SECTION A: INTRODUCTION AND BACKGROUND

CHAPTER A1: INTRODUCTION

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1 INTRODUCTION

Our focus on sustainable development - on economic prosperity, social wellbeing, environmental stewardship and strong governance and integrity systems - provides the framework in which our business operates. Delivering on our sustainable development commitment means making sustainable development considerations an integral part of our business plans and decision making processes[1].

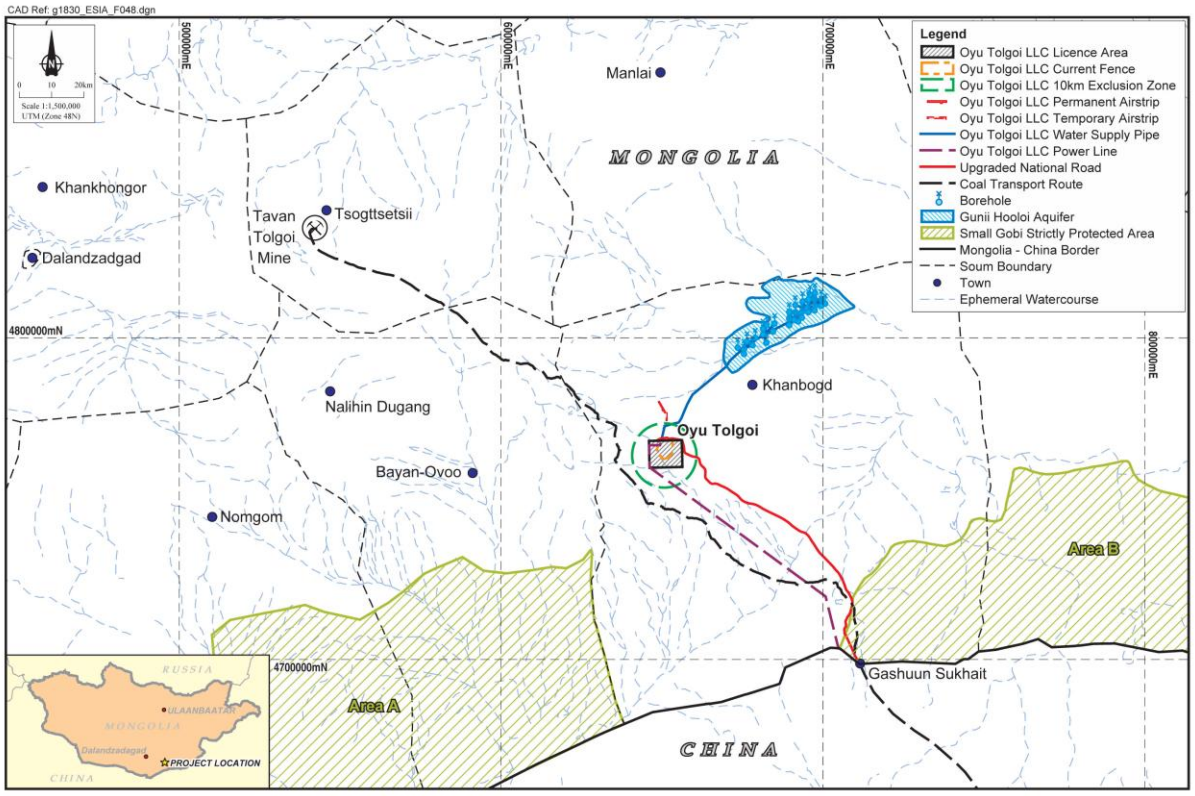
We believe that the realisation of a broad, common good can be assisted by enterprise that demonstrates, through its Corporate Citizenship practices, its support for human rights, social justice and sound environmental management – and is encouraged to prosper in a free-market business environment[2].

1.1 PROJECT BACKGROUND

Oyu Tolgoi LLC (Oyu Tolgoi or Project Proponent), formerly Ivanhoe Mines Mongolia Inc. LLC, is developing the Oyu Tolgoi copper and gold deposit (the Project) located in the Khanbogd *soum* (or district) of Omnogovi *aimag* (or province) in the South Gobi region of Mongolia.

The Oyu Tolgoi deposit is the largest copper-gold deposit in Mongolia and is amongst the world's largest undeveloped copper-gold projects. The deposit is located 600 km south of the Mongolian capital of Ulaanbaatar and 80 km north of the Chinese-Mongolian border (see *Figure 1.1*).

Figure 1.1: Project Location



[1] The approach of Rio Tinto, the manager of the Oyu Tolgoi Project, to doing business. Found at: http://www.riotinto.com/index_ourapproach.asp.

[2] The approach of Ivanhoe Mines, the largest shareholder in Oyu Tolgoi, as set out in both the Ivanhoe and Oyu Tolgoi Statements of Values and Responsibilities. Found at: http://www.ivanhoemines.com/i/pdf/Values-Resp_V6.pdf.

The Project will comprise the following major facilities and activities:

- The construction and operation of open-pit and underground mining operations and related infrastructure;
- The construction and operation of an ore concentrator plant, with an average throughput of 100,000 tonne per day (tpd)[3], which may be enlarged in the future;
- The construction and operation of a tailings storage facility (TSF) and waste rock dumps (WRD);
- The construction workforce peaked at approximately 14,800 in December 2011, making the project the largest employer in Mongolia at that time. Almost 10,000 workers, equalling 67% of the total workforce were Mongolian citizens. In addition, Oyu Tolgoi is undertaking training for an additional 3,300 Mongolian workers from which it can recruit staff, while providing additional trained workers into the Mongolian economy;
- The development of a water borefield, and abstraction of water from deep aquifers in the Gunii Hooloi basin some 35-70 km northeast of the mine site, and the construction of a pipeline, power line and access track from the borefield to the mine site;
- The construction and operation of a road from the Oyu Tolgoi mine site to the Chinese border at Gashuun Sukhait to export copper concentrate to China;
- The construction and operation of a 220 kV electrical transmission line from the Chinese border adjacent to Gashuun Sukhait to the Oyu Tolgoi mine site; and
- The construction of an international standard airport to transport workers and equipment to and from the Oyu Tolgoi site.

The power supply assumptions for the Project are based on the Investment Agreement terms as agreed with the Government of Mongolia. The Investment Agreement authorises Oyu Tolgoi to construct a 220kV transmission line to import power for the Project from the People's Republic of China (Initial Power Supply). The Initial Power Supply is considered to be an interim solution to meet the Project's power requirements until a domestic Mongolian power source is available. The Investment Agreement requires Oyu Tolgoi to secure its total power requirements for the Project from within Mongolia within four years of commencement of commercial operations (early 2017 on current schedule). Oyu Tolgoi intends to secure its total power requirements from within Mongolia approximately two years earlier than required under the Investment Agreement. It is proposed that the Project's long term power needs be met by a new power plant constructed within the Mine Licence Area. Once commissioned, the power plant is expected to provide the power required to operate the Project and replace the initial power supply used during commissioning and early operations. Oyu Tolgoi has completed initial studies to define and identify the following in respect of the power plant:

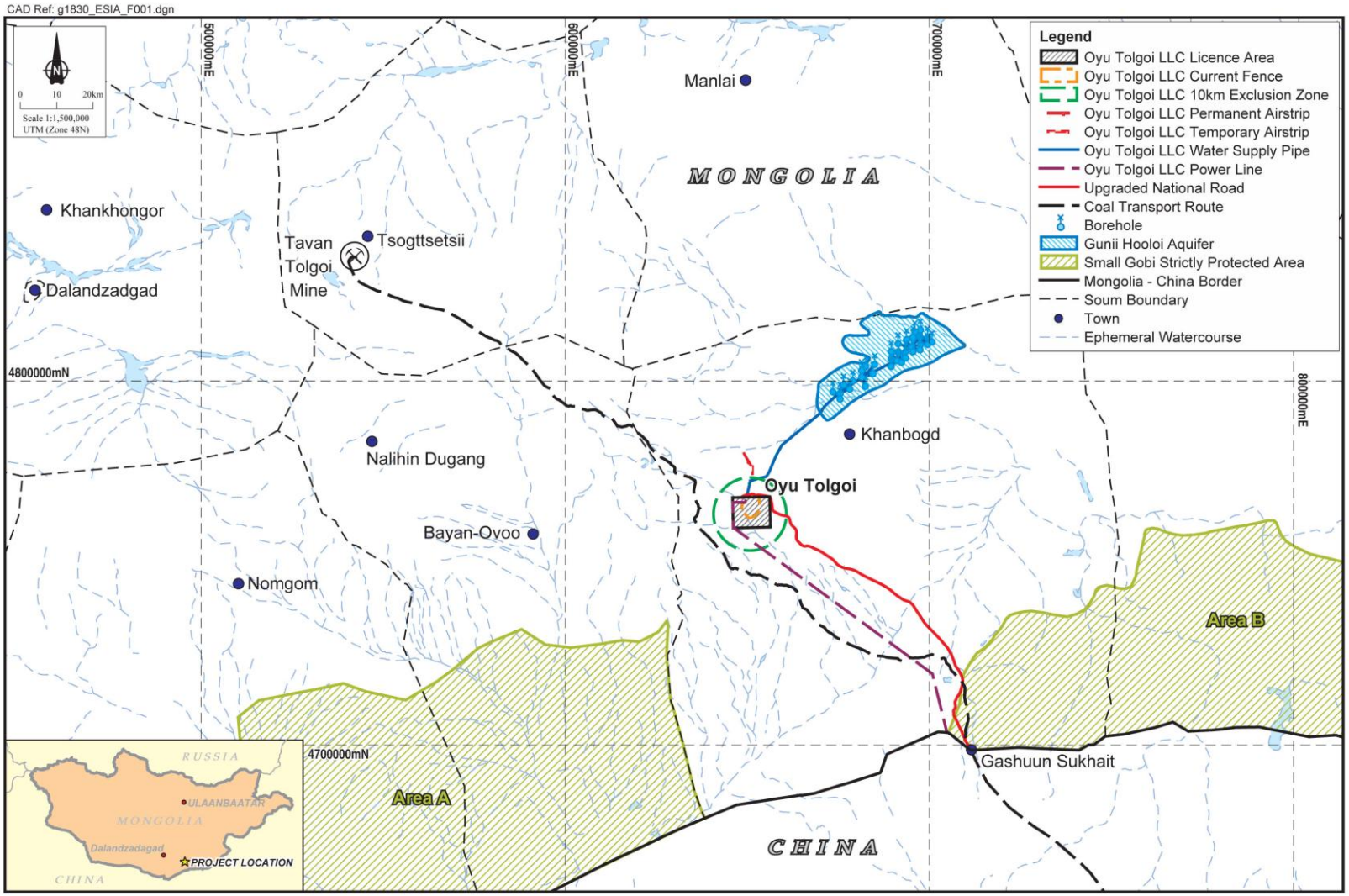
- The location within the Mine Licence Area;
- Capacity and technological requirements;
- Fuel and raw materials requirements; and
- Water demand.

Oyu Tolgoi has prepared a Detailed Environmental Impact Assessment (DEIA) to Mongolian standards which has been publicly disclosed and approved by the Mongolian Ministry for Environment and Tourism (MNET). Due to the ongoing nature of planning for the power plant, as part of the subsequent phase of the Project (Phase 2), complete information is not currently available for inclusion in this Environmental and Social Impact Assessment (ESIA). As a result, a supplemental ESIA will be prepared in respect of the power plant. The power plant will be subject to the same Project Standards that apply to the Project and which are described later in this ESIA. Further information is provided in *Chapter C13: Cumulative Impacts*.

The layout of the Project and the location of these major facilities are shown in *Figure 1.2* and *Figure 1.4*.

[3] Ore processing capacity of up to 110,000 tpd of ore is needed provide an average rate of 100,000 tpd to allow for maintenance down time.

Figure 1.2: Key Project Features



This ESIA is based on the initial construction of an open pit copper-gold mining operation at the Southern Oyu deposit, with a 100,000 tonnes per day (tpd) capacity ore concentrator and required infrastructure to support an ore processing capacity of 160,000 tpd of ore[4]. This is expected to be supplemented within four years by production from the Hugo North underground development based on block caving mining operations.

Increasing underground ore production will eventually require a corresponding expansion to the plant throughput capacity. Oyu Tolgoi is exploring an expansion to the plant to process up to 160 000 tpd of ore within the 27-year life of the Project. This expansion is subject to any necessary regulatory approvals and the identification and permitting of additional water resource requirements to provide the increased processing capacity. Water use requirements for this level of expansion have been discussed with the Government of Mongolia and once additional water resource performance data from the Gunii Hooloi aquifer is compiled, the necessary regulatory approvals for any additional water resource use for the concentrator throughput expansion (e.g., for increased water abstraction from the Gunii Hooloi aquifer) will be sought from the Government of Mongolia. Any further expansion beyond 160,000tpd remains speculative at this stage and has not been approved by Oyu Tolgoi, Rio Tinto or Ivanhoe Mines.

In line with its Health, Safety and Environmental Policy, Oyu Tolgoi is committed to assessing in full the potential economic, environmental, health and safety and social impacts of its operations, and is committed to avoiding, minimising or mitigating negative impacts and enhancing positive impacts wherever possible.

Oyu Tolgoi expects to meet applicable requirements of Mongolian legislation for natural resource operations, project development and environmental and social impact assessment[5]. Additionally, the Project has been designed to meet current international good practice. This ESIA sets out how this Project will seek to implement international good industry practices including the applicable requirements of the International Finance Corporation (IFC) Performance Standards for Social and Environmental Sustainability (2006) and the European Bank for Reconstruction and Development (EBRD) Environmental and Social Policy (2008).

This draft ESIA will be disclosed to Project stakeholders and the public and will be updated as needed in response to their comments. The ESIA will be used as a reference by international financial institutions seeking to finance the development of the Oyu Tolgoi Project in accordance with their environmental and social policies, IFC performance standards, EBRD policy requirements, and the Equator Principles[6] for commercial banks.

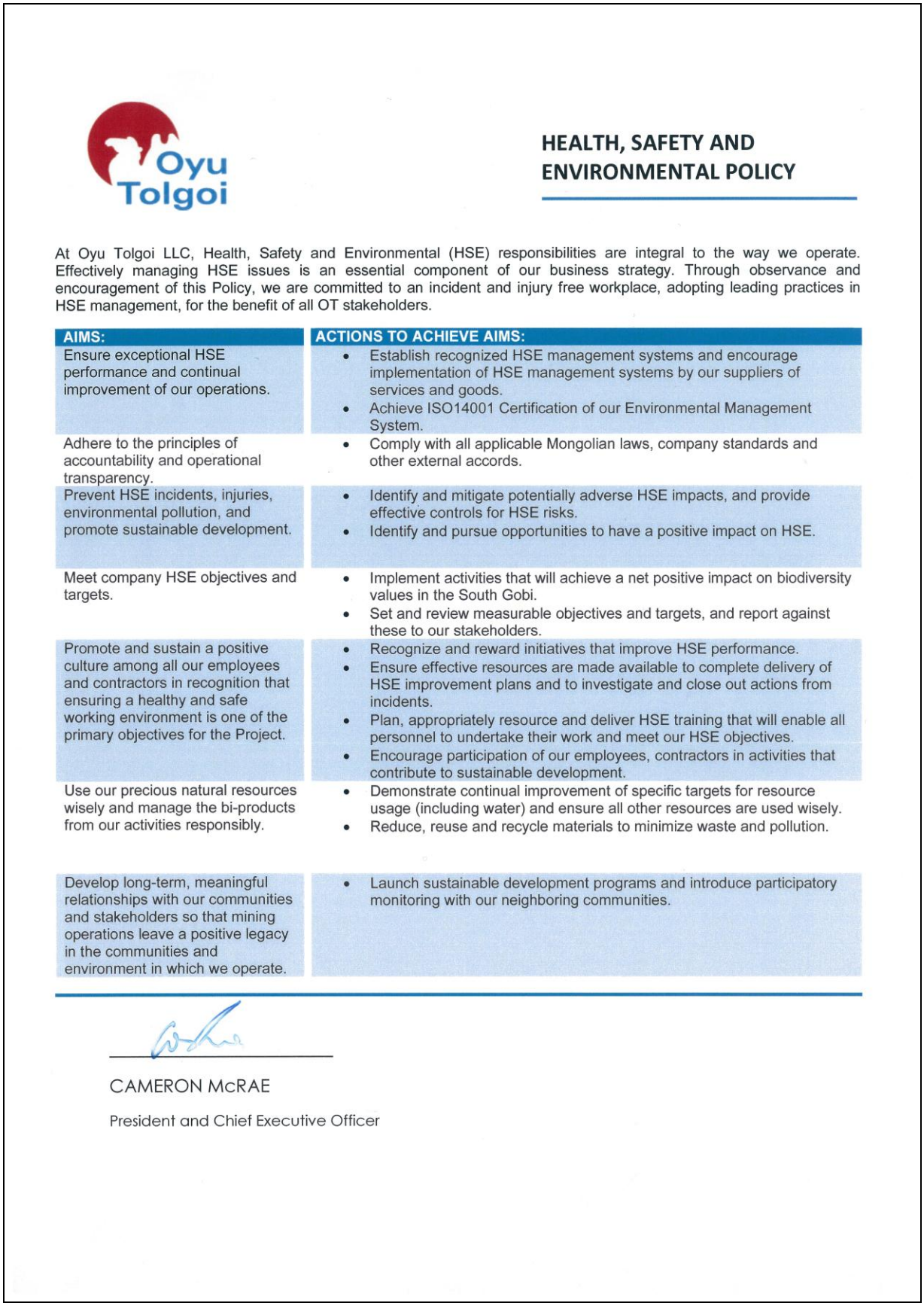
The Oyu Tolgoi Health, Safety and Environmental Policy (which also addresses community issues) is presented below.

[4] These represent average capacities to allow for maintenance downtime and other stoppages. As result, the initial maximum capacity of the concentrator plant will be 110,000 tpd of ore to provide an average capacity of 100,000 tpd.

[5] Further details on Oyu Tologi corporate citizenship can be found at http://en.ot.mn/page/39.shtml

[6] For further details on the Equator Principles, please refer to www.equator-principles.com

Figure 1.3: The Oyu Tolgoi Health, Safety and Environmental Policy



Oyu Tolgoi

HEALTH, SAFETY AND ENVIRONMENTAL POLICY

At Oyu Tolgoi LLC, Health, Safety and Environmental (HSE) responsibilities are integral to the way we operate. Effectively managing HSE issues is an essential component of our business strategy. Through observance and encouragement of this Policy, we are committed to an incident and injury free workplace, adopting leading practices in HSE management, for the benefit of all OT stakeholders.

AIMS:	ACTIONS TO ACHIEVE AIMS:
Ensure exceptional HSE performance and continual improvement of our operations.	• Establish recognized HSE management systems and encourage implementation of HSE management systems by our suppliers of services and goods. • Achieve ISO14001 Certification of our Environmental Management System.
Adhere to the principles of accountability and operational transparency.	• Comply with all applicable Mongolian laws, company standards and other external accords.
Prevent HSE incidents, injuries, environmental pollution, and promote sustainable development.	• Identify and mitigate potentially adverse HSE impacts, and provide effective controls for HSE risks. • Identify and pursue opportunities to have a positive impact on HSE.
Meet company HSE objectives and targets.	• Implement activities that will achieve a net positive impact on biodiversity values in the South Gobi. • Set and review measurable objectives and targets, and report against these to our stakeholders.
Promote and sustain a positive culture among all our employees and contractors in recognition that ensuring a healthy and safe working environment is one of the primary objectives for the Project.	• Recognize and reward initiatives that improve HSE performance. • Ensure effective resources are made available to complete delivery of HSE improvement plans and to investigate and close out actions from incidents. • Plan, appropriately resource and deliver HSE training that will enable all personnel to undertake their work and meet our HSE objectives. • Encourage participation of our employees, contractors in activities that contribute to sustainable development.
Use our precious natural resources wisely and manage the bi-products from our activities responsibly.	• Demonstrate continual improvement of specific targets for resource usage (including water) and ensure all other resources are used wisely. • Reduce, reuse and recycle materials to minimize waste and pollution.
Develop long-term, meaningful relationships with our communities and stakeholders so that mining operations leave a positive legacy in the communities and environment in which we operate.	• Launch sustainable development programs and introduce participatory monitoring with our neighboring communities.

CAMERON McRAE

President and Chief Executive Officer

Project Proponent

The Project Proponent is Oyu Tolgoi, a Mongolian company whose ultimate shareholders are:

- Ivanhoe Mines Ltd – 66%; and
- Government of Mongolia – 34%.

Ivanhoe Mines Ltd (Ivanhoe) (IVN:TSX,NYSE,NASDAQ) is focused on the development of its discoveries in the Asia Pacific region. Core assets are Ivanhoe's 66% interest in the Project; its 57% interest in Mongolian coal miner South Gobi Resources (SGQ:TSX,1878:HK); its 63% interest in Ivanhoe Australia (IVA:ASX), with copper-gold and molybdenum-rhenium development projects; and its 50% interest in Altynalmas Gold Ltd., which is developing the Kyzyl Gold Project in Kazakhstan. Rio Tinto International Holdings Limited (Rio Tinto)[7] has a 51% interest in Ivanhoe[8] and a Rio Tinto Group company manages the Oyu Tolgoi Project on behalf of Oyu Tolgoi.

1.2 PROJECT OVERVIEW

The mineral resources that the Oyu Tolgoi Project will develop lie in Mining Licence 6709A, which covers an area of 8,496 ha, centered at latitude 43°00'45"N, longitude 106°51'15"E) (see *Figure 1.4).*

The mineral resources consist of a series of deposits containing copper, gold, silver and molybdenum. The deposits contain a currently identified resource of almost 40 billion pounds (Blb) of contained copper and 20 million ounces (Moz) of contained gold in the Measured and Indicated categories and another 40 Blb of contained copper and 25 Moz of contained gold in the Inferred category[9] [10]. The mineralized geological trend in which the Project mineralized resources lie is still open to the north and south, and the deposits themselves have not been closed off at depth.

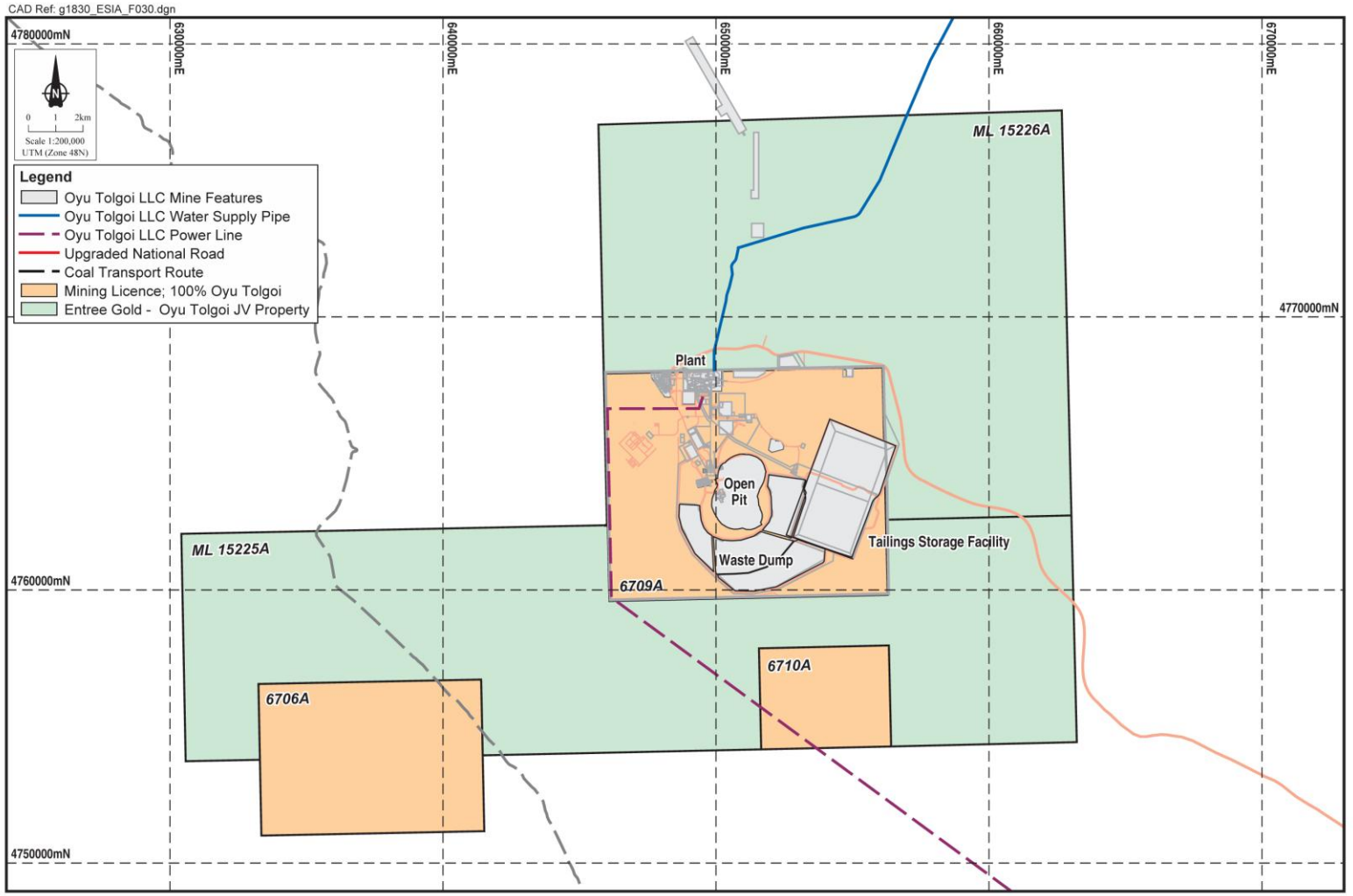
[7] Rio Tinto is a leading international mining group, combining Rio Tinto plc, a London listed public company headquartered in the UK, and Rio Tinto Limited, which is listed on the Australian Stock Exchange, with executive offices in Melbourne. The two companies are joined in a dual listed companies (DLC) structure as a single economic entity, called the Rio Tinto Group.

[8] As at 31 December 2011.

[9] Oyu Tolgoi Technical Report, June 1010 (IDP 10). AMEC Minproc.

[10] Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories. An Inferred Mineral Resource has a lower level of confidence than that applied to an Indicated Mineral Resource. An Indicated Mineral Resource has a higher level of confidence than an Inferred Mineral Resource but has a lower level of confidence than a Measured Mineral Resource. A Mineral Reserve is the economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic and other applicable factors that demonstrate, at the time of reporting, that economic extraction can be justified. For further information refer to: http://www.cim.org/committees/cimdefstds_dec11_05.pdf

Figure 1.4: Mining Licences and Key Project Features



In October 2009, Oyu Tolgoi, Ivanhoe Mines Ltd. and Rio Tinto International Holdings Limited signed an Investment Agreement (IA) with the Government of Mongolia. The IA defines the fiscal and regulatory environment under which the Project will operate and provided for the Government of Mongolia to become a 34% equity owner of the Project through Oyu Tolgoi, with the option to increase its equity holding by a further 16% after a defined period. At the time of signing, there were number of conditions precedent that needed to be satisfied in order for the IA to become effective. On 31st March 2010 the conditions precedent were declared satisfied by the GoM.

This ESIA is based on the initial construction of an open pit copper-gold mining operation at the Southern Oyu deposit, with a 100,000 tonnes per day (tpd) capacity ore concentrator and required infrastructure to support an ore processing capacity of 160,000 tpd of ore[11]. This is expected to be supplemented within four years by production from the Hugo North underground development based on block caving mining operations. The proposed increase in production capacity is still at an early stage of planning and is considered as part of the assessment of cumulative impacts within this ESIA (see *Chapter C13: Cumulative Impacts*).

The Project, as set out in this ESIA, is consistent with the current Reserve Case definition as set out in the Independent Development Plan 2010 (IDP10)[12] for the Oyu Tolgoi Project and has a planned life of 27 years.

Increasing underground ore production will eventually require a corresponding expansion to the plant throughput capacity. Oyu Tolgoi is exploring an expansion to the plant to process up to 160 000 tpd of ore within the 27-year life of the Project. This expansion is subject to any necessary regulatory approvals and the identification and permitting of additional water resource requirements to provide the increased processing capacity. Water use requirements for this level of expansion have been discussed with the Government of Mongolia and once additional water resource performance data from the Gunii Hooloi aquifer is compiled, the necessary regulatory approvals for any additional water resource use for the concentrator throughput expansion (e.g., for increased water abstraction from the Gunii Hooloi aquifer) will be sought from the Government of Mongolia. Any further expansion beyond 160,000tpd remains speculative at this stage and has not been approved by Oyu Tolgoi, Rio Tinto or Ivanhoe Mines.

1.2.1 Project Ownership & Licences

Based on the conversion of existing Mineral Exploration Licences under the terms of the Minerals Law of Mongolia (1997), the Government granted the Mining Licence for the Oyu Tolgoi deposits to Oyu Tolgoi in 2003 (Oyu Tolgoi License). along with Licences for two further properties identified as Mining Licences 15225A, and 15226A.

The Oyu Tolgoi Licence includes the right to explore, develop mining infrastructure and facilities and conduct mining operations on the Project. In 2006, the Mongolian Parliament passed new mining legislation (Minerals Law, 2006) and changed the term of Mining Licences to a 30-year term with two 20-year extensions in accordance with such legislation.

The focus of this ESIA is activities related to Mining Licence 6709A (referred to as the Mine Licence Area).

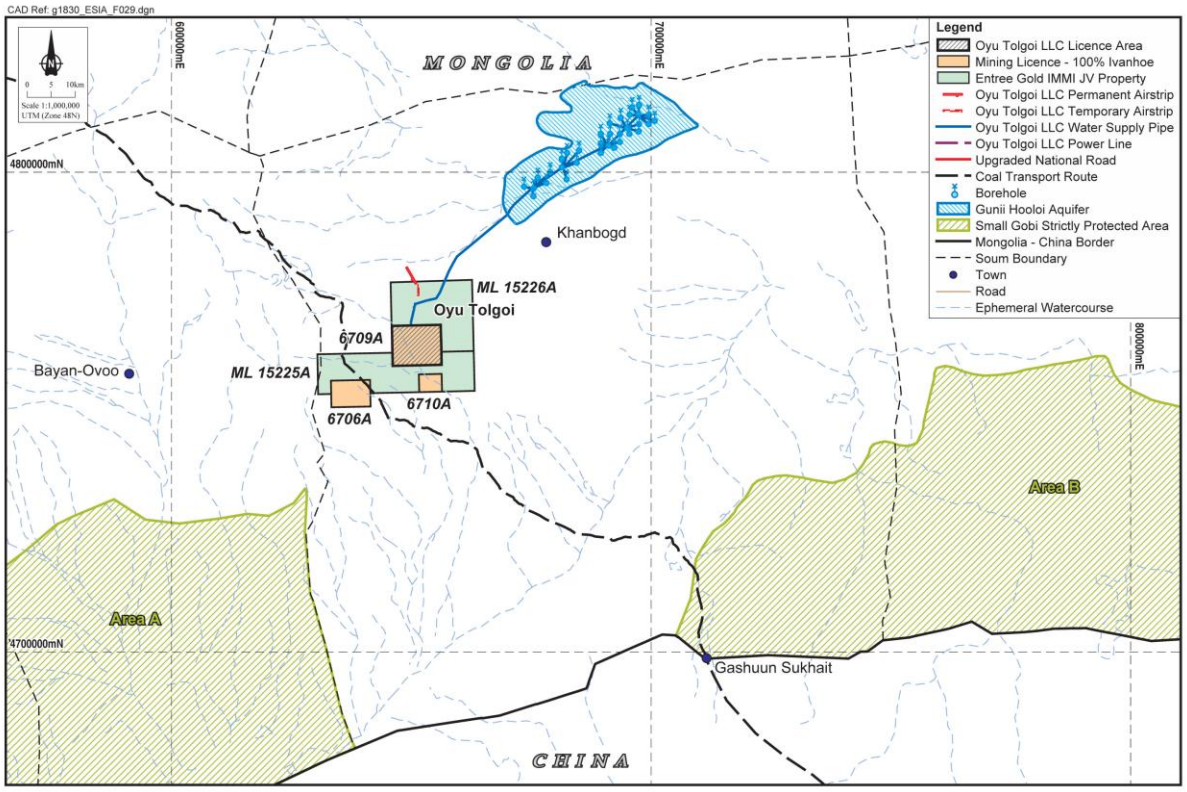
Licences 15225A and 15226A (referred to as the “Lookout Hill Property”) are legally held by Entrée Gold Inc, a Canadian mineral exploration company focused on the exploration and development of copper and gold projects. The Lookout Hill Property surrounds the Oyu Tolgoi Licence area. A portion of the Lookout Hill property is subject to a joint venture with Oyu Tolgoi. The joint venture property hosts the Hugo North Extension copper-gold deposit and the Heruga copper-gold-molybdenum deposit. Rio Tinto and Ivanhoe Mines are major shareholders in Entrée Gold Inc , holding approximately 13% and 12% respectively.

Figure 1.5 illustrates the mineral deposits and Licence boundaries.

[11] These represent average capacities to allow for maintenance downtime and other stoppages. As result, the initial maximum capacity of the concentrator plant will be 110,000 tpd of ore to provide an average capacity of 100,000 tpd.

[12] Oyu Tolgoi Technical Report, June 1010 (IDP 10). AMEC Minproc.

Figure 1.5: Oyu Tolgoi and Surrounding Licences



The boundary coordinates of the Oyu Tolgoi Licence 6709A are defined in *Table 1.1* by latitude/longitude and also by UTM coordinates (WGS-84, Zone 48N).

Table 1.1: Oyu Tolgoi Property (Mining Licence 6709A) Boundary Coordinates

Point	Latitude/Longitude, MSK42		UTM, WGS-84, Zone48N	
	Latitude	Longitude	Northing	Easting
1	42° 58’ 30” N	106° 47’ 30” E	4759595.990	646096.713
2	43° 03’ 00” N	106° 47’ 30” E	4767924.920	645918.987
3	43° 03’ 00” N	106° 55’ 00” E	4768149.900	656099.637
4	42° 58’ 30” N	106° 55’ 00” E	4759820.928	656289.773

Note: Coordinates relate to the four corners of the Oyu Tolgoi Mining Licence

1.3 PURPOSE OF THIS ESIA

This ESIA has been prepared to identify and assess potential environmental and social impacts of the Project on the biophysical and human environments and to set out measures to avoid, minimise, mitigate and manage adverse impacts to acceptable levels as defined by Mongolian regulatory requirements and international good practice as defined by the requirements of the IFC and EBRD. To do this, the ESIA has incorporated and documented the following processes:

- delineation of a detailed environmental and social baseline;
- description of the Project;
- identification and assessment of environmental and social impacts and issues, both adverse and beneficial, associated with the Project;

- documentation of measures adopted to avoid, or where avoidance is not possible, minimise or mitigate and manage adverse impacts on workers, affected communities, other stakeholders, and the broader environment;
- identification of feasible opportunities for improved environmental and social performance adopted by the Project;
- development of robust management systems that will avoid or where avoidance is not possible, minimise, mitigate and manage identified impacts in an integrated manner across all Project activities and throughout the life of the Project; and
- demonstration of how environmental and social performance will be improved through a dynamic process of performance monitoring and evaluation.

In support of this process, the ESIA documents previous engagement by the Project with stakeholders and communities that may be affected by the Project, and summarises how they have been informed and consulted on matters that could potentially affect them. The ESIA also provides a framework for how the Project aims to maintain a process of meaningful engagement with stakeholders over the life of the Project.

1.4 THE DEVELOPMENT OF THIS ESIA

This ESIA builds upon an extensive body of studies and reports that have been prepared for Project design and development purposes and for Mongolian approvals under Mongolian Law, including:

- The Environmental Protection Law (1995);
- The Law on Environmental Impact Assessment (1998 and amended in 2001); and
- The Minerals Law (2006).

A number of Detailed Environmental Impact Assessments (DEIAs), covering different elements of the Project, were prepared over a nine-year period between 2002 and 2011[13]. DEIAs are prepared as part of the Mongolian permitting process and are submitted to the Ministry of Nature Environment and Tourism for approval. The DEIAs provide baseline information for both social and environmental issues. The DEIAs have been updated for this ESIA with more recent monitoring and survey data and additional social analysis completed since the DEIAs were originally prepared.

The original DEIAs were prepared in accordance with the request of the Government that the DEIAs to be split into separate component-specific assessments to facilitate technical review. Subsequently, the Government has requested that an updated combined DEIA be prepared by Oyu Tolgoi whereby the assessment of impacts and discussion of mitigation measures is Project-wide. The current ESIA (this document) has been used to support the preparation of the updated combined DEIA for Mongolian regulatory approvals purposes.

The format and content of the original DEIAs were in accordance with then-existing Mongolian regulatory requirements. While the DEIAs were prepared taking account of existing World Bank policies and IFC guidelines, they were not prepared to meet the full Social and Environmental Sustainability Performance Requirements of IFC (as published in 2006) , nor to meet the EBRD Environmental and Social Policy (as published in 2008) and its associated Performance Requirements. For example, the DEIAs did not address social and community issues in a comprehensive manner or reflect the extensive work undertaken by Oyu Tolgoi in this area.

The current ESIA has been developed as a comprehensive integrated assessment of the Oyu Tolgoi Project, and reflects compliance with applicable Mongolian regulatory requirements, international good practice and the requirements of potential Project lenders, including IFC and EBRD[14].

[13] Further details of the DEIAs undertaken for the purposes of Mongolian approvals are provided in *Chapter A3: Methodology*.

[14] The ESIA team have sought to use standardised spellings throughout the ESIA, however in some instances spellings may be different where they have been taken from third party documents.

1.5 SCOPE OF THIS ESIA

EBRD and IFC have similar, but different definitions for the scope of an impact assessment. Both institutions frame assessments in terms of a project's "area of influence". The guidance provided by both EBRD and IFC has been utilised in defining the scope of this ESIA. Key elements of the scope of this assessment are set out below.

1.5.1 Definition of the 'Project'

Project elements directly addressed in this ESIA

For the purposes of this ESIA, the ***"Project"*** constitutes the direct activities that are to be financed and/or over which the Project can exert control and influence through its project design, impact management and mitigation measures. This comprises:

- All Oyu Tolgoi Project facilities within the Mine Licence Area and surrounding 10 km buffer zone[15], including the following key features:
  - Open pit mining facilities;
  - Underground mining facilities;
  - Accommodation camps;
  - Construction-related activities and facilities, including concrete batch plant, quarry and lay-down areas;
  - Power generation facilities;
  - Heating plant and boilers;
  - Crusher;
  - Concentrator;
  - Tailings storage facility;
  - Water management facilities (including diversion of the Undai River);
  - Waste water management facilities for camps and mining operations;
  - Waste management facilities (municipal and industrial);
  - Waste rock storage facilities;
  - Access roads within the Mine Licence Area;
  - Vehicle and equipment maintenance and repair facilities;
  - Fuel storage facilities;
  - Electrical power distribution; and
  - Administration buildings and catering facilities.
- Airport facilities, including a temporary and permanent airport and associated local access roads to the Oyu Tolgoi site;
- Contractor accommodation camps located adjacent to Khanbogd;
- Dedicated off-site worker accommodation planned for Khanbogd;

[15] Agreed with regulatory authorities as a land use planning tool to reduce nuisance and disturbance to herder winter camps by the relocation of camps within this zone. Herders may freely access this land for summer pasture grazing but permanent winter camps within the zone were relocated in 2005. The buffer zone is 10km in radius from the centre of the Mine Licence Area. This represents a land use planning mechanism that has resulted in the relocation of a number of herder winter shelters. Road alignments have alternatively used a separation distance concept to avoid disturbance to existing winter shelters wherever possible.

- Gunii Hooloi water abstraction borefield and the water pipeline supplying the mine, as well as maintenance roads, pumping stations, construction camps, storage lagoons and other support infrastructure;
- Infrastructure improvements (and associated resource use) by Oyu Tolgoi between the mine site and the Chinese border, including the 220 kV power transmission line, the access road (which will be used for concentrate export), construction camps, local water boreholes and borrow pits;
- Dedicated border crossing at Gashuun Sukhait for the exclusive use of the Oyu Tolgoi Project; and
- Concentrate will be sold by Oyu Tolgoi at the Mongolia/China border crossing at Gashuun Sukhait. This point of sale marks the Mongolia/China border as a key boundary to the Project Area.

Infrastructure Components that may be Transferred to Third-Party Ownership in the Future

A number of infrastructure components of the Project will be constructed by Oyu Tolgoi but may be transferred at some stage to public or third-party operation and/or ownership. Transfer of these infrastructure components to public operation and ownership will limit the degree of control that Oyu Tolgoi can exert over their management and operation. These infrastructure components may be owned and operated by the Government and will (or may be) used by members of the public and/or other commercial operations, and include:

- The final Permanent Airport (which is planned to be handed over to the Government after the completion of the Project construction phase);
- The road from Oyu Tolgoi to the Chinese border at Gashuun Sukhait (this road follows the alignment for the designated national road, and is planned to be handed over to the Government upon completion of the Project construction phase);
- The dedicated border crossing facility at Gashuun Sukhait (to be operated by the Mongolian authorities); and
- The 220 kV electricity transmission line from the Chinese border to Oyu Tolgoi (which may become owned by the Government of Mongolia).

The infrastructure elements identified above have been considered part of the Project for the purposes of this ESIA.

Future project elements not directly addressed in this ESIA

In addition to the Project elements identified above, there are certain other activities and facilities that are expected to be developed over time, either as part of or in support of the Project, that do not constitute part of the Project for the purposes of this ESIA. These include:

- Project expansion to support an increase in ore throughput from 100,000 tpd up to 160,000 tpd; and
- Long-term Project power supply. Under the terms of the IA, Oyu Tolgoi will source electricity from within Mongolia within four years of the commencement of Project operations. Oyu Tolgoi is developing a coal-fired power plant located within the Oyu Tolgoi Mine Licence Area to provide the required power from Mongolian sources. This development is considered to be an Associated Facility[16] of the Oyu Tolgoi Project, and is the subject of an ESIA that is supplemental to this ESIA for the Oyu Tolgoi Project.

While the impacts of these future Project elements (and their mitigation and management) are not directly addressed in this ESIA they are considered in the cumulative impact assessment, as discussed in *Section 1.5.2* below.

[16] Defined in IFC Performance Standard 1 as follows: "*associated facilities that are not funded as part of the project (funding may be provided separately by the client or by third parties including the government), and whose viability and existence depend exclusively on the project and whose goods or services are essential for the successful operation of the project*"

1.5.2 Definition of the 'Project Area of Influence'

The *"Project Area of Influence"* includes the Project and the following elements that are not planned to be funded as part of the Project, but which are integral to overall project development:

- Local roads, such as the road between Khanbogd and the Oyu Tolgoi site, and other roads used regularly by the Project; and
- Communities or individuals who may provide employees or services to the Oyu Tolgoi site, the local and regional transport network and local services and utilities. Specifically, this includes the Khanbogd soum and Khanbogd soum centre (see *Figure 1.7*).

Activities within the Project Area of Influence (but which are outside the Project) are not under the direct control of Oyu Tolgoi[17].

Scope of Impact on Communities and Community Members

The potential impacts of the Project on the human environment may extend farther than the direct physical impacts of the Project on the biophysical environment. As a result, the Project Area of Influence (for the purposes of this assessment) also extends to include:

- Communities and community members that will be directly affected by the Project in ways that are foreseeable and within the reasonable control of the Project during construction, operations and closure (including economically and physically displaced persons such as herder households whose winter camps and access to traditional summer pastures may be affected by the Project);
- Communities and community members that may be directly affected by population influx (e.g. effects on water supply, wastewater, solid waste, housing and other public services or facilities), including Khanbogd soum and Khanbogd soum centre; and
- Communities and herder households that may be impacted by potential changes to local and regional groundwater supplies in the Gunii Hooloi basin, downstream of the Oyu Tolgoi site and along transportation corridors where access to, and water supplies in, established herder wells may be affected.

The following figures provide an overview of the key features within the Mine Licence Area and the wider Project Area of Influence.

[17] The term "Project Area" is used within the ESIA report as short-hand to refer to the Project Area of Influence, particularly in respect of socio-economic matters where it refers to the *soums* of Khanbogd, Bayan-Ovoo, Manlai and Tsogttsetsii and the *aimag* capital Dalanzadgad.

Figure 1.6: Key Project Features in the Mine Licence Area

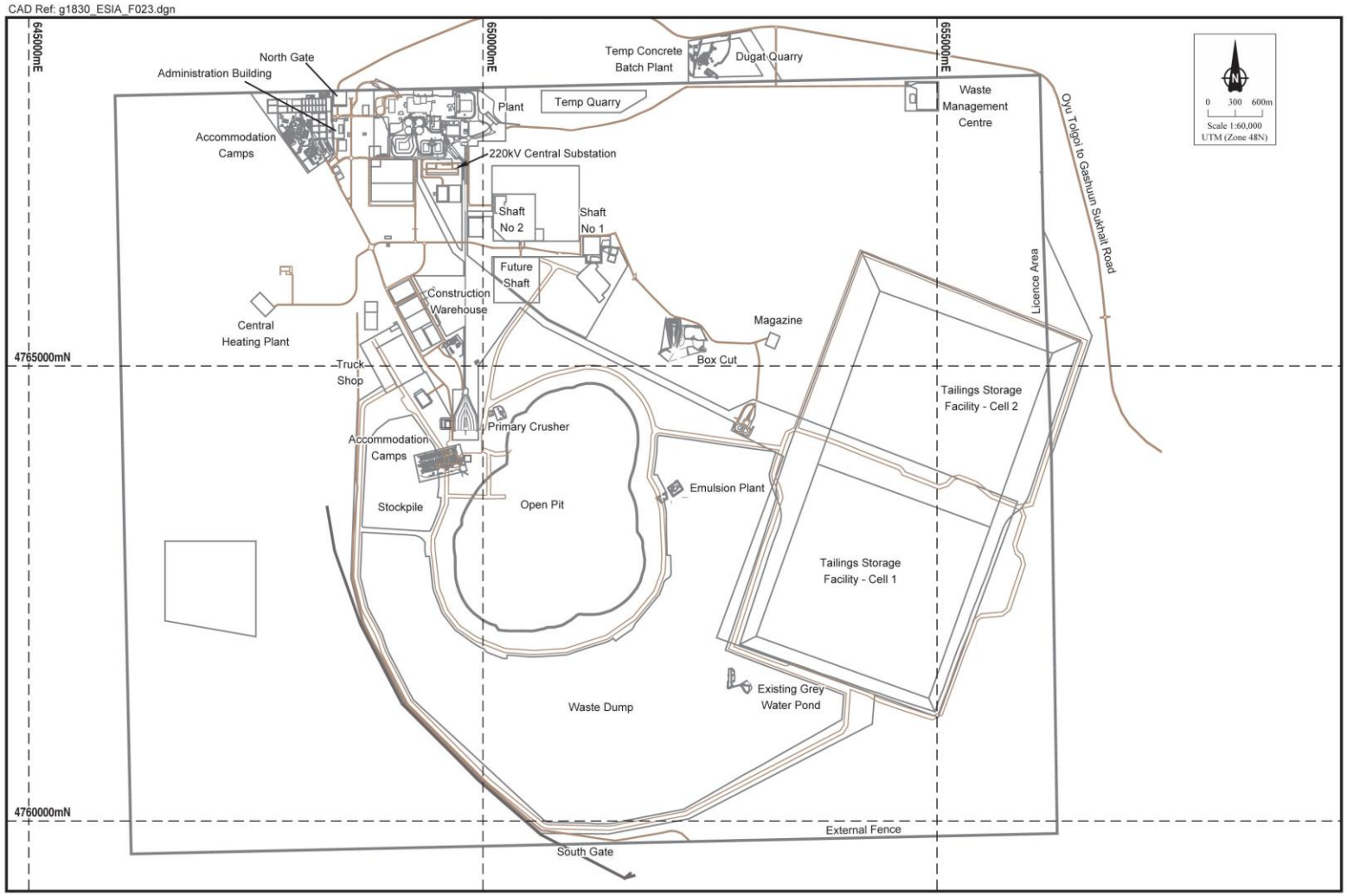
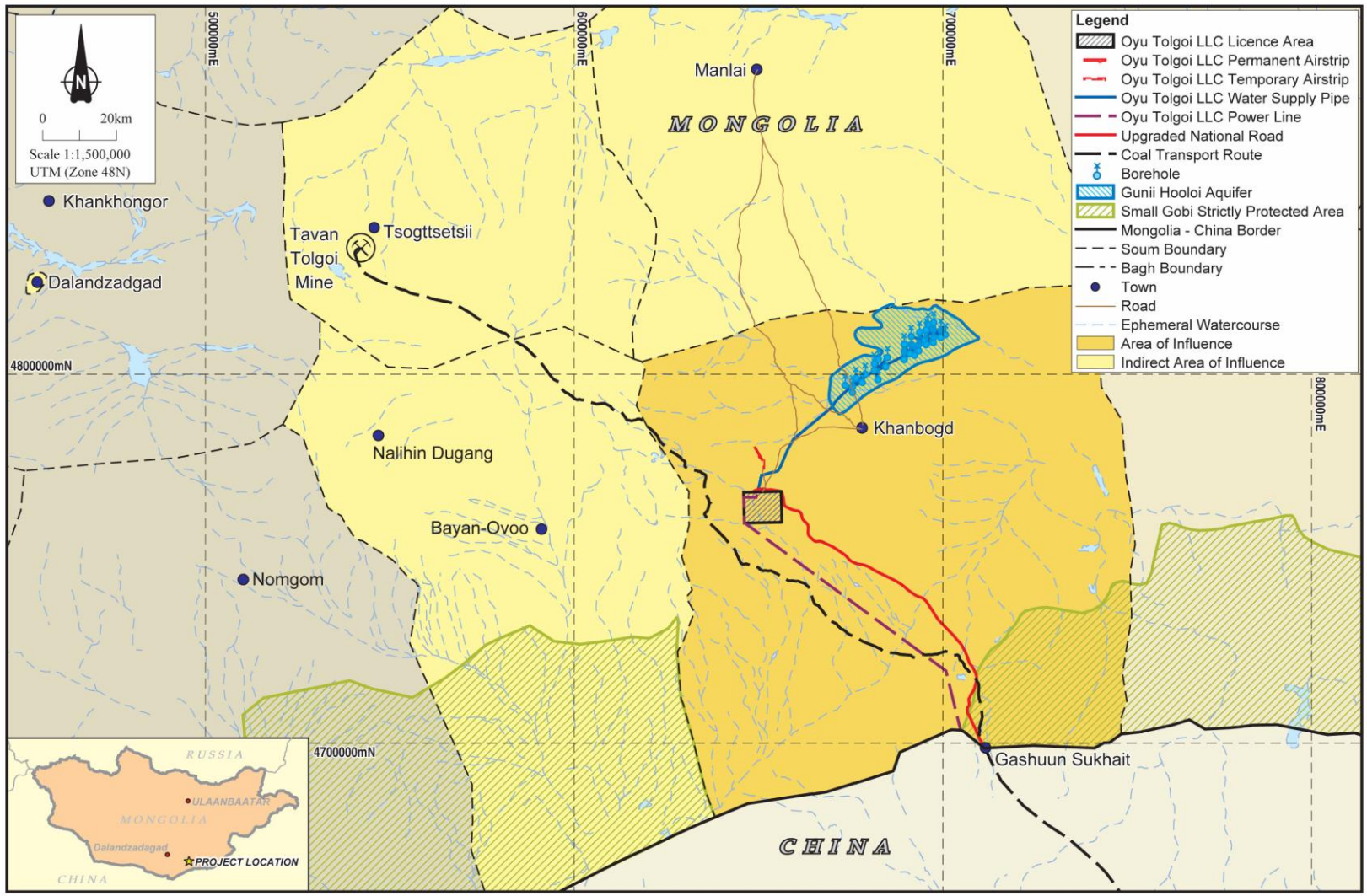


Figure 1.7: Project Footprint and Area of Influence



1.5.3 Cumulative Impacts

Cumulative impacts are defined as:

The combination of multiple impacts from existing projects, the proposed project, and/or anticipated future projects [which] may result in significant adverse and/or beneficial impacts that would not be expected in case of a stand-alone project[18].

Cumulative impacts may occur to geographical areas, communities and other stakeholders affected by further planned development of the Project and also the impacts of the Oyu Tolgoi Project where they may combine with impacts from other existing or planned projects or other trends and developments. This will include:

- Macro-economic impacts across the Mongolian economy;
- Communities and infrastructure in the South Gobi region (for example related to influx, economic changes, and pressure on infrastructure). Specifically, within Omnogovi aimag, this includes the soums of Khanbogd, Bayan-Ovoo, Manlai and Tsogttsetsii and the aimag capital Dalanzadgad;
- Biodiversity impacts related to the fragmentation of ecosystems by roads and other infrastructure; and
- Water resources (for cumulative impacts) in terms of both shallow aquifers for herder water supplies and deep aquifers for potential industrial water supplies.

This ESIA addresses a Project with a 27-year design life. It is anticipated that the Project will continue in operation well after that date, and may also be expanded. Plans for such developments are still at an early stage, so while reference is made in this ESIA to the potential extended life of the Project, limited detailed information or plans are available and therefore such expansion is not evaluated in this ESIA.

Similarly, a number of future developments of Project Associated Facilities are still under evaluation and no clear decision has yet been made as to the preferred approach to be adopted by the Project. These include:

- The potential for a future rail link to be constructed from the South Gobi into China for the export of coal from the Tavan Tolgoi area. If the rail link is constructed, the Project would propose the construction of a spur line from the Oyu Tolgoi site to join the rail link. This would have significant impacts in terms of reducing the volume of heavy vehicle movements transporting concentrate from Oyu Tolgoi and coal from other mines into China. This is a decision that is being evaluated by the Government and is not under the control of the Project.
- The future power supply for the Project. In accordance with the IA, power will be supplied during the first four years of Project operations from China by the Inner Mongolia Power Company after which Oyu Tolgoi is required to source electricity from within Mongolia.

Cumulative impacts are considered in *Chapter C13: Cumulative Impacts*. The assessment of cumulative impacts considers the socio-economic and environmental cumulative effects of multiple projects within the South Gobi region and also considers the potential impact of increasing the production capacity and the operational lifetime of the Oyu Tolgoi Project.

1.6 ESIA STRUCTURE

The ESIA has been prepared to provide an integrated social and environmental assessment of the Oyu Tolgoi Project across all social and environmental media and across phases of the Project. The ESIA draws on a range of project component-specific DEIAs previously prepared for Mongolian approval purposes and a socio-economic impact assessment (SIA) that was prepared by Oyu Tolgoi to assist in understanding socio-economic issues associated with the Project[19].

The ESIA is structured into five principal sections as follows:

[18] International Finance Corporation Guidance Notes: Performance Standards on Social and Environmental Sustainability, 31 July 2007. Para. G22.

[19] These reports are described in more detail in *Chapter A3: Methodology*.

- **Non-Technical Summary:** This provides a non-technical summary of the Project, its key features, potential environmental and social impacts, and how the Project proposes to manage those impacts to an acceptable level. It describes public consultation and disclosure undertaken by the Project and provides key contacts for further information.
- **Section A – Introduction:** This section provides background information relating to the Project and the legal and regulatory framework within which the Project will operate. It defines the Project, the alternatives to the Project and within the Project design, and outlines the purpose and scope of this ESIA as well as previous environmental and social assessments that have been undertaken.
- **Section B – Baseline Assessment:** This section describes the existing environmental and social baseline for the Project Area, divided into the biophysical and social environments. Key sensitivities are summarised at the end of each chapter.
- **Section C – Impact Assessment:** This section describes the processes used to assess environmental and social impacts for all Project components, and the results of the assessment. This includes cumulative impacts related to other projects in the region. The section also sets out a summary of proposed impact mitigation measures.
- **Section D – Environmental & Social Management Plans:** This section provides detailed information on how the Project will seek to manage environmental and social impacts across the Project's area of influence.

1.7 FURTHER PROJECT DETAILS

Further details on the Project are available on the Ivanhoe website: www.ivanhoemines.com, on the Oyu Tolgoi website: www.ot.mn, and on the Rio Tinto website: www.riotinto.com.

GLOSSARY OF ABBREVIATIONS

µg/m^3	Microgram
a.m.s.l	Above mean sea level
AASTO	American Association of State Highway Transportation Officials
AER	Oyu Tolgoi Annual Environmental Report
AIFO	Italian Development Organisation
Aimag	Province
Al	Aluminium
ANC	Acid Neutralizing Component
ANFO	Ammonium Nitrate Fuel Oil
ANZEC	Australian and New Zealand Environmental Council
API	American Petroleum Institute
ARD	Acid Rock Drainage
ARI	Average Return Interval
As	Arsenic
ASM	Artisanal Mining
Bagh	Sub district of a soum
BCG	Bacillus Calmette-Guérin (vaccine against tuberculosis)
BIBO	Bus-In-Bus-Out
Blb	Billion pounds
Bn	Billion
BPA	Border Protection Authority
CBO	Community Based Organisation
CCC	Consolidated Construction Camp
Cd	Cadmium
CEDAW	United Nations Committee on the Elimination of Discrimination Against Women
CELM	Central Environmental Monitoring Laboratory
CEMS	Continuous Emissions Monitoring System
CES	Mongolian Central Electricity System
CFB	Circulating Fluidised Bed
CFB	Coal Fired Boiler
CHA	Critical Habitat Assessment
CHP	Combined heat and power plant
CHP	Cultural Heritage Programme
CHP	Coal-fired Heating Plant
CHSSP	Community Health, Safety and Security Programme
CICA	Convention on International Civil Aviation
CIS	Catering International Services
cm	Centimetre
CMTU	Confederation of Mongolian Trade Unions
CO	Carbon monoxide
Co	Cobalt
CO_2	Carbon dioxide
CPI	Consumer price index
CPR	Centre for Policy Research
Cr	Chromium
CRSD	Community Relations and Sustainable Development Team
CSIRO	Commonwealth Scientific Research Organisation
Cu	Copper
d	Day
DaFs	Dioxins and Furans
dB	Decibel
dB(A)	A weighted decibel
DCS	Distributed Control System

DEIA	Detailed Environmental Impact Assessment
DIDOP	Detailed Integrated Development and Operations Plan
DMP	Dust monitoring location
DNL	Day Night average sound Level
DPS	Diesel Power Station
EBRD	European Bank for Reconstruction and Development
ECL	Engineered Clay Liner
EDC	Export Development Canada
EITI	Extractive Industries Transparency Initiative
EMS	Environmental Management System
EP	Equator Principles
EPCM	Engineering, Procurement, Construction Management
EPP	Environmental Protection Plan
ERT	Emergency Response Team
ES	Ecosystem Services
ESR	Ecosystem Services Review
ESS	Ecosystem Services Screening
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
EU	European Union
FDP	Family Doctor Practice
Fe	Iron
FEL	Front End Loaders
FGD	Focus Group Discussion
FGP	Family Group Practice
FIFO	Fly-In-Fly-Out
FS	Factors of Safety
g	Gram
GAP	Gross Agricultural Products
GDP	Gross Domestic Product
GG	Galbyn Gobi
GH	Gunii Hooloi
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GIS	Gas Insulated Switchgear
GIS	Geographical Information System
GNI	Gross National Income
GoM	Government of Mongolia
GPN	Good Practice Notes
GS	Gashuun Sukhait
GTZ	German Technical Organisation
GWh	Gigawatt hour
ha	Hectare
HAZCHEM	Hazardous chemicals
HCl	Hydrochloric acid
HDI	Human Development Index
HDPE	High-density polyethylene
Hf	Hydrogen Fluoride
Hg	Mercury
HGV	Heavy Goods Vehicle
HH	Herder Household
HIA	Health Impact Assessment
HLIP	Herder Livelihood Improvement Programme
HRR	Health Resources Review

HSMP	Health and Safety Management Plan
HSMS	Health and Safety Management System
Hz	Hertz
IA	Investment Agreement
IBA	Important Bird Area
ICAO	International Civil Aviation Organisation
ICCPR	International Covenant on Civil and Political Rights
ICMM	International Council on Mining and Metals
ICOLD	International Commission on Large Dams
ICOMS	International Commission on Monuments and Sites
ICT	Information and Communication Technology
IDOP	integrated development and operations plan
IDP	Integrated Development Plan
IFC	International Finance Corporation
IFI	International Financial Institutions
ILO	International Labour Organisation
IMAR	Inner Mongolia Autonomous Region
IMF	International Monetary Fund
IMMI	Ivanhoe Mines Mongolia Inc LLC
IMPC	Inner Mongolia Power Company
INMAR	Inner Mongolia Autonomous Region
IPCC	Intergovernmental Panel on Climate Change
IPECON	Initiative for People-Centred Conservation
ITRB	Independent Tailings Review Board
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
JIL	Jiayou International Logistics
kg/ha	Kilogram per hectare
Khoroos	Urban subdistrict
km	Kilometre
KOICA	Korean International Cooperation Agency
KPI	Key Performance Indicator
KTKK	Khukh Tenger Khugjil Konsortium
kV	Kilovolts
KW	Kilowatt
L	Litre
L/s	Litres per second
L/t	Litres of water used per tonne
LA_{eq}	Equivalent continuous level
LAG	Local Advisory Group
LA_{max}	The highest A weighted noise level recorded during a noise event
LA_{min}	The minimum A weighted noise level recorded during a noise event
Lden	Day evening and night level
LFPR	Labour Force Participation Rate
Lin peak	Linear peak - the maximum level of air pressure fluctuation measured in decibels without frequency weighting
Lnight	Night level
LPG	Liquefied Petroleum Gas
LRF	Livelihood Restoration Framework
LRPI	Local Regional Planning and Infrastructure
m	Metre
m.a.s.l	Metres above sea level
m/s	Metre per second
m^3	Cubic metre
m^3/s	Cubic metre per second
$m^{3/}s/kW$	Metres cubed per second per kilowatt

Ma	Million years
MA	Millennium Ecosystem Assessment (UN sponsored)
MARC	Maintenance and Repair Contract
MASIA	Mongolian Academy of Science Institute of Archaeology
MBDA	Mongolian Business and Development Agency
mbgl	Metres below ground level
MDE	Maximum Design Earthquake
MDG	Millennium Development Goal
MEP	Mechanical, Electrical and Pipe
MIC	Maximum Instantaneous Charge
MIHT	Mongolian International Heritage Team
ml	Millilitre
mm	Millimetre
mm/sec	Millimetres per second
Mm^3	Million cubic metres
MMI	Modified Mercalli Intensity
MMR	Maternal Mortality Ration
Mn	Million
MNET	Ministry of Nature Environment and Tourism
MNT	Mongolian Tugrug (tögrög)
MOE&S	Mongolian Ministry of Education and Science
MOH	Mongolian Ministry of Health
MoSWL	Ministry of Social Welfare and Labour
Moz	Million ounces
MRPAM	Mineral Resources and Petroleum Authority of Mongolia
MRSM	Mongolian Society for Range Management
MRTCUD	Ministry of Roads, Transport, Construction and Urban Development
MSDS	Material Safety Data Sheets
Mt	Million tonnes
mtpa	Million tonnes per annum
MW	Mega Watt
NAF	Non-Acid Forming
NBCC	National Building Code of Canada
NEMA	National Emergency Management Association
NER	Net Enrolment Ratio
NGO	Non-Governmental Organisation
Ni	Nickel
nm	Nanometre
NO_x	Oxides of nitrogen
NNI	No net loss
NPI	Net Positive Impact
NSO	Mongolian National Statistics Office
O_3	Ozone
OBE	Operating Basis Earthquake
OHS	Occupational Health and Safety
OSBL	Outside Battery Limits
OSH	Occupational Safety and Health
OT	Oyu Tolgoi
OT-GS	Oyu Tolgoi to Gashuun Sukhait
Oyu Tolgoi LLC	Project Proponent
PAF	Potentially Acid Forming
PAPs	Project Affected Peoples
Pb	Lead
PE	Person Equivalent
PEDS	Personal Emergency Device System
PEM	Participatory Environmental Monitoring

PM	Particulate Matter
PM_{10}	Particulate Matter of less than 10 microns in diameter
$PM_{2.5}$	Particulate Matter of less than 2.5 microns in diameter
PMC	Project Management Contractor
PMCP	Preliminary Mine Closure Plan
PMT	Project Management Team
PPE	Personal Protective Equipment
PPPs	Public Private Partnerships
PPV	Peak Particle Velocity
PRA	Property Relations Agency
PR	Performance Requirement (EBRD)
PS	Performance Standard (IFC)
PTRC	Population Training and Research Centre
PUG	Pasture User Group
PWM	Participatory Water Monitoring
QA/QC	Quality Assurance/Quality Control
QH	Quality Hectares
RAP	Resettlement Action Plan
RC	Reverse Circulation
RCAG	Research Centre of Astronomy and Geophysics
READ	Rural Education and Development Project
ROM	Run-Of-Mine
SAG	Semi-Autonomous Grinding
SAM	Illegal artisanal and small-scale mining
SBR	Sequencing Batch Reactors
SEA	Sustainability East Asia
SEMP	Socio-economic Action Plan
SEP	Stakeholder Engagement Plan
SGRDC	Southern Gobi Regional Development Council
SGSPA	Small Gobi Strictly Protected Area
SGSS	Second Generation Sentinel Surveillance
SHI	Social Health Insurance
SIA	Socio-economic Impact Assessment
SINC	Social Insurance National Council
SME	Small and Medium Enterprise
SMS	Social Management System
SO_2	Sulphur dioxide
Soum	Region
SRI	US Statistical Research Inc
SSI	Semi-Structured Interviews
SSIGO	State Social Insurance General Office
STI	Sexually Transmitted Infection
STP	Sewage Treatment Plant
t/h	Tonnes per hour
TAPM	A prognostic meteorological model that is integrated with an air dispersion model
TDS	Total Dissolved Solids
TEM	Transient Electromagnetic
TFR	Total Fertility Rate
tpd	Tonnes per day
TSF	Tailings Storage Facility
TSP	Total Suspended Particles
TVET	Technical and vocational college
U.S. EPA	United States Environmental Protection Agency
UBC	Uniform Building Code
UHG	

UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
USEBS	Umnugovi Social, Economic and Environmental Baseline Survey
UTM	Universal Transverse Mercator coordinate system
VAT	Value Added Tax
VOCs	Volatile Organic Compounds
VPN	Virtual Private Network
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network
WBCSD	World Business Council's Sustainable Development
WG	Working Group
WHO	World Health Organisation
WMF	Waste Management Facility
WPT	Windfall Profits Tax
WRD	Waste Rock Dump
WWF	World Wildlife Fund
WWMD	World Water Monitoring Day
WWTP	Waste Water Treatment Plant
Zn	Zinc