Oyu Tolgoi ESIA: Supplemental Appraisal
Oyu Tolgoi to Gashuun Sukhait Road: Zone 3 Alignment

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1. INTRODUCTION

This Supplemental Appraisal is an internal document prepared by Oyu Tolgoi LLC (OT) for internal assessment process. It addresses changes to the "Project"[1] as described and assessed in the Oyu Tolgoi Environmental and Social Impact Assessment (ESIA)[2] and subsequent Diversion Road Supplemental Appraisal[3].

OT has made further changes to the proposed design, construction and operation of the road in Zone 3 of the Oyu Tolgoi to Gashuun Sukhait infrastructure corridor (the "New Road") from Tsagaan Khad to the customs port at the Mongolian-Chinese border;

The New Road (*Figure 1*) will be a permanent paved road, adjacent to the Energy Resources (ER) toll road, with an alignment that follows the current unsealed Diversion Road for approximately one third of its length. When operational, the New Road will take traffic from north to south and the ER Road will take traffic south to north, with the overarching objective of having an integrated highway rather than a number of different route options between Tsagaan Khad and the Mongolian-Chinese border. Construction of the New Road is planned to commence in July 2015.

This Supplemental Appraisal describes:

- the rationale behind the proposed change, including a summary of planning history and alternatives considered;
- compliance with the legal and project requirements that are relevant to the development activity, (noting that regulatory approval of the New Road is being undertaken separately);[4]
- the potential impacts and risks arising from these activities relative to baseline environmental and social conditions;
- the mitigation measures implemented to minimise adverse impacts;
- the significance of residual risks; and
- monitoring and management in terms of OT's Environmental and Social Management Plans (ESMPs).

For the purposes of assessment, the baseline conditions in this Supplemental Appraisal have been described from information provided in the OT ESIA disclosed in August 2012[5]; the 2012 Diversion Road DEIA[6]; the 2012 Diversion Road Supplemental Appraisal[7] and the Baseline for the 2015 New Road DEIA[8]. Mitigation measures have been taken from OT's Operational Management Plans (OMPs), which were developed as part of the ESIA. Requirements listed in the Diversion Road Land Disturbance Permit

[1] For the purposes of the ESIA, the "Project" constitutes the direct activities that OT can exert control and influence through its project design, impact management and mitigation measures. The infrastructure corridor from Oyu Tolgoi to Gashuun Sukhait was included as a Project element that was directly assessed in the ESIA.

[2] Oyu Tolgoi (2012) Environmental and Social Impact Assessment.

[3] Oyu Tolgoi (2012) ESIA Supplemental Appraisal, Diversion Road and Realignment Road.

[4] Regulatory approval is being sought by OT separately from this Supplemental Appraisal; from the Ministry of Roads and Transportation and the Ministry of Environment and Green Development, as required under Mongolian Law.

[5] Oyu Tolgoi (2012) Environmental and Social Impact Assessment.

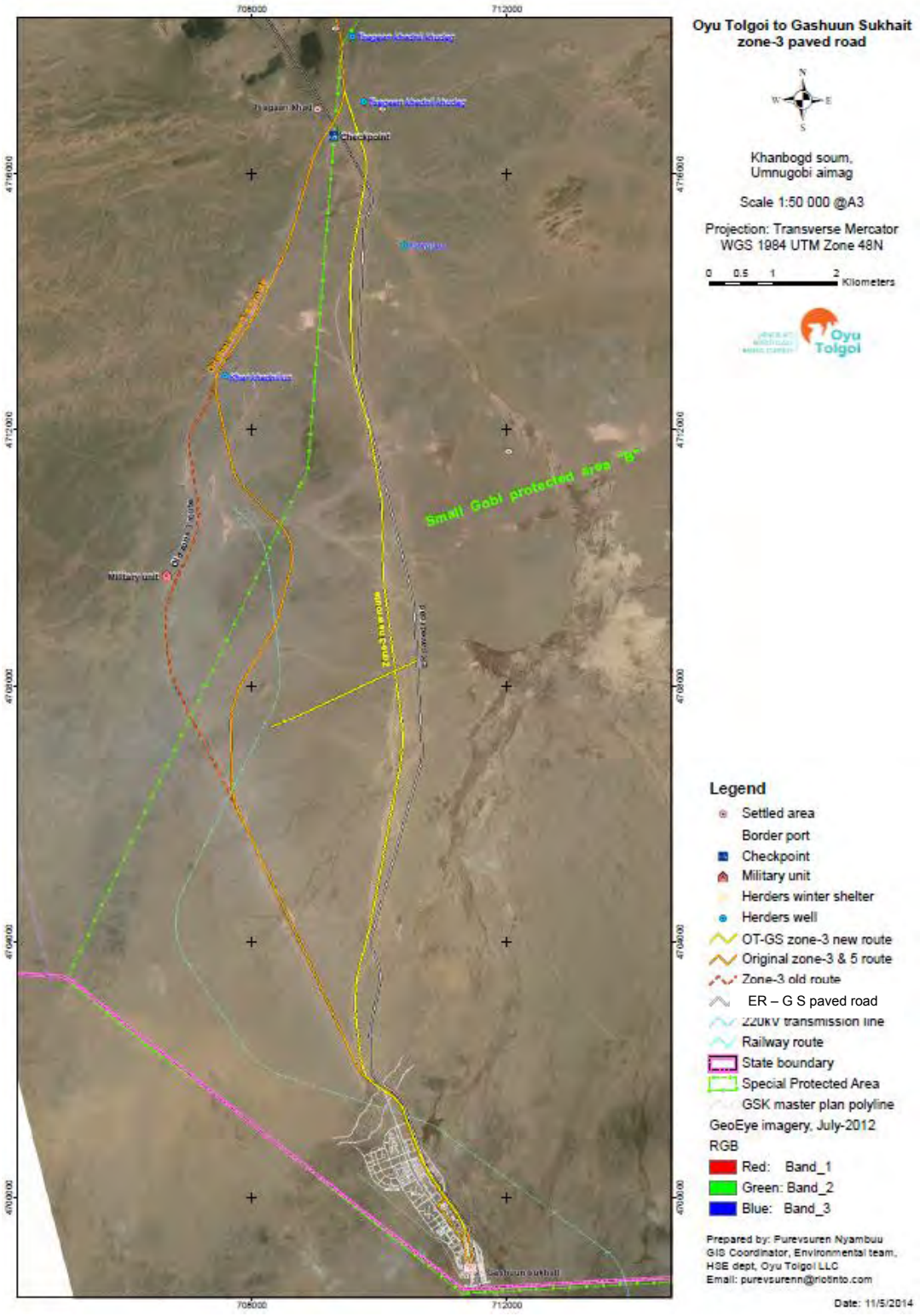
[6] Nature Friendly (2012) Oyu Tolgoi – Gashuun Sukhait road, Zone 3, Road Diversion Detailed Environmental Impact Assessment.

[7] Oyu Tolgoi (2012) ESIA Supplemental Appraisal, Diversion Road and Realignment Road.

[8] JEMR LLC (2014) Baseline for the 2015 Tsagaan Khad to Gashuun Sukhait Paved Road DEIA, DRAFT.

(LDP) as previously issued for internal risk management control by OT[9], have also been considered. Any further sources of mitigation have been referenced.

Figure 1: New Road Route



[9] The Diversion Road LDP is considered to assess a similar area to the New Road corridor. The LDP process for the New Road will be triggered when the Feasibility Study and Detailed Environmental Impact Assessment for the New Road have been completed.

The requirements of OT's Stakeholder Engagement Plan (OT-05-PLN-001) have been implemented in parallel to this assessment process.

1.1 PROJECT RATIONALE

The rationale for the proposed change to the route are:

- The need to rationalise the road approaches to Gashuun Sukhait into a single integrated road system that can cope flexibly with all vehicle traffic (OT vehicles, coal trucks and public vehicles);
- Long-term stability for OT in terms of having a road alignment approved and in operation that will be subject to the minimum change and interference in the future;
- Alignment with the Energy Resources (ER) toll road will minimise the environmental footprint through the removal of multiple road alignments as they cross the SGSPA B;
- Improved road safety by the use of one-way roads; and
- The existing approved route is now traversed by a planned railway (not under the control of OT) in three places, whereas the revised alignment is crossed by the planned railway in a single location.

1.2 ALTERNATIVES AND CONSTRAINTS

1.2.1 Alternative Alignments

There is currently a convergence of authorised and informal roads leading to the Mongolian/Chinese border crossing at Gashuun Sukhait in the southern section of the SGSPA B. The number of different roads is the result of infrastructure development by various organisations independently operating within the south Gobi area.

OT have considered a number of alternative alignments since initially planning the route to Gashuun Sukhait. Planning has evolved as a result of a number of internal and external influences. In summary:

- **The Original Alignment**, as described and assessed in the ESIA[10]. The Original Alignment is a national road, which was due to be upgraded by OT to a national specification sealed bitumen road to be used by OT and general traffic, and was assessed as part of the ESIA.

  OT was required to comply with a Directive from the Government of Mongolia to move the national road further away from a military installation which added to construction constraints. This was assessed as separately as the "Realignment Road" in 2012[11]. Severe congestion from coal trucks using the section of the Original Alignment Road from Tsagaan Khad to Gashuun Sukhait made access to the border increasingly difficult and dangerous for OT traffic, and prevented construction of the national road along this section.

- **The New Road alignment** will be a permanent paved road, adjacent to ER Road and following the Diversion Road for 6.4 km of its 18.6 km length. When operational, the New Road will take traffic from north to south and the ER Road will take traffic south to north, with the overarching objective of having an integrated highway rather than a number of different route options between Tsagaan Khad and the Mongolian-Chinese border.

  The purpose of altering some of the alignment from the Diversion Road route has been to straighten the alignment, in order to reduce its impact and make the road safer (as there will be more gradual bends).

[10] Oyu Tolgoi ESIA (2012) Section A: Introduction and Background. Chapter A4 – Project Description; and Chapter A5 – Analysis of Alternatives.

[11] Oyu Tolgoi (2012) ESIA Supplemental Appraisal, Diversion Road and Realignment Road.

The New Road will remove the need for existing multiple road alignments crossing the SGSPA B, minimise the environmental footprint of this route corridor. The New Road will also improve road safety through the use of one-way roads acting as a single integrated system

- **The ER Road** was built by a consortium of coal companies, led by Energy Resources (ER), to provide a paved road with dedicated access between Tsagaan Khad and the border, for use by their coal trucks. The ER Road imposes a toll, which has resulted in a number of vehicles driving off road or using the national road to avoid tolls; and imposes weight restrictions, which further limits its use by coal trucks, many of which exceed the stipulated weight limit[12].
- **The unsealed Diversion Road** was used to construct the ER Paved Road. OT has previously identified this route as the most appropriate alternative to deviate vehicles whilst the upgrade of the national road was undertaken. Due to a slowdown in coal exports in 2013-2014, OT have been able to use the ER Road as it is less congested, and as the Original Alignment was not upgraded due to congestion reasons. The unsealed Diversion Road was not used by OT despite being proposed for use by OT, and manned gates were installed at either end to present coal trucks from using the road.

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1.2.2 Regulatory and Permitting Constraints

Options for alternatives are constrained by the regulatory framework that governs designated protected areas and the need for a long-term solution to the final road alignment to the border that involves multi-party negotiations. All road alternatives are located within the border "buffer zone" with China, and are therefore controlled by the General Authority for Border Protection.

The entire length of the New Road, Diversion Road and ER Road are located within the Limited Use Zone of the SGSPA B. Part of the Original Alignment is within the SGSPA B Limited Use Zone, with the remainder in the SGSPA B Buffer Zone (where the development of this infrastructure is subject to the Law on Buffer Zones (1997)). The process to obtain relevant approval for the New Road is being sought separately to this report.

1.2.3 New Road Alignment Represents the "Best" Approach

It is considered that the positive impacts of constructing the New Road, which is an additional two lane sealed road running adjacent to the ER Road, will outweigh the negative impacts of constructing a road in the SGSPA B Limited Use Zone.

The New Road alignment builds on the existing approach of OT to minimise the environmental impact of the road approach to Gashuun Sukhait and has been developed in consultation and cooperation with ER.

Positive impacts include:

- reducing the broad scale land disturbance brought about by the use of unsealed roads and off-road driving;
- improving traffic safety by introducing one-way traffic; the alignment is the shortest distance when compared with the alternatives;
- the alignment is in an existing road corridor as it, where possible, follows the existing alignment of the ER Road (400 m maximum distance from it); and
- improving construction safety by allowing for road construction without having to divert traffic using a national road.

. The avoidance of all impacts in an environmentally-sensitive area has not been possible due to practical location constraints and therefore mitigation measures are to be implemented to minimise

[12] OT traffic does not exceed stipulated weight limits as all outgoing trucks are carefully weighed to ensure that they do not exceed axle weights and comply with Mongolian Requirements and Project Standards

impact in accordance with the mitigation hierachy. Importantly, the construction of adjacent roads means that while all adverse impacts could not be avoided, they have been minimised as far as practical.

1.3 CURRENT SITUATION

The upgrade of the national road section between the Oyu Tolgoi mine site and Tsagaan Khad is complete.

The Original Alignment for the road section between Tsagaan Khad and Gashuun Sukhait followed the existing unpaved road, known as the "Coal Road", which runs parallel to the western border of the South Gobi Special Protected Area (SGSPA) B section, and continued through the Limited Use Zone of the SGSPA B to Gashuun Sukhait.

1.3.1 Realignment Road

The Original Alignment was required to be realigned in 2011 to avoid a Mongolian military post ("the Realignment Road"), however, due to safety concerns from heavy coal truck traffic on the road that was to be upgraded, OT was unable to upgrade the road for its use during 2011. OT sought an alternative alignment to use in the interim and selected the unsealed "Diversion Road" which followed the route of a road used by Energy Resources (ER) during the construction of the ER Paved Road. These changes to the Project were subject to a Supplemental Appraisal which was disclosed to Lenders and approved in 2012[13].

The Realignment Road has not been constructed, the Diversion Road is not in use and OT is currently using the ER Road, along with ER and TT vehicles, public light vehicles and state vehicles.

1.3.2 Long-Term Planning: The New Road

OT has recognised from the outset that a long-term solution to traffic management between Tsagaan Khad and from the border crossing at Gashuun Sukhait was required. This was complicated by the uncertainty over the plans for other transport alignments within the approach to the border crossing. It was recognised that any long-term solution would require coordination with both ER and the Mongolian authorities. OT has actively engaged stakeholders on this matter since the issue first arose in 2011. ER and OT have now agreed on a way forward and are combining their resources to create a four-lane integrated highway that connects Tsagaan Khad with the border crossing at Gashuun Sukhait.

OT is planning to construct and use a permanent paved road ("New Road") that runs broadly parallel to the existing ER road between Tsagaan Khad and Gashuun Sukhait. Once operational, the New Road and the ER Road will become a four-lane integrated highway (two lanes each way) available for OT, ER and other traffic to and from the Gashuun Sukhait border crossing. It is expected that the New Road will carry traffic exiting Mongolia (north to south), and the ER Road will carry traffic that has entered Mongolia from China (south to north).

The New Road (Figure 1) will run from the current intersection with the National Road to/from Oyu Tolgoi and Khanbogd, and the ER Road immediately to the south of Tsagaan Khad to the entrance/exit of the customs facilities at the Gashuun Sukhait border crossing.

The New Road alignment lies to the west of the ER toll road and at its farthest extent is no more than 400 m from it. The route follows the current unsealed Diversion Road route as far as possible (6.4 km of a total length of 18.6 km), but has been modified to avoid a number of sensitive habitat areas, and to take account of the route of a railway which is being planned by the Government.

A traffic study undertaken as part of the Feasibility Study indicated that in the first year of operation, there will be an average of approximately 600 haulage vehicles and 50 passenger vehicles using the road per day. In 2034, it has been estimated that there will be an average of approximately 1,100 heavy haulage vehicles and 600 passenger vehicles using the road per day[14].

[13] Oyu Tolgoi (2012) ESIA Supplemental Appraisal, Diversion Road and Realignment Road.

[14] The baseline traffic volume was calculated from Road Supervision and Research Center data and Gashuun Sukhait port data

1.3.3 Key Characteristics of the New Road

The project design of the New Road is summarised below.

Alignment and dimensions

- The New Road alignment runs west of the existing ER Road with a maximum separation of 400 m between the two roads.
- The total width of the road is 12 m with 8 m paved surface and 2 m shoulders on each side.
- The New Road will overlay the existing unsealed temporary diversion road for a distance of 6.4 km (ie for approximately one third of its length).
- The New Road design passes to the east of the current ER Road checkpoint, effectively straightening the alignment.
- The total length of the planned road is 18.6 km.

Planned structures of the road

- Surface drainage will be facilitated by 16 concrete culverts of 1 m diameter and one 2x2 m box culvert located in areas where surface water flows have been identified.
- Livestock crossings are planned. These will be similar to the design used on the Oyu Tolgoi road north of Tsagaan Khad, with a ramp on either side of the road to allow animal and herders to cross the road without having to climb road shoulders. The location of the crossings is yet to be determined.

Land disturbance

- The total area of surface soil disturbance is estimated at 516,200 m^2.
- Approximately 233,000 m^3 of earth will be moved for filling, excavation, drainage and for the road shoulders.

River crossings

- There is no permanent water in the Project area, but the proposed road will cross two major ephemeral drainage systems.
- A 170 m long floodway will be constructed where the road traverses a drainage system located approximately 1.5 km south of Tsagaan Khad comprising of 16 concrete pipe culverts with 1 m diameter located along the route.
- A 2 x 2 m box culvert will also be incorporated into road design for the crossing of the southern significant drainage feature located 2 km north of the Gashuun Sukhait border crossing point.

Road signs

- There will be 23 road signs, 18 distance signs, and 3 information signs installed along the road.

Traffic

- Supply logistics and transportation of road construction materials are yet to be finalised, but the following information is proposed in the road feasibility study:
  - all road construction materials, ie cement, reinforced steel and bitumen, will be sourced from China due to cost and time savings over other options;
  - other chemical ingredients (Dolomitic and hydrated lime) are also likely to be sourced from China due to its proximity to the proposed project site; and
  - approximately 60 mobile plant and trucks including the asphalt and concrete plants (both with a capacity of 80-120 tonne/hour), crushers, bulldozer, grader, road rollers, water and dump trucks, are planned to be operated during the road construction.

Borrow pits

- Gravel and sands will be mined from four previously used quarries used for the ER Road construction in 2011. These quarries are located outside the SGSPA B, but are inside the Buffer Zone of the SGSPA B.
- It is not anticipated that aqdditional quarries or borrow pits will be required. However, if during construction additional fill material is required, these will be located outside the SGSPA B and subject to the internal OT Land Disturbance Permit Procedure and any applicable regulatory requirements set out in the DEIA.

Water supply

- The Project construction water demand will be supplied from an existing well previously constructed along the ER road[15]. The well is locked and is not used by other water users, such as herders..
- Water boreholes used by the current railway project between Tavan Tolgoi and Gashuun Sukhait may also be accessed to supply Project water needs.[16]

Timing of construction

- The road construction is planned to commence in July 2015 subject to the timing of Feasibility Study approval by the Ministry of Transport and continue until November 2015, when construction activity will be suspended over the winter. Construction will recommence in April 2016 and is expected to be complete by the November that year.

[15] Well location is GGW32 694345 4741618.

[16] Personal communication between biodiversity consultants and CEG.

2. PROJECT COMPLIANCE FRAMEWORK

This Supplemental Appraisal is being undertaken for internal assessment requirements and not for regulatory approval, which is being undertaken by OT separately.

2.1 PERFORMANCE STANDARDS AND REQUIREMENTS

Potential environmental and social impacts and risks are assessed in accordance with the relevant IFC Performance Standards on Environmental and Social Sustainability and the relevant Performance Requirements of the EBRD Environmental and Social Policy. A detailed discussion of IFC and EBRD requirements is contained in the Oyu Tolgoi ESIA.[17]

2.2 MONGOLIAN REGULATORY REQUIREMENTS

Mongolian environmental protection is enacted through a number of statutes which are discussed in detail in the Oyu Tolgoi ESIA. Environmental protection is supported by statutes focusing on land, land use and expropriation and customary land use. In addition, Mongolia is signatory to a number of international agreements on the protection of fauna and flora, biodiversity and sustainable development, energy and climate change, water, and tangible and intangible cultural heritage, among others. The statutes of importance to development activities within the SGSPA B are discussed in detail in the Oyu Tolgoi ESIA.[18]

2.3 PERMITS AND APPROVALS

The New Road is located within the Limited Use Zone of the SGSPA B, which has been designated under the Law on Special Protected Areas (1995, amended 2008). Once the Feasibility Study for the New Road has been approved, OT will obtain the formal permits and approvals required to construct the road in the Limited Use Zone (as previously obtained for the Original Alignment).

The Borrow Pits will be located in the Buffer Zone of the SGSPA B, which has been designated under the Law on Buffer Zones (1997). Buffer zones are established around Special Protected Areas to prevent and minimise adverse impacts on these areas. The approval of the borrow pits are subject to DEIA approval. The DEIA will be submitted once the Feasibility Study has been approved.

2.4 OT REQUIREMENTS

2.4.1 Health, Safety & Environmental Management System

An integrated Health, Safety and Environment Management System (OT HSE MS) and Communities and Social Performance Management System (CSP MS) aligned with Rio Tinto Standards is implemented at OT.

The mitigation measures identified in the OT ESIA to mitigate environmental and social impacts and risks have been incorporated into the OT HSE MS and OT CSP MS. Management Systems have been developed to meet Mongolian regulatory requirements as well as be in accordance with good international industry practice and the OT HSE MS has been certified to the ISO14001 environmental management standard.

For each specific environmental and social issue, the detail of the management of environmental and social risks is provided in a document hierarchy comprised of the following:

- Management Plans: These describe the key management controls and associated management activities, standards and controls.
- Procedures, implementation plans, guidelines and policy documents (Implementation Documents): these documents are used for effective planning and control of HSE and CSP and

[17] Oyu Tolgoi ESIA (2012) Section A: Introduction and Background. Chapter A2 - Policy and Legal Framework.

[18] Oyu Tolgoi ESIA (2012) Section A: Introduction and Background. Chapter A2 - Policy and Legal Framework.

detail the tasks and activities to be undertaken to implement management controls during operations by OT personnel[19].

Contractor Management

All contractors have a contractual obligation to implement the measures set out in the existing OT EMS, as outlined in the OT Contractor Management Framework (OT-07-PLN-0001) and implemented via the OT Procurement Principles. Obligations include implementing any additional measures relevant to the contractor's scope of work that are defined in the OT Environmental and Social Management Plans (ESMPs).

2.4.2 Land Disturbance Permit

The OT HSE MS incorporates the requirement for an assessment of site conditions prior to any land disturbing activities involving disturbance to native vegetation completed by or on behalf of OT, as per the OT Land Disturbance Permit (LDP) Procedure (OT-10-E-PRC-0001).

Environmental requirements which are considered include topsoil protection, rare or endangered flora species protection, wildlife and its habitat protection and water resource and quality protection. Compliance with legal and other requirements (including ESIA requirements) are also considered.

Pre-disturbance inspections and LDPs will be issued once the Feasibility Study and DEIA have been approved for the New Road. Contractors are required to comply with the conditions of the LDP during construction. OT environmental specialists will undertake compliance monitoring to ensure any conditions of operation are adhered to.

2.4.3 Integration of Construction Activities with Environmental and Community Issues

The OT Construction and Engineering Group (CEG) integrates with the Regional Development and Social Performance (RDSP) and HSE Departments on construction-related matters (e.g. DEIA, ESMPs, monitoring, LDP and stakeholder engagement). This ensures that construction and contractor execution plans address potential environmental and/or community impacts.

Key elements are as follows:

- Primary interface/single point of contact between the (construction) Project Management Team and the OT RDSP and Environment departments;
- Provision of timely information regarding scheduled construction activities, principally those "beyond the fence" which have larger potential impacts on the local communities;
- Collect, review, and disseminate information from the OT RDSP and Environment Departments (i.e. feedback, complaints and comments) regarding construction execution or impacts; and working with the OT RDSP and Environment Departments to actively prevent and resolve problems.

2.4.4 OT Camp Management

OT Camps are managed in accordance with applicable Mongolian standards and the OT Camp Standard and Code of Behaviour (HR-ST-01) and comply with IFC/EBRD Guidelines[20].

[19] Table 1 of the OT Environmental and Social Management Plan (OT-10-PLN-0003) provides a non-exhaustive list of Implementation Documents associated with each Management Plan.

[20] IFC/EBRD (2009) Guidance Note "Workers Accommodation. Processes and Standards".

3. IMPACT APPRAISAL AND MITIGATION

This section details the approach to identifying and assessing the environmental and social impacts resulting from the construction and operation of the New Road.

The appraisal focuses on the following topic areas:

- Resource consumption and pollution prevention;
- Community Health, Safety and Security;
- Biodiversity;
- Cultural Heritage;
- Labour and Working Conditions; and
- Cumulative Impacts.

For each of these topics the appraisal sets out:

- Baseline conditions;
- Impacts;
- Mitigation measures; and
- Monitoring

3.1 APPRAISAL APPROACH

The mitigation hierarchy is an internationally accepted approach to '*anticipate and avoid, or where avoidance is not possible, minimise, and, where residual impacts remain, compensate/offset for risks and impacts to workers, affected communities, and the environment*'[21]. Acceptable options to minimise impacts will vary and include abate, rectify, repair, and/or restore impacts, as appropriate. This appraisal:

- utilises baseline information from the OT ESIA, supplemented with recently commissioned studies;
- describes the impacts arising from the construction and operation of the New Road;
- describes the mitigation measures to be implemented to minimise impacts, so that the residual impact is not significant;
- describes the preferred approach to offsetting or compensating residual impacts identified as significant; and
- describes the monitoring to be undertaken to ensure that mitigation measures are effective, and provide feedback to the management system to ensure its efficacy for the duration of the project.

3.1.1 Baseline Information

The description of the baseline conditions and mitigation measures is taken from the OT ESIA disclosed in August 2012; the 2012 Diversion Road DEIA[22] and supporting documentation; the 2012 Diversion Road Supplemental Appraisal[23] and the Baseline for the 2015 New Road DEIA[24]. In addition, specialist

[21] IFC Performance Standard 1 (2006) Social and Environmental Assessment and Management Systems.

[22] Nature Friendly (2012) Oyu Tolgoi – Gashuun Sukhait road, Zone 3, Road Diversion Detailed Environmental Impact Assessment.

[23] Oyu Tolgoi (2012) ESIA Supplemental Appraisal, Diversion Road and Realignment Road.

[24] JEMR LLC (2014) Baseline for the 2015 Tsagaan Khad to Gashuun Sukhait Paved Road DEIA, DRAFT.

biodiversity consultants undertook an assessment of the area surrounding the New Road in 2014 to assess potential impacts to biodiversity and recommend mitigation measures[25].

The Diversion Road corridor is similar to the New Road Corridor. Where baseline information from the 2012 Diversion Road DEIA is more detailed than the 2014 DEIA Baseline, it has been clearly referenced.

3.1.2 Impact Appraisal Method

In order to retain consistency, the method used in the OT ESIA to classify impacts is retained in this appraisal. Impacts have been classed as either Positive or Adverse; defined as follows:

- Positive: Advantageous or positive impact to a resource or receptor;
- Negligible (Adverse): Impact that is typically short term and/or highly localised and/or highly unlikely;
- Minor (Adverse): Impact that is typically short to medium term and/or localised and/or unlikely;
- Moderate (Adverse): Impact that is typically medium term and/or restricted and/or likely; and
- Major (Adverse): Impact that is long term and/or widespread and/or likely to certain. In addition, impacts that are materially in breach of Project standards are adverse and major.

To provide a consistent approach to impact appraisal the criteria used in the OT ESIA to define the impacts and the significance of impacts, have been retained:

- Duration: short, medium and long-term;
- Extent: highly localised, localised, restricted and widespread; and
- Likelihood: highly unlikely, unlikely, likely, certain.[26]

A discussion of the significance of the residual impact and the means of addressing this in terms of the overall project Net Positive Impact (NPI) commitment is included.

3.1.3 Mitigation Hierarchy

The mitigation measures follow a hierarchy of:

- Adopting an initial design that avoids impacts;
- Adopting low impact alternatives;
- Applying mitigation measures to manage remaining impacts; and
- Compensating or offsetting remaining significant residual impacts.

Mitigation measures that are generally consistent with good international industry practice (GIIP) are taken from the OT ESIA disclosed in August 2012, and recent specialist studies.

3.2 RESOURCE CONSUMPTION AND POLLUTION PREVENTION

This section discusses the potential impacts arising from resource consumption and pollution generated by activities relating to the construction, maintenance and rehabilitation of the New Road.

3.2.1 Baseline Conditions

Topography, Soils and Geology

A comprehensive description of the landscape, geology and topsoil of the area is given in the OT ESIA.[27] In general, the soils are poorly developed and are formed below the very sparse vegetation cover of the

[25] WCS and Sustainability East Asia (2014) Biodiversity Assessment of proposed design changes to Gashuun Sukhait Road.

[26] Oyu Tolgoi ESIA (2012) Section A: Introduction and Background. Chapter A3 – Methodology.

[27] Oyu Tolgoi ESIA (2012) Section B: Baseline Assessment Chapter B5 – Topography, Geology and Topsoil.

Gobi (typical coverage is 8-25%). The organic content of soils is generally less than 1% and they are weakly alkaline. The fine silt layer that forms on the surface of the light brown semi desert soils of the project area provides a crust which, in conjunction with the pebbles on the surface, protects the soil against wind erosion and maintains the limited organic material in the surface layers. Disturbance of the surface soil crust results in exposure of sub-soils to wind erosion, which can result in reduced organic and nutrient content as well as the loss of soil structure.

The area between the Tsagaan Khad settlement and the Gashuun Sukhait border crossing is heavily degraded by human activity such as ditches and mounds from road construction, increased traffic and multiple off-road tracks disturbing significant areas of land along each side of the two main road routes. The Tsagaan Khad settlement has no formal planned roads and is substantially impacted by windblown coal dust from the numerous coal stockpiles that are placed around the settlement. Coal unloading/loading and stockpiling is carried out at Tsagaan Khad as the Mongolian operated trucks that transport coal from the Tavan Tolgoi coal mines to the border are required to unload on the Mongolian side of the Gashuun Sukhait border crossing, at Tsagaan Khad. The coal is then loaded onto Chinese trucks for the onward journey to Chinese markets. Coal fines/particles are visible in the soils and water courses surrounding Tsagaan Khad. Soil contamination has been recorded from industrial and domestic sources at the Tsagaan Khad settlement and along the road to Gashuun Sukhait.

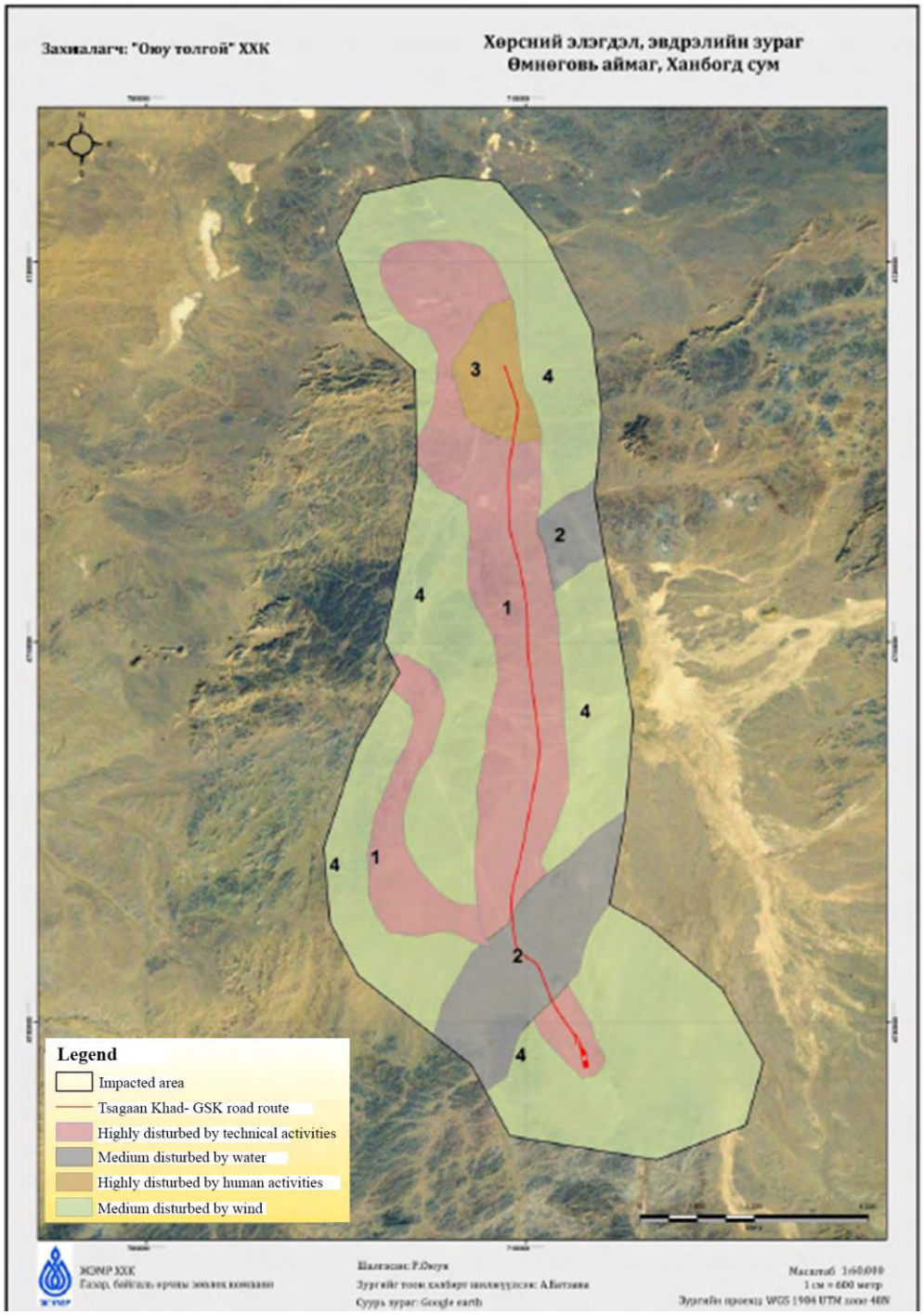
Soil samples taken as part of the 2014 DEIA Baseline study showed that soils along the New Road alignment corridor are vulnerable to wind and water erosion and pollution. Vehicle movements cause the compaction of the upper soil layer which causes the loss of mechanical properties. Soils may also become friable, and are eroded by wind and can add to sediment loading when surface runoff increases. In particular, the 2014 study found that:

- in and near Tsagaan Khad and Gashuun Sukhait, soils were contaminated with coal dust and waste and were heavily affected by wind erosion;
- near the Baruun Togoo Mountain, soils were not polluted and not affected by wind erosion, but surface runoff erosion was noted; and
- along the New Road alignment, soils have generally been severely damaged by off-road driving, with cuts up to 30 cm deep.

Soil damage along the road route is shown in *Figure 2*, which shows where soils have been affected by linear water erosion, wind erosion and human activities.

Soil samples taken along the New Road alignment were analysed for heavy metals including Chromium, Lead, Cadmium, Nickel and Zinc; the results of the analysis indicated that concentrations of all metals were below the Mongolian Standard (MNS 5850: 2008) levels.

Figure 2: Soil disturbance along the New Road Corridor



Groundwater and Ephemeral Watercourses

The hydrology and hydrogeology of the Infrastructure Corridor is similar to that around the OT Mine Licence Area, in that the area contains ephemeral watercourses which only flow for short periods after significant rainfall events.

The New Road crosses four small ephemeral watercourses between Tsagaan Khad and Gashuun Sukhait, two of which have significant drainage features intersecting the proposed new road alignment. These watercourses originate in the *Baruun togoo ovoo* mountain (1,136.9 m) and *Zoon togoo ovoo* mountain (1119.4 m) located to the west and east in the northern section of the Road, and in the foothills of the mountains located on the boundary of Mongolia and the Republic of China in the southern section of the Road.

Three wells and two boreholes were identified within the DEIA study area during the 2014 DEIA Baseline Study. Chemical analysis from one well and one borehole satisfied the drinker water standard in MNS 900:2010. The colour and sediment of the water indicated that it is not suitable for drinking. There are no known herder wells in the vicinity of the New Road corridor.

Noise

A survey of all vehicle noise levels along the Oyu Tolgoi to Gashuun Sukhait road was undertaken in March 2011 to establish baseline noise levels.[28] Average daytime noise levels ranged from 66 dB(A) to 77 dB(A) along the Oyu Tolgoi to Gashuun Sukhait Road. Night-time average noise levels ranged from 25 dB(A) to 56 dB(A).

Night-time noise levels recorded at the Gashuun Sukhait site were below the Project Standard of 55 dB(A) but the night-time noise levels at Tsagaan Khad exceeded the Project Standard. Daytime noise levels at both Tsagaan Khad and Gashuun Sukhait exceeded the Project Standard.

Air Quality and GHG Emissions

The 2014 DEIA Baseline survey took field measurements at seven points along the New Road alignment corridor. The threshold for sulphur dioxide and nitrogen dioxide under MNS 4585:2007 was exceeded at one point. The general ambience of the New Road alignment is very dusty with high measurements of $PM_{2.5}$ and PM_{10}, which has been attributed to off-road driving, soil degradation, coal dust, and low levels of precipitation.

An inventory of greenhouse gas (GHG) sources and an initial estimate of emissions were undertaken for the Project ESIA[29] and included an estimate of the GHG emissions associated with the construction of the national road between Oyu Tolgoi and Gashuun Sukhait. If necessary, the inventory will be updated to include the emissions associated with the construction of the New Road. GHG emissions are not discussed further in this report.

3.2.2 Impacts

Topography, Soils and Geology
Impacts arising from the construction of the New Road include:

- erosion of topsoil from vehicle access tracks, site clearance, reuse or establishment of borrow pits and quarries and stockpiling of excavated materials;
- soil contamination due to spillage of fuel and other hazardous materials;
- litter deposited by site personnel, site vehicles and from non-project vehicles travelling to the border crossing; and
- dust generation from vehicle movement, land clearance; borrow pit excavation and stockpiling of road-building materials.

[28] Oyu Tolgoi ESIA (2012). Section B: Baseline Assessment. Chapter B4: Noise and Vibration.

[29] Oyu Tolgoi ESIA (2012). Section A: Introduction and Background. Chapter C2 - Climate and Air Quality.

Borrow pits and gravel pits will be located outside the SGSPA B but inside the Buffer Zone, and are therefore subject to approval as part of the DEIA process.

Groundwater and Ephemeral Watercourses

The primary potential impact resulting from construction activities is impaired water quality arising from increased sediment load in ephemeral watercourses, and the potential contamination of ephemeral watercourses by spillage of hydrocarbons.

The potential change to natural drainage regimes where ephemeral watercourses are intersected by the proposed road may negatively impact the vegetation within these drainage systems, including elms. These impacts may result from water erosion of the stream bed downstream of the outflow, which may cause minor changes to the direction of flow, leading to reduced water flow to established vegetation.

Noise and Air Quality

The use of mobile equipment, asphalt plants, and crushers during the road construction will result in additional noise emissions and potentially increasing avoidance of the area by wildlife. However, considering the location of the construction site in proximity to a major mineral haulage route and the existing activities in this area that contribute to avoidance by migratory ungulates, the additional construction period noise is unlikely to be significant.

Noise and air quality impacts arising from the operation of the road, will be significantly influenced by the volume of traffic using the road.

The traffic study undertaken as part of the Feasibility Study modelled the future traffic volume, based on a number of assumptions including the amount of coal traffic, the amount of OT traffic, the planned railway facility and changes in general traffic volumes. Predicted volumes of traffic are shown in *Table 1* below[30].

The increase in vehicle numbers, particularly heavy haulage vehicles, will have negative air quality and noise impacts on local receptors which include residents in Tsagaan Khad and wildlife along the road route.

Table 1: Traffic volume modelling for first year of operation and 2034

Year	Number of heavy haulage vehicles per day	Number of passenger vehicles per day	Total number of vehicles per day
First year of operation (2014 in Feasibility Study)	597	47	644
2034	1092	596	1688

Construction of the New Road may cause dust impacts which will add to the already dusty environment along the alignment corridor. During operation, the road will reduce the amount of off-road driving and increase the number of vehicles using the sealed road surface. This will have a beneficial impact as vehicle-generated dust in the transport corridor will become negligible.

3.2.3 Mitigation Measures

The following ESMPs and OT Procedures provide mitigation for the potential impacts described in Section 3.2.2 above:

OMPs

- The Atmospheric Emissions Management Plan (OT-10-E2-PLN-0001) provides procedures for controlling dust emissions.

[30] The baseline traffic volume was calculated from Road Supervision and Research Center data and Gashuun Sukhait port data.

- The Biodiversity Management Plan (OT-10-E9-PLN-1001), particularly in relation to noise levels and disturbance to wildlife.
- The Noise and Vibration Management Plan (OT-10-E6-PLN-0001) provides controls for traffic noise levels and disturbance to wildlife.
- The Transport Management Plan (OT-10-C3-PLN-001) and Land Use Management Plan (OT-10-E9-PLN-0001) provide procedures to control off-road vehicle access and noise.
- The Water Resources Management Plan (OT-10-E10-PLN-0001) outlines procedures for drilling abstraction boreholes; impact assessment and mitigation; and road construction.

Procedures

- The Land Disturbance Permit Procedure (OT-10-E-PRC-0001) defines the standards and procedures relevant to land disturbing activities, and ensuring that these are adhered to by effectively utilising the Land Disturbance Permit system. The Procedure includes the identification of sensitive receptors and is used to control dust generation rising from specified activities (e.g. borrow pits/quarry activities) that involve land disturbance.
- The Hazardous Materials Handling Procedure (OT-10-E5-PRC-0001-E) outlines requirements when handling and storing hazardous materials to prevent spillages.
- The Rehabilitation Procedure (OT-10-E9-PRC-0002-E) provides guidance on steps for the rehabilitation of roads, tracks and borrow pits.
- The Spill Response Procedure (OT-10-E5-PRC-0002-E) describes the effective and efficient response process to be implemented in the event of a hazardous material spill so as environmental impacts of the spill are minimised.
- The Topsoil Handling Procedure (OT-10-E9-PRC-0001-E) outlines the requirements for effective topsoil management, including stripping, stockpiling and monitoring activities.

Topography, Soils and Geology

There are nearly 20 quarry and borrow pits located in the SGSPA B Buffer Zone, which is within 3 km of the SGSPA B Limited Use Zone to the west of the SGSPA B boundary. Some of these existing quarries and borrow pits have been technically rehabilitated and it is expected that these existing and partially restored borrow pits will be used for the Project materials supply subject to DEIA approval.

OT Environment Department requires that Contractors responsible for activities involving earthworks develop and implement a Topsoil Handling Procedure, unless, following a review of the scope of works, this is not considered necessary by OT. This is administered through the Land Disturbance Permit (LDP) Procedure. Contractors' procedures include, but are not limited to, consideration of:

- Planning;
- Topsoil stripping;
- Storage;
- Erosion and dust control; and
- Re-use of topsoil (during reinstatement).

Contractors' procedures must be approved by OT and be compatible with the requirements detailed in the Topsoil Handling Procedure.

Additional mitigation measures to minimise the unavoidable impacts on soils include:

- Use of water tankers for dust suppression on unsealed surfaces, borrow pits and quarry areas and material stockpiles
- Inspection and removal of litter and other anthropogenic waste from along the road alignment three times weekly during peak construction period.

Groundwater and Ephemeral Watercourses

As part of the New Road design, OT will construct one floodway on the northernmost water course approximately 1.5 km south of Tsagaan Khad. This will comprise of 16 concrete pipe culverts with 1 m diameter located along the route. A 2 x 2 m box culvert will also be incorporated into road design for the crossing of the southern significant drainage feature located 2 km north of the Gashuun Sukhait border crossing point.

Table 2 below outlines existing mitigation measures outlined in the OMPs, Investment Agreement and other supporting documentation, that will be undertaken to minimise the impacts of the New Road to water resources.

Table 2: Water Resources Mitigation

Document	Reference	Mitigation
Water Resources Management Plan[31]	WR16	Where Project construction facilities/infrastructure (e.g. Project roads) cross ephemeral surface water channels or playa areas, fords or culverts will be constructed. Where culverts are used these locations will be individually assessed, designed and installed to ensure adequate flow of flood waters and to avoid significant erosion upstream or downstream of the culvert. Culverts will be designed to accommodate 1 in 10 year flood events except in headwater locations where they will be designed to accommodate 1 in 100 year flood events. Working in ephemeral watercourses when flash floods may occur will be avoided to reduce the risks of erosion. Disturbed stream banks will be restored to minimise risk of erosion.
	WR15	Any temporary water supply boreholes will be individually assessed prior to use to confirm that its area of influence does not include any existing springs/boreholes used by third parties or wildlife.
	WR04	When drilling water abstraction boreholes: (i) the operations will use water based polymer drilling mud; (ii) the cuttings and excess mud will be collected in local mud pits; and (iii) upon completion of the works the mud pits will be allowed to evaporate and will then be covered and the areas restore Mitigation measures will be undertaken in the event of interconnection of hydrogeological units.
Investment Agreement	Clause 6.19.2	OT has made a commitment in the Investment Agreement not to reduce the quality or quantity of the existing potable and livestock water supplies from current levels (Investment Agreement).
Biodiversity Assessment[32]		The application of drainage design that allows channelled water that flows beneath the road to disperse downstream of the outflows and replicate natural flows is less likely to result in impacts to vegetation downstream of the crossing. Additional structures like riprap pads or spreader ditches to re-establish the natural sheet flow downstream of the planned culverts should also be considered. Placement of culverts should be appropriately spaced depending on the slope of the area to avoid a drainage shadow effects.

Noise

Activities likely to create noise levels in excess of project standards will be managed to minimise potential disturbance to wildlife through the following mitigation:[33]

- Noisy construction activities will be limited to normal working hours;
- No stationary noisy equipment will be located within 500 m of a spring or other wildlife focal point;

[31] Water Resources Management Plan (OT-10-E10-PLN-0001)

[32] WCS and Sustainability East Asia (2014) Biodiversity Assessment of proposed design changes to Gashuun Sukhait Road.

[33] Biodiversity Management Plan (OT-10-E9-PLN-1001) Annex D.

- Noise abatement equipment such as noise barriers, baffles, sound insulation or enclosures will be utilised for particularly noisy equipment;
- Particularly noisy equipment which has the potential to reach the upper limits of the Project standards will be fitted with noise abatement equipment such as noise barriers, baffles, sound insulation or enclosures where practicable; and
- Speed limits on the New Road are less than 80 km/hr.

Air Quality

Dust-generating works will be controlled by the conditions outlined in the LDP (once issued) and the mitigation set out in the Atmospheric Emissions Management Plan (OT-10-E2-PLN-0001), Transport Management Plan (OT-10-C3-PLN-0001) and Land Use Management Plan (OT-10-E9-PLN-0001).

3.2.4 Residual Effects

The New Road is a permanent structure and the operation of an integrated formal and sealed road system will markedly reduce off road driving and related dust and soil impacts. The residual effect on the topography and soils in the vicinity of the New Road is considered **positive**.

Noise levels of construction plant and machinery working on site will be managed in terms of the Noise and Vibration Management Plan and the additional mitigation outlined above. The residual effect on wildlife is considered to be **negligible**.

The New Road will become a permanent feature of the landscape. The paved surface will minimise the generation of dust plumes arising from use of the road by OT traffic and non-project traffic to access the border at Gashuun Sukhait. As the New Road is being built in an existing road corridor, the residual impact from vehicle noise, the potential for litter and contamination of areas adjacent to the road are considered to have a **negligible** effect on the area adjacent to the road alignment.

Potential for impacts to surface water will be greatest during the construction phase when work is undertaken around the ephemeral water courses. Any such impacts should be short-term in nature and, with appropriate mitigation, the long-term effect on ephemeral water courses once the road is operational are expected to be **negligible**.

3.2.5 Monitoring

The Air Quality Monitoring Plan (OT-10-E2-PLN-0002-E) requires particulate monitoring during road construction.

The Noise Monitoring and Control Procedure (OT-10-E6-PRC-0001) describes the methodologies, locations and frequencies for noise monitoring and associated noise management measures.

The Water Monitoring Plan (OT-10-E10-PLN-002-E) requires quarterly groundwater monitoring of monitoring bores along Oyu Tolgoi to Gashuun Sukhait road alignment. Visual inspection and photographs should be taken of major culverts to provide qualitative assessment of erosion caused by the road construction. Additionally, herder well condition surveys will be conducted annually to check for any deleterious impacts from erosion and sedimentation.

Monitoring of contractor performance in the construction of the New Road will be undertaken to ensure compliance with the conditions of the LDP and relevant Management Plans.

The Rehabilitation Procedure (OT-10-E9-PRC-0002-E) will be implemented for borrow pits and any unused roads or tracks after construction to achieve final land use compatible with previous uses including endemic vegetation cover, waste bodies, wildlife habitat and livestock pasture.

3.3 COMMUNITY HEALTH, SAFETY AND SECURITY

3.3.1 Baseline Conditions

In the second quarter of 2012, Tsagaan Khad was formally established as a *bagh* in its own right, namely Khairkhan *bagh* of Khanbogd *soum*. Approximately 100 people live in the Tsagaan Khad area and

approximated 1,200-2,000 people transit through the area, mostly coal truck drivers[34]. The number of trucks passing through Tsagaan Khad has been constantly declined since 2013 due to reduced coal demand in.

By 2015, land use permissions were issued for five petrol stations and companies within Tsagaan Khad.

Water supply comes from Energy Resource borehole well and also from "Durvuljin Teeg" well located from 16 km south east from Tsgaan Khad. The bagh obtain its power supply from China however all families and private enterprises in the Tsagaan khad uses self, small-scale power generators.

3.3.2 Impacts

Potential impacts arising from the construction and operation of the New Road on herders and residents of Tsagaan Khad:

- Increased dust and noise from vehicle traffic for camps located adjacent to the road;
- Impacts on shallow herder wells from water resources used for road construction; and
- Loss of stock from road kill associated with increased traffic (the overall traffic volume will not increase, it will simply be focused on key roads).

Impacts arising from the operation of the New Road are the same as for those associated with the long-term operation of the ER Toll Road, namely:

- Increased risk of road traffic accidents resulting in fuel or cargo spillage;
- Increased risks of collisions with other vehicles or pedestrians resulting in injury or death;
- Increased risk of collision with wildlife and herd animals;
- Deterioration of local roads resulting from heavy equipment usage and high levels of vehicular traffic; and
- Physical barrier to wildlife movements.

However it is believed that these will be minimal given the area is currently used for transportation.

3.3.3 Mitigation

The following mitigation measures have been instituted to alleviate the environmental impacts rising from activities:

- Maintain a minimum separation distance of 500 m between the road alignment and herder camps or community facilities;
- Restrict OT vehicles to designated routes (no off-road driving permitted); and
- Ensure that construction activities do not adversely affect herder wells and natural spring water quality and, if impacted, that appropriate mitigations are undertaken, as described in the Water Resources Management Plan.

The following mitigation measures have been instituted to address public health & safety issues:

- Application of appropriate safety standards by OT, with legal compliance being a minimum requirement, for all vehicles and transport operations. Driver safety training will be required for OT drivers who will be competency tested on a regular basis;
- Design the fully constructed road to be suitable for the safe operation of predicted traffic volumes and size of the trucks. OT, with local authorities and other road users, will review the adequacy of the road and road surface to ensure public safety is maintained on an ongoing basis.
- OT procedures for emergency response will, as a minimum, meet legal compliance and include the involvement of local authorities and community awareness programs; and

[34] personal communication with Khanbogd governors office.

- Any blasting activities will comply with Mongolian laws and regulations. Nearby residents will be notified of blasting operations, should this be required.

Tsagaan Khad

Although the Oyu Tolgoi to Gashuun Sukhait national road bypasses Tsagaan Khad, the New Road commences on the outskirts of the settlement. OT will work with regional authorities on the management of influx-related issues in areas recognised as at-risk in terms of influx. The Influx Management Plan and Community Health, Safety and Security Plan document the proposed initiatives and activities that OT proposes as the means of addressing influx-related issues.[35][36]

3.3.4 Residual Impacts

Environmental and social conditions in the Tsagaan Khad settlement are largely determined by the extent of the coal stockpiling and transport activities that occur in the settlement. The residual impact arising from the construction and operation of the New Road on the Tsagaan Khad community is considered to be **minor** given the implementation of the described mitigation measures.

3.3.5 Monitoring

Monitoring of contractor performance during the construction of the New Road will be undertaken to ensure compliance with the conditions of the LDP and their contract requirements.

3.4 BIODIVERSITY

Small Gobi Strictly Protected Area (SGSPA)
The SGSPA comprises two separate units located approximately 36 km south-west (A unit) and 70 km south-east (B unit) of the Oyu Tolgoi MLA. The SGSPA occupies a total of 1,839.176 ha in the Nongon, Bayan-Ovoo and Khanbogd *soums* of Omnogovi *Aimag* and Khatanbulag *Soum* of Dornogobi *Aimag*. The western Part A is largely uninhabited with the exception of rangers and border guards whereas the eastern Part B is seasonally used by herders.

The SGSPA was established in 1993 (through Parliament Resolution No. 83) as representative of the south-eastern Gobi regional ecosystem because of the then relatively low disturbance from grazing and hunting. Anecdotal evidence suggests that the gap between areas A and B of the SGSPA may have been due to historical oil leasing activity at the time when the protected area was designated.

The SGSPA is categorised as Ib under the IUCN designation. This designation refers to *a large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition*.

The SGSPA contains a variety of habitats including cliffs, sand dunes, dried lakes, wide wadi and oases with streams, which provide important habitats for species including Asiatic Wild Ass, Black-tailed Gazelle, Argali and Siberian Ibex.

Four zones are defined within the SGSPA, namely:

- Buffer Zone;
- Limited Use Zone;
- Conservation Zone; and
- Pristine Zone.

The entire New Road is located within the Limited Use Zone of the SGSPA B and the borrow pits and quarry pits are located in the Buffer Zone of the SGSPA B.

[35] Influx Management Plan (OT-10-PLN-0004)

[36] Community Health, Safety and Security Management Plan (OT-10-PLN-0001)

Socioeconomic surveys undertaken for the road corridor ESIA in 2004 found eight herder families raising approximately 4,000 head of livestock within the SGSPA B[37]. These traditional herder families occupied the area prior to the establishment of the SGSPA and have not been required to relocate.

SGSPA Administration

In 2006, the SGSPA administration was established in Khanbogd *soum*. Fourteen people are reported to be employed by the administration of which nine are rangers (herders who primarily graze stock within the protected area and undertake some patrolling for illegal hunting). The number of rangers is considered low when compared to the size of the SGSPA and OT Biodiversity Strategy and plans to support the SGSPA management authority.

OT has:

- Consulted with the SGSPA Protection Authority, local communities and other key stakeholders;
- Ensured that the Project's environment management, mitigation and offset commitments are consistent with the management objectives stated within the Protected Area Management Plan; and
- Ensured that the OT Offset Management Strategy includes measures to strengthen the protected areas.[38]

Critical Habitat

The Area of Influence (AoI) for the Oyu Tolgoi Project is defined as the area within which both direct and indirect impacts are expected to occur.[39] Within the AoI, priority biodiversity features are defined as species or habitats which trigger Critical Habitat as defined by the lenders (IFC PS6 and EBRD PR6) or which are considered priorities for Rio Tinto's NPI biodiversity planning (Rio Tinto 2011).

A critical habitat assessment was conducted by international biodiversity specialists as part of the baseline studies for the OT ESIA in order to determine the extent of, and qualifying criteria for, critical habitat relevant to the Project.[40] Two units of analysis for the Oyu Tolgoi Project were assessed:

- A larger (51,415 km^2) unit of analysis comprising Khanbogd, Manlai and Bayan-Ovoo *soums*, and Sectors A and B of SGSPA (identified as ecologically appropriate for wide-ranging/large mammals); and
- A smaller (27,375 km^2) unit of analysis comprising Khanbogd and Manlai *soums* (identified as ecologically appropriate for all other species, species assemblages, evolutionary processes and ecosystem services owing to potential impacts from the mine and associated infrastructure, notably potential hydrological impacts across both *soums*).

Based on the criteria set out in IFC PS6 Paragraph 9 and the EBRD PR6 Paragraph 13, both units of analysis qualify as critical habitat:

- The majority of the larger unit of analysis is Tier 1 critical habitat for Asiatic Wild Ass or Khulan (*Equus hemionus*);
- The whole of the larger unit of analysis is Tier 2 critical habitat for Argali (*Ovis ammon*) and Goitered Gazelle (*Gazella subgutturosa*); and
- The whole of the smaller unit of analysis is Tier 2 critical habitat for Mongolian Chesney, Short-toed Snake-eagle, granite outcrop floral communities, and four ecosystem services, namely water regulation, livestock (including pasture), biomass fuel and freshwater.

[37] Eco-Trade LLC (2004); Detailed Environmental Impact Assessment Report for Oyu Tolgoi to Gashuun Sukhait Infrastructure Corridor

[38] Oyu Tolgoi ESIA (2012). Section C: Impact Assessment. Chapter C6: Biodiversity and Ecosystems. Annex C: RBA Appendix 4: Biodiversity offsets strategy for the Oyu Tolgoi project, section 4.5. 2012.

[39] Direct impacts are confined to the within MLA; indirect impacts are those occurring outside of the MLA.

[40] TBC and FFI (2012) Oyu Tolgoi Project Critical Habitat Assessment: IFC Performance Standard 6/EBRD Performance Requirement 6.. Unpublished draft report of The Biodiversity Consultancy Ltd and Fauna & Flora International, August 2012.

In terms of IFC PS6, within areas of natural habitat, the client will not significantly convert or degrade[41] such habitat, unless the following conditions are met:

- There are no technically and financially feasible alternatives;
- The overall benefits of the project outweigh the costs, including those to the environment and biodiversity; and
- Any conversion or degradation is appropriately mitigated.

In terms of IFC PS6, within areas of critical habitat, the client will not implement any project activities unless the following conditions are met:

- There are no measurable adverse impacts on the ability of the critical habitat to support the established population of species described in paragraph 9, or the functions of the critical habitat described in paragraph 9;
- There is no reduction in the population of any recognised critically endangered or endangered species; and
- Any lesser impacts are mitigated in accordance with paragraph 8 of IFC PS6, where mitigation measures will be designed to achieve no net loss of biodiversity where feasible.

3.4.1 Baseline Conditions

The description of baseline biodiversity conditions of the area surrounding the New Road is taken from the OT ESIA, the DEIA for the Diversion Road undertaken in 2012, the DEIA Baseline for the New Road undertaken in 2014 and the updated Biodiversity Assessment undertaken by the independent biodiversity specialists in 2014.

Vegetation

A flora field survey of the (then) proposed Oyu Tolgoi to Gashuun Sukhait road route was conducted in May 2006 (Eco Trade 2006) where the flora of the area was characterised as "generally poor" (i.e., relative low numbers of species) and with endemics being "few in number." The findings are detailed in the OT ESIA[42], however the survey area did not directly cover the New Road corridor. Flora and vegetation field surveys covering the New Road corridor were undertaken in 2012[43] and 2014[44], and the corridor was visited in May 2014 as part of the Biodiversity Assessment [45].

Endemic, relict, rare, endangered and medicinal plants grow in the New Road study area, with the following main groups:

- Dominant vegetation communities *are Potaninia mongolica-Anabasis-Allium*; *Anabasis-Potaninia mongolica*-Poaceae, *Anabasis*-Poaceae, *Salsola*-Poaceae-Allium, *Reamuria soongarica*-Allium, Poaceae-forb, as shown in *Figure 3;*
- Dominant plant species are: *Stipa gobica* Roshev., *Stipa glare*osa P.Smirn., *Cleistogenes songorica* (Roshev.) Ohwi.); and
- Common plant species include *Allium polyrrhizum* Turcz. ex Rgl.), *Ajania fruticulosa* (Ledeb.) Poljak., *Kochia prostrata* (L.) Schrad., *Ptilotrichum canescens* C.A.Mey., *Convolvulus Ammanii* Desr., *Oxytropis aciphylla* Ledeb., *Eurotia ceratoides* (L.) C.A.Mey.

[41] Significant conversion or degradation is: (i) the elimination or severe diminution of the integrity of a habitat caused by a major, long-term change in land or water use; or (ii) modification of a habitat that substantially reduces the habitat's ability to maintain viable population of its native species.

[42] Oyu Tolgoi ESIA (2012). Section B: Baseline Assessment. Chapter 7a: Biodiversity.

[43] , Nature Friendly (2012). Detailed Environmental Impact Assessment: Oyu Tolgoi – Gashuun Sukhait road, Zone 3, Road diversion.

[44] JEMR LLC (2014) Baseline for the 2015 Tsagaan Khad to Gashuun Sukhait Paved Road DEIA, DRAFT.

[45] WCS and Sustainability East Asia (2014) Biodiversity Assessment of proposed design changes to Gashuun Sukhait Road.

Vegetation that has a designated status includes:

- Ten species of rare and endangered plants,
- Fourteen species of endemic and sub-endemic plants, and
- Three species of relict plants: *Caryopteris mongolica* Bunge, *Reaumuria songorica* (Pall.) Maxim., *Potaninia mongolica* Maxim., *Zygophyllum xanthoxylon* (Bunge) Maxim.

The following species are included in Redbook of Mongolia and 20 species of medicinal and extreme beneficial plants: *Amygdalus mongolica* Maxim., *Potaninia Mongolica* Maxim., *Caryopteris mongolica* Bunge, *Tugarinovia mongolica* Iljin., *Olgaea leucophylla* (Turcz.) Iljin, and *Brachanthemum gobicum* Krasch.

Elm trees have been identified as a high value biodiversity feature in the area and provide important habitat for wildlife in the region. The trees also have social values attached and are not usually used for domestic uses such as fuel wood. Elm trees are occasionally linked with sacred sites[46].

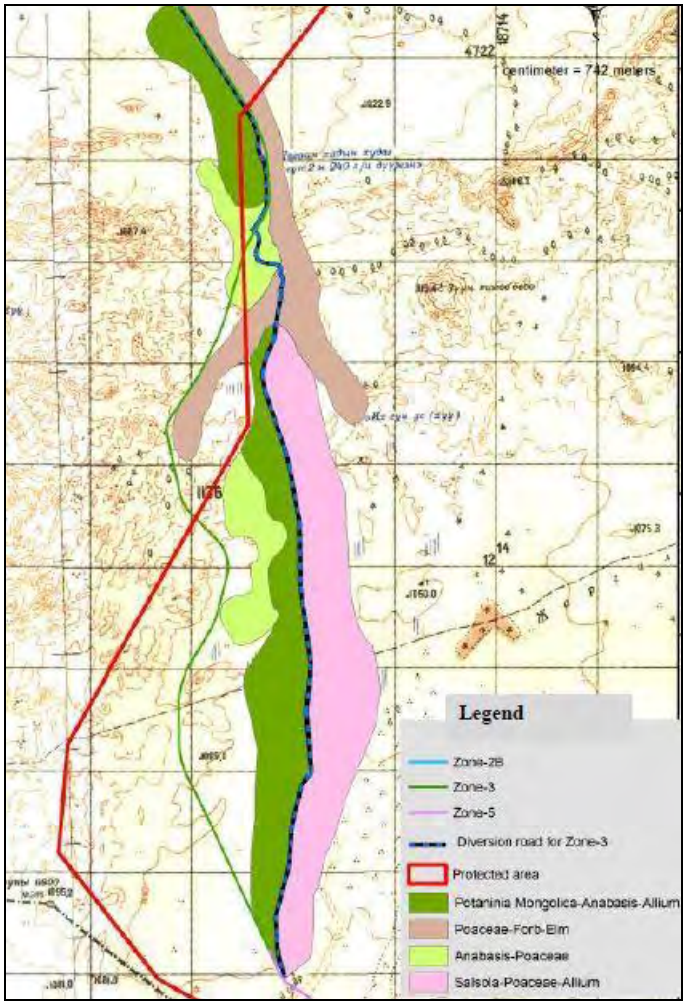
The rangeland vegetation has been identified by OT as critical habitat, providing a vital provisioning ecosystem service to wildlife and domestic animals, which are important assets for the well-being of the local community.

The nearest saxaul tree (*Haloxylon ammodendron*) community is located 10 km west of the New Road alignment.

The New Road corridor is located along the existing transport corridor bound by the ER road to the east and the unsealed Coal Road to the west. The vegetation in the corridor has been heavily disturbed by the various activities associated with road construction, coal transport, off-road driving and the coal unloading and reloading activities in Tsagaan Khad. Vegetation has been disturbed primarily due to the creation of multiple parallel tracks adjacent to the ER road (caused by trucks and other vehicles attempting to negotiate poor condition/waterlogged sections of the road) and the deposition of windblown dust plumes generated by traffic on the unimproved surfaces.

[46] TBC and FFI (2012) Oyu Tolgoi Project Critical Habitat Assessment: IFC Performance Standard 6/EBRD Performance Requirement 6.. Unpublished draft report of The Biodiversity Consultancy Ltd and Fauna & Flora International, August 2012.

Figure 3: Vegetation Types along the Diversion Road Alignment[47]



As a LDP has not been issued yet, and in the absence of any other information, the previous LDP issued in 2011[48] has been used to provide further baseline information as the road corridor is similar. The pre-disturbance inspection started immediately north of Tsagaan Khad and finished at the Gashuun Sukhait border crossing point. The inspection focused on identification of plant species and appropriate mitigation measures. The study was undertaken in 5 km sections:

- Section 1 – The proposed area has*Nitaria sibirica, Remania songarica* and *Salsola passerine*. Three rare and endangered plant species were found, namely *Astrathamnus centrali usioticus, Oxytropis aciphylla* and *Tamarix onssisima*. The uppermost 40 cm of topsoil was suitable for separation and storage during construction;
- Section 2 – The proposed area has *Salsola passerina, Reamania soongarica, Sympegma regelii* and *Anabasis brevifolia*. Three rare plant species were found, namely *Tugarinovii mongolica, Caragana brachypoda* and *Potanina mongolica* but no special protection measures were required due to the presence of these species in surrounding areas. The uppermost 20 cm of topsoil was suitable for separation and storage during construction;

[47] This map has been taken from the Oyu Tolgoi – Gashuun sukhait road, Zone 3, Road diversion" Detailed Environmental Impact Assessment. Nature Friendly. October 2012. The map shows the Diversion road alignment, however it has been assumed for the purposes of this document that the road corridor is representative of the New Road alignment.

[48] Land Disturbance Permit 111102. Oyu Tolgoi to Gashuun Sukhait Diversion Road in Zone 3. 17 November 2011.

- Section 3 – The proposed area has *Nitraria sibirica, Reamania soongarica* and *Salsola passerine*. No rare plant species were found. The uppermost 30 cm of topsoil was suitable for separation and storage during construction; and
- Section 4 - The proposed area has *Salsola passerina, Sympegma regelii Reamania soongarica* and *Anabasis brevifolia*. Two rare plant species, including *Caragana brachypoda* and *Asticthamnus centralii-asiaticus* were identified; however, as this species grows in the surrounding vicinities, no special protection measures are required. The uppermost 20 cm of topsoil was suitable for separation and storage during construction.

A further LDP was issued in May 2012 based on the realignment[49], in which the area was described as abundant in *Anabasis brevifolia, Salsola passerine* and *Sympegma regelii*. Two rare plant species, including *Oxytropis aciphylla* and *Asticthamnus centralii-asiaticus* were identified. As these species grows in the surrounding vicinities, no special protection measures were required. The specimens of Siberian elm (*Ulmus pamila*) found along the route are not to be disturbed. Topsoil of this area is of storable quality and stripping depth is 30 cm.

Mammals

Fauna surveys were completed along the Oyu Tolgoi to Gashuun Sukhait road route in 2003[50], prior to the coal road development. The study area included the high-voltage power line corridor; covering a significantly larger area than the road corridor itself (e.g. sections of the Galbyn Gobi and SGSPA) so as to maximise the likelihood of observing migratory and nomadic mega-fauna utilising the area. Direct observations of fauna were supplemented with observations of tracks, burrows, skeletons and anecdotal information from herders.

The area hosts globally important populations of large native herbivores which have become decimated or extinct in much of their historical ranges, such as the khulan (*Equus hemionus*, also known as Asiatic wild ass) and the goitered or black-tailed gazelle (*Gazella subgutturosa*). Rocky areas support Siberian ibex (*Capra sibirica*) and argali sheep (*Ovis ammon*).

The species of greatest conservation interest in the Oyu Tolgoi AoI is the Khulan, a species recognised as Endangered by both the IUCN and the Mongolian Red List of Mammals[51]. While globally significant populations of khulan are well documented from the South Gobi region, the habitats utilised by this nomadic species have been locally fragmented to varying extents by the creation of transportation infrastructure.[52]

OT has started its Pilot Core Biodiversity Monitoring programme which aims to track OT's progress towards Net Positive Impact (NPI)[53]. The positions of 20 GPS tracked khulan between August 2013 until the end of October 2014, show that 11 different khulan crossed the OT road a total of 98 times and 7 different khulan crossed the ER Road 34 times[54]. Collared khulan data has shown that khulan have crossed the ER Road and Coal Road south of Tsagaan Khad once, as shown in Figure 4 below. The khulan crossed the road at night time or early in the morning, and initial analysis of data indicates that crossings are influenced by water distribution.

[49] Oyu Tolgoi LDP 120508. OT-GSK Road Construction – Zone 3 Realignment. 25 May 2012

[50] Eco-Trade LLC (2004). Oyu Tolgoi Project Environmental Impact Assessment, Volume I Report of Oyu Tolgoi to Gashuun Sukhait Road and Infrastructure Corridor, Environmental Protection Plan and Environmental Monitoring Plan.

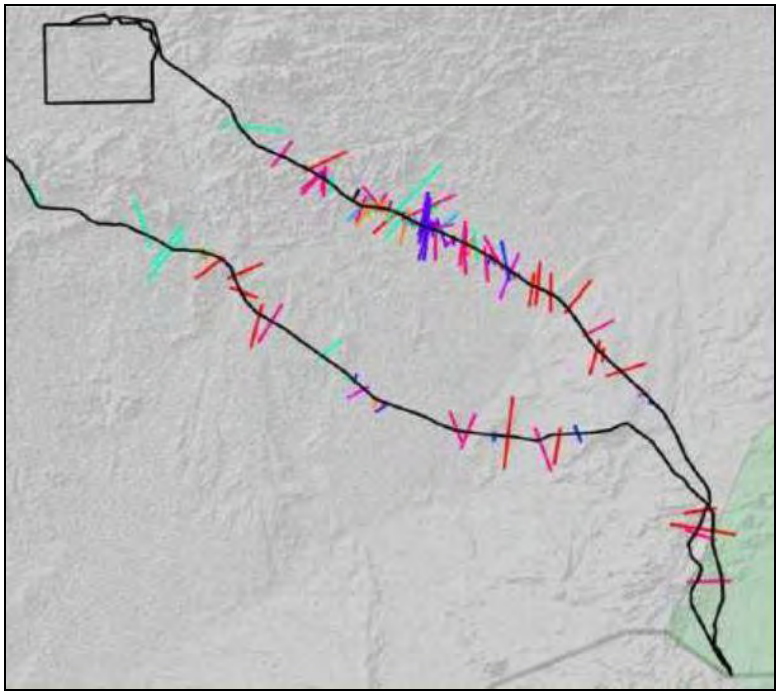
[51] Clark, E. L., Munkhbat, J., Dulamtseren, S., Baillie, J. E. M., Batsaikhan, N., King, S. R. B., Samiya, R. and Stubbe, M. (compilers and editors) (2006). Summary Conservation Action Plans for Mongolian Mammals. Regional Red List Series Vol. 2. Zoological Society of London, London.

[52] Oyu Tolgoi ESIA (2012). Section B: Baseline Assessment Chapter 7a - Biodiversity.

[53] The Oyu Tolgoi core biodiversity monitoring project is under implementation and is in its second year and current results are subject to change when more data becomes available.

[54] Kaczenkdy, P. and Payne, J (2014). Impact of mining related infrastructure development on khulan movements in the SE Gobi.

Figure 4: Segments of khulan tracks that crossed the ER Road and Coal Road in 2014.



There are indications that the roads within the area may have a barrier impact for gazelle movement. In August 2013, it was observed that gazelles approached the ER Road but they were repeatedly turned back as the trucks approach. There are also clear indications that deep ditches and earth mounds along the road (the ER Road have these to stop other company trucks accessing the paved road) prevent ungulates crossing the roads as evidenced by numerous animal tracks observed along the roads.[55] The results of the GPS tracked goitered gazelle will be available in Q2 2015.

Fauna field surveys covering the New Road corridor were undertaken in 2012[56] and 2014[57], and the corridor was visited in May 2014 as part of the Biodiversity Assessment [58]. The 2014 DEIA survey was conducted over eight days in May 2014 and observed 24 sightings of goitered gazelle; khulan droppings and one siting of the tolai hare (*Lupus tolia*).

Reptiles and Amphibians

The only amphibian known to occur within the Mongolian Gobi region and the Project Area is the Mongolian toad or "mongol bakh" (*Pseudepidalea raddei*). The deserts of southern Mongolia are well populated by several species of lizards and snakes adapted to the harsh seasonality and arid to semi-arid conditions and several species were observed during the 2014 DEIA field survey. Studies to date in the Oyu Tolgoi AoI have reported eight species of lizards and five species of snakes.

Invertebrates

There are no published systematic surveys of the South Gobi invertebrate fauna at a regional or sub-regional level and the available literature is scant. Within Mongolia, there appears to be 68 species of ant and studies concluded that the cold winters appear to limit diversification of ants. The extensive

[55] WCS and Sustainability East Asia (2014) Biodiversity Assessment of proposed design changes to Gashuun Sukhait Road.

[56] Nature Friendly (2012) Detailed Environmental Impact Assessment: Oyu Tolgoi – Gashuun Sukhait road, Zone 3, Road diversion, Nature Friendly.

[57] JEMR LLC (2014) Baseline for the 2015 Tsagaan Khad to Gashuun Sukhait Paved Road DEIA, DRAFT.

[58] WCS and Sustainability East Asia (2014) Biodiversity Assessment of proposed design changes to Gashuun Sukhait Road.

distribution of two hot desert species in the Gobi indicates an impoverished fauna and may be an example of the dominance-impoverishment rule.[59]

The 2014 DEIA field survey noted a number of invertebrate species, including Orthoptera, Hemiptera, Dpitera, Coleoptera, Blattoptera and Hymenoptera.

Birds

There are no avian species endemic to the South Gobi region, as most of the species are widespread over the interior deserts and steppes of Central Asia. At least 137 species of birds have been reported from the Oyu Tolgoi AoI and species are being added regularly. Of these, one species is categorised as globally Endangered, six species are categorised as globally Vulnerable, one species is categorised as Near Threatened and a further two species are categorised as Least Concern by the IUCN. Mongolia has few resident bird species, owing to its northerly location and harsh winters. Of almost 200 bird species predicted or known from the unit of analysis used for the Critical Habitat determination, 174 are considered to be migratory species, with some of these also congregatory. However, despite the occurrence of these migrants within Oyu Tolgoi AoI, there is currently no indication that the Oyu Tolgoi AoI constitutes a major flyway where migratory birds regularly concentrate in numbers exceeding a 1% species population threshold, although occasional large shorebird concentrations have been noted at ephemeral lakes and pools in the area.

The 2014 DEIA Baseline survey recorded 16 species of bird, namely: *Milvus migrans* (black kite), *Falco naumanni* (lesser kestrel), *Syrrhaptes paradoxus* (Pallas' sandgrouse), *Columba rupestris* (hill pigeon), *Calandrella cheleensis* (Asian short-toed lark), *Eremophila alpestris* (horned lark), *Podoces hendersoni* (Mongolian ground jay), *Corvus corax* (common raven), *Galerida cristata* (crested lark), *Passer montanus* (tree sparrow), *Pica pica* (magpie), *Oenanthe deserti* (desert wheatear), *Phoenicurus auroreus* (daurian redstart), *Carduelis spinus* (Euarsian siskin), *Anthropoides virgo* (demoiselle crane) and *Athene noctua* (little owl).

During the houbara bustard field survey in July 2014, a total of 11 individuals were observed along the Tavan Tolgoi to Gashuun Sukhait, and Oyu Tolgoi to Gashuun Sukhait roads confirming the presence of this species in the area. Some of them were observed within 100 m distance from paved roads.

The snake eagle survey completed in 2013 and July 2014 found no nests along the New Road corridor. The nearest known nest is approximately 16 km north of Tsagaan Khad.

3.4.2 Impacts

The land adjacent to and between the New Road and the ER Road is severely degraded from off-road vehicle use, road construction impacts and the construction of barrier ditches to prevent off-road access. Direct biodiversity impacts associated with the construction of the New Road are reduced in comparison to the development of the proposed 2012 Realignment Road, as the disturbance is confined within a pre-existing disturbed corridor.

Habitat Disturbance and Habitat Loss

Construction of the New Road could negatively impact roadside vegetation by cutting off hydrological flows from the other side of the road or by channelling water through culverts and into artificial channels that do not reconnect to the original hydrology of the landscape.

The long term indirect impact of the New Road on adjacent vegetation is likely to be positive as the paved road will reduce dust generation from the use of unsealed roads and provide an opportunity for rehabilitation and revegetation of the numerous parallel vehicle tracks adjacent to the new dual lane road system.

Khulan, goitered gazelle and houbara bustard are identified as high value biodiversity features in the region that are potentially most impacted by loss of habitat, however as the corridor is already degraded, it is not anticipated that construction of the New Road will have a significant effect on these priority species. The short-toed snake eagle is known to nest on elm trees in the southern Gobi region of Mongolia. Although there are some elm trees along the proposed road alignment to the east of Tsagaan Khad, and disturbance to these will be avoided during construction, the close proximity to the settlement

[59] Oyu Tolgoi ESIA (2012). Section B: Baseline Assessment Chapter 7a – Biodiversity.

and the existing disturbance caused by other activities in the area means that it is unlikely that construction of the New Road will have any additional impacts to snake eagle habitat.

The impact from direct habitat loss from road construction will be minor due to the already disturbed corridor.

Habitat Avoidance and Fragmentation

Potential impacts of the Oyu Tolgoi mine, power lines and transport roads on biodiversity and identified mitigation measures are provided and discussed in OT's Biodiversity Management Plan[60] . This section summarises potential impacts of the New Road on some high value biodiversity features[61] from both the construction and operational phase.

The New Road Project area is completely surrounded by infrastructure and human settlements, with the Coal Road to the west, ER Road to the east, the Tsagaan Khad settlement in the north and the Gashuun Sukhait border crossing in the south. Given the impacts from existing human activity and infrastructure, it is unlikely that the road construction of the New Road will add to further avoidance by khulan or other migratory animals as they are already avoiding the area due to the weight of existing traffic[62].

The existing roads in the New Road corridor have already contributed to habitat fragmentation. There are indications that the existing roads within the Project area may have a barrier impact for goitered gazelle movement[63], however there is also evidence that Khulan have been crossing the roads in the Project area[64]. Construction of the New Road will reinforce this already fragmented environment.

Direct and Indirect Mortality from Collision and Hunting/Gathering

Given the existing settlements at Gashuun Sukhait and Tsagaan Khad, and the traffic volumes that pass through the New Road corridor, it is unlikely that the temporary construction workforce will cause a significant increase in illegal hunting or gathering of plants. Both these activities are prohibited by OT and its contractors as part of the Illegal Wild Plants and Animal Products Policy (OT-10-E9-PLC-1001).

Although OT will set a common speed limit on the road to avoid collisions and traffic accidents, the change in road design from a single carriageway to dual carriageway may potentially encourage drivers to drive at higher speed.

3.4.3 Mitigation

Habitat Loss

The LDP for the New Road has not been issued yet, however the previous LDP (for the Diversion Road) did not require any special protection measures for vegetation other than that elm trees must not be removed. Construction of the New Road will avoid disturbance to elm trees, in particular those growing in the natural drainage feature approximately 1.2 km south of Tsagaan Khad. [65] As a critical habitat species, these are already protected by mitigation embedded within OT's ESMS and are monitored as part of OT's Core Biodiversity Monitoring Programme.

[60] Oyu Tolgoi Biodiversity Management Plan Rev 19 July 2014 OT-10-ELN-PLN-1001

[61] The high value biodiversity features identified by OT include Asiatic wild ass or khulan *(Equus hemionus)*, Argali *(Ovis ammon)*, Goitered Gazelle (*Gazella subgutturosa)*; Houbara Bustard (*Chlamydotis undulate)*; Short-toed Snake-eagle (*Circaetus gallicus)*; 18 'very rare' plants (e.g., Mongolian Chesney (*Chesneya/Chesniella mongolica*); Granite outcrop floral communities; Riverine Elms; Tall Saxaul Forest; and Rangeland habitat.

[62] WCS and Sustainability East Asia (2014) Biodiversity Assessment of proposed design changes to Gashuun Sukhait Road.

[63] The habitat range and nomadic patterns of goitered gazelle will be studied further using information from the satellite collaring programme which started in September 2014.

[64] Petra Kaczensky & John Payne (November 2014) Impact of mining related infrastructure development on khulan movements in the SE Gobi.

[65] WCS and Sustainability East Asia (2014) Biodiversity Assessment of proposed design changes to Gashuun Sukhait Road.

Borrow pits and gravel pits will be rehabilitated as per OT's Rehabilitation Procedure (OT-10-E9-PRC-0002-E).

OT will consider the following measures to avoid habitat loss due to changing hydrology from road construction:

- Appropriate spacing of culverts to avoid any drainage shadow effects
- Drainage designs that minimise the channelling impacts on surface and shallow rooted vegetation; and
- Construction of spreader ditches or levee banks downstream of major culverts to redistribute the water to sheet flow, if needed. Installation of armoured riprap pads after culverts to slow the water flow speed and promote dispersion runoff.

Disturbance

The Diversion Road LDP required that for any construction activities undertaken during houbara bustard lekking season, specific measures will be implemented, including:

- Field monitoring of proposed disturbance area, immediately prior to and during activities to identify habitat or activity, to be avoided;
- Scheduling of works so that impacts on sensitive areas were avoided wherever possible; and
- Specific induction of contractors and employees on measures to minimise disturbance to breeding species through the restriction of certain activities or avoidance of machinery use in identified areas.

Wildlife mortality from vehicle collisions

OT has detailed mitigation in place as part of the Biodiversity Management Plan (OT-10-E9-PLN-1001) and Transport Management Plan (OT-10-C3-PLN-0001) which includes:

- Adopting and enforcing suitable speed limits (in line with OT vehicle speed limits) on all public users of the OT to Gashuun Sukhait Road. (TMP29);
- encouraging all road users to minimise parking beside roads except in an emergency or to manage fatigue;
- providing driver awareness and training for all OT staff and contractors with specific information on priority biodiversity features; and
- ensuring that road safety signs include wildlife warning signs.

Installation of two livestock crossings along the New Road alignment, which can also be used by wildlife.

3.4.4 Residual Impacts

It is not anticipated that species will avoid the New Road corridor more than they already do, as the local area is already so disturbed. Although the New Road will add a further barrier that contributes to the habitat fragmentation caused by the existing infrastructure, the road will result in positive impacts associated with a reduction in off-road driving (such as reduced dust and reduced habitat loss).

Adverse residual impacts are expected after the application of available mitigation actions from mortality from collisions for some priority biodiversity features and are considered **minor** once mitigation measures are implemented.

3.4.5 Net Positive Impact and Offset Strategy

OT has committed to a goal of Net Positive Impact (NPI) on biodiversity and as such any significant residual impacts on priority biodiversity features will need to be offset to achieve NPI.

Overall, the Oyu Tolgoi project will have some unavoidable residual impacts on biodiversity including direct habitat loss, indirect habitat loss, and increased mortality arising from increased hunting, increased collecting, collisions with vehicles, and increased numbers of natural predators. The conservation of Khulan is recognised as the highest biodiversity priority for the Oyu Tolgoi project given the international

importance of the southern Gobi region to this rapidly declining globally endangered species and the likely residual impacts of the Oyu Tolgoi project on the species.

Biodiversity offsets are recognised as a last, however fundamental, step in the Rio Tinto environmental toolkit and the company has produced a draft Biodiversity Offset Guidance Note (Rio Tinto, 2010) to assist business units in developing a technically, socially and politically feasible and robust offset plan. This plan supports the OT biodiversity offsets strategy developed for the project. The aim of OT's Biodiversity Offsets Strategy is '*to achieve Net Positive Impact on biodiversity through the generation of gains in priority biodiversity features to offset residual project losses'*, and it has the following objectives:

- Reduce illegal hunting and collecting (through implementation of anti-poaching units and capacity-building within government institutions to increase prevention, detection and conviction rates of wildlife crime; and reduce hunting of Houbara Bustards;
- Improve rangeland management (through provision of support to herders, implementation of conservation schemes, development of an alternative livelihoods scheme and revitalising *soum*-level grazing planning);
- Reduce impacts of non-project powerlines (elsewhere in the southern Gobi region);
- Strengthen protected areas (through implementing strengthened management of the SGSPA areas, reviewing the management of Ergeliin Zoo NR and Important Bird Areas, and working with government to review and revise protected area extent and zoning);
- Raise the bar in regional development (through championing sustainable regional development, and facilitating collaborative regional planning);
- Establish strong enabling mechanisms (through the establishment of a long-term financing mechanism, and implementation of a Stakeholder engagement Plan);
- Monitoring and evaluation informs adaptive management (through the design and implementation a Monitoring and Evaluation system to quantify losses and gains); and
- OT capacity building (through internal capacity-building for promoting managing and implementing the Offsets Strategy).

As stated in the OT Biodiversity Offsets Strategy, these objectives and their supporting activities have undergone a process of expert consultation to determine that they are the best available options. OT will have produced a strategic plan for the delivery of biodiversity offsets in the southern Gobi region. This plan articulates specific and costed conservation actions designed to fully address the residual impacts of the Oyu Tolgoi project to priority biodiversity features. Key subject matter experts have been approached as part of the stakeholder consultation process to formulate OT's offsets approach and a comprehensive stakeholder engagement process has been undertaken to canvass the opinion of a range of stakeholders on the identified possible offsets.

The OT Biodiversity Action Plan (BAP) outlines key actions for biodiversity management, mitigation and offsets. Because of their scale and the level of stakeholder engagement required biodiversity offsets will be developed through a separate but complimentary process to the BAP. However, conservation actions identified through the offsets planning process have been fully integrated into the BAP. The BAP sets out key actions for biodiversity management, mitigation and offsets and provides specific completion indicators and timeframes. As stated in the BAP, the BMP includes commitments and actions related to construction that will occur during the operations phase. Biodiversity-related commitments have been mainstreamed into other applicable Management Plans, where appropriate.

The NPI Forecast is currently being updated and will be available in mid-2015.

3.4.6 Monitoring

Monitoring of biodiversity issues during construction and operation of the New Road will be undertaken as described in OT Biodiversity Management Plan (OT-10-E9-PLN-1001). The geographical scope of the existing biodiversity monitoring regime will be extended to include the New Road. Monitoring measures include:

- Recoding all wildlife mortalities;

- Routine wildlife animal counts conducted as appropriate and subject to a suitably-qualified expert being in place;
- Vegetation monitoring in plots as appropriate;
- Monitoring restoration condition and rehabilitation, and rehabilitation success by monitoring landscape function analysis, vegetation dynamics, habitat complexity, observations of biodiversity, evidence of nesting and invasive alien plant monitoring;
- Rare plant distribution and density; and
- Elm tree quantity and survival condition.

3.5 CULTURAL HERITAGE

3.5.1 Baseline Conditions

The 2014 DEIA Baseline[66] states that the Archaeological Institute of Mongolian Science Academy has confirmed that there are no archaeological artefacts along the New Road alignment and Project site and provides a certificate from June 2014 stating as such.

For the purposes of this assessment, the Diversion Road Supplemental Appraisal[67] will be used as an additional source of information, as the New Road corridor is similar to the previously assessed Diversion Road corridor.

Archaeological Sites

The route of the Diversion Road was surveyed in February 2012 for cultural heritage sites and the location of herder shelters by OT specialists. Seven monuments were recorded along the Diversion Road; of these, two classified as rock structures, three classified as monuments and two classified as excavated monuments.

Paleontological Sites

Following the initial paleontological site investigations undertaken during Phase 1 of the cultural heritage field investigations, further field surveys were undertaken between 27 June and 10 July 2011. Surveys were conducted at intervals along the Oyu Tolgoi to Gashuun Sukhait road to distances of 3-5 km on either side of the road alignment, as well as at the location of two operational borrow pits established for the construction of the Oyu Tolgoi to Gashuun Sukhait road. No paleontological findings were made.[68]

Ethnographic Sites

An Ethnographic Assessment was conducted during the latter months of 2010 in the areas of the Oyu Tolgoi to Gashuun Sukhait road and 220 kV power line with the aim of identifying and recording sites of spiritual significance such as sacred mountains, ovoo (worship cairn), current and old burial places, birth place marked stones, places with magical and negative powers, horse racing fields, and guard or hunting hideaways. The assessment was carried out by the Institute of History (Department of Ethnology and Anthropology) of Mongolian Academy of Sciences and conducted the study within 15 km of the Oyu Tolgoi to Gashuun Sukhait road and 220 kV power line.[69]

The assessment identified categories of sites that have symbolic significance to communities and/or herders resident in or utilising the area on a seasonal basis. These categories include:

[66] JEMR LLC (2014) Baseline for the 2015 Tsagaan Khad to Gashuun Sukhait Paved Road DEIA, DRAFT.

[67] OT (2012) Oyu Tolgoi ESIA: Supplemental Appraisal Diversion Road and Realignment Road.

[68] Tsogtbaatar, Kh and Chinzorig, Ts. (2011) Report on preliminary exploration and assessment of paleontology in the area planned to build infrastructural facilities field site of Oyu Tolgoi Project. Mongolian Academy of Sciences, Paleontological Centre, Ulaanbaatar.

[69] Ch. Sampildondov and Lh. Purevjav (2011). Report on Ethnographic Assessment or Sacred and Inherited Places around Oyu Tolgoi Project Construction Objects (Oyu Tolgoi to Gashuun Sukhait road, power towers, water pipeline and new airport), Ulaanbaatar.

- Ritual performed sacred places – sacred worshipped places which have certain fixed ritual performance such as public festival and ceremonies within 1-5 year periods;
- Worshipped places - sacred worshipped places that have no fixed ritual performances; individuals worship by themselves and have fresh tea offering in the mornings;
- Sacred-powerful places - when something unexpected, abnormal and disordered happens, the site can affect and show negative power when any stone or trees are removed, and the place is approached by people. Also, in instances where previously known praying manuals are lost and nobody knows how to conduct the proper ritual performance, the site becomes "fierce" with some negative power;
- Taboo places - this category comprises funeral places - pre-modern and modern, chosen either by families or decided by the *soum* administration. These places can also be where something bad happened and people avoid residing there; and
- Inherited places - inherited places are pasture, winter camp, wells or water bodies which are important for nomadic livelihood and inherited from their ancestors or newly possessed. Also, it includes birth places, Mongolian traditional stone *ger* game bases, historical guard or hunting hideaways and horse racing area.

Within the area around the Diversion Road, Tsagaan Khad was identified as an area considered a fierce, sacred site to the herders that camp around the area. However, the rare and sacred trees have previously been removed and the settlement has become one of the more populated areas of Khanbogd *soum*. However, the herders who previously camped around this area say that area is sacred and worshipped by them as it is where they grew up and ancestors resided. Therefore, the concept of the sacred place is sometimes not literally connected to the actual area.

No other sacred sites were identified in the areas adjacent to the New Road.

3.5.2 Impacts

The physical loss of tangible heritage (physical resources) is primarily associated with the construction phase of the New Road. The impacts include:

- Disturbance to heritage sites arising from land disturbance activities such as topsoil stripping, creation of borrow pit areas and areas demarcated for the location of plant and equipment;
- Disturbance of tangible heritage as a result of dust deposition and vibration effects arising from the movement of construction vehicles and machinery; and
- Damage and/or deliberate disturbance of heritage by Project workers and/or incomers to the region.

The potential impacts to the seven archaeological sites arising from land disturbance activities and from vehicle movements and plant and equipment are considered to be **negligible** given that the New Road is constructed adjacent to a pre-existing alignment and two of the sites were previously excavated.

There are no known cultural heritage sites in close proximity to the New Road, and the potential for impacts is anticipated to be **negligible**.

During the operations phase, the potential for permanent physical disturbance of archaeological sites is expected to be **negligible**.

The potential for impacts to archaeological sites arising from the increased access to the area is anticipated as **minor** adverse. Once the New Road is completed, travel times through the South Gobi area will be substantially decreased and this may encourage an increase in visitation to cultural heritage sites within the area, with the accompanying potential for damage.

3.5.3 Mitigation

The mitigation measures employed by OT to manage impacts to cultural heritage include the Land Disturbance Permit (LDP) Procedure, the Chance Finds Procedure (CFP) and the Cultural Heritage Site Protection Plan (CHSPP) as detailed in the Cultural Heritage Management Plan (OT-10-PLN-0002).

A LDP has not been issued yet. The LDP Procedure requires that prior to any land disturbing activities, it must be ascertained by an authorised organisation that there are no areas of cultural significance, including archaeological and paleontological findings, in the proposed work area. The OT RDSP Department must provide such clearance to the Environmental Department in a LDP approval RDSP checklist prior to the issue of the LDP to the relevant OT Department or the appointed contractor. The checklist is completed during the pre-disturbance inspection undertaken by OT specialists, and signed-off by the Superintendent Cultural Heritage.

Where ground disturbance activities occur, the LDP mandates the implementation of the Chance Finds Procedure. The Chance Finds Procedure has been developed by OT in consultation with Rio Tinto cultural heritage advisors and is designed to ensure the safety, integrity and proper handling of any previously undocumented objects of cultural or historical significance, including archaeological assets and paleontological features. Observance of the Procedure is mandatory for all OT employees and contractors.

In the event of a cultural heritage site being in close proximity to infrastructure, a Site Protection Plan is prepared that details the requirements for the management of the site while works are undertaken. The Plan also details requirements for future management considerations and incident reporting.

3.5.4 Residual Impacts

Following the excavation of the remaining five archaeological sites, the residual impact to cultural heritage is assessed as **negligible**.

3.5.5 Monitoring

Archaeological sites are regularly monitored by OT's environmental officers as part of the monitoring programme outlined in the Cultural Heritage Management Plan (OT-10-PLN-0002). OT also undertake periodic monitoring of contractor compliance with the conditions of the LDP. However, with the cessation of works on the national road, the contractor has been demobilised and no compliance monitoring has recently been undertaken.

4. STAKEHOLDER ENGAGEMENT

As documented in the Stakeholder Engagement Plan (OT-05-PLN-0001), OT undertakes on-going engagement with affected herders, communities, government and NGOs. The New Road corridor is within the Direct Area of Influence as defined in the OT ESIA[70].

4.1 HERDERS

Five herder households were identified in the New Road area in 2011. These households all signed up to a five year compensation agreement. OT Community Relation officers visited herder households between January and March 2015 and informed them about the proposed New Road. No further herder households were identified during these field visits.

4.2 SGSPA ADMINISTRATION AND KHAIRKHAN BAGH GOVERNOR

Consultation was undertaken with the SGSPA B and the Khairkhan *bagh* governor between January and March 2015. Both noted that the New Road is preferred to the Diversion Road/Realignment Road as it is an integrated solution to transport between Tsagaan Khad and the border at Gashuun Sukhait.

The SGSPA administration suggested that:

- OT creates a new deep well in the SGSPA B with a solar motor pump for wild animals.
- OT includes one livestock/wildlife crossing and one road crossing in the Project Design. The suggested coordinates have been provided to the OT CEG team. OT are planning to include two livestock crossings as a precautionary approach so that they can also be used for wildlife.

[70] Oyu Tolgoi ESIA (2012). Section A: Introduction and Background, Chapter A1: Introduction

4.3 TSAGAAN KHAD

The Tsagaan Khad *bagh* governor was interviewed by consultants as part of the 2012 DEIA study[71][72]. The discussion focused on issues relating to in-migration of people into the settlement, and the management of impacts arising from the influx. In summary:

- The lack of facilities for particularly children living in the settlement and the informal nature of businesses serving the coal trucks moving through the area;
- The increase in environmental degradation due to odd-road driving in protected zones of the SGSPA, the collection of medicinal and other plant species, including firewood;
- The increase in litter attributed to the general lack of awareness of environmental sensitivity among the itinerant population who do not dispose of waste matter correctly;
- The lack of control over coal truck emissions contributing to the poor air quality of the area; and
- Until recently, the lack of formal waste management facilities within the settlement.

The Governor proposed that a management plan to formalise the residents of the settlement, and establish awareness-raising courses for residents as to the sensitivity of the surroundings and erect signage prohibiting entry to the sensitive areas of the SGSPA.

5. LABOUR AND WORKING CONDITIONS

Contractors and Sub-Contractors working at OT project sites are required to comply with all OT requirements, as outlined in the Contractor Management Framework (OT-07-PLN-0001). Compliance by Contractors and Sub-Contractors occurs either by adopting OT policies and procedures or implementing their own equivalent procedures that are approved by OT.

The LDP Procedure is undertaken by OT and the findings are fed into the risk assessment used to develop the contractor scope of work. This scope of work also includes an analysis of the risks associated with the activities to be performed by the Contractor, including an assessment of the risks of non-compliance or conformance with Project Standards. The HSE Management System applies to contractors and includes processes to ensure that all contractor tools and equipment are inspected and evaluated to be in a safe condition and conform to OT standards and procedures.

The focus of Contractor monitoring is on ensuring that employment arrangements do not contravene applicable Mongolian Law and on monitoring the working and living conditions at Project work sites and in the worker accommodation camps. It is expected that personnel working on the New Road will be accommodated at a camp adjacent to the Diversion Road approximately half way between Oyu Tolgoi and Tsagaan Khad. OT camps are strictly managed in terms of the OT Camp Standard and Code of Behaviour (HR-ST-01). Compliance verification to assess contractors' performance against OT policy and standards is periodically undertaken.

6. CUMULATIVE IMPACTS

This section discusses the cumulative impacts of the New Road in the context of the prevailing environmental and social conditions of the surrounding area.

The New Road is being built within an existing transportation corridor with existing fragmentation effects and a high incidence of off-road driving. Once operational, the New Road is expected to have a beneficial impact by facilitating a more defined transport corridor in the area than what is currently in place. The New Road provides an opportunity to rehabilitate the sections of the Diversion Road and off-

[71] Nature Friendly (2012) Detailed Environmental Impact Assessment: Oyu Tolgoi – Gashuun Sukhait road, Zone 3, Road Diversion.

[72] Since the 2012 study, OT has engaged with the Khairkhan *bagh* overnor on the proposed new route.

road tracks in the area, potentially reducing the overall land disturbance between Tsagaan Khad and Gashuun Sukhait. This will reduce the amount of dust from off-road driving and improve road safety by being part of an integrated road system with the ER Road.

With mitigation measures in place, the cumulative impacts of the New Road will be minor due to existing fragmentation effects of the Coal Road and ER Road in the region. OT is planning to mitigate fragmentation impacts by installing livestock crossings. This mitigation cannot be expected to mitigate road fragmentation impacts at a broader scale unless similar measures are also implemented for the Coal Road and ER Road.

7. DISCUSSION AND CONCLUSIONS

The New Road is situated within an area designated as a protected area in terms of Mongolian legislation (the SGSPA B). With the implementation of effective mitigation measures, the residual environmental and social impacts are mostly considered to be negligible or minor. In summary:

- The location of the New Road adjacent to the ER Paved Road will minimise the impact on biodiversity by building a road in an already disturbed area that is aligned;
- Once the LDP has been issued, contractors will be monitored to ensure that they comply with its conditions;
- The OT HSE MS and CSP MS, with its associated OMPs, Procedures and supporting documentation, will be adhered to; and
- Given the location of the entire New Road within the Limited Use Zone of the SGSPA B and within an area deemed Critical Habitat, measures to mitigate potential impacts to biodiversity will be key in OT meeting its commitment to a NPI for biodiversity.