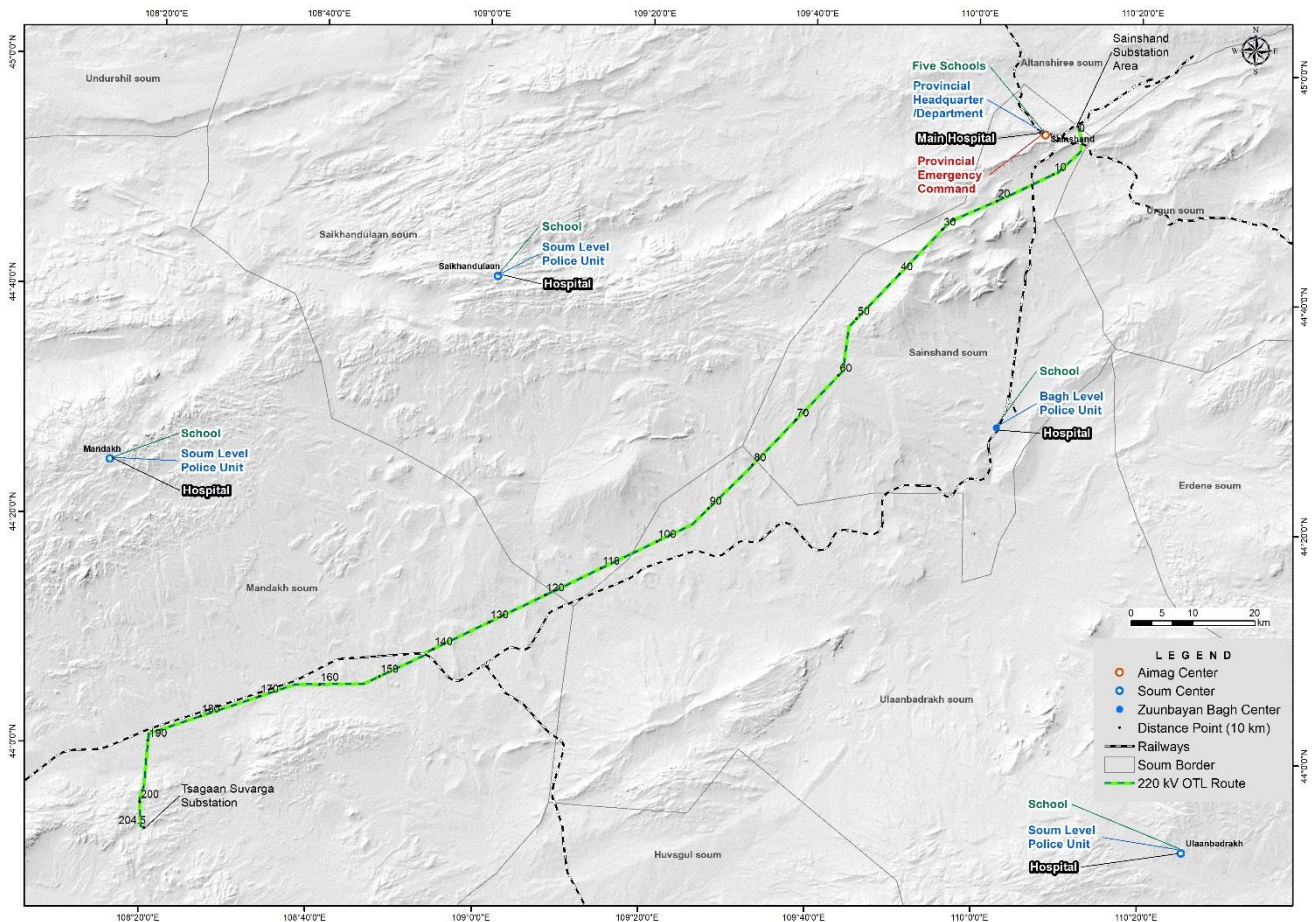


Figure 14-8 Location of social infrastructure

14.4.147 Between 2020 and 2024, Dornogovi aimag's police force expanded from 87 to 124 sworn and civilian personnel, marking a net increase of 37 officers and a 43% growth over five years. The per-head coverage indicators in **Table 14-43** demonstrate a consistent improvement in police service availability in Dornogovi aimag from 2020 to 2024. Over this period, the number of officers per 100,000 residents increased significantly, rising from 1,233 to 1,730.

Table 14-43 Total Police Personnel and Per-head Coverage Indicators, 2020–2024

Year	Total Personnel	Net Change vs. 2020	% Change vs. 2020	People per Officer	Officers per 100,000 Residents
2020	87	–	–	811	1,233
2021	103	+16	+18%	695	1,440
2022	112	+25	+29%	642	1,556
2023	119	+32	+37%	607	1,650
2024	124	+37	+43%	578	1,730

Source: Calculated from *OpenDataLab.mn* (2020–2023) and *CSC.gov.mn* (2024).

14.4.148 As the force expanded, its functional composition shifted decisively toward frontline service delivery. Thematic detective roles, covering eco-crime, family-violence, child protection, and livestock theft, more than doubled from five positions in 2020 (5 staff) to thirteen in 2023 (13 staff), with no additional growth in 2024⁶⁰. Despite these overall gains, the distribution of officers remains heavily skewed toward urban centres. By 2023, 55% of all frontline officers were based in Sainshand city and 15% in the Zamyn-Uud logistics hub, leaving the twelve rural soums—which account for 43% of the aimag's population— with only 29 % of officers.

Emergency Services

14.4.149 Emergency Command is provided in each aimag centre in Mongolia. This command coordinates and manages preparedness, disaster risk reduction (DRR), response, and recovery at the aimag level. The location of Dornogovi aimag's emergency services are shown in **Table 14-44**. The main unit in relation to the Project is located in Sainshand city.

Table 14-44 Unit Locations and Geographic Coverage

Unit	Location	Active Personnel	Estimated Coverage (km²)
Provincial Emergency Command	Sainshand city	3	—
Fire & Rescue Unit No. 17	Zamyn-Üüd soum	4	~54,736
Fire & Rescue Unit No. 23	Airag soum	4	~54,736

⁶⁰ Cybil Portal. (2024). *CMM review: Mongolia 2024*. <https://cybilportal.org/projects/cmm-review-mongolia-2024/>

14.4.150 As of 2024, Dornogovi aimag's emergency services are critically understaffed, with only 11 active personnel employed out of 167 authorized positions, resulting in a staffing utilization rate of just 6.6%. The available workforce equates to 15.3 responders per 100,000 residents, substantially below the recommended international benchmark of 50 per 100,000 for rural areas. This personnel shortfall directly compromises the province's capacity to meet standard response times, particularly given the vast territorial scope of the project area (~109,472 km²).

Health Facilities

14.4.151 The health care in Mongolia is a three-tier health system with primary care (family health centres in Ulaanbaatar city and other big cities and soum and village health centres), a secondary tier of health centres in aimag and districts in Ulaanbaatar city and referral or third tier national level specialised centres (e.g. Cardiovascular Centre, the National Cancer Centre, the National Centre for Communicable Diseases, etc.).

14.4.152 Each soum has there one hospital, as shown in **Figure 14-8** above. The nearest emergency hospital is in Sainshand city. This hospital provides specialized care across multiple departments, including Paediatrics, Internal Medicine, Neurology, Surgery and Trauma, Obstetrics and Gynaecology, Infectious Diseases and Tuberculosis, Emergency Admission, and Day Care Treatment.

14.4.153 Between 2020 and 2024, Mongolia's health system experienced a steady expansion in both institutional capacity and service utilization. As shown in **Table 14-45**, the total number of licensed health organisations nationwide grew by 38.1%, from 4,575 to 6,316. Correspondingly, the national facility density improved from 141.9 to 195.8 per 100,000 population, a 38.0% increase. In contrast, Dornogovi aimag saw only a 31.0% rise in licensed organizations (from 87 to 114), with facility density increasing from 2.7 to just 3.5 per 100,000 population.

Table 14-45 Facility Availability and Utilization Indicators — Mongolia vs. Dornogovi Aimag (2020–2024)

Selected indicators	Administrator unit	2020	2021	2022	2023	2024	2020-2024, Δ %
Number of licensed health organizations	Mongolia	4575	4952	4998	6267	6316	+38.1
	Dornogovi aimag	87	76	93	116	114	+31.0
Facility density (per 100000 population)	Mongolia	141.9	153.5	155	194.3	195.8	+38.0
	Dornogovi aimag	2.7	2.4	2.9	3.6	3.5	+29.6
Number of hospital beds	Mongolia	27083	35310	29629	29443	30117	+11.2
	Dornogovi aimag	523	540	550	549	553	+5.7
Number of inpatients	Mongolia	836277	934986	1005916	1042835	1039624	+24.3
	Dornogovi aimag	16863	20618	19377	19353	19632	+16.4
Bed density (per 10000 population)	Mongolia	84	107.6	88.7	87	88.1	+4.9
	Dornogovi aimag	74.1	75.3	76.4	76.7	77.1	+4.0
Inpatient utilization rate (per 1000 population)	Mongolia	259.3	284.8	301.1	308.3	304.1	+17.3
	Dornogovi aimag	239	287.7	269.3	270.2	273.8	+14.6

Source: Calculated based on NSO Mongolia. www.1212.mn; Number of hospital beds for 2020 and using data from the National Health Indicators 2020, National Centre for Health Development (NCHD), Mongolia

14.4.154 Hospital bed capacity also expanded nationwide by 11.2%, from 27,083 to 30,117 beds. Dornogovi aimag's bed count rose modestly by 5.7%, from 523 to 553 beds. This increase translated into a bed density of 77.1 per 10,000 population in 2024, still notably below the national average of 88.1. Utilization indicators similarly reflect this disparity: while Mongolia's inpatient admission rate increased by 24.3% and utilization rate by 17.3%, Dornogovi aimag's figures rose only by 16.4% and 14.6%, respectively.

14.4.155 The national average number of people per physician steadily declined from 259.4 in 2020 to 214.1 in 2024, reflecting improved physician coverage. By contrast, Dornogovi aimag experienced a more fluctuating pattern, peaking at 277.8 in 2022 before dropping to 248.1 in 2024, still above the national level.

14.4.156 Although Dornogovi aimag demonstrated modest health system gains from 2020 to 2024, growth remains concentrated in its urban centre and significantly lags national benchmarks. Rural communities continue to face structural disadvantages in access to both health infrastructure and professional services. As **Table 14-46** demonstrates, this disparity becomes more pronounced when disaggregated at the soum level. Sainshand soum, as the administrative centre, accounted for nearly all facility growth in the aimag, with the number of licensed health organizations rising by 36.5% (from 74 to 101). Meanwhile, rural soums, including Mandakh, Saikhandulaan, and Ulaanbadrakh, retained just one licensed health organization each throughout the five-year period, indicating zero net growth in institutional availability in the rural periphery.

Table 14-46 Facility Availability and Utilization Indicators — Selected Soums of Dornogovi Aimag (2020–2024)

Selected indicators	Administrator unit	2020	2021	2022	2023	2024	2020-2024, Δ %
Number of licensed health organizations	Sainshand soum	74	63	80	103	101	+36.5
	Mandakh soum	1	1	1	1	1	0
	Saikhandulaan soum	1	1	1	1	1	0
	Ulaanbadrakh soum	1	1	1	1	1	0
Number of hospital beds	Sainshand soum	327	346	356	355	359	+9.8
	Mandakh soum	8	9	9	9	9	+12.5
	Saikhandulaan soum	6	7	7	7	7	+16.7
	Ulaanbadrakh soum	7	8	8	8	8	+14.3
Number of inpatients	Sainshand soum	11437	13624	12998	12252	12171	+6.4
	Mandakh soum	229	359	240	312	276	+20.5
	Saikhandulaan soum	137	187	192	265	269	+96.4
	Ulaanbadrakh soum	196	268	200	204	278	+41.8
Bed density (per 10000 person)	Sainshand soum	124.6	128.2	128.3	126.1	126.7	+1.7
	Mandakh soum	51.2	57.6	58.3	58.9	56.7	+10.7
	Saikhandulaan soum	43.6	50.1	49.7	50.0	50.8	+16.5
	Ulaanbadrakh soum	46.9	52.8	52.9	54.1	54.6	+16.4
Inpatient utilization rate (per 1000 person)	Sainshand soum	436.0	504.9	468.4	435.3	429.4	-1.5
	Mandakh soum	146.5	229.8	155.5	204.1	173.8	+18.6
	Saikhandulaan soum	99.6	133.9	136.4	189.3	195.4	+96.2
	Ulaanbadrakh soum	131.4	177.0	132.3	138.0	189.9	+44.5

Source: Calculated using NSO Mongolia. www.1212.mn; Number of hospital beds for 2020 data from the National Health Indicators 2020, National Centre for Health Development (NCHD), Mongolia.

14.4.157 The distribution of hospital beds followed a similar pattern. Sainshand added 32 new beds between 2020 and 2024 (+9.8%), resulting in a stable bed density of around 126.7 per 10,000 population. In contrast, rural soums experienced minor numerical gains in bed count (e.g., +1 to +2 beds), which translated to slightly improved, but still inadequate, bed densities ranging between 50.8 and 56.7 per 10,000. For instance, Mandakh's bed density in 2024 stood at 56.7, which is less than half of Sainshand soum's figure.

Education Facilities

14.4.158 The following table provides education infrastructure between Mongolia's national averages and Dornogovi aimag, with additional breakdown for the Project soums. This data highlights the distribution of educational facilities, their capacity, and infrastructure quality across different administrative levels from 2021-2025.

Table 14-47 Comparative Education Infrastructure, Mongolia vs. Dornogovi and Selected Soums (2021–2025)

Infrastructure Indicator	National Average	Dornogovi Aimag	Sainshand soum	Mandakh soum	Saikhandulaan soum	Ulaanbadrakh soum
Preschool Infrastructure						
Number of kindergartens (2021-2022)	1,475	42	14	1	2	1
Number of kindergartens (2024-2025)	1,598	40	14	1	2	1
Kindergarten capacity utilization (%)	112.3	117.4	123.6	109.3	101.2	107.5
Inclusive Kindergartens (%)	38.2	42.5	57.1	0.0	50.0	0.0
General Education Infrastructure						
Number of schools (2021-2022)	839	21	6	1	1	1
Number of schools (2024-2025)	856	21	6	1	1	1
Schools operating in multiple shifts (%)	68.4	70.5	100.0	0.0	0.0	0.0
Schools with dormitories (%)	72.3	76.2	33.3	100.0	100.0	100.0
Dormitory capacity (beds)	-	1,115	240	80	60	60
Dormitory occupancy rate (%)	83.7	62.5	87.5	70.0	73.3	60.0
Digital Infrastructure						
Schools with broadband internet (%)	92.7	95.2	100.0	100.0	0.0	100.0
Student-computer ratio	12	10	8	15	18	12
Classrooms with digital equipment (%)	65.3	72.4	87.6	60.0	40.0	55.0
Facility Condition						
Schools requiring renovation (%)	23.5	19.0	16.7	0.0	100.0	0.0

Infrastructure Indicator	National Average	Dornogovi Aimag	Sainshand soum	Mandakh soum	Saikhandulaan soum	Ulaanbadrakh soum
Schools with accessible facilities for disabled students (%)	41.2	47.6	66.7	0.0	0.0	100.0

Source: National Statistics Office of Mongolia (2021–2022, 2024–2025); Dornogovi Education Reports (2021–2025). <http://dornogovibg.edu.mn/>

14.4.159 Each soum has one kindergarten and one secondary school. The distances to the soum centres are:

- Sainshand – 4.4km from the substation location
- Mandakh – 44km
- Saikhandulaan – 50.6km
- Ulaanbadrakh – 93km

14.4.160 Dornogovi aimag's education sector has shown steady improvement from 2021–2025, with preschool enrollment reaching 92.7% and basic education at 96.2%, while teacher qualifications increased from 48.3% to 56.4%. Statistical data reveals significant urban–rural disparities, with Sainshand hosting nearly half of all students and maintaining a 23.3 student–teacher ratio compared to rural areas like Ulaanbadrakh with a more favorable at 9.1.

14.4.161 Table 14-48 presents educational service accessibility across Mongolia, Dornogovi aimag, and the Project soums, highlighting key metrics from 2021–2025 that demonstrate both progress and persistent disparities in educational access. Dornogovi aimag has made significant progress in educational service accessibility between 2021–2025, with several indicators exceeding national averages. Preschool enrollment increased dramatically from 80.2% to 92.7%, surpassing the national average of 88.7% by 2024–2025.

14.4.162 The student-teacher ratio shows marked urban-rural disparities that impact service quality. While Sainshand maintains a high ratio of 23.3, rural soums like Ulaanbadrakh (9.1) and Mandakh (11.3) offer more favorable ratios. Special education services show mixed accessibility patterns. While 0.7% of students with disabilities are integrated into mainstream schools across the aimag, the distribution of resource rooms is uneven. Ulaanbadrakh stands out with 100% of its schools having resource rooms, while Mandakh and Saikhandulaan have none.

Table 14-48 Educational Service Accessibility in Mongolia, Dornogovi, and Selected Soums (2021–2025)

Service Accessibility Indicator	National Average	Dornogovi Aimag	Sainshand	Mandakh	Saikhandulaan	Ulaanbadrakh
Preschool Education						
Preschool Enrollment Rate (2021–2022) (%)	80.5	80.2	85.6	78.3	76.5	75.8
Preschool Enrollment Rate (2024–2025) (%)	88.7	92.7	96.3	89.1	88.4	87.2
Children with disabilities in preschool (%)	1.2	0.8	1.1	0.0	0.5	0.0

Service Accessibility Indicator	National Average	Dornogovi Aimag	Sainshand	Mandakh	Saikhandulaan	Ulaanbadrakh
Teacher-child ratio in kindergartens	1:23	1:24	1:26	18	1:19	1:17
Basic Education						
Primary education enrollment (2021-2022) (%)	96.8	97.3	98.1	96.5	95.8	96.2
Primary Enrolment Rate (2024–2025) (%)	98.2	101.0	101.5	100.2	99.5	100.0
Basic education enrollment (2021-2022)	93.5	93.9	95.2	92.8	91.5	92.3
Basic education enrollment (2024-2025)	95.1	96.	97.5	94.8	93.6	94.1
Complete secondary enrollment (2024-2025)	63.8	65.6	68.3	62.5	60.2	61.8
Student-teacher ratio	21.5	21.8	23.3	11.3	22.8	9.1
Teacher Qualifications						
Teachers with advanced qualifications (2021-2022) (%)	45.7	48.3	54.2	42.1	40.5	38.7
Teachers with Advanced Qualifications (2024) (%)	52.8	56.4	59.0	51.2	48.5	47.3
Teachers with Master's Degrees (%)	11.2	13.6	16.8	8.3	7.1	9.5
Special Education Services						
Students with disabilities in mainstream schools (%)	0.8	0.7	0.9	0.5	0.3	0.6
Schools with resource rooms for special needs (%)	38.5	42.9	66.7	0.0	0.0	100.0
Additional Educational Services						
Extracurricular Programs Offered (%)	92.3	95.2	100.0	100.0	100.0	100.0
Career Guidance Availability (%)	76.5	81.0	100.0	0.0	0.0	100.0
Access to dormitory services for eligible students (%)	83.7	100.0	100.0	100.0	100.	100.0

Source: National Statistics Office of Mongolia (2021-2022, 2024-2025); Dornogovi Education Reports (2021–2025).

<http://dornogoviibg.edu.mn/>

14.4.163 Dornogovi aimag exhibits significant urban-rural disparities in educational resources, quality, and outcomes, with Sainshand city (the aimag centre) concentrating nearly half of all educational resources. The student population distribution is heavily skewed, with 45.2% of the aimag's students attending schools in Sainshand, while rural soums like Ulaanbadrakh account for only 1.5% of total students. This concentration pattern is similarly reflected in teacher distribution, with 41.8% of all teachers working in Sainshand. The student-teacher ratio reveals an interesting paradox in resource allocation. While Sainshand maintains a high ratio of 23.3, rural areas like Ulaanbadrakh (9.1) and Mandakh (11.3) have much more favorable ratio.

14.4.164 Access to specialised educational services has a stark urban-rural divide. While 100% of Sainshand schools have science laboratories and psychological services, these facilities are entirely absent in the selected rural sums. Similarly, 83.3% of Sainshand schools have language laboratories, while none are available in rural areas. Ulaanbadrakh stands as an exception in career counseling services, matching Sainshand's 100% availability while other rural sums have none.

Water Supply

14.4.165 From 2020 through 2024, centralized water-supply coverage in Dornogovi aimag grew from 31.3% to 33.2%, a net gain of 1.9 percentage points, which represents a 6.1% increase over the 2020 baseline (**Table 14-49**). Urban connections in Sainshand rose from 87.9% to 89.2% (+1.3 percentage points, a 1.5% uplift), while rural soums achieved proportionally larger relative gains despite small absolute changes: Mandakh soum grew from 10.0% to 10.5% (+0.5 percentage points, +5.0%), Saikhandulaan soum from 13.5% to 14.3% (+0.8 percentage points, +5%), and Ulaanbadrakh soum from 12.3% to 13.0% (+0.7 percentage points, +5.7%).

Table 14-49 Centralized system coverage by year and location (% of households)

Year	Dornogovi (%)	Sainshand (Urban) (%)	Mandakh (Rural) (%)	Saikhandulaan (Rural) (%)	Ulaanbadrakh (Rural) (%)
2020	31.3	87.9	10.0	13.5	12.3
2021	31.5	88.3	10.3	13.7	12.6
2022	30.9	88.7	10.2	13.9	12.5
2023	32.5	88.9	10.4	14.0	12.8
2024	33.2	89.2	10.5	14.3	13.0
%Change (2020–2024)	+6.1	+1.5	+5.0	+5.9	+5.7

Source: Calculated using 2020 census and 2021–2024 survey data. Dornogovi Statistical Office,
<https://dornogovi.nso.mn/>

14.4.166 Household use of portable sources (wells, springs, tanker-truck) in the aimag decreased from 67.9% in 2021 to 66.2% in 2024 (–2.5%), but remained dominant in rural areas at 88.8%. Private systems held steady at 0.6% (**Table 14-50**). In 2024, 57.1% of all households accessed water via direct piped connections or kiosks- 91.2% in Sainshand versus 13.0% or less in each rural Project soum. Over 70% of households in Mandakh, Saikhandulaan, and Ulaanbadrakh still relied on unprotected surface sources, with Mandakh also depending on tanker trucks for 9.2% of its supply (**Table 14-51**). These figures illustrate that while overall aimag coverage has improved by over six percent relative to 2020, rural-area expansions lag behind urban upgrades.

Table 14-50 Household Water Source Types and Urban–Rural Distribution in Dornogovi Aimag, 2021–2024

Source Type	2021 Total (%)	2024 Total (%)	% Change (2021–2024)	Urban (2024) (%)	Rural (2024) (%)
Portable water (wells, springs, trucks)	67.9	66.2	–2.5%	52.1	88.8
Centralized system	31.5	33.2	+5.4%	47.1	11.0
Independent (private) systems	0.6	0.6	0.0%	0.8	0.3

Source: Calculated using 2021–2024 survey data. Dornogovi Statistical Office, <https://dornogovi.nso.mn/>

Table 14-51 Household Water Sources by Type and Location in Dornogovi Aimag, 2024

Water Source	Dornogovi (HHs)	Dornogovi (%)	Sainshand (%)	Mandakh (%)	Saikhandulaan (%)	Ulaanbadrakh (%)
Central & private piped connections	6 037	30.0	47.3	0.8	0.0	0.2
Piped-water kiosks	5 450	27.1	43.9	7.2	13.9	5.8
Protected wells	2 858	14.2	2.1	6.5	15.0	19.7
Protected springs	13	0.1	0.0	0.0	0.0	0.2
Bottled water	336	1.7	1.6	0.0	0.0	0.0
Unconnected piped (“open” taps)	494	2.5	4.4	0.0	0.2	0.0
Tanker-truck delivery	259	1.3	0.1	9.2	0.0	2.2
Surface sources (river, dam, unprotected)	4 668	23.2	0.6	76.3	70.9	71.9

Source: Dornogovi Statistical Office, Wastewater Treatment and Waste Management

14.4.167 The household surveys indicated that seven of the ten interviewed households use a public well; and three households use a private well for their water source. Six households use the same well for drinking water and watering livestock. Four households use different types of the water source their drinking and watering livestock.

14.4.168 According to the six respondents who use the same water source for both drinking and watering livestock, the average distance to the nearest well is 1.6 km, with the closest well located 0.1 km away and the farthest at 3 km. For the four households using separate water sources for drinking and livestock, the average distance to the drinking water well is 8.2 km, with the closest well located 5 km away and the farthest at 15 km. For livestock, the average distance is 4.8 km, with the nearest well at 4 km and the farthest at 5 km.

Table 14-52 Water source distance from herder camp, km

Distance to well	Households that use the same water source, km	Households that use the different water source, km	
		Drinking	Livestock
Nearest	0.1	5	4.8
Farthest	3	15	4
Average	1.6	8.2	5

Wastewater Treatment and Waste Management

14.4.169 Between 2020 and 2024, Dornogovi aimag made gradual progress in expanding sanitation infrastructure. The most notable development was the commissioning of a centralised wastewater treatment plant (WWTP) in Sainshand in mid-2022, with a daily treatment capacity of 3,000 m³. Managed by Chandmani Ilch LLC, this facility contributed to incremental gains in centralised sewage coverage. Despite these advancements, rural areas remained predominantly reliant on on-site systems and informal waste disposal practices. The divergence in service access between Sainshand and other soums underscores ongoing spatial inequality in essential public health infrastructure.

14.4.170 From 2020 to 2024, the proportion of households in Dornogovi aimag connected to a centralised sewage system increased from 30.2% to 31.8%, reflecting a modest 1.6 percentage-point gain or a 5.3% increase over the 2020 baseline (**Table 14-53**). This growth was primarily driven by Sainshand, where the share rose from 65.4% to 67.1% (+1.7 percentage-point or +2.6%). In contrast, rural soums recorded significantly larger proportional increases- Mandakh (+125%), Saikhandulaan (+34.8%), and Ulaanbadrakh (+27.3%)- though absolute coverage remained below 4% in all cases.

Table 14-53 Percent of Households Connected to Centralized Sewage System, by Dornogovi and Project soums, 2020–2024

Year	Dornogovi	Sainshand (Urban)	Mandakh (Rural)	Saikhandulaan (Rural)	Ulaanbadrakh (Rural)
2020	30.2	65.4	0.8	2.3	2.2
2021	30.4	65.7	1.0	2.5	2.3
2022	31.4	66.0	1.2	2.8	2.5
2023	31.2	66.3	1.5	2.9	2.6

Year	Dornogovi	Sainshand (Urban)	Mandakh (Rural)	Saikhandulaan (Rural)	Ulaanbadrakh (Rural)
2024	31.8	67.1	1.8	3.1	2.8
Δ % (2020–2024)	+5.3%	+2.6%	+125.0%	+34.8%	+27.3%

Source: Calculated using 2020 census and 2021–2024 survey data. Dornogovi Statistical Office, <https://dornogovi.nso.mn/>

14.4.171 As shown in **Table 14-54**, in Sainshand soum 45.0% of households were connected to the centralised sewage system, while only 11.0% discharged wastewater untreated. In stark contrast, over two-thirds of households in Mandakh soum (68.2%), Saikhandulaan soum (66.8%), and Ulaanbadrakh soum (71.4%) relied on direct discharge without any form of treatment. Boreholes and pit latrines served as secondary methods, especially where centralised systems were unavailable. Independent or private wastewater systems remained rare, representing less than 1% of households aimag-wide. These figures demonstrate the concentration of safe wastewater management services in urban zones, while rural areas continue to face high public and environmental health risks due to limited infrastructure.

Table 14-54 Household Wastewater Removal Methods by Area (2024)

Method	Households	Dornogovi (%)	Sainshand (%)	Mandakh (%)	Saikhandulaan (%)	Ulaanbadrakh (%)
Borehole / Pit latrine	7,970	36.5	42.9	26.3	28.4	25.8
Centralized sewage system	6,947	31.8	45.0	1.8	3.1	2.8
Open discharge (no treatment)	6,735	30.9	11.0	68.2	66.8	71.4
Independent / Private system	177	0.8	1.1	3.2	1.7	0.0

Source: Calculated using data from Dornogovi Statistical Office, <https://dornogovi.nso.mn/>

14.4.172 Formal household access to solid waste disposal, comprising either authorised landfills or regular service-provider collection, rose slightly from 23.3% in 2020 to 24.5% in 2024. Sainshand maintained a consistently higher coverage rate, rising from 31.1% to 32.2%, while all rural soums remained below 15% (**Table 14-55**).

Table 14-55 Official Solid Waste Disposal Coverage by Year and Location (% of Households)

Year	Dornogovi (%)	Sainshand (%)	Mandakh (%)	Saikhandulaan (%)	Ulaanbadrakh (%)
2020	23.3	31.1	11.0	13.5	12.3
2021	23.4	31.4	11.3	13.7	12.5
2022	23.7	31.6	11.5	13.9	12.7
2023	23.9	31.9	11.6	14.0	12.8
2024	24.5	32.2	11.8	14.2	13.0
Δ % (2020–2024)	+5.2%	+3.5%	+7.3%	+5.2%	+5.7%

Source: Calculated using 2020 census and 2021–2024 survey data. Dornogovi Statistical Office, <https://dornogovi.nso.mn/>

14.4.173 The 2024 data (**Table 14-56**) also reveals considerable variation in actual waste disposal methods. While over 73% of Sainshand soum households benefit from service-provider collection, rural soums rely more heavily on informal disposal. Nearly half of households in Mandakh soum (46.5%), Saikhandulaan soum (50.3%), and Ulaanbadrakh soum (44.1%) dispose of waste at undesigned

locations, and 13–16% burn or bury their waste. These patterns confirm that while solid waste management systems have expanded slightly, rural communities continue to face barriers to safe and regulated waste disposal.

Table 14-56 Household Solid Waste Disposal Methods by Area, 2024

Method	Households	Dornogovi (%)	Sainshand (%)	Mandakh (%)	Saikhandulaan (%)	Ulaanbadrakh (%)
Service-provider collection	11,829	54.3	73.1	24.8	22.5	25.6
Authorized landfill	5,353	24.5	24.7	13.1	14.2	14.7
No designated site (dumping)	3,517	16.1	1.9	46.5	50.3	44.1
Burned or buried	1,130	5.0	0.4	15.6	13.0	15.6

Source: Calculated using data from Dornogovi Statistical Office, <https://dornogovi.nso.mn/>

14.4.174 At the household survey level, six households use proper waste disposal via central landfill located in either the soum or aimag centre. They collect and store the waste, then typically transport and discard it once a month. Three reported to burn waste near their camp and one discards of waste near their camp in no formal area.

14.5 Potential Impacts and Effects

Construction Phase

Health and Wellbeing

- 14.5.1 There are several community health and wellbeing risks and impacts that need to be considered during construction. The first potentially significant impact stems from the direct geophysical effects of OHTL construction activities. These activities include, but are not limited to, increased road traffic, land clearance, earthworks and excavation, stockpiling, backfilling, and levelling, unprotected tower base excavations (risk to children and livestock in particular), as well as the movement of construction personnel, and HGV material and equipment transport and handling. 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.
- 14.5.2 These activities heighten dust and emissions levels that can impact physical health, by way of impediments to breathing and a range of eye and respiratory conditions, and infections in the case of excessive exposure to small dust particles. These activities can also impact wellbeing by way of the annoyance of higher frequency washing and cleaning in the case of increased dust, and by way of the anxiety and stress caused by disturbance to livestock, conversations, and rest and contemplation, in the case of increased noise and vibration. Seasonality will be a key factor in determining noise and dust levels, being highest during the warmer drier months of the year and known to be an issue in the Project Area.
- 14.5.3 The impact of Project construction generated emissions, dust, noise, and vibration, on human health and wellbeing is predominantly, however, a function of receptor proximity and a function of the intensity and length of exposure to construction-related activity sources. For air quality, dust, and emissions,

impacts are typically experienced within up to 250m-300m of construction activities or 50m of routes used by construction related vehicles on public roads. In general, nuisance noise related to construction machinery depends on the type of equipment and distance to the nearest receptor, with noise sensitive receptors like residential properties being most affected within 90m of activities.

- 14.5.4 The health and wellbeing risks and impacts posed by construction activities resulting in dust, noise and nuisance are contingent on a range of variables including; the nature and scale of the construction works, the proximity of the works to population centres, the ratio of the migrant workforce to the host population and the proportion of the workforce native to the area; workforce accommodation arrangements and the density of the overall population during construction. The specifics of many of these variables will not be known until the Construction Contractor is appointed, but it is reasonable to assume that for a linear project, impacts will be transient and relatively short term in any one area, as sections of the OHTL are worked on at a time. Overall, a medium magnitude of impact is anticipated.
- 14.5.5 Although individuals are sensitive to these impacts, including dust (respiratory mortality surged in both Sainshand soum (+59.9%) and Mandakh soum (+96.7%) and peaked sharply in Ulaanbadrakh soum in 2024 (47.81 per 10,000), there are no settlements immediately adjacent to the Project substations or OHTL route; the nearest sensitive settlement receptor being Sainshand around 4.4km from the Project; and the Tsagaan Suvarga mine and associated workers at the second substation. Local communities are therefore receptors of low sensitivity in the Project Area. Along the route, there are 16 herder camps within 1km of the OHTL route and due to their proximity, herder households are considered receptors of medium to high sensitivity, depending on the distance from the works. This will result in a **Minor Adverse** effect for local communities and a **Moderate to Major Adverse** effect for herders with camps near the proposed works. It is considered that, where these impacts affect vulnerable people, such as the elderly and people with chronic health conditions (Very High sensitivity), the overall effect will be **Major Adverse**; two of the households interviewed had an elderly person; none had household members with chronic health conditions.
- 14.5.6 Another significant potential health impact of construction stems from the presence of the construction workforce. An influx of non-local, expatriate, or inter-regional, workers heighten the risk of communicable disease spread because of the increased number of carriers from outside the area and more concentration human interaction. This includes the spread of infectious diseases like Coronavirus, Pneumonia, and Flu, as well as Sexually Transmitted Diseases (STDs), including HIV/AIDs, and the dangers these pose for unwitting partners.
- 14.5.7 An influx of construction workers can also result in friction with the local community, affecting community cohesion. The reason for such impacts could be due to increased frustration among the locals due to the newcomers' construction workers having a different lifestyle, and potentially culture, language or ethnicity. Influx may also result in potential rivalry between the locals and newcomers' competing for construction employment; workers and construction vehicles movements along the route alignment and in the surrounding areas causing disturbance to local residents; and lack of full awareness about the Project construction activities, the timing and duration, together with noise and air quality impacts, creating negative emotions towards, or concerns about construction workers and therefore could reduce local community's trust. This may also heighten the risk of gender-based violence and harassment (GBVH).

- 14.5.8 Furthermore, an influx of labour from another country can make social cohesion more challenging and increase the risk of influx. Local workers may feel threatened or disadvantaged because of labour influx and, potentially, overseas construction workers moving to the Project area.
- 14.5.9 It is estimated that around 200 construction workers will be required for the Project. It is anticipated that the Construction Contractor would establish a workers' accommodation camp near Sainshand, and potentially smaller camps moving along the route to service works areas. Sainshand city and Dornogovi aimag itself has many ongoing developments and mining projects funded by foreign investment, with a higher degree of familiarity of local communities with migrant workers (Chinese, French, Indians, etc.) and their culture and habits. This is against a back drop of STIs in the aimag showing relative stability over the 2020-2024 period, with a reduction from 62.2 in 2020 to 44.1 in 2024. The STI trends across soums also showed consistent decline over this period. The majority of existing crime in the aimag is associated with the built up area of Sainshand city/soum. Livestock theft has also seen a reduction in the Project Area over this period, only with a slight increase in Sainshand soum.
- 14.5.10 As such, the impact of a Project influx is considered to be low to medium. Given the distance of local communities from the Project, with the exception of Sainshand which itself is a city, overall local communities are considered to be a receptor of low sensitivity. Herder households along the OHTL route are considered to be a receptor of medium sensitivity; with females and children high sensitivity. Overall, the effect of an influx on social cohesion, culture and health and associated wellbeing is **Negligible to Minor Adverse** on local communities, **Minor to Moderate Adverse** on herders, and **Major to Moderate** for women and children.

Electromagnetic Fields

- 14.5.11 There is no possibility of EMF impacts associated with the project's construction phase, since the electrical equipment will not be energised at this stage. The EMF impacts during the construction phase have not been considered further in the ESIA.

Safety and Security

- 14.5.12 There are several community safety and security risks and impacts that need to be considered during construction, including public injuries as a result, for example, of increased construction traffic to and from the site and around the works sites; unprotected excavations (risk to children and livestock in particular); and machinery or operator loss of control.
- 14.5.13 Construction activities are associated with inherent accident and injury risks (including from material spillages, electrocution, equipment mishandling, falls into excavated trenches), and these will be greatest for persons closest to the works. There are safety risks from unauthorised access to construction works and equipment however, the works and any construction compounds and construction workers' accommodation would be expected to be fenced as a security provision. As construction should be conducted within areas of restricted access, the main safety risk to community members is likely to be from construction traffic using public roads (to Sainshand) and tracks to the Project route itself.
- 14.5.14 During construction, vehicle numbers will increase on public roads and tracks leading to the works due to raw material, waste, personnel, and equipment transporters, moving to and from construction points, inevitably raising the accident and injury risk to other road users, including pedestrians (and

their livestock), horse riders, and drivers, with the risk of serious accidents and injuries accentuated by the typically heavy weight and long stopping distances that will be characteristic of many of the construction vehicles using the roads and tracks.

- 14.5.15 As with health and wellbeing, the safety and security risks and impacts posed by construction are a function of a range of variables including; the nature and the scale of the construction works, the proximity of the works to population centres, the ratio of the migrant workforce to the host population and the proportion of the workforce native to the area; workforce accommodation arrangements, and overall population density during construction. Given the Project location, the main receptors will be herders, who in this instance are considered to be of high sensitivity. The impact is likely to be medium, with an overall **Major Adverse** effect prior to mitigation.
- 14.5.16 Specifically with respect to safety and security and gender, Mongolia has a high rate of GBVH and exploitation, sexual abuse, and sexual harassment (SEAH). GBVH is known to be a risk in the construction sector, especially within local communities when there are large influxes of male workers from outside the area. Such workers often come without their families and have large disposable incomes relative to the local community and can pose a risk in terms of sexual harassment, violence and exploitative transactional relationships. Women and children in this sense are considered receptors of Very High sensitivity. Overall, it is anticipated that the construction workforce would have a medium impact based on its likely size, resulting in the potential for a **Major Adverse** effect without appropriate mitigation measures in place.

Infrastructure and services

- 14.5.17 Proposed construction activities, and any net increase in local population because of an influx of migrant workers, will increase demand on existing local services and infrastructure during construction. Specifically, this may include increased demand for healthcare, catering, and administrative engagement, fuel and power to support construction machinery, water for the site workforce and at any workers' construction camps, as well as water for materials and processes such as concrete mixing and dousing, as well as the need for waste and wastewater management. It is assumed that a workers' accommodation camp will be used, minimising the demand for accommodation locally.
- 14.5.18 The significance of the impact of these demands, and their propensity to compromise existing local infrastructure and service supply and cause inflationary pressures, will be contingent on workforce size and the ratio of the migrant workforce to the host population and native workforce. It will also be contingent on the latent capacity of local services and infrastructure, construction scale and timescales, working practices, and local water and power sourcing needs.
- 14.5.19 In terms of water and power, it is assumed that the Construction Contractor will use the national electricity grid only where required and capacity exists and use generators or petroleum powered machinery at camp and work sites, and that water will likely be obtained from existing potable supplies or trucked into the work site.
- 14.5.20 Of greatest sensitivity is likely to be the ability of Dornogovi aimag's emergency services to respond to incidents, with the only 11 active personnel employed out of 167 authorized positions, resulting in a staffing utilization rate of just 6.6%.

- 14.5.21 Across the proposed OHTL route, the baseline indicates that the availability and capacity of existing host community social infrastructure is low outside of Sainshand city, so they are considered high sensitivity receptors. The magnitude of impact for this development is considered medium, resulting in a Major Adverse effect in relation to infrastructure and services access prior to mitigation.
- 14.5.22 Transportation activities necessary for the construction phase may impact current road networks, traffic flows, and existing users. Increases in traffic movements and the transportation of equipment and workers can have a negative effect on the local transportation network. The main surfaced roads into/out of Sainshand city are not expected to be significantly impacted from the planned increased in vehicle movements as these are main highways. Locally, dirt roads may be used to access the site; the impact of which is addressed under health and safety above. Overall, the anticipated impact on the road network is considered low, and the sensitivity of the road network is low, resulting in a **Negligible effect**.
- 14.5.23 The potential impact of the Project on existing infrastructure where it is crossed by the route is considered in **Chapter 16: Land Use, Tenure and Displacement**.

Operation Phase

Community health and wellbeing

- 14.5.24 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 a Very Low risk of health and safety impacts during operation.
- 14.5.25 The Project will strengthen the reliability and stability of the transmission network which will have a positive impact on wellbeing in relation to existing users of the CES. Overall, users of the CES are considered receptors of medium sensitivity and the impact is likely to be medium, alongside other upgrades, result in a **Moderate Beneficial** effect on the wellbeing of users of the CES.

Electromagnetic Fields

- 14.5.26 Electromagnetic fields (EMFs) are created both naturally and as a result of human activity. EMFs are generated naturally within the human body by nerve and muscle activity and are always present at background levels in the broader environment. Additionally, EMFs are produced whenever electrical or electronic devices are in operation. EMFs are static electric, static magnetic and time-varying electric and electromagnetic (radio wave) fields with frequencies up to 300 GHz.
- 14.5.27 All overhead powerlines generate EMFs. Typically, the electricity they transport is an alternating current (AC) at frequencies of 50 or 60 Hz. Consequently, substation transformers and powerlines that transmit AC are surrounded by low-frequency electric and magnetic fields.
- 14.5.28 An electric field is generated by voltage, which represents the electrical pressure pushing the flow of electricity. Its strength (or amplitude) is measured in volts per metre (V/m) and is dependent on the voltage, which remains approximately constant as the line is energised.
- 14.5.29 Magnetic fields are generated by the flow of electric current and are measured in amperes per metre

(A/m). However, investigators often use flux density as an alternative measurement, expressed in microtesla (μT) or millitesla (mT). For transmission lines the electric current, and consequently the magnetic field, fluctuates based on the power demand at any given moment.

- 14.5.30 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 the receptor. EMFs are generally higher directly beneath the line and decrease to the sides at increasing distance. A key difference between the two fields is that electric fields can be easily screened, whereas magnetic fields can penetrate most buildings.
- 14.5.31 According to the Energy Networks Association (ENA)⁶¹, one difference between electric and magnetic fields is that electric fields are easily screened - by buildings, hedges, fences and trees. So inside a house there will be very little electric field from a power line outside. By contrast, magnetic fields pass readily through most buildings.
- 14.5.32 There has been considerable debate over whether EMFs pose a risk to human health. Numerous studies over the past two decades have shown inconsistent results, and no definitive, convincing evidence suggests that residential exposure to EMFs is harmful human health.
- 14.5.33 The International Commission on Non-Ionizing Radiation Protection (ICNIRP) is an independent body that offers scientific advice and guidance on the environmental and health effects of non-ionising radiation (NIR) to protect people and the environment from harmful NIR exposure and develops science-based guidelines on safe exposure limits for NIR, including EMFs. These guidelines set exposure limits based on the frequency and intensity of EMFs, designed to protect against known health risks. ICNIRP regularly reviews and updates its guidelines to reflect new research. In 2020, they revised their recommendations, incorporating data from studies on 5G and other emerging technologies.⁶² Their recommendations are widely accepted as the global benchmark.
- 14.5.34 The WHO, through its International EMF Project, assesses global research on EMFs and their potential health effects. While it does not set exposure limits, the WHO provides guidance to countries on adopting safe EMF practices. The WHO generally supports ICNIRP standards but advises governments to conduct further research on long-term EMF exposure and consider precautionary measures, particularly for high-exposure settings like cell towers.
- 14.5.35 The EU adopts its own EMF standards, largely informed by ICNIRP guidelines, with additional emphasis on precautionary measures. It enforces exposure limits for both workers and the general public. EU Directive 2013/35/EU specifically addresses occupational exposure, providing guidelines for protecting workers in environments with high EMF exposure. The ICNIRP 'reference levels' for the public are:
- 360 microteslas for magnetic fields
 - 9,000 volts per metre for electric fields

⁶¹ The ENA is a not-for-profit industry body representing the companies which operate the energy networks in the UK and Ireland.

⁶² Available at: [Global EMF Standards and Regulations](#)

14.5.36 They apply where the time of exposure is significant. These guidelines are designed to prevent established health effects, but were set after examining all the evidence, including the evidence on cancer.

14.5.37 Typical ground-level UK field levels from overhead power lines are shown in **Table 14-57**. 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 14-57 Typical Ground-Level UK Field Levels from Overhead Power Lines

		Magnetic Field (microtesla, μT)	Electric Field (Volts per metre, V/m)
The largest steel pylons (275kV and 400 kV)	Typical field (under line)	5-10	3,000-5,000
	Typical field (50m to side)	0.4 – 0.6	50 – 100
Smaller steel pylons (132kV)	Typical field (under line)	0.5 – 2	500 - 3,000
	Typical field (50m to side)	0.03 - 0.2	20 - 100

Source: ENA⁶³

14.5.38 It is noted that in the UK, there is no restriction in the UK on EMF grounds on how close a house can be to an overhead line, as overhead lines are designed to ensure they comply with the exposure limits even directly underneath the wires.

14.5.39 An example of the typical magnetic field calculated for a 275 kV line (i.e. higher voltage than the proposed Project) is shown in **Figures 14-8 and 14-9**. An example of the typical electric field calculated for a 275 kV line is shown in **Figures 14-10 and 14-11**.

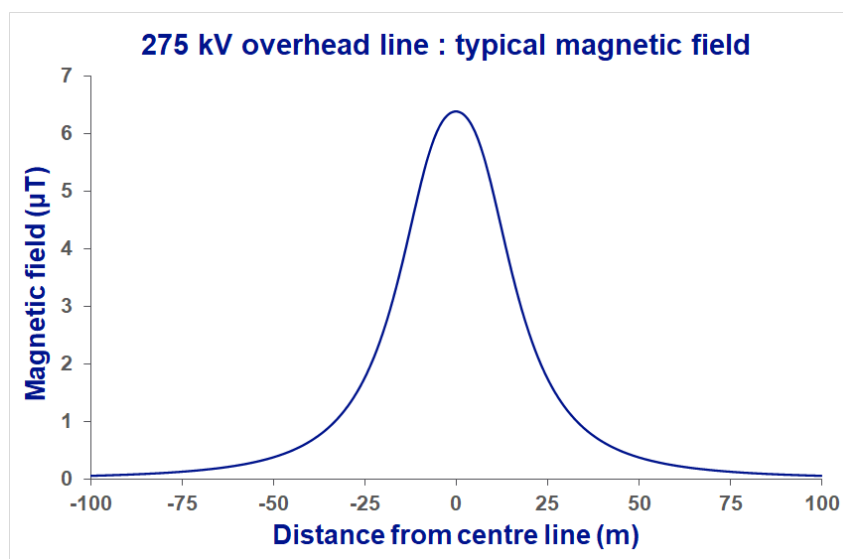


Figure 14-9 Typical magnetic field produced by a 275 kV overhead line⁶⁴

⁶³ Available at: [ENA EMFs THE FACTS_V01 2025.pdf](#)

⁶⁴ Available at: [Electric and magnetic fields from transmission overhead lines | EMFs](#)

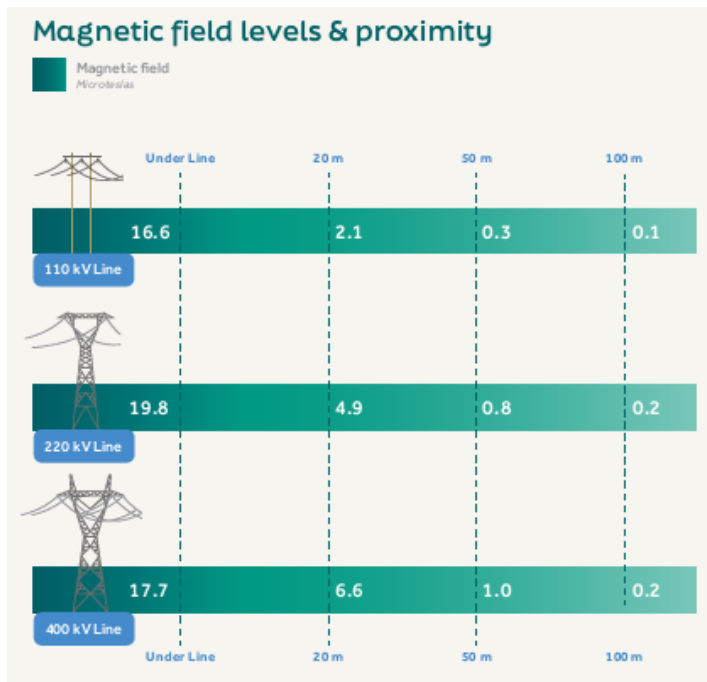


Figure 14-10 Magnetic fields and proximity – 220kV⁶⁵

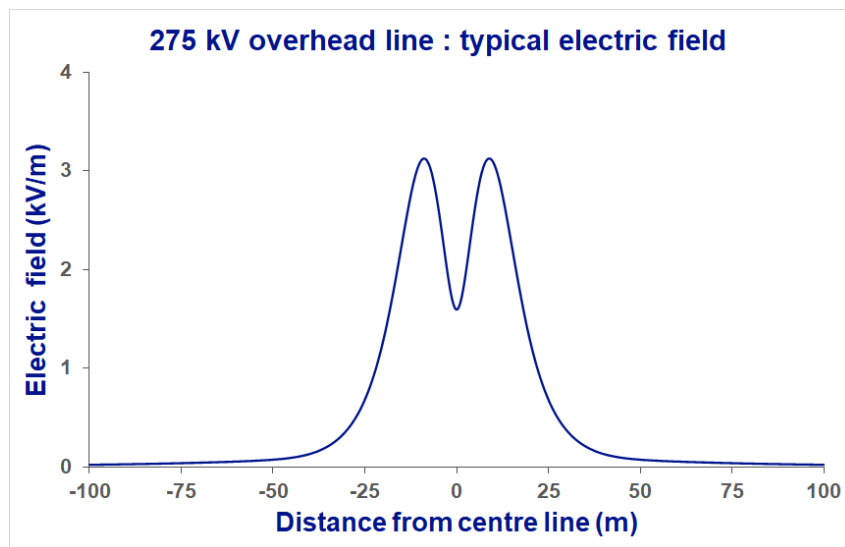


Figure 14-11 Typical magnetic field produced by a 275 kV overhead line⁶⁶

⁶⁵ Available at: [EMF-Information-Brochure-2024.pdf](#)

⁶⁶ National Grid. Available at: <https://www.emfs.info/electricity-system-and-sources/overhead-line/transmission#230548828-1756587807>. Accessed July 2025.

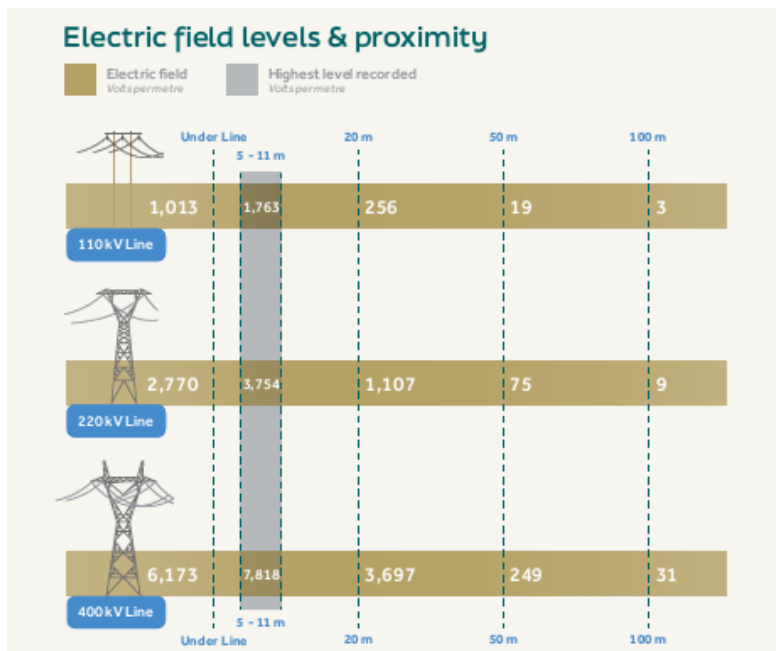


Figure 14-12 Electric fields and proximity – 220kV⁶⁷

- 14.5.40 Based on the above, the proposed transmission may pose potential health risks limited to areas where the distance from the centreline are limited to around 20m or less. By 100m, EMFs are within reference levels and may be similar to typical background levels found in most homes. Furthermore, no households will be permitted within a 25m distance from the outer edge of the transmission towers. The closest herder camps are 100m from the centreline; therefore, no significant adverse effects of EMFs are anticipated due to their distance from the line. It is not expected that any herders would be grazing livestock directly under the line for any period of time, and therefore lengthy exposure from grazing of livestock is not considered a risk. Overall, the possibility of receiving high-level short-term exposure to EMF in exceedance of ICNIRP exposure guidelines is negligible. Furthermore, the possible effects of EMFs on various animals have been studied several times, and no detectable effects of EMFs have been found. Therefore, whilst herders may be considered a receptor of High sensitivity, the impact based on the above data is negligible. A **Negligible** effect is therefore predicted in relation to EMFs. However, it is recognised that as EMFs are not generally understood by the general public and there may be a perceived adverse impact of the OHTL that will require an awareness campaign in the local community.
- 14.5.41 Small electricity distribution substations generally produce up to 2 microteslas close to their perimeter fence, and often no electric field at all. The fields fall rapidly with distance and, within 1 to 2m 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 themselves (generally less than a microtesla); the fields close by are mainly produced by power lines and cables entering them. There are no residential properties within 250m of the substations. Occupational exposure is addressed in **Chapter 17: Labour and Working Conditions**.

⁶⁷ Available at: [EMF-Information-Brochure-2024.pdf](#)

Safety and Security

- 14.5.42 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. Trespassing of unauthorised personnel into the substations could also result in exposure to electric shocks and death, as could climbing the tower and/or touching the overhead lines.
- 14.5.43 It is assumed that the design of the Project will include for appropriate health and safety measures. All structures will be adequately earthed and earthing cables used. The substations will be fenced and made secure from the public, with authorised access only permitted. In accordance with the Regulations for Operation of Electrical Installations – Order No. 101, 2014, warning signs stating “Do not climb! Dangerous” will be placed on the lower part of the towers adjacent to the authorised climbing area. The signboard measures 390×280 mm, with a white background and an outer border 5 mm wide in black (see below). This is a permanent warning placard to be mounted on support structures of overhead transmission lines rated above 1000V, at a height of 2.5 to 3m. It must be installed on every pole within urban and central areas, and on every second pole outside those areas.



- 14.5.44 From stakeholder engagement it is understood that in general terms, there is a good understanding of the risks of OHTLs with the general public. However, children in particular could be seen to be at higher risk. Whilst the Study Area is generally sparsely populated, children are considered a receptor of high sensitivity. Should an impact occur it is likely to result in potentially serious injury or death and therefore is considered to be a high impact. Whilst the risk is considered low, overall the Project could result in a **Major Adverse** effect on safety.
- 14.5.45 Horseback riders and livestock move freely around the route of the OHTL. The presence of the Project will not restrict movement during operation. There may be occasional O&M vehicles along the route to undertake maintenance activities however, the frequency and nature of this activities is not considered likely to result in an adverse impact.
- 14.5.46 With respect to safety and security and gender, whilst some construction workers might remain in the area e.g. related to other employment opportunities, overall, the Project will not necessitate a permanent increase in workers in the Project Area. Women and Children are considered High sensitivity receptors in relation to GBVH and SEAH. However, given the lack of any Project related influx during O&M, the impact in relation to this is considered very low to negligible, resulting in the potential for a Moderate to Minor Adverse effect.

Infrastructure and Services

- 14.5.47 The potential for incidents and accidents specifically associated with the risks of working at a substation and with OHTLs could put pressure on the capacity of emergency health care services during operation. Given that health infrastructure locally is in relatively poor condition and that the capacity of health and emergency services locally is limited in staff numbers and resources, the sensitivity of these services is considered High. Appropriate training and management measures would be anticipated to be in place for O&M activities and the likelihood of incidences is likely be substantially reduced from the construction phase. Therefore the impact (likelihood) of any such incident or accident is considered relatively low. Overall the significance of the effect is **Moderate Adverse** on emergency and health care services.
- 14.5.48 During operation, only very low levels of water, wastewater, etc. are anticipated associated with general O&M activities. The impact of the Project on this related infrastructure is therefore considered **Negligible**.
- 14.5.49 During the operational phase only very low levels of traffic would be generated by the Project with trips relating to maintenance and upkeep of the towers, OHTL and substations. The impact of operational traffic on the road network is therefore considered **Negligible**.
- 14.5.50 The potential impact of the Project on existing infrastructure where it is crossed by the route is considered in **Chapter 16: Land Use, Tenure and Displacement**.
- 14.5.51 From a positive perspective, the Project will strengthen the reliability and stability of the transmission network and improve capacity of the electricity system in the CES. Overall, this is likely to result in a **Moderate Beneficial** effect on the electricity network and knock on positive effect in users of the CES.

14.6 Mitigation and Enhancement Measures

Construction Phase

Health and Wellbeing, Safety and Security

- 14.6.1 Construction related air, noise and vibration impacts can be significantly reduced through the implementation of appropriate management and engineering practices and measures that are outlined more fully in the Air Quality and Noise chapters (**Chapters 7 and 8**) of this report.
- 14.6.2 At the broadest level this will involve the Construction Contractor developing, as part of a detailed Construction ESMP (CESMP), **Air Quality, Noise and Vibration, Traffic, and Water, Wastewater and Drainage Management Plans** to internationally recognised good practice standards and regularly reporting and auditing against these to the road contracting authority, and for all construction sub-contractors and workers to be contractually obliged to adhere these plans.
- 14.6.3 These plans should set out measures that include, but are not limited to; the covering of material stockpiles close to herder households to prevent wind whipping; the use of water dust suppression near dust generating machinery; regular site inspections in drier months; restricted working hours for loud activities near herder households; vehicle and equipment maintenance regimes; identified

construction traffic route on dirt roads that bypass herder households and limit extent of tracks that can be used; limits to construction vehicle idling and speed; the use of plant and machinery conforming to relevant standards and directives on noise and vibration; and, stopping plant and machinery when it is not in use.

- 14.6.4 With respect to water supplies, no surface or groundwater will be used without prior permissions in place with the relevant regulator and/or local community or well owner. Construction workers will be provided with potable water from approved sources; as will any construction worker camps. The **Water, Wastewater and Drainage Management Plan** will include measures to minimise water usage and explore opportunities for water reuse where possible, with the promotion of water efficiency through training. Local herder wells within Project footprint and/or adjacent to Project works will be mapped and any local herders' wells adjacent to construction works will be demarcated and protected from damage. Any loss of wells used by local herders will be replaced; where necessary, an alternative water supply will be provided whilst repairs are undertaken. Further details are provided in **Chapter 13 Water**. Water use at any workers' accommodation camps is addressed in **Chapter 17 Labour and Working Conditions**.
- 14.6.5 As with reducing construction traffic noise, dust, and emissions, impacts, the **Traffic Management Plan** will be critical in reducing accident risks. These plans should include the identification and designation of construction traffic routes to site, that avoid herder households or any well-used routes that could interfere with local access. It is recommended that a separation distance of 100m is maintained between identified *gers* and construction related vehicles. Where it is not possible to avoid such areas, all project employees and transport providers should be strictly required to limit their speed when passing near project settlements as part of their contractual obligations, with contract suspension or cancellation if not adhered to. Project local authorities must be made aware of this obligation so they can help hold contractors and employees to account. At any rate, speed restrictions will be in place for all construction vehicles.
- 14.6.6 A **Community Health, Safety and Security Management Plan** will be developed by the Construction Contractor to incorporate key measures that affect Project community members from the Air Quality, Noise, Traffic, and Water, Wastewater and Drainage Management Plans and address health and safety measures specifically relevant to community members, including reference to their access limitations to restricted working areas, and construction schedules highlighting noisy or dusty works. Other measures this will address include:
- Construction areas, inclusive of open excavations, stockpiles and construction equipment will be surrounded by barricades with appropriate warning signs to protect workers and the public.
 - Site security for the construction compounds will be provided.
 - While no information on security personnel to be used by the Construction Contractor is available at this stage, where security personnel are deployed at construction sites, the Construction Contractor will be required to conduct a due diligence investigation of security personnel is conducted to ensure they have appropriate licensing, experience, and training and have been vetted.

- 14.6.7 To support and reinforce the Community Health, Safety and Security Management Plan, an Influx Management Plan will be developed and implemented by the Construction Contractor to addresses the risks and potential impacts associated with influx to and from the Project, especially the immigration of people from outside of the Project area. The Influx Management Plan will aim to: minimise the potential for influx to occur; mitigate the impacts associated with influx that do occur; and monitor any residual project-induced influx.
- 14.6.8 With respect to health and influx impacts, while principally aimed at supporting local development, the most effective mitigation of heightened communicable disease risk is for the Construction Contractor to promote local workforce recruitment. This will be undertaken through the development and implementation of the Construction Contractor's **Labour Management Plan** and **Local Employment and Procurement Plan** (as outlined in more detail in **Chapter 15: Economy, Employment and Livelihoods** and **Chapter 17: Labour and Working Conditions**). The latter will identify local employment and local content requirements and will also take account of local demand and supply for basic goods to avoid pressures on basic foodstuffs and to help manage inflationary pressures. Hiring positions will be disclosed to Project residents and open to all local people of working age and ability, with prioritisation of local employment prioritisation, including any reasonable training provision required to enable this. Further details are provided in **Chapter 17 Labour and Working Conditions**.
- 14.6.9 To further reduce the risk of communicable disease (and social tensions between migrant workers and community members), the Construction Contractor should give preference to migrant worker accommodation and amenity provision in workers' accommodation camps. As identified in **Chapter 17: Labour and Working Conditions**, a **Workers' Camp Management Plan** will be prepared and implemented by the Construction Contractor. Careful consideration will need to be given to any use by contractors of existing capacity in accommodation and other available local amenities to avoid social tensions arising between locals and contractors. Any workers' accommodation camp should be clearly delineated and located outside existing settlements and established in compliance with **EBRD/IFC's (2009) Guidance Note: Workers' accommodation: processes and standards**⁶⁸. Any workers' accommodation camps should be located at least 1km from existing residential settlements and herder households/camps. The construction workers' accommodation will be staffed and equipped with healthcare facilities for all workers, to avoid straining the available healthcare facilities that are serve the local communities.
- 14.6.10 As identified in the stand-alone SEP, a **Project ESIA Disclosure Package** will be disclosed in early 2026 for a period of 120 days to meet EBRD requirements. This disclosure period will be aligned with the DEIA public consultation period as far as possible. Following the disclosure period, a **Public Consultation Summary Report (PCR)** will be prepared and disclosed to the general public. Where necessary, an updated ESIA Report and associated documents will also be prepared and issued on the EBRD website; and an updated NTS provided at the aimag and soum level
- 14.6.11 During construction, the Construction Contractor will prepare and implement a **Construction Stakeholder Engagement Plan (CSEP)** that aligns with the Project Stakeholder Engagement Plan. This will include a Stakeholder programme for engaging with the local community and herder households in camps within 1km of proposed works. A Community Liaison Officer (CLO) will be appointed.

- 14.6.12 A **Community Grievance Mechanism** shall also be established by the Construction Contractor prior to construction to ensure that Project communities have an adequate channel to voice construction health and wellbeing concerns through a simple complaints, resolution and reporting procedure.
- 14.6.13 The CSEP and **Community Grievance Mechanism** shall be widely disclosed by the Construction Contractor, publicised, and accessible to all community members, and support the registration, investigation, and redress, of any transgressions, health related or otherwise. Further details are provided in **Chapter 6** and in the **stand-alone SEP**. Disclosure methods may include:
- Local posters / Local information boards (as applicable)
 - Stakeholder and community meetings;
 - By informing the Khurals and Governors; and
 - Media such as Facebook.
- 14.6.14 With respect to **vulnerable people**, additional measures will be put in place by the Construction Contractor where they may be affected by the construction phase. This will include, for example, targeted stakeholder engagement (at a location suitable for the stakeholder), support with applications for employment, accessible grievance channels and support in transport to engagement events.
- 14.6.15 To mitigate adverse effects on community wellbeing, the Construction Contractor CLO will consult regularly with local communities in line with an engagement programme set out in the CSEP. These meetings will raise awareness in local schools within the affected communities and herder households with children on any health, safety and security concerns (for example, not entering construction sites, construction traffic, etc). Community liaison will be undertaken in advance of works to ensure that the local community and existing dirt track users are aware of the construction works and associated risks; and yearly thereafter, or at a frequency agreed with the stakeholders. Warning signs will be erected at appropriate sites along access roads.
- 14.6.16** To reduce safety risks during the construction period, it will be necessary for the Construction Contractor to develop an **Emergency Preparedness Plan** to internationally recognised best practice standards. Given the distance of Project sites from emergency treatment facilities, special contingency measures will need to be included to address the treatment of scheme workers and the public in the event of construction related accidents. The Plan will cover the requirements of national law and EBRD PR4 and detail preventative measures for all incidents, including identification of potential risks and emergencies e.g. spills, fires, collisions, worker injury; roles and responsibilities and procedures for responding to identified risks and emergencies; emergency response equipment requirements; and the location of the nearest medical treatment facilities. It is noted that the National Emergency Management Agency and its inspectors may also require/undertake an audit. In accordance with the 2017 Law on Disaster Protection, any entity must provide timely information on disaster protection activities, disasters and dangerous situations to higher level organizations and emergency organisations, and to provide necessary documents and factual information. Project specific emergency response drills will be carried out at least monthly. All staff must participate in these drills. Periodic emergency drills will also be held with the local community and soum/bagh governments, to

⁶⁸ 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

test the functionality of evacuation procedures, communication flows, first-response capacity, and stakeholder coordination mechanisms. Findings from the emergency response drills will be documented and communicated in lessons learned bulletins or shared with the relevant parties such as the regulators. Further details are provided in **Chapter 17: Labour and Working Conditions**.

14.6.17 All construction workers will be issued a **Code of Conduct**, which they will need to sign, and inducted for cultural sensitisation and site safety procedures, for example vehicle speed limits and use of designated access roads to reduce suspension of dust.

14.6.18 In relation to **GBVH and sexual exploitation and abuse and sexual harassment (SEAH)**, all parties will meet the ILO's Convention No. 190 on eliminating violence and harassment in the workplace and the EBRD, IFC and CDC Groups sector-level briefs on GBVH – 'Addressing Gender-Based Violence and Harassment (GBVH) in the Construction Sector'⁶⁹ and 'Addressing Gender-Based Violence and Harassment (GBVH) in the Public Transport Sector'⁷⁰.

14.6.19 The PIU will:

- Undertake a review of GBVH and gender risk assessment.
- Develop a Project Discrimination and Harassment Policy.
- Develop a stand-alone Project Gender Equality and GBVH Action Plan based on a completed GBVH and gender risk assessment. The Action Plan will include proactive measures to promote women's employment.
- Provide training to project employees, suppliers and contractors on GBVH and SEAH associated risks.
- Promote open discussions about GBVH and SEAH concerns through disclosure of gender awareness materials.
- Provide training and implementation of effective Project and employee grievance mechanisms.
- Monitor the implementation of the Plan by PIU internally and the Construction Contractor and their supply chain.
- Maintain gender disaggregated data on staff and contractors.

14.6.20 The Construction Contractor will:

- Comply with the Project Discrimination and Harassment Policy and Project Gender Equality and GBVH Action Plan.
- Raise awareness about gender and GBVH risks, and necessary actions for workforce security.
- Promote open discussions about GBVH and SEAH concerns through disclosure of gender awareness materials/training and implementation of effective Project and employee grievance mechanisms.
- Attend / support training on the Code of Conduct and GBVH.
- Maintain gender disaggregated workforce data and provide such data as part of monthly reporting to the MoE/PIU.

⁶⁹ Available at: <https://assets.cdcgroup.com/wp-content/uploads/2020/07/14193353/Addressing-GBVH-in-the-construction-sector.pdf>

⁷⁰ Available at: <https://assets.cdcgroup.com/wp-content/uploads/2020/07/14193354/Addressing-GBVH-in-the-public-transport-sector.pdf>

- 14.6.21 With respect to GBVH and SEAH, the Community Grievance Mechanism will allow for anonymous reporting and will take a “survivor-centred” approach, and include systems for ensuring the immediate and ongoing safety of survivors and witnesses (including from further harm and retaliation), for protecting and guaranteeing the confidentiality and the identity of survivors and witnesses at all times, for offering options of support for survivors, and for including clear protocols for responding to reports in a non-judgmental and non-discriminatory manner. Anonymous reports will be possible, if the aggrieved party does not wish to be identified.
- 14.6.22 The above measures are also set out in **Chapter 17 Labour and Working Conditions**, together with additional monitoring measures for GBVH specifically in the workplace.
- 14.6.23 Given potential issues of the use of security personnel and impacts on the local community, the Construction Contractor will prepare and implement a **Security Management Plan**. The Construction Contractor will carry out appropriate checks to ensure that security companies (if any such companies are engaged) and personnel (where reasonably possible) do not have a history of past abuse. Security personnel will be trained in the use of force and in the applicable laws so that no contravention of national legislation takes place, including GBVH. Training will also cover the guiding principle that force shall not be used except in defence and in proportion with the nature and extent of the threat. Security guards will be directly employed by the Construction Contractor in accordance with their policies and will not be armed.
- 14.6.24 On all of the above, the Construction Contractor will be required to report to the MoE/PIU as part of periodic environmental and social reporting, to be determined in the Construction Contractor contract. Audits will be conducted periodically by the Supervision Engineer and PIU. The Construction Contractor will also be required to report any trespassing incidents and the measures undertaken in such cases to control the situation and prevent it from occurring again.

Infrastructure and Services

- 14.6.25 The Construction Contractor will be required to develop an **Infrastructure Strategy** together with the MoE/PIU/NPTG, covering engagement with infrastructure owners and activities to prevent damage to infrastructure. This may cover the following activities:
- Coordinate with the relevant authorities and asset owners to identify OHTL route crossings with other infrastructure, including obtaining technical requirements or conditions for the OHTL intersections / crossings and construction management requirements. All consultations will include formal communications..
 - Avoid damage to existing infrastructure and utilities during the construction of the substation and the OHTL from inappropriate construction activities (e.g. driving of machinery). Should any damage occur, restoration and/or compensation activities will be undertaken by the Construction Contractor.
 - Develop and implement a Water Management Plan to identify sources of water for the Project for potable and non-potable use, estimation of quantities required, impact on other water users, measures to minimise water usage, and measures to ensure quality is suitable for Project requirements. Coordinate with the relevant water utility company(ies) for securing additional water requirements of the Project.
 - Coordinate with the relevant water utility company for disposal of wastewater at the nearest WWTP or other arrangements as appropriate.

- Coordinate with the relevant aimag or hire a qualified private contractor to collect solid waste from the site and transport it to the nearest authorised landfill.
- Coordinate with a private contractor for the collection of hazardous waste from the site to dispose of at a Hazardous Waste Treatment Facility.
- As above, develop and implement a Traffic and Transport Plan before commencement of any transportation activities to ensure that the transportation process is properly and adequately managed.
- As part of induction training, it must be emphasised to all workers the presence of such infrastructure elements within the Project site. It must also be emphasised that all activities should be restricted to designated areas and that it is strictly prohibited to approach such elements or its buffer area.

14.6.26 Through processes outlined above, the Construction Contractor should prioritise local recruitment to reduce accommodation, catering and utility demands where these are limited, and prepare details on water and power requirements in liaison with suppliers and regulators, to avoid exceeding local capacity.

14.6.27 As part of their **Emergency Preparedness and Response Plan**, the Construction Contractor will also need to identify suitable health facilities in liaison with local health authorities to ensure workforce healthcare demands do not detriment resident users.

Operation Phase

Health and Wellbeing, Safety and Security

14.6.28 The most significant impact during operation will be the health and safety of the general public in relation to the presence of the substation and OHTL. From stakeholder engagement it is understood that in general terms, there is a good understanding of the risks of OHTLs with the general public. However, children in particular could be seen to be at higher risk.

14.6.29 Additional measures to address health, safety and security should be considered in the final design of the Project such as adequately earthed and earthing cable, signs, fencing and other barriers such as barbed wire. Measures will be taken to ensure that the general public cannot climb the towers using such barriers as anti-climb barriers or barbed wire. Appropriate warning signs as required under national legislation and international best practice will be used on the towers to warn of the risk to life. The substations will be made secure at all times and unauthorised persons will be kept away from the premises. Appropriate firefighting facilities will be available at the substations. The use of fire within the RoW will not be permitted.

14.6.30 The NPTG will prepare and implement a **communication strategy for engagement with the local community and herder households on health and safety**. This will cover a series of educational meetings with local communities and herder households in the aimag in relation to safety and the risks associated with higher voltage lines and refreshing local community and herder knowledge regarding restriction zone requirements. This should be undertaken immediately prior to the operation of the new line; one year following operation; and following any serious accidents or incidents. They will also have in place a grievance mechanism that is disclosed to the local communities and is readily accessible.

- 14.6.31 Appropriate training and PPE will be provided for O&M workers by the NPTG or their contractors, as outlined in **Chapter 17 Labour and Working Conditions**, to reduce the potential for incidents and accidents.
- 14.6.32 To reduce disturbances locally (noise, dust and vibration), especially for herders near the OHTL, in relation to O&M activities, the NPTG will ensure that either an O&M ESMP is prepared or that the measures set out in this ESIA disclosure documents are incorporated into an existing O&M manual.
- 14.6.33 Whilst the Project is not considered to result in a significant impact in relation to EMFs, the design of the Project should be such to ensure that EMF levels are within accepted guidelines for occupational and human health exposure, in accordance with national legislation and international best practice. Any micro-siting of the towers should avoid siting ideally no closer than 100m to a herder camp but always maintaining a 25m RoW from camps.
- 14.6.34 If considered necessary (e.g. complaints), NPTG should 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.
- 14.6.35 Finally, ongoing maintenance will be required to ensure the safety of the equipment to reduce health and safety risks. In the event of an emergency, such as wind damage to the OHTL that may result in the wires being reachable by the public, there will be appropriate protocols in place to ensure rapid deployment of qualified staff to earth wires and rectify the damage.
- 14.6.36 The NPTG will during operation:
- Develop and implement a **Discrimination and Harassment Policy** based on the Project Discrimination and Harassment Policy prepared by the PIU.
 - Adapt the PIU **Gender Equality and GBVH Action Plan for O&M purposes**, covering training to project employees, suppliers and contractors on GBVH and SEAH associated risks.
 - Promote open discussions about GBVH and SEAH concerns through disclosure of gender awareness materials/training and implementation of effective Project and employee grievance mechanisms.
 - Provide training to staff and suppliers on GBVH.
 - Maintain gender disaggregated data of staff.
- 14.6.37 All O&M contractors will be obliged to comply with the above.

Infrastructure and Services

- 14.6.38 The NPTG will ensure that an **O&M Emergency Preparedness and Response Plan** is in place and implemented; and that the relevant health services have been engaged in relation to how emergencies will be addressed, with specific attention to incidents and accidents related to high voltage lines and substation. There should be clear guidelines in terms of which hospitals locally and nationally provide such services. As with construction, emergency response drills will be carried out monthly at the

substations. All staff must participate in these drills. Periodic emergency drills will also be held with the local community and soum/bagh governments, to test the functionality of evacuation procedures, communication flows, first-response capacity, and stakeholder coordination mechanisms. Findings from the emergency response drills will be documented and communicated in lessons learned bulletins or shared with the relevant parties such as the regulators. Further details are provided in **Chapter 17 Labour and Working Conditions**.

14.7 Residual Effects

Construction Phase

14.7.1 The following residual effects are expected to remain following the implementation of the above mitigation measures:

- Health and wellbeing – effects posed by construction activities (such as dust, noise and nuisance) will be reduced from a Minor Adverse to Minor Adverse to Negligible (Not Significant) effect for local communities; from a Moderate to Major Adverse (Significant) effect to Minor (Not Significant) to Moderate Adverse (Significant) effect for herders with camps near the proposed works; and from a Major Adverse (Significant) to Moderate Adverse (Significant) effect for vulnerable herder household members depending on the final measures employed.
- Health and wellbeing - effects related to Project influx will remain at Negligible to Minor Adverse (Not Significant) on local communities; will be reduced from Minor to Moderate Adverse to Minor Adverse (Not Significant) on herders; and reduce from Major to Moderate (Significant) for women and children to Moderate (Significant) to Minor Adverse (Not Significant).
- Safety and security – effects related to safety and security risks will be reduced from Major Adverse (Significant) to Minor Adverse (Not Significant).
- Gender safety and security – effects will be reduced from Major Adverse (Significant) to Moderate (Significant) or Minor Adverse (Not Significant) depending on the final measures implemented.
- Infrastructure and services (social infrastructure) - effects will be reduced from Major Adverse (Significant) to Moderate (Significant) or Minor Adverse (Not Significant) depending on the final measures employed.
- Infrastructure and services (transport infrastructure) - effects will be remain Negligible (Not Significant).

Operation Phase

14.7.2 The following residual effects are expected to remain following the implementation of the above mitigation measures:

- Health and wellbeing of electricity users - effects will remain as Moderate Beneficial (Significant).
- Health and wellbeing due to O&M activities – effects will be reduced from Minor Adverse (Not Significant) to Negligible (Not Significant).
- Health and wellbeing of the herder households near the line (EMFs) - effects will remain as Negligible (Not Significant).
- Safety and security - effects will be reduced from Major Adverse (Significant) to Minor Adverse (Not Significant) assuming appropriate safety measures such as secure access are in place.



- Gender safety and security – effects will be reduced from Moderate Adverse (Significant) to Minor Adverse to Negligible (Not Significant).
- Infrastructure and services - effects will remain Moderate Beneficial (Significant) in relation to the improvement to the electricity network.
- Infrastructure and services - effects will be reduced from Moderate Adverse (Significant) to Minor Adverse Not Significant) for hospital services.
- Infrastructure and services - effects will be remain Negligible (Not Significant) for utilities such as water and wastewater) and transport infrastructure.

15 Economy, Employment and Livelihoods

15.1 Introduction

15.1.1 This chapter presents the likely significant effects of the project on Economy, Employment and Livelihoods. The chapter presents the impacts of both construction and operational phases.

15.2 Legislative Framework, Policy and Guidance

15.2.1 **Table 15-1** summarises the legislation, policy and guidance of relevance to this assessment.

Table 15-1 Summary of Legislation, Policy and Guidance relevant to Economy, Employment and Livelihoods

Level	Key legislation / policy / guidance
International	EBRD PR5 Land Acquisition, Restrictions on Land Use and Involuntary Resettlement EBRD Strategy for the Promotion of Gender Equality 2021-2025 EBRD PR10 Information Disclosure and Stakeholder Engagement
	International Labour Organisation (ILO) Conventions: <ul style="list-style-type: none"> • Freedom of Association and Protection of the Right to Organise Convention 1948 (No. 87) • Right to Organise and Collective Bargaining Convention 1949 (No. 98) • Forced Labour Convention 1930 (No. 29) (and its 2014 Protocol) • Abolition of Forced Labour Convention 1957 (No. 105) • Minimum Age Convention 1973 (No. 138) • Worst Forms of Child Labour Convention 1999 (No. 182). • Equal Remuneration Convention 1951 (No. 100) • Discrimination (Employment and Occupation) Convention 1958 (No. 111)
	Guiding Principles on Business, United Nations, and Human Rights (2011)
National Law	The Constitution of Mongolia, 1992 Civil Code, 2002 Law on Land, 2002 Law on Allocation of Land to Mongolian Citizens for Ownership, 2002 Law on Protection of Cultural Heritage 2016, as amended Labour Code, 2021 Law on Minimum Wage, 2010 Law on Occupational Health and Safety, 2008

15.3 Assessment Methodology

Scope

- 15.3.1 In terms of temporal scope, this impact assessment covers the construction and operational phases of the Project. This chapter focusses on the economy, employment and livelihoods.

Study Area

- 15.3.2 In terms of spatial scope, the Project area includes Dornogovi aimag economy and the Central Energy System (CES) which the OHTL will connect into. The AoI includes the footprint of all Project activities and the RoW, which is 25m either side of the towers along the OHTL route in rural areas and 6m either side in urban areas in Mongolia for a 220 kV overhead line; and 25m around substations; and land users affected by the Project.

Methodology

- 15.3.3 The methodology follows that set out in **Chapter 14**.

Sensitive Receptors

- 15.3.4 Potentially sensitive receptors include:
- Project affected communities and businesses
 - Herders
 - Owners of land and infrastructure crossed by the Project route (mine licence areas, railways, roads)
 - Customers of CES
 - Construction workers
 - Women and vulnerable people/groups

Significance Criteria

- 15.3.5 The significance criteria are as set out in **Chapter 14**.

Limitations and Assumptions

- 15.3.6 The limitations and assumptions are as set out in **Chapter 14**.

15.4 Baseline Conditions

Sources of Data

- 15.4.1 The baseline economy, employment and livelihoods data have been collated from secondary data sources (as listed in the text) including the National Statistical Office (NSO) of Mongolia and aimag and soum level statistical data, as well as primary data sources, including social surveys and stakeholder engagement undertaken 23-28 June 2025.
- 15.4.2 As part of the ESIA, Key Informant Interviews (KIIs) and group meetings with local government officials were completed from 23-28 June 2025 and focus group discussions (FGDs) were held in all four soums. Further details are provided in the Stakeholder Engagement Plan (SEP).
- 15.4.3 Ten household surveys were completed in two Project soums. Further details of the survey process and results are contained in **Appendix D and E**, respectively.

Economy

- 15.4.4 Mongolia was classified as an upper-middle income country in 2024. It had a Gross Domestic Product (GDP) per capita of 23,381.55 thousand MNT in 2024, an increase compared to previous years. Growth is forecast to average 6.3% over 2025-2026, driven by a significant increase in mineral production, although the economy remains vulnerable to its dependence on mining and extreme weather affecting agriculture and livestock⁷¹. GDP per capita has increased by 101.4% on the national average in the last 45 years, while in Dornogovi Province it increased by 40.42%. Even though the level of increase is comparatively low at the local level when compared to the national level, it is still a considerable increase.

Table 15-2 GDP per capita, Mongolia and Dornogovi aimag, in thousand MNT, 2020-2024

Area	2020	2021	2022	2023	2024	2020-2024 Δ%
Mongolia	11,612.90	13,267.90	16,121.03	16,121.03	23,384.55	101.37
Dornogovi aimag	7,270.80	8,437.10	9,112.07	11,519.31	10,209.98	40.42

Source: www.1212.mn

⁷¹ Mongolia Overview: Development news, research, data | World Bank

- 15.4.5 Between 2020 and 2024, Mongolia's GDP at market prices more than doubled, increasing by 113.5% from 37.5 trillion MNT to 80.0 trillion MNT. Dornogovi aimag also experienced economic growth, but at a slower rate of 42.7%, with GDP rising from 512.9 billion MNT in 2020 to 732.0 billion MNT in 2024.
- 15.4.6 In 2023, the total GDP of Dornogovi aimag was 824.9 billion MNT (**Table 15-3**). Services remained the largest sector, representing 57.46% of GDP, or 474.0 billion MNT. In 2024, Dornogovi aimag's GDP declined to 732.0 billion MNT. As **Table 15-3** shows, nationally, over the period 2020-2024 the Services sector is the highest contributor to GDP, followed by Industry with Agriculture remaining a low contributor and having reduced from 13% to 7% over that period.
- 15.4.7 At the aimag level, the contribution of these sectors to GDP is more varied. Services have remained the highest share of GDP over the period 2020-2024. The agricultural share of GDP was higher than the national level from 2020-2023, however, 2024 has seen a significant contraction from 32% in 2020 to 6% in 2024. Within agricultural, at both the national and aimag level, livestock is the highest share of this sector. Overall, the Industry share of GDP has remained fairly constant between 2020-2024, with an increase from 16% to 19% share in 2020 and 2024, respectively. Within the Industry sector, for the data available, construction output more than doubled between 2020 and 2023, reflecting a growth of 117%, compared to 62.7% growth nationally. Mining also showed a rapid increase, growing by 186.2% between 2020-2023, with mining contributed 7.27% to Dornogovi aimag's GDP in 2023 (2024 data is not broken down by sub-sector). In 2024, the Services sector increased its share substantially, reaching 75.17% of the aimag's GDP (the biggest share increase coming from 'Transport, information, communication').

Table 15-3 GDP at current market prices, Mongolia and Dornogovi aimag, billion MNT, 2020-2024

Industries /Mongolia vs. Dornogovi/	2020	2021	2022	2023	2024
Mongolia					
GDP at market prices	37,453,275.33	43,555,484.41	53,851,544.46	70,441,515.81	79,956,293.30
Agriculture	4,807,615.81	5,669,646.87	6,911,445.53	6,897,630.28	5,828,561.90
Crop	353,153.97	561,121.14	614,949.80	777,893.50	-
Livestock	4,438,752.61	5,071,250.48	6,245,125.87	6,111,782.12	-
Other agriculture	15,709.23	37,275.25	51,369.86	7,954.66	-
Industry	15,070,053.93	17,425,673.92	20,537,818.74	29,353,264.50	32,245,220.5
Mining	9,037,196.68	11,053,908.08	12,682,487.30	20,201,492.03	-
Manufacturing	3,439,759.06	3,682,205.74	4,635,483.46	5,171,848.03	-
Electricity, gas, steam supply; water supply; sewerage, waste management and remediation activities	1,020,302.03	1,076,901.48	1,129,411.94	1,420,404.52	-
Construction	1,572,796.16	1,612,658.62	2,090,436.04	2,559,519.92	-
Services	17,575,605.58	20,460,163.62	26,402,280.19	34,190,621.04	41,882,510.9
Trade, hotels and restaurants	5,853,836.07	7,184,434.76	9,351,353.81	12,851,859.78	-
Transport, information, communication	2,204,672.92	2,720,569.98	3,219,316.55	5,404,940.88	-
Financial and other business activities	4,681,269.95	5,231,431.10	6,335,627.16	8,008,470.01	-
Other services	4,835,826.65	5,323,727.78	7,495,982.67	7,925,350.36	-
Dornogovi aimag					
GDP at market prices	512,928.89	604,714.30	655,731.83	824,932.16	731,968.70
Agriculture	165,221.34	211,112.87	243,026.15	188,232.05	43,193.30
Crop	1,466.26	2,348.33	1,732.37	2,547.64	-
Livestock	163,732.42	207,895.14	241,208.53	185,684.42	-
Other agriculture	22.66	869.41	85.25	0	-
Industry	82,080.57	85,457.01	77,095.84	162,669.15	138,551.30
Mining	20,944.26	25,426.97	6,227.28	59,942.32	-
Manufacturing	34,526.49	38,415.61	47,361.67	59,599	-
Electricity, gas, steam supply; water supply; sewerage, waste management and remediation activities	13,874	10,838.92	13,094.39	15,493.04	-
Construction	12,735.83	10,775.52	10,412.50	27,634.78	-
Services	265,626.97	308,144.41	335,609.85	474,030.96	550,224.10
Trade, hotels and restaurants	31,072.33	31,690.89	32,456.98	48,328.94	-
Transport, information, communication	109,944.14	130,681.92	137,251.36	230,373.18	-
Financial and other business activities	42,949.54	56,743.69	60,419.58	59,909.47	-
Other services	81,660.97	89,027.92	105,481.94	135,419.37	-

Source: www.1212.mn

- 15.4.8 Statistical data was requested however was not available at the soum level.
- 15.4.9 In 2024, Mongolia traded with a total of 163 countries, with the total foreign trade turnover reaching 27.4 billion US dollars, of which exports to 81 countries were 15.8 billion US dollars and imports were 11.6 billion US dollars. Total turnover increased by 3.0 (12.1%) billion US dollars from 2023. In 2024, USD 596.5 million increase in exports from the previous year was mainly due to USD 693.4 million increase in copper ores and concentrates, USD 161.4 million increase in gold, USD 152.8 million increase in iron ores and concentrates. However, coal exports decreased by USD 200.5 million, canned meat products exports decreased by USD 46.0 million. The USD 2.4 billion increase in imports from the previous year was mainly due to USD 395.6 million increase in cars, USD 288.6 million increase in trucks, USD 186.0 million increase in diesel, USD 147.7 million increase in bulldozers, graders, excavators and USD 120.7 million increase in petrol.
- 15.4.10 Most foreign trade is with China and Russia, with most trade carried by road and rail (mainly rail for mining). In 2024, 45.6% of the total exports in Gashuun sukhait, 19.7% of the total exports in Zamiin-Uud and 12.9% of the total exports in Shivee khuren, which accounted for 78.1% of the total exports. In 2024, 51.8% of the total imports in Zamiin-Uud and 21.3% of the total imports in Sukhbaatar, which accounted for 73.1% of the total imports (NSO, News Release, 15 January 2025).

Employment and Sectors

Employment

- 15.4.11 In 2024, Mongolia had 1,441,091 economically active persons, of which 65.4% of males and 50.5% of females were employed (**Table 15-4**), and 5.9% of males and 5.4% of females were unemployed (**Table 15-6**). A slightly higher percentage of men than women were employed in the labour force; 65.4% compared to 50.5% of women. The labour force participation rate was 61.3% overall, 69.70% for males and 53.5% for females (**Table 15-5**)⁷².
- 15.4.12 In 2024, Dornogovi aimag had 30,473 economically active persons, of which 64.1% of males and 58.2% of females were employed (**Table 15-4**) and 5.4% were unemployed (**Table 15-6**). A slightly higher percentage of men than women were employed in the labour force. The labour force participation rate was 64.5% overall, 69.3% for males and 60.1% for females. Dornogovi showcased more female labour participation than the national average (**Table 15-5**)⁷³.
- 15.4.13 In terms of trends in the labour force participation rate (**Table 15-5**), Dornogovi aimag has seen a steady decrease since 2020. The labour force participation of males is higher than that of females. Overall, the national average increased by 0.33%, 1.46% for males and 1.11% decline for females, while Dornogovi aimag showcased an overall decline of 10.17%, 11.94% for males and 7.96% for females⁷⁴.
- 15.4.14 No employment data was available at the soum level.

⁷² National Statistical Office of Mongolia. Available at: www.1212.mn.

⁷³ Available at: https://1212.mn/en/statistic/statcate/573055/table-view/DT_NSO_0400_020V2

⁷⁴ Available at: [Mongolia Overview: Development news, research, data | World Bank](#)

Table 15-4 Economically active people, Mongolia and Dornogovi aimag, 2020-2024

Year		2020	2021	2022	2023	2024	2020-2024 Δ%
Mongolia %	Male	64.0	61.2	63.1	63.8	65.4	+2.19
	Female	50.5	47.7	50.3	49.5	50.5	0.00
Dornogovi %	Male	74.4	69.2	65.2	70.1	64.1	-13.84
	Female	63.4	54.0	55.6	57.4	58.2	-8.20

Source: www.1212.mn

Table 15-5 Labour force participation rate, by sex, aimag

Area	Gender	2020	2021	2022	2023	2024	2020-2024 Δ%
Mongolia	Total	61.1	59.1	60.3	59.5	61.3	0.33
	Male	68.7	67	68.1	67.9	69.70	1.46
	Female	54.1	51.8	53.1	51.9	53.50	-1.11
Dornogovi aimag	Total	71.8	63.5	60.7	65.9	64.5	-10.17
	Male	78.7	70.4	66.1	72.9	69.3	-11.94
	Female	65.3	56.6	55.6	58.8	60.1	-7.96

Source: www.1212.mn

Table 15-6 Labour rates of Dornogovi aimag and comparison, 2020 - 2024

	Area	2020	2021	2022	2023	2024	2020-2024 Δ%
Composite measure of labour underutilization, %	Mongolia	11.7	13.6	10	8.5	7.8	-33.33
	Dornogovi	4.8	3	1.7	4.4	7.7	+60.42
Unemployment rate, %	Mongolia	6.7	8.3	6.4	5.3	5.9	-11.94
	Dornogovi	4.2	2.9	0.7	3.2	5.4	+28.57
Combined rate of time-related underemployment and unemployment, %	Mongolia	7.1	8.8	7	5.8	6.2	-12.68
	Dornogovi	4.2	2.9	0.8	3.2	5.4	+28.57
Combined rate of unemployment and potential labour force, %	Mongolia	11.3	13.1	9.4	8	7.5	-33.63
	Dornogovi	4.8	3	1.6	4.4	7.7	+60.42

Source: www.1212.mn

15.4.15 In 2024, in Dornogovi aimag, in the sectors of agriculture, mining and manufacturing, the following numbers of people were informally employed, respectively; 560, 0, 107, and 0. This is in comparison to the informally employed numbers of 179,811, 735, 27,201, and 79 respectively, for the national average.

Unemployment

15.4.16 In 2024, there were 85,424 people unemployed in Mongolia, of which 2,388 were unemployed in Dornogovi aimag. This is an increase from 2020, when it was 1,613. Overall, in 2024 the unemployment rate in Mongolia was 5.9% at the national level (**Table 15-7**). Compared to national figures, the unemployment rate of 5.4% in Dornogovi aimag, a rural area, is comparatively low, with estimates ranging from 0.7% to 2.8% across the Project soums.⁷⁵

Table 15-7 Unemployed people⁷⁶, project aimag and comparisons, 2020-2024

	Province	2020	2021	2022	2023	2024	2020-2024 Δ%
Labour underutilization	Mongolia	164,779	189,610	141,180	118,919	113,957	-30.84
	Dornogovi aimag	1,613	951	506	1,379	2,388	+48.05
Unemployed	Mongolia	90,371	109,434	87,466	72,573	85,424	-5.47
	Dornogovi aimag	1,416	943	213	1,011	1,653	+16.74
Time-related underemployment	Mongolia	4,897	6,754	8,376	6,505	4,315	-11.88
	Dornogovi aimag	0	0	30	0	0	0.00
Potential labour force	Mongolia	69,511	73,422	45,338	39,841	24,219	-65.16
	Dornogovi aimag	197	8	263	368	735	+273.10

Source: <https://www.1212.mn/>

15.4.17 In relation to underemployment, the time-related underemployment rate was 0 in Dornogovi aimag in 2024, compared to a national level of 4,315. For labour underutilisation (the difference between labour supply and demand, which translates into an unmet need for employment among the working age population), the number was 2,388 in Dornogovi aimag, compared to a national level of 113,957.⁷⁷

15.4.18 No unemployment data was available at the soum level.

Sector Employment

15.4.19 As can be seen in **Table 15-8**, the highest percent of employment in Dornogovi aimag historically was in the agricultural sector, with 6473 employees in 2024, followed closely by public administration and defence, transportation and storage, and wholesale retail trade, with 2776, 5259, and 2273 employees respectively in 2024. Mining and quarrying, and education services and human health and social work sectors also were a significant component of the total employment, each employing over a thousand people in 2024. Among these sectors, the agricultural sector has experienced a decline in number of employees, of 54.16%, and similarly, sectors such as public administration and defence with a 43.46% decline, and wholesale retail with 14.8% decline in number of employees each. Conversely, the mining and quarrying sector experienced 13.48%, and the construction sector experienced 332.71% increases in the number of employees.

⁷⁵ Available at: https://1212.mn/en/statistic/statcate/573070/table-view/DT_NSO_2800_007V1

⁷⁶ According to the NSO, registered unemployed are those segments of the population of the working age who are currently not involved in a paid or self-employed job and actively seeking work and registered at the labour and social welfare services divisions and labour exchange office according to the legislation of Mongolia.

⁷⁷ Available at: Source: <https://www.1212.mn/>

15.4.20 According to the Dornogovi aimag's Head of Development Policy, Planning and Investment Department, the aimag is notable for its mining industry, including Tsagaan Suvarga, Alag Tolgoi, and the coal deposit in Dalanjargalan. In Airag soum, there is a fluorspar mine. The aimag has deposits of coal, fluorspar, copper, iron ore, and uranium. The northern part of Dornogovi aimag is an agricultural region, producing Sainshand soum's vegetables needs.

Table 15-8 Employment by sector, Dornogovi aimag

Sector	2020	2021	2022	2023	2024
Total	32,041	31,229	29,754	30,233	28,820
Agriculture, forestry and fishing	14,118	9,409	12,349	7,843	6,473
Mining and quarrying	1,965	976	2,057	1,032	2,230
Processing industries	61	884	313	889	578
Electricity, gas, steam and air conditioning supply	515	1,735	739	472	585
Water supply; sewerage, waste management and remediation activities	91	0	0	0	0
Construction	428	268	660	342	1,852
Wholesale and retail trade; repair of motor vehicles and motorcycles	2,668	3,718	2,895	2,868	2,273
Transportation and storage	3,277	5,649	5,019	7,626	5,259
Accommodation and food service activities	112	278	828	1,124	938
Information and communication	298	124	53	213	405
Financial and insurance activities	204	1,039	205	282	410
Real estate activities	0	0	0	0	0
Professional, scientific and technical activities	96	171	54	40	98
Administrative and support service activities	330	0	136	371	50
Public administration and defense; compulsory social insurance	4,909	3,891	1,426	4,424	2,776
Education services	1,487	1,936	2,018	931	2,624
Human health and social work activities	778	928	670	592	1,507
Arts, entertainment and recreation	488	91	252	218	416
Other service activities	99	133	77	966	346
Activities of households as employers	113	0	0	0	0
Activities of extraterritorial organizations and bodies	0	0	0	0	0

Source: https://www.1212.mn/en/statistic/statcate/573055/table-view/DT_NSO_0400_035V7

15.4.21 Although statistical data was not available at the Project soum level, the following information was obtained from the KIIs:

- In Sainshand soum, agriculture was reported as a key sector. However, it was also noted that in 2022, an Industrial Strategic Plan was approved, dividing the aimag into three regions and five subregions based on geographical location. The plan outlines the development of medium and light industries in alignment with heavy industry and mining. Light industry includes food processing, garment production, and leather processing.
- In Ulaanbadrakh soum, mining was reported as the key economic sector. Active mining companies include: Badrakh Energy – petroleum operations; Ariun Khad – mining; and Teekhiin Shonkhor – mining. No factories exist in Ulaanbadrakh soum however there are small shops and businesses.
- In Saikhandulaan soum, livestock husbandry is the main economic sector. Only one white stone mine operates minimally, exporting to Japan.
- In Mandakh soum, the main economic sectors were reported as mining, railway, and livestock husbandry. There are five coal mines in Mandakh, including Tumen Khurd, Mandakh Lake, Tumen Gobi and Ikh Gobi. Tsagaan Suvarga copper and molybdenum mine where the substation is located is also in this soum. The soum also has many small and medium enterprises (SMEs) however, only 3–4 operate consistently. Overall, the soum stated that the local economy is primarily based on livestock farming,

Livelihoods, Income and Expenditure

15.4.22 At the national level (**Table 15-9**), the average monthly household income was MNT 2,409,836 in 2024, which rose by 72.86% from 2020. The monthly average income of households residing in rural areas was MNT 1,729,754, which is 63.33% of the urban average.

Table 15-9 Average Monthly Household Income by Source and Region (in MNT), 2020–2024

Region	Type of income in MNT	2020	2021	2022	2023	2024	2020-2024 Δ%
Mongolia	Monetary income - Total	1,394,136	1,500,995	1,728,919	2,021,952	2,409,836	+72.86
	Wages and salaries	754,492	694,576	860,693	1,083,367	1,360,216	+80.28
	Pensions and allowance	294,996	441,046	452,833	480,455	549,924	+86.42
	Income from household businesses	203,898	223,982	247,788	304,262	323,170	+58.50
	Other	140,750	141,391	167,605	153,868	176,526	+25.42
	Received from others free of charge	52,142	41,603	58,817	52,796	61,399	+17.75
	Foodstuff, which consumed from private farm or enterprise	62,559	78,856	72,848	87,594	96,654	+54.50

Source: www.1212.mn

15.4.23 At the national level (**Table 15-10**), the average monthly household expenditure was 2,626,520 MNT in 2024, which is an increase of 72.36% from 2020. The same level of increase is also observed in the aimag centre average, where it rose from 1,486,466 MNT in 2020 to 2,536,988 MNT in 2024, which is an increase of 70.67%. The same increase is also observed in the soum level, where it rose by 67.48%, from 1,364,763 MNT in 2020 to 2,285,711 MNT in 2024. Overall, the national average rose the highest, while the soum centre average rose the lowest, yet all average increases are approximately 70%.

Table 15-10 Average Monthly Household Expenditure (in MNT), 2020–2024

Location	2020	2021	2022	2023	2024
National	1,523,887	1,489,318	1,816,777	2,183,779	2,626,520
Aimag centre	1,486,466	1,520,087	1,832,273	2,180,730	2,536,988
Soum centre	1,364,763	1,414,487	1,610,366	1,862,992	2,285,711

Source: https://1212.mn/en/statistic/statcate/573058/table-view/DT_NSO_0800_029V1;
https://1212.mn/en/statistic/statcate/573051/table-view/DT_NSO_0300_004V1

15.4.24 State expenditure per head in MNT in 2020 was 940,337.3 at the national level and 1,159,438 MNT for Dornogovi aimag respectively. In 2024, these figures rose to 2,046,385.6 MNT for the national and 2127316 MNT for Dornogovi aimag. The average increase is of about 170% (**Table 15-11**).

Table 15-11 State expenditure per head (in MNT), 2020–2024

Area	2020	2021	2022	2023	2024
National	940,337.3	1,026,810.9	844,239.0	1,237,268.7	2,046,385.6
Dornogovi aimag	1,159,438.0	1,228,780.9	1,209,851.1	1,861,364.4	2,127,316.0

Source: https://1212.mn/en/statistic/statcate/573058/table-view/DT_NSO_0800_029V1;
https://1212.mn/en/statistic/statcate/573051/table-view/DT_NSO_0300_004V1

15.4.25 As of 2024, nationally the largest components of the total income are wages (53.0%) and pensions and allowances (21.4%), and the households spent 74.4% of the total expenditure on non-food goods and services and 17.7% on food items (**Table 15-12**).

Table 15-12 Structure of Average Monthly Household Income by Source (%), 2024

Type of income in MNT	Mongolia
Monetary income - Total	100.00
Wages and salaries	56.44
Pensions and allowance	22.82
Income from household businesses	13.41
Other	7.33
Received from others free of charge	2.55
Foodstuff, which consumed from private farm or enterprise	4.01

Source: www.1212.mn

- 15.4.26 Across all aimags in Mongolia, the 'wages and salary share of the average monthly income was 56.44%, 'received from others free of charge' was 2.55% and 'foodstuff, consumed from private farm or enterprise income' was 4.01% between 2020-2024.
- 15.4.27 At the national level, 531,800 (15.2%) people received social welfare pensions and allowances of MNT 292,449.6 million in 2024. The minimum subsistence level of population (per capita, per month) was MNT 198,300 in 2024 in the Central Region, which includes Dornogovi aimag, whereas it was MNT 230,000 in Ulaanbaatar⁷⁸.
- 15.4.28 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, 17,932 people received social welfare pensions and allowances of MNT 58,400,000 thousand in 2024⁷⁹.
- 15.4.29 At the national level, the average monthly household consumption expenditure (**Table 15-13**) was MNT 2.6 million MNT in 2024, which was an increase of MNT 435,074 (19.8 %) from the previous year⁸⁰.
- 15.4.30 At the aimag level, the average 'monetary expenditure' share of the total expenditure 96.3%, 'received from others free of charge' was 2.7% and 'foodstuff, consumed from private farm or enterprise income' was 1.03% in 2024. At the soum level, the 'monetary expenditure' share of the total expenditure was slightly lower at 90.7%, 'received from others free of charge' was 3.4%, and 'foodstuff, consumed from private farm or enterprise income' was 5.8% 2024.

Table 15-13 Monthly average expenditure and income per household, all aimags

Area	2020	2021	2022	2023	2024
Monthly average expenditure per household					
National	1,456,883	1,526,617	1,877,075	2,309,473	2,721,263
Aimag centre	1,511,603	1,490,646	1,982,524	2,345,046	2,606,850
Soum centre	1,342,914	1,496,770	1,664,769	1,967,562	2,322,609
Monthly average income per household					
National	1,424,598	1,642,915	1,846,967	2,308,110	2,641,671
Aimag centre	1,358,766	1,568,352	1,911,622	2,210,654	2,443,063
Soum centre	1,268,197	1,518,994	1,614,845	1,959,046	2,205,222

Source: www.1212.mn

⁷⁸ Available at: https://1212.mn/mn/statistic/statcate/573074/table-view/DT_NSO_2200_001V1

⁷⁹ Available at:

https://www.dornogovi.gov.mn/files/article/attach/orig/1679295330181_72de8190c801588a9571efd77c53fc2b.pdf

⁸⁰ Available at: https://1212.mn/en/statistic/statcate/48171310/table-view/DT_NSO_1900_002V2

15.4.31 No data was available at Dornogovi aimag or Project soum level. Details from the household survey are provided in **section 15.4.40** onwards.

15.4.32 As the group most likely to be affected by the Project, further details are provided on herders' livelihoods. According to the NSO's classifications, herder households are distinguished as:

- 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
- 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.

15.4.1 As of 2024, the number of herder households recorded nationally was 249,450, with 5,534 in Dornogovi aimag. Sainshand had 271 herder households, Ulaanbadrakh had 326, Mandakh had 355 and Saikhandulaan had 294. The majority of herder households possess solar, wind, and small electric generators, satellite antenna and televisions, and radios⁸¹. **Table 15-14** summarises the number of herders and herder-households in the Project soums.

Table 15-14 Total number of Herders and herder's households, by soum and number, 2024

	Total number of households (#)	Total number of households with livestock (#)	Total number of herder households (#)	Total number of Herders (#)
Dornogovi aimag	21,801	5,510	4,410	6,861
Sainshand	8471	421	271	362
Ulaanbadrakh	533	389	326	494
Saikhandulaan	460	338	294	478
Mandakh	511	388	355	608

Source: NSO. www.1212.mn

⁸¹ NSO. Available at: https://1212.mn/en/statistic/statcate/48171307/table-view/DT_NSO_1001_026V1

15.4.2 By the end of 2024, Dornogovi aimag had 1,452,223 livestock: 58,119 camels, 107,109 horses, 71,681 cattle, 554,781 sheep and 660,533 goats (**Table 15-15** below). The total number of livestock decreased by 842,592, which is approximately by 37% is lower than in 2023. Goats and sheep comprise the largest share of livestock herds, 38% and around 45.5% respectively. Horses comprise 7%, cattle just under 5% and camels 4%.

15.4.3 In the Project soums, goats, sheep and horses are the main livestock. Livestock numbers in Saikhandulaan soum have been increasing in the last few years, and in four Project soums, the number of goats decreased in 2023 and 2024 due to consecutive two years *dzud*⁸². Most goat products (milk, dairy products and meat) are sold at the aimag and soum markets and only a small amount is consumed by the producing households.

Table 15-15 Number of livestock, by type, (thousand heads), Project soums, thousand, 2020-2024

Aimag/soums	Type of livestock	2020	2021	2022	2023	2024
Dornogovi aimag	Total	2,551.545	2706.795	2,909.698	2,294.815	1,452.223
	Horse	165.032	183.849	202.203	171.706	107.109
	Cattle	103.747	118.062	131.499	108.077	71.681
	Camel	45.381	48.335	52.631	54.537	58.119
	Sheep	1,069.688	1,158.465	1,245.05	997.722	554.781
	Goat	1,167.697	1,198.084	1,278.315	962.773	660.533
Sainshand soum	Total	139.827	141.662	138.489	92.366	62.173
	Horse	9.806	10.38	10.514	9.025	5.707
	Cattle	5.909	7.057	6.592	4.811	3.531
	Camel	3.529	3.572	3.586	3.715	3.794
	Sheep	53.428	54.507	52.912	36.757	22.892
	Goat	67.155	66.146	64.885	38.058	26.249
Ulaanbadrakh soum	Total	170.758	186.753	198.088	144.857	112.618
	Horse	13.835	16.384	18.979	17.91	12.348

82 Dzud- A **zud**, **dzud** (Mongolian: зүд) is a natural disaster characterized by severe winter conditions that result in significant livestock mortality. It typically involves a combination of summer drought causing inadequate pasture and winter conditions like heavy snow, strong winds, and extremely low temperatures. These conditions make it difficult for animals to find food and survive the harsh winter, leading to widespread livestock deaths and impacting herders' livelihoods.

Aimag/soums	Type of livestock	2020	2021	2022	2023	2024
	Cattle	8.471	9.797	11.229	11.029	7.914
	Camel	5.573	5.672	6.151	5.79	6.194
	Sheep	60.234	68.259	71.398	46.35	35.087
	Goat	82.645	86.641	90.331	63.778	51.075
Saikhandulaan soum	Total	199.263	202.411	213.751	169.549	144.571
	Horse	12.647	13.424	14.16	12.143	9.92
	Cattle	8.474	9.69	10.392	7.083	5.827
	Camel	4.763	4.873	5.386	5.833	6.415
	Sheep	84.364	86.772	88.737	72.677	58.35
	Goat	89.015	87.652	95.076	71.813	64.059
Mandakh soum	Total	191.018	188.517	201.726	162.315	145.428
	Horse	9.887	10.585	11.594	9.611	9.284
	Cattle	4.405	4.479	5.196	3.903	4.067
	Camel	8.528	9.281	10.195	10.626	11.474
	Sheep	61.013	60.499	59.288	49.065	40.919
	Goat	107.185	103.673	115.453	89.11	79.684

Source: www.1212.mn

- 15.4.4 In Mandakh soum, the soum leadership identified that there was a trend towards herders are forming cooperatives to access loans since the start of the Government's "New Cooperative Movement". They reported that, to date, nine cooperatives have been established in Mandakh soum, with 3–4 in the process of setting up a cooperative. According to surveys, people have bought livestock and freezers to prepare meat for mining supply. They're also preparing dairy products for sale.
- 15.4.5 In Sainshand soum, they noted that a camel development policy has been implemented in response to severe winter storms and dzud, which reduced the camel population from 64,000 to 24,000. To address this, the "Bonus for Colt or Young camel" programme was launched, and by 2024, the camel population had increased to 58,000.
- 15.4.6 Poverty in Mongolia is persistent, and the poverty incidence is higher in rural areas. As of 2022, 27.1% of population were living below National Poverty Line. A significant portion of the poor reside in urban

areas, with a large concentration in Ulaanbaatar⁸³. Dornogovi aimag is relatively better off with respect to poverty compared to the national and regional levels. Within the soums, Sainshand had the lowest count for the share of the population whose consumption is below the poverty line in 2024 (15.9), followed by Mandakh and Saikhandulaan (both 19.2) and Ulaanbadrakh (19.4).

- 15.4.7 The poverty gap is the average distance below the poverty line as a proportion of the poverty line where the mean is taken over the whole population, counting the non-poor as having zero poverty gaps. The poverty gap was lowest in Sainshand (4.3) followed by Saikhandulaan (both 5.2) and Ulaanbadrakh (5.3).
- 15.4.8 The poverty severity (the distribution of the consumption among the poor population) for 2024 also shows a similar trend, being 1.9 in Dornogovi aimag. Poverty severity was lowest in Sainshand (1.8) followed by Mandakh and Saikhandulaan (both 2.1) and Ulaanbadrakh (2.2)⁸⁴.

Household Survey

- 15.4.9 A total of 23 structures potentially within the RoW were identified using Google Earth. A site visit was then undertaken to confirm the existence, location and types of structures and to administer HHS. A total of 10 herder households were interviewed, of 13 recorded with assets within the RoW. Data relevant to this chapter is presented below.
- 15.4.10 All households covered in the survey were located in Sainshand and Saikhandulaan soums of Dornogovi aimag. Nine households live in ger, and only one household lives in a house, in Bagh #2 (Chandmani) of Sainshand soum.
- 15.4.11 All surveyed household have livestock, as shown in **Table 15-16**. Five households have up to 200 head livestock comprised 50, and three households have more than 500 head livestock.

Table 15-16 Number of Livestock, identified by respondents

Number of livestock	Number of households	Percent
Up to 200	5	50.0
200-500	2	20.0
500+	3	30.0
Total	10	100.0

⁸³ Available at: <https://www.adb.org/where-we-work/mongolia/poverty>

⁸⁴ NOW. Available at: [Статистикийн мэдээллийн нэгдсэн сан](#).

15.4.12 Income from sale of livestock and livestock products is the main income source of income for the majority of surveyed households (47.4%) (**Figure 15-1**). According to the households' answers, the second main source of household income is pension (26.3%) income and welfare allowance or child money (21.1%).

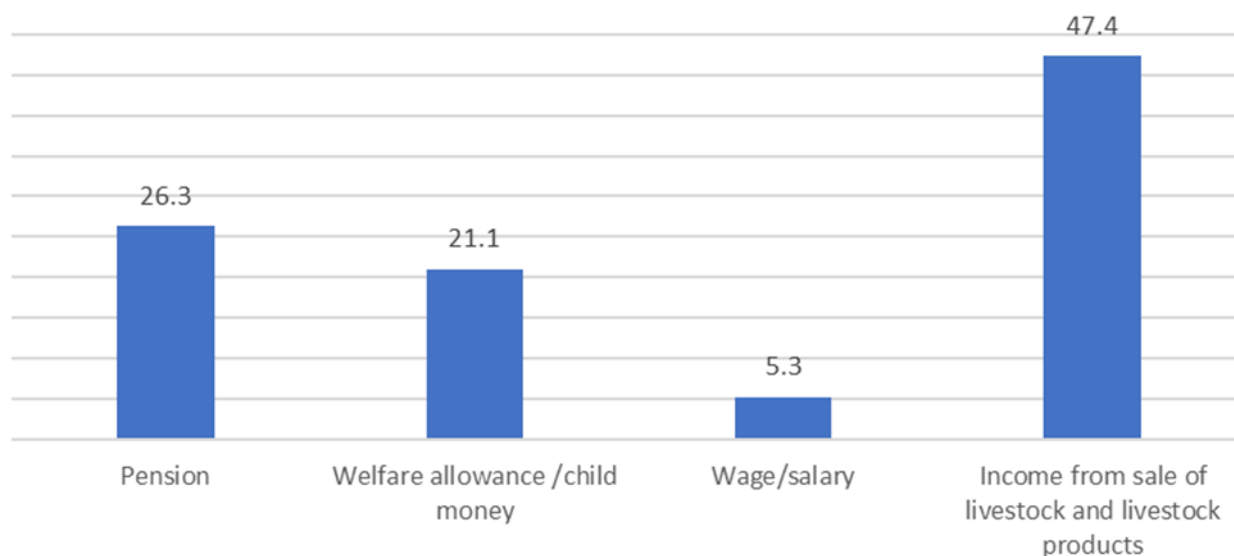


Figure 15-1 Household income source type, % The majority of the respondents have 2 or more income sources, such as income from sale of livestock and animal products, and pension.

15.4.13 Five households receive pension, with an average of 863,800 MNT (**Table 15-17**). Four households benefit from welfare allowances and child support, averaging 209,000 thousand MNT. All households earn income from the sale of livestock and livestock products, with an average of 2,007,000 MNT.

Table 15-17 Household's monthly average income, by source

Source type	Number of households	Average income, thousand MNT
Pension	5	863.8
Sale of livestock and livestock products	10	2,007.0
Welfare allowance /child money	4	209.0
Wage/salary	1	2,000.0

15.4.14 Four of the households have up to 1-2 mln. MNT monthly income (**Table 15-18**). Two households had an income ranging from 2 mln. MNT to 2.5 mln. MNT, and four households have monthly average income 2.5 mln. MNT or more.

Table 15-18 Monthly average income, MNT

	Frequency	Percent
1.0-2.0 mln MNT	4	40.0
2.0-2.5 mln MNT	2	20.0
2.5+ mln MNT	4	40.0
Total	10	100.0

- 15.4.15 The surveyed households' average monthly food expenses amount to 460,000 MNT (**Table 15-19**). Three households have electricity expenses, with an average amount of 340,000 MNT. Eight households reported transport-related costs, such as fuel, etc., with an average of 741,300 MNT. Seven households spend on average of 285,700 MNT per month on healthcare and medical services. Additionally, four households have education-related expenses, averaging 262,500 MNT per month.

Table 15-19 Household's monthly average expenses, by type

Type of household expenses	Number of households	Average, thousand MNT
Food	10	460.0
Electricity	3	340.0
Transport	8	741.3
Education	4	262.5
Health	7	285.7
Other	4	405.0

- 15.4.16 The household survey result show that two households have monthly expenses of up to 0.5 million MNT (**Table 15-20**). Three households with monthly expenses ranging from 0.5 to 0.99 million MNT. Another two households report monthly expenses between 1.0 and 1.99 million MNT. Meanwhile, two percent of surveyed households have average monthly expenses exceeding 2.0 million MNT. The respondents had quite a wide ranging level of expenses.

Table 15-20 Monthly average expenses, in MNT

	Frequency	Percent
Up to 0.5 mln. MNT	2	20.0
0.5-0.99 mln. MNT	3	30.0
1.0-1.99 mln. MNT	2	20.0
2.0-2.99 mln. MNT	1	10.0
3.0 mln. MNT and more	2	20.0
Total	10	100.0

15.5 Potential Impacts and Effects

Construction Phase

Employment and Gender

- 15.5.1 The construction phase is anticipated to be in the order of 24 months, and it is expected that during this time, short-term direct employment opportunities will be created. A potentially positive and significant socio-economic impact relates to OHTL construction employment, with salaries likely to be comparable to sector averages and likely to exceed remuneration in other sectors of the local informal economy. This can markedly increase the earnings and disposable income of local working age

people.

- 15.5.2 In addition, construction of the Project will provide workers with the opportunity to up-skill, both through obligatory induction training 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 road, will increase the transferable skill base, and the future employment and income generating prospects, of the workers.
- 15.5.3 Most direct construction employment opportunities will be for unskilled labouring and semi-skilled machine operative jobs, and it is anticipated that these will be largely contracted to, and undertaken by, men. However, Construction Contractor and employee expenditure on local goods and support services, including administration, hospitality, transport, assets, hard goods and consumables, would result in further direct and indirect “spin-off” employment. There will, therefore, be opportunities for women from local communities to secure direct and indirect employment and income generation from construction related services and purchases, including in catering, sales, property leasing and rental, and managerial and administrative assistance.
- 15.5.4 There are no projections of construction employment numbers, and it is unlikely that these will be definitively known prior to contractor appointment. However, based on similar projects it is anticipated that this could be in the region of 200 staff, though the composition of the staff is likely to require more skilled than unskilled staff. Given the rural location of the Project site, it is unlikely that there will be significant direct employment from people within the local community.
- 15.5.5 Overall, in 2024 the unemployment rate in Mongolia was 5.9% at the national level whereas in Dornogovi aimag the unemployment rate was 5.4%. As a predominantly rural area, this rate is comparatively low, with estimates ranging from 0.7% to 2.8% across the Project soums. Dornogovi aimag has a labour force participation rate of 64.5% in 2024; though this was a slight decrease from previous years. Dornogovi aimag also has a higher female labour participation than the national average. Engagement via the FGDs identified for example in Saikhandulaan soum there are a few unemployed people in the soum centre. In relation to underemployment, the time-related underemployment rate was 0 in Dornogovi aimag in 2024, compared to a national level of 4,315. For labour underutilisation (the difference between labour supply and demand, which translates into an unmet need for employment among the working age population), the number was 2,388 in Dornogovi aimag, compared to a national level of 113,957. At the national level, the average monthly household income was MNT 2,409,836 in 2024, which rose by 72.86% from 2020. Six of the 10 households interviewed had average monthly household incomes above 2 mIn MNT. Overall, therefore, the Project Area and the local population as receptors are considered to have a low sensitivity in terms of need for employment, with some localised pockets of need geographically within the aimag and with the younger generation (who often migrate out of the aimag) having a medium sensitivity.
- 15.5.6 The magnitude of impact is contingent on the Construction Contractor’s recruitment and goods and service sourcing policy, with low-level local recruitment and sourcing supporting fewer direct and indirect local livelihood benefits. Nonetheless, it will provide a positive impact for local communities and contribute to livelihood security. Finally, while conferring enduring skills transfer benefits, the impact is largely short-term.

- 15.5.7 Overall, a **Minor to Moderate Beneficial** effect is anticipated for employment, including gender, prior to enhancement measures. It is noted from stakeholder engagement that the soums have reported others moving into the area and “establishing” themselves as residents for the purposes of obtaining employment on development projects; and therefore, careful mitigation will be required to maximise opportunities for the local communities.

Local and Regional Economy

- 15.5.8 The local economy will be positively affected during construction through construction employee expenditure on transport, assets, hard goods and consumables. In particular, where set out as a requirement for the Construction Contractor, the purchase of locally produced dairy products, meat and vegetables will stimulate the local economy and local producer and seller incomes. This will be further enhanced regionally through any direct demand by the Construction Contractor for project materials, provisions and services.
- 15.5.9 The Project Area is predominantly formed of mining and agricultural sectors, with Project soums’ economic being based predominately on livestock herding. The economy is affected by livestock conditions, which for example, was impacted adversely by the 2024 dzud (harsh winter). Business sector development overall in the aimag is low and Dornogovi aimag has been identified at a national level for further development. Overall, the sensitivity of the local economy and businesses, which will predominately benefit from the construction phase, is therefore considered Medium. A medium magnitude of impact is anticipated for the reason outlined in the paragraph above, as all construction projects have positive impacts but the extent to which will depend on materials and goods sourcing. Therefore, a **Moderate Beneficial** effect on the economy is predicted, for the period of construction in the local area and, depending on the sourcing of services and goods, a **Minor Beneficial** effect on the economy at the wider regional scale; albeit the impact is largely short-term.

Livelihoods

- 15.5.10 As identified above, construction phase employment can markedly increase the earnings and disposable income of local working age people, contributing towards improved livelihoods, albeit for a limited time. Construction workers will also gain qualifications and experience through training and employment that will potentially also contribute to more sustained employment opportunities in the future related to the construction industry. As identified above, the purchase of locally produced dairy products, meat and vegetables will also contribute to herder household incomes. It is likely that these livelihood benefits will catalyse impacts during the period of construction as a minimum. Overall, local livelihoods are considered to be of Medium sensitivity and the magnitude of impact Low to Medium, therefore a **Minor to Moderate Positive** effect is predicted.

Living Costs

- 15.5.11 Conversely, and contingent on local surpluses and productive capacity and responsiveness, a significant increase in demand for goods and services due to a temporary labour influx can lead to local inflationary pressures and increased living costs if supplies of labour, goods and services cannot be met. The local community economy and average incomes are relatively high in Dornogovi aimag, and therefore its sensitivity to such inflationary pressures is considered Low. The magnitude of this impact is likely to be low to medium depending on the use and availability of local resources, resulting in a **Negligible to Minor Adverse** effect.

Operation Phase

Employment and Gender

- 15.5.12 Following the completion of the construction phase of the Project, construction workers will need to find alternative employment opportunities. There will be relatively limited direct employment opportunities for O&M of the OHTL as it will be operated by the existing NPTG. At this stage it is not known if additional workers or contractors to supplement the existing NPTG workforce would be required. The sensitivity of the Project communities in terms of employment opportunities is considered relatively low to medium, given the lower unemployment levels in the Project Area and the planned development projects in the Project Area. The magnitude of the impact is negligible given the limited requirement for O&M labour, resulting a **Minor Adverse to Negligible** effect. It is possible over time if the Project contributes to the stimulation of development in the Project Area, indirectly additional employment opportunities will be created (such as at Tsagaan Suvarga mine), resulting, in time, to a **Minor Beneficial** effect.

Regional and Local Economy

- 15.5.13 Currently, the Protect Area and the CES suffer from power grid capacity shortages reliable power supply. Whilst the Project does not increase electricity supply or distribution directly to new or existing consumers, the Sainshand-Tsagaan Suvarga 220 kV double-circuit transmission line will interconnect the Ulaanbaatar-Baganuur-Choir line and the Choir-Sainshand line (currently in the pre-construction phase), as well as the Ulaanbaatar-Mandalgovi-Tavantolgoi-Oyu Tolgoi-Tsagaan Suvarga corridor, to form a circular transmission network. This closed-loop system will significantly improve the reliability and resilience of power supply in the CES. As such, it will contribute directly to the government's strategy in the energy sector and in so doing, provide integral infrastructure to achieve the Government's long-term development agenda of economic growth through providing reliable energy supply to industry in the region.
- 15.5.14 Improved reliability and resilience of power supply in the CES will have a positive impact on existing businesses within Dornogovi aimag and the CES more widely, supporting growing and future demand for electricity through improving transmission capacity of the network. It aligns with the Vision-2050: Mongolia's Long-Term Development Policy and the New Recovery Policy; and addresses the Action Program of the Government of Mongolia for 2024–2028 to prepare project documentation for the 220 kV overhead transmission line and substation along the Sainshand–Tsagaan Suvarga corridor. An improved transmission service can stimulate development of new businesses in the Project Area, which will have knock on effects on the local economy (demand for services) and provide revenue at the regional and national level.
- 15.5.15 These developments may include, for example, the expansion at Tsagaan Suvarga mine and an increased focus on promoting agriculture in the region (such as poultry farms) and the Gerelt Gobi Industrial Complex in Khuvsgul soum. Dornogovi aimag representatives interviewed in the KIIs also stated that, if the Project proceeds, Dornogovi aimag plans to jointly implement four major energy projects with private sector partners, including a 100 kV power station in Mandakh soum, a 70 MW thermal power station in Sainshand, and a 60 MW project in Altan Shiree soum.
- 15.5.16 In addition to the above, the training, qualifications and experience of the construction workforce will be valuable to the local economy.

- 15.5.17 The sensitivity of the local economy and businesses is considered Medium and the potential magnitude of impact Low to Medium, therefore a **Minor to Moderate Beneficial** effect on the provision of infrastructure that contributes to supporting the economy is anticipated.
- 15.5.18 The sensitivity of the regional economy and businesses is considered to be Low currently, however, with increased developments could be Medium (i.e. increased demand for electricity would make these businesses more vulnerable to poor energy provision services) and the potential magnitude of impact Medium, therefore a **Minor Beneficial** 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 **Moderate Beneficial** effect in the longer term.

Livelihoods

- 15.5.19 The potential impacts on loss of access to pasturelands is addressed in **Chapter 16: Land Use, Tenure and Displacement**.
- 15.5.20 Following the completion of the construction phase of the Project, construction workers will need to find alternative employment opportunities. The training, qualifications and experience of the construction workforce will assist in seeking other employment on developments in and outside the region.
- 15.5.21 The Project will provide more reliable electricity to Dornogovi aimag, with the intention as stated in policy that this facilitates growth of development in the area. It will also directly support the expansion of the Tsagaan Suvarga mine. The first processing plant has been constructed and will be operational within 6 months (from the time of writing this report) and the second is under construction and will be operational within 18 months. The expanded mine is due to provide 1,300 direct employment opportunities and 5,000-7,000 indirect employment opportunities. There are 140 people employed at present. Whilst it can be assumed that a large number of these jobs will be taken by those from outside Dornogovi aimag and its soums, it is noted from the stakeholder engagement that existing mines do provide sources of livelihood for local herders – for example, the Mandakh soum representatives reported that herders have been selling meat and dairy products through contracts to mines in their soum and reported an improvement in those herder livelihoods as a result. It is likely that these livelihood benefits catalyse indirect impacts in the short and longer-term. These increases in employment opportunities will ultimately increase the local authority tax base for social infrastructure and service development, including education and skills and provision. Whilst an indirect effect, over time, development of the region and diversification of employment can help in the longer term to slow or reverse the outmigration of younger working age residents.
- 15.5.22 Overall, and combined with other development related to the energy sector and business development in the local area, 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. Local communities are considered to be of Medium sensitivity and the magnitude of impact, albeit indirect, Low to Medium over time, therefore a **Minor to Moderate Beneficial** effect is predicted.

Living Costs

- 15.5.23 During operation, the Project is unlikely to have an ongoing direct impact on living costs as there is no requirement for local employment as a result of the Project, and therefore potential for influx. Some construction workers may remain in the area / move on to another development in the Project Area, however, Dornogovi aimag is already subject to several developments over the past few years and therefore, it is likely the local economy has adjusted to this level of influx. The Project itself is not directly related to distribution of electricity to the buyer and tariffs are controlled by legislation. It is therefore not considered that the Project itself will directly or necessarily indirectly impact electricity tariffs for ultimate end users. Therefore, the impact on living costs during operation is considered **Negligible**.

15.6 Mitigation and Enhancement Measures

Construction Phase

Employment and Gender

- 15.6.1 As identified in **Chapter 17: Labour and Working Conditions**, to provide a framework for labour management the MoE/PIU will develop and implement the following:
- A **Project Discrimination and Harassment Policy**, that contractors will be required to comply with;
 - A stand-alone **Project Gender Equality and GBVH Action Plan**, based on a completed GBVH and gender risk assessment, that contractors will be required to comply with. This will include measures to promote the employment of women;
 - A **Project Code of Conduct**, which will include measures relating to gender equality and GBVH that contractors will be required to comply with;
 - A **Project Supply Chain Policy** and **Supply Chain Management Plan**, that contractors will be required to comply with; and
 - An overarching **Project Labour Management Plan** that contractors will be required to comply with. This will cover PIU staff as well as set the standard for contractors working on the Project. The Project Labour Management Plan will include measures such as:
 - Ensuring there is a transparent and fair recruitment process.
 - Upholding the principles of equal opportunity and non-discrimination.
 - Ensuring procurement avoids exploitative practices and child labour.
 - Ensuring that contractors employ special measures of protection or assistance to remedy past discrimination or promote local employment opportunities, such as ensuring that applications are received from under-represented groups such as women.
 - Ensuring that training opportunities are provided on technical, health and safety and manual work, where suitable.
 - Ensuring that women and men are paid the same wages for work of the same value, i.e. remuneration is based on the employee's skills, experience, responsibilities and other objective, non-gender-related factors.
 - Ensuring the application of the E&S and OHS performance requirements in contracts.
 - Setting out the requirements for labour audits, both for the PIU and the expectations for audits to be carried out by contractors and their sub-contractors.

- Setting out targets on key topics such as local employment and number of women employed and Key Performance Indicators (KPIs) to track and report on indicators such as the percentage of local hires, the percentage of female or other under-represented groups.

15.6.2 The above should be developed in accordance with the EBRD Non-discrimination and Equal Opportunity Guidance for clients⁸⁵ and ensure effective implementation of the Energy Sector Gender Policy (2023-2032) approved in 2023 and its Implementation Action Plan⁸⁶. In addition to the E&S and OHS requirements that will be included in any contractual documents for contractors, as outlined in **Chapter 17: Labour and Working Conditions** the PIU will also undertake audits of contractors to ensure that, amongst other aspects, the procurement process during construction avoids exploitative practices and child labour.

15.6.3 The Construction Contractor will be required to:

- Comply with the **Project Discrimination and Harassment Policy**, to promote equal opportunities.
- Comply with the **Project Gender Equality and GBVH Action Plan**; promote open discussions about GBVH and SEAH concerns through disclosure of gender awareness materials; and attend/support PIU-led training on the Code of Conduct and GBVH.
- Develop and implement a Construction **Labour Management Plan** that aligns with the Project Labour Management Plan and complies with applicable national labour laws and EBRD Performance Requirement 2, to manage labour processes. It will include, amongst other topics:
 - Details of a recruitment process which is transparent and fair.
 - Details of how employment opportunities will be advertised (using measures such as advertisements on MoE and Contractor websites, on soum and bagh governor offices bulletin boards, Facebook, Television and providing information to the soum and bagh meetings).
 - Details of specific measures to promote employment on the basis of non- discrimination, ensuring that applications are received from under-represented groups such as women.
 - Details of the training opportunities which will be provided on technical, health and safety and manual work, where suitable.
- A **Local Employment and Procurement Policy and Plan**, which will ensure that priority is given to employing the local workforce where the skills are appropriate..
- A **Training Plan**, to promote upskilling and ensuring workers have the appropriate training to undertake their work.
- Comply with the **Project Supply Chain Policy** and develop and implement a **Supply Chain Management Plan** that aligns with the Project Supply Chain Management Plan, to ensure that all sub-contractors will need to comply with the same requirements as the main Construction Contractor including compliance with national legislation and EBRD PRs.

⁸⁵ Available at:

[bing.com/ck/a?!&&p=753ada2c683df0acc7c9e395435ded21ae989b1dc34bea493fe0648d2c098bdJmltdHM9MTc2NTE1MjAwMA&ptn=3&ver=2&hsh=4&fclid=0d1bc705-5b79-6820-052d-d3aa5a996913&psq=EBRD+equal+opportunity+and+non-discrimination+guidance+note&u=a1aHR0cHM6Ly93d3cuZWJyZC5jb20vZG93bmxxvYWRzL2Fib3V0L3N1c3RhaW5hYmlsaXR5L05vbKRp2NyaW1pbmF0aW9uLnBkZg&ntb=1](https://www.bing.com/ck/a?!&&p=753ada2c683df0acc7c9e395435ded21ae989b1dc34bea493fe0648d2c098bdJmltdHM9MTc2NTE1MjAwMA&ptn=3&ver=2&hsh=4&fclid=0d1bc705-5b79-6820-052d-d3aa5a996913&psq=EBRD+equal+opportunity+and+non-discrimination+guidance+note&u=a1aHR0cHM6Ly93d3cuZWJyZC5jb20vZG93bmxxvYWRzL2Fib3V0L3N1c3RhaW5hYmlsaXR5L05vbKRp2NyaW1pbmF0aW9uLnBkZg&ntb=1)

⁸⁶ Order by the State Secretary of the MoE. Order No. B/3516, 20 October 2023.

- 15.6.4 With respect to the **Local Employment and Procurement Plan**, this should ensure that priority is given to employing the local workforce where the skills are appropriate. The Plan should be strongly affirmative in promoting local employment, especially among marginalised and vulnerable persons, including the provision of any reasonable training needs to facilitate the employment and upskilling of applicants from the project affected area. The Construction Contractor shall procure goods locally wherever possible including perishable goods provided by herder households who could adversely affected by the Project. The exception to this is illegally obtained goods, such as meat from poaching. To promote local businesses, the Plan will include a mapping exercise of local, regional and national small and medium enterprises, including the local herder supply chain.
- 15.6.5** The Plan will cover all aspects, from the analysis of the existing skills available at a local, regional and national level, to the processes of employment and use of women, as well as promoting the use of local goods and services. It will also consider opportunities for collaborating with local senior schools to develop apprenticeship and graduate programmes. Measures will be put in place within the Plan to ensure that the procurement process avoids exploitative practices and child labour. This may include, for example, the requirement for training of those responsible for the recruitment process, the provision of contractual clauses for workers and sub-contractors and the requirement for labour audits (see **Chapter 17: Labour and Working Conditions** for further details).
- 15.6.6 The Plan will also include recruitment targets and KPIs, in line with targets set out in the Project Labour Management Plan. Reporting on the KPIs, including gender disaggregated workforce data, will be provided as part of monthly reporting to the MoE/PIU on key topics such as local employment and number of women employed.
- 15.6.7 The Plan, recruitment process and employment positions will be disclosed to the public and residents within the Project affected baghs and soums; and be open to all people locally of working age and ability, including women.
- 15.6.8 To assist with preferential employment opportunities to local communities, individuals planning to reside temporarily in a location should register with local authorities. As there is a history of outside workers moving to the Project Area for work prior to the start of a project, the Construction Contractor should ensure that they work with the local authorities to favour local community members that have been residing in the Project Area long-term.
- 15.6.9 The Construction Contractor will be encouraged to employ local workers by providing preference to suitably qualified and experienced applicants from local communities, by working with the local authorities to identify suitable candidates. The Construction Contractor will also be required to provide training to construction workers via a Training Plan.
- 15.6.10 As identified in the Project SEP, a Community Liaison Officer (CLO) will be appointed by the Construction Contractor to facilitate engagement with the local communities in relation to labour opportunities. Engagement at the local community level has indicated that the following measures should be used for outreach to the local community:
- Local posters and information boards
 - Media such as Facebook, television for public outreach, Telegram and Viber within institutions
 - Sharing information at bagh and soum citizens meetings
 - Utilising existing outreach from soum representatives with local herders



- 15.6.11** The Construction Contractor will also develop and implement a **Community Grievance Mechanism** to ensure that local communities and stakeholders have an adequate channel to voice concerns. Further details of this are provided in **Chapter 6** of this report and in the **Project SEP**.

Local and Regional Economy and Livelihoods

- 15.6.12** As identified above, the Construction Contractor will:

- Comply with the Project Supply Chain Policy.
- Comply with the Project Labour Management Plan.
- Develop and implement a construction-specific Supply Chain Management Plan in line with the Project Supply Chain Policy.

- 15.6.13** To enhance the local development benefits of construction and support spinoff employment, the Construction Contractor and sub-contractors should prioritise the procurement of goods and services locally. As such and as identified above, the Construction Contractor will develop and implement a **Local Employment and Procurement Plan**. In collaboration with local authorities and businesses, this will identify and outline local content requirements that can be met locally wherever feasible, including aggregates, perishable agricultural products, and cleaning and catering services. This should include purchase of goods from local herders, especially those directly affected by the Project (see **Chapter 16: Land Use, Tenure and Displacement**).

- 15.6.14** As outlined in **Chapter 17: Labour and Working Conditions**, the Construction Contractor will perform supply chain due diligence (and/or obtain the third-party supply chain due diligence reports) to verify potential suppliers' credentials regarding the occurrence of forced labour child labour or OHS failures. Once appointed, the Construction Contractor will undertake monthly inspections of sub-contractors, in line with the Supply Chain Management Plan.

- 15.6.15** All construction workers will be provided with a reference/confirmation of employment letter and a skills/training log, to enhance their employment prospects post-construction. This will be a benefit for both a local and migrant workforce.

Living Costs

- 15.6.16** In addition to promoting the local supply chain, the Local Employment and Procurement Plan will include a requirement to monitor local demand and supply for basic goods and local price trends, to avoid pressures on basic foodstuffs and to help manage inflationary pressures. Mitigation measures will be required in the event of increased living costs.

Operation Phase

Employment and Gender

- 15.6.17** Mitigation measures and enhancement opportunities in operation are limited in relation to the Project. A Project-specific **Operational HR Policy and Labour Management Plan** will be prepared by the NPTG (compliant with EBRD PR2) and 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.

- 15.6.18 As part of ongoing business practices, the MoE and NPTG should ensure effective implementation of the Energy Sector Gender Policy (2023-2032) approved in 2023 and its Implementation Action Plan⁸⁷. Furthermore, the MoE and NPTG should adopt gender-sensitive workplace policies to comply with the revised Labour Code. The guidelines for such policy were approved by The Tripartite National Tripartite Committee on Labor and Social Partnership⁸⁸, and according to this Resolution all partner organizations including government organisations and private sector companies have to develop and adopt own gender-sensitive workplace policies.
- 15.6.19 Either the NPTG's existing Labour Management Plan or a Project-specific Operational Labour Management Plan should ensure that it includes for:
- Details of a recruitment process which is transparent and fair;
 - Details of the employment opportunities for locals (such as in O&M); and
 - Details of how employment opportunities will be advertised (such as advertisements on MoE/NPTG website).
- 15.6.20 Where the NPTG uses external suppliers, they should either update any existing Supply Chain Management Plan that they have or, where such a plan does not exist, develop and implement a **Supply Chain Management Plan** to cover the operation stage, and as a minimum to cover the following:
- Ensure that any tendering process includes clauses and policies on minimum working age, normal working hours, freedom to collective bargaining, good working conditions and eradicating risks of forced labour;
 - Include labour management clauses in procurement contracts; and
 - Include for continuous monitoring of suppliers' performance and conduct risk assessments to ensure that third parties' performance follows national labour legislation and complies with EBRD PR2.
- 15.6.21 The NPTG will also develop and implement the following:
- A **Discrimination and Harassment Policy**, to promote equal opportunities.
 - A stand-alone **Gender Equality and GBVH Action Plan**, to promote gender quality.
- 15.6.22 The latter will identify how the NPTG will specifically promote employment opportunities for women. The NPTG will maintain gender-disaggregated data on their workforce and report on this annually.
- 15.6.23 A Labour Grievance Mechanism will also be in place and disclosed to all staff during induction and on an annual basis thereafter.
- 15.6.24 A Community Grievance Mechanism will also be in place and will be disclosed to the local community, so that any grievances in relation to employment opportunities can be raised. Anonymous reporting will be possible. The Grievance Mechanism will be widely disclosed by various means, such as local notices, meetings, via stakeholder events, etc. as outlined in the Project Stakeholder Engagement Plan.

⁸⁷ Order by the State Secretary of the MoE. Order No. B/3516, 20 October 2023.

⁸⁸ The Resolution No.38 by the National Tripartite Committee on Labor and Social Partnership, 12 December 2022.

Local and Regional Economy and Livelihoods

- 15.6.25 The positive impacts on the regional economy will mainly be indirect. No additional measures are identified for the regional economy.
- 15.6.26 The MoE should work with the local developments in the area, such as the mines, to help provide for a proportion of the construction workforce to be recruited on local projects, which will benefit the local economy once the Project has been finished as skilled workers will be available to the workforce.

Living Costs

- 15.6.27 No mitigation measures are proposed for the operation phase.

15.7 Residual Effects

Construction Phase

- 15.7.1 The following residual effects are expected to remain following the implementation of the above mitigation and enhancement measures:
- Employment and Gender - effects will be enhanced from Minor to Moderate Beneficial to **Moderate-Major Beneficial** (Significant).
 - Regional Economy - effects will be enhanced from Minor Beneficial to **Moderate Beneficial** (Significant).
 - Local Economy - effects will be enhanced from Moderate Beneficial to **Moderate to potentially Major Beneficial** (Significant) over time.
 - Livelihoods - effects will remain at **Minor** (Not Significant) to **Moderate Beneficial** (Significant).
 - Living Costs - effects will be reduced from **Minor Adverse to Negligible** to **Negligible**.

Operation Phase

- 15.7.2 Assuming that management systems are implemented to meet Mongolian standards and EBRD PR2 and proposed enhancement measures are employed, the following residual effects are expected to remain following the implementation of the above mitigation measures:
- Employment and Gender - taking account of the limited direct O&M opportunities, effects will remain **Minor Beneficial to Negligible** (Not Significant).
 - Regional Economy - effects will be enhanced from Minor (Not Significant) to Moderate Beneficial (Significant) to **Moderate Beneficial** (Significant) over time, due to improved reliability of electricity transmission and positive knock on effect on development.
 - Local Economy - effects will remain Moderate Beneficial (Significant) and possibly, over time, increasing to **Major Beneficial** (Significant).
 - Livelihoods - effects will remain **Minor to Moderate Beneficial** (Significant).
 - Living Costs - effects will remain at **Negligible**.

16 Land Use, Tenure and Displacement

16.1 Introduction

16.1.1 This chapter presents the likely significant effects of the project on Land Use, Tenure and Displacement aspects. The chapter presents the impacts of both construction and operational phases.

16.2 Legislative Framework, Policy and Guidance

16.2.1 **Table 16-1** summarises the legislation, policy and guidance of relevance to this assessment.

Table 16-1 Summary of Legislation, Policy and Guidance relevant to Land Use, Tenure and Displacement

Level	Key legislation / policy / guidance
International	EBRD PR5 Land Acquisition, Restrictions on Land Use and Involuntary Resettlement EBRD Strategy for the Promotion of Gender Equality 2021-2025 EBRD PR10 Information Disclosure and Stakeholder Engagement
	International Labour Organisation (ILO) Conventions: <ul style="list-style-type: none"> • Freedom of Association and Protection of the Right to Organise Convention 1948 (No. 87) • Right to Organise and Collective Bargaining Convention 1949 (No. 98) • Forced Labour Convention 1930 (No. 29) (and its 2014 Protocol) • Abolition of Forced Labour Convention 1957 (No. 105) • Minimum Age Convention 1973 (No. 138) • Worst Forms of Child Labour Convention 1999 (No. 182). • Equal Remuneration Convention 1951 (No. 100) • Discrimination (Employment and Occupation) Convention 1958 (No. 111)
	Guiding Principles on Business, United Nations, and Human Rights (2011)
National Law	The Constitution of Mongolia, 1992 Civil Code, 2002 Law on Land, 2002 Law on Allocation of Land to Mongolian Citizens for Ownership, 2002 Law on Protection of Cultural Heritage 2016, as amended Labour Code, 2021 Law on Minimum Wage, 2010 Law on Occupational Health and Safety, 2008

16.3 Assessment Methodology

Scope

- 16.3.1 In terms of temporal scope, this impact assessment covers the construction and operational phases of the Project. This chapter focusses on land uses, tenure and physical and economic displacement.

Study Area

- 16.3.2 In terms of spatial scope, the Project area includes Dornogovi aimag economy and the Central Energy System (CES) which the OHTL will connect into. The AoI includes the footprint of all Project activities and the RoW, which is 25m either side of the towers along the OHTL route in rural areas and 6m either side in urban areas in Mongolia for a 220 kV overhead line; and 25m around substations; and land users affected by the Project.

Methodology

- 16.3.3 The methodology follows that set out in **Chapter 14: Social and Community**.

Sensitive Receptors

- 16.3.4 Potentially sensitive receptors include:
- Land owners and land users
 - Project affected communities
 - Herders
 - Local businesses, including owners of infrastructure crossed (mine licence areas, railways, roads)
 - Women and vulnerable people/groups

Significance Criteria

- 16.3.5 The significance criteria are as set out in **Chapter 14: Social and Community**.

Limitations and Assumptions

- 16.3.6 The limitations and assumptions are as set out in **Chapter 14: Social and Community**.

16.4 Baseline Conditions

Sources of Data

- 16.4.1 The baseline land use, tenure and potential economic and physical displacement have been collated from secondary data sources (as listed in the text) including the National Statistical Office (NSO) of Mongolia and aimag and soum level statistical data, as well as primary data sources, including the HHS and stakeholder engagement undertaken 23-28 June 2025.
- 16.4.2 As part of the ESIA, Key Informant Interviews (KIIs) and group meetings with local government officials were completed from 23-28 June 2025 and focus group discussions (FGDs) were held in all four soums. Further details are provided in the **Stakeholder Engagement Plan (SEP)** and are cross-referenced in the **Land Acquisition and Resettlement Framework (LARF)**.
- 16.4.3 Ten household surveys were completed in two Project soums. Further details of the survey process and results are contained in **Appendix F and G of this ESIA Report**, respectively.

Land Use in the Project Area

- 16.4.4 In accordance with the Law on Land, aimags and soums are responsible for allocation of land use within their territory. Government actions plans, including requirements for land for national-level projects, are required to be reflected within aimag development plans to facilitate regional development management and coordination.
- 16.4.5 Land uses are classified as 'agricultural land', 'towns, villages and other settlements', 'land under roads and networks', 'land with forest resources', 'land with water resources' and 'land for special state needs'. The distribution of these land types for Dornogovi aimag and the breakdown of the Agricultural land is shown in **Table 16-1** for 2020-2024 and **Figure 16-1** for 2024.
- 16.4.6 The main land use in Dornogovi aimag is agricultural land, of which, "pastures" are almost half the land use of the aimag. The majority of the route of the OHTL is pastureland used for grazing.

Table 16-2 Land use, Dornogovi aimag, 2020-2024, in thousand ha*

Unified land territory	2020	2021	2022	2023	2024
Total	10,947.2	10,947.2	10,947.2	10,947.2	10,947.2
Agricultural land	9,534	9,515	9,490.6	10,272	10,271
Of which: Pastures	9,106.3	9,087.2	9,062.6	9,833.9	9,833.1
Land of cities, villages and other settlements	168.6	187.4	211.4	218.6	219.3
Of which: Land for Construction sites	2.3	2.3	2.5	0	0
Land of public space	13.8	13.7	13.5	0	0
Land of industrial sites	9	9.1	9.2	0	0
Land of mining sites	140.2	158.9	182.8	0	0
Land of ger district	3.4	3.4	3.5	0	0
Land under roads and networks	62.5	62.7	63	68.1	68.1

Unified land territory	2020	2021	2022	2023	2024
Land of road	35.5	35.6	35.6	38.5	38.5
land of railway	11.2	11.2	11.2	13	13
land of air transport	4.1	4.1	4.1	4.1	4.1
Land of area network	11.7	11.8	12.1	12.5	12.5
Land with forest resources	158.5	158.6	158.6	309.4	309.4
Of which: Forest land	115.5	115.5	115.5	0	0
Land with water resources	27.8	27.8	27.8	79.1	79.1
Of which: Land of rivers and river basin	0.4	0.4	0.4	0	0
Land of lakes, ponds and salt marshes	25.7	25.7	25.7	0	0
Of which: Land of brooks and springs	1.6	1.6	1.6	0	0
Land for special needs	995.9	995.9	995.9	0	0
Of which: State special protected areas	656.7	656.7	656.7	0	0
Area for petroleum exploration purposes under product sharing contract	23.4	23.4	23.4	0	0
Freezone	0.9	0.9	0.9	0	0

Source: www.1212.mn https://www.1212.mn/en/statistic/statcate/573072/table-view/DT_NSO_2400_015V4 <https://www.eic.mn/statistics>

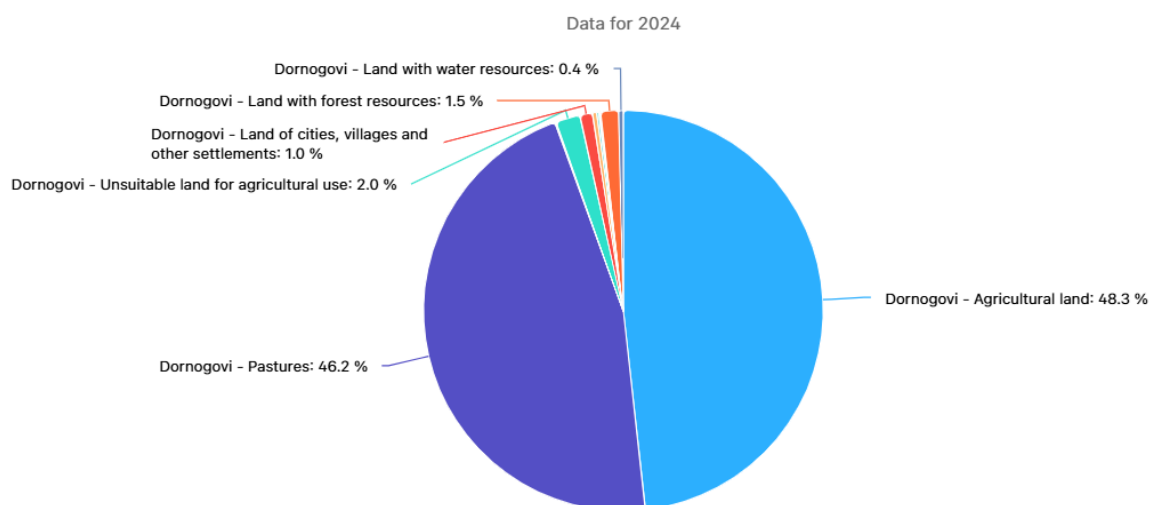


Figure 16-1 Land use types in Dornogovi aimag, 2024, by main types

Source: https://www.1212.mn/en/statistic/statcate/573072/table-view/DT_NSO_2400_015V4

16.4.7 Land use in the Project soums is set out in **Table 16-3**. As can be seen land use is dominated by pasturelands. Towards the south of the Project Area, the land is used predominantly for camel pastures. The use of pastureland depends on seasonal conditions such as drought or dzud (harsh winter). Permanent land disputes are uncommon, but conflicts may arise when herders migrate to areas with better forage during feed shortages.

Table 16-3 Land use in the Project soums

Soum name	Agricultural land	Urban and settlement land	land under roads and networks	Forest fund land	Water fund land	Special purpose land	Area, he
Sainshand	1,437,109.3	332,053.0	2,283.7	3,552.5	0	11,043.7	1,786,042.3
Mandakh	18,614,816.9	61,118.1	2,913.2	21,349.4	0	0	18,700,197.7
Saikhandulaan	32,134,199.1	10,627.6	2,289.6	0	0	0	32,147,116.3
Ulaanbadrakh	1,491,842.2	142,971.6	3,233.6	28,118.1	30.8	0	16,66,196.4
Total	53,677,967.6	546,770.3	10,720.2	53,020.1	30.8	11,043.7	54,299,552.7

16.4.8 According to the KIIs, over 70% of Mandakh soum is pastureland and 98% of Saikhandulaan soum is pastureland. In Saikhandulaan soum, the interviewees stated that there were no major issues with pasture use. During droughts or harsh winters, herders from other areas temporarily move in, however conflicts do not arise. In Ulaanbadrakh soum, interviewees identified that the pastureland is overgrazed and facing challenges, with the northern part of the soum suffering damage from the frequent movement of wild horses and gazelles.

16.4.9 Pastureland generally is used 'within' the soum, with no inter-soum grazing rights. Each year, the aimag carries out a pasture carrying capacity assessment in August, based on that year's harvest yield, the number of livestock to be overwintered, and the number of newborn animals. These factors help determine whether the available pasture is sufficient for the number of livestock. In 2024, following a *dzud* (severe winter disaster), pasture conditions were favourable (during the *dzud*, approximately 27–30% of livestock were lost) however, in most years, pasture demand exceeds capacity by a factor of five. Following the *dzud*, due to the lack of inter-soum reserve grazing zones, soums were instructed to establish shared reserve pasture areas. A total of 108 hectares were approved for this purpose in Dornogovi aimag. In 2025, additional reserve zones are planned in Erdene and Khatanbulag soums, which would expand the total area to around 210 hectares.

Land Use at the Substations and along the OHTL Route

16.4.10 In general, the OHTL route is sparsely populated and has vegetation characteristics of the Gobi Desert. There are no residential structures within the 6m RoW at the departure and arrival points of the OHTL with the Project substations.

16.4.11 Land use along the OHTL and its 25m RoW is shown in **Figure 16-2**. It comprises:

- Pastureland used for grazing livestock and camel
- Licenced mining areas and explosives areas
- Local protected areas (see Chapter 9: Biodiversity, Flora and Fauna)
- Land allocated for development
- Infrastructure, such as roads, railways and transmission/communication lines

16.4.12 There are a number of herder household camps and wells within 1km of the planned route, however, outside the 25m RoW – see **Figure 16-3**.

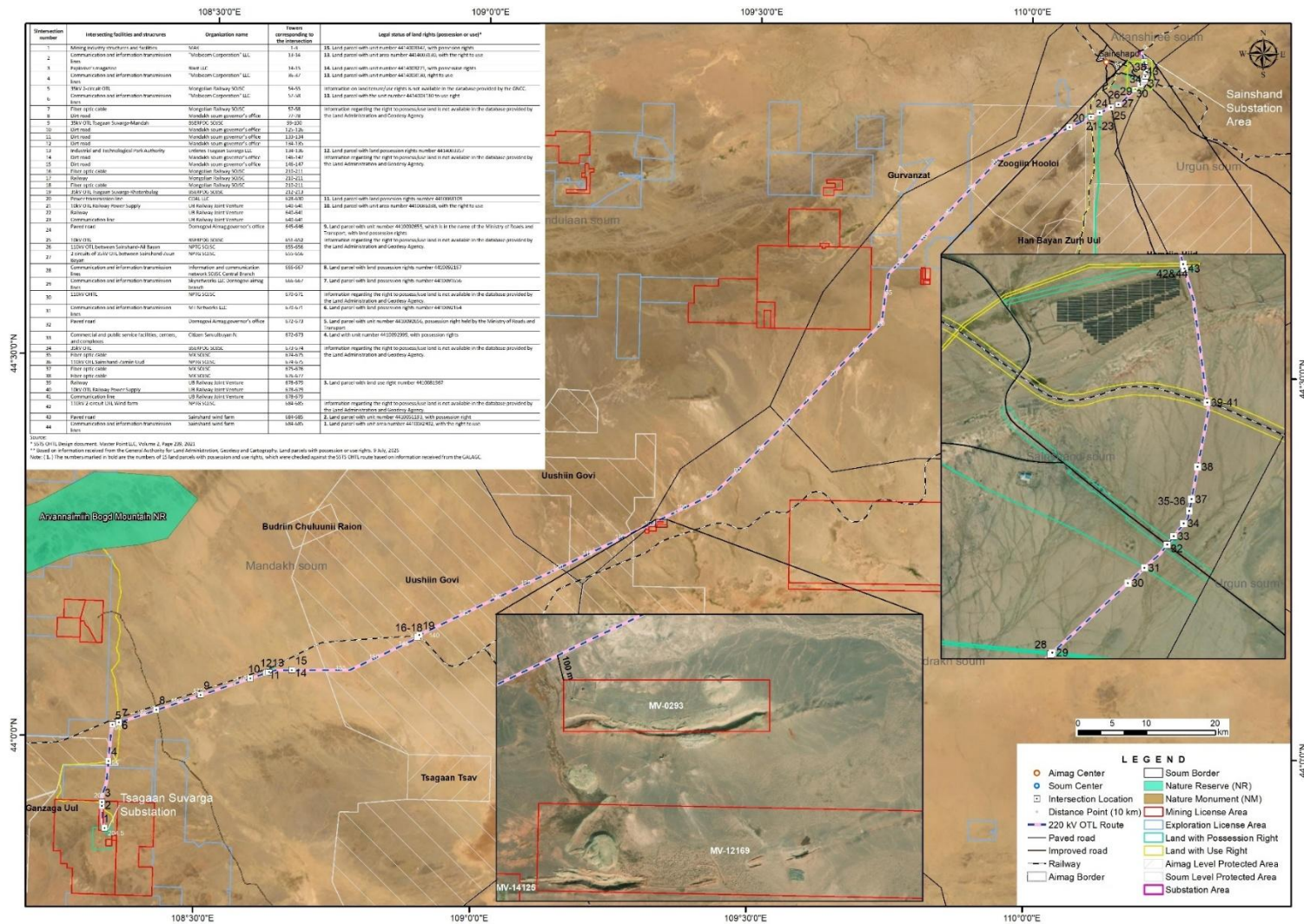


Figure 16-2 Land uses along the OHTL route and infrastructure crossed by the route

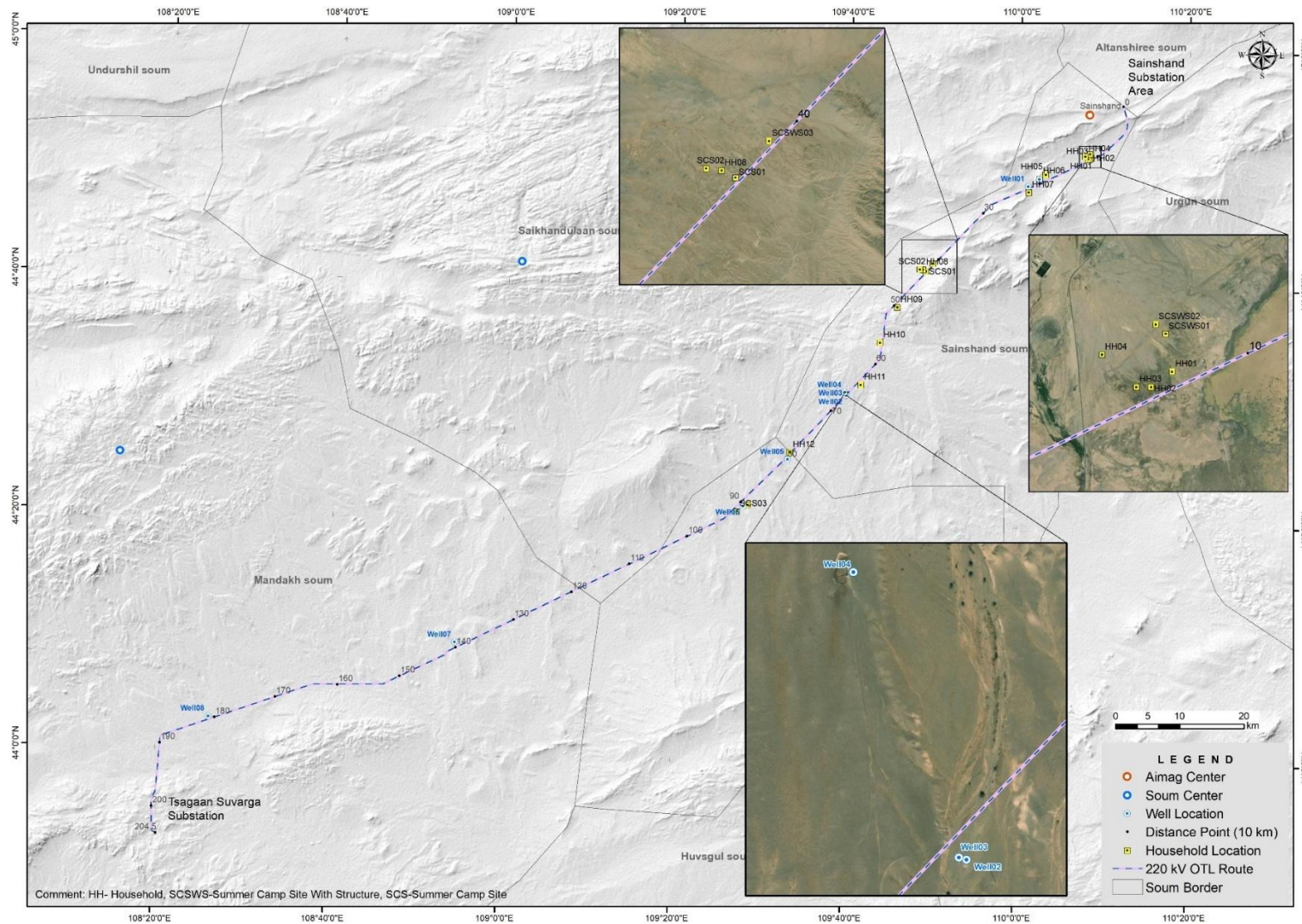


Figure 16-3 Herder households and wells within 1km of the proposed OHTL route

Pastureland

- 16.4.13 The land along and adjacent the OHTL route, whilst it has various additional designations as are described in this section and shown in **Figure 16-2** above, is predominantly land used as pasture for grazing livestock. According to the Law on Land, winter pastures and rangelands must be allocated to *baghs* and should be used collectively. Requests have been made at the soum level land offices, however, no land use maps showing the specific designated winter pasturelands have been provided. There are no designated summer or autumn pasture areas, as these change from year to year depending on forage conditions, livestock numbers, weather and the individual requirements of herder families and therefore, summer and autumn grazing is conducted informally. Pasturelands being grazed are shown in **Plates 16-1 and 16-2**.



Plate 16-1 Grazing livestock



Plate 16-2 Grazing livestock

Herder camps and assets

- 16.4.14 Herders in the Project area reside in *gers*⁸⁹ within winter, autumn or summer camps, depending on the time of year. The *ger* is a mobile structure, as it was designed by herders to accommodate the nomadic lifestyle. It is generally uncommon for herder households to live at the same location in the pastureland area year-round, with herder movements being dictated by the seasons. Herders typically move at least twice a year, in spring (March – May, depending on weather) and at the beginning of winter (October - November). However, more significant displacements are sometimes necessary in the search of better pastures and water resources.
- 16.4.15 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 will collect and where it is possible to establish a shallow well. These tend to be more permanent establishments. During summer and autumn when pastures grow, herders transfer their *gers* to a location they find to have good pasture. While herders frequently return to similar areas for summer grazing, the ultimate option of summer camps depends on the weather and subsequent grazing conditions every year. The most important parameters for choosing summer or autumn camps are

⁸⁹ A *ger*, also known as a yurt, is a traditional Mongolian dwelling that is ideally suited to the nomadic lifestyle of Mongolia. It is a portable, collapsible tent made of a wooden frame covered with felt or fabric, allowing for easy assembly and disassembly.

rangeland yields and water points. In order to protect winter camp sites, it is accepted that a summer or autumn camp and pasture should not encroach on a winter camp area.

- 16.4.16 According to the 2025 HHS, the average distance between winter and summer camps is 2.3km, the shortest is 0.5km, and the farthest is 7km.
- 16.4.17 At the time of the ESIA surveys in 2025, a total of 10 winter camps, five summer camps and one autumn camp were identified within a 1km buffer from the OHTL route. All but one camp was located in Sainshand soum (see **Table 16-4**). None of these camps or assets are within the 25m RoW, the closest are two camps within 100m of the OHTL route (in 2nd bagh, Chandmani and 5th bagh, Zuunbayan, both in Sainshand soum) (see **Table 16-5**).
- 16.4.18 Herder households own the structures and assets within the land area of their camps. In addition to the *gers*, structures may include 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). The assets within the camps identified are identified in **Table 16-5** and illustrated in **Plate 16-3**. Photos of the camps and assets surveyed are provided in **Appendix H**.

Table 16-4 Summary of Herder Camps identified within 1km of the OHTL Route

Location (soum/bagh)	Winter camp	Autumn camp	Summer camp	Wells	Other assets without a camp
Sainshand soum	10	1	4	2	1
Ulaanbadrakh	-	-	1	1	-
Mandakh	-	-	-	-	-
Saikhandulaan	-	-	-	-	-

Table 16-5 Camps within 1km of the OHTL Route

Asset ID	Soum	Bagh	Type	Land tenure	Structures	Distance from OHTL, km
HH01	Sainshand	2 nd bagh, Chandmani	Winter camp	-	Livestock winter shelter, locked barn, broken car	0.2
HH02	Sainshand	2 nd bagh, Chandmani	Winter camp	Use	Livestock winter shelter, barn with wheels, ger, broken car, trailer with wheels	0.1
HH03	Sainshand	2 nd bagh, Chandmani	Winter camp	Ownership	Truck, broken barn, barn, ger, small ger	0.2
HH04	Sainshand	2 nd bagh, Chandmani	block fence	-	Ger, block fence	0.8
HH05	Sainshand	1 st bagh Dalaishand	Winter camp	Possession	Ger, kiosk, livestock winter shelter	0.9
HH06	Sainshand	1 st bagh Dalaishand	Winter camp	Possession	Livestock block winter shelter, barn, solar panel, Ger	0.7

Asset ID	Soum	Bagh	Type	Land tenure	Structures	Distance from OHTL, km
HH07	Sainshand	6 th bagh, Khairkhan	Winter camp	Possession	Livestock winter shelter, broken car wrecks, kiosk	0.6
HH08	Sainshand	6 th bagh, Khairkhan	Summer camp	-	House, solar panel, kiosk, livestock fence-2 Car, Motorcycle	0.6
HH09	Sainshand	6 th bagh, Khairkhan	Winter camp	Possession	Kiosk, car wreck, livestock winter shelter	0.6
HH10	Sainshand	5 th bagh, Zuunbayan	Winter camp	Possession	Water container, fence made with wheels	0.2
HH11	Sainshand	5 th bagh, Zuunbayan	Winter camp	Possession	A broken bus, 2 kiosk, a winter shelter, and a large water container	0.5
HH12	Sainshand	5 th bagh, Zuunbayan	Winter camp	Possession	Ger, camel fence, water container	0.1
SCSWS01	Sainshand	2 nd bagh, Chandmani	Summer camp	-	Ger, livestock fence	0.5
SCSWS02	Sainshand	2 nd bagh, Chandmani	Summer camp	-	Ger, livestock winter shelter	0.6
SCSWS03	Sainshand	6 th bagh, Khairkhan	Summer camp	-	Ger	0.2
SCSWS04	Ulaanbadra kh	Argalant	Summer camp	-	Ger, car, livestock moving fence	1
SCS02	Sainshand	6 th bagh, Khairkhan	Autumn camp	-	Autumn camp	1



Winter camp



Winter camp



Winter camp



Winter camp



Autumn camp



Summer camp

Plate 16-3 Camps along the OHTL route

16.4.19 Nine herder wells were also identified within 1km corridor on both sides of the OHTL route, as summarised in **Table 16-6** and shown in **Figure 16-3** above and **Plate 16-4** below, with further photos in **Appendix I**.

Table 16-6 Wells within 1km of the OHTL Route

No.	Name of Well	Lattitude	Longitude	Distance from the OHTL route (km)	Function
1	Well01	44.81299	110.01580	0.95	Drinking water and livestock.
2	Well02	44.51672	109.66397	0.95	Drinking water and livestock.
3	Well03	44.51675	109.66381	0.96	
4	Well04	44.52088	109.66157	0.97	Unknown- Site owner was not present at the time of the survey.
5	Well05	44.425652	109.55187	0.84	Drinking water and livestock
6	Well06	44.35902	109.46652	0.82	Unknown- Site owner was not present at the time of the survey.

No.	Name of Well	Latitude	Longitude	Distance from the OHTL route (km)	Function
7	Well07	44.15948	108.91027	0.85	Unknown- Site owner was not present at the time of the survey.
8	Well08	44.04614	108.43514	0.90	Unknown- Site owner was not present at the time of the survey.
9	Well09	44.82330	110.03775	0.90	Unknown- Site owner was not present at the time of the survey.



Plate 16-4 Wells along the OHTL route

Mining and explosives

16.4.20 Mining is practiced in the Project Area, with a total of 96 active licences (exploration and mining) identified in the Project soums. As of 2025, the following mining licences are applicable within the 25m RoW as reported in Table 16-7 (also shown in **Figure 16-2** above).

Table 16-7 Mining licences within the RoW

License Name	Soum	License ID number	License Holder's Registration Number	Type	Dates	Description
Ungut	Sainshand	XV-19251	5935288	Exploration licence - inactive	05/11/2015 - 05/11/2027	The site shows no evidence of active exploration activities, either from direct field inspection or satellite imagery analysis.
Tsagaan tsaviin khudag	Sainshand	MV-19543	2000001088 5877539	Exploration licence - inactive	26/08/2019 - 26/08/2049	The site shows no evidence of active exploration activities, from satellite imagery analysis.
Dovtsog Khudag	Mandakh	XV-20392	2659603	Exploration licence - inactive	12/21/2015 - 12/21/2027	The site shows no evidence of active exploration activities, from satellite imagery analysis.
Tsagaan Suvarga	Mandakh	MV-17535	2095025	Mining	14/05/2014 - 14/05/2044	Tsagaan Suvarga mine started construction in 2014 and will reach full operation in 2026, and is due to

License Name	Soum	License ID number	License Holder's Registration Number	Type	Dates	Description
						operate for at least 20-25 years, based on current contracts.

16.4.21 It should be noted that the mining licence area around km105 is around 93m from the route, as shown in **Figure 16-4**. Furthermore, the OHTL route only crosses the Tsagaan Suvarga licence area as it enters into the substation.

16.4.22 As **Figure 16-4** shows, there is an orange area to the immediate north of Tsagaan Suvarga licence area. This area is owned by an explosives company called Blast. They provide a blasting service to mining companies. A DEIA for development of this site has been approved and construction is underway for storage of explosives; though it is not known if that includes areas under the proposed route of the OHTL.

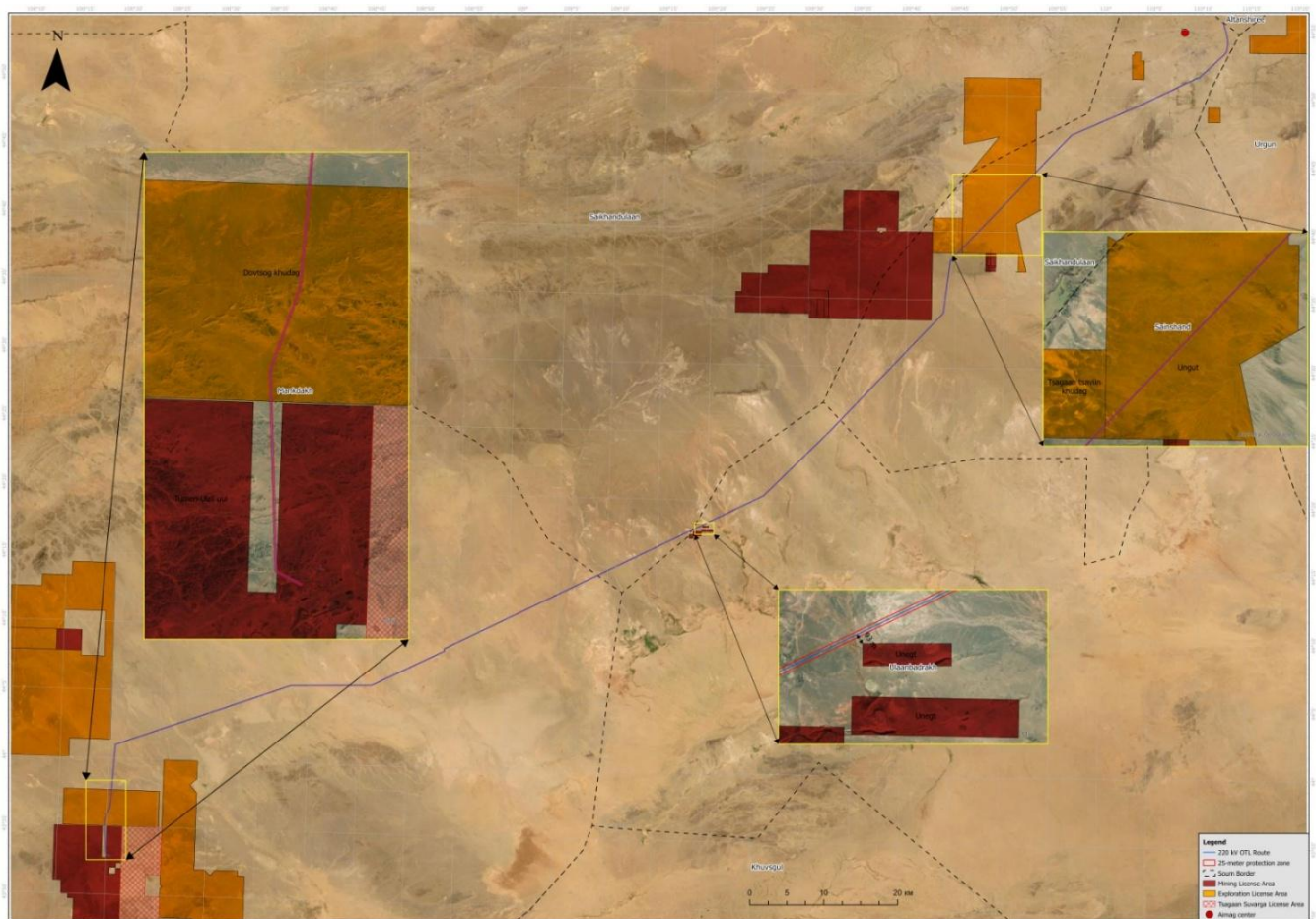


Figure 16-4 Location of mining licences along the OHTL route

Protected Areas

- 16.4.23 These Project falls within a priority conservation area (PCA), the Southern Gobi Ecological Region of Mongolia. These areas were identified by the government to help protect Mongolia's territory. The identification of this PCA resulted in the designation of two Locally Protected Areas, namely Uushiin Gobi and Ganzaga Uuliin Urgutgul which are discussed in more detail below. Although Priority Conservation Areas outside existing LPAs are not formally protected, future protection may be applied to these areas.
- 16.4.24 Overall, there are three locally protected areas (LPAs) that the OHTL route passes through as shown in **Figure 16-2** above:
- Zoogiin Hooloi (historical and cultural heritage site)
 - Uushiin Gobi (priority conservation area)
 - Ganzaga Uuliin Urgutgul (priority conservation area)
- 16.4.25 It is noted that locally protected areas is land that remains under state ownership however, local aimags and soums retain the authority to designate these area based their self-governing rights.
- 16.4.26 According to the information on the website of the Environmental Information Center of Mongolia, Zoogiin Hooloi LPA was designated on July 30, 2014, and was released from protection on July 30, 2019; parts of Uushiin Gobi have been released from protection; and Ganzaga Uuliin Urgutgul LPA is planned to be released from protection in 2036. The reason for releases is not available.
- 16.4.27 Further details are provided in **Chapter 9: Biodiversity, Flora and Fauna** and **Chapter 10: Cultural Heritage**. 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. No additional permission is required beyond that provided by the soum governors to cross these designations.

Land Allocated for Development

- 16.4.28 According to data provided by the Land Agency in the Project soums, there are several areas that have been identified as land allocated for development, as shown in **Figure 16-2** above:
- A land parcel allocated to an industrial and technological park (No.13 on **Figure 16-2**)
 - A land parcel allocated to commercial and public service facilities, centres, and complexes (No.33 on **Figure 16-2**)
- 16.4.29 These land parcels have not, however, been developed, as can be seen in **Plates 16-5 and 16-6**.



Plate 16-5 Land parcel #1



Plate 16-6 Land parcel #33

16.4.30 It is noted that these areas of land are, essentially, state owned.

Infrastructure

16.4.31 In addition, the OHTL route crosses various paved and dirt roads, railways and transmission and communications lines, as shown in **Figure 16-2** above:

- Communication and information transmission lines – 9
- 10kV OHTL – 3
- 35kV OHTL – 5
- 110kV OHTL – 4
- Fibre optic cables – 6
- Paved roads – 3
- Dirt roads – 6
- Railway – 3

16.4.32 The impacts on these are described further under 'Infrastructure' in **Chapter 14: Social and Community**.

Land Tenure

16.4.33 There are three categories of land tenure in Mongolia, as set out in the Law on Land (2003, revised versions in 2003, 2004, 2006, 2009, 2010, 2012-2019, 2021):

- **Land ownership.** Ownership rights are limited to Mongolian citizens and include the right to manage and sell the land. 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.
- **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. 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.

16.4.34 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;
- Public tenure lands in cities, villages and other settlements;
- Land under roads and networks;
- Lands with forest resources; and
- Lands with water resources.

16.4.35 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. In general, pastureland is state land and therefore public, not private property. 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.

16.4.36 In accordance with the Law on Land, the land for winter camps can be possessed. Possession certificates can be issued for other types of camps. 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. Possession certificates can be extended by no longer than 40 years. Of the above camps, seven herders reported having a possession certificate and one reported owning the land for their winter camps. However, certificates were not provided to verify and ultimately, the land office in each soum will need to confirm land ownership and possession with the MoE.

16.4.37 According to the Law on Land, citizens with land ownership certificate can dig a well on the owned land. 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, which are regulated by the Law on Water (2012). There are two classifications depending on the purpose of water use and consumption: the water user⁹⁰ and the water consumer⁹¹. 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.

16.4.38 To obtain agreement in principle on the preferred route for the OHTL, the design team that identified the route for the MoE, MasterPoint LLC, obtained an approval page with signatures from the following organisations: NPTG, Dornogovi Aimag, Mongolian Railways, National Emergency Management Agency, National Dispatching Center, Baganuur-South East Region Power Transmission, Land Relation, Urban Development Agency and the Dornogovi Branch of the Information & Communication

⁹⁰ “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)

⁹¹ “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)

Network. Any changes to the preferred route in principle would require final agreement with the same parties.

- 16.4.39 In accordance with the Law on Land set out above, to obtain a possession right for the OHTL and its RoW, the NPTG (who will operate the transmission line) will need to proceed with the Application for Land Possession process. This requires an application for land possession through the e-government service system. As part of that process, in accordance with Article 32.1 of the Law on Land, information must be provided on:
- Purpose and duration of land possession;
 - The entity's registered name, jurisdiction, address, and a copy of the state registration certificate;
 - A schematic map showing the administrative and territorial unit, size, boundaries, location, and plot of land where the entity intends to conduct production or services; and
 - The purpose and duration of land possession.
- 16.4.40 Upon receipt of the application, the land officer of the soum, aimag, capital city, or district must register it in accordance with the procedures approved by the state administrative authority in charge of land matters. The registration shall record the year, month, day, hour, and minute of receipt, and a certificate of this record shall be issued to the applicant. The possession of the land is issued 15 or 30 years (depending on the request), and can be extended for a further 15 years. This will apply, in the case of this Project, to the following land types:
- Pastureland used for grazing
 - Local protected areas
 - Land allocated for development
 - Mineral licence areas
- 16.4.41 In addition to the above, engagement and agreement will be required as outlined below.
- 16.4.42 The NPTG will need to engage with the individuals or organisations that possess access to the areas of land allocated for development and agree that the land can be used for the Project.
- 16.4.43 For the mining licence areas, in line with Mongolian Government Resolution No. 97 of 18 March 2020, the NPTG will need to:
- Engage with licence holders and obtain a "no objection" agreement for the mining licence holders to cross their licence areas;
 - Inform the Mineral Resources and Petroleum Authority.
- 16.4.44 As per EBRD requirements, any land required that affects local herder camps or assets will require engagement and agreement with those households.
- 16.4.45 Finally, any infrastructure that could potentially be affected by the route will be subject to engagement and agreement between NPTG and the infrastructure owner.

- 16.4.46 A total of 23 structures potentially within the RoW were identified using Google Earth. A site visit was then undertaken to confirm the existence, location and types of structures and to administer HHS. During the field surveys, it was determined that there was a total of 16 camps and nine wells. A total of 13 owners of these assets were identified (some had more than one camp); however, it was not possible to identify the owner of one camp (SCSWS04) and a fence. Of the owners identified, it was possible to interview 10 herder households. Data relevant to this chapter is presented below.
- 16.4.47 All households covered in the survey were located in Sainshand and Ulaanbadrakh soums. Nine households live in *ger*, and only one household lives in a house, in Bagh #2 (Chandmani) of Sainshand soum. All surveyed households possess a winter camp or autumn/spring camps. Respondents confirmed that the average distance between their winter and summer camps is 2.3km, the shortest is 0.5km, and the furthest is 7km.

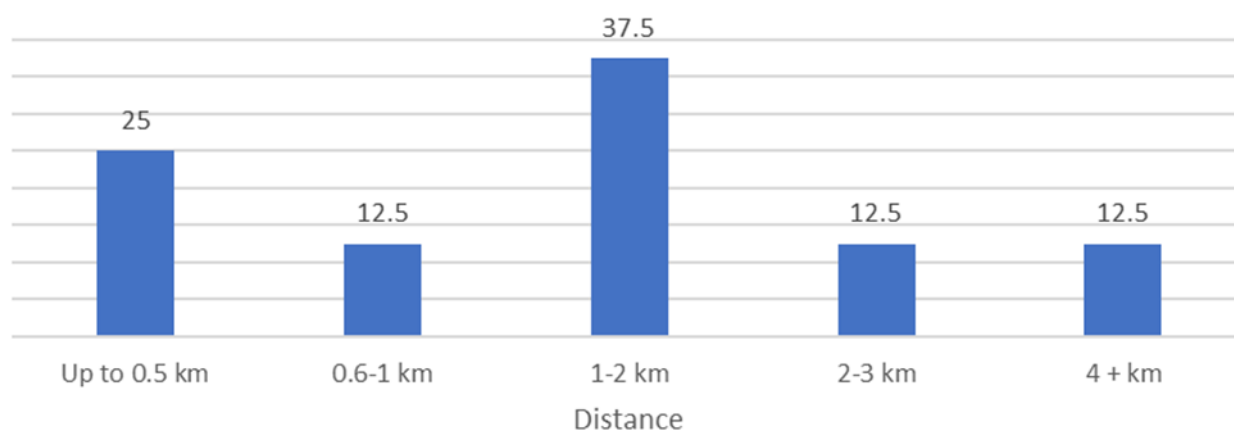


Figure 16-5 Distance between winter and summer camp, %

- 16.4.48 Only one household has no car, four households have one car, and five households have more than two cars. A total of five households had refrigerators/freezers, all surveyed households have solar panel, one or two. A total of eight households has no washing machine, while six households have TV sets.

Table 16-8 Social indicators of surveyed households

Social indicators	Number of items			
	1	2	3 and more	None
Car/light vehicle, truck	4	4	1	1
Motorcycle	8	1	-	1
Refrigerator/Freezer	4	1	-	5
Washing machine	2	-	-	8
Solar panel	8	1	1	-
TV set	6	-	-	4

- 16.4.49 All surveyed household have livestock, as shown in **Table 16-9**. Five households have up to 200 head livestock comprised 50, and three households have more than 500 head livestock.

Table 16-9 Number of Livestock, identified by respondents

Number of livestock	Number of households	Percent
Up to 200	5	50.0
200-500	2	20.0
500+	3	30.0
Total	10	100.0

16.4.50 Seven households use public wells, while three households use a private well for their water source. Six households use the same well for drinking water and watering livestock. According to six respondents who use the same water source for both drinking and watering livestock, the average distance to the nearest well is 1.6km, with the closest well located 0.1km away and the furthest at 3km. According to the four households that use separate wells, the average distance to the drinking water well is 8.2km, with the closest well located 5km away and the farthest at 15km. For livestock, the average distance to a well is 4.8km, with the nearest well at 4 km and the furthest at 5km. All respondents reported that the OHTL would not cause any difficulties for watering their livestock.

Table 16-10 Water source distance, km

Distance to well	Households that use the same water source, km	Households that use the different water source, km	
		Drinking	Livestock watering
Nearest	0.1	5	4.8
Furthest	3	15	4
Average	1.6	8.2	5

16.4.51 Collectively, all ten surveyed households utilize 9.8 hectares for both residential living and livestock grazing (**Figure 16-6**). Out of surveyed households, four households have up to 0.7 hectares of land, three households have exactly 0.7 hectares, and another three households have 2.0 hectares each. Regarding land tenure status, two households own the land, seven households stated that they have a possession certificate and household uses it without formal right.

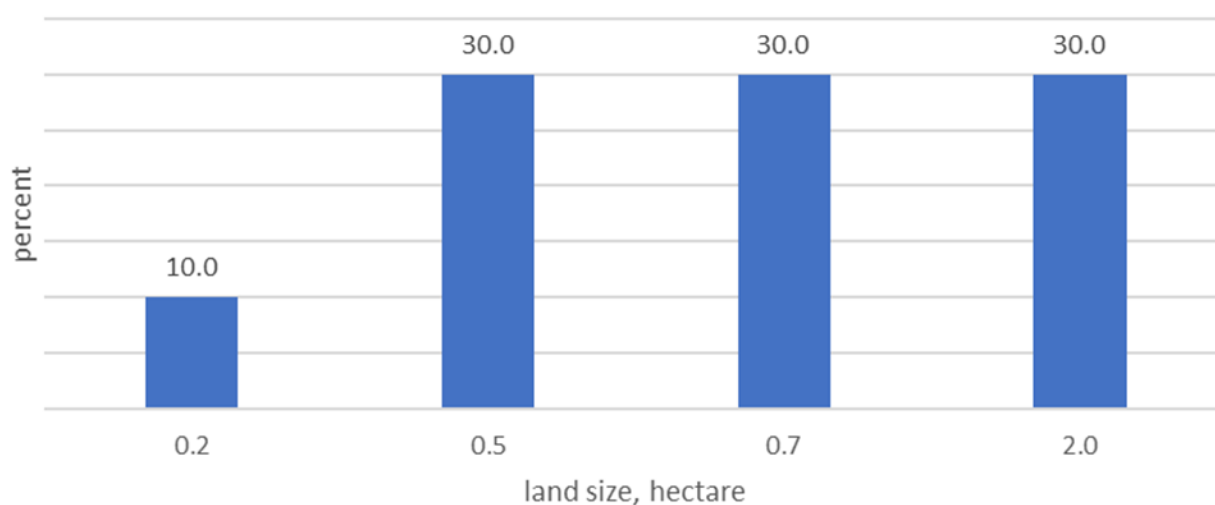


Figure 16-6 Size of land of the surveyed households

16.4.52 Surveyed households were asked about the main purpose of land use near the proposed high-voltage OHTL route. Eight households use the Project land for livestock grazing, one household uses it for residential purposes, and one household has a well. All households use this area year-round. The location of the households are set out in **Table 16-4** and **Figure 16-3** above; as identified earlier, none are located within the Project route or its RoW.

Table 16-11 Purpose and frequency of use of the land around high-voltage overhead transmission lines

Purpose of use of the land around high-voltage overhead transmission lines	Frequency	Percent
Livestock grazing	8	80.0
Living/residential	1	10.0
Well	1	10.0
Total	10	100.0

16.4.53 Income from sale of livestock and livestock products is the main income source of income for the majority of surveyed households (47.4%). According to the respondents' answers, the second main source of household income is pension (26.3%) income and welfare allowance or child money (21.1%).

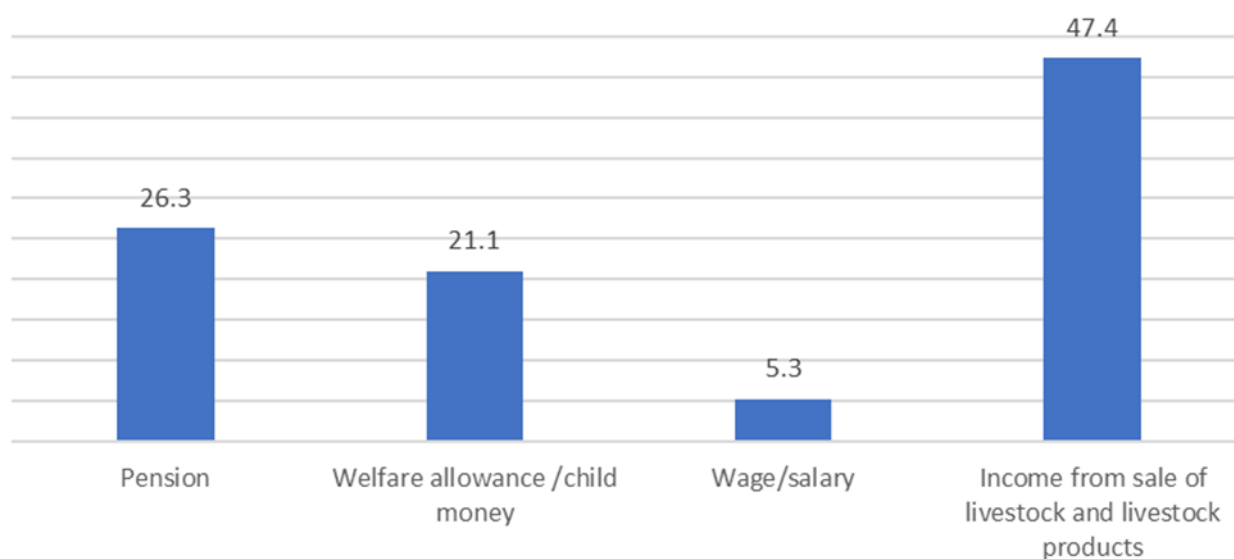


Figure 16-7 Household income source type, %

16.4.54 The majority of the respondents have two or more income sources, such as income from sale of livestock and animal products, and pension. Five households receive pension, with an average of 863,800 MNT (**Table 1-12**). Four households benefit from welfare allowances and child support, averaging 209,000 thousand MNT. All households earn income from the sale of livestock and livestock products, with an average of 2,007,000 MNT.

Table 16-12 Household's monthly average income, by source

Source type	Number of households	Average income, thousand MNT
Pension	5	863.8

Sale of livestock and livestock products	10	2,007.0
Welfare allowance /child money	4	209.0
Wage/salary	1	2,000.0

16.4.55 Forty percent of households have up to 1-2 mln. MNT monthly income (**Table 16-11**). Households with income ranging from 2 mln MNT to 2.5 mln. MNT comprise 20% of all surveyed households, and 40% of the total households have monthly average income 2.5 mln. MNT or more. This is compared to the national level average monthly household income of MNT 2,409,836 in 2024 and a monthly average income of households residing in rural areas of MNT 1,729,754 (see **Table 15-9 in Chapter 15: Economy, Employment and Livelihoods**). The majority of those interviewed therefore have incomes comparable to, or slightly above or below the national average; with four reporting an income considered lower than the national average.

Table 16-13 Monthly average income, MNT

	Frequency	Percent
1.0-2.0 mln MNT	4	40.0
2.0-2.5 mln MNT	2	20.0
2.5+ mln MNT	4	40.0
Total	10	100.0

16.4.56 The surveyed households' average monthly food expenses amount to 460,000 MNT. Three households have electricity expenses, with an average amount of 340,000 MNT. Eight households reported transport-related costs, such as fuel, etc., with an average of 741,300 MNT. Seven households spend on average of 285,700 MNT per month on healthcare and medical services. Additionally, four households have education-related expenses, averaging 285,700 MNT per month.

Table 16-14 Household's monthly average expenses, by type

Type of household expenses	Number of households	Average, thousand MNT
Food	10	460.0
Electricity	3	340.0
Transport	8	741.3
Education	4	262.5
Health	7	285.7
Other	4	405.0

16.4.57 The household survey result show that two households have monthly expenses of up to 0.5 million MNT. Three households with monthly expenses ranging from 0.5 to 0.99 million MNT. Another two households report monthly expenses between 1.0 and 1.99 million MNT. Meanwhile, two percent of surveyed households have average monthly expenses exceeding 2.0 million MNT. The respondents had quite a wide ranging level of expenses. This is compared to the national level average monthly household expenditure of 2,626,520 MNT in 2024, an aimag centre (covering all aimags) average of 2,536,988 MNT in 2024 and a soum level (covering all soums) of 2,285,711 MNT in 2024 (see **Table 15-10 in Chapter 15: Economy, Employment and Livelihoods**). As can be seen, the majority of the respondents have monthly average expenditure lower than the national, aimag and soum levels; with three having expenditure levels equal to or above those levels.

Table 16-15 Monthly average expenses, in MNT

	Frequency	Percent
Up to 0.5 mln. MNT	2	20.0
0.5-0.99 mln. MNT	3	30.0
1.0-1.99 mln. MNT	2	20.0
2.0-2.99 mln. MNT	1	10.0
3.0 mln. MNT and more	2	20.0
Total	10	100.0

16.5 Potential Impacts and Effects

Construction Phase

Land Use

- 16.5.1 The Project passes through land predominantly used as pasture land for grazing livestock, though land is also designated for mining exploration licences and LPAs. For the most part, the route passes through state land, though seven of the herders with camps within the 1km buffer reported having a possession certificate and one reported owning the land for their winter camps (though no evidence was provided to support these statements). There are also several small areas of land allocated for development, though with no evidence of development; and several crossings or nearby utilities/infrastructure.
- 16.5.2 During construction, there could be some disruption to existing land uses as a result of access restrictions for safe construction working along the OHTL route. It is anticipated that the working area would be similar to that for the permanent RoW, i.e. 25m from the towers. As the land is currently mainly used for grazing, access for grazing is likely to be most affected. No impact is anticipated on the use of land for exploration mining or allocated developments, as these land parcels are not currently in use. No impact is anticipated on the use of land as LPAs, as despite their designations, they are currently used for grazing.
- 16.5.3 There may be some localised impact on land uses such as paved and dirt roads, railways and other OHTLs/communications lines, where works are close to or cross these features; for example, if traffic is required to be temporarily halted whilst the lines are being strung across a paved road.
- 16.5.4 Access restrictions that could affect land uses will be short term and generally localised to the kilometre of route being worked on at any one time. As such, no significant effect on existing land uses is anticipated during construction (displacement impacts are addressed below). The sensitivity of the current land uses is considered medium to low. The magnitude of the impact on land use during construction is considered low (the construction activities in themselves will not cause a change to existing land uses) and the overall effect on land use is considered to be **Minor Adverse to Negligible**, and temporary in nature.

Physical and Economic Displacement

- 16.5.5 According to the EBRD (2017)⁹², **physical displacement** refers to the loss of habitation and related fixed assets as a result of land acquisition or expropriation that require people using and occupying those fixed assets to move to another location. **Economic displacement** refers to the loss of assets or resources, and/or loss of access to assets or resources that leads to loss of income sources or means of livelihood as a result of project-related land acquisition, clearance or restriction of access to natural resources. People or enterprises may be economically displaced with or without experiencing physical displacement.

⁹² EBRD (2017) Resettlement Guidance and Good Practice Manual.



- 16.5.6 No physical displacement is anticipated as a result of the Project; there are no structures or residential uses within the OHTL route or its RoW (25m either side of the OHTL route). The closest property is a winter camp (HH02) at 100m from the Project route.
- 16.5.7 During construction there will be a loss of or loss of access to: pastureland, land within three mining licence areas (one active mine and two exploratory) and one explosives storage area; land within CPA/LPAs; and land allocated for development within the working footprint of the OHTL. The majority of the loss of land/access to land will be permanent i.e. the loss of land within the 25m RoW, which is assumed to also be the temporary working area to be used during construction. As such, these permanent losses of land/access to land are addressed under 'Operation' below (where impacts on land within the mining licence areas/explosives storage site, in CPA/LPAs, land allocated for development are discussed). The only potential temporary loss of access to land during construction is in relation to pasturelands, which is considered below.
- 16.5.8 Livestock grazing is usually undertaken over a wide area (several hectares as identified in the HHSs). Sixteen herder camps and nine wells were identified within a 1km distance from the OHTL route and therefore could experience some temporary access restrictions during the construction works. The magnitude of impact will depend on a number of factors, including whether the herders are at the camps within the 1km buffer at the time of the works; construction access restrictions, if any; extent of linear development undertaken at any one time; the number of livestock owned by the herders and the carrying capacity of the pastures in the years of construction. It is assumed the construction works will take place in spring/summer when weather conditions are more favourable. This is typically when herders move to summer pastures (the majority of the camps identified within the 1km buffer were winter camps). As such, it is considered that herders will be able to find alternative grazing land for the period of time during which access is potentially restricted. It is also assumed that the construction will take place in sections along the route, reducing the likelihood for wholesale access restrictions. Herders are considered a receptor of medium sensitivity given that the majority (six) of herders in the Project Area have good incomes compared to the national average and the remaining four had incomes comparable to rural averages, however, are subject to weather conditions that can affect pasture quality and livestock health. The magnitude of impact on access to land during construction on access to pasturelands is considered low. Overall, without proactive management potential access restrictions could result in a **Minor Adverse** effect on access to land and subsequent impact on livelihoods. However, as mentioned, access restrictions and impacts will be localised and short term only.
- 16.5.9 It is not considered that the above will affect herders livelihoods as grazing will still be possible. However, potential impacts on herder's livelihoods during construction include dust emissions from the construction works that may limit access to pasturelands beyond the confines of working areas and have an adverse effect on livestock health. Also, as pastoral livestock along the OHTL route roam relatively freely, construction traffic and works present an elevated injury risk to livestock, depending on final construction routes and restrictions on animal access. In the absence of mitigation, these changes could elevate injury risk to livestock. As has been reported in the KIIs from other similar projects, the potential for livestock to fall into construction pits and die is also a risk to livestock and therefore herder livelihoods. Livelihood losses may, in some cases such as vulnerable households, present food insecurity risks. The sensitivity of herder livelihoods is medium and, without appropriate construction activity controls (dust, open pits, etc.), the likely impact magnitude is medium, resulting in a **Moderate Adverse** effect on livelihoods prior to mitigation.

- 16.5.10 In terms of access to resources, a potential effect of OHTL construction relates to temporary changes to water resources. Specifically, such changes can include the depletion of water through abstraction and use and the potential pollution risk in the case of accidental spillages and leakages to soils, which could indirectly impact local herder wells and, to a much lesser extent in this location, communities using surface or groundwater, through contamination to drinking sources. In the absence of mitigation, these changes can affect the access to water resources for some community members. Construction Contractors will not be permitted to use local herder wells. Although Dornogovi aimag is a relatively dry aimag, the proposed works are only likely to result in low-level disruption to water access at construction sites. The sensitivity of herder household receptors to water access is high and the likely impact magnitude is low, resulting in a **Moderate Adverse** indirect effect on livelihoods.
- 16.5.11 Temporary land take will also be required for the construction works such as:
- Haul roads for construction materials
 - Construction compounds
 - Construction workers' accommodation camp
- 16.5.12 The location of these sites will be determined by the Construction Contractor and therefore is not currently known. However, it is assumed that the Contractor will negotiate agreements with the soum government/administration, which will involve the Construction Contractor signing a land use agreement with the soum and paying a land use fee for its temporary use. The sensitivity of the land likely to be used is considered low, as for the most part this will be State land. The magnitude of impact is also considered to be low, resulting in a **Negligible** effect in relation to temporary land requirements.

Operation Phase

Land Use

- 16.5.13 As identified in the Law on Energy and the Mongolian Government Resolution No. 97 of 18 March 2020, certain activities are restricted within the RoW, including the presence/construction of *gers*, housing or building or any activities other than those permitted by the network owners or possessors within such boundaries. This will have a permanent impact on some land uses (and consequent potential economic displacement impacts – discussed further below).
- 16.5.14 The OHTL will not result in a change of existing land uses for herder camps or use of wells along the route, as there are no camps or wells within the 25m RoW. Grazing will still be permitted within the RoW, and therefore no impact on the use of land for grazing is anticipated either.
- 16.5.15 The Project will result in a restriction on land uses within the 25m RoW, which will affect the mining licence areas and explosives storage site. Neither Ungut nor Tsagaan tsaviin khudag have any active exploration, with the Ungut licence expiring in 2027. The Tsagaan tsaviin khudag licence area is only marginally crossed in its south-west corner by the OHTL route. Therefore no change to current land uses is anticipated. The route of the OHTL has been agreed in liaison with MAK at Tsagaan Suvarga mine and therefore, overall, no change to existing mining land uses at the mine is anticipated.
- 16.5.16 Although the Project will result in a permanent loss of land within the three LPAs/PCA, it will not change how these areas are currently used. Moreover, it is understood that protection at these sites has been or is due to be released.

- 16.5.17 Although the Project will result in a permanent loss of land within the areas allocated for development, it will not change how these areas are currently used.
- 16.5.18 During normal operation, it is not anticipated that the Project will have an impact on the various infrastructure it crosses.
- 16.5.19 Overall, the overall significance of effect on land uses as described above is considered **Negligible**. There is a longer term potential impact that the Project results in the increase in development in the Project Area, however the extent of any development is contingent on various factors that are currently unknown (such as when such development is due to take place and whether it is contingent on factors beyond improved electricity supply).
- 16.5.20 It is not known if the MoE/NPTG have undertaken engagement with Blast in relation to the explosives storage area to the north of Tsagaan Suvarga mine; there is a potential that the OHTL route that passes through the centre of this area could impact on the use of this land for explosives storage. The sensitivity of the land use is considered medium, and the impact is considered medium, resulting in a **Moderate Adverse** effect prior to mitigation.
- 16.5.21 During emergency situations (e.g. storm) there is a possibility that failure of the OHTL could impact adjacent infrastructure. For example, if the power cables are blown down and pull down a nearby OHTL or fall on the railway line, preventing operation. In general, the OHTL will be positioned at a sufficient distance to avoid direct impact on failure. Furthermore, it is expected due to safety reasons that any failure would be addressed promptly. Depending on these various factors, there is a potential for a **Moderate Adverse** effect on other infrastructure in emergency situations.

Physical and Economic Displacement

- 16.5.22 The land required for the Sainshand substation has been addressed as part of the EBRD Choir-Sainshand OHTL project; no additional land at the substation is required to accommodate this Project. The substation at Tsagaan Suvarga is within an existing substation and again, no additional land is required. Therefore no displacement impacts are anticipated at either of the substation locations.
- 16.5.23 The main land required for the Project is associated with the construction of the tower foundations for the OHTL along the Project route and accommodating the 25m RoW. This land is required as a protective zone associated with a 220kV OHTL, with various restrictions in land use attached to it. No physical displacement is anticipated as there are no structures within the OHTL route or its RoW.
- 16.5.24 There are no herder camps or assets within the 25m RoW. Therefore based on the current OHTL route, there will be no displacement related to land ownership, possession or land use for herder households.
- 16.5.25 In relation to the loss of access to pasturelands that could have an effect on herder livelihoods; the footprint of the towers will result in approximately 9,340m² of land being affected. This is a small area in relation to the total area of land allocated to pastures in the Project Area. Furthermore, grazing will be permitted within the RoW. Therefore, no economic displacement of herder livelihoods is anticipated. The impact on herder livelihoods of improved transmission and energy supply, impacting on local businesses that could have a positive impact on herder livelihoods is addressed in **Chapter 15: Economy, Employment and Livelihoods**.

- 16.5.26 The OHTL passes across three mining licence areas. Of these, Tsagaan Suvarga mine is operational. The permanent loss of land where the OHTL and its RoW passes through the mining licence area is very small and will not affect the majority of this licenced area. The sensitivity of this mining business is considered low and the impact very low, resulting in a **Negligible** effect on MAK (the mining company) during construction. Rather, beneficial impacts associated with improved electricity transmission are anticipated and this is considered in **Chapter 15: Economy, Employment and Livelihoods**.
- 16.5.27 The OHTL route passes through the edge of the Tsagaan tsaviin khudag exploration area and the small area of land required is unlikely to affect the viability of this area for mining; though it is noted that there is currently no activity at this site. The route does, however, pass through the middle of the Ungut exploratory mining licence area. There is a potential that this could affect the viability of future use of this licence, however, the licence is not currently under use and is due to expire in 2027. Overall, as the business associated with these exploratory licences are not currently generating an income or employing people they are considered receptors of low sensitivity. The impact is low to medium at the sites, respectively, resulting in a **Negligible to Minor Adverse** displacement in relation to potential loss of income sources for these businesses, respectively.
- 16.5.28 The OHTL route also passes through the middle of the Blast explosives storage site to the north of Tsagaan Suvarga, that is under construction. Details have not been seen on the extent of development, however, taking a worst case scenario there is a possibility that an OHTL could restrict the (current or more likely future) development of this site with a knock on effect on business income. The business is considered to have medium sensitivity and the potential economic impact could be medium, resulting in a **Moderate Adverse** effect without mitigation,
- 16.5.29** The land for the OTHL route (and its 25m RoW) has been agreed by Dornogovi aimag government and the local soums, and therefore no permanent physical or economic displacement, including impact on livelihoods, is anticipated in relation to the PCA/LPAs; all of which either have been released or are due to be released from designation. Ecological impacts on ecology are considered in **Chapter 9: Biodiversity, Flora and Fauna**.
- 16.5.30 The two areas of land allocated for development would likely be made unviable due to the OHTL route passing over them; however, it is currently understood that whilst allocated, no development has taken place or is due to take place on these sites. Therefore, no direct economic displacement is anticipated; though there could be a potential for some economic displacement associated with fees of obtaining a new plot of land. Their sensitivity is overall is considered low given the lack of development and area for re-siting available in the Project Area, and the impact medium, resulting in a **Minor Adverse** displacement in relation to potential loss of income sources.
- 16.5.31 Finally, the Project is not anticipated to have any permanent displacement impacts on other infrastructure such as the transmission lines, roads and railways it crosses. None of these features will need to be moved or dismantled as a result of the Project. It is assumed that the MoE will undertake to obtain the relevant permissions to cross these infrastructure and therefore, there will be no direct or indirect economic displacement (e.g. due to the loss of a road or railway and therefore access to a business). Whilst, as identified under land use, there could be economic impacts during an emergency scenario, this cannot be predicted with certainty and any loss of use of utilities will be addressed under compensation rights associated with the relevant legislation.

16.6 Mitigation and Enhancement Measures

Construction Phase

Land Use

- 16.6.1** Land tenure is discussed under the operational impacts for Physical and Economic Displacement below.
- 16.6.2** With respect to the protection of land uses during construction, the Construction Contractor will implement a **CESMP** to limit adverse effects occurring beyond working areas and a **Construction Traffic Management Plan** to manage construction and local traffic within agreed routes. As outlined below under Physical and Economic Displacement, the Construction Contractor will liaise with the herder households nearby to understand land use requirements during the construction works and agree specific measures that may be required to ensure that herders still have access to grazing land and their wells. This may include, for example, maintaining access wherever feasible to allow for the safe passage of livestock between grazing areas.
- 16.6.3** In accordance with the **CSEP**, the Construction Contractor will undertake communication at the local soum and bagh level, with the local herder households along the route, and with infrastructure owners to notify in advance of activities with the potential to affect local communities. Further details are provided in **Chapter 6**.
- 16.6.4** Specifically with respect to the infrastructure and utilities, the Construction Contractor will be required to develop an **Infrastructure Strategy** together with the MoE/PIU/NPTG, covering engagement with infrastructure and utility owners and activities to prevent damage to infrastructure. This may cover the following activities:
- Coordinate with the relevant authorities and asset owners to identify OHTL route crossings with other infrastructure, including obtaining technical requirements or conditions for the OHTL intersections / crossings and construction management requirements. All consultations will include formal communications; and
 - Avoid damage to existing infrastructure and utilities during the construction of the substation and the OHTL from inappropriate construction activities (e.g. driving of machinery). Should any damage occur, restoration and/or compensation activities will be undertaken by the Construction Contractor.

Physical and Economic Displacement

- 16.6.5** Mitigation measures for permanent and temporary use of land are addressed here under construction, as some actions will be required pre-construction to secure the Project route.
- 16.6.6** As identified above, the NPTG as the final operator of the transmission line will need to secure possession rights for the OHTL route and its RoW in accordance with the Law on Land. This will entail confirming the final route of the line and an Application for Land Possession.
- 16.6.7** However, given that approval has not been obtained for all land uses along the route, it is possible that the existing route may require final adjustments (beyond any immediate micro-siting of towers).

Therefore, prior to the Application for Land Possession, the final route will need to be agreed with relevant land users and owners:

- Individuals or organisations that possess access to the areas of land allocated for development and agree that the land can be used for the Project;
- Mining licence holders;
- Mineral Resources and Petroleum Authority;
- The company Blast, who own the site for explosives storage near Tsagaan Suvarga mine;
- Utility and infrastructure owners that could be affected by the construction of operation of the project, such as the railway line operators;
- Aimag and soum leaders, for any changes to the existing route; and
- Local herders within 1km of any final route.

- 16.6.8 Where agreement is not possible, a new alignment may be required. As such, the PIU will establish a **Change Management Procedure** that triggers the requirement for additional or new E&S assessment for changes to project components, such as route and location changes, especially if the route changes to the route identified and assessed in this ESIA. The E&S screening tool provided in the ESMP can be used as a base to establish whether further assessment is required.
- 16.6.9 The NPTG or nominated party will ensure that appropriate agreement is reached with the relevant infrastructure owners where the route crosses other infrastructure; and all relevant operating criteria will be employed on the Project. This may include obtaining the necessary permissions to cross or work those, and either agree crossing methods or compensate for works conducted by those operators/owners during the crossing to minimise disruption to their use during construction.
- 16.6.10 The final route will also take into account the proposals made in this ESIA to avoid ecologically sensitive areas (see **Chapter 9: Biodiversity, Flora and Fauna**).
- 16.6.11 Once a final route has been selected the NPTG should apply for land possession in line with the Law on Land and the route will be clearly demarcated. The Project Implementation Unit will work with the local soums inform local herders of the planned Project route to avoid the establishment of any new camps or structures within the right of way.
- 16.6.12 As per EBRD requirements, in addition to the above, any temporary land required that affects local herder camps or assets should be subject to engagement with those households. It is advised that the MoE together with the local soums inform local herders of the route of the OHTL to avoid the establishment of any new camps or structures within the RoW corridor. Whilst it is a legal requirement to maintain the RoW clear of structures, given the lack of knowledge on the Project further engagement is required to prevent new development prior to the start of construction.
- 16.6.13 Regardless, in alignment with best practice and given the transient nature of herder summer and autumn camps, the MoE/PIU together with the Construction Contractor should undertake a full survey along any amendments to the route to confirm whether there are any structures that may be located within the final proposed route alignment and its 25m RoW. In line with EBRD PR5, physical displacement should be avoided wherever feasible. It is therefore recommended that final micro-siting is undertaken to avoid the need for physical displacement. Given that it is understood no further detailed design is to be undertaken, this requirement must be included in contractor procurement documents. Any working areas will also need to ensure that they do not encroach into other herder

assets identified along the route, including documented evidence of impact during land entry and land exit by the Construction Contractor in each OHTL working section.

- 16.6.14 If, following the pre-construction surveys, it is determined that physical or economic displacement impacts of significance are unavoidable, then a Resettlement Action Plan (RAP) or Livelihoods Restoration Plan (LRP), with targeted livelihood, land, and asset, surveying, will be prepared for the Project in accordance with the Project LARF. The implementation of the LARF, and subsequently the preparation of a RAP and/or LRP will ensure appropriate measures are included for the process of land acquisition, and physical and economic displacement. This will include measures such as the following, as applicable:
- Engagement with the local government and herders is necessary, including confirmation of a cut off date (to avoid herders using the final corridor). A survey of the footprint impacts is required, including asset valuation where relevant, in line with EBRD PR5 and national requirements. Wherever possible, the design should be revised to avoid and reduce displacement impacts as far as possible;
 - Where necessary, access will be maintained to allow for the safe passage of livestock between grazing areas.
 - Compensate legal landowners and users (including any individuals with customary land rights) at full replacement cost for any loss of land and non-land assets;
 - Provide livelihood restoration measures and assistance for any loss of livelihood and compensate for loss of income associated with both temporary and permanent economic displacement;
 - Reach a 'negotiated settlement' with affected landowners and users on livelihood restoration and compensation measures;
 - Compensate and restore livelihood of informal businesses which have been affected directly and indirectly for any potential loss of income and any non-land assets (this may include, for example, preferential employment or purchase of goods from project displaced persons);
 - Provide transitional support to economically displaced persons, as necessary, based on a reasonable estimate of the time required to restore their income-earning capacity, production levels and standards of living; and
 - Undertake monitoring of the land acquisition and livelihood restoration process to ensure the Project affected individuals' livelihoods are restored to a pre-Project levels.
- 16.6.15 The Construction Contractor will be required to select temporary site requirements (such as for compounds and workers' accommodation camps) based on minimal E&S impacts, including avoiding any mining licences, PCA/LPA and herder camps; and avoiding any economic and physical displacement. They will be required to conduct an E&S screening of impacts, to be approved by PIU/MoE and review by the EBRD; this screening template is provided in the ESMP. Where necessary, additional mitigation measures will be applied to reduce any adverse impacts in the siting of any temporary sites such as camps, the Construction Contractor will consult with local authorities and communities. Should any involuntary resettlement be required, the Construction Contractor will prepare a RAP/LRP in line with the Project LARF, following the principles set out above in sections 16.68 and 16.6.9.
- 16.6.16 The timing of construction works will be such to minimise impact on herders, where possible e.g. during summer months when there are fewer herders present and/or residing in the vicinity of the route. To ensure there are no additional impacts that could affect use of grazing lands, the Construction Contractor will:

- Advise local communities and herders in advance of works, so they can avoid being in close proximity to the construction sites with increased risks e.g. of construction traffic collisions with livestock, in line with the **CSEP**.
- Restrict clearance and construction works to within designated working areas.
- Non-potable water sources will be determined to minimise local impacts on water supply and drinking water for construction workers will be sourced from bottled containers which will be delivered to the construction compounds.
- Comply with the Project **Code of Conduct**, which will set out practice measures that the construction workers will have to adhere to ensure a positive relationship is built and maintained with the local communities.
- Prepare and implement a **Pollution Prevention Plan** to manage the risk of spills and pollution that could affect local livelihoods.
- Prepare and implement a **Waste Management Plan** will be implemented, Municipal waste will be segregated and collected by the relevant municipality.
- Put in place a **Community Grievance Mechanism** and communicate this to stakeholders through engagement via the soum and bagh leaders, and other mechanisms as set out in the SEP.

Operation Phase

Land Use

- 16.6.17 As above under Physical and Economic Displacement, the NPTG will ensure that appropriate permissions have been obtained for any access to existing land uses.
- 16.6.18 Where necessary, this may include support to identify alternative sites for use by land users/owners.
- 16.6.19 With respect to other infrastructure, the OHTL should be positioned at a sufficient distance to avoid direct impact on this infrastructure in the event of a failure such as tower collapse or cable detachment. It is expected due to safety reasons that any failure would be addressed promptly. The NPTG will ensure that appropriate agreement is reached with the relevant infrastructure owners where the route crosses them; and all relevant operating criteria will be employed on the Project.

Physical and Economic Displacement

- 16.6.20 See Construction impacts above.

16.7 Residual Effects

Construction Phase

- 16.7.1 The following residual effects are expected following the implementation of the above mitigation and enhancement measures:
- Land Use - effects on land use will be reduced from Negligible to Minor Adverse to **Negligible** (Not Significant).
 - Physical Displacement - No physical displacement is anticipated as a result of the Project; there are no structures within the OHTL route or its RoW.

- Economic Displacement – the impact of loss of access to pastureland under the tower footprints will remain **Negligible** (Not Significant).
- Economic Displacement – the permanent land take impact on land ownership, use or impact on business viability at Tsagaan Suvarga mine will remain **Negligible** (Not Significant).
- Economic Displacement – the permanent land take impact on land ownership, use or impact on business viability associated with Tsagaan tsaviin khudag and Ungut exploratory licenced areas will remain **Negligible to Minor Adverse** (Not Significant), respectively.
- Economic Displacement – the permanent land take impact on land ownership, use or impact on business viability associated with the Blast explosive storage area will be reduced from Moderate Adverse (Significant) to **Minor Adverse to Negligible (Not Significant)** (it is assumed either agreement is provided, or the route is amended).
- Economic Displacement - the impact of permanent landtake on the land areas allocated for development will potentially be reduced from **Minor Adverse** (Not Significant) to **Negligible** (Not Significant), if other suitable areas for development are identified (or if the developments are no longer required).
- Economic Displacement - the Project is not anticipated to have any displacement impacts on other infrastructure such as transmission lines, roads and railways it crosses. None of these features will need to be moved or dismantled as a result of the Project.
- Economic Displacement: Temporary loss of access to pasturelands and associated impacts on herder livelihoods - effects will likely remain **Minor Adverse** (Not Significant) though could be **Negligible** (Not Significant) depending on final construction approach.
- Economic Displacement - Temporary impact on herder livelihoods through dust, traffic collisions and other construction-related risks – effects will be reduced from Moderate Adverse to **Minor Adverse** (Not Significant) through implementation of appropriate construction management plans.
- Economic Displacement - Temporary impact on access to water resources mainly for herders - effects will be reduced from Moderate Adverse (Significant) to **Minor Adverse** (Not Significant) through implementation of appropriate construction management plans.
- Physical or Economic Development: associated for Construction Contractor sites – as it is assumed that the Contractor will negotiate agreements with the soum government/administration, a **Negligible** effect (Not Significant) is predicted.

Operation Phase

16.7.2 Assuming that management systems are implemented to meet Mongolian standards and EBRD PR2 and proposed enhancement measures are employed, the following residual effects are expected to remain following the implementation of the above mitigation measures:

- Land Use - The OHTL will not result in a change of existing land uses for herder camps along the route, as there are no camps within the 25m RoW.
- Land Use – The overall impact on the current mining land uses, CPA/LPAs and land areas allocated for development will remain **Negligible** (Not Significant).
- Land Use - effects on the land under construction for explosives storage will be reduced from Moderate Adverse (Significant) to **Negligible** (Not Significant) (it is assumed either agreement is provided, or the route is amended).
- Land Use – effects on other infrastructure during emergency scenarios will be reduced from Moderate Adverse (Significant) to **Minor Adverse** (Not Significant) through appropriate planning and engagement with the relevant infrastructure owners.



17 Labour and Working Conditions

17.1 Introduction

17.1.1 This chapter presents the likely significant effects of the project on labour and working conditions, including occupational health and safety (OHS), GBVH, Workers' Accommodation Camps and Supply Chain Risks. The chapter presents the impacts of both construction and operational phases.

17.2 Legislative Framework, Policy and Guidance

17.2.1 Details of relevant legislation, policy and guidance is set out in Chapter 4. **Table 8-1** summarises the legislation, policy and guidance of relevance to this assessment.

Table 17-1 Summary of Legislation, Policy and Guidance relevant Labour and Working Conditions

Level	Key legislation / policy / guidance
International	EBRD PR2 Labour and Working Conditions EBRD PR4 Health, Safety and Security EBRD Strategy for the Promotion of Gender Equality 2021-2025 EBRD PR10 Information Disclosure and Stakeholder Engagement European Framework Directive on Safety and Health at Work, 1989 (89/391/EEC) and associated directives European Directive on Workplace Requirements, 1989 (Directive 89/654/EEC)
	<ul style="list-style-type: none"> International Labour Organisation (ILO) Conventions: Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87) Right to Organise and Collective Bargaining Convention, 1949 (No. 98) Workers' Representatives Convention, 1971 (No.135) Forced Labour Convention, 1930 (No. 29) (and its 2014 Protocol) Abolition of Forced Labour Convention, 1957 (No. 105) Minimum Age Convention, 1973 (No. 138) Worst Forms of Child Labour Convention, 1999 (No. 182). Equal Remuneration Convention, 1951 (No. 100) Discrimination (Employment and Occupation) Convention, 1958 (No. 111) Employment Service Convention, 1948 (No.88) Employment Policy Convention, 1964 (No.122) Vocational Rehabilitation and Employment (Disabled Persons) Convention, 1983 (No.159) Private Employment Agencies Convention, 1997 (No.181) Occupational Health and Safety Convention, 1981 (No.155) Safety and Health in Mines Convention, 1995 (No.176) Maternity Protection Convention, 1952 (No.103) Tripartite Consultation (International Labour Standards) Convention, 1976 (No.144)
	<ul style="list-style-type: none"> Guiding Principles on Business, United Nations, and Human Rights (2011) The Voluntary Principles on Security and Human Rights (2000)
National Law	<ul style="list-style-type: none"> Civil Code, 2002

Level	Key legislation / policy / guidance
	<ul style="list-style-type: none"> • Labour Code, revised version, 2021 • Law on Occupational Health and Safety, 2008 • Law on promotion of employment, revised edition 2011 • Law on Pensions Benefits provided by the Social Insurance Fund in Case of Industrial Accidents and Occupational Diseases • Law on Health, 2011 • Law on Labour Safety and Hygiene, 2008 • Law on Hygiene, 2016 • Law on Minimum Wage, revised version, 2010 • General Law on Social Insurance, 2023 • Law on Pensions to be Issued from the Social Insurance Fund, 2023 • Law on Benefits to be Issued from the Social Insurance Fund, 2023 • Law on Ensuring Gender Equality, 2011 • Law on Children's Rights, 2016 • Law on Combating Domestic Violence, 2016 • Law on Human Rights of Persons with Disabilities, 2016 • Law on State Inspection, 2003 • Law on Violations, 2017 • Law on Sanitation, 2016 • Law on Standardization, Technical Regulation, and Conformity Assessment Accreditation, 2017 • Rules of the Labor Dispute Resolution Commission, Government Resolution #153, 13 April 2022 • Procedure for resolving labour disputes with the support of a labour mediator, Government Resolution #04, 4 January 2023 • Labor Arbitration Rules, Government Resolution #05, 4 January 2023 • Approval of general procedures for conducting inspection, Government Resolution #479, 28 December 2022 • Action Plan for the Protection of Human Rights in Business Activities, the Prevention of Human Rights Violations, and the Restoration of Violations (2023-2027)" (Parliament Resolution No. 231, June 14 2023)

17.3 Assessment Methodology

Scope

- 17.3.1 In terms of temporal scope, this impact assessment covers the construction and operational phases of the Project. This chapter focusses on Labour and Working Conditions.

Study Area

- 17.3.2 In terms of spatial scope, the Project area includes Dornogovi aimag economy and the Central Energy System (CES) to which the OHTL will connect into. The AoI includes the footprint of all Project activities and the RoW, which is 25m either side of the centre line of the OHTL route in rural areas and 6m either side in urban areas in Mongolia for a 220 kV overhead line; and 25m around substations; and land users affected by the Project.

Methodology

- 17.3.3 The methodology follows that set out in **Chapter 14: Social and Community**.
- 17.3.4 The following topics are covered in other chapters of this ESIA Report:
- **Chapter 15** covers impacts on the economy, employment and livelihoods.
 - **Chapter 16** covers impacts land uses and tenure, and physical and economic displacement.
 - **Chapter 17** covers Labour and Working Conditions.
- 17.3.5 Specifically, worker influx and gender-based violence and harassment (GBVH) in relation to the local community are addressed in Chapter 15, with the focus in this chapter on labour-related issues including GBVH in relation to labour.

Sensitive Receptors

- 17.3.6 Potentially sensitive receptors include:
- Project affected communities
 - Construction workers
 - Migrant workers
 - Substation workers
 - O&M workers
 - Third party suppliers
 - Women and vulnerable people/groups

Limitations and Assumptions

- 17.3.7 The limitations and assumptions are as set out in **Chapter 14: Social and Community**.

17.4 Baseline Conditions

Sources of Data

- 17.4.1 The baseline labour and working conditions have been collated from secondary data sources, mainly the National Statistical Office (NSO) of Mongolia and aimag level statistical data, as well as interviews with the MoE, PIU and NPTG, as well as local soum leadership.
- 17.4.2 The baseline conditions for Labour and Working Conditions and Occupational Health and Safety (OHS) have been considered in relation to relevant Mongolia legislation and practices.

Employment Conditions

17.4.3 The main employment law is enshrined in the Mongolian Labour Code⁹³. Requirements include:

- An employer or its authorized representative shall introduce the job duties, employment terms, and salary to the person who is going to be recruited prior to arising of employment relations.
- An employer or its authorized representative shall agree the job duties, amount of salary and other employment terms with the person who is going to be recruited, and the employment relations shall commence as of the person starts performing the job duties. If the relations between an employer and employee have a nature of employment relations it is prohibited to enter into a contract other than an employment contract.
- An employer and employee shall conclude an employment contract through mutual agreement.
- An employer is obliged to execute an employment contract in writing for signing of the parties and give one copy of the employment contract to the employee.
- An employer may receive, process, maintain and use the required data of an employee during employment relations for the purpose of recruitment of an individual and communication with the employee. In the event of a need to receive an employee's data from a third party, the employer shall introduce its need and purpose to the employee in advance.
- An employer shall be responsible for the cost related to maintaining and protecting employee's data.

17.4.4 In Article 43.2 of the Labour Code, an employer shall be subject to the following basic obligations:

- to pay remuneration suitable for the job duties in due times, set reasonable labour norms unless it is set in collective agreement or collective bargaining, inform payroll system and procedures followed at the business entity or organization to employee;
- to comply with the labour legislation, collective agreements, collective bargaining, employment contracts and internal labour regulations, provide certified copies of the job description and employment contract to an employee;
- to conclude an employment contract with an individual as stated in this law, provide a workplace that meets the requirements and standards of the Law on Occupational Safety and Health and is free from discrimination, pressure, violence, and sexual harassment;
- to respect employee's rights, freedom, legitimate interests, reputation or honour;
- to not disclose employee's personal secrets;
- to provide an employee with work and equipment, tools, documents and other things and instructions required for performance of his/her job duties;
- to cover an employee in mandatory social and health insurance, pay and report the premiums at the rate stipulated in law, and document payment of social and health insurance premiums;
- where monitoring equipment is operated at workplace for indispensable requirements, inform of it to employee in advance, develop use procedure for compliance, and not place monitoring equipment at workplaces specified in Sub-paragraph 3.1.15, Law on Occupational Safety and Health;
- to provide an employee with opportunities of refresher training or upgrade of qualifications pertaining to the job duties as per legislation;
- to explain and introduce the grounds for termination or end of an employment contract; and

⁹³ Available at: <https://legalinfo.mn/mn/detail?lawId=16230709635751>

- to not work an employee over the maximum limit of work hours determined in law.

- 17.4.5 In Central Asia, the incidence of child, and forced or compulsory, labour is relatively high. This mainly arises from a lack of supply chain monitoring in manufacturing, but cases of child and forced or compulsory labour, as well as workplace harassment and exploitation, in the construction sector are also well documented and there is a risk that, in the absence of mitigation, legal and human rights infringements arise in the construction workforce. However, it also needs to be recognised that in the context of Mongolian culture, child labour is seen as an integral part of traditional nomadic herding culture that involves, for boys, herding livestock, horseback riding, haymaking; and for 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.
- 17.4.6 Mongolia has ratified several key ILO conventions related to forced labour, collective bargaining, discrimination, child labour, and health and safety. Mongolia joined the Convention on the Rights of the Child, approved by the United Nations in 1990 and ratified International Labour Organization (ILO) Convention No.182 on the Worst Forms of Child Labour, supported in 1999; and ILO Convention No.138 on the Minimum Age for Employment in 2002. Mongolia has paid particular attention to developing and implementing a national policy aimed at eliminating child labour, and the restriction and cessation of the involvement of children in harmful conditions and the worst forms of labour.
- 17.4.7 In Mongolia, the minimum age for work is 16. However, the Labour Code allows children to be employed at age 15 with parental consent. Article 142.3 of the Labour Code states that a *“person who is 13-15 years old may be employed for performing uncomplicated duties in a workplace that meets occupational safety and health requirements at the consent of his/her legal representative (father, mother, care-taker, guardian) if the job has no adverse impact on his/her health and development and obstruct his/her learning”*. Article 142.5 states that *“A person who has not reached 15 may be employed for art and sports performance and commercials if a state child rights inspector authorizes based on the written consent of his/her legal representative (father, mother, care-taker, guardian), hours of work and working conditions.”*
- 17.4.8 The following restrictions are determined in the workplace of minors in the Annex to Order No. A/122 of the Minister of Labor and Social Security dated June 10, 2022⁹⁴:
- Work in which it is impossible to monitor the child's exposure to violence, in isolation from his family and those living with him
 - Working with electrical and gas-powered machinery and equipment (electric saws, drills, etc.);
 - Working with flammable and explosive substances;
 - Working with electric generators, electric wires, and working with a risk of electric shock;
 - Work on equipment with high speed rotation and longitudinal and wave motion, such as conveyor belts and drilling machines;
 - Working with loud noises that make it impossible to hear the work instructions;
 - Working long hours in extremely hot or cold weather;
 - Work with exposure to adverse physical factors in the workplace exceeding 50 percent of the maximum permissible levels specified in occupational hygiene standards;

⁹⁴ Available at: <https://legalinfo.mn/mn/detail?lawId=16532151428791>

- Work that poses an ergonomic hazard to children, or work that exceeds the maximum permissible lifting load (manually - up to 16 years old (male child can lift 8 kg, female 5 kg), or requires repetitive or forced movements.

17.4.9 Within the construction sector, the following restrictions apply to child labour as set out in the Order No.122:

- all types of demolition and demolition activities
- construction and repair of buildings
- electrical work
- polishing and grinding tools
- masonry
- cutting and crushing of stone slabs
- mixing, mixing and polishing of cement
- welding, reaming, metalworking
- transportation of construction materials
- cleaning of building structures and other similar activities
- preparing mortar, bulk packing of cement in non-industrial environments
- assembly, installation, related repair and maintenance of machinery and equipment

17.4.10 The appendix to Order No. A/123 of the Minister of Labor and Social Security defines the types of light work and employment conditions that a person who has reached the age of 13 can engage in⁹⁵. These include that people aged 13-15 may be engaged in light work other than those specified in the list of jobs that pose a threat to the mental, physical development, life, and health of children, negatively affect their upbringing and morality, and are prohibited from employing minors by law. When employing people aged 13-15, the following employment conditions shall be met:

- Working hours: During school hours, no more than 15 hours a week, or 2 hours a day, for a total of 10 hours; for household work, no more than 1 hour a day, for a total of 5 hours a week. During school holidays, no more than 20 hours a week, or 2 hours a day from Monday to Friday or 2 hours on weekends; may be employed for up to 8 hours per week for household work.
- Regardless of school and school term holidays, persons aged 13-15 shall not be employed between 6 pm and 6 am.
- During the continuous working hours of light work, breaks shall be taken at regular intervals. During the breaks, persons aged 13-15 shall be provided with conditions such as temporary rest, drinking water, and toileting.
- Persons aged 13-15 may be employed up to 5 days per week.
- Persons aged 13-15 shall be employed in light work that meets occupational safety and hygiene requirements, standards, and age-appropriate working conditions.
- Persons aged 13-15 shall not be employed under the following conditions:
 - without permanent and direct supervision by an adult;
 - without appropriate training necessary to perform the work or duties;
 - away from their family for a long time, more than one day;
 - working alone or in isolation for long hours;
 - not taking into account the child's wishes and without the child's consent.

⁹⁵ Available at: <https://legalinfo.mn/mn/detail?lawId=16532151599871>

- 17.4.11 The NSO of Mongolia, with support from the ILO, undertook surveys on child and on forced labour in 2021/2022. The Child Labour Report⁹⁶ using data from 2021-2022, shows that 16.3% (138.5 thousand) of children 5-17 years are in child labour. Boys are more likely to be involved in child labour than girls. The prevalence of child labour rate amongst boys is 19.9%, with that of girls 12.5%. Considering the child labour rate by age group, 16.8% of children 5-12 years old are in child labour compared to 12.7% of 13-14 years old, and 17.0% of 15-17 years old. In terms of area of residence, 10.2% of children aged 5-17 living in urban areas are in child labour, while this figure stands at 30.0% for children living in rural areas. Among children in child labour, 58.2 thousand (42.0%) children are involved in hazardous work, 78.2 thousand (56.5%) are below the minimum age for light work, and 2.1 thousand (1.5%) are aged 13-14 years and are involved in non-light work.
- 17.4.12 The ILO Forced Labor Report⁹⁷ shows that approximately 3,575 people aged 18 and above were in a situation of privately imposed forced labour in Mongolia at some point during the reference period. That is, approximately two out of every 1,000 adults experienced privately imposed forced labour at some moment in the period 2021-2022.
- 17.4.13 The MoE will be the body responsible for Project implementation. An organogram of the organisation is provided in **Figure 17-1**. The MoE does not currently have a department responsible for addressing environmental and social issues. A PIU has been set up by the MoE within the Ministry for implementation of the EBRD Choir-Sainshand OHTL Project. The EBRD is under discussion with the MoE to maintain the same PIU for implementation of this Project.

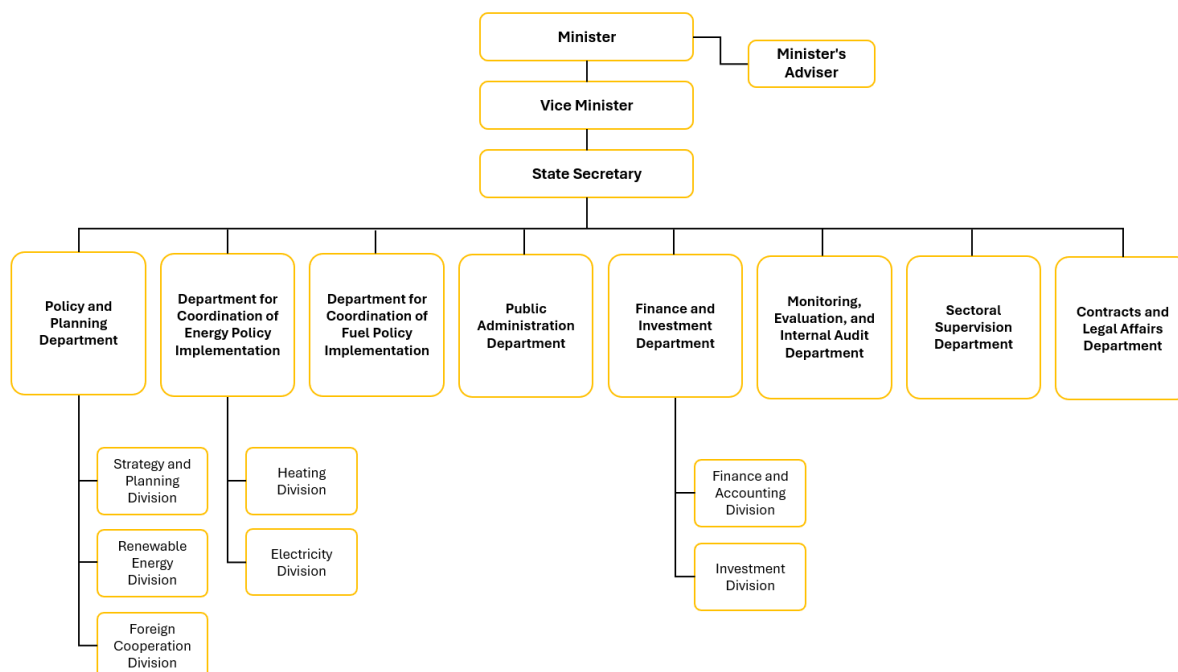


Figure 17-1 MoE Organogram⁹⁸

⁹⁶ Available at: [Child_labour_in_Mongolia_Child_labour_survey_results_2021-2022.pdf](#)

⁹⁷ Source: [Forced Labour in Mongolia LFS 2022.pdf](#)

⁹⁸ Available at: Organizational chart of the Ministry of Energy <https://www.energy.gov.mn/p/110>.

17.4.14 The MoE has a MISSION AND VISION statement published on its website. This states that:

The mission of the Ministry of Energy is to implement an energy policy that ensures the growth of Mongolia's social and economic development, to ensure a healthy, safe, and comfortable environment for people to live in, and to ensure reliable and stable conditions for production and services.

17.4.15 Discussion with the MoE indicates that they do not have an Environmental and Social Policy or other related policies such as supply chains, etc. and it is understood that there is no Environmental and Social Management System (ESMS) in place. However, the PIU are preparing one for implementation of the Choir-Sainshand OHTL project.

17.4.16 With respect to Human Resources (HR), all state organisations have labour rules, and HR related functions, performance management system, recruitment, etc. – all set by the Civil Service Council. The MoE therefore has a HR policy set by the Law on Civil Service. The MoE's Human Resources Policy⁹⁹, job vacancies, job descriptions, recruitment procedure, Code of Ethics, and Strategic Plan are all on the Mongolian version of the MoE's website¹⁰⁰.

17.4.17 There are no specific policies in relation to child or forced labour, though this is covered in the Labour Code and other laws, such as the Law on Children's Rights.

17.4.18 In accordance with the Law on Civil Service, civil servants can log labour grievances to the Civil Service Council which has a special unit for resolution of such grievances. For any other grievances (by communities, enterprises, citizens etc.) MoE has a phone and email contact number and online submission of requests, suggestions and/or complaints vehicle, in addition to Government's central grievance centre: www.11-11.mn. The MoE also publishes annual reports on grievances.¹⁰¹ There is no data on the MoE website on the number of ongoing labour disputes with the Ministry.

17.4.19 The NPTG will be the body responsible for Project O&M. The NPTG has five branches in 15 aimags, including the capital city and employs 1,307 people in total. The NPTG confirmed in the KIIs that they do not employ any children below 18 years of age.¹⁰²

17.4.20 An organogram of the organisation is provided in **Figure 17-2**. It is noted that following a recent decision made by Cabinet meeting (2 July 2025), the "Western Regional Energy System" State-Owned Joint-Stock Company and "Altai-Uliastai Energy System" State-Owned Joint-Stock Company were reorganized and merged with NPTG. The structure now has seven branches however an updated organogram was not available at the time of reporting.

⁹⁹ Approved in 2022 by Order of the State Secretary of the MoE. Order #B/84, 27 June 2022.

¹⁰⁰ Available at: <https://www.energy.gov.mn/p/102>.

¹⁰¹ Available at MoE website at <https://energy.gov.mn/c/1575>.

¹⁰² KII. 8 July 2025.

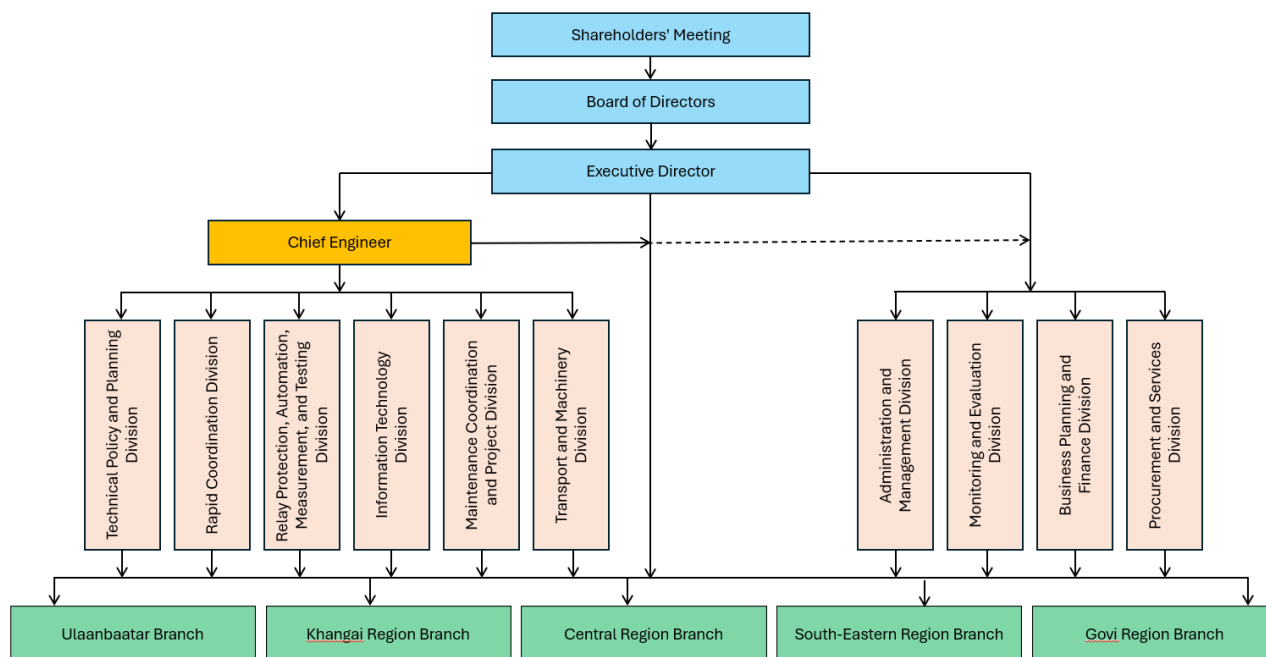


Figure 17-2 NPTG Organogram

- 17.4.21 Discussion with the NPTG indicates that they do not have an Environmental and Social Policy however they do have policies and procedures in place related to OHS, HR, internal Ethics committee, training, and capacity building. It is also noted that NPTG introduced ISO 45001 is an international standard for occupational health and safety (OH&S) management systems.
- 17.4.22 The NPTG has adopted standard operating procedures for each type of work. The Monitoring Department is responsible for policy, risk assessment, implementation, quality assurance, and customer service. Workers' issues are discussed at the Trade Union. The Trade Union actively participate in issues related with OHS. Risk assessments are conducted and updated annually.
- 17.4.23 The NPTG does not currently have a department responsible for addressing environmental and social issues. The NPTG has an internal Ethics Committee which handles grievances. Any citizens have right to log complaint to the National Human Rights Commission and court regarding violation of employment rights or human rights. No information was available on the number of labour disputes.

Gender

- 17.4.24 In 2022, the National Committee on gender equality approved the cross-sectoral strategic plan for promoting gender equality in Mongolia (2022-2031). One of the objectives of the strategic plan (Objective 1.5) aims at *"Intensifying cross-sectoral coordination and cooperation to combat gender-based violence"*. The MoE, together with other ministries, is tasked to *"Create an enabling legal and policy environment to provide the employees and their families with housing and appropriate working conditions engaged in the sectors such as mining, infrastructure and free economic zones"* and *"Conduct the human rights, gender and social impact related assessments in the infrastructure development sectors such, mining, construction and urban development, road and transport, energy and other relevant areas reflect the findings in the pertinent policy planning processes"*.

- 17.4.25 However, in terms of the Global Gender Gap Index, Mongolia ranked 85th out of 146 countries in 2024, a reduction by five positions from 2023¹⁰³.
- 17.4.26 According to a 2021 report by the MoE submitted to the National Gender Committee, 32 enterprises and companies in the energy sector employed a total of 11,691 employees and workers, of which 8,412 (72.3%) were males and 3,201 (27.7%) were females¹⁰⁴. The Energy Sector Gender Policy and Implementation Plan were approved in 2023. Reportedly, in 2024 around 3,000 women worked in the male dominated energy sector¹⁰⁵.
- 17.4.27 A total of 25 women are employed in the MoE, out of a total of approximately 91 staff. Three out of nine professional staff in the PIU are women. Both the Minister for Energy and the State Secretary are males (currently in office), and 15.3% of heads of divisions and department are males (2021 latest data)¹⁰⁶.
- 17.4.28 Within the NPTG, out of a total of 560 staff, around 40% are women in 2024. Furthermore, the NTPG has an employee in charge of gender issues, and trainings are organized for all staff on gender related law, and other bylaws.
- 17.4.29 The lack of a female worker-friendly workplace conditions, stereotypes, lack of gender-sensitive human resource policies in entities, unwillingness of employers to hire female workers due to their reproductive role, harsh working conditions in terms of OHS are factors that contribute to low rate of employment of women in the sector¹⁰⁷.
- 17.4.30 As of 2021, the employment rate of women in Mongolia's construction sector was about 15.8%¹⁰⁸. Factors for this low rate were identified as a lack of female worker-friendly workplace conditions, stereotypes, lack of gender-sensitive human resource policies in entities, and an unwillingness of employers to hire female workers due to their reproductive role¹⁰⁹.

Gender-based violence and harassment

- 17.4.31 Aggregate statistic data on gender-based violence and harassment (GBVH) is currently unreported in Mongolia. The National Human Rights Commission of Mongolia surveyed *"Sexual Harassment Awareness, Attitudes and Prevalence in the Workplace - Public Administration"* in 2021. A total of

¹⁰³ Available at: [Global Gender Gap Report 2024 | World Economic Forum](#).

¹⁰⁴ MoE (2021). The report on gender equality in the energy sector. Not published. Cited in *"Gender assessment of the energy sector. Research report"*. MoE. ADB, RWE, Mongolian Women Lawyers Association, MonEnergy LLC. Ulaanbaatar.

¹⁰⁵ "Women's Right-2024" national conference, 5 March 2024. <https://gogo.mn/r/vxv2k>

¹⁰⁶ MoE (2021). The report on gender equality in the energy sector. Not published. Cited in *"Gender assessment of the energy sector. Research report"*. MoE. ADB, RWE, Mongolian Women Lawyers Association, MonEnergy LLC. Ulaanbaatar.

¹⁰⁷ MoE (2021). The report on gender equality in the energy sector. Not published. Cited in *"Gender assessment of the energy sector. Research report"*. MoE. ADB, RWE, Mongolian Women Lawyers Association, MonEnergy LLC. Ulaanbaatar.

¹⁰⁸ Source: "Is it only a man's world?" German Cooperation Association, 2021

¹⁰⁹ Available at: Ministry of Energy, ADB, RWE, Mongolian Women Lawyers Association and MonEnergy LLC. Gender assessment of the energy sector. Research Report. Commissioned by the Ministry of Energy, 2022.

3,000 public administration employees participated in the survey. A total of 26.9% or a quarter of the public administration employees who participated in the survey said they had been subjected to one or more types of sexual harassment, while 6% did not want to answer. In terms of the types of sexual harassment, 23.4% were subjected to verbal sexual harassment, 15.1% to physical sexual harassment, and 12.5% to physical sexual harassment. Employees are more likely to be subjected to verbal sexual harassment in the workplace. 56% of public administration employees said they were sexually harassed by their superiors, 30% by their co-workers, 12% by employees of their co-working organizations, 2% by customers, and 0.5% by others.

- 17.4.32 The report on gender equality in the energy sector shows that 3% of surveyed employees experienced bullying and GBV at workplace, majority being females¹¹⁰. Surveyed respondents were not satisfied how their complainants regarding GBV were handled and resolved. Most of the organisations studied by research team have regulations to prevent any harassment in the workplace, but they do not take specific measures, starting from improving awareness building and advocacy, which means that there is a need to strengthen and implement a system to protect against workplace harassment¹¹¹.
- 17.4.33 During the KIIs, Mandakh soum reported that child sexual abuse cases are high, with three cases of sexual violence against young children reported since 2014. It is recognised overall that GBVH is probably under recorded. Heavy alcohol consumption and domestic violence were observed as issues in all soums.

Sex Workers and Human Trafficking

- 17.4.34 For Trafficking in Persons (TIP), sexual exploitation and forced labour registered with the police between 2018-2020, the number of such crimes increased from 26 (2014) to 40 (2020). According to available data, in 2022 the police identified 30 Mongolian trafficking victims, including 20 women and nine girls exploited in sex trafficking, and one male labour trafficking victim; this was compared with 56 sex trafficking victims (49 women and seven girls)¹¹². The number of cases reported to the police is growing annually, a positive sign that crime detection is improving. However, no crime related to the illegal acquisition of human blood, tissue and organs has been reported so far. Police-registered figures differ significantly from those of service providers, indicating that many human trafficking cases are not reported to law enforcement agencies. MGEC, an NGO that provides assistance to victims of human trafficking, for example, reported it only provided assistance to three victims of trafficking in 2003, but recently reached an average of 30-40 clients per year.
- 17.4.35 During the KIIs, the Dornogovi aimag representatives reported that there are currently no cases of prostitution have been officially recorded at the aimag level. It was recognised that at the soum levels

¹¹⁰ MoE (2021). The report on gender equality in the energy sector. Not published. Cited in *"Gender assessment of the energy sector. Research report"*. MoE. ADB, RWE, Mongolian Women Lawyers Association, MonEnergy LLC. Ulaanbaatar.

¹¹¹ Most of the organizations studied have regulations to prevent any verbal harassment in the workplace, but they do not take specific measures, starting from improving awareness and awareness, which means that there is a need to strengthen and implement a system to protect against workplace harassment.

¹¹² US. Department of State. 2024 Trafficking in Persons Report: Mongolia. Available at: <https://www.state.gov/reports/2024-trafficking-in-persons-report/mongolia/>

it is difficult to prove such cases exist.

Supply Chain

- 17.4.36 From available engagement with the MoE, it is understood that neither the MoE nor NPTG have a supply chain management procedure in place; in Mongolia there is no national requirement for supply chain audits.
- 17.4.37 As with all government procurement process, it is expected that the MoE will manage the procurement process for appointing a Construction Contractor for the Project in accordance with the EBRD's Procurement policy, using FIDIC. Mongolia's Procurement Law is only applied for works and services that are funded by state budget or local government budgets.
- 17.4.38 Similar to the current Choir-Sainshand OHTL project supported by the EBRD, the Construction Contractor will be commissioned by the MoE following a pre-qualification stage and then an invitation to tender will be issued. The selected Construction Contractor will be required to adhere to the technical specifications issued by the MoE as part of the tendering process, and Construction Contractor will confirm their adherence in a written contract.
- 17.4.39 While the Construction Contractor will be required to develop, implement and maintain a CESMP, which will specify social and labour requirements, experience from other EBRD-funded projects in Mongolia indicates that there is a lack of adherence to such plans; as well as a lack of capacity and capability to undertake and enforce monitoring. Key issues identified with the supply chain will centre on labour and working conditions.

Occupational Health and Safety

- 17.4.40 Primary laws regulating occupational safety and health are identified in **Table 17-1**. The Constitution of Mongolia establishes that citizens have the right to favourable working conditions, as well as to material and financial assistance in cases such as disability and other situations specified by law. To enforce these constitutional provisions, the Labour Code and the Law on Occupational Safety and Health serve as key instruments.
- 17.4.41 Employers under Mongolian law are required to take all necessary measures to provide and maintain a safe and healthy workplace taking into account inherent risks in its particular sector and specific classes of hazards that may be present. Employees are also required to obey and observe all measures taken to ensure acceptable occupational health and safety.
- 17.4.42 Mongolian laws are inclusive of but not limited to, trade union provisions, working hours, pensions, disabilities, salaries, healthcare and discrimination. Employers must:
- inform employees of the occupational risks and preventative measures that must be taken to address said risks. The employer must take all necessary measures to prevent occupational illnesses.
 - inform employees of their legal rights and obligations and must provide the employees with the necessary training on occupational health and safety.

- 17.4.43 The employer is responsible for the provision of a safe working environment and must provide workers all the required Personal Protective Equipment (PPE), without any cost to them. The employer must regularly inspect, and audit PPE provided, along with all other health and safety equipment, to ensure that they are in good working order.
- 17.4.44 There is a requirement for the organisation to spend not less than 0.5% of the cost of product and services on labour safety and hygiene, preventive measures for industrial accidents.
- 17.4.45 Directors (owners) and employers of business entities and organisations must assume responsibilities to ensure of labour safety, improve working conditions, implement legislation and monitor implementation of them.
- 17.4.46 With specific regard to construction activities, Mongolian laws require employers to prepare a health and safety plan (or equivalent) prior to the commencement of any construction activities.
- 17.4.47 Each business entity or organisation with more than 20 employees is required to establish and operate an Occupational Safety and Hygiene Council¹¹³.
- 17.4.48 The MoE does not currently have an ESHS department. The MoE has a sector inspection and monitoring department that is responsible for conducting inspections and audits, organizing disaster protection activities, providing integrated management and organization within the industry during disasters, preventing risks, and conducting risk assessments. A PIU has been set up for the Choir-Sainshand OHTL project under implementation by the MoE. A similar structure may be set up for this Project to ensure EHSS/OHS implementation and monitoring.
- 17.4.49 The NPTG introduced ISO 45001, an international standard for OHS management system. As part of this management system the NPTG adopted an Occupational Health and Safety Management System policy. The policy has stated goals and sets out the means to achieve these objectives¹¹⁴. Standards on Personal Protective Equipment (PPE) have been approved in 2019¹¹⁵.

17.5 Potential Impacts and Effects

Construction Phase

Labour and Working Conditions

- 17.5.1 Discussions with the MoE and the PIU indicate that the construction workforce will be provided with a formal contract and comply with the Mongolian Labour Code on working hours, OHS, management of non-employee relations and grievances, and working conditions as a minimum. Details are not currently known in relation to workforce accommodation arrangements, which would be the responsibility of a Construction Contractor – however, given the remoteness of the location it is anticipated that at least a worker's accommodation camp will be required, most likely to be located near Sainshand city. There is a risk that the accommodation provided to workers will not be suitable

¹¹³ Available at: <https://legalinfo.mn/mn/detail/11653>

¹¹⁴ Available at: <https://www.transco.mn/safety/11>

¹¹⁵ Available at: <https://www.transco.mn/safety/10>

(for example, unsanitary, not providing sufficient facilities, or too small for the number of workers).

- 17.5.2 Where the Labour Code does not cover the full range of working conditions, good international practice should be followed. If not managed in accordance with this practice and legislation, there is a risk of exploitative working practices (such as withholding of personal documents or passports; not providing a contract or other related documentation that clarify worker rights; excessive working hours, and/or lack of breaks and rest periods), labour grievances, supply chain issues, OHS concerns (such as insufficient PPE), and child and forced or compulsory labour. Furthermore, as with all construction work, there is a potential that workers will be exposed to an additional level of personal safety risk given the nature of workplace activities, natural hazards and working in remote locations. However, the MoE has an Inspection and Monitoring department that monitors implementation of sector policies, implementation of projects, evaluates outcomes and conducts internal audits.
- 17.5.3 The principal determinant of this impact will be the labour management arrangements and practices of the Construction Contractor, and their preparedness to implement fair working and accommodation conditions, prevent human rights infringements, avoid hazards, and mitigate risks to workforce health and safety; as well as the capacity of the MoE/PIU to monitor contractual obligations.
- 17.5.4 The receptor sensitivity is considered medium. The construction phase of the Project will be limited in time and physical extent; however, the consequences could extend beyond the construction phase. The anticipated impact severity is therefore considered moderate, resulting in a **Moderate Adverse** effect prior to mitigation.

Gender

- 17.5.5 Most unskilled and skilled labour jobs are expected to be undertaken by men, with skilled work most likely to be provided by migrant workers. However, there may be opportunities for local women to obtain jobs in catering, the workers' accommodation camp, the service industry and administration. There may also be opportunities for female professionals to conduct technical work in planning, designing and mapping the Project, for example, as part of the PIU. The sensitivity of women is considered high and the challenges in relation to women in the construction workforce is considered medium prior to mitigation, resulting in a **Major Adverse** effect.
- 17.5.6 The World Bank reports¹¹⁶ that it is well established that GBVH risks can intensify within communities experiencing large male worker influxes from outside the area, with GBVH being committed mostly by coworkers or construction supervisors. With respect to GBVH, the impact likelihood and severity is high which, combined with high sensitivity, results in a **Major Adverse** effect prior to mitigation.

¹¹⁶ Addressing Gender-Based Violence and Harassment (GBVH) in the Construction Sector. Available at: <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/09994131202227991/idu0b41f17750d13e04edc0b0630fe02c6a736b1>

Supply Chain

- 17.5.7 Without a supply chain management procedure in place and being implemented, there is a risk that social and labour aspects in management of the supply chain are not considered sufficiently. This is known to be a risk for management of international contractors and their supply chain based on other projects in Mongolia. At this stage, it is unknown if the works will be commissioned with national or international companies. A predominantly migrant workforce could result in an increased risk of child and forced labour in the supply chain. Supply chain workers could be located in Mongolia or in other countries and they may be more vulnerable to unsafe work sites, and without direct monitoring from Project personnel, forced and child labour may be used. Supply chain workers are considered to be of high sensitivity and with a lack of standard controls in place, the impact severity is considered to be medium to high), this could result in a **Major Adverse** effect without mitigation.

Occupational Health and Safety

- 17.5.8 In relation to OHS, it is assumed that the Construction Contractor and any sub-contractors will have sufficient workforce, with adequate training and equipment to deliver the Project. However, as with all construction sites, there is the potential for workers to be exposed to heightened personal safety risks relating to workplace activities (for example, exposure to the risk of drowning where works are carried out in the vicinity of or within the river). The range and types of hazard attributable to a construction project vary substantially depending on the construction methods employed and the degree of control implemented by the Construction Contractor and their sub-contractors. Generic OHS risks associated with substation and OHTL construction include:
- Potential injuries from handling heavy equipment, tools, and materials
 - Danger of electrocution, electrical shocks and burns when working near high-voltage equipment
 - Working in confined spaces and excavations
 - Working at heights
 - Exposure to hazardous chemicals, solvents, and construction materials
 - Prolonged exposure to high noise levels from machinery and equipment.
 - Working in a remote area, including heat-related illnesses from high temperatures and cold stress from exposure to cold weather conditions
 - Exposure to chemicals, hazardous or flammable materials
 - Slips and falls
 - Accidents involving construction vehicles and equipment
 - Risks of fires and explosions from flammable materials and electrical faults
 - Exposure to dust and gases generated from activities such as excavation, and vehicle exhaust
 - Potential injuries from handling heavy equipment, tools, and materials
 - Working in areas where there are wild animals and grazing animals
- 17.5.9 The majority of the workforce will be skilled workers, experienced in similar projects. However, OHS risks remain, particularly in relation to working from heights, working with electricity and working in a desert environment (heat and dust). The Project site is isolated, and the nearby villages are small and ill-equipped to deal with major accidents or incidents. In the event of an accident on the site, the injured party may need to be transported a long way to receive treatment. Skilled workers are less likely to have OHS impacts as they are already aware of the risks on OHTL projects. However local workers may not have worked on a construction site previously and will be at a higher risk of accident or incident.

- 17.5.10 A temporary construction worker accommodation camp could expose workers to the risks of illness. Contractors will be required to produce a Workers' Accommodation Plan that addresses: sleeping areas; sanitary and toilet facilities; canteen, cooking and laundry facilities, standards for nutrition and food safety, medical facilities, and leisure, social and telecommunication facilities. The accommodation plan needs to ensure there is a manager responsible for the hygiene, safety and security of accommodation. Workers will not be charged for accommodation and related services.
- 17.5.11 The study area is prone to natural hazards, including droughts, floods, and earthquakes, as outlined in **Chapter 12: Soils and Natural Hazards** and **chapter 18: Climate**. Potential emergency conditions can arise as a result of natural hazards such as dust storms, extreme heat, flooding and lightning strikes.
- 17.5.12 The sensitivity of workers is considered high as on any construction project they can be exposed to a high risk of hazards, including natural hazards. The magnitude of the potential risk of the hazard occurring, prior to mitigation, is moderate 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** prior to mitigation.

Operation Phase

Labour and Working Conditions

- 17.5.13 O&M staff will be required, serviced both from within the MoE and NPTG, and through contracts with O&M Contractors (see below). It is not anticipated that an additional workforce would be required for O&M of the Project.
- 17.5.14 It is expected that the MoE and NPTG will comply with the Mongolian Labour Code and will ensure that all employees, including both permanent and temporary employees, will be provided with a contract. It is also expected that the Project will comply with the Labour Code on working hours, working conditions, occupational health and safety, and the management of non-employee relations and grievances. Workers will undertake O&M works along the OHTL and at the substations in accordance with NPTG management policies, plans and procedures. However, if not managed, there could be impacts associated with supply chain, occupational health and safety, child and forced labour. There is also the potential for discrimination against workers due to lack of specific HR policy and procedures.
- 17.5.15 The potential impacts on labour and working conditions are anticipated to be medium risk and workers of high sensitivity, effects could be **Major Adverse** during operation without appropriate mitigation in place.

Gender

- 17.5.16 It is not anticipated that any additional staff will be required during the O&M stage. Currently, more women than men work at both the MoE and the NPTG. The sensitivity of women is medium, and the impact severity is likely to be very low, resulting in a **Negligible** effect prior to mitigation.
- 17.5.17 During operation, there is a risk of GBVH in the workplace. The sensitivity of women to GBVH is high in Mongolia and the likelihood and severity of impact is moderate, resulting in a **Major Adverse** effect prior to mitigation.

Supply Chain

- 17.5.18 The NPTG does not currently monitor O&M Contractors in relation to social and labour aspects, with procurement contracts mainly focused on health and safety and technical requirements. It is expected that the O&M Contractors will most likely be Mongolian companies and will comply with the Mongolian Labour Code and will ensure that all employees, including both permanent and temporary employees, will be provided with a contract. However, if not managed, there could be impacts associated with supply chain, occupational health and safety, child and forced labour. Due to the high sensitivity of the receptor (workers) and an anticipated moderate risk, effects could be **Major Adverse** during operation without appropriate mitigation in place.

Occupational Health and Safety

- 17.5.19 OHS hazards include risk of electrocutions; fire generation from falling overhead lines and from lightening; falling and/or swinging objects; electrocution, electric shock and arc flash incidents; potential collapse of towers; falling from heights; EMFs; fire risk at substations; exposure to chemicals, hazardous or flammable materials; and potential injuries from handling heavy equipment, tools, and materials. 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.
- 17.5.20 EMFs from substations are usually measured rather than calculated. For example, based on UK electrical industry measurements this identifies that at substations at all voltages from the highest (400 kV) to the lowest (11 kV), EMFs reduce with distance, with the highest fields found at the perimeter fence or wall¹¹⁷. The EMF Directive (2013/35/EU) provides occupational exposure limits and requires employers to assess EMF risks. There is also a potential for exposure to workers along the OHTL. It is possible that occupational exposure limits may be exceeded depending on the equipment installed and the duration of working hours within areas that have higher exposure.
- 17.5.21 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.

17.6 Mitigation and Enhancement Measures

Construction Phase

Labour and Working Conditions and Gender

- 17.6.1 A PIU will be set up in the MoE to support the MoE deliver the Project. Where feasible, this should include current PIU staff to ensure consistency and lessons learned are applied. PIU staff will be fully competent in environmental, social and OHS performance management. Their role will be to assist in all aspects of environmental and social planning and implementation, internal monitoring and evaluation, and training of the MoE and relevant government staff on environmental and social

¹¹⁷ Available at: [Compliance with UK public EMF limits | EMFs](#)

assessment and EBRD's ESP.

17.6.2 To reduce and mitigate adverse effects associated with labour and working conditions, including child labour and forced labour, the MoE/PIU will implement the following measures:

- Develop and implement **Project policies** within a Project ESMS, covering as minimum:
 - Project Environmental and Social policy
 - Project Human Resources Policy and Procedure (covering labour and working conditions and community health and safety and gender)
 - (see section 17.6.9 for further details)
- The **Project Human Resources Policy and Procedure** will ensure it is in line with national legislation, applicable ILO standards and recommendations and EBRD PR2. The human resource policy and procedure specifically applicable to this Project should set out the approach to managing employees and contractors, including rights under Mongolian labour and employment law, and employee rights to join worker organisations and bargain collectively. It should provide a clear statement that the Construction Contractor will not use forced labour or employ children in a manner that is exploitative or likely to interfere with their education or be harmful to their development.
- The **Project Discrimination and Harassment Policy** should set out legal duties and EBRD PR2 requirements in relation to preventing harassment and discrimination and ensuring a zero-tolerance process is in place for discrimination against workers; outlines acceptable behaviours; sets out the requirement for training; and outlines the requirement for a grievance mechanism to address complaints, ensuring that all parties are treated fairly and that the process is documented.
- Develop a **Project Code of Conduct**, which will include measures relating gender equality and GBVH and set out expectations in relation to local culture and drug and alcohol use, anti-social behaviour, sexual harassment, assault, and community safety.
- Develop and implement an overarching **Project Labour Management Plan**, which will cover PIU staff as well as set the standard for contractors working on the Project. The Project Labour Management Plan will include measures such as:
 - Approach to managing the workforce, including third party and supply chain
 - Management of worker relationships
 - Access to worker's organisations
 - Human rights and GBVH
 - Working conditions and terms of employment
 - Child labour and forced labour policies and ensuring procurement avoids exploitative practices and child labour
 - Equal opportunities and non-discrimination
 - Occupational health and safety
 - Bribery and corruption
 - Oversight provided of contractor policies/procedures
 - Access by all workers to policy/procedures in their language(s)
 - Arrangement for inspections
 - Provision of a transparent and fair recruitment process
 - Ensuring that contractors employ special measures of protection or assistance to remedy past discrimination or promote local employment opportunities, such as ensuring that applications are received from under-represented groups such as women
 - Ensuring that training opportunities are provided on technical, health and safety and manual work, where suitable
 - Ensuring that women and men are paid the same wages for work of the same value, i.e. remuneration is based on the employee's skills, experience, responsibilities and other objective, non-gender-related factors

- Ensuring all worker's (including Construction Contractor and sub-contractors) employment contracts are in line with both national legislation, applicable ILO standards and recommendations and EBRD PR2
- Mental Health and Wellbeing Support should be integrated into the Labour Management Plan, including signposting to counselling resources and training on stress management and burnout prevention
- Setting out targets on key topics such as local employment and number of women employed and Key Performance Indicators (KPIs) to track and report on indicators such as the percentage of local hires, the percentage of female or other under-represented groups.

- 17.6.3 The **Project Labour Management Plan** should be developed in accordance with the EBRD Non-discrimination and Equal Opportunity Guidance for clients¹¹⁸ and ensure effective implementation of the Energy Sector Gender Policy (2023-2032) approved in 2023 and its Implementation Action Plan¹¹⁹. The PIU will liaise with and train any Project Supervision Consultant or Engineer Supervisor role, to facilitate monitoring of implementation of mitigation measures during the construction stage. There should be co-ordination for resolving complicated issues that arise in the field and to provide continuously updated information to submit reports to the PIU and the EBRD.
- 17.6.4 The Project Labour Management Plan will also set out requirements for **labour audits** of contractors by the PIU, as well as the expectations for audits to be carried out by the contractors and their sub-contractors. Periodic inspections will be undertaken by the PIU (or their representatives) at least every 6 months during construction to monitor the Construction Contractor's performance against Project requirements, national legislation and applicable ILO standards. Actions will be tracked and a feedback loop provided to the Construction Contractor.
- 17.6.5 E&S and OHS requirements will be included in any contractual documents for contractors. To assist in this, the **Project ESAP** will be simplified in terms of the requirements to be implemented by the Construction Contractor and Construction Contractor requirements contained within the ESAP will be included in their contracts.
- 17.6.6 The MoE/PIU will also undertake a GBVH and gender risk assessment and, based on the results, develop a stand-alone **Project Gender Equality and GBVH Action Plan**. This will include measures to promote the employment of women such as gender considerations in bidding documents so that each contracting company is expected to meet them at all stages of the project implementation; and include training to project employees, suppliers and contractors on GBVH associated risks. It will also include procedures for avoiding gender bias in recruitment and gender-based violence and harassment in the workplace. KPIs will be set, for example, in relation to increasing the number of women working in the construction sector and the number of GBVH cases; and require all contractors to reflect this in their policies and operations.

¹¹⁸ Available at:

[bing.com/ck/a?!&p=753ada2c683df0accc7c9e395435ded21ae989b1dc34bea493fe0648d2c098bdJmItldHM9MTc2NTE1MjAwMA&ptn=3&ver=2&hsh=4&fclid=0d1bc705-5b79-6820-052d-d3aa5a996913&psq=EBRD+equal+opportunity+and+non-discrimination+guidance+note&u=a1aHR0cHM6Ly93d3cuZWJyZC5jb20vZG93bmhvYWZrL2Fib3V0L3N1c3RhaW5hYmlsaXR5L05vbkrPc2NyaW1pbmF0aW9uLnBkZg&ntb=1](https://www.bing.com/ck/a?!&p=753ada2c683df0accc7c9e395435ded21ae989b1dc34bea493fe0648d2c098bdJmItldHM9MTc2NTE1MjAwMA&ptn=3&ver=2&hsh=4&fclid=0d1bc705-5b79-6820-052d-d3aa5a996913&psq=EBRD+equal+opportunity+and+non-discrimination+guidance+note&u=a1aHR0cHM6Ly93d3cuZWJyZC5jb20vZG93bmhvYWZrL2Fib3V0L3N1c3RhaW5hYmlsaXR5L05vbkrPc2NyaW1pbmF0aW9uLnBkZg&ntb=1)

¹¹⁹ Order by the State Secretary of the MoE. Order No. B/3516, 20 October 2023.

- 17.6.7 The MoE/PIU will also promote open discussions about GBVH concerns through disclosure of gender awareness materials/training and implementation of effective and support the Construction Contractor in the delivery of training on GBVH to the construction workforce. GBVH training should be provided on induction and provided annually thereafter, with a review of the need for additional training following reports of an incident.
- 17.6.8 The PIU will work with the Construction Contractor to undertake community awareness sessions in relation to GBVH and the mechanisms available for reporting any incidents (see Grievance Mechanism below) in advance of the construction activities, including mechanisms that exist via local health organisations and the police.
- 17.6.9 As part of the Project report, the Construction Contractor will work with the PIU to record and report cases reported specifically in relation to GBVH grievances, both in the community and in the workplace, as part of the wider monthly reporting requirements as set out in the SEP.
- 17.6.10 As set out in the SEP, the PIU will establish a Project-specific community Grievance Mechanism on the MoE website that will be managed by the MoE PIU, that is described in more detail in **Chapter 6 and the SEP**. Specific to labour issues, a Project-specific Labour Grievance Mechanism will be established for PIU staff. All staff will be informed of the mechanism on employment; and details of expected timelines to address complaints will be provided. Anonymity will be maintained where requested.
- 17.6.11 Both mechanisms will allow for anonymous reporting and will take a “survivor-centred” approach, specifically with respect to GBVH, that includes systems for ensuring the immediate and ongoing safety of survivors and witnesses (including from further harm and retaliation), for protecting and guaranteeing the confidentiality and the identity of survivors and witnesses at all times, for offering options of support for survivors, and for including clear protocols for responding to reports in a non-judgmental and non-discriminatory manner. Anonymous reports will be possible, if the aggrieved party does not wish to be identified.
- 17.6.12 To reduce and mitigate adverse effects associated with labour and working conditions, including child labour and forced labour, the Construction Contractor will implement the following measures:
- Comply with all Project policies and plans.
 - Comply with the **Project Discrimination and Harassment Policy**, to promote equal opportunities.
 - Comply with the **Project Code of Conduct**. The Construction Contractor will ensure that all staff have signed the Code of Conduct and will provide induction programme for construction staff, including sub-contractors and their workers on the Code.
 - Develop and implement a **Labour Management Plan** that aligns with the Project Labour Management Plan and complies with applicable national labour laws and EBRD Performance Requirement 2, to manage labour processes. An outline Labour Management Plan is provided in **Appendix E of the ESMP**. The Contractor Labour Management Plan will include (but not to be limited to); site rules; job and task specific hazard analysis and controls; PPE use; safety training for personnel; and, monitoring and reporting of work hours, over time, lost time, incidents, injuries, near misses, etc. The Plan will also include measures to:
 - Ensure that Project and Contractor policies and policies are documented and communicated to all employees.

- Ensure that proposed working conditions, including wage and benefit entitlements, working hours, and safe working practices, are documented and communicated to all employees.
- Ensure the provision of a flexible working regime, where practicable, for workers who may prefer to work from home due to health issues, childcare, home schooling, etc. without fear of victimisation.
- Ensure that mental health is covered during workers inductions and that information is provided on how to seek help from local specialists, if required.
- Ensure that a zero-tolerance process is in place for discrimination against workers.
- Ensure that all workers (including Construction Contractor and sub-contractors) have employment contracts.
- Promote employment on the basis of non-discrimination, ensuring that applications are received from under-represented groups such as women.
- Ensure arrangements are in place for construction workers so that they have access to welfare facilities such as toilets and shaded and/or heated locations for breaks on construction sites.
- Ensure training opportunities are provided on technical, health and safety and manual work, where suitable.
- Set out the recruitment process and hiring procedure, including identifying construction recruitment needs and staffing requirements; developing and reviewing job descriptions in a standard template; how employment opportunities will be advertised (using measures such as advertisements on MoE and Contractor websites, on soum and bagh governor offices bulletin boards, Facebook, Television and providing information to the soum and bagh meetings); the interview and selection process; and skills and capability testing (where appropriate e.g. for Equipment drivers/operators, before starting work) and pre-employment medical checks if necessary) performing reference checks where references are available.
- Ensure risk insurance policies availability triggered automatically.
- Set out the KPIs that will be met, in line with the overarching Project Labour Management Plan.
- Develop and implement a **Local Employment and Procurement Policy and Plan**, which will ensure that priority is given to employing the local workforce where the skills are appropriate. Further details are provided in **Chapter 16: Economy, Employment and Livelihoods**.
- Comply with the **Project Gender Equality and GBVH Action Plan**; and promote open discussions about GBVH and SEAH concerns through disclosure of gender awareness materials; and attend / support PIU-led training on the Code of Conduct and GBVH. The Construction Contractor will also promote and develop a mentoring programme for women in the construction workforce and report on gender-disaggregated workforce numbers in construction monitoring reports in line with requirements set out in the Project Labour Management Plan.
- Develop and implement a **Training Plan**, to promote upskilling and ensuring workers have the appropriate training to undertake their work.

17.6.13 The PIU will approve all Construction Contractor plans prior to their implementation, including the Emergency Preparedness and Response Plan. The Construction Contractor will ensure that:

- All employees and any suppliers have access to the human resource policy and procedure.
- All employees are aware of their rights to join local trade union.
- All workers have an employment contract for all permanent and temporary employees in accordance with the Labour Code.

- 17.6.14 Before work begins, the Construction Contractor will conduct a thorough **risk assessment**. This will include consideration of any works close to other structures, including the existing OHTLs. The Construction Contractor will be compliant with relevant measures as set out in EBRD's *Briefing Note 01: Underground and overhead services*¹²⁰, *Electric power and distribution health and safety toolkit*¹²¹ and *Working near Overhead Cables*¹²². It will also take into consideration remote working and natural hazards; and, as discussed below under OHS, will include a review of medical facilities in the Project Area and emergency protocols (see OHS below for further details). A **Construction Risk Register** for the Project will be developed and maintained by the Construction Contractor (see also OHS below).
- 17.6.15 The location and number of camps is currently unknown however if workers' accommodation camp(s) are required, the Construction Contractor will develop and implement a **Workers' Accommodation Management Plan**. Any camp will be required to be compliant with *EBRD/IFC's (2009) Guidance Note: Workers' accommodation: processes and standards*¹²³. Where required, to help ensure a restful, safe, and comfortable, environment outside working hours, while also reducing the risk of social tensions arising between community members and construction workers, Project contractors should preference the accommodation and amenity provision of migrant employees in camps located outside, and delineated from, existing Project settlements, and maintain and manage these facilities in compliance with the Guidance Note. The Plan will set out requirements for monitoring of the camp(s) against the requirements of the Guidance Note on a monthly basis as a minimum.
- 17.6.16 Construction Contractor's Labour Management Plan, the Construction Contractor will:
- Perform **labour audits** during construction on a monthly basis to identify aspects such as ensuring all workers (direct and indirect) have access to the Project and any construction-specific human resources policy and procedures; reviewing whether there any gaps in payment, provision of personal protective equipment and/or any other concerns regarding human resources. The audit will ensure that all worker's (including sub-contractors) employment contracts are in line with both national legislation, applicable ILO standards and recommendations and EBRD PR2; and where necessary, ensure that vulnerable employees have been provided with sufficient support.
 - Track and report on KPIs.
 - Provide progress report from Contractor during construction through monthly, quarterly and annual reporting to the PIU or their nominated organisation e.g. the Construction Supervision Engineer.
- 17.6.17 Finally, the Construction Contractor will provide a **Labour Grievance Mechanism** that will be open to all staff and sub-contractors. All staff will be informed of the mechanism on employment; and details of expected timelines to address complaints will be provided. Anonymity will be maintained where requested.

Supply Chain

¹²⁰ Available at: [How to implement our performance requirements](#)

¹²¹ Available at: [How to implement our performance requirements](#)

¹²² Available at: [Working_near_overhead_cables_En.pdf](#)

¹²³ 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

17.6.18 To reduce and mitigate adverse effects associated with the construction supply chain, the following will be implemented:

17.6.19 The MoE/PIU will:

- Develop and implement a Project supply chain policy and plan. The **Project Supply Chain Policy and Supply Chain Management Plan** will, as a minimum, cover:
 - Inclusion of relevant ESAP requirements in contracts/subcontracts.
 - Review of contractor tenders and prioritisation of suppliers that have strong ESG ratings and/or environmental performance certifications.
 - Review of contractor policies, procedures and plans upon selection and appointment.
 - Assessment of labour risks such as forced and child labour, including direct allegations and entity/sanction lists.
 - Verification of training and/or proper credentials for contractor staff/managers responsible for ESMS.
 - Inspection and auditing requirements and frequency.
 - Key performance indicators (KPIs) for the supply chain.
- Ensure that the Project construction tendering process includes clauses and policies on minimum working age, normal working hours, freedom to collective bargaining, good working conditions, supply chain management, and measures to eradicate forced labour risks. Further details are captured in the **stand-alone ESMP**.
- Arrange **independent audits and inspections** of the construction sites and construction compounds at least every 6 months to ensure compliance with their Labour Management Plan and ESMP both national legislation and applicable ILO standards and recommendations. Monitoring and management of contractor performance will include:
 - Review of contractor experience as part of the procurement process, including consideration of language barriers in the case of migrant workers and how this would be managed on site and Contractor environmental and social performance credentials;
 - Ensure all contractors have human resources policies and procedures on minimum working age, normal working hours, freedom to collective bargaining, good working conditions and eradicating risks of forced labour;
 - Ensure all contractors have an employment contract for all permanent and temporary employees in accordance with the Labour Code;
 - Ensure that ensure that all permanent and temporary employees have a copy of their signed contract; and
 - Ensure that training on specific Project requirements is being undertaken.

17.6.20 The Construction Contractor will be required to:

- Comply with the **Project Supply Chain Policy** and develop and implement a construction-specific **Supply Chain Management Plan**, aligning with the Project Supply Chain Management Plan, to ensure that all sub-contractors comply with the same requirements as the main Construction Contractor, including compliance with national legislation and EBRD PRs.
- **Prior to engaging suppliers. perform supply chain due diligence/obtain the third-party supply chain due diligence** reports to verify potential suppliers' credentials regarding the occurrence of forced labour child labour or occupational health and safety failures.
- Report on KPIs monthly to the PIU or their nominated organisation e.g. the Construction Supervision Engineer.

- 17.6.21 The Construction Contractor will undertake regular compliance audits of the supply chain, at a frequency identified in the Supply Chain Management Plan but recommended to be at least once a year, as appropriate to the length of the supply chain contract. Consideration will be given to the need for an environmental and social performance penalty mechanism for poor performance. Serious breaches should result in a halt to all activities with that supply chain.
- 17.6.22 If security companies or personnel are used, the Construction Contractor will carry out appropriate checks to ensure that security companies (if any such companies are engaged) and personnel (where reasonably possible) do not have a history of past abuse. Security personnel will be trained in the use of force and in the applicable laws so that no contravention of national legislation takes place, including GBVH. Training will also cover the guiding principle that force shall not be used except in defence and in proportion with the nature and extent of the threat. Security guards will be directly employed by the Construction Contractor in accordance with their policies. If security personnel will be armed, the Construction Contractor will train them on UN Voluntary Principles of Human Rights.

Occupational Health and Safety

- 17.6.23 To reduce and mitigate adverse effects associated with OHS, the following will be implemented by the Construction Contractor:
- Construction workers will be provided with a safe and healthy work environment, taking account of inherent risks and specific classes of hazards associated with the Project; this will include the provision of fire extinguishers on site. The Construction Contractor and sub-contractors will be required to develop management arrangements and procedures to avoid hazards and, where this is not possible, mitigate the risks to the workforce in accordance with the hierarchy of risk management; including **risk assessments** prior to works in line with *Briefing Note 01: Underground and overhead services*¹²⁴, *Electric power and distribution health and safety toolkit*¹²⁵ and *Working near Overhead Cables*¹²⁶ and capturing aspects such as remote working and natural hazards.
 - A **Construction Risk Register** for the Project will be developed and maintained by the Construction Contractor.
 - Incoming workers should be enrolled in health insurance and participate in at least basic preventive health screenings.
 - The Construction Contractor will develop, implement and maintain a **CESMP**, which will be inclusive of, but not limited to the following sub-plans which are relevant to OHS only, including legislative compliance and duty of care requirements:
 - Air Quality (including dust) Management Plan – see **Chapter 7: Air quality**;
 - Noise and Vibration Management Plan – see **Chapter 8: Noise and Vibration**;
 - Water, Wastewater and Drainage Management Plan – see **Chapter 8: Water**;
 - Construction Traffic Management Plan – see **Chapter 14: Social and Community**;
 - Pollution Prevention Plan – see the **ESMP**;
 - Spill Prevention and Response Plan – see the **ESMP**;
 - Waste Management Plan – see the **ESMP**;
 - Hazardous Materials Management Plan – see the **ESMP**;
 - Occupational Health and Safety (OHS) Plan – see the **ESMP**;
 - Community Health, Safety and Security Plan – see **Chapter 14: Social and Community**;

¹²⁴ Available at: [How to implement our performance requirements](#)

¹²⁵ Available at: [How to implement our performance requirements](#)

¹²⁶ Available at: [Working_near_overhead_cables_En.pdf](#)

- Security Plan – see Chapter 14: Social and Community;
- Workers' Camp Management Plan – see **above**; and
- Emergency Preparedness and Response Plan – **see below**.

- 17.6.24 The Construction Contractor will develop an **OHS Plan**, which will consider the specific risks associated with the Project, including legislative compliance and duty of care requirements. All workers will be equipped with proper PPE (e.g., masks, eye goggles, breathing equipment, gloves, EMF shielding clothing, etc.). Workers engaged in tasks at elevated heights must wear full-body harnesses and be equipped with lanyards or lifelines. The OHS Plan will include KPIs proposed to be monitored during construction. The Construction Contractor will carry out regular site inspections during construction activities to verify the proper implementation of safety measures. Regular reporting on the health and safety performance onsite will be required, in addition to reporting of any accidents, incidents and/or emergencies and the measures undertaken in such cases to control the situation and prevent it from occurring again.
- 17.6.25 Prior to any construction, the Construction Contractor will implement and disseminate an **Emergency Preparedness and Response Plan** developed in liaison with local community members, authorities, police and emergency services. This will cover the requirements of national law and EBRD PR4 and detail preventative measures for all incidents, including identification of potential risks and emergencies e.g. spills, fires, collisions, worker injury; roles and responsibilities and procedures for responding to identified risks and emergencies; emergency response equipment requirements; and the location of the nearest medical treatment facilities. The Construction Contractor will identify the relevant first aid, clinical and hospital treatment points, in liaison with these providers. In addition, the KIs identified a requirement for an on-site physician who can provide primary care and basic treatment services. Specific consideration should be given to the limited mobile phone data coverage along the alignment and the need to consider alternative to mobile phone, such as satellite phones.
- 17.6.26 Project specific emergency response drills shall be carried out on a periodic basis (at least monthly). All staff must participate in these drills. Findings from the emergency response drills shall be documented and communicated in lessons learned bulletins or shared with the relevant parties such as the regulators. Periodic emergency drills at both community and district levels will test the functionality of evacuation procedures, communication flows, first-response capacity, and stakeholder coordination mechanisms. Following every exercise and drill the Construction Contractor will conduct a debriefing/review and decide on revisions to this Plan. Specific items for review will include:
- Correctness of telephone numbers
 - Correctness of external interfaces
 - Adequacy of first-aid facilities on site
 - Adequacy of treatment facilities at local health clinics
 - Response times
 - Specific additional training requirements
 - Employee understanding and participation
 - Emergency Response Team organisation

17.6.27 The Construction Contractor will ensure that all sub-contractors comply with the above plans.

Operation Phase

Labour and Working Conditions

17.6.28 The following mitigation measures will be implemented during operation by the NPTG:

- Develop Project policies, covering as minimum:
 - Environmental and Social policy
 - Human resources policy (covering labour and working conditions and community health and safety and gender). Ensure employees and suppliers have access to human resources policies and are aware of their rights to a trade union.
 - Discrimination and Harassment Policy
 - Supply Chain Policy and Management Plan.
- If not already in existence, a **Labour Management Plan** for the O&M phase should be developed. This should cover child and forced labour. Mental Health and Wellbeing Support should be integrated into the operational HR policy, including signposting to counselling resources and training on stress management and burnout prevention.
- Conduct risk assessments to identify physical chemical, biological and other hazards and prioritising hazard elimination, hazard control and hazard minimisation. Risk assessments should be prepared taking consideration of Briefing Note 01: Underground and overhead services¹²⁷, *Electric power and distribution health and safety toolkit*¹²⁸ and *Working near Overhead Cables*¹²⁹, natural hazards and remote working.

17.6.29 The NPTG will have a labour grievance mechanism in place that is accessible to staff and sub-contractors. This will be disclosed to staff at induction. The supply chain will also be made aware of this grievance mechanism.

17.6.30 The NPTG should conduct Annual Labour Audits to assess operational workforce conditions, including pay, working hours, contract compliance, PPE provision, and grievance uptake.

Gender

17.6.31 The following mitigation measures will be implemented during operation by the NPTG, in liaison with the PIU as far as is practicable:

- Adopt a gender-sensitive workplace policies to comply with the revised Labour Code.
- Develop and implement a stand-alone Gender Equality and GBVH Action Plan, which will include training to project employees, suppliers and contractors on GBVH associated risks.
- Include requirements related to gender considerations in bidding documents. In particular, the objective of increasing the number of women working in the construction sector should be set for all contractors to reflect this in their policies and operations.
- Promote open discussions about GBVH concerns through disclosure of gender awareness materials/training
- Provide training to staff and suppliers on GBVH.

¹²⁷ Available at: [How to implement our performance requirements](#)

¹²⁸ Available at: [How to implement our performance requirements](#)

¹²⁹ Available at: [Working_near_overhead_cables_En.pdf](#)

- Implement effective employee grievance mechanisms.

17.6.32 A zero-tolerance process will be in place for discrimination against female workers.

17.6.33 Gender disaggregated data will be maintained on staff and contractors.

Supply Chain

17.6.34 The following mitigation measures will be implemented by the NPTG during operation:

- Develop and implement a **Supply Chain Management Plan** specific to the O&M phase, and as a minimum to cover the following:
 - Adhere to Mongolian Labour Code and ILO standards;
 - Provide written employment contracts;
 - Ensure adequate OHS measures and access to grievance mechanisms
 - Ensure that any tendering process includes clauses and policies on minimum working age, normal working hours, freedom to collective bargaining, good working conditions and eradicating risks of forced labour; and
 - Include labour management clauses (as specified in bullet point above) in procurement contracts.

17.6.35 The NPTG will undertake regular compliance audits of the supply chain, at a frequency identified in the Supply Chain Management Plan but recommended to be at least once a year, as appropriate to the length of the supply chain contract. Consideration will be given to the need for an environmental and social performance penalty mechanism for poor performance. Serious breaches should result in a halt to all activities with that supply chain.

Occupational Health and Safety

17.6.36 In terms of OHS, it will be necessary for the NPTG to prepare and implement a detailed O&M ESMP, incorporating an OHS system and emergency preparedness and response aligned with the international standard ISO14001 and EBRD PR2 on Labour and Working Conditions. The following mitigation measures should be implemented during operation:

- The NPTG will elaborate their existing O&M Plan to cover EBRD PR2 and EBRD PR4 or, if this is not available, develop an O&M ESMP. This should include necessary provisions to ensure that the risk of exposure of the workers is assessed, managed and monitored.
- The 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. This may include:
 - Functional testing, commissioning, performance, testing and reliability testing of the complete Project should be undertaken.
 - Conduct a Project specific risk assessment identifying physical chemical, biological and other hazards and prioritising hazard elimination, hazard control and hazard minimisation. Risk assessments should be prepared taking consideration of Briefing Note 01: Underground and overhead services¹³⁰, *Electric power and distribution health and safety toolkit*¹³¹ and *Working near Overhead Cables*¹³²; and include consideration of remote working and natural hazards.

¹³⁰ Available at: [How to implement our performance requirements](#)

¹³¹ Available at: [How to implement our performance requirements](#)

¹³² Available at: [Working_near_overhead_cables_En.pdf](#)

- Ensure appropriate safety signage is on display within the substations and on all towers, following GIP electrical specifications and codes of practice.
- Ensure staff are adequately trained. Specialised and electrical PPE will be provided for the workforce in accordance with relevant standards, including those specifically relevant to working with or around electricity.
- 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.
- Regular inspection of the RoW to ensure non permitted land uses are not occurring.

17.6.37 The NPTG should track and report on OHS key performance indicators (KPIs), such as:

- Lost Time Injuries (LTIs)
- Near misses
- PPE compliance rates
- Safety training completion rates

17.6.38 A Project-specific **O&M Emergency Preparedness and Response Plan** should be developed and implemented by NPTG. A medical evacuation procedure should be developed to enable injured workers to access appropriate emergency facilities. First aid facilities should also be provided at the substations. Specific consideration should be given to the limited mobile phone data coverage along the alignment and the need to consider alternative to mobile phone, such as satellite phones.

17.6.39 Emergency response drills shall be carried out on a periodic basis (at least monthly). All staff must participate in these drills. Findings from the emergency response drills shall be documented and communicated in lessons learned bulletins or shared with the relevant parties such as the regulators. Periodic emergency drills at both community and district level **administrations** will test the functionality of evacuation procedures, communication flows, first-response capacity, and stakeholder coordination mechanisms. Following every exercise and drill the NPTG will conduct a debriefing/review and decide on revisions to this Plan. Specific items for review will include:

- Correctness of telephone numbers
- Correctness of external interfaces
- Adequacy of first-aid facilities on site
- Adequacy of treatment facilities at local health clinics
- Response times
- Specific additional training requirements
- Employee understanding and participation
- Emergency Response Team organisation

- 17.6.40 In terms of occupational exposure to EMFs, appropriate consideration will be given to the EU Directive 2013 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields), which is based on values set out in ICNIRP 2020. The Directive requires that employers have taken reasonable steps to prevent harm in the workplace from exposure to EMFs. The Directive requires that employers ensure that the exposure of workers to electromagnetic fields is limited to the health effects exposure limit values (ELVs)¹³³ and sensory effects ELVs¹³⁴ set out in Annex II, for non-thermal effects, and in Annex III, for thermal effects. Compliance with health effects ELVs and sensory effects ELVs must be established by the use of relevant exposure assessment procedures, as set out in Article 4 of the Directive. Employers are required to assess all risks for workers arising from electromagnetic fields at the workplace and, if necessary, measure or calculate the levels of electromagnetic fields to which workers are exposed. Where necessary, an action plan should be developed and additional information and training provided to the employee. Appropriate health surveillance and medical examinations may also be required for staff who exceed the Health Effects Exposure Limit Values and report experiencing a health effect.
- 17.6.41 The NPTG's operational HR policy and Labour Management Plan will include a **Labour Grievance Mechanism** and 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.

17.7 Residual Effects

Construction Phase

- 17.7.1 The following residual effects are expected to remain following the implementation of the above mitigation measures:
- Labour and working conditions - effects will be reduced from Moderate Adverse (Significant) to **Moderate (Significant)** to **Minor Adverse (Not Significant)** following implementation of the mitigation measures.
 - Gender – effects will be reduced from Major Adverse (Significant) to **Minor Beneficial (Not Significant)** following implementation of the mitigation measures.
 - GBVH - effects will be reduced from Major Adverse (Significant) to **Minor Adverse (Not Significant)** following implementation of the mitigation measures.
 - Supply chain - effects will be reduced from Major Adverse (Significant) to **Minor Adverse (Not Significant)** following implementation of the mitigation measures.
 - OHS – effects will be reduced from Major Adverse (Significant) to **Major (Significant) to Minor Adverse (Not Significant)** following implementation of the mitigation measures.

¹³³ According to the Directive, 'health effects ELVs' means those ELVs above which workers might be subject to adverse health effects, such as thermal heating or stimulation of nerve and muscle tissue.

¹³⁴ According to the Directive, 'sensory effects ELVs' means those ELVs above which workers might be subject to transient disturbed sensory perceptions and minor changes in brain functions.

Operation Phase

17.7.2 Assuming that management systems are implemented to meet Mongolian standards and EBRD PR2, the following residual effects are expected to remain following the implementation of the above mitigation measures:

- Labour and working conditions – based on current practices, effects will be reduced from Major Adverse (Significant) to **Minor Adverse (Not Significant)** following implementation of the mitigation measures.
- Gender - With mitigation in place to promote women in equal opportunity rights, the overall effects will remain **Negligible (Not Significant)** due to the lack of opportunities for employment at this stage.
- GBVH - effects will be reduced from Major Adverse (Significant) to **Minor Adverse (Not Significant)** following implementation of the mitigation measures.
- Supply chain -effects will be reduced from Major Adverse (Significant) to **Minor Adverse (Not Significant)** following implementation of the mitigation measures.
- OHS – effects will be reduced from Moderate to Major Adverse (Significant) to **Minor (Not Significant) to Major (Significant) Adverse** following implementation of the mitigation measures.

18 Climate Resilience

18.1 Introduction

- 18.1.1 This chapter presents the likely significant effects of climate change impacts on the Project. Effects are assessed for both construction and operational phases, and recommendations have been made based on the results of this assessment.

18.2 Legislative Framework, Policy and Guidance

- 18.2.1 The following policies, legislation and guidance have been used to inform this assessment. The EBRD's ESP and related PRs are relevant to this Project and aim to ensure that issues such as environmental and social sustainability, the rights of affected workers and communities, and compliance with relevant regulatory requirements and GIP are built in at every relevant stage of the project cycle.
- 1.1.1 Mongolia's legal framework for environmental assessment and management consists of several policies, strategies and frameworks relevant to this assessment, as summarised in **Table 18-1**.

Table 18-1 Legal frameworks for environmental assessment and management in Mongolia

Level	Key legislation / policy / guidance
International	<p>The Project must comply with the EBRD PRs, ensuring that the Project avoids, where possible, adverse impacts on workers, communities, and the environment. PRs 1 and 3 are considered to be most appropriate for the purpose of this assessment; view Table 4-1 in Chapter 4 for a detailed overview of the PRs.</p> <p>The EU Directive 2011/92/EU (the EIA Directive) on the assessment of effects of certain projects on the environment (amended 2014/52/EU).</p> <ul style="list-style-type: none"> UN Framework Convention on Climate Change (UNFCCC) 1994.
National law	<p>Mongolia's legal framework for environmental assessment and management consists of several policies, strategies and frameworks relevant to this assessment. See Table 4-4 in Chapter 4 for further detail.</p> <p>The Constitution of Mongolia 1992 (2023 Amendment).</p> <p>Law on Environmental Protection 1995 (2012 Amendment).</p> <p>Law on Environmental Impact Assessment 1998 (2012 Amendment).</p> <p>Minister of Environment and Green Development, Ordinance A-117 2014</p> <p>The EIA requirements of Mongolia are regulated by the Law on EIA (1998, amended 2002 and again in 2012), the purpose of which including the assessment of environmental impacts of projects and decision-making procedures.</p>
National standards	<p>Mongolian national standards applicable to this assessment are listed below. See Table 4-6, 4-7 and 4-8 in Chapter 4 for further detail.</p>

Level	Key legislation / policy / guidance
	MNS 4191:1993. Environmental protection standard system. Baseline climate parameters of Mongolia MNS 5645:2006. Transportation of construction materials in pieces and bulk. Classification, transportation condition. General requirements.

1.2 Assessment Methodology

Scope

- 18.2.2 It is assumed that the construction phase of the Project will commence in 2026 and extend for around two years. The lifespan of the Project is taken to be 60 years, located within the Dornogovi aimag. Climate projections for the periods of 2011-2040, 2041-2070 and 2071-2100 have been used to assess climate vulnerability during the construction and operational phases.

Study Area

- 18.2.3 The Study Area for this assessment is the Dornogovi aimag. The Area of Influence (AoI) includes all land within and adjacent to the Project, including the 204km line, Sainshand city, Tsagaan Suvarga mine, and the four soums that the proposed route crosses through. The assessment also considers land use and land users, including licensed mining and exploratory areas, the nearby Trans-Mongolian Railway, and areas of designated environmental protection.

Methodology

Data Collection

- 18.2.4 Baseline climate data has been gathered for the years 1981-2010; this period was selected due to data availability and industry best practice.
- 18.2.5 Future climate projections have been collected from the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report 6th Coupled Model Intercomparison Project (CMIP6) and considers changes in annual and seasonal mean temperatures, precipitation rates, and likelihood of extreme weather events. CMIP6 model outputs are available for five Shared Socioeconomic Pathways (SSPs) which examine future greenhouse gas emissions pathways with projected future socio-economic development. They represent the most updated climate scenarios for future climate projections by the IPCC. The scenario chosen for this assessment is SSP5-8.5 – a high greenhouse gas (GHG) emissions scenario characterised by a $>4^{\circ}\text{C}$ ($\sim 4.4^{\circ}\text{C}$) increase in average global temperatures by the year 2100.
- 18.2.6 Climate projections were selected for the 30-year periods of 2011-2040, 2041-2070, and 2071-2100, aligning with the Project's assumed construction period and operational lifespan.
- 18.2.7 To assess wildfire risk, historical burnt area data was gathered from the Moderate Resolution Imaging

Spectroradiometer (MODIS) MCD64A1 Burned Area Monthly Product for the period 2000–2024. This dataset provides global monthly burnt area estimates at a 500-metre resolution. Each pixel classified as burnt is detected using an adaptive algorithm that considers reflectance changes and active fire observations. The total burnt area per month within the study boundary was assessed by calculating the identified burnt pixels and converting them into area estimates.

Sensitive Receptors

- 18.2.8 The sensitivity of a receptor to a climate risk is defined as the degree of response a receptor may have to a change and its capacity to accommodate and recover from a change if it is affected¹³⁵. **Table 18-2** demonstrates how sensitivity is defined.

Table 18-2 Sensitivity definitions

Sensitivity	Description
High Sensitivity	<ul style="list-style-type: none"> The receptor is directly dependent on the existing climate conditions to continue to operate now and in the future or may only tolerate minimal change in climate conditions.
Medium Sensitivity	<ul style="list-style-type: none"> The receptor is dependent on the current climate conditions to an extent but can continue to function under a range of conditions and will tolerate some change.
Low Sensitivity	The current and future climate conditions have limited effect on the receptor.
Negligible	The current and future climate conditions have no effect on the receptor.

- 18.2.9 The Project receptors within the Study Area and their potential climate effects have been identified and set out in **Table 18-3** below.

Table 18-3 Potential climate effects on relevant receptors

Project Receptor	Description of Potential Effect
Construction Phase	
Construction equipment (e.g. cranes, vehicles, construction plant)	Extreme temperatures, including freezing temperatures and heatwaves, may result in equipment malfunctions or breakdown, in turn causing delays to the construction programme. Drought and low water availability may result in an increase in dust, further increasing the risk of equipment malfunction.
Building site (e.g. temporary structures)	<p>Drought and low water availability may result in an increase in dust, resulting in damages to temporary structures and systems.</p> <p>Heavy precipitation may lead to flooding, particularly following prolonged dry periods. This may cause damage or restrict access to temporary structures and systems, resulting in delays to the construction programme.</p>

¹³⁵ IEMA (2022) Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation. (Online) Available at: <https://www.iema.net/media/mabhqino/iema-cia-climate-change-resilience-june-2020.pdf>

Project Receptor	Description of Potential Effect
Road network (e.g. access roads)	Heavy precipitation or storm damage may overwhelm or obstruct drainage assets, resulting in surface flooding restricting road access. Debris from storm events may further obstruct access points, causing delays to the construction programme. Extreme temperatures may impact the integrity of the road and cause it to subside or buckle as a result of freeze-thaw.
Environment (e.g. water bodies)	Heavy rainfall and surface flooding can increase sediment runoff and contamination of local waterbodies, particularly when preceded by drought or prolonged dry periods.
Human health (e.g. site workers)	Health and safety risks may be posed to construction workers as a result of extreme heat, extreme cold, wildfires, or storms. Workers may experience heat stress or injury as a result of these events.
Operational Phase	
Buildings and infrastructure receptors (OHTL and associated structures)	Extreme heat may result in the overheating of infrastructure, increasing risk of fire. Conversely, extreme cold may reduce operational efficiency of infrastructure, resulting in service delays. Storm events may cause damage to infrastructure and associated structures due to debris and high wind speeds. High precipitation and flooding may damage assets. In combination with prolonged dry periods/drought, shrink-swell or subsidence may occur resulting in damage or disruption. Prolonged dry conditions/drought could reduce the availability of potable water.
Infrastructure receptors (access roads and pavements)	Damage or rutting to access roads may occur if materials are not sufficiently resilient to extreme temperatures, particularly the change from extreme hot to extreme cold. High precipitation/flooding and storms may obstruct access roads, preventing operational or maintenance workers from accessing infrastructure and thus resulting in delays.
Landscape receptors	Landscape design surrounding the Project may be compromised if planting is not sufficiently resilient to extreme temperatures, drought, precipitation, or storm events. This may in turn compromise asset foundations, requiring repairs.
Human health (operational and maintenance workers)	Increased thermal impacts on operational and maintenance workers as a result of extreme temperatures may lead to injury, particularly during high summer temperatures and low winter temperatures. Prolonged dry conditions/drought may reduce availability of potable water, increasing risk of dehydration and overheating for workers.

Significance Criteria

- 18.2.10 The significance of an effect is determined by assessing the likelihood of an event occurring against the anticipated magnitude of its consequences. Likelihood and consequence have been assessed qualitatively, considering existing design controls and embedded mitigation.

Likelihood

18.2.11 Likelihood of an effect occurring has been assessed using the trends identified within the CMIP6 climate projection data. **Table 18-4** outlines the criteria used to determine likelihood.

Table 18-4 Likelihood definitions

Likelihood	Description
Very Low	<ul style="list-style-type: none"> The event may occur once during the lifetime of the Project.
Low	<ul style="list-style-type: none"> The event occurs during the lifetime of the Project (e.g. once in 70 years).
Medium	The event occurs limited times during the lifetime of the Project (e.g. approximately once every fifteen years).
High	The event occurs several times during the lifetime of the Project (e.g. approximately once every five years).
Very High	The event occurs multiple times during the lifetime of the Project (e.g. approximately annually).

Consequence

18.2.12 The consequences of an effect occurring have been assessed using the categories defined in **Table 18-5**.

Table 18-5 Consequence definitions

Consequence	Description
Negligible	<ul style="list-style-type: none"> Little to no consequence on the construction or operation of the proposed development.
Minor Adverse	<ul style="list-style-type: none"> Localised disruption causing minor interruption to operations or services (e.g. less than one day) but no permanent or long-lasting effect on the proposed development. Minimal financial, reputational, environmental or health and safety losses.
Moderate Adverse	Some localised damage to infrastructure causing temporary interruption to operations or services (less than a week) and requiring repair. Moderate financial, reputational, environmental or health and safety losses.
Large Adverse	Damage to infrastructure is extensive causing major interruption to operations and services (more than a week) and requiring major repairs or replacement of infrastructure. Major financial, reputational, environmental or health and safety losses.
Major Adverse	Permanent damage leading to complete loss of operations on the proposed development for an extended period of time and requiring replacement of infrastructure across the majority of the proposed development. Extreme financial, reputational and environmental losses extending beyond the limits of the proposed development. Severe health effects and/or fatalities.

Significance

18.2.13 Likelihood and consequence have been applied to the matrix provided in **Table 18-6** to determine overall significance of each effect on the identified receptors.

Table 18-6 Significance definitions

		Consequence				
		Negligible	Minor adverse	Moderate adverse	Large adverse	Major adverse
Likelihood	Very low	Not significant	Not significant	Not significant	Not significant	Not significant
	Low	Not significant	Not significant	Not significant	Significant	Significant
	Medium	Not significant	Not significant	Significant	Significant	Significant
	High	Not significant	Significant	Significant	Significant	Significant
	Very high	Not significant	Significant	Significant	Significant	Significant

18.3 Assumptions and Limitations

18.3.1 This chapter has been informed by the following principal assumptions:

- The assessment assumes that mitigation measures relevant to different assets would be implemented effectively.
- The assessment assumes that baseline environmental conditions and impact assessments accurately reflect the current state, with no significant unforeseen changes or hazards expected.
- The projections from the IPCC Sixth Assessment Report are presented to include the Project's anticipated design life, i.e. from the start of the construction period through to the end of operational life. These time periods include 2011-2040, 2041-2070 and 2071-2100.
- The assessment also presumes stability in the existing regulatory and policy frameworks, recognising that any future changes could impact timelines, costs, and feasibility.

18.3.2 The following limitations have been identified within this chapter and should be considered when reviewing this report:

- The assessment is affected by assumptions associated with climate modelling and climate change projections incorporated into the CMIP6 models. Uncertainties are considered within climate projections due to natural variability and an incomplete understanding of the climate system, and its imperfect representation in models. The projections use probability to describe a range of possible outcomes, as estimated by scientific methodology. While global climate projections provide a range of potential climate futures, they cannot cover all potential future climate outcomes. As such, nine climate models have been utilised as part of this assessment:
 1. ACCESS-CM2
 2. CNRM-CM6-1
 3. CNRM-ESM2-1
 4. GFDL-ESM4
 5. INM-CM5-0

6. MRI-ESM2-0
7. MIROC6
8. CanESM5
9. IPSL-CM6A-LR

- Uncertainty exists in the relationship between changes in climate hazards and the respective response in terms of asset performance. This uncertainty has been assessed qualitatively.
- Stakeholder engagement and support from local communities, governments, and investors may vary, potentially impacting the Project's acceptance and success. Recommended mitigation measures are not guaranteed for approval.

18.4 Baseline Conditions

Existing Baseline Conditions

- 18.4.1 The proposed route of the OHTL will run through Dornogovi aimag, located in southeast Mongolia within the Gobi Desert region. The area is characterised by hotter, drier conditions than the broader national climate, with some steppe land cutting through the desert landscape. Mean annual surface air temperature for the region from 1981-2010 is around 5.8°C, around 4°C higher than the national average¹³⁶.
- 18.4.2 Mongolia, including Dornogovi aimag, is subject extremely cold winters and hot summers. Minimum temperatures for the region average at -29.3°C, while maximum temperatures average at 37.7°C – a difference of 67.0°C. The total number of heat days per year, assessed as the number of days reaching >30°C, is around 47. Comparatively, the number of cold days per year, assessed as the number of days reaching <0°C, is 99.
- 18.4.3 Precipitation is relatively limited across the year, even during the summer wet season. Average annual precipitation for the baseline period is 116mm, indicating generally dry conditions with intermittent showers. Maximum 1-day precipitation for the baseline period averages at 15mm, while maximum 5-day precipitation averages at only 28mm. Dornogovi is subject to frequent wildfires, many of which occur within Sainshand soum. Out of five wildfire events that have been reported in the past three years, four of them occurred in Sainshand and covered a total area of 337.8km² ¹³⁷.
- 18.4.4 No instances of flooding have been reported during the baseline period, though events such as snowstorms, dust storms, drought, and extreme precipitation are reportedly common in this area¹³⁸. Average baseline wind speed measures at 16.3 km/hour, with maximum wind speed averaging at 38.8 km/hour. Instances of storm events have increased in the past 10 years, with up to 23 days of

¹³⁶ World Bank (2021) Mongolia Climatology. (Online) Available at:

<https://climateknowledgeportal.worldbank.org/country/mongolia/climate-data-historical>

¹³⁷ NASA (2025) VNP14A1 v001 VIIRS/NPP Thermal Anomalies/Fire Daily L3 Global 1 km SIN Grid. (Online) Available at: <https://lpdaac.usgs.gov/products/vnp14a1v001/>

¹³⁸ Association of North East Asia Regional Governments (2024) Dornogovi Province. (Online) Available at: http://www.neargov.org/en/page.jsp?mnu_uid=3712&

snowstorms, 65 days of dust storms, and 33 days of strong winds reaching up to 40 metres per second.

Future Baseline

- 18.4.5 The future baseline conditions for the Study Area have been projected using CMIP6 climate data, which models the anticipated changes to key climate variables over time. The projections used for this assessment are relevant to the construction phase in the 2020s and the operational lifespan of the Project up to 2100.
- 18.4.6 Table 18-7 provides the projected changes for climate variables for 2011-2040, 2041-2070, and 2071-2100 relative to a 1981-2010 baseline.

Table 18-7 Projected climate conditions under SSP5-8.5 compared to a 1981-2010 baseline

Climate Indices	Baseline	Projections SSP5-8.5 Median (10th, 90th percentile)		
	1981-2010	2011-2040	2041-2070	2071-2100
Temperature				
Minimum temperature (°C)	-29.3	-27.6 (-32.3, -23.5)	-25.6 (-31.4, -21.7)	-22.8 (-28.19, -17.1)
Maximum temperature (°C)	37.7	39.4 (37.5, 41.57)	41.5 (39.4, 43.8)	43.9 (41.4, 46.2)
Annual average temperature (°C)	5.8	7.3 (6.2, 8.4)	9.1 (7.8, 11.0)	11.7 (10.0, 14.6)
Heat days (Tmax>30)	47	68 (50, 85)	90 (70, 112)	115 (97, 139)
Cold days (Tmax<0)	99	93 (81, 108)	83 (65, 99)	67 (38, 86)
Precipitation				
Average annual precipitation (mm)	116	125 (77, 194)	140 (78, 203)	151 (82, 245)
Maximum 1-day precipitation (mm)	15	16 (8, 26)	17 (9, 28)	18 (10, 32)
Maximum 2-day precipitation (mm)	24	24 (13, 46)	27 (16, 46)	30 (15, 54)
Maximum 5-day precipitation (mm)	28	28 (15, 56)	31 (18, 56)	35 (19, 69)
Wind				
Average wind speed (km/h)	16.3	15.8 (14.1, 16.84)	15.7 (14, 16.6)	15.4 (14.1, 16.6)
Maximum wind speed (km/h)	38.8	38.0 (34.2, 43.3)	37.6 (33.6, 42)	38.2 (34.0, 44.0)

- 18.4.7 The median projection data under SSP5-8.5 indicates a 4% increase in maximum temperature compared to baseline during the construction period, increasing to 9% from 2041-2070 and 14% from 2071-2100. A 6% increase in minimum temperature is also expected during the construction period, increasing to 14% in 2041-2070 and 29% in 2071-2100. Average annual temperatures increase by 21% during the construction period, increasing by 36% and 50% during the following time periods.

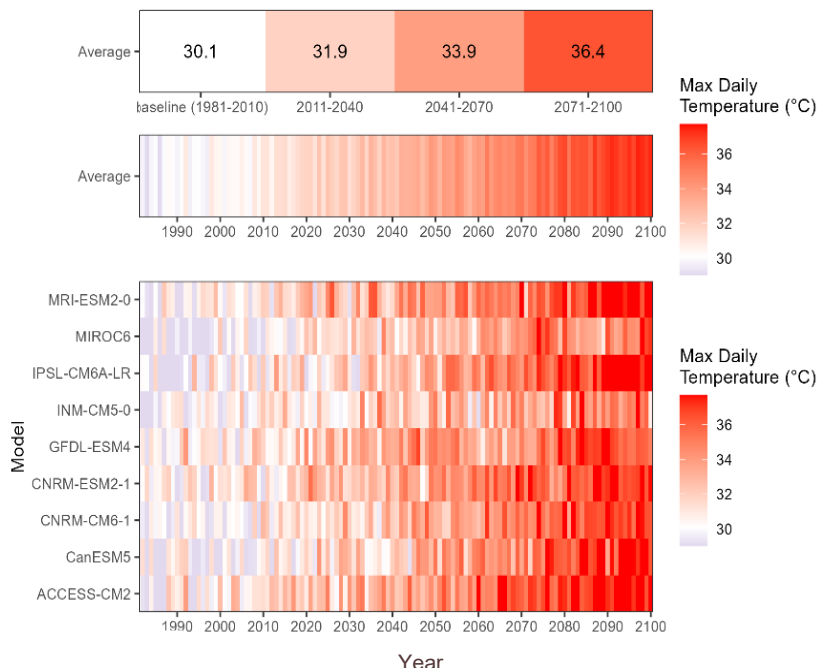


Figure 18-1 Average annual maximum temperature compared to a 1981-2010 baseline

- 18.4.8 Average annual precipitation is anticipated to be around 7% higher during the 2020s compared to baseline, further increasing to 17% in 2041-2070 and 23% in 2071-2100. Comparatively, average wind speed is projected to decrease by 3% during the construction phase and further decrease by 4% and 6% in the following time periods, respectively.
- 18.4.9 Data was also obtained from the MODIS MCD64A1 Burned Area Product to assess wildfire susceptibility. Analysis of a 2000-2024 dataset indicates episodic but significant fire events likely influenced by seasonal dryness, likely to be exacerbated by increasing temperatures.

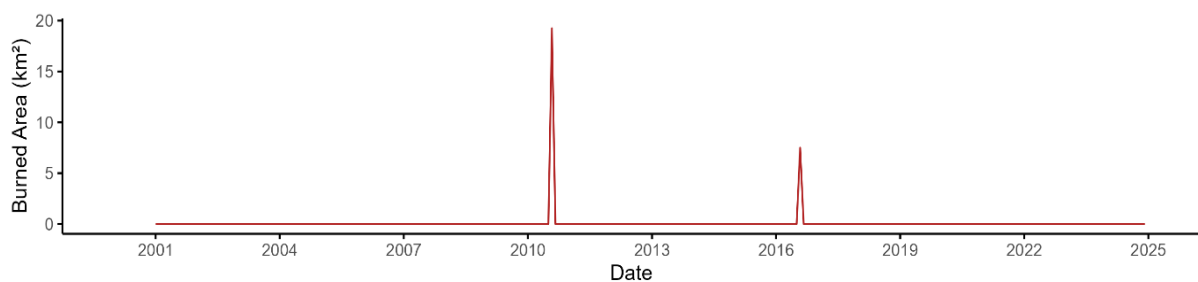


Figure 18-2 Modelled monthly burnt area (MODIS MCD64A1 Burned Area Product)

18.5 Potential Impacts and Effects

Construction Phase

- 18.5.1 **Table 18-8** outlines the climate hazards that may affect the construction phase, with initial consequence ratings provided.

Table 18-8 Potential impacts on Project receptors during the construction phase

Hazard	Receptor	Potential Impact	Likelihood Without Mitigation	Consequence Without Mitigation	Significance
Extreme heat	Construction equipment (e.g. cranes, vehicles, construction plant)	Overheating of equipment leading to loss of efficiency or breakdown, resulting in delays to the construction programme and increased costs.	Medium	Minor Adverse	Not Significant
	Human health (e.g. site workers)	High temperatures may result in uncomfortable working conditions for construction workers, reducing productivity and potentially resulting in health impacts including dehydration, sunburn, heat stroke, and fatality.	High	Large Adverse	Significant
Extreme cold	Construction equipment (e.g. cranes, vehicles, construction plant)	Reduced efficiency due to low temperatures, leading to delays in the construction programme.	Medium	Minor Adverse	Not Significant
	Human health (e.g. site workers)	Low temperatures may result in reduced productivity of workers and potential health impacts including hypothermia, resulting in injury or fatality.	High	Large Adverse	Significant
Wind	Construction equipment (e.g. cranes, vehicles, construction plant)	Potential damage to equipment at height (e.g. cranes, cherry pickers) during periods of high wind speed resulting in increased costs and safety risks.	Medium	Moderate Adverse	Significant
	Building site (e.g. temporary structures)	Damage may occur to structures as a result of windblown debris, potentially affecting the integrity of the structure and resulting in financial costs if repairs are needed.	Low	Minor Adverse	Not Significant
	Road network (e.g. access roads)	Windblown debris may block temporary access roads, preventing materials and workers from accessing the construction site and causing delays.	Low	Minor Adverse	Not Significant
	Human health (e.g. site workers)	High wind speeds may result in health and safety impacts to construction staff as a result of windblown debris, potentially resulting in injury.	Low	Moderate Adverse	Not Significant

Hazard	Receptor	Potential Impact	Likelihood Without Mitigation	Consequence Without Mitigation	Significance
Storms	Construction equipment (e.g. cranes, vehicles, construction plant)	Potential damage to equipment at height (e.g. cranes, cherry pickers) during periods of stormy weather, resulting in increased costs and safety risks.	Medium	Moderate Adverse	Significant
	Building site (e.g. temporary structures)	Storm events may result in structural damage due to windblown debris or lightning strikes, potentially affecting structural integrity and temporary electrical systems.	Low	Minor Adverse	Not Significant
	Human health (e.g. site workers)	Storm events including high wind speeds, rainfall, and lightning strikes may result in disruption or injury to construction staff, including injury from windblown debris, flooding, or electrocution.	Low	Large Adverse	Significant
Rainfall and flooding	Construction equipment (e.g. cranes, vehicles, construction plant)	Flooding may damage or wash away equipment, leading to delays in the construction programme and increased costs.	Low	Moderate Adverse	Not Significant
	Building site (e.g. temporary structures)	Intense rainfall and/or flooding may result in water ingress, causing damages and reducing access to structures.	Low	Minor Adverse	Not Significant
	Road network (e.g. access roads)	Flooding may block temporary access roads, preventing materials and workers from accessing the construction site and causing delays.	Low	Minor Adverse	Not Significant
	Human health (e.g. site workers)	High rainfall events resulting in flooding may result in construction staff becoming stranded or injured, up to and including drowning. Water ingress may reduce accessibility to temporary structures, reducing productivity. Exposure of temporary electrical systems to water may increase the risk of fire, further increasing the risk of injury.	Low	Large Adverse	Significant
Dust storms	Construction equipment (e.g. cranes, vehicles, construction plant)	Dust storms may result in the build-up of sand deposits within equipment, resulting in failure and delays to construction programme and financial impacts.	Medium	Minor Adverse	Not Significant
	Building site (e.g. temporary)	Dust deposition may occur in any HVAC systems present in the temporary structures, reducing	Low	Minor Adverse	Not Significant

Hazard	Receptor	Potential Impact	Likelihood Without Mitigation	Consequence Without Mitigation	Significance
	structures)	heating/cooling capacity.			
	Road network (e.g. access roads)	Dust deposits may block temporary access roads, preventing materials and workers from accessing the construction site and causing delays.	Medium	Minor Adverse	Not Significant
	Human health (e.g. site workers)	Dust storms may result in health impacts to construction staff, including respiratory illness and impacts to eyes and vision.	Medium	Large Adverse	Significant
Wildfire	Construction equipment (e.g. cranes, vehicles, construction plant)	Equipment exposed to fire may be damaged, especially equipment requiring fossil fuels, resulting in programme delays and financial impacts.	Low	Large Adverse	Significant
	Building site (e.g. temporary structures)	Wildfires may spread to temporary structures and result in damage to and/or loss of assets, and in turn leading to health and safety risks to workers.	Low	Large Adverse	Significant
	Human health (e.g. site workers)	Wildfires pose a significant risk to human health and wellbeing, potentially resulting in permanent injury or fatality.	Low	Large Adverse	Significant

Operational Phase

18.5.2 **Table 18-9** outlines the climate hazards that may impact the operational phase, with initial consequence ratings provided.

Table 18-9 Potential impacts on Project receptors during the operational phase

Hazard	Receptor	Potential Impact	Likelihood Without Mitigation	Consequence Without Mitigation	Significance
Extreme heat	Buildings and infrastructure (OHTL and associated structures)	Overheating of the OHTL may result in sagging, risking damage or connection with vegetation, structures, or the public, resulting in loss of power, fire, injury and/or repair costs.	High	Large adverse	Significant
	Landscape receptors	Prolonged periods of high temperatures leading to die-back of vegetation may lead to desiccation of soils, increasing the risk of instability within foundations and damage to towers.	High	Moderate adverse	Significant
	Infrastructure (access roads)	High temperatures can damage road surfaces, soften surface layers, causing deterioration. Damaged road surfaces can cause unstable driving conditions for drivers, posing a risk of accidents.	Low	Minor adverse	Not Significant
	Human health (operational and maintenance workers)	High temperatures can impact productivity of operational/maintenance workers, leading to reduced transmission capacity. Prolonged exposure to high temperatures may also result in impacts to health and wellbeing, potentially resulting in dehydration, heat stroke, sunburn, and injury.	Low	Moderate adverse	Not Significant
Extreme cold	Buildings and infrastructure (OHTL and associated structures)	Heavy snowfall/freezing rain may result in damage to OHTL and/or towers, resulting in a cascading failure event leading to widespread loss of power and potential repair costs.	High	Large adverse	Significant
	Human health (operational and maintenance workers)	Prolonged exposure to low temperatures may reduce productivity and impact health and wellbeing, potentially resulting in hypothermia and injury.	Medium	Moderate adverse	Significant
Wind	Buildings and infrastructure (OHTL and associated structures)	High wind speeds may cause damage to OHTL and/or pylons, potentially exacerbated by falling trees/ structures or windblown debris, resulting in loss of power and repairs costs.	Low	Large adverse	Significant
	Infrastructure (access roads s)	Windblown debris may block access for maintenance workers to infrastructure which may result in delays to routine or emergency maintenance leading to reduced transmission capacity.	Low	Minor adverse	Not Significant

Hazard	Receptor	Potential Impact	Likelihood Without Mitigation	Consequence Without Mitigation	Significance
	Landscape receptors	High winds may lead to increased movement of desert sands, leading to unusual dust deposition and desertification/vegetation die-back resulting in reduced foundation stability. This in turn increases the risk of impacts to towers.	Low	Moderate adverse	Not Significant
	Human health (operational and maintenance workers)	High wind speeds may increase the risk of injury to maintenance workers as a result of windblown debris, particularly when working at height.	Low	Moderate adverse	Not Significant
Storms	Buildings and infrastructure (OHTL and associated structures)	Storm events may result in damage to OHTL and/or pylons as a result of falling trees/structures or windblown debris, resulting in line failure and repair costs. Impacts may be exacerbated by concurrent winds during or after a storm event.	Low	Large adverse	Significant
	Infrastructure (access roads)	Windblown debris may block access for maintenance workers to infrastructure which may result in delays to routine or emergency maintenance leading to reduced transmission capacity.	Low	Minor adverse	Not Significant
	Landscape receptors	High winds may lead to increased movement of desert sands, leading to unusual sand deposition and desertification/vegetation die-back resulting in reduced slope stability. This in turn increases the risk of landslides and impacts to towers.	Low	Moderate adverse	Not Significant
	Human health (operational and maintenance workers)	High wind speeds and lightning may increase the risk of injury to maintenance workers as a result of windblown debris and electrocution, particularly when working at height.	Low	Large adverse	Significant
Rainfall and flooding	Buildings and infrastructure (OHTL and associated structures)	Flood events can reduce the capacity of substations, reducing transmission rates and potentially resulting in loss of power and repair costs. Flooding of electrical systems may also lead to fire, resulting in significant damage to infrastructure and widespread power outages.	Medium	Large adverse	Significant
	Infrastructure (access roads)	Flooding may block access for maintenance workers to infrastructure which may result in delays to routine or emergency maintenance leading to reduced transmission capacity.	Medium	Minor adverse	Not Significant

Hazard	Receptor	Potential Impact	Likelihood Without Mitigation	Consequence Without Mitigation	Significance
	Landscape receptors	Heavy rainfall events following prolonged dry conditions can reduce soil stability, increasing the risk of foundation instability and damage to towers.	Low	Moderate adverse	Not Significant
	Human health (operational and maintenance workers)	Flood and flash flood events can cause significant safety risks to operational and maintenance workers, resulting in injury and/or drowning with potential for fatality.	Low	Moderate adverse	Not Significant
Dust storms	Buildings and infrastructure (OHTL and associated structures)	Dust deposition on transmission lines can reduce effectiveness of insulators, causing flashovers which may result in fire or injury to the public and requiring line to be de-energised. Impacts may be exacerbated when combined with high humidity and/or rainfall.	High	Large adverse	Significant
	Infrastructure (access roads)	Dust deposition may block access for maintenance workers to infrastructure which may result in delays to routine or emergency maintenance leading to reduced transmission capacity.	Medium	Minor adverse	Not Significant
	Human health (operational and maintenance workers)	Exposure to dust storms may result in respiratory and/or cardiovascular illness, as well as impacts to vision.	Medium	Moderate adverse	Significant
Wildfire	Buildings and infrastructure (OHTL and associated structures)	Wildfire resulting in damage to the OHTL and towers, reducing power transfer and potentially resulting in power outages and repair costs.	Low	Large adverse	Significant
	Human health (operational and maintenance workers)	Exposure to wildfires may result in significant health and safety impacts, including permanent injury and/or fatality.	Low	Large adverse	Significant

Mitigation and Enhancement Measures

18.5.3 The following mitigation measures are recommended for the construction phase based on the anticipated impacts and effects:

- Inspect equipment regularly to ensure that systems have not been damaged by climate events, including extreme heat, extreme cold, sand deposition and windblown debris.
- Provide sufficient PPE for staff to avoid impacts associated with overheating, hypothermia, storm events, flooding, and other extreme climate events.
- Ensure that any HVAC systems present on site are inspected regularly to ensure they are clear of any dust or debris that may have accumulated.
- Equipment should be stored away from trees or structures when not in use to avoid damages that may occur as a result of high winds and/or storm events.
- Equipment should be stored away from any nearby water bodies when not in use to avoid damages that may occur as a result of flooding.
- Monitor weather forecasts on a weekly basis and plan activities accordingly, and avoid working at height during high wind speeds.
- Ensure electrical equipment is powered down during storm events to mitigate potential impacts arising from power surges.
- Keep temporary flood barriers and pumps on site for use during high rainfall events to mitigate the risk of flooding.
- Dust suppression techniques should be utilised on site to mitigate the impacts associated with sand accumulation.
- Flammable materials should be stored away from structures and equipment to reduce the risk of wildfire spread.

18.5.4 The following mitigation measures are recommended for the operational phase based on the anticipated impacts and effects:

- Adopt conservative static ratings with large safety margins.
- Ensure transmission line design complies with standard lightning protection practice in Mongolia (suitable surge arresters and substation shielding).
- Utilise granite dust in paved areas to reduce the risk of road melt during periods of extreme heat.
- Plant heat, fire, and drought resistant vegetation.
- Provide maintenance workers with appropriate PPE to mitigate risks associated with extreme heat, extreme cold, and heavy rainfall events.
- Utilise hydrophobic coatings to reduce ice and snow accumulation and mitigate impacts of heavy rainfall.
- Regularly inspect and maintain drainage infrastructure to avoid water attenuation.
- Where possible, avoid carrying out maintenance activities during periods of extreme heat or cold, or during high wind speeds.
- Monitor weather forecasts prior to undertaking any planned routine maintenance and reschedule activities where necessary to avoid working during adverse climate conditions.
- Sand accumulation in substations can be mitigated by including sand removal as a maintenance activity, (to be performed by substation operator as part of routine duties or by maintenance contractor). Consider incorporating HDPE barriers in cyclone fence.

- Consider installing current-limited fuses to allow for automatic interruption of power flow should overheating occur, mitigating the risk of arcing and minimising fire risk.
- Consider additional insulator sheds to mitigate against reduced creepage distance.
- Remove flammable materials and vegetation from the area to reduce the risk of wildfire.

18.5.5 Further detail on mitigation measures can be found in Section 7: Residual Effects.

18.6 Residual Effects

Construction Phase

18.6.1 **Table 18-10** outlines the climate hazards that may affect the construction phase, with significance ratings assigned based on anticipated likelihood and consequence, assuming mitigation measures are implemented.

Table 18-10 Significance of potential impacts during the construction phase after mitigation

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
Extreme heat	Construction equipment (e.g. cranes, vehicles, construction plant)	Overheating of equipment leading to loss of efficiency or breakdown, resulting in delays to the construction programme and increased costs.	Equipment should be inspected regularly to ensure that cooling systems and ventilation are functioning as expected and clear out any dust or debris that may be accumulating within the systems. During periods of high temperatures, works should be scheduled for cooler periods throughout the day (i.e. morning or evening). Where possible, equipment should be stored in shaded areas when not in use.	Low	Minor Adverse	Not Significant
	Infrastructure (access roads)	High temperatures can damage road surfaces, soften surface layers, causing deterioration. Damaged road surfaces can cause unstable driving conditions for drivers, posing a risk of accidents.	Road conditions should be monitored during hot weather and staff recommended to reduce speed if road surface conditions deteriorate.	Very Low	Minor Adverse	Not Significant
	Human health (e.g. site workers)	High temperatures may result in uncomfortable working conditions for construction workers, reducing productivity and potentially resulting in health impacts including dehydration, sunburn, heat stroke, and fatality.	Staff should be provisioned with appropriate PPE to mitigate risks of overheating, including lightweight, breathable, and moisture-wicking fabrics. UV exposure should be limited through UV-protected clothing, shading, and sun screen, and sufficient potable water should be provided to prevent risks associated with dehydration. Health and safety training should be delivered to all staff prior to beginning work, and should include information on the signs of heat exhaustion and related health impacts.	Low	Moderate Adverse	Not Significant

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
Extreme cold	Construction equipment (e.g. cranes, vehicles, construction plant)	Reduced efficiency due to low temperatures, leading to delays in the construction programme.	Equipment should be inspected regularly to ensure that heating systems and ventilation are functioning as expected and clear out any dust or debris that may be accumulating within the systems. When not in use, machinery should be stored inside where possible to protect against harsh conditions and prevent heat loss, with batteries properly charged and insulated to prevent loss of power. Consider utilising engine heaters to aid in start ups and reduce the risk of engine damage.	Low	Minor Adverse	Not Significant
	Human health (e.g. site workers)	Low temperatures may result in reduced productivity of workers and potential health impacts including hypothermia, resulting in injury or fatality.	Staff should be provisioned with appropriate PPE to mitigate risks of from cold, including insulated mid-layers, waterproof and windproof outer layers, insulated gloves and boots, and head and face protections. Health and safety training should be delivered to all staff prior to beginning work, and should include information on the signs of hypothermia and related health impacts. Where possible, work should be limited during periods of extreme low temperatures and staff should be provided with regular breaks in adequate warm shelter.	Low	Moderate Adverse	Not Significant
Wind	Construction equipment (e.g. cranes, vehicles, construction plant)	Potential damage to equipment at height (e.g. cranes, cherry pickers) during periods of high wind speed resulting in increased costs and safety risks.	When not in use, equipment should be stored away from trees or structures that could fall during high wind to prevent potential damage. Should cranes be utilised, lower the height to	Very Low	Minor Adverse	Not Significant

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
			minimise wind resistance and prevent falls. Monitor weather forecasts on a weekly basis to ensure that high-risk activities are not being carried out during periods of high winds.			
	Building site (e.g. temporary structures)	Damage may occur to structures as a result of windblown debris, potentially affecting the integrity of the structure and resulting in financial costs if repairs are needed.	Monitor weather forecasts on a weekly basis and ensure that all materials are secured to prevent windblow. Ensure that all smaller equipment is removed from the site and/or secured and ensure that all temporary structures are effectively anchored to withstand winds, and larger equipment is stored away from temporary structures to prevent damage in the event of a fall.	Very Low	Minor Adverse	Not Significant
	Road network (e.g. access roads)	Windblown debris may block temporary access roads, preventing materials and workers from accessing the construction site and causing delays.	Monitor weather forecasts on a weekly basis and ensure that all materials are secured to prevent windblow. Ensure that all smaller equipment is removed from the site and/or secured.	Very Low	Minor Adverse	Not Significant
	Human health (e.g. site workers)	High wind speeds may result in health and safety impacts to construction staff as a result of windblown debris, potentially resulting in injury.	Monitor weather forecasts on a weekly basis and ensure that high-risk tasks are scheduled for periods of low wind. Avoid working at height during high wind speeds and ensure that materials and smaller equipment is secured to prevent windblow. Store larger equipment away from temporary structures and areas with high footfall to avoid injury due to falls.	Very Low	Minor Adverse	Not Significant

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
Storms	Construction equipment (e.g. cranes, vehicles, construction plant)	Potential damage to equipment at height (e.g. cranes, cherry pickers) during periods of stormy weather, resulting in increased costs and safety risks.	When not in use, equipment should be stored away from trees or structures that could fall during high wind to prevent potential damage. Should cranes be utilised, lower the height to minimise wind resistance and prevent falls. Monitor weather forecasts on a weekly basis to ensure that high-risk activities are not being carried out during periods of high winds. Ensure equipment is powered down to prevent damage if a power surge occurs due to lightning.	Very Low	Minor Adverse	Not Significant
	Building site (e.g. temporary structures)	Storm events may result in structural damage due to windblown debris or lightning strikes, potentially affecting structural integrity and temporary electrical systems.	Monitor weather forecasts on a weekly basis and ensure that all materials are secured to prevent windblow. Ensure that all smaller equipment is removed from the site and/or secured. Electricals should be powered down where possible to prevent damage if a power surge occurs due to lightning.	Very Low	Minor Adverse	Not Significant
	Human health (e.g. site workers)	Storm events including high wind speeds, rainfall, and lightning strikes may result in disruption or injury to construction staff, including injury from windblown debris, flooding, or electrocution.	Monitor weather forecasts on a weekly basis and reschedule works where possible to prevent working during storm events. Avoid working at height during storm events and ensure that materials and smaller equipment is secured to prevent windblow. Store larger equipment away from temporary structures and areas with high footfall to avoid injury due to falls.	Very Low	Moderate Adverse	Not Significant
Rainfall and flooding	Construction equipment (e.g. cranes, vehicles,	Flooding may damage or wash away equipment, leading to delays in the construction programme and increased costs.	Equipment should be stored away from any nearby water bodies and elevated if possible to reduce the risk of flood damage. It is also recommended that	Low	Minor Adverse	Not Significant

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
	construction plant)		temporary flood barriers, such as sandbags, be kept on site and utilised in preparation for any anticipated heavy rainfall events.			
	Building site (e.g. temporary structures)	Intense rainfall and/or flooding may result in water ingress, causing damages and reducing access to structures.	It is recommended that temporary flood barriers, such as sandbags, be kept on site and utilised in preparation for any anticipated heavy rainfall events.	Very Low	Minor Adverse	Not Significant
	Road network (e.g. access roads)	Flooding may block temporary access roads, preventing materials and workers from accessing the construction site and causing delays.	It is recommended that temporary flood barriers, such as sandbags, be kept on site and utilised in preparation for any anticipated heavy rainfall events. If possible, consider utilising pumps to transport runoff away from access routes.	Very Low	Minor Adverse	Not Significant
	Human health (e.g. site workers)	High rainfall events resulting in flooding may result in construction staff becoming stranded or injured, up to and including drowning. Water ingress may reduce accessibility to temporary structures, reducing productivity. Exposure of temporary electrical systems to water may increase the risk of fire, further increasing the risk of injury.	Monitor weather forecasts on a weekly basis and reschedule works where possible to prevent working during heavy rainfall events. It is recommended that temporary flood barriers, such as sandbags, be kept on site and utilised in preparation for any anticipated heavy rainfall events.	Low	Moderate Adverse	Not Significant
Dust storms	Construction equipment (e.g. cranes, vehicles, construction plant)	Dust storms may result in the build-up of sand deposits within equipment, resulting in failure and delays to construction programme and financial impacts.	Vehicles and equipment should be covered prior to anticipated Dust storm events to prevent sand deposition. Dust suppression techniques and windbreaks should also be utilised on site to reduce dust buildup and wind velocity.	Low	Minor Adverse	Not Significant

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
	Building site (e.g. temporary structures)	Dust deposition may occur in any HVAC systems present in the temporary structures, reducing heating/cooling capacity.	HVAC systems should be regularly maintained to remove any potential sand deposition and ensure that systems are working as expected. Dust suppression techniques and windbreaks should also be utilised on site to reduce dust buildup and wind velocity.	Low	Minor Adverse	Not Significant
	Road network (e.g. access roads)	Sand deposits may block temporary access roads, preventing materials and workers from accessing the construction site and causing delays.	Dust suppression techniques and windbreaks should also be utilised on site to reduce dust buildup and wind velocity.	Low	Minor Adverse	Not Significant
	Human health (e.g. site workers)	Dust storms may result in health impacts to construction staff, including respiratory illness and impacts to eyes and vision.	Forecasts should be checked on a weekly basis and activities amended based on current climatic conditions. Staff should be provisioned with appropriate PPE including face and eye coverage to protect against potential health impacts, and shelter should be available to all staff if required.	Low	Minor Adverse	Not Significant
Wildfire	Construction equipment (e.g. cranes, vehicles, construction plant)	Equipment exposed to fire may be damaged, especially equipment requiring fossil fuels, resulting in programme delays and financial impacts.	Ensure that any flammable materials, including fossil fuels, are stored away from equipment to reduce risk of fire spread. Remove any flammable vegetation or materials from areas around equipment and provide fire suppression equipment on site.	Low	Moderate Adverse	Not Significant
	Building site (e.g. temporary structures)	Wildfires may spread to temporary structures and result in damage to and/or loss of assets, and in turn leading to health and safety risks to workers.	Ensure that any flammable materials, including fossil fuels, are stored away from temporary structures to reduce risk of fire spread. Remove any flammable vegetation or materials from areas around the structures and provide fire suppression equipment on site.	Low	Moderate Adverse	Not Significant

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
	Human health (e.g. site workers)	Wildfires pose a significant risk to human health and wellbeing, potentially resulting in permanent injury or fatality.	Ensure that any flammable materials, including fossil fuels, are stored away from temporary structures and other areas frequently used by workers to reduce risk of fire spread. Remove any flammable vegetation or materials from these areas and provide fire suppression equipment on site. Training should be delivered to staff on fire prevention and suppression, including information on how to avoid health and safety impacts should a wildfire occur.	Very Low	Large Adverse	Not Significant

Operational Phase

- 18.6.2 **Table 18-11** outlines the climate hazards that may affect the operational phase, with significance ratings assigned based on anticipated likelihood and consequence, assuming mitigation measures are implemented.

Table 18-11 Significance of potential impacts during the operational phase after mitigation

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
Extreme heat	Buildings and infrastructure (OHTL and associated structures)	<p>If high temperatures and low wind conditions coincide with heavy electrical loading, it will result in elevated conductor temperatures. This could result in a breach of minimum acceptable clearance between the 220kV conductor and ground.</p> <p>Under extreme conditions, there is potential for permanent conductor damage (annealing), resulting in loss of power, fire, injury and/or repair costs.</p>	The traditional approach used to ensure that transmission line power flow is limited to a safe value is to adopt conservative static ratings with large safety margins. Traditional fixed seasonal ratings assume worst-case 40–45 °C ambient, 0.5 m/s perpendicular wind, full sun → conductor almost never reaches conductor annealing temperature even at full rating. The rating of AC - 400/51 conductor should be limited to 222 MW @ +45 degrees Celsius. SCADA monitoring to be used to raise alarms if actual loading approaches the design temperature rating.	Low	Moderate Adverse	Not Significant
	Infrastructure (access routes)	Extreme high temperatures can lead to road melt and buckling, blocking access to infrastructure which may result in delays to routine or emergency maintenance leading to reduced transmission capacity.	Granite dust should be used on paved areas to reduce the risk of road melt during periods of extreme heat ¹³⁹ .	Medium	Minor Adverse	Not Significant
	Landscape receptors	Prolonged periods of high temperatures leading to die-back of vegetation may lead to soil instability, increasing the risk of foundation instability and damage to towers.	Clear and maintain non-heat or -fire resistant vegetation around substations and towers to reduce risks, with potential to replace vegetation with more resilient alternatives.	Low	Moderate Adverse	Not Significant

¹³⁹ Road Surface Treatments Organisation (n.d.) Why are our roads melting? (Online) Available at: <https://www.rsta-uk.org/why-are-our-roads-melting>

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
	Human health (operational and maintenance workers)	High temperatures can impact productivity of operational/maintenance workers, leading to reduced transmission capacity. Prolonged exposure to high temperatures may also result in impacts to health and wellbeing, potentially resulting in dehydration, heat stroke, sunburn, and injury.	Staff should be provisioned with appropriate PPE to mitigate risks of overheating, including lightweight, breathable, and moisture-wicking fabrics. UV exposure should be limited through UV-protected clothing, shading, and sun screen, and sufficient potable water should be provided to prevent risks associated with dehydration. Health and safety training should be delivered to all staff prior to beginning work, and should include information on the signs of heat exhaustion and related health impacts.	Low	Moderate Adverse	Not Significant
Extreme cold	Buildings and infrastructure (OHTL and associated structures)	Heavy snowfall/freezing rain may result in damage to OHTL and/or pylons, resulting in a cascading failure event leading to widespread loss of power and potential repair costs.	Consider utilising hydrophobic coatings and other low-ice adhesion materials to reduce ice and snow accumulation on conductors. Line monitoring systems can also be utilised to monitor and address accumulation early.	Low	Moderate Adverse	Not Significant
	Infrastructure (access routes)	Low temperatures in combination with high temperatures can lead to a freeze-thaw effect, damaging access roads and potentially blocking access to infrastructure which may result in delays to routine or emergency maintenance leading to reduced transmission capacity.	Ensure that surface drainage is regularly maintained to reduce water accumulation on paved surfaces, reducing the risk of freeze-thaw.	Very Low	Minor Adverse	Not Significant

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
	Human health (operational and maintenance workers)	Prolonged exposure to low temperatures may reduce productivity and impact health and wellbeing, potentially resulting in hypothermia and injury.	Staff should be provisioned with appropriate PPE to mitigate risks of from cold, including insulated mid-layers, waterproof and windproof outer layers, insulated gloves and boots, and head and face protections. Health and safety training should be delivered to all staff prior to beginning work, and should include information on the signs of hypothermia and related health impacts. Where possible, work should be limited during periods of extreme low temperatures and staff should be provided with regular breaks in adequate warm shelter.	Low	Moderate Adverse	Not Significant
Wind	Buildings and infrastructure (OHTL and associated structures)	High wind speeds may cause damage to OHTL and/or towers, potentially exacerbated by falling trees/structures or windblown debris, resulting in loss of power and repairs costs.	Consider increasing the tension of the transmission line to reduce wind-induced oscillation and proactively maintain lines to ensure that potential faults are identified and repaired early. Windbreaks may also be utilised to reduce potential impacts associated with windblown debris.	Very Low	Moderate Adverse	Not Significant
	Infrastructure (access routes)	Windblown debris may block access roads, blocking access for maintenance workers to infrastructure which may result in delays to routine or emergency maintenance leading to reduced transmission capacity.	Consider utilising windbreaks in key risk areas to reduce potential impacts associated with windblown debris.	Very Low	Minor Adverse	Not Significant

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
	Landscape receptors	High winds may lead to increased movement of desert sands, leading to unusual sand deposition and desertification/vegetation die-back resulting in reduced slope stability. This in turn increases the risk of landslides and impacts to towers.	Consider utilising windbreaks to reduce potential impacts associated with windblown debris.	Very Low	Moderate Adverse	Not Significant
	Human health (operational and maintenance workers)	High wind speeds may increase the risk of injury to maintenance workers as a result of windblown debris, particularly when working at height.	Avoid carrying out maintenance works during periods of high wind speed, particularly tasks that require staff to work at height.	Very Low	Moderate Adverse	Not Significant
Storms	Buildings and infrastructure (OHTL and associated structures)	Thunderstorm activity is rare in the location due to low moisture and high-pressure systems, but convective storms do occur sporadically in summer, often linked to monsoon influences from the southeast. These can bring brief heavy rain, lightning, and flash floods, but the overall frequency is low. Storm events may result in damage to OHTL and/or towers as a result of falling trees/structures or windblown debris, resulting in line failure and repair costs. Impacts may be exacerbated by concurrent winds during or after a storm event.	Ensure transmission line design complies with standard lightning protection practice in Mongolia (suitable surge arresters and substation shielding)	Very Low	Moderate Adverse	Not Significant
	Infrastructure (access routes)	Windblown debris may block access roads, blocking access for maintenance workers to infrastructure which may result in delays to routine or emergency maintenance leading to reduced transmission capacity.	Consider utilising windbreaks to reduce potential impacts associated with windblown debris.	Very Low	Minor Adverse	Not Significant

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
	Landscape receptors	High winds may lead to increased movement of desert sands, leading to unusual sand deposition and desertification/vegetation die-back resulting in reduced slope stability. This in turn increases the risk of landslides and impacts to Lightning arresters may also be employed to divert potential lightning strikes.	Consider utilising windbreaks to reduce potential impacts associated with windblown debris.	Very Low	Moderate Adverse	Not Significant
	Human health (operational and maintenance workers)	High wind speeds and lightning may increase the risk of injury to maintenance workers as a result of windblown debris and electrocution, particularly when working at height.	Avoid carrying out maintenance works during storm events, particularly tasks that require staff to work at height.	Very Low	Moderate Adverse	Not Significant
Rainfall and flooding	Buildings and infrastructure (OHTL and associated structures)	Flood events can reduce the capacity of substations, reducing transmission rates and potentially resulting in loss of power and repair costs. Flooding of electrical systems may also lead to fire, resulting in significant damage to infrastructure and widespread power outages.	Consider elevating substations and installing water pumps or other drainage infrastructure to reduce the risk of water attenuation. Hydrophobic coatings and other low-ice adhesion materials may also be used to reduce the risk of water ingress to power lines and conductors, further reducing the risk of electrical fires.	Low	Moderate Adverse	Not Significant
	Infrastructure (access routes)	Flooding may block access for maintenance workers to infrastructure which may result in delays to routine or emergency maintenance leading to reduced transmission capacity.	Ensure that surface drainage is regularly maintained to reduce water accumulation on paved surfaces.	Medium	Minor Adverse	Not Significant
	Landscape receptors	Heavy rainfall events following prolonged dry conditions can reduce slope stability, increasing the risk of landslides and damage to towers.	Plant drought-resistant vegetation in landscaping to reduce the risk of soil degradation and slope instability and improve drainage to avoid surface runoff.	Very Low	Minor Adverse	Not Significant

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
	Human health (operational and maintenance workers)	Flood and flash flood events can cause significant safety risks to operational and maintenance workers, resulting in injury and/or drowning with potential for fatality.	Monitor weather forecasts prior to undertaking work and reschedule works where possible to prevent working during heavy rainfall events.	Low	Moderate Adverse	Not Significant
Dust storms	Buildings and infrastructure (OHTL and associated structures)	<p>Sandstorms in the vicinity of transmission lines can result in deposition of heavy dust on insulator sheds.</p> <p>Light rain / mist can cause the dust to become a 'sludge' reducing the effective creepage distance of insulator strings. In the extreme this can cause a flashover which may result in tripping of the transmission line. Sludge formation is a low risk in the dry, arid conditions of the Gobi.</p> <p>Sand may accumulate around substation structures. Sand build up is to be expected.</p> <p>Sand may build up at tower foundations resulting in tilting foundations. Sand build up is to be expected.</p>	<p>Ensure that the design of the transmission line considers the dust pollution levels expected in the Gobi. Consider additional insulator sheds to mitigate against reduced creepage distance.</p> <p>Sand accumulation in substations can be mitigated by including sand removal as a maintenance activity, (to be performed by substation operator as part of routine duties or by maintenance contractor). Consider incorporating HDPE barriers in cyclone fence.</p> <p>Consider use of HDPE barriers in areas with highly mobile dune fields. Barrier fences are 1.5 to 2.5m high, shaped in a semi-circle in the direction of prevailing winds, placed 20 - 50m upwind of the tower. (Adds 1 - 3% to cost of selected towers).</p>	Low	Moderate Adverse	Not Significant
	Infrastructure (access routes)	Sand deposition may block access for maintenance workers to infrastructure which may result in delays to routine or emergency maintenance leading to reduced transmission capacity.	Consider installing sand fences to prevent sand accumulation on access routes for substations.	Low	Minor Adverse	Not Significant

Hazard	Receptor	Impact	Mitigation	Likelihood	Consequence	Significance
	Human health (operational and maintenance workers)	Exposure to dust storms may result in respiratory and/or cardiovascular illness, as well as impacts to vision.	Staff should be provisioned with appropriate PPE including face and eye coverage to protect against potential health impacts, and shelter should be available to all staff if required.	Low	Moderate Adverse	Not Significant
Wildfire	Buildings and infrastructure (OHTL and associated structures)	Wildfire resulting in damage to the OHTL and towers, reducing power transfer and potentially resulting in power outages and repair costs.	Consider installing current-limited fuses to allow for automatic interruption of power flow to prevent arcing, minimising fire risk. Ensure that vegetation is heat and fire resistant and regularly maintained to reduce the volume of flammable material near assets.	Low	Moderate Adverse	Not Significant
	Human health (operational and maintenance workers)	Exposure to wildfires may result in significant health and safety impacts, including permanent injury and/or fatality.	Ensure that any flammable materials are stored away from areas frequently used by workers to reduce risk of fire spread. Remove any flammable vegetation or materials from these areas and provide fire suppression equipment to staff. Training should be delivered to staff on fire prevention and suppression, including information on how to avoid health and safety impacts should a wildfire occur.	Low	Moderate Adverse	Not Significant