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Kyrgyz Republic: Environmental and Social Impact Assessment (ESIA) - Tyup-Karakol Road

Non-Technical Summary (NTS)

April 2022

Notice

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Acronyms and abbreviations

Acronym / Abbreviation	Description
CO	carbon monoxide
CO ₂	carbon dioxide
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
EU	European Union
GHGs	Greenhouse gases
IBA	Important Bird Area
KDTP	Survey Institute Kyrgyzdortransproyekt
LARF	Land Acquisition and Resettlement Framework
LRP	Livelihoods Restoration Plan
MoT	Ministry of Transport and Communications
NO _x	oxides of nitrogen
NTS	Non-Technical Summary
PM	Particulate matter
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
SEP	Stakeholder Engagement Plan
SO ₂	sulphur dioxide

1. Introduction

1.1. Background

The European Bank for Reconstruction and Development (EBRD) is considering providing finance to the Kyrgyz Republic (the Borrower), for the benefit of the Ministry of Transport and Communications (MoT or Client), for the approximately 32 kilometre (km) Tyup-Karakol Road section of the Balykchy-Karakol Road (the Project). The Balykchy-Karakol Road is part of the 440 km Issyk Kul Lake ring road, the rehabilitation/upgrading of which is a priority project for the Kyrgyz Republic government and is supported by a number of International Financing Institutions. The Balykchy-Karakol Road is located in the Issyk Kul basin and the site of the Project road is shown within the black circle in Figure 1-1.

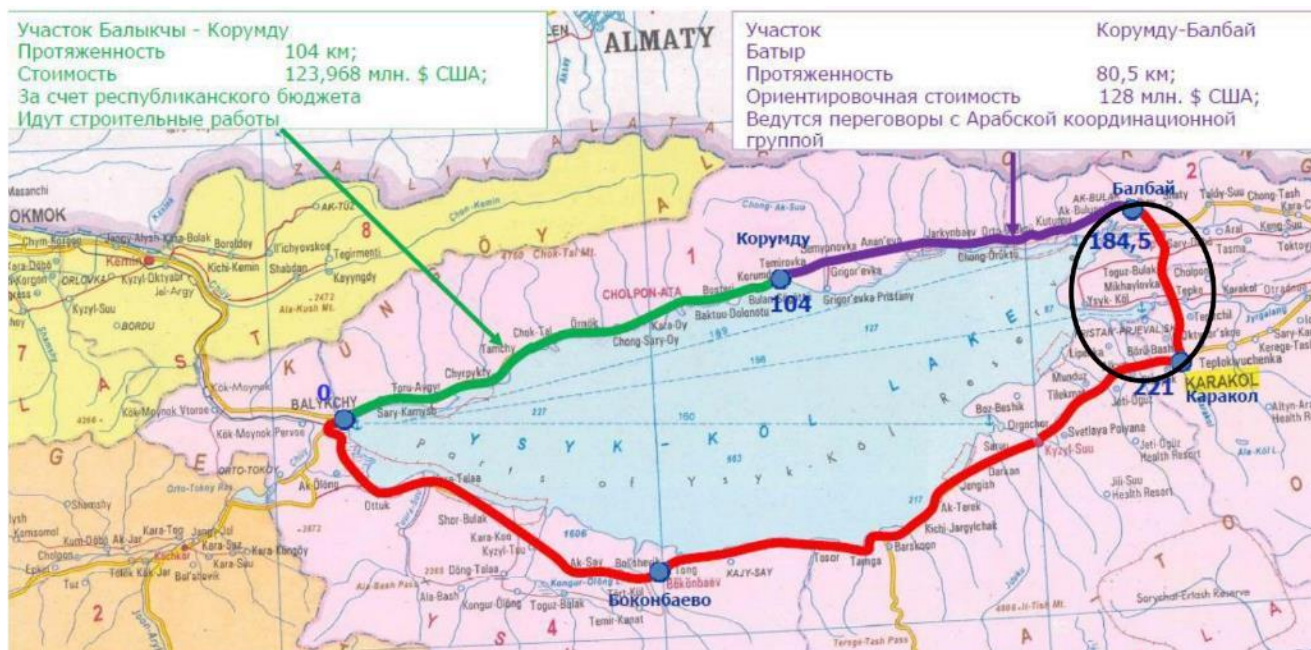


Figure 1-1. Project location¹

The EBRD has categorised the Project as “A” in relation to its 2014 Environmental and Social Policy, which means that a comprehensive Environmental and Social Impact Assessment (ESIA) is required to determine the bankability of the Project.

The EBRD has commissioned WS Atkins International (Atkins), with their sub-consultants, CAI Consulting (CAIC) to undertake the ESIA and prepare the ESIA Disclosure Package to EBRD requirements

This Non-Technical Summary (NTS) is one of a number of documents within the **ESIA Disclosure Package**, as follows:

- ESIA Report
- Stakeholder Engagement Plan (SEP)
- Environmental and Social Management Plan (ESMP)
- Land Acquisition and Resettlement Framework (LARF)
- Environmental and Social Action Plan (ESAP)

¹ The green section has been financed by State budget. The works are complete. The purple section will be financed by the Islamic Bank of Development. The loan has been signed; the works have not started yet. The EBRD section is the red section on the Eastern side of the lake (black circle). The financing of the Southern section in red is not decided yet.

1.2. Purpose of the Non-Technical Summary

The purpose of this NTS is to provide an easily understandable summary of the information that is provided in the ESIA Disclosure Package documents identified above. It provides the public with information about the Project, including the outcomes of the ESIA, the management actions to address positive and negative environmental and social impacts, and the proposed stakeholder engagement process and grievance mechanism.

1.3. Scope of the Non-Technical Summary

This NTS identifies:

- The Project and alternatives considered
- Summary of environmental and social considerations for the detailed design phase of the Project
- Summary of environmental and social impacts associated with the Project during construction and operation
- Mitigation measures and monitoring requirements to address negative impacts
- Summary of management measures
- Overview of the Stakeholder Engagement Plan and Grievance Mechanism

2. Description of the Project

2.1. Project Overview

The Project road passes through the administrative boundaries of Tyup rayon (district) and Ak-Suu rayon, which are in Issyk-Kul oblast (province). A Feasibility Study for the 440 km ring road was updated in 2018 by the Survey Institute Kyrgyzdortransproyekt (KDTP) on behalf of the MoT for the road section between Korumdu and Karakol, covering the Project road. It proposes the widening of the Project Road from a 2-lane to 4-lane carriageway, and also considers a possible ring road around Tyup. After completion of the Project, the road should comply with the Category II international technical standard. A Technical and Economic Due Diligence Consultant, EGIS, has been engaged by the EBRD under a separate contract to undertake a technical and economic review of the Feasibility Study.

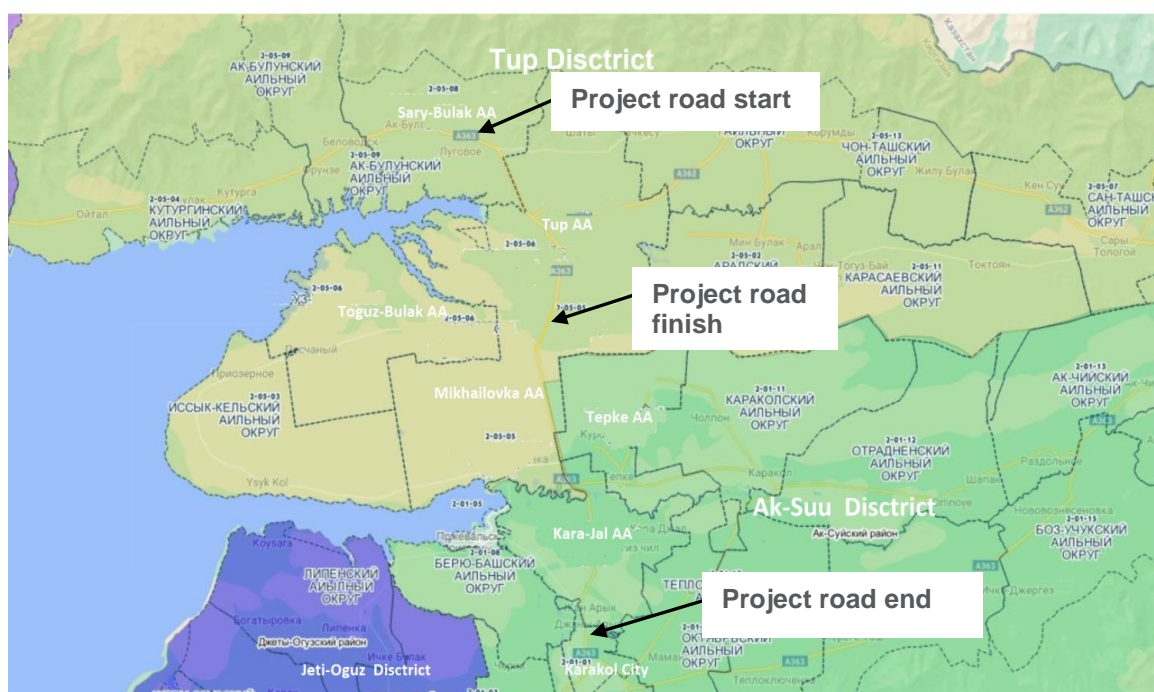


Figure 2-1. Map of the administrative boundaries along the Project road

2.2. Need for the Project

The Balykchy–Karakol Road is of strategic importance for the country, linking the two cities of Balykchy and Karakol and their vicinities located in the eastern part of Kyrgyz Republic along the northern shore of Issyk-Kul Lake. As well as being economically important as a tourist destination, the Issyk Kul basin is also important for its agricultural production, food processing and mineral extraction. Karakol is a renowned and growing centre for skiing, trekking, mountaineering and also hosts a number of health resorts.

The existing road is designed to a Category III 2-lane road (an international road with an average level of service) and has an asphalt concrete coating with a thickness varying from 5 to 20 cm. The current pavement (width of the carriageway) is 5.6-15.6m, with a shoulder of 1-4.7 m.

Dynamic development during the past decade has been accompanied by steady growth in passenger and cargo traffic. Improved interregional connectivity and rising tourist inflows have resulted in traffic growth of around 60% since 2010 with a consequent need to widen the road to address existing and future traffic predictions. Furthermore, the road has not been properly repaired for the last 30-35 years due to lack of financing, and there are almost no road markings, safety barriers, or traffic signage, making the road dangerous for current users. The Project therefore aims to address current and future traffic needs, related to traffic volumes and type of traffic, as well as improve the safety of the road. The Project road is also the only section of the Issyk Kul ring road in its northern section that has not been upgraded; thus, the Project aims to improve the road conditions as part of the wider improvements to the strategic ring road, to benefit economic activities in the area including agriculture, food processing and mineral extraction as well as tourism; maintain the strategic importance of the Balykchy–Karakol Road; and to facilitate the trade and tourist relationship of Kyrgyzstan, Kazakhstan and China, providing opportunities for the both national and regional development and further improvement of transport services.

The overall objective of the rehabilitation/upgrading of the Project road is to improve road safety and facilitate trade and tourist relationship of Kyrgyzstan, Kazakhstan, and China, giving opportunities for both national and regional development and further improvement of transport services.

2.3. Key Project Characteristics

2.3.1. Project Route

The route of the EBRD Project is along the existing Karakol-Tyup Road, as shown in Figure 2-1. It passes through the administrative boundaries of Tyup *rayon* (district) and Ak-Suu *rayon* in Issyk-Kul *oblast* (province). Specifically, the road passes through the administrative boundaries of the Aiyl Aimaks (local areas) of Sary-Bulak, Tup, Mikhailovsky, Tepke, Kara-Jal and finally Karakol City. Karakol is the administrative capital of the province.



Figure 2-2. Project Road

The road starts just outside the town of Sarybulak and passes through the town of Tyup, it then continues adjacent to the town of Boz Bulun and through Jan Aryk before ending in the town of Karakol. The terrain is flat to rolling. The road passes across two main rivers (Tyup River and Jergalan River) and several smaller rivers and drainage channels and has several junctions to the villages of:

- Toguz Bulak to the west, and Bolon to the east, after Tyup town
- Mikhailovsky to the west before the Jergalan River
- Kurbu and Tepke to the east before the Jergalan River
- Tegiz Chil to the east after the Jergalan River

2.3.2. Proposed Works

The Project scope, as reported in the Feasibility Study prepared by KDTP and the Technical and Economic Due Diligence Report by EGIS, is summarised as:

- Complete reconstruction of the existing 32 km Category III road and widening to 4 x 3.5 m lanes Category II standard with 2.6 m wide paved median and 2 m unpaved shoulders on rural sections (outside Tyup)
- Construction of 4 x 3 m lanes with reduced median through Tyup
- Street lighting, walkways, and covered drainage on urban sections
- Construction of a separate 3 m wide bike path outside urban sections
- Partial demolition and widening of the existing three span Tyup River Bridge
- Widening of the three span Jergalan River Bridge
- Replacement of all drainage structures
- Relocation of utilities
- Construction of 640,000 m³ of embankment with imported material
- Installation of 21.6 km of New Jersey barriers
- Provision for construction of eight bus stops and one vehicle repair pit
- Planting of 13,000 trees and 2,400 shrubs

There are no specific details of junction improvements. Note that the above will be reviewed as part of the detailed design phase and does not reflect the specific recommendations of the ESIA Report prepared as part of the Disclosure Package.

For the purposes of the ESIA, it has been assumed that a symmetrical widening would occur along the road i.e., widening on both the right hand side and left hand side.

It should be noted that this design is under review by a detailed design consultant and therefore the specifics of the road design may change to those listed above.

2.3.3. Right of Way and Roadside

The Law on Highways, N 72 of 1998 sets out a 'right of way' depending on the category of road under consideration. In addition to the above Law, a Decree was passed in 2017 which defines a 'roadside', which is the land plot that adjoins on both sides to the right of way.

According to the legislation, the current Category III road has:

- A right of way of 14 m either side of the centreline, i.e. a total width of 28 m
- A roadside of 20 m either side of the centreline, i.e. a total width of 40 m
- Total land currently allocated to the existing road (right of way and roadside) = 14 m + 20 m = 34 m either side of the centreline, or 68 m total width

The proposed new road, which would be reclassified as a Category II, would result in the following:

- A right of way of 16 m either side of the centreline, i.e. a total width of 32 m
- A roadside of 40 m either side of the centreline, i.e. a total width of 80 m
- Total of the right of way and roadside = 16 m + 40 m = 56 m either side of the centreline, or 112 m total width

It is understood that for the Project, the footprint of the road only, and any temporary working areas, would require clearance. The total road construction width based on the design details in the FS has been estimated at up to 35 m outside of towns (17.5 m either side of the centre line) and 20 m within Tyup (10 m either side of the centre line). As such, assuming a symmetrical widening of the road (i.e. on both the east and west sides of the existing road), the area required for clearance falls almost entirely within the existing road right of way and roadside. Only the footprint and temporary works areas would be cleared for the widening of the road, no additional clearance would be required within the wider “roadside”.

2.3.4. Detailed Design Phase

The MoT will appoint a Road Design Consultant to develop the detailed design of the Project. This will determine whether the road widening is symmetrical or asymmetrical and various other details of the design.

The ESIA disclosure package, including the Environmental and Social Management Plan (ESMP), will form part of the tender documentation for the detailed design consultant. The Road Design Consultant will be expected to address the measures proposed in the ESIA and the ESMP to avoid and minimise adverse environmental and social impacts, in particular related to road safety. It is anticipated that the final design will incorporate the recommendations made, including the requirement for roundabouts and urban design in the villages/towns to ensure road safety and pedestrian crossings are in place.

A programme of Road Safety Audits will be developed to assess safety performance along the alignment and village access roads, and to identify any unsafe conditions. This will include an independent Road Safety Audit on the detailed design which will be approved by the EBRD.

Further survey work (e.g., targeted ecology surveys) will be undertaken, where required to assess the updated Project design.

2.3.5. Construction Phase

Typical site installation and preparatory work for road projects includes:

- Development of the lay down areas, work sites and construction camps
- Mobilisation and installation of the crushing and concrete plant
- Mobilisation of supplies and materials necessary for construction (vehicles, trucks, construction equipment)
- Temporary signage and the setting up of deviations where necessary
- General cleaning, clearing, and cutting of trees where necessary
- Installation of drainage.

Earthworks will include cutting and/or embankments.

The types of equipment that will be required includes:

- | | |
|--|----------------------|
| • Bulldozers | • Concrete mixer |
| • Graders | • Generators |
| • Dump trucks | • Mobile crane |
| • Mechanical shovels on wheels or on track | • Mixer trucks |
| • Finisher | • Pumps |
| • Sweeper | • Vibrating plate |
| • Pneumatic compactors | • Compressors |
| • Cylinder compactors Water tanks | • Circular saw |
| • Fuel tanks | • Painting equipment |
| • Planers / milling machines Loaders | |

Temporary facilities may include:

- Worker's accommodation camp(s)

- Temporary laydown areas and access or haul roads
- Borrow pits and quarries

The requirement for, and location of, the camp(s), laydown areas and access/haul roads is not currently known and would be determined by the Construction Contractor.

During construction raw materials will be required for the road pavement, including sand, concrete, bitumen, aggregate and water. It is anticipated that existing borrow pits and quarries in the province will be used.

2.4. Operation and Maintenance Phase

The MoT is responsible for transport sector policy and for planning, developing, and regulating transport in the road, railway, and aviation sectors in the Kyrgyz Republic, and is the Project Proponent/Owner in the context of this Project.

The year of opening of the road has been identified currently as 2024, though this date is subject to various approvals. The road has been designed for a 20-year lifespan. The current speed limit on the existing road is 90 km/hour outside urban areas, and it is anticipated that this will increase to 110 km/hour for the newly widened road. It is anticipated that the speed limit will be 40 km/hour in urban sections. These speeds will be confirmed in the detailed design phase.

The Road Management Department sits below the MoT and is responsible for operation and maintenance of MoT roads in Kyrgyzstan. The Road Management Department has regional offices that will undertake routine operation and maintenance activities. No details are currently available on operational and maintenance activities however, these typically include routine maintenance and unplanned maintenance such as clearing the road and repairing potholes.

2.5. Project Alternatives

The Project has considered alternatives to site locations and layout, and to the process and operational aspects of the activity.

The 'no project' alternative considers the outcomes should the Project not go ahead. In this case, not developing the Project would mean that the existing 2-lane road will continue to be used. If no improvement or rehabilitation of the road is undertaken, it is likely that further degradation would occur which will result in heightened road safety risks and increased risk of life, especially given the high road safety accident levels currently recorded in both Kyrgyz as a whole and in the Project area, compared to Europe.

The main alternative considered was whether or not to include a bypass around Tyup town and whether the road should be widened symmetrically or asymmetrically. Each option was compared in terms of Technical, Economic, Environmental and Social criteria using a weighted Multi-criteria analysis developed in consultation with EBRD.

The following bypass options were considered:

- West Bypass A
- West Bypass B
- East Bypass
- Town Option

These are shown in Figure 2-2. The bypass options were all for a Category III 2-lane road.

Considered alternatives for road widening were:

- Asymmetrical widening on the left from North to South (i.e., to the east)
- Asymmetrical widening on the right from North to South (i.e., to the west)
- Symmetrical widening (i.e., either on both sides)

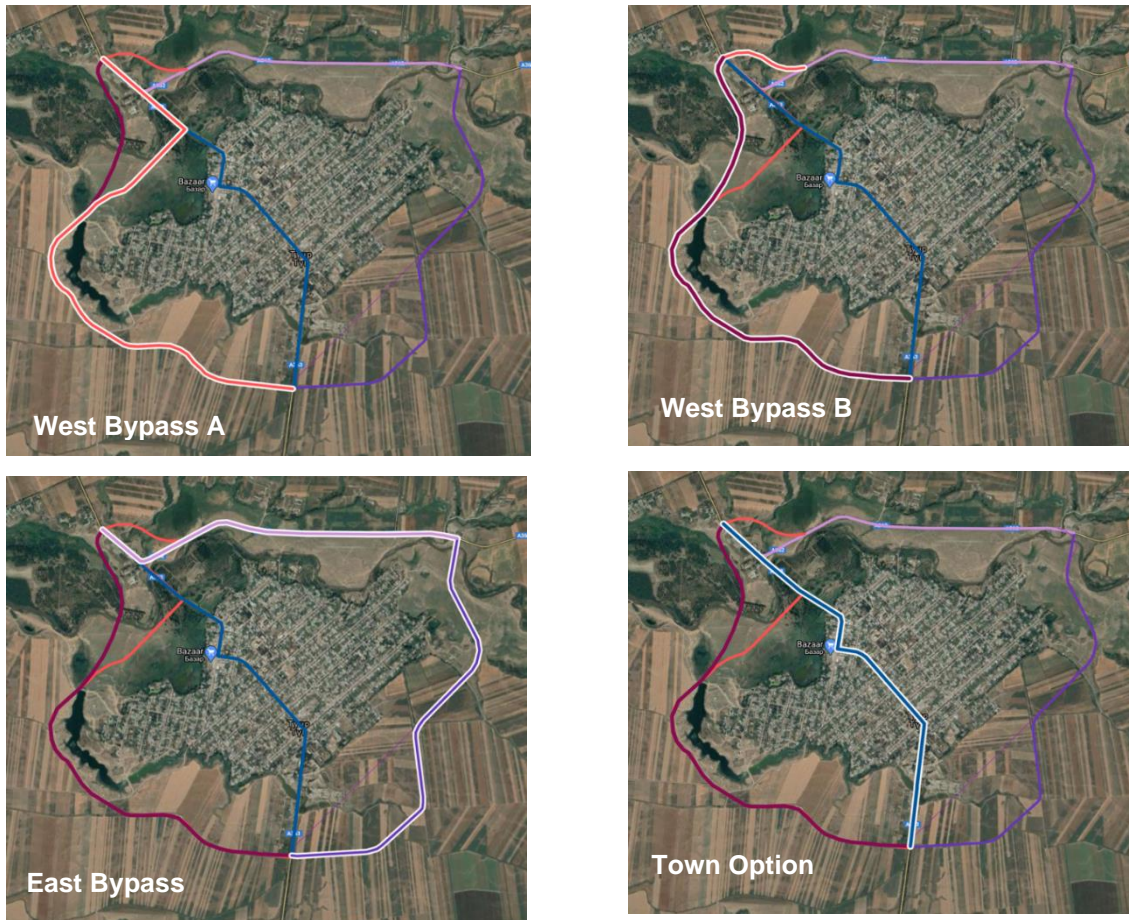


Figure 2-3. Road section to be financed by EBRD

Based on a review of the Multi-criteria analysis and feedback from a stakeholder engagement exercise undertaken on the bypass options, the MoT advised that they supported the through town option. It was therefore agreed that the 'Preferred Option' to be carried through into the detailed design stage should be upgrading the road on its existing alignment, though with a reduction in width to 4 x 3 m lanes through Tyup provided that suitable measures are included in the design to safeguard road users and pedestrians from increased accident risk.

The main alternatives for consideration of pavement structure are whether a flexible pavement or a rigid pavement is used. A flexible pavement (bituminous) consists of combination of mineral aggregate with bituminous binder ranging from inexpensive surface treatment to asphalt concrete whereas a rigid pavement is made of concrete pavement.

Rigid pavements tend to have lower maintenance costs, a longer design life and higher flexural strength; but flexible pavements tend to have lower construction costs and have a higher ability to expand and contract with temperature and so do not need expansion joints.

Options for pavement structure include Conventional Asphalt Concrete and Stone mastic asphalt. The use of stone mastic asphalt has been proposed for review during detailed design as it would offer advantages in terms of long term durability and temperature variation which is likely to increase as a result of climate change. The final choice will be made in detailed design.

The provision of street lighting has both positive effects (visibility at night) and negative effects (high maintenance costs, poor maintenance and non-uniform illumination can become a source of hazard). Overall, however, lighting at key areas in the town such as junctions, intersections, service facilities, public transport stops, and pedestrian crossings will have positive safety impacts. Lighting options include traditional energy supplies or energy-saving lights and adaptive lighting technology. Energy-saving lights and adaptive lighting technology significantly reduce costs as they are more cost effective and efficient. Power cuts are common in the Project area, therefore independent power sources (e.g., solar or wind batteries) are preferred. In particular,

LED lighting and solar energy systems can significantly reduce operational costs and are therefore preferred in terms of lighting options.

3. Legal Aspects and Compliance

3.1. National Requirements

The legal basis for environmental assessments in Kyrgyzstan is formed by the Law on Environmental Protection (No. 53, 1999, amended in 2002-2015), Law on Environmental Expertise/ Review (No. 54, 1999, amended in 2003-2015), Regulations on the procedure of the state ecological examination in the Kyrgyz Republic (Decree of Government No. 248, 2014, supplemented in 2017), Regulations on Environmental Impact Assessment (EIA) in the Kyrgyz Republic (Decree of Government No. 60, 2015) and other normative documents.

Construction of the highways and railways is within the List of Economic Activities subject to Environmental Impact Assessment.

A national Environmental Impact Assessment will need to be prepared by the MoT on the detailed design to obtain an Environmental Impact Assessment permit for the Project.

3.2. EBRD Requirements

The EBRD requirements include compliance with their Performance Requirements. The Performance Requirements (2014) applicable to this Project are:

- Performance Requirements 1: Assessment and Management of Environmental and Social Impacts and Issues
- Performance Requirements 2: Labour and Working Conditions
- Performance Requirements 3: Resource Efficiency and Pollution Prevention and Control
- Performance Requirements 4: Health and Safety
- Performance Requirements 5: Land Acquisition, Involuntary Resettlement and Economic Displacement
- Performance Requirements 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Performance Requirements 8: Cultural Heritage
- Performance Requirements 10: Information Disclosure and Stakeholder Engagement

The EBRD also requires the Project to meet all relevant European Union (EU) environmental standards.

The most relevant EU Directive in relation to the Project is EU Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by 2014/52/EU (the EIA Directive); the EU Directive on the conservation of wild birds (2009/147/EC), referred to as the Birds Directive; and Directive 2008/96/EC of the European Parliament and of the Council of 19 November 2008 on road infrastructure safety management.

EBRD also observes the Aarhus Convention (on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters), the Espoo Convention (on Environmental Impact Assessment in a Transboundary Context) and the International Labour Organization core conventions.

The ESIA Disclosure Package has been prepared to meet the requirements of the EBRD and the above-mentioned EU and International Labour Organization requirements.

4. Summary of Environmental and Social Impacts and Mitigation Measures

4.1. Introduction

Baseline data was collected through desk-based research and field surveys. The field surveys undertaken were as follows:

- Site Reconnaissance Environment and Hydrology - 02 to 06 November 2020
- Site Reconnaissance Social and Resettlement - 24 to 27 November 2020
- Site Reconnaissance Cultural Heritage - 27 to 30 November 2020
- Winter bird survey - 16 to 21 December 2020
- Site Reconnaissance and Terrestrial Ecology - 14 to 21 October 2020
- Site Reconnaissance and Aquatic Ecology - 14 to 21 October 2020 & 22 to 27 April 2021
- Water quality sampling - 03 to 04 December 2020
- Vegetation survey - 25 to 30 April 2021
- Invertebrate survey - 22-27 April 2021
- Herpetofauna and mammals - 22-27 April 2021
- Spring Bird survey - 22-27 April 2021
- Stakeholder engagement - 25 to 28 March 2021
- Social surveys and additional stakeholder engagement - 15 to 19 June 2021
- Resettlement and cultural heritage - 15 to 19 June 2021
- Air quality surveys - 28 June to 1 July 2021; and diffusion tubes were installed on 22 July and collected on 11 August 2021

The key sensitive receptors along the route are provided in Appendix A.

4.2. Detailed Design Phase

A Detailed Design Consultant will be appointed to develop the design of the Project. The ESMP prepared for the ESIA disclosure package forms part of the tender documentation for the detailed design consultant. The Consultant will be expected to address the measures proposed in the ESIA and the accompanying ESMP to avoid and minimise adverse environmental and social impacts, in particular related to road safety.

A programme of Road Safety Audits will be developed to assess safety performance along the alignment and village access roads, and to identify any unsafe conditions. This will include an independent Road Safety Audit on the Detailed Design.

During the detailed design, additional surveys such as land use and tenure surveys, ecological surveys and traffic and pedestrian counts may be required to assess any changes in the design from the current Feasibility Study design.

Based on these updates, the national EIA should be prepared by the MoT and submitted to the local environmental regulatory authority for approval and for permitting purposes.

4.3. Construction Phase

A Construction Contractor will be appointed for the construction of the Project. It will be essential to ensure that the contractual relationships between the MoT and the Construction Contractor are clear and in particular that obligations stated in the ESIA and ESMP, as well as in any local permits obtained for the Project, form part of construction contract.

Where details are not yet available as the Construction Contractor (e.g. need for and location of any workers' camps) has not yet been appointed, a precautionary approach has been taken and assumptions have been made based on similar Projects and professional judgement.

4.3.1. Air Quality and Greenhouse Gases

The main potential impacts on air quality during construction will be associated with generation of dust and gaseous emissions. Final details of the plant and equipment likely to be used on site will be determined by the appointed Construction Contractor.

Earthworks will result in exposed areas of soil which will potentially generate dust when it is windy. Construction activities will result in dust generation from site preparation, site excavation, construction activities and movement of heavy goods vehicles. Larger dust particles fall out of the atmosphere quickly after initial release and therefore tend to be deposited in close proximity to the source of emission. The level and distribution of dust emissions will vary according to the duration and location of activity, weather conditions, and the effectiveness of suppression measures. Although unlikely to cause long-term or widespread changes to local air quality, the Project is in an area where dust is already a concern for residents. In towns such as Karakol and Tyup, due to the proximity of the works to properties, dust may be an issue for human receptors, within 50 m of road traffic and within 350 m of construction activities.

The main sources of gaseous emission during construction will be road construction machinery, equipment and trucks used for material transportation. The operation of vehicles and equipment will result in emissions of carbon monoxide (CO), sulphur dioxide (SO₂), and oxides of nitrogen (NO_x) from diesel fuel. However, the emissions will only be emitted during the use of machinery during active construction periods. The greatest impact on air quality due to emissions from vehicles and typical construction plant e.g. excavators will be in areas immediately adjacent to site access. Generally, it is considered that additional vehicle movements generated during the construction phase will have the potential to influence local air quality at sensitive receptors located within 200 m of roads used by construction traffic. Traffic contribution to pollutant concentration reduces with increased distance from the road, with negligible effect beyond 200 m.

With the implementation of mitigation measures proposed below, the overall impact on air quality from dust during construction is considered Moderate to Major Adverse as mitigation measures cannot fully control dust in an existing dusty and windy environment. The overall impact of gaseous emissions will be Minor Adverse with mitigation in place. These impacts will be temporary where construction works are in progress.

The following mitigation measures have been recommended:

- An Air Quality Management Plan will be prepared and implemented. All works will be undertaken in accordance with national laws and best practice.

Dust

- Comply with national dust emission standards where applicable. Crusher site and mixing plants shall be located at a distance of at least 500 m to 1 km downwind from sensitive receptors.
- Inform local communities of construction schedule at least three months in advance of activities starting. Community grievance mechanism in place. Inform local communities close to quarries of blasting and construction schedule in advance of activities.
- Regular dust suppression (watering based on 2-4 litres/m²) along roads and the earthwork sites.
- Construction vehicles will strictly follow approved deviation routes to avoid creating multiple earth tracks. Erect visible signs informing site road traffic of permissible routes. Enforce speed limits for all construction vehicles of no more than 20 km/h. Earth material transporting trucks shall be covered with tarpaulin.
- PPE will be provided to workers exposed to dust.
- Soil stripping during windy periods will be prohibited. Cover stockpiles.
- Conduct regular visual inspections of air quality at active construction sites.
- Blasting activities should be restricted during windy conditions.
- Parked construction vehicles and equipment will not be located in proximity to sensitive receptors (e.g. health centres, schools).
- All project staff including drivers to be inducted for environmental awareness and site procedures, for example vehicle speed, use of designated roads.
- Inform communities and stakeholders of blasting and construction schedule in advance activities.
- Avoid site runoff of water or mud from site compounds by providing appropriate temporary drainage.
- Where practicable, implement a wheel washing system dislodge accumulated dust and mud prior to leaving the sites.
- Rehabilitate disturbed areas as soon as practicable.
- Avoid bonfires and burning of waste materials.

Gaseous Emissions

- Emission of pollutants from the vehicles and machineries shall be measured in accordance with national standards
- Construction vehicles shall be inspected at the start of construction and regularly to ensure the vehicles meet relevant emission standards.
- Conduct regular air quality monitoring by visual inspection of emissions from vehicles e.g. smokes.
- Prohibit idling of road construction machinery.

Monitoring requirements will include:

- Pre-construction monitoring of air quality at select locations identified in the ESMP.
- Daily visual inspection of dust and emissions (e.g. smoke from exhausts) at active construction sites.
- If necessary (e.g. activities creating significant dust), undertake real-time measurements

4.3.2. Noise and Vibration

At this stage, the Construction Contractor has yet to be appointed, and therefore specific details on the number, type and location of construction plant that might be used during construction phase are not available. However, based on similar road projects and the equipment that is used, a qualitative assessment has been made of the impacts likely to arise from construction works.

Temporary noise and vibration effects will occur as a result of the use of equipment, earthworks, and the movement of construction workers and construction vehicles.

Where materials need to be transported to or from sites, the effects of the additional traffic along access routes are likely to extend beyond the immediate construction corridor; however, it is anticipated that most construction traffic will use the Project footprint i.e., the existing road as the haul road, and therefore the works area and haul road will be the same in many areas. Impacts are predicted to occur at noise sensitive receptors as follows:

- within 0-60 m of the works during the Daytime period;
- within 0-200 m of the works during the Evening/Weekend period; and
- within 0-300 m during the Night-time period.

This indicates that the distance over which the impacts will occur is further during evening/weekend and night-time periods. Properties in Tyup, including residential houses that are considered noise sensitive receptors, are located within 300 m of the road, including some within 60 m. As such, therefore temporary noise impacts will occur at these sites when construction works are located within these distances.

There are also two schools, considered noise sensitive receptors, within 180-190 m of the road. However, no impact will occur as the schools will be closed during the impact periods noted above i.e. evening, weekend and night-time periods.

Vibration levels from mobile heavy construction equipment are generally considered to be imperceptible at distances greater than around 20 m from the source. Given the proximity of the road to nearby sensitive receptors within Tyup, the potential for vibration impact should not be discounted at this stage. It is advised that the potential for impact from vibration is minimised through careful and considered choice of working methods and noise-emitting construction plant, and the application of best practical means.

Should piling be necessary (such as where bridge decks may be widened on Tyup River or Jergalan River) then the magnitude of the potential for noise and vibration impact rests upon the piling methodology that is proposed. For example, augured piling will result in significantly less noise and vibration impact than sheet piling or hammer piling. If piling activity is proposed, then the potential for impact at sensitive receptors should be scoped and will be assessed.

With the implementation of mitigation measures proposed below, there remains the potential for short-term Moderate to Major Adverse effect from noise in urban areas and a Minor Adverse to Negligible effect from vibration.

The following mitigation measures have been recommended:

- A Noise and Vibration Management Plan will be prepared and implemented by the Contractor. All works will be undertaken in accordance with national laws and best practice.

- Advance warning should be given to local communities regarding construction activities (e.g., construction schedule). Detailed engagement with those in premises (residential or other) within 300 m of the works front, in advance of the works. Establishment of agreed criteria whilst undertaking significantly noisy or vibration-causing operations near to sensitive locations. Community grievance mechanism must be put in place and disclosed.
- Ensure all staff and operatives are briefed on the requirement to minimise noise nuisance.
- Use of attenuation measures such as silencers/enclosures where appropriate.
- Avoidance of unnecessary sounding of horns.
- Construction machinery and equipment engines will not be revved unnecessarily and will be turned off when not in use.
- Noise-generating works in urban areas will be undertaken during normal working hours i.e. Daytime (07:00-19:00), and Saturday (07:00 – 13:00). These hours should be disclosed and agreed with receptors within 300 m in advance of the works.
- Work during the evenings (19:00-23:00 weekdays; 13:00-23:00 Saturday, 07:00-23:00 Sunday) and night time (23:00-07:00) should be avoided where receptors are located within 300 m of the works. Where this is not possible, advance warning should be given to those potentially affected and the grievance mechanism disclosed to those potentially affected.
- Site hoardings and screens will be used to provide acoustic screening at the following sites:
 - NSRs within 0-60 m of the works during the Daytime period
 - NSRs within 0-200 m of the works during the Evening/Weekend period
 - NSRs within 0-300 m during Night-time period
- Where heavy construction vehicle movements/equipment is required within 20 m of sensitive receptors (buildings, residential buildings, monuments), take before and after photos at the building, and undertake vibration monitoring at the sensitive receptor (before and during vibrational works).
- Maximum speed limit for all construction vehicles of 20 km/h.
- Equipment maintained in good condition with regards to minimising environmental noise and vibration, with regular maintenance.

Temporary site/facility siting:

- Work accommodation camps, construction facilities, laydown and storage areas and access roads will be located at least 500 m from noise sensitive receptors.

All construction machinery and equipment will be:

- In conformance with relevant national or international standards, directives or recommendations on noise or vibration emissions.
- Modern and maintained regularly, paying attention to all noise-reducing devices, silencers, or mufflers.
- Subject to preventive inspections and planned maintenance in order to maintain in good condition with regards to minimising environmental noise and vibration as well as workers exposure to harmful noise and vibration.
- Positioned appropriately to minimise noise at sensitive locations.
- Started up sequentially rather than simultaneously.

Monitoring requirements will include:

- Pre-construction monitoring of noise and vibration levels at select locations identified in the ESMP.
- Daily auditory monitoring of noise levels when working near receptors (i.e. in towns or near properties).
- If necessary (e.g. activities creating significant noise), undertake real-time measurements

4.3.3. Hydrology and Groundwater

The Project crosses several rivers and streams, including the Tyup River, Jergalan River, Shaty River, Tegizchil River and Zhany Aryk River as well as other surface water features (see Figure 4-1). These rivers drain into the Issyk Kul lake.

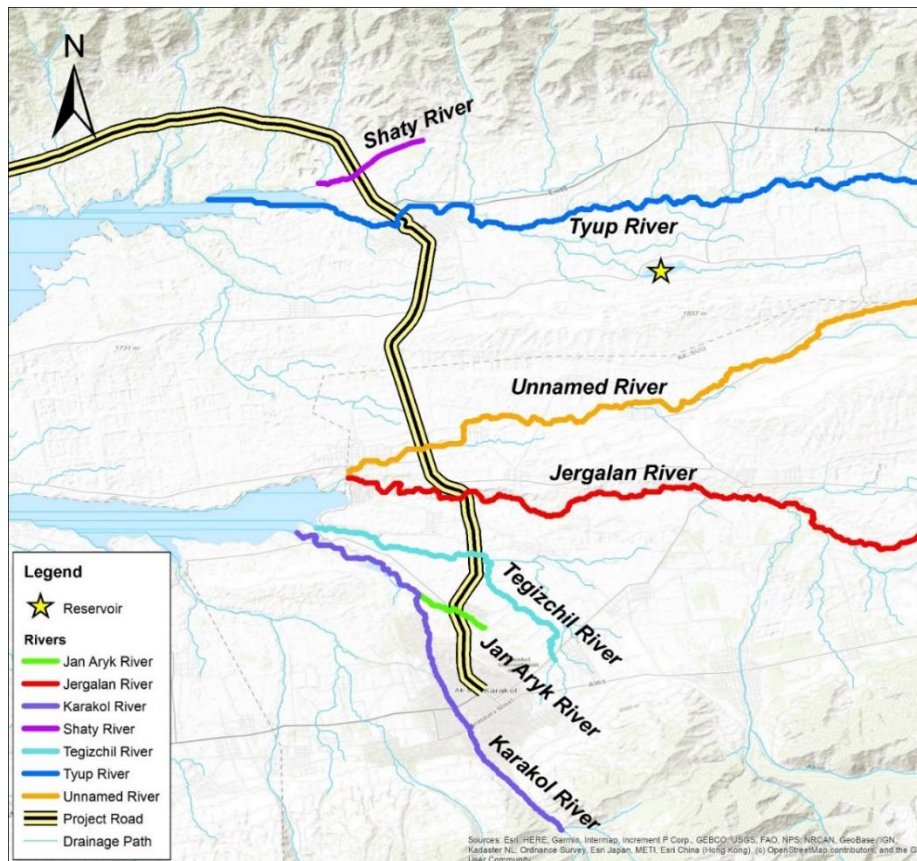


Figure 4-1. Main rivers crossing the Project road

Works in and near rivers (bridges, culverts) could result in changes to the hydromorphology of the rivers and increase flood risks through flows being more effectively conveyed downstream or water backing up due to insufficient capacity.

Land clearing and grading adjacent to the rivers and surface water features could result in alteration of surface water drainage patterns with potential to increase runoff (and associated soil erosion and sediment runoff).

The location of any construction compounds (laydown areas, workers' accommodation camp(s)) could result in the displacement of flood waters and changes to surface water runoff pathways, increasing flood risk to surrounding area.

Uncontrolled discharges of surface water may also impact sensitive receptors.

The Project area falls within the Issyk Kul Mesozoic-Cenozoic groundwater system. Excavation, earthworks, temporary dewatering and installation of deep foundations associated with new structures and installing cuttings may result in local changes to groundwater levels and groundwater flow pathways.

Water will be required for the construction workforce on site and at any camp(s) used, and construction activities such as water dousing. Detailed Project water use information i.e., water demand and water sources to use, are not currently available. All permits for water supplies, and all water sources will require permits from the relevant authorities, thus ensuring that potential impacts on water supplies are considered.

With the implementation of mitigation measures proposed below, the overall impact on water resources and quality will be Minor Adverse.

The following mitigation measures have been recommended:

A detailed Water, Wastewater and Drainage Management Plan; Spill Prevention and Response Plan; and Emergency Preparedness and Response Plan will be developed and implemented.

In-channel works

- Construction activities should, where possible, account for seasonality i.e., take place during 'drier' months (September-April) of the year where possible, to minimise the impact of run-off. Where this is not possible, avoid earth moving activities during heavy rainfall days.

- Appropriate isolation techniques should be used where the erection of temporary in-channel structures is required for construction. These measures would be in place for the minimum possible period of time in order to minimise disruption of flow, sediments and biota.
- In-channel works should make use of sediment traps to capture sediment released. The channel shall be restored if altered (i.e., sediment disturbed/removed).
- Where works are undertaken on the rivers, flood risk will be assessed daily in periods of high rainfall through contact with meteorological stations and local authorities.

Land clearing and grading

- Drainage should be considered as part of the detailed design.
- Temporary drainage systems should be implemented to alleviate localised surface water flood risk and prevent obstruction of existing surface runoff pathways. Where necessary, temporary drainage should be put in during the early works.

Surface Water runoff from construction compounds

- Natural drainage patterns to be maintained where practicable. This includes in the siting of any construction workers' accommodation camp(s) or laydown areas which should be at least 25 m from natural drainage patterns.
- Where necessary, temporary drainage systems should be implemented to alleviate localised surface water flood risk and prevent obstruction of existing surface runoff pathway.
- Installation of culverts should be such to avoid channelling and erosion on downstream side of streams/rivers. Rehabilitation of water channel should be undertaken as soon as practicable following construction of the culvert/bridge.

Earthworks, temporary dewatering and installation of deep foundations

- Deep foundations, associated with bridge construction, extending beneath the groundwater table should take into account the site-specific water level and flow monitoring data obtained from intrusive ground investigation for the project.

Construction water demand

- A water needs and supply assessment will be undertaken, covering water saving good practices. Permits will be obtained as necessary by the Construction Contractor.
- Livestock wells will not be used. Any such wells will be protected from construction works.
- Construction workers will be provided with potable water from approved sources e.g. mains water supply.
- Where construction water supply is not a mains supply, a mass balance model will be prepared for construction water demand where abstraction is proposed from surface water bodies. This may require additional monitoring data (quality and flow) at and downstream of abstraction locations. Where model results suggest significant increases in concentrations, specific measures (dependent upon the nature of the abstraction) to help reduce volume of abstraction would need to be identified e.g. re-use on site, multiple water supply options, etc.
- Construction Contractor will monitor water use/extraction from any permitted surface water bodies and/or groundwater wells used.
- Construction Contractor will undertake regular training of workers on measure to conserve water during construction and within any work camps required.

Monitoring requirements will include:

- Monitoring of water use during construction.

4.3.4. Water Quality

In-channel works could result in the release of sediments and increase of turbidity in affected rivers. Land clearing and grading adjacent to the rivers and surface water features could result in alteration of surface water drainage patterns with potential to increase sediment runoff. For both, there is a heightened risk of pollution during periods of high rainfall, snowmelt and river flow, when sediments can be more easily washed into adjacent and downstream surface water features, although it is also recognised that higher flows will also provide increased dilution.

Potential impacts also include contamination from storage and use of oil and chemicals potentially from construction machinery working in or near the river and accidental spills that could enter surface waters directly, in run-off (from land or road) or could percolate into groundwater.

Discharges of untreated water from construction camps and abstraction of water for construction purposes may also affect water quality. If used, construction workers' accommodation camp activities such as domestic waste and use of latrines can potentially cause both surface and ground water contamination through surface run off and/or through leaching through surface to groundwater aquifers.

The above have the potential to affect all Project rivers and streams where works occur in or near these surface water features. The main works are proposed across the Tyup River and Jergalan River. Given that Tyup River and Jergalan River flow into the Issyk-Kul Lake approximately 3 km and 6 km downstream of where the road crosses them, there is substantial dilution potential in the rivers which is expected to mitigate the flow of increased sediment/pollutant concentrations into the Issyk-Kul Lake. Furthermore, should increases in sediment/pollutant concentration occur in inflows from these rivers as a result of construction activities, the diversity of inflows into and sizeable volume of the Issyk-Kul Lake mean that it has substantial dilution potential that would provide natural mitigation, whilst any localised impacts at the location of inflows are expected to be temporary given that mixing will occur in the Lake. No Change is therefore anticipated effect.

Discharges of untreated water from construction camps and abstraction of water for construction purposes may also affect water quality. Required discharges must be treated, appropriately, particularly to remove sediment/silt, and, if necessary, discharge permits must be obtained.

With the implementation of mitigation measures proposed below, the overall impact on water quality will be Moderate Adverse for the Tyup River and Jergalan River in relation to in-channel works and land clearing and grading near these rivers, and for all other impacts and features, a Minor Adverse to Negligible effect.

The following mitigation measures have been recommended:
<ul style="list-style-type: none"> • A Water, Wastewater and Drainage Management Plan; and Spill Prevention and Response Plan should be prepared and implemented. • Soil and ground disturbance will be restricted to 'area(s)' where construction is taking place. Construction activities should, where possible, account for seasonality i.e., take place during 'drier' months of the year to minimise the impact of run-off. • Visual inspections should be undertaken during in-channel works for sedimentation events. Regular inspection and monitoring of existing surface water drainage features (including pipe network) to maintain their character and function. • Sediment traps will be used to capture sediment released. The channel shall be restored if altered (i.e., sediment disturbed/removed). • Activities/time spent in-channel should be kept to a minimum. • Any channels altered (i.e., sediment disturbed/removed) should be restored. • Retention of existing drainage infrastructure throughout construction where possible. • Vehicle and equipment wash to be undertaken at designated areas where all wastewaters can be collected and disposed of by an approved contractor. No direct or indirect discharge to the site or surface water features is permitted. • If used, Workers' accommodation camp site(s) and location of latrines should be carefully selected under the local environmental authority's guidance and will be at least 500 m from rivers. • Fuels and chemicals to be stored in designated containers with accidental spill control measures including storage on impermeable surface, clear labels, bonding in an area that can contain 110% of the largest container volume. Procedures to be followed when refuelling vehicles and equipment to minimise the risk of spills to the environment (e.g., spill kits) to be available. Train all fuel and chemicals handling staff to use spill kits work according to the emergency preparedness and response plan. • Hazardous materials such as chemicals, fuels and oils, and wastes to be stored appropriately on site (following best practice guidelines). • In the event that previously unidentified contamination is observed during construction, works in the affected area will cease and appropriate mitigation measures designed, or an appropriate disposal process identified. • Camp site and location of latrines should be carefully selected under the local environmental authority's guidance. Wastewater treatment to be implemented in construction camp(s). Required discharges must be treated, appropriately, particularly to remove sediment/silt, and, if necessary, discharge permits must be obtained. • Contractor shall undertake a more detailed water needs and supply assessment; and obtain necessary permits for water abstraction. • No surface or groundwater to be used without prior permissions in place. Permits will be obtained as necessary. • If water is abstracted from surface waters, as part of the permit process a mass balance model shall be used to understand the impacts of reduced dilution capacity on the abstraction water body/bodies. This may require

additional monitoring data (quality and flow) to be collected at and downstream of abstraction locations. Where model results suggest significant increases in concentrations, specific measures (dependent upon the nature of the abstraction) will be identified to help reduce volume of abstraction.

Monitoring requirements will include:

- Pre-construction monitoring of water quality pre-construction and during construction at select locations identified in the ESMP including at the Lake entrance of the Rivers Tyup and Jergalan.
- During construction, visual inspections should be undertaken during in-channel works for sedimentation events.
- Monitoring downstream on the Rivers Tyup and Jergalan during in-channel works, including at the Lake entrance of the Rivers Tyup and Jergalan.
- Following an incident there may be a requirement to undertake samples. This will be undertaken on an “as needs” basis.

4.3.5. Soils

The Project will be constructed along the existing road, with the majority of the adjacent land use being greenfield with planted trees, drainage channels and agricultural fields. Soil (especially topsoil) resilience and recoverability are considered to be low as soil formation is a long-term process and there is no natural resilience to imposed stresses. No specific volumes of the potential area of soils to be removed are currently available.

Inappropriate storage (e.g., stockpile too high) or storage for too long may result in loss of soil structure, which can increase the risk of soil deterioration, including encouraging processes such as soil erosion and soil compaction. Erosion and deterioration of soils may occur where vegetation is disturbed or removed; the vegetation cover is a mix of arable crops and pasture. In general, it will be possible to reverse the impact of storing topsoils as long as the soils are stockpiled in accordance with best guidance and are not stockpiled for too long.

Where works are undertaken to the side of the existing carriageway, there is an increased risk of compaction in areas where soils are left *in situ* but are subject to camp facilities (if used), construction traffic loads and the presence of stockpiles. The impact will be highly localised and possible to reverse in temporary construction areas.

There is also a risk of contamination of soils from leaks and minor spills during the handling and storage of fuels and chemicals, for example during refuelling and operation of plant and septic tanks, washing of equipment; and inappropriate management and storage of wastes, including wastewaters.

Finally, there is also the possibility that the Project will encounter unidentified contamination which may be disturbed by earthworks, in particular along the existing parts of the road that will need to be removed. Contaminated soil may affect construction workers through being inadvertently ingested or inhaled or through dermal contact, as well as the general public, livestock, flora and fauna, agricultural crops and waterbodies.

With the implementation of mitigation measures proposed below, the overall impact on soils will be Minor Adverse.

The following mitigation measures have been recommended:

- A Soil Management Plan, Spill Prevention and Emergency Response and Preparedness Plan, Traffic Management Plan and Waste Management Plan will be implemented.

General soil management

- Construction vehicles will be prevented from driving on unauthorised/ unplanned areas. Additional construction haul roads will be avoided where possible to avoid multiple earth tracks. Signs will be erected on deviation and access roads to ensure that heavy duty trucks strictly follow approved deviation tracks to avoid creating multiple earth tracks. All drivers will be trained of the correct and approved haul roads and to avoid creating multiple earth trucks.
- Where practicable, a wheel washing system will be implemented to dislodge accumulated dust and mud prior to leaving the sites.
- Construction activities should, where possible, account for seasonality i.e., take place during ‘drier’ months (September-April) of the year where possible, to minimise the impact of silt run-off. Where this is not possible, avoid earth moving activities during heavy rainfall days. Sediment and erosion controls (e.g., cut-off drains, swales, detention / retention basins preferably with vegetation to uptake pollutants, mesh fencing, sandbags, straw bales, etc.) will be implemented at all construction sites to limit the loss of soil from the site.

- The quantity of excavated soil material will be limited as far as practical, and soils will be appropriately managed with re-use of soils (including topsoil) on site wherever possible.

Soil stripping and stockpiling

- Topsoil will be stripped and stored in accordance with relevant standards (stripping and storage of fertile soil during earthworks) and protect against wind and rain erosion and contamination with waste and other materials.
- A site rehabilitation plan will be executed including all waste removal and soil restoration at all sites impacted by construction activities. Topsoil stockpiles shall be used for rehabilitation.

Soil contamination

- Spill kits shall be kept in accessible locations at all times during construction, and on-site environmental and safety staff shall be trained with oil spill neutralization skills and their use and disposal.
- Site runoff of water or mud from site compounds will be avoided by providing appropriate temporary drainage.
- All vehicles, machinery and equipment will be maintained and refuelled on hard standing and procedures will be adopted to minimise the risk of spills to the environment.
- Wastes generated during the construction activities that have the potential to pollute will be stored within appropriate storage facilities (bunded, secondary containment) and procedures will be implemented for handling, storage, transport and transfer, subject to a full method statement to address construction risks and avoid impacts.
- Personal protective equipment (PPE) will be used, and hygiene facilities made available to all workers to mitigate the potential risks to the health of construction workers from existing soil contamination and refuse appropriate.

4.3.6. Materials Use and Waste Management

The use of raw materials and generation and disposal of waste will occur during construction. The main resources required include aggregates, concrete, sand, water and bitumen. The potential for significant effects depends on the volumes required, origins and sources of materials, including their general availability (production, stock, sales) and the proportion of recovered (reused or recycled) materials they contain. Specific details of quantities required are not currently available; however, given local supplies it is assumed that majority of the materials will be provided in country, from existing resources which will reduce the potential impact of sourcing new quarries or borrow pits.

Both non-hazardous and hazardous waste will be generated during construction. The generation, storage and disposal of waste can have adverse effects. Anticipated waste types will include excavated material, construction material, municipal solid waste and wastewaters. Non-hazardous waste, such as construction debris, packaging waste, waste wood and metals, in addition to hazardous waste such as used oil, empty drums or replaced parts of the construction machinery may cause pollution if poorly disposed of.

With the implementation of mitigation measures proposed below, the overall impact on materials use and waste is considered to be Minor Adverse, depending on final material sources and waste disposal measures used. In relation to landfill capacity, there are licensed landfill sites in the Project area with capacity, one outside Tyup and one outside Karakol. It is likely that specific arrangements will be required for hazardous waste management.

The following mitigation measures have been recommended:

- A Materials Use and Waste Management Plan and Spill Prevention and Response Plan will be implemented.
- Wherever possible, the efficient use of materials will be sought including re-use of materials on site wherever feasible e.g. using excavated materials for aggregate and embankments. Targets should be set within the Materials Use and Waste Management Plan for recycling and re-use on site, in accordance with the inventory of waste materials, materials will be re-used and recycled on site e.g. re-use of excavated materials for aggregate, re-use of topsoils on site, salvage of materials e.g. bridge steel and timber, recycling of excavated asphalt.
- The waste hierarchy will be applied in project planning to ensure efficient use and management of resources to prevent generation of waste at source and facilitate waste recovery wherever possible.
- Waste permitting documentation/licenses will be obtained.
- Wherever possible, asphalt should be recycled to minimise its need for disposal. Where recycling of asphalt is not possible, appropriate and approved methods for its disposal shall be identified to ensure there is no dumping of asphalt during construction within the UNESCO biosphere or in other locations that could have adverse environmental and social impacts.
- Waste storage, collection, transportation and disposal will be undertaken according to the legal requirements, by licenced/certified companies.

- Disposal of wastes without a permit shall be prohibited. Waste will be disposed of to official landfill sites and hazardous waste facilities. Hazardous waste will be transported from the construction site to appropriately licenced/permitted facilities for treatment, recycling, re-use or disposal.
- Project employees will be provided with training on waste management to improve knowledge and awareness on reducing waste generation, waste types and their classification, and project waste management rules.
- All vehicles/drivers will be provided with waste collection sacks to prevent any unauthorized waste disposal.
- Hazardous waste storage area will be clearly identified and demarcated, including on a facility map or site plan. Access to hazardous waste storage areas will be limited to employees who have received proper training.
- Storage areas will be provided with fire extinguishers, spill kits according to the type and quantity of stored hazardous waste. Waste containers will be secured and labelled with the contents and associated hazards, be properly loaded on the transport vehicles and be accompanied by a shipping paper with the description of the load and its associated hazards.

4.3.7. Ecology

There are four internationally recognised biodiversity conservation sites within the Project Area: Issyk Kul Biosphere Reserve; and Issyk-Kul National Reserve; Issyk Kul Lake Ramsar site; and Eastern Issyk Kul Lake Important Bird Area (IBA).

UNESCO Biosphere Reserves are designated to promote solutions reconciling the conservation of biodiversity with its sustainable use. They are learning areas for sustainable development under diverse ecological, social and economic contexts. Issyk-Kul Biosphere Reserve (see Figure 4-2) is organised into four zones:

- **Core Zone:** Containing the most important habitats, species and other natural features. This area is subject to the highest level of protection (all economic activity is prohibited).
- **Buffer Zone:** To protect the core zone from adverse anthropogenic activity. Some activities are permitted (e.g. forestry, ecologically sensitive fishing, recreation, agricultural use of summer pastures and alpine meadows); but more damaging activities are prohibited (e.g. establishment of new settlements, industries, manufacturing or tree felling programmes; and introduction of new species of plants and animals).
- **Transition Zone:** In this area priority is given to the development of sustainable economic activity (e.g. agriculture, industrial projects, transport, communication, defence and new settlements), which must comply with all relevant environmental and ecological standards.
- **Rehabilitation Zone:** This is a small area in which past human activity has damaged and degraded habitats, communities and ecological/environmental functioning, so there is a need for regeneration and re-vegetation.

The Project is entirely in the Transition Zone, except for a small area north west of Tyup where the road appears to cross the Core Zone. Correspondence has indicated that the core zone abuts rather than crosses the Project road.

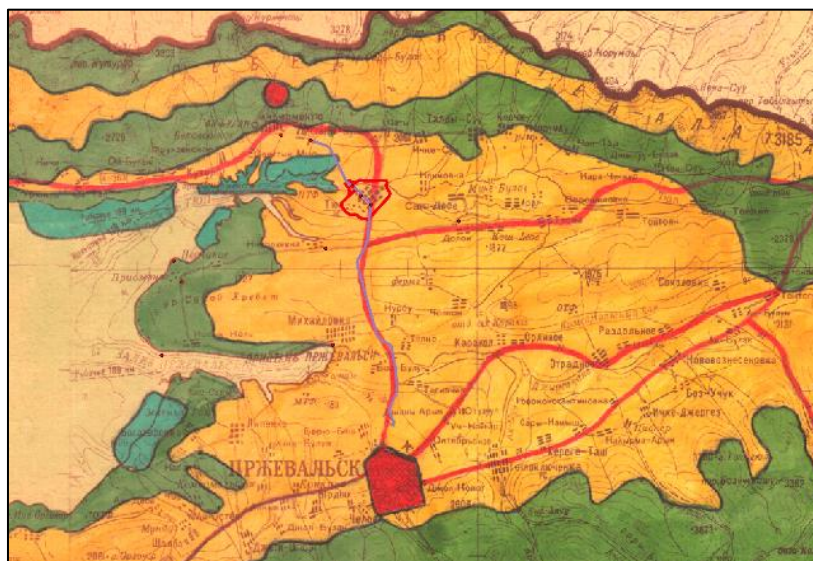


Figure 4-2. UNESCO Biosphere Reserve of Issyk-Kul in the Project area
Key: Blue – Core Zone; green – Buffer zone; Yellow - Transition zone

Issyk-Kul Nature Reserve is also designated as wetland of international importance under the criteria of the Ramsar Convention on Wetlands 1971 (Ramsar site) (see Figure 4-3). Issyk-Kul Lake is a high altitude, deep, low salinity, unfrozen lake. The Issyk-Kul Lake is the habitat of native fishes and an important wintering area for waterfowl and semi-aquatic birds. There are 60-70 thousand wintering waterfowls in the Ramsar Site. This was one of the main reasons for the inclusion of the Issyk-Kul Lake and Issyk-Kul Reserve in the List of Wetlands of International Importance.

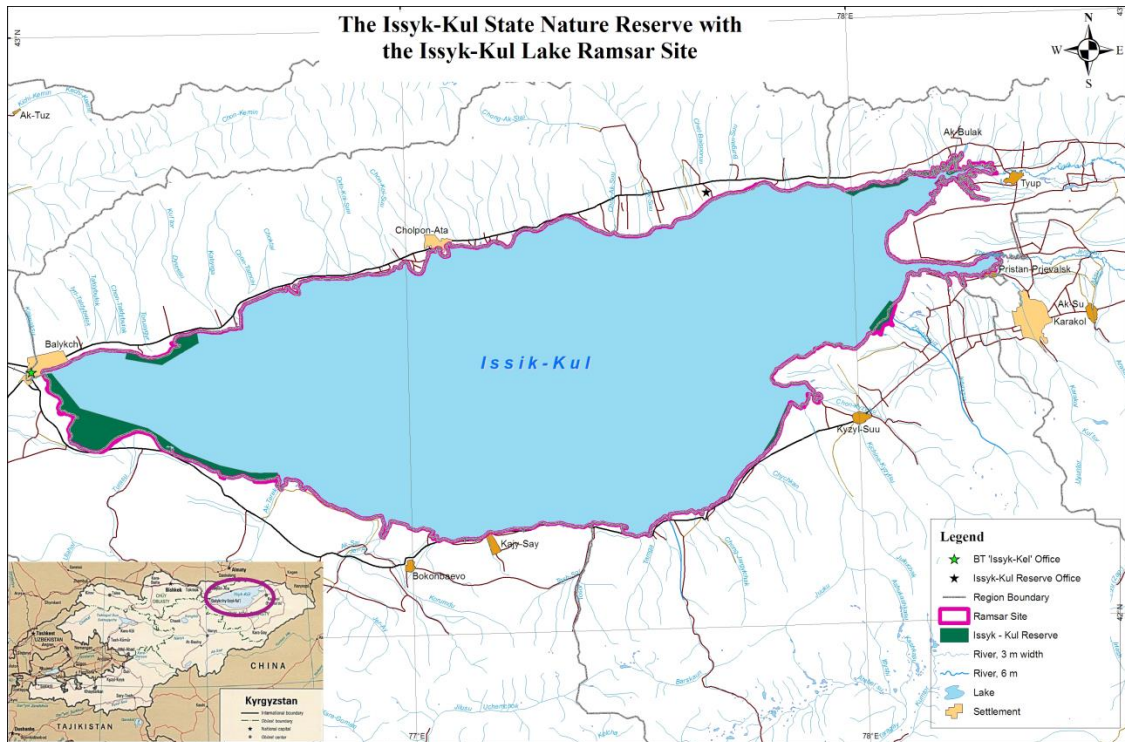


Figure 4-3. Location of Issyk Kul State Nature Reserve and Issyk Kul Lake Ramsar Site

The Project is located approximately 150 m from Eastern Issyk Kul Lake Important Bird Area (IBA) at its closest point (Figure 4-4). The territory of Eastern Issyk Kul Lake IBA includes mudflats along the shores, sea buckthorn thickets growing along the 2 km length of shores, shallow floodplains, estuaries of Tyup, Jergalan (Djergalan), Karakol, Tegizchil rivers. The territory is situated in close proximity to Karakol city.

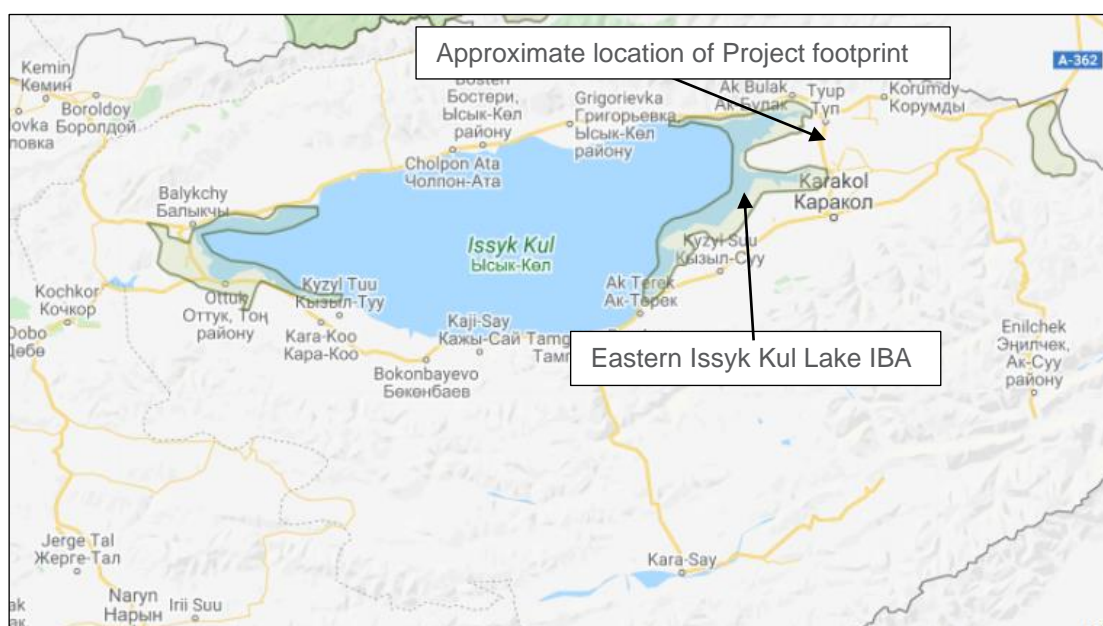


Figure 4-4. Location of Eastern Issyk Kul Lake IBA

The Project Area falls in the Tien Shan mountain regime. The Kyungey Ala-Too mountains are located to the north of the Project road and the Terskey Alatau to the south (the 'sunny' and 'shady' Alatau, respectively). The majority of the habitat within the vicinity of the Project road is cultivated ground i.e., arable farmland (see Figure 4-5). Other habitats present include woodland (plantation)/tree belts, running and standing water, wetlands, disturbed ground and built up areas, steppe habitat, bare ground (quarries) and mosaics i.e., areas that can't be identified as one type of habitat such as wetlands dominated by scrub.



Figure 4-5. Photograph of cultivated habitat within the Project Area

A total of 95 floral species were recorded during the two field visits. This comprises 11 species of trees, six species of shrubs, dwarf shrubs and vines, and 78 species of herbs, including 48 species recorded in October 2020, 59 species recorded in December 2020 and 67 species recorded in April 2021. One Kyrgyz Red Data Book species, quadrifolious tulip, was recorded. One endemic species, *Astragalus projecturus*, was recorded at two locations, the closest of which was approximately 100 m from the existing road.

Along the road there are perennial trees, often planted in several rows, the average age of which is 50 - 60 years. A number of these trees need replacing as they are dead and, in some cases, pose a threat to the carriageway.

Evidence or sightings of 15 mammal species was recorded in Project surveys during the October, December 2020 and April 2021 site visits. This comprises grey wolf (Habitats Directive Annex II and IV), house mouse, wood mouse, common vole, field vole, brown rat, muskrat, Tien Shan ground squirrel (relict gopher), northern mole vole, rabbit, tolai hare, Asian badger, least weasel, red fox and jackal. Anecdotal evidence of an additional four species or groups of species was also recorded (Eurasian water shrew, long-eared hedgehog, forest dormouse and bats).

A total of 104 avifaunal species were recorded during the three field visits, including 48 species recorded in October 2020, 59 species recorded in December 2020 and 67 species recorded in April 2021. A total of 28 important species were recorded, comprising four species listed in the Kyrgyz Red Data Book (Eurasian eagle-owl, osprey, white-tailed eagle and whooper swan), one species listed as IUCN globally threatened species (common pochard – vulnerable) and 15 species on Annex 1 of the EU Birds Directive (black kite, bluethroat, common crane, common kingfisher, common tern, Eurasian eagle-owl, long-legged buzzard, Montagu's harrier, night heron, osprey, ruddy shelduck, smew, western marsh harrier, white-tailed eagle and whooper swan). No demoiselle cranes were observed during the three survey visits. A large number of rook nests (2265) were recorded in the roadside plantation woodland in April 2021.

No reptiles were recorded during the surveys and no amphibian species were identified during the October or December 2020 surveys. One species of amphibian, Xinjiang Toad was recorded during the April 2021 survey.

A total of eight terrestrial invertebrate species were recorded during the April 2021 site visits. This comprised two species of blister beetle, two species of darkling beetle, two species of butterfly, one species of firebug and one species of dung beetle.

The Project road crosses two main watercourses, and other smaller watercourses and irrigation channels. The two main watercourses are the Jergalan River and Tyup River, which are the two largest rivers in the Issyk-Kul basin. Issyk-Kul lake contains 26 fish species of which 12 are endemic to the lake and its drainage basin, four are Central Asian endemics, and 10 have been introduced (figures and naming conventions vary slightly according to which source is consulted). Fish surveys yielded 12 species across the five watercourses surveyed with a further four species suspected as being present following interviews with local residents. These include the endemic species, osman (recorded/suspected in all watercourses) and marinka (both Kyrgyz Red Data Book), as well as the chebak. In addition to the endemics are a number of records of introduced species, of which Sevan trout are notable being recorded/suspected in all of the watercourses surveyed.

Aquatic invertebrate surveys yielded a total of 34 aquatic invertebrate taxa. One species recorded (bladetail dragonfly *Lindenia tetraphylla*) is listed on EU Habitats Directive Annex IV. No Kyrgyz Red Data Book species were recorded.

The Project area is also considered to contain ‘critical habitats’ defined by the EBRD as habitats that contain certain sensitive biodiversity features. Sensitive features include Issyk-Kul lake and adjoining rivers for their unique ecosystems; the River Shaty, River Tyup, River Jergalan, River Tegizchil and River Zhany Aryk supporting endemic fish; habitats supporting the plant species *Astragalus projecturus*; as a precautionary measure, habitats supporting the Asiatic frog; and Issyk-Kul lake Ramsar site and Eastern Issyk-Kul lake IBA for supporting globally significant migratory or congregatory species.

The construction of the Project could result in degradation of habitat (i.e., smothering of vegetation and/or enrichment from nitrogen deposition) due to an increase in the generation of dust and particulate matter and spread of invasive plant species) that qualify as Critical Habitat i.e., areas that support *Astragalus projecturus*. Habitat degradation could also have an indirect effect on Issyk-Kul lake Ramsar site and Eastern Issyk-Kul lake IBA via a reduction in foraging resources of certain designated features and trigger species.

The construction of the Project also has the potential to impact East Issyk Kul IBA, Issyk Kul Ramsar site, Issyk Kul National Preserve and associated Critical Habitats indirectly, due to changes in visual, noise and vibration stimuli (increased presence of people and plant). This could result in the temporary disturbance and displacement of species. However, due to the temporary nature of the works and limited extent of the construction footprint in comparison to the foraging and resting/roosting resources available, the magnitude of the impact is considered to be low.

Changes in local hydrology and water quality due to potential works within, above and in the vicinity of watercourses and uncontrolled discharges respectively may indirectly impact East Issyk Kul IBA, Issyk Kul Ramsar site, Issyk Kul National Preserve and associated Critical Habitats downstream of the works. These impacts could affect species such as amphibians, endemic fish, Eurasian otter and waterbirds which are dependent on open water riverine and riparian habitats, although it is considered highly unlikely to affect all areas of habitat that these species use.

In relation to non-critical habitats, the Project will involve the permanent loss of relatively small areas of habitat (i.e., that under the footprint of the road and quarries) which comprises mainly of agricultural areas of low importance, and plantation woodland/tree belts. Very small areas of wetland and riparian habitats could also be lost where the new road crosses water courses. Changes in local hydrology and water quality due to works in the watercourse and uncontrolled discharges respectively could adversely impact open water and riparian habitats downstream of the works.

In relation to terrestrial species, the Project may have impacts on the loss and degradation of habitats that species rely on; on severance; on disturbance and mortality due to changes in visual, noise and vibration stimuli from an increased presence of people and plant; and through changes in local hydrology and water quality. An increase in invasive species of plants could also have an indirect impact on species due to loss of foraging, breeding and sheltering resources.

In relation to aquatic ecology, potential impacts on aquatic habitats include direct habitat loss, degradation and severance from in-channel works; and changes in local hydrology. Localised habitat losses may act to reduce in-channel and/or bankside and riparian habitat complexity and watercourse function. Increasing the length of culverts at existing crossings will have only a limited impact on watercourse habitat function due to the extent of similar habitats present within the watercourse systems. The temporary and permanent loss of small areas of existing watercourse habitat could affect those aquatic species reliant on those habitats. Changes in visual, noise and vibration stimuli due to the increased presence of people and plant operation (including the potential for piling activities) could result in the temporary disturbance and displacement of fish species within the Shaty River, Tyup River, Jergalan River, Tegizchil River, Zhany Aryk River.

If all proposed mitigation measures below are fully implemented it is considered that the impacts on all sensitive receptors during construction can be reduced so that they are not significant (i.e., Minor Adverse or Negligible).

However, if the recommended mitigation does not have the desired effect, the effects due to habitat loss and degradation on potential Critical Habitats and Priority Biodiversity Features may remain Moderate or Major Adverse.

If the impacts cannot be mitigated, compensation may be required to achieve net gain in accordance with EBRD's requirements. Where areas of habitat that contain *Astragalus projecturus* or quadrifolious tulip are due to be lost or subject to habitat degradation, plants/bulbs of these species will be transplanted to areas of suitable retained habitat. The direct purchase, enhancement and management of suitable areas of habitat may also be required. The acquisition of extra habitat and propagation of these species from seed, to boost habitat area and plant numbers, would mean the measures go beyond basic mitigation to compensation and a net gain for biodiversity. These measures will also seek to support the conservation of the Biosphere Reserve, especially near the core zone where it abuts the road to the north of Tyup. Alternatively, or in addition, supporting the conservation of Lake Issyk Kul would be appropriate. Once the final alignment is determined, the impact on these species will be determined and, where necessary, a detailed method statement will be drawn up by a botany specialist to ensure that the translocation and further propagation of any plants is successful and incorporated into the Project Biodiversity Management Plan.

The following mitigation measures have been recommended:	
Terrestrial habitats and species	<ul style="list-style-type: none"> Road widening should avoid areas of sensitive features. Ensure the footprint of the Project is not increased through poor working practices on site in order to minimise habitat loss. Demarcation of working areas and fencing of sensitive sites. Ensure measures are taken to prevent spread of invasive plant species. Avoid site clearance in, and movement of soils from areas containing invasive species and appropriate treatment of individuals plants where applicable. Where the new alignment affects quadrifolious tulip and <i>Astragalus projecturus</i>, transplantation of quadrifolious tulip bulbs, and <i>Astragalus projecturus</i> plants, from habitat due to be lost or subject to habitat degradation in the spring-summer period to areas of suitable retained habitat. Transplantation method statement and biodiversity action plan to be drawn up by a botany specialist. Replant trees along the new road, at a safe distance from the road. Proposed species include <i>Armeniaca vulgaris</i> for the first rows and taller species <i>Betula pendula</i>, <i>Salix babylonica</i> for the third and forth rows, where relevant. Collaborate with local governments, environmental departments and specialists on regional biodiversity conservation to provide mitigation advice as and when needed. Measures should be taken to prevent fire. Minimise noise and illumination (especially at night). Excavations covered at night or ramps/sloping sides provided. Vegetation cleared outside of the breeding bird season (generally April to August) where practicable. If this is not possible, a pre-clearance walkover will be completed by a suitably qualified ecologist to check for the presence of active bird nests, including the rookery present in the roadside plantation woodland. Should any active nests be identified, it is recommended that these are excluded from works until such time that the chicks have fledged the nest. Any clearance of low vegetation in sensitive areas within the footprint should be undertaken in two stages (a high cut, a short period to allow reptiles, amphibians and small mammals to disperse followed by a lower cut) where possible 'Toolbox talks' provided by an Ecological Clerk of Works (from the Construction Contractor team) or equivalent to ensure workforce are aware of required mitigation and legislation relevant to hunting and poaching. Any carcasses on/near roads in the vicinity of the Project should be removed to prevent scavengers (including vultures) coming close to roads and colliding with site infrastructure and plant. Use of poison at waste sites to be prohibited. All excavations covered at night or ramps/sloping sides provided where practicable to allow animals to escape.
Aquatic habitats and species	<ul style="list-style-type: none"> Design of new/replacement bridge crossings on the Tyup River and Jergalan River as clear span structures with set back any bridge abutments from the watercourse banks. Set back any bridge abutments from the watercourse banks to maintain riparian connectivity beneath the bridge deck. Adopt environmentally sensitive design of culvert replacements. Consider replacement of existing culverts on the Shaty River, Tegizchil River and Zhany Aryk River with a clear span structure with set-back abutments to improve watercourse and reinstate riparian habitat connectivity. Create habitat corridors on water course crossings at regular intervals and in sensitive areas.

- Avoid full channel width coffer damming and over-pumping associated with any in-channel dewatering works. If dewatering is required, then only dewater half channel widths at a time to maintain flow through working area or flume flow through the working area as not to affect hydrological character of the watercourses.
- Night working in areas adjacent to the river to be avoided where possible. If night-time working is required, avoid directional lighting of the watercourses.
- Plant and machinery should be started up at least 10 m from the river bank and gradually brought towards the watercourse to maximize the opportunity for fish to move away from the works area before being distressed.
- Prior to any watercourse dewatering, measures shall be implemented that act to displace fish from the reach which will be affected. Measures may include the removal of features that provide cover such as large stones, boulders and large wood to reduce the overall attractiveness of the reach for fish species. All large substrates or wood should be placed outside of the working area e.g., in the channel downstream of the works, and replaced following the reinstatement of flow in the affected reach. Any pumps or sumps used for dewatering or over pumping/fluming should be appropriately screened to prevent fish entrainment or impingement.
- To ensure no entrainment or harm to the fish populations of the Project's watercourses, fish removal/management may be required in relation to any de-watering activities required to facilitate culvert/bridge works. Where practical, appropriate fish exclusion measures e.g., use of stop-nets, shall be implemented to prevent fish moving back into the working area. Avoid in-channel works/dewatering during key sensitive stages for fish e.g., spawning/migration periods. Information on seasonal constraints in relation to fish spawning in the watercourse is limited, but endemic species such as the osam are known to spawn between April and September.
- Percussive (hammer) piling shall be avoided in favour of softer alternatives (e.g., silent sheet piling, vibratory sheet piling) where ground conditions allow. Where not possible, soft start piling procedures should be utilised. The soft-start duration should be a period of not less than 20 minutes and should piling cease for a period greater than 20 minutes, the soft start procedure must be repeated.
- Management of aqueous discharges and waste. Development of an emergency response plan and adequate on site provision of spill kits and wash down areas.
- Set site compounds, access routes and materials/waste storage areas back from watercourse. If used, Workers' accommodation camp site(s) and location of latrines should be carefully selected under the local environmental authority's guidance and will be at least 500 m from rivers. The same distance applies to any laydown areas and equipment camps or haul roads.

Additional surveys have been recommended:

- Ecological surveys during the detailed design to determine impacts on protected species as a result of the final agreed alignment.
- Advance surveys for sensitive habitats and species. Where necessary, a transplantation method statement and biodiversity action plan should be drawn up by a botany specialist. Any transplantation of quadrifolious tulip bulbs should be undertaken in the spring-summer period to areas of suitable retained habitat.
- Pre-construction surveys - walkover surveys focusing on areas of natural habitat such as steppe, scrub, watercourses and riparian vegetation; plantation woodland and areas in which quadrifolious tulip and Astragalus projecturus; as well as invasive plant species.
- During ecological clearance works, the Construction Contractor will employ an Ecological Clerk of Works to undertake daily/weekly inspection to ensure compliance with method statements.

4.3.8. Cultural Heritage

The baseline section has identified 21 cultural heritage assets within the Tyup District however only one site (the Orthodox Church in Tyup) was identified as being located within the Project Area. The 'Temple in honour of the Kazan icon of the Mother of God (Tup)' Orthodox Church is located c.40 m south west of the A363 road.

Communication was made with the national UNESCO office in respect of the The Silk Roads: the Routes Network of Chang'an-Tianshan Corridor World Heritage Site. A response was received which states that the section of the A363 road that falls within the Project Area is not part of the UNESCO WHS "*However, it is included in the Tentative List of Cultural Heritage of Kyrgyzstan for nomination to the World Heritage List, in the Tien Shan Corridor of the Silk Road series.*" However, the UNESCO website clearly states that the *Tien Shan Corridor of the Silk Road series* is on the inscribed list (inscribed in 2014) not the tentative list. As a precautionary approach, the A363 road will be assumed as part of the UNESCO WHS for the purposes of this assessment.

Other features of cultural heritage interest along the Project road are shown in Figure 4-6 and include the Monument (gumbez) to Balbay-Baatyr which is located within a graveyard of the Sary-Bulak *ayil okmotu* in the Tyup district c. 17m from the A363 road alignment, the Monument of Teke Baatyr is located at the pass

"Tasma", alongside the Tyup-Karakol A363 road, three cemeteries have been identified along the A363 road's western alignment. These are located in the villages of Tepke, Zhany-Aryk and to the south-west of Zhany-Aryk, and one sacred site near Jany-Aryk village.

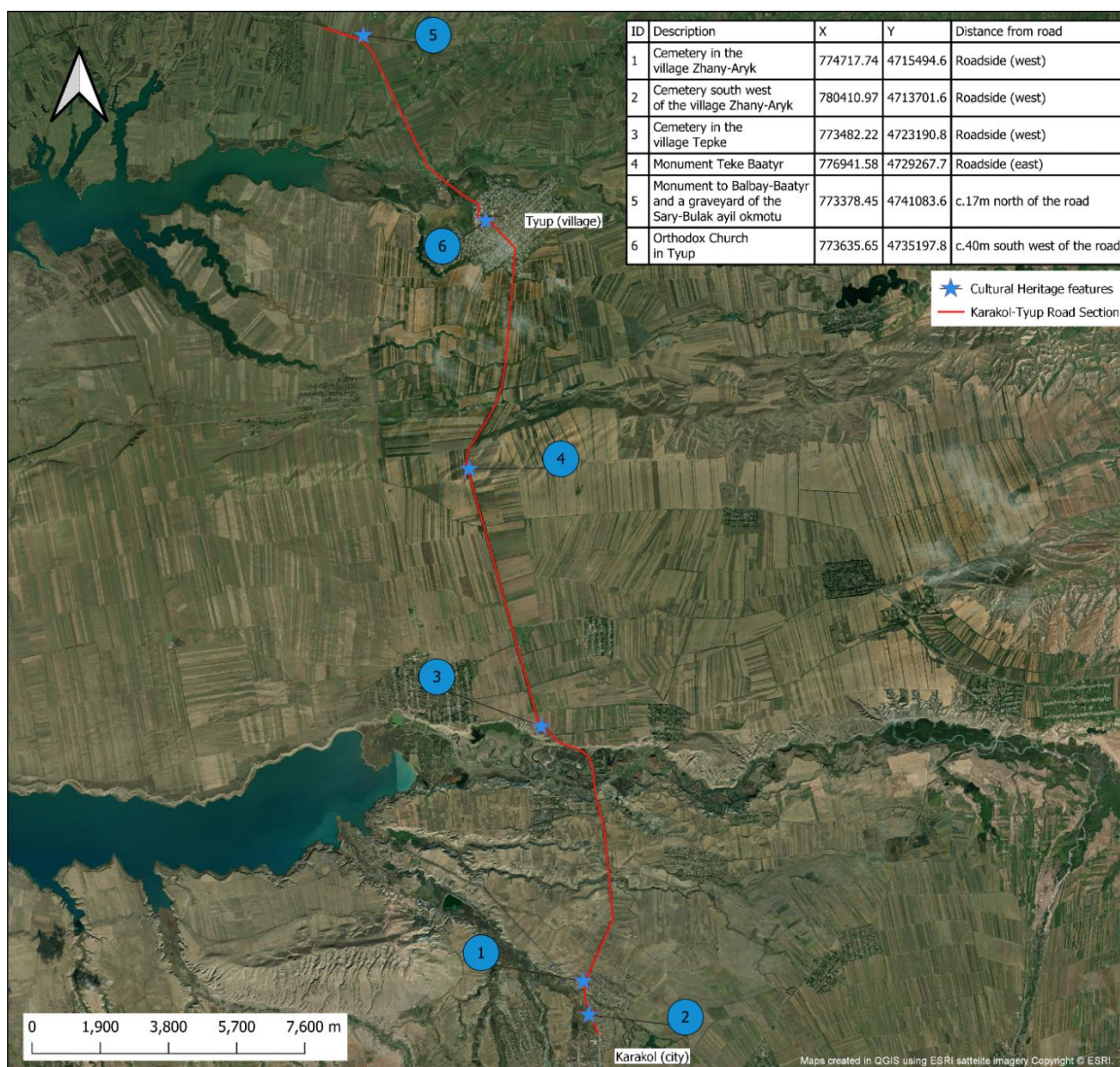


Figure 4-6. Heritage baseline

All Project works that involve earthworks could potentially result in physical damage to previously identified or unidentified tangible cultural heritage sites, both archaeological objects and sacred sites, and loss or limitation of access to sacred sites.

Potentially, the most sensitive cultural heritage asset is the A363 road itself, as this could form part of the Chang'an – Tianshan Silk Route WHS. The Chang'an – Tianshan Silk Route World Heritage Site and is highly sensitive to change as it is recognised as having Outstanding Universal Value and should be protected for the international community. Any construction works which would destroy or remove the physical presence of the Silk Route or any archaeological remains associated with it would constitute a high impact.

The Monument of Teke Baatyr is located on the roadside edge of the A363 and therefore is extremely vulnerable to setting change from the road improvements. The statue of Balbay-Baatyr is only 17 m from the eastern side of the current road.

The Orthodox Church in Tyup (Temple in honour of the Kazan icon of the Mother of God (Tup)), located c.40m south west of the A363 road, dates to the beginning of the 20th century. It is included on the National Register for Historical and Cultural monuments and is therefore deemed to be of high value. As the road upgrade to the

A363 is to include the section that runs through the centre of Tyup, there could potentially be impacts on the Church or its setting from construction activity.

There are three cemeteries which border the current road edge and would need to be treated with sensitivity, especially as local people may still visit and have ancestors buried in these locations. It is also of local historic interest. There is potential for these sites to be damaged or significantly changed by the new road improvements.

There is one sacred site on the edge of Lake Issyk-Kul, however this will not be impacted as it is not in proximity to the construction activity.

With the implementation of mitigation measures proposed below, the overall impact are still considered Major Adverse for the period of construction.

The following mitigation measures have been recommended:

- A Cultural Heritage Management Plan will be prepared and implemented. A Chance Finds Procedure will be put in place. The Code of Conduct will include prohibiting worker interaction with cultural heritage.
- If any archaeological remains associated with the Chang'an-Tianshan Silk Route World Heritage Site are present, the Ministry of Culture, Information, Sport and Youth Policy would need to be informed as well as the UNESCO representative. Depending on the sensitivity and extent of archaeology exposed, it may be proposed that the road improvements avoid the area of archaeological interest due to its international significance.
- If any archaeological remains associated with the Chang'an-Tianshan Silk Route World Heritage Site are present, they would require careful and professional archaeological excavation and the engagement of UNESCO in the management of any finds / information recovered. This would require appropriate licences to undertake the work and an approved archaeological investigation strategy by the authorities and UNESCO representatives. This would compensate for the loss of archaeological remains in the ground.
- The Balbay-Baatyr monument should be screened from construction works and compounds with appropriate fencing. The access to the monument should also remain unaffected and open so visitors can still go to see it.
- The Teke Baatyr monument is at risk of damage due to its location on the roadside. Attempts should be made to avoid damaging the monument through construction activity and road widening being undertaken on the opposite side of the road to the monument. Access to the monument may also be affected and a new parking area / access route should be included as an improvement measure so that people can still visit the monument. The monument could also benefit from some form of visual screening to minimise the construction works infiltrating on its setting.
- The church in Tyup would benefit from screening of construction works and placement of compounds and road building activities away from the street it is located on in order to minimise effects on its setting from noise, dust and pollutants.
- Avoid inclusion of the graves/cemeteries in the design of the Project. Apply screening of construction activities as a compensatory measure during construction.

Monitoring requirements will include:

- Pre-construction vibration monitoring at sensitive receptors including residential properties that will fall within 20 m of vibration-inducing works, the Church in Tyup and Balbay-Baatyr monument.
- Vibration monitoring during construction activities within 20 m of these sensitive receptors.

4.3.9. Land Use, Tenure and Displacement

With the exception of where the road passes through the urban areas of Tyup and Karakol (approximately 5 km in total), the land use along the remainder of the Project road is predominantly agricultural, mainly consisting of cultivated arable fields sparsely populated by farms that are connected to the Project road by minor backroads. The terrain is generally flat to rolling, with expansive views across the plateau where trees are not planted along the road, across to the mountains in the distance to the east and north of the Project area.



Field being grazed in the floodplains to the west of Tyup



Agricultural fields between Tyup and Karakol



Road south of Tyup town



Road near Jergalan river



Riparian habitats near Jergalan River



Photograph of the tree-lined road

Figure 4-7. Land uses along the Project road

The Project will require permanent land take for the 4-lane road and bridge reconstruction and new junctions. It is estimated that a total of around 44 ha of new land will be required to reconstruct the existing 32 km of road.

Temporary land take will also be required for construction facilities such as lay down areas, workers' accommodation camp(s) and access (haul) roads. Existing quarries and borrow pits will be used wherever possible. The location of these sites will be determined by the Construction Contractor.

No major permanent changes in land use are anticipated as the road already exists and the land required for widening is immediately adjacent to the existing road and is within State owned land.

Based on the current design, the Project footprint may result in the following permanent impacts:

- Permanent loss of small areas of agricultural/pasture land along the road in rural areas and land under urban use in Tyup (land to five properties under private use and to one municipal property) where the road is widened; the design of the Project road may also result in permanent changes to access to land, specifically, pedestrian and vehicle access in towns and across the road to fields and grazing lands outside towns.
- Permanent loss of or displacement of 25 structures, of which two are residential buildings, one private building thought to be a shop, two petrol stations (one is disused), three cemetery walls (as identified above under cultural heritage), fences at three private properties and two municipal, one private structure/billboard and 11 municipal signboards/billboard.
- Impacts on one business thought to be a shop.

No permanent impacts on livelihoods are currently envisaged because of the permanent land take requirements. The above will be reviewed on the basis of the final road alignment.

It is expected that the Construction Contractor will negotiate the temporary use of any land at the district level without the need for any involuntary displacement. Nonetheless, construction works along the road may result in temporary loss of access to land or property; on businesses where access is temporarily restricted; on livelihoods. These impacts will be temporary in nature. Access restrictions will be site-specific as works progress along the road i.e., the entire stretch of road will not be affected for the entire construction programme. There may be a temporary impact on business where access restrictions result in a loss of footfall or loss of access to a market; and where the business activities of the municipal buildings that may be affected have to be relocated. Journey times may also be impacted for longer-distance trade. The potential loss of access to businesses could have a knock-on effect on livelihoods. Access restrictions may also result in an impact on livelihoods due to a temporary loss of access to agricultural lands and pasturelands.

A Land Acquisition and Resettlement Framework (LARF) has been prepared as part of the ESIA package that sets out the displacement impacts and identifies a proposed way forward for compensation measures to meet national and EBRD Performance Requirement 5. Once the detailed design is available, a further detailed survey on site of all assets affected by the design will be required and a Land Acquisition and Resettlement Plan will need to be prepared, updating the impacts identified to date where relevant.

With the implementation of mitigation measures proposed below, the overall impact related to land use, tenure and displacement is considered Minor Adverse to Negligible in most cases but is considered Moderate Adverse in relation to the resettlement requirement for the two residential houses.

The following mitigation measures have been recommended:

- The design should ensure that adequate consideration has been given to junctions and access across the road for local communities, inside the towns and in the rural areas. This will include roundabouts, junctions and pedestrian and livestock crossings. Pedestrian crossings should cater for vulnerable people such as disabled people.
- Where necessary, culverts/passes may be required in rural areas to allow for the safe passage of livestock between grazing areas and possibly farmers/machinery where relevant.
- Clearance and construction work sites and timings will be announced in advance to affected persons to allow them to take adequate actions.
- Structures such as bus stops to be incorporated into design of new road.
- The Construction Contractor will be required to select temporary site requirements on the basis of minimal environmental and social impacts, including avoiding economic and physical displacement. They will be required to conduct an environmental and social screening of impacts, to be approved by MoT and EBRD. Where necessary, additional mitigation measures will be applied to reduce any adverse impacts in the siting of any temporary sites such as camps and access road, the Contractor will consult with local authorities and communities. The Construction Contractor will maintain records of voluntary agreements made with landowners for the temporary use of land.
- Clearance and construction works shall be restricted to within designated working areas. Clearance and construction work sites and timings will be announced in advance to affected persons to allow them to take adequate actions.
- A grievance mechanism will be put in place and communicated to stakeholders.

Reporting and monitoring requirements will include:

- Once the detailed design is available, a survey of the footprint impacts is required, including asset valuation where relevant, in line with EBRD PR5 and national requirements. Wherever possible, the design should be revised to avoid and reduce displacement impacts as far as possible.
- A resettlement action plan and/or livelihoods action plan shall be prepared and implemented in accordance with the ESIA LARF.
- Monitoring of any compensation for loss or relocation of assets, where necessary, will be undertaken.

4.3.10. Employment, Economy and Livelihoods

The construction phase will be in the order of 24-36 months, and it is expected that during this time, short-term direct employment opportunities will be created. The construction workforce numbers are not currently known, and the extent of local hires will also depend on Contractor requirements. Wherever possible local employment on the Project should be actively supported.

Project construction represents livelihood benefits particularly, and most directly, for Project workers and their families for whom improved financial security, and new work skills and experience development could be relatively quickly realised during construction. Project construction employment will comprise a mix of skilled, semi-skilled and unskilled requirements. The range of salaries therefore is likely to be both below and above sector averages, depending on the position. In all cases, it will be important to emphasise the temporary nature of construction employment opportunities so as to help manage Project stakeholder expectations.

During construction the access of pastoralists to limited areas of pastureland immediately adjoining the Project road will be restricted. However, since livestock grazing is generally undertaken over a very wide area, it is anticipated that the amount of temporarily restricted pastureland as a proportion of remaining pastureland available for grazing will be extremely small in all cases. Any temporary restriction of access to pastureland adjoining the road is not therefore considered to have any significant adverse effects on pastoralist livelihoods.

Other livelihoods dependent on road access, such as for taxi drivers and HGV drivers, and tourism operators may be more significantly negatively impacted. In addition, livelihoods depending on downstream activities of rivers crossed by the road such as fishing and tourism along Issyk Kul Lake, are at risk of being impacted in the event of Project construction-related pollution incidents. Overall, however, only a low to very low magnitude of impact is predicted given the nature of the works and the short timescale over which restrictions are likely to be in place at any one site.

The local economy will be positively affected during construction through construction employee expenditure on transport, assets, hard goods and consumables. In particular, the purchase of locally produced dairy products, meat and vegetables will stimulate the local economy and local producer and seller incomes. This will be further enhanced locally through any direct demand by the main Contractor for project materials, provisions and services. Conversely, and contingent on local surpluses and productive capacity and responsiveness, a significant increase in demand for goods and services due to labour influx may lead to local inflationary pressures and increased living costs if supplies of labour, goods and services cannot be met. In particular, and dependent on the accommodation option used for construction workers, the influx could increase the availability and cost of temporary accommodation, including rents for local persons.

With the implementation of mitigation measures proposed below, the overall impact on the economy, employment and livelihoods is considered Major and Moderate Positive, with potential Minor Adverse effects on some livelihoods and local communities in relation to local inflationary pressures.

The following mitigation measures have been recommended:

- A Labour Management Plan and Grievance Mechanism will be in place to manage labour processes. A local procurement and recruitment policy will be developed that enhances purchase of local content, use of local workers and women, and promotes the use of local goods and services. A Community Liaison Officer will be appointed by the Construction Contractor to facilitate engagement with the local communities in relation to labour opportunities.
- The recruitment process will be fully disclosed to the public and open to all people locally of working age and ability, including women. The process should be based on appointment by merit rather than by any political, clan, or class affiliation but should be affirmative with regard to promoting opportunities to less advantaged and more vulnerable people locally.
- Training should be provided to upskill local employment.
- Collaboration will be undertaken with local authorities to reduce discrimination against local workers in the community.

- Goods will be procured locally wherever possible, including perishable goods provided by local agricultural product producers (farmers).
- Advance warning of works and provision of access throughout works.
- Works to be undertaken near sites outside of key tourism periods wherever practicable (Summer season June-September; Winter season December-February).
- Appropriate road drainage to be installed during construction works to avoid pollution incidents.

4.3.11. Community Health, Safety and Security

There are a number of community health, safety and security risks and impacts that need to be considered during construction, including public injuries as a result, for example, of; increased road traffic to and from the site, to and from quarries, and around the works sites; traffic congestion; construction materials and equipment being dropped; unprotected road excavations (risk to children and livestock in particular); and machinery or operator loss of control. There are also elevated risks to public health as a specific result of increased construction traffic and equipment use, including, respiratory damage from protracted vehicle idling and dust arising from construction activities; delayed treatment e.g. at local hospitals as a result of reduced emergency response times due to an increased (construction) demand on existing services; exposure of the local population to potentially hazardous materials from improper management; as well as increases in noise.

As site construction works will be restricted access areas, the main source of risk of injury will be from construction traffic. These potential traffic impacts will be associated mainly with local communities especially in Tyup town (including vulnerable people), farmers, pastoralists (and livestock), pedestrians and cyclists and tourists.

In relation to safety and security, the presence of the construction workforce may lead to risks associated with an influx of expat/or inter-regional workers who may move to the Project area for jobs. This can result in rapid changes in local demographics and social dynamics. Differences in access to Project job opportunities may also lead to discrimination, harassment, and resentment. An influx of non-local workers could potentially cause local tensions and conflict, increasing the potential for increased sexual assault risk to women and young girls. An influx of temporary workers and the interaction between the construction workforce and local communities may also increase occurrence of communicable diseases. An influx of new persons also creates an increased risk of other infectious diseases to be spread, in particular COVID-19.

Population influx as a result of construction activities, albeit even short-term, can put pressure on local services, including through heightened demand for electricity, water, and health facilities. There are a number of health facilities in the Project Area, of varying capabilities and capacities that could be impacted by workforces reliant on local health services when present in the area. Increased demand for their use could have an adverse effect on access for local communities to these services, given the availability and capability of local service facilities in the Project Area (hospitals, fire service, police).

In the case that security personnel are deployed at construction workers camp(s) and/or at works sites, the Contractor will be required to ensure that any private security service providers comply with Kyrgyz Law and have been vetted. It is recommended that a due diligence investigation for all security personnel, where used, is conducted to make sure they have appropriate licensing, experience, and training for security contractors.

With the implementation of mitigation measures proposed below, the overall impact on the community health and safety is considered to be Minor Adverse.

The following mitigation measures have been recommended:

- The road designer will engage with the local communities to understand their needs and incorporate these where feasible into the design, especially in relation to crossing types and locations in Tyup.
- A detailed Community Health, Safety and Security Plan and a Traffic Management Plan will be prepared that covers on and off construction site areas.
- Community liaison will be undertaken in advance of works to ensure that the local community and road users are aware of the constructions works and associated risks.
- The Contractor will be required to manage haul roads, access roads and haul traffic and provide suitable siting of laydown areas to avoid sensitive sites (e.g. busy areas) with regards to ingress and egress. Access shall be maintained wherever feasible along the road. Traffic will not be diverted into local towns. Warning signs will be erected at appropriate sites near local access roads. Provision of appropriate safety management on site including barriers to separate construction workers from traffic to avoid injury to workers and the general public.
- A fully coordinated community grievance mechanism will be developed and implemented. This shall be widely disclosed, publicised and accessible to all community members. This shall be widely disclosed, publicised and

accessible to all community members to support the reporting and redress of any transgressions, sexual or otherwise as well as other Project grievances.

- Contractor will be required to locate the construction camps and access tracks at in suitable areas (at least 25 m away from houses) to minimise disruption to the local community.
- All Contractor employees will be issued with a Code of Conduct addressing expectations and punitive measures concerning their discipline and behaviour (including for inappropriate sexual fraternisation) in project-affected communities. Employee awareness and responsibility training (that includes instruction on sexual harassment, exploitation and abuse, conduct, and health, gender and local culture and traditions) will be included as part of the induction programme for all Contractor workers.
- Contractor will be required to undertake a due diligence investigation for all security personnel and organisations to be used.
- An emergency response plan will be prepared, that will take into account impacts on local communities and how local communities and services may need to respond in the case of an emergency. Liaison with relevant services in advance of the works and in development of the emergency response plan. A COVID-19 policy and emergency plan will also be prepared and implemented.

4.3.12. Labour and Working Conditions

Details about the labour procedures and management and any construction workers' accommodation camps are not yet known. However, it is expected that the Contractor will comply with Kyrgyz labour law and will ensure that all employees, permanent and temporary, will be provided with a contract. Where Kyrgyz labour law does not cover the full range of working conditions, good international practice will be followed. If not managed in accordance with the legislation and good international practice, there could be significant risks and / or impacts associated with labour grievances, supply chain issues, occupational health and safety, child and forced labour, as well as risks of gender-based violence and harassment (GBVH).

In relation to occupational health and safety, it is assumed that the Construction Contractor will have sufficient workforce and equipment to deliver the Project. However, as with all construction sites, there is a potential that workers could be exposed to an additional level of personal safety risk relating to workplace activities. The Construction Contractor will be required to develop management arrangements and procedures to remove hazards and, where this is not possible, to reduce risks to workforce health and safety.

With the implementation of mitigation measures proposed below, the overall impact on the labour conditions is anticipated to be Minor Adverse.

The following mitigation measures have been recommended:

- A Labour Management Plan will be implemented. The HR policy and Labour Management Plan will be readily available and understandable to all employees, and set out its approach to managing employees, including rights under Kyrgyz labour and employment law, and employee rights to join worker organisations and bargain collectively.
- Local representatives of the Issyk-Kul Social Protection Department (branch of the Ministry of Labor and Social Protection of the Kyrgyz Republic) in close collaboration with local self-governments will inform the communities on the risks of child labour and school dropout.
- Opportunities to maximise gender equality and minimise any potential for gender-based violence and harassment (GBVH) should be taken where possible by the Construction Contractor in accordance with the International Labour Organization's Convention No. 190 on eliminating violence and harassment in the world of work (which will take effect in 2021) and the EBRD, IFC and CDC Groups sector-level briefs on GBVH – 'Addressing Gender-Based Violence and Harassment (GBVH) in the Construction Sector' and 'Addressing Gender-Based Violence and Harassment (GBVH) in the Public Transport Sector'.
- A formal Project labour grievance mechanism will be set up and maintained.
- Independent labour audits will be conducted during construction; one audit to be conducted shortly after mobilisation, and one audit to be conducted at peak in terms of workforce volume.
- A Third party supplier procedure will be developed and adopted.
- Workers' accommodation camp(s) will be established in accordance with EBRD/IFC guidance: 'Workers' accommodation: processes and standards'. A Code of Conduct will be prepared that includes measures for construction camp living. Security shall be hired to guard camps and shall be available for prompt communication with workers. Food safety, drinking water quality and hygiene at any worker camps will be required and regular controls will be imposed.
- An Occupational Health and Safety Plan will be implemented. Job and task specific hazard analysis and controls will be undertaken for all activities. This will include implementation of a reporting and investigation procedure.
- A detailed Emergency Preparedness and Response Plan detailing preventative measures for all types of incidents covered in the plan will be developed and implemented. This plan should be developed and implemented in liaison

with local community members, authorities, and emergency services. This Plan be in place prior to construction commences on site. First aid facilities will be provided. A COVID-19 policy and emergency plan will also be prepared and implemented.

4.4. Operation Phase

4.4.1. Air Quality and Greenhouse Gases

Sensitive receptors such as residential properties and the two schools within 200 m of the roads could be affected by changes in traffic. However, there may be less congestion, particularly through urban areas, with potentially lower emissions from traffic during peak times, and a potential improvement in air quality, offsetting any increase in concentrations arising from increases in traffic or road realignment.

For nitrogen dioxide (NO₂), the road contribution in 2024 with and without the Project could be up to 4.5 µg/m³ and 5.5 µg/m³ respectively. Assuming background concentrations do not bring the total concentration to above 40 µg/m³, then the road contribution can be considered as acceptable in terms of its potential effect on nearby receptors, as it is below the World Health Organisation air quality guideline (40 µg/m³ as an annual mean).

For Particulate matter (PM₁₀), the road contribution in 2024 with and without the Project could be up to 1.1 µg/m³ and 1.9 µg/m³ respectively. Provided background concentrations do not bring the total concentration to above 20 µg/m³, then the road contribution can be considered as acceptable in terms of its potential effect on nearby receptors, as it is below the World Health Organisation air quality guideline (20 µg/m³ as an annual mean).

For Particulate matter (PM_{2.5}), the road contribution in 2024 with and without the Project could be up to 1.1 µg/m³ and 1.9 µg/m³ respectively. Provided background concentrations do not bring the total concentration to above 10 µg/m³, then the road contribution can be considered as acceptable in terms of its potential effect on nearby receptors, as it is below the international World Health Organisation air quality guideline (10 µg/m³ as an annual mean).

In the 2024 opening year, vehicular carbon dioxide (CO₂) emissions are expected to increase by 27% as a result of the Project compared to the scenario without the Project. This magnitude of change in carbon dioxide emissions is maintained in 2042 with the change in emissions with the Project compared to without the Project 26%. The estimated emissions may be lower in future years due to more stringent vehicle emission standards and a cleaner vehicle fleet.

There are no mitigation measures proposed for the operational phase of the Project, as these are not considered to be necessary given the magnitude of the predicted change in concentrations, and assuming total concentrations would not exceed national and international air quality standards. However, the following monitoring is proposed.

The following monitoring measures have been recommended:

- Monitoring of the Project post-construction in the first year of operation to compare Project operation emissions with those pre-construction. Further details are provided in the ESMP.
- Should these results indicate that emissions are above the relevant standards, additional mitigation measures may need to be applied.

4.4.2. Noise and Vibration

The Project does not generate changes in journey origin or journey destination. Potential impacts include those from changes in traffic and those from changes in the alignment. Traffic flows are projected to increase, and there will be a change in alignment of 5 m or more with the road widening. In addition to this, speeds are anticipated to increase from 90 km/hr to 110 km/hr with the completion of the Project. Sensitive receptors that could be affected by these changes are residential properties and the two schools in Tyup within 600 m of the road. Overall, the noise assessment shows that minor to moderate increases in noise, although these impacts are primarily driven by the proposed change in operational speed on the road, and natural traffic growth over the intervening years.

In general, an improved road surface that is subject to a regular maintenance regime will result in improvements in relation to vibration impacts. In terms of impact assessment, international guidance states:

“Operational vibration is scoped out of the environmental impact assessment methodology as a maintained road surface will be free of irregularities as part of project design and under general maintenance, so operational vibration will not have the potential to lead to significant adverse effects”²

However, as it recognised that the threshold for human perception of vibration is lower than for threshold for structural damage, it is recommended that a post-construction monitoring survey is undertaken to allow comparison of pre- and post-construction vibration levels at select sensitive receptors.

With the implementation of mitigation measures identified below, the overall impact during operation will be Minor to Moderate Adverse for noise and Negligible for vibration.

The following mitigation measures have been recommended:	
<ul style="list-style-type: none"> Noise control can be applied directly to the noise source, along the transmission path, or at the noise sensitive receptors to reduce noise levels. If considered necessary following confirmation of the final alignment and its position in relation to sensitive receptors, the following measures should be considered: <ul style="list-style-type: none"> Noise control at the source – this is incorporating mitigation measures such as speed restrictions and traffic calming in the design of the Project to reduce noise. Noise control along the transmission path – these measures might include noise barriers, landscaping bunds and the use of low noise road surfacing. If considered necessary following noise monitoring post-construction (as identified in the box below) the following measures should be considered: <ul style="list-style-type: none"> Noise control at noise sensitive receptors– this could include the use of acoustic glazing with mechanical ventilation where necessary for existing properties. Regular maintenance regime preserving the integrity of the road surface. 	

The following monitoring measures have been recommended:	
<ul style="list-style-type: none"> Monitoring of the Project post-construction in the first year of operation to compare Project operation emissions with those pre-construction. Further details are provided in the ESMP. Should these results indicate that emissions are above the relevant standards, additional mitigation measures may need to be applied. 	

4.4.3. Surface Water and Groundwater

The impact of operational activities on the Tyup River, Jergalan River and the Unnamed Channel as a result of permanent new bridges could have an impact on flood risk and flow conveyance and sedimentation within the watercourse channels, with an increased flood risk through flows being more effectively conveyed downstream or water backing up due to insufficient capacity, though the design of structures is such to reduce the likely impact.

A permanent increase in areas of impermeable surfaces will increase surface water volume and rate of runoff. Road construction also inevitably alters, to a certain degree, the natural drainage regime by altering natural sheet run-off and stream hydrology. The works could also lead to an increased risk of flooding to road users if the capacity of the culverts is not designed for future climate change.

Permanent disturbance of groundwater flow paths to the Issyk Kul Mesozoic-Cenozoic groundwater system may also occur due to deep foundations, cuttings and underpass structures acting as barriers to groundwater flow.

Overall, with the mitigation measures in place the effects will be Negligible to Minor Adverse for the Tyup River and Jergalan River only, where the most significant works will take place.

The following mitigation measures have been recommended:	
<ul style="list-style-type: none"> Watercourse crossings should be sized appropriately to minimise flow conveyance impacts. Adherence to the drainage strategy for the Project to alleviate localised surface water flood risk and prevent obstruction of existing surface runoff pathways. Design of any discharge outfalls from highway runoff should incorporate measures to mitigate any erosion of sediments Drainage system, sediment and erosion controls, including appropriate drainage systems, will be routinely 	

² UK Design Manual for Roads and Bridges, LA111 Noise and Vibration Rev 2, May 2020

inspected and maintained/cleaned to remove debris and manage runoff to maintain their function.

- Deep foundations extending beneath the groundwater table should be designed in accordance with industry standards – taking into account the site-specific water level and flow monitoring data obtained from intrusive ground investigation for the Project.

4.4.4. Water Quality

Release of hazardous substances during maintenance (e.g., accidental spills and leaks) could potentially pollute surface waters. Accidental leaks or spills might occur during the maintenance of the drainage system. There may also be accidental leaks or spills from vehicles using the roads during operation. Potential contamination could run off into the drainage channels and therefore have an impact on the receiving water body at the discharge point. It may also run off directly from bridges.

As with hydrology in the section above, a permanent increase in impermeable surface area through construction of new hardstanding infrastructure will increase surface water volume and rate of run-off, which can potentially increase pollutant/contaminant load in surface water run-off and therefore affect the water quality of surface water features in the Project Area.

Overall, with the mitigation measures in place the effects will be Negligible to Minor Adverse with the exception of a permanent increase in areas of impermeable surfaces resulting in increased pollutant/contaminant load in surface water run-off to the Tyup River and Jergalan River, which is considered Moderate Adverse.

The following mitigation measures have been recommended:

- A Spill Prevention and Response Plan will be developed and implemented.
- Training will be provided in appropriate use of equipment and substances for maintenance activities.
- During operation and maintenance activities, spill kits will be kept in accessible locations at all times, and employees trained in their use and disposal.
- The design of drains shall incorporate appropriate measures to avoid sediment and contaminated runoff reaching the rivers the road crosses. This will include measures such as cut-off drains, swales, detention / retention basins preferably with vegetation to uptake pollutants, mesh fencing, sandbags, straw bales. Their capacity shall be designed based on flood survey estimation and designed to avoid blocking or affecting any surface runoff.
- Cyclic maintenance of surface water drainage infrastructure will be undertaken to maintain character and function.

Monitoring requirements will include:

- Post-construction monitoring of water quality at select locations identified in the ESMP once during Year 1 of operation.

4.4.5. Waste Management

The anticipated waste streams during operation are likely to be both non-hazardous/inert and hazardous, and will include concrete, asphalt concrete materials, oil and lubricants, oily rags and waste electrical and electronic equipment. Maintenance and repair works may also require workers to be based on site for an extended period of time, requiring temporary welfare facilities. Operational waste types that are likely to be generated as a result of maintenance/repair works include organic waste, paper, plastic, glass, metal and other both hazardous and non-hazardous wastes.

As identified for construction, there are two licensed landfills in the project area though hazardous wastes will be required to be transported to specialist facilities.

Uncontrolled municipal solid waste may also arise if appropriate storage containers are not provided along the route. The number of stopping locations along the road are currently unknown. Such sites tend to attract waste thrown by road users if there are no waste bins and/or irregular removal of waste. Whilst this is not a Project operational impact, this waste could impact on the Project as it may enter into drainage channels, necessitating more frequent maintenance clearance of the drainage channels to maintain their functionality.

With the implementation of mitigation measures identified below, the overall impact during operation will be Minor Adverse to Negligible.

The following mitigation measures have been recommended:

- An operation phase Waste Management Plan will be implemented.
- Removal of hazardous waste will be undertaken by a specialist licensed company.

- Provision of a dedicated area for the storage of hazardous waste arisings. Removal of hazardous waste by a specialist licensed company.
- Provision of budget from the relevant authority to supply and service waste collection bins and signage for the public at all locations.
- Signage to avoid fly tipping.
- Municipal solid waste should be gathered on a regular basis and stored in closed containers until recycled or disposed of as per the local legal requirements.

4.4.6. Ecology

During operation, the following impacts may occur: Degradation of wildlife habitats; Mortality and injury to species such as road traffic collisions; Disturbance to species from noise, light or other visual stimuli and displacement of fauna; Changes to the local hydrology and water quality (pollutants and fine sediment) that could impact aquatic and riparian receptors (vegetation communities, fish, aquatic invertebrates) within watercourse and downstream receiving waterbodies (Issyk-Kul lake); and impacts associated with the spread of invasive species.

Potential impacts on Protected and Designated Areas/Critical Habitats, ecosystem services and non-critical habitats include: degradation of habitats; and changes in water quality. An increase in the number of vehicles and dust, particulate matter and other emissions, could result in contamination of adjacent habitats due to smothering (and/or enrichment from nitrogen deposition) of vegetation. This could directly affect areas that support *Astragalus projecturus* and have an indirect effect on certain Ramsar site qualifying species and IBA trigger species, due to a reduction in resting places and/or foraging resources. Changes to water quality due to uncontrolled discharges and pollution events (e.g., from road accidents involving tankers or other vehicles carrying hazardous materials) could adversely impact open water and riparian habitats within East Issyk Kul IBA, Issyk Kul Ramsar site, Issyk Kul National Preserve (via trigger species and designation features) and Critical Habitats as well as general riparian habitats downstream of the event.

Potential impacts on aquatic habitats include habitat degradation and changes in local hydrology. In operation the Project will not result in any temporary or permanent loss of existing watercourse or riparian habitat. Localised in-channel habitat degradation may, however, arise from run-off and ingress of pollutants and fine sediment due to the increased footprint of the new road and uncontrolled discharges arising from road traffic collisions entering Project watercourses.

Uncontrolled direct discharges from the increased road footprint may act to affect watercourse habitat quality through changes in sediment dynamics and flow. However, changes in discharge patterns resulting from road run-off are considered to be negligible.

Potential impacts on terrestrial species include degradation of habitats; direct mortality and disturbance; and changes in water quality. Vehicle and wildlife collisions occur on the existing road, but this is likely to increase due to the additional carriageway and therefore an increase in time required to cross the road. The improvement of the road may also lead to an increase in traffic and the speed of vehicles. The main species affected are mammals such as foxes, hedgehog, and owls. An increase in artificial lighting at night, from car headlights, could lead to disturbance of species that rest, forage, and commute in adjacent habitats including Eurasian otter, waterbirds, owls, and bats. However, no lighting along rural areas is proposed so the impacts will be intermittent.

Changes in water quality due to works in the watercourse and uncontrolled discharges and pollution events (e.g., from road accidents involving tankers or other vehicles carrying hazardous materials) could adversely impact watercourse riparian habitats and associated species such as amphibians, Eurasian otter and waterbirds downstream of the works.

Potential impacts on aquatic species include disturbance and changes to water quality. During operation there may be changes in visual (e.g. vehicle headlights), noise and vibration stimuli due to an increase in the number of vehicles crossing the watercourse. This could result in the temporary disturbance and displacement of fish species within the Project rivers, though the magnitude of this impact on fish is assessed as very low due to the localised nature of the disturbance and the ability of fish to utilise suitable habitat elsewhere in the watercourse system away from the crossing locations. There are risks to aquatic species in relation to changes in water quality arising from ingress of uncontrolled surface water run-off (including pollutants and fine sediment) from the new road and uncontrolled discharges arising from road traffic collisions entering Project watercourses. There is a risk that accidental spills and uncontrolled discharges may impact fish and aquatic invertebrate species at the point of ingress.

With the implementation of mitigation measures identified below, the overall impact during operation will be Minor Adverse to Negligible.

The following mitigation measures have been recommended:

- Incorporation in design of speed limits and warning signs showing the presence of animals near to watercourses and wetlands to prevent collisions and accidents and reduce emissions.
- Provision of safety barriers at watercourse crossing locations to reduce risk of accidental spills.
- Design of road drainage to include measures to improve quality. The detailed design will include sedimentation/attenuation ponds which will ensure that runoff from the road water does not reach the major watercourses or Issyk-Kul lake. No direct discharge from the road to the watercourse.
- Provision of underpasses or safe places for mammals, reptiles, and amphibians to cross the road e.g., underneath bridges or within culverts adjacent to at known and/or likely crossing points, where local topography allows. These passes should be provided where any linear habitat crosses the road, particularly the larger watercourses but also any small streams where commuting animals may be forced up onto the road.

Monitoring requirements will include:

- Post-construction monitoring of sites will be undertaken as necessary and set out in the Biodiversity Management Plan, following the pre-construction surveys. This may include monitoring of translocation sites, as relevant.

4.4.7. Cultural Heritage

The Silk Route WHS would be slightly affected by the upgraded road Project. However, as the Silk Route already exists alongside the road and was itself a road for travelling, the change to its setting from operation of the road would be a very low. The impact would be more severe if this was recognised as an important cultural tourism asset with facilities for visitors' knowledge and enjoyment.

The Orthodox Church in Tyup is located off the A363 down a side street and is close enough to the road for its setting to be affected, especially at the junction with the A363. However, as the A363 already exists and is likely to continue on the same alignment, there should be little alteration to the Church's environment from the operation of the improved road. It is considered that this would not result in a change to the current conditions.

If the road or other road infrastructure was located closer to the Balbay-Baatyr statue then there would be operational impacts from the new road as this would affect the setting of the monument and people's experience of it as levels of noise, dust and traffic could increase.

Due to the location of Teke-Baatyr on the immediate roadside of the A363, the increased volume of traffic, likely increase in noise and dust will have an impact on the setting of the monument and people's experience of it.

The three cemetery sites in the Villages of Tepke, Zhany-Aryk and to the south-west of Zhany-Aryk all border the A363. The operation of the improved road will change the setting of these sites, which are sensitive locations for local people, and have notable historical value. Although the current environment for the cemeteries is by the roadside, the increasing likely loss of tranquillity from rising noise levels and volume of traffic will mean a high impact.

One of the 120 sacred sites around the Issyk Kul Lake is located beyond the cemetery near Jany-Aryk village. As the A363 already exists and is likely to continue on the same alignment, there should be little alteration to the site's environment from the operation of the improved road.

With the implementation of mitigation measures proposed below, the overall impacts are still considered Moderate to Major Adverse for the period of construction.

The following mitigation measures have been recommended:

- Dependent on the route of the road upgrade, it may be that the setting of the Balbay-Baatyr monument would benefit from visual screening from the road.
- Permanent screening of the road from the Teke Baatyr monument and Balbay-Baatyr monument.
- Visual screening for the three cemetery sites.
- Where feasible appropriate access, parking and additional signage (history of the sites) should be provided to facilitate future development of tourism. This could include a tourist service point near the monument to Teke Baatyr.

Monitoring requirements will include:

- Post-construction vibration monitoring at Balbay-Baatyr monument and Church in Tyup.

4.4.8. Economy, Employment and Livelihoods

One of the principal underlying drivers for the Project is to improve road safety and facilitate trade and tourism between Kyrgyzstan, Kazakhstan and China, giving opportunities for both national and regional development and further improvement of transport services. During operation, therefore, the Project will have a direct and indirect positive impact on the national, regional, and local economy.

The road improvement works will help reduce road travel times and costs, expanding market access and freight traffic flows, which in turn facilitates and improves inter-urban and inter-regional trade. Reduced transport times and costs will in turn reduce the cost and increase the shelf life of product provision to consumers, potentially helping to promote the increased exports from the province, especially in time sensitive agricultural produce from the Project area such as dairy products, livestock, fruits, and vegetables.

In addition to agriculture, Issyk-Kul province is highly dependent on tourism. Improved road conditions and ease of travel will encourage more domestic tourism around Issyk Kul Lake, especially around Karakol and Tyup, and are likely to also help increase tourism from Kazakhstan and China and further afield.

The Project is also likely to make the Project settlements and the wider Project area more attractive for potential investment as increased through traffic and road access can stimulate the development of road services (e.g., motels, restaurants and petrol stations), and support small retailers (such as farm sellers, souvenir shops etc) along the road.

This direct economic stimulus will have indirect multiplier effects on the local economy through the expenditure of local business and service provider beneficiaries on other local goods and services.

There will be relatively limited direct employment opportunities for operation and maintenance phase of the Project, although a small number of workers will be required to maintain the road on a full-time basis.

Potential impacts on livelihoods will in the main be positive. Overall, an improvement to the road will result in an improvement in trade and tourism, which will contribute to the local economy and in turn support growth in employment and livelihoods. For example, local taxi drivers, through stakeholder consultation, noted that private passenger income is their sole income source, and they carry passengers between the villages several times a day and therefore an improved road network will result in increased journey frequencies and opportunities. Additionally, the reduced wear and tear on vehicles from an improved road surface will reduce vehicle maintenance costs.

Against this, some adverse livelihood impacts may be experienced by local businesses and farmers/pastoralists where changes in their access rights may increase their journey times and accessibility as local traffic will have to contend with 4-lanes and u-turns rather than the most simplified current configurations. Adverse tourism and fishing related livelihood impacts may also be experienced in the case of project related pollution events by those using ecosystem services and Lake activities downstream of the rivers where the Project road crosses.

With the implementation of mitigation measures proposed below, the overall impact is considered to be up to Major Positive, with some Minor adverse effects as identified above.

The following mitigation measures have been recommended:	
<ul style="list-style-type: none"> Recruiting for operation and maintenance activities from the local community where feasible. Provide equal opportunities for women in line with HR policy and Labour Management Plan. To encourage tourism, low-impact transport, and ensure safety, the design should include the provision for demarcated cycle channels in the urban sections traversed by the Project road. Sections of the road should cater for parking to facilitate future development of tourism. For example, the provision of identified plots for yurt sites and/or car parking, where souvenirs and supplies can be sold to tourists. Sites should be selected in liaison with tourism entities. Tourist information boards should be installed along the road in the vicinity of the main tourist sites. Installation of sedimentation ponds and appropriate drainage to ensure contaminated run off water does not reach the rivers and Issyk Kul Lake. 	

4.4.9. Community Health, Safety and Security

The new road will improve road surfaces, signage, road markings, barriers, and pavements, which will contribute to improved road safety conditions and, therefore, reduce the accident risk for road users. The improved road will contribute positively to the wellbeing of most road users who will experience less stress through smoother quieter and faster journeys, better signage and pedestrian demarcation, and less wear and

tear on the vehicles. In addition, Project road users will benefit from an increase in rest and leisure time as a result of the reduced travel times and improved access to these facilities.

Conversely, there is an increased risk to the general public of road traffic accidents due to an increase in traffic volumes and in road accident severity due to increased vehicle speeds. These risks will be heightened at population gathering sites such as schools, churches, mosques, hospitals, and tourist sites. It is relatively easy for pedestrians to cross the road in its current two-lane form however, when the road is increased to four lanes with a concrete median, crossing will only become feasible at dedicated crossing points. Accidents may therefore occur where people attempt to cross the new four lane highway outside of dedicated crossing points. Livestock also currently cross the Project road all along its length as there are no specific crossing points.

The potential for an increase in road traffic accidents identified above could put pressure on the capacity of emergency health care services during operation in the absence of the mitigation measures outlined below.

An increase in vehicle use of the road may result in an influx of people passing through the towns and villages which, though likely short term with lower levels of interaction with the local community, could result in an increased the occurrence of communicable diseases.

The increased number of lanes and traffic may also inconvenience and therefore increase the stress levels of some local users of the road, particularly pedestrians and cyclists due to the need for allocated crossing locations in both urban and rural areas. In Tyup town the physical restrictions on access because of the road will reduce levels of social and psychological connectivity between those living and working to the east of the road and those living and working to the west of the road. This will be detrimental to the town's existing sense of social cohesion at the community level and is likely to increase some people's sense of isolation and marginalisation at the individual level. This could be further exacerbated by an increase in the presence of transitional non-resident road users through the town and the inherent increased risk of tensions associated with their interaction with local community members, particularly younger women and girls.

With the implementation of mitigation measures proposed below, the overall impact is considered to be up to Major Positive, with some Minor adverse effects as identified above.

The following mitigation measures have been recommended:

- Appropriate design and ongoing maintenance to reduce health and safety risks e.g. signs, barriers, lighting and crossings will be used.
- Confirmation and monitoring of accident rates and review of whether sufficient and adequate crossing points have been put in place such as shelters, protective barriers, pavements and street lighting along all high pedestrian use road sections. Measures should be designed in liaison with the local community and ensure accessibility for vulnerable people e.g., crossings at grade and necessary auditory and visual aides.
- Provision of appropriate parking bays and rest stops, to be provided in liaison with the local communities.
- Culverts / livestock crossings should be provided in rural areas at regular intervals and the need for fencing to prevent errant livestock crossing fast traffic should be provided where necessary. These sites should be determined in liaison with local farmers. Educational meetings in relation to livestock use of the road, in particular farmer households should be informed about potential collisions and penalties imposed by relevant law. Provision of adequate lighting to reduce the risk of accidents at night.
- Educational meetings with local communities and media adverts in relation to driver behaviour and speed limits and also locally, to help make drivers and pedestrians aware of the new road layout, including safe crossing use and locations, when complete.
- Educational meetings in relation to livestock use of the road, in particular farmer households should be informed about potential collisions and penalties imposed by relevant law. Provision of adequate reflective signage and markings and consideration of road lighting at key sites, while accounting for bio-diversity effects, to reduce the risk of road accidents at night.
- Installation of surveillance and speed cameras where feasible to support the monitoring of violations and provision of fines.
- Provision of lighting and surveillance cameras in the urban areas for increased safety and security.
- A Road Safety Audit should be undertaken Post Construction to confirm recommendations accepted during the design stage Road Safety Audit have been implemented. A further Road Safety Audit should be undertaken 12 months post opening and then periodically every 3 years to assess road traffic collisions along the road and identify any trends/blackspots that requires remedial actions.
- Ongoing maintenance and repairs, including maintenance of drainage channels for the enhancement of road longevity and to maintain community health and safety e.g. filling subsidence voids and cracks, and levelling obtrusions on affected road and pavement sections to avoid risk of accidents.
- Installation of surveillance cameras for monitoring of violations and provision of fines.
- Review provision of health services and budget for serious road traffic accidents along the road.

- Local awareness campaign amongst local communities of HIV/AIDS and other anti-social behaviour from male travellers on the route and managing potential anti-social behaviour from male travellers on the route.
- Adequate policing to reduce the risk of unwanted anti-social behaviour from increased truckers along the route on the local community in particular women and young girls.

4.4.10. Labour and Working Conditions including Occupational Health and Safety

Operations and maintenance staff will be required, serviced both from within the MoT and through contracts however, at this stage, it is not known if additional workforce would be required. It is expected that the MoT and Contractors will comply with the Kyrgyz labour laws and will ensure that all employees, including permanent and temporary, will be provided with a contract.

Occupational Health and Safety risks include the risk of road-related accidents while undertaking maintenance activities. It is assumed that a sufficiently trained and equipped workforce will be provided to deliver operation and maintenance activities in accordance with Kyrgyz law and international best practice.

The potential impacts on labour and working conditions and occupational health and safety are anticipated to be low risk and overall could have a Minor Adverse to Minor Positive effect during operation.

The following mitigation measures have been recommended:

- A Labour Management Plan and Occupational Health and Safety Plan will be prepared and implemented. Equal opportunities for women will be provided.
- MoT should ensure that all staff are adequately trained. Personal Protective Equipment (PPE) will be provided for the workforce. Regular maintenance of equipment will reduce the risk of injury from failing equipment.
- An Emergency Preparedness and Response Plan will be implemented.
- A labour Grievance Mechanism will be in place.

4.5. Climate Change

The ESIA has considered the key climate risks associated with the Project. The key climate risks to consider during the design stage are:

- Increases in river discharges and the impact on fluvial flood risk and bridge design
- Extreme heavy rainfall and the impact on surface water flood risk and drainage design
- Extreme high temperatures and the impact on road surface choice and bridge expansion joints
- Risk of landslides or rockfalls associated with precipitation or temperature extremes

This analysis has identified a number of recommendations for consideration during the design stage:

- Incorporate climate change allowances for river flow and extreme rainfall during design, when applying the mitigation measures outlined in the hydrology section of this report. Further hydrological modelling may be required to inform the design stage, and climate change should be factored into this modelling through the use of flow uplifts.
- The use of Stone Mastic (or Matrix) Asphalt for road surfacing is recommended as it is suggested to be resilient to higher temperatures exceeding the range expected to be experienced during the surface's design life of 12-16 years.
- Ensure current mitigation measures remain in place or are replaced (e.g., A number of forest plantations were observed in the Project Area and along the Project road, which according to stakeholders provide a wind shield to road users).

4.6. Cumulative Impact Assessment

During construction, the combined effects of dust, air emissions and noise on local communities will be greater than the effect of a single impact on these receptors. Residents living in the vicinity of the main construction sites will experience increased nuisance and disturbance as a result of increased air and noise emissions and traffic volumes. Cumulative effects are most likely to be experienced by local communities (residents and businesses in Tyup, the entrance to Karakol and properties and small villages along the road) as well as all road users. Flora and fauna adjacent to these sites may also be affected by a combination of noise and dust, as well as pollution events if they occur. However, construction works will be for a shorter period outside any one location and will be temporary.

Cumulative effects may also be experienced on terrestrial and aquatic flora and fauna in the Project Area. Disturbance caused by noise, dust, light, increased construction workers and traffic movements, poor waste management practices and potential pollution incidences could have a combined cumulative effect on fauna that is greater than the effect of a single impact. Terrestrial and aquatic environments may experience a combination of impacts arising from, dust, silt mobilisation and pollution incidences. Noise, dust, emissions and prevention of pollution incidences will be managed through the

Environmental and Social Management Plan, with specific measures in place where works take place around rivers and other aquatic habitats.

In relation to the Biosphere and Eastern Issyk Kul Important Bird Area, the construction works will be general sufficiently distant to avoid cumulative effects arising from noise, traffic and air quality impacts. However, it is possible that pollution incidences that occur in more than one river crossed by the works would result in a cumulative adverse water quality effect on the Lake. However, the water quality assessment has determined that the distance of the main river crossings from the Lake will allow for substantial dilution potential before any flow of increased sediment/pollutant concentrations flow into the Lake, therefore no significant cumulative effects on the UNESCO Biosphere Reserve at the Lake are anticipated. At the section of the Biosphere where the core zone abuts the Project road just north of Tyup no protected species or habitats have been identified and therefore, no significant cumulative effects are anticipated assuming that the road is constructed on the east side at this location.

The Project itself is part of a wider initiative to improve road conditions of the Issyk Kul Lake ring road. If the works on other stretches of the road around the Lake are undertaken at the same time, this could arise in combined impacts of dust, air emissions and noise and traffic disturbance that could have a cumulative effect on road users around the Lake. Depending on transport routes used to reach each main sites works, the increase in traffic could also affect other local communities e.g., along the northern stretch of road.

The demand for a workforce from more than one project being constructed at the same time could also have cumulative effect through a combined demand for construction workers, raw materials, equipment and goods and services. This will result in increased employment opportunities and increased revenue than this Project alone. It will also result in a larger influx of construction workers and retrenchment following the construction phase. In the event that works are undertaken at the same time as other road projects, the demand for resources and services could put more pressure on the local communities and facilities (e.g., workers, water supply, health care centres, electricity supply). The combined total of direct and indirect impacts on the economy, employment and livelihoods, both positive and negative, could be greater if this Project is undertaken at the same time as the other road development projects.

The construction of several road projects at the same time will also result in a cumulative effect on waste management facilities, with an increased generation of construction wastes. Overall, it is understood that there is sufficient capacity at local landfills from construction projects and therefore no significant adverse effects are predicted.

During operation, the increase in traffic after commissioning of the Project road will give rise to increased traffic volumes and associated gaseous and noise emissions which in combination could have a larger impact on local communities than the effect of, for example, air quality alone on local communities. This is likely to be experienced most by local communities with houses or business along the road in the town of Tyup, where the road will be closest to properties. The combined cumulative effect will depend on final alignment shifts.

Positive cumulative effects may arise during operation through the stimulation of economic growth which could also have a positive impact on local businesses and livelihoods. Overall, there could be knock-on effects resulting in increased potential for employment opportunities and increased revenue which could in turn have positive effects on well-being.

During operation, there may be cumulative effects on aquatic environments resulting from drainage along the road where it crosses rivers, and this combined runoff flowing into the Lake. The design of any discharge outfalls from highway runoff will incorporate measures to mitigate any erosion of sediments and contaminated drainage. Should this not be in place and effective, there is a risk that contaminated water from the road will drain into the Lake. However, with appropriate measures in place, significant cumulative effects on the Lake and the Biosphere are not predicted.

As identified above, the other major development in the Project area is the other stretches of the Issyk Kul Lake ring road that have been/will be rehabilitated. Together, these projects could result in an increase in traffic around the Lake, resulting in increased traffic, air emissions and noise that will have an adverse effect on local communities, which will increase over time as traffic volumes increase. These road rehabilitation projects together, once completed, will also result in a positive cumulative effect on road users and trade/business around the Lake, by providing improved road conditions and journey times, that will result in cumulative positive effects on economic activities, including agriculture, food processing and mineral extraction as well as tourism, in the Issy Kul province. The road projects combined will facilitate the trade and tourist relationship of Kyrgyzstan, Kazakhstan and China, providing greater opportunities for both national and regional development than one of the projects on their own. The improved trade and business opportunities will also result in increased livelihood impacts on local communities around the Lake. These cumulative effects are considered to be positive and significant.

5. Stakeholder Engagement and Grievance Mechanism

5.1. Stakeholder Engagement

A Stakeholder Engagement Plan (SEP) has been developed as part of the ESIA Disclosure Package and covers the following:

- Introduction
- Project Description
- Legal framework for stakeholder engagement and information disclosure
- Stakeholder identification
- Supplementary engagement
- Future stakeholder engagement programme
- Grievance mechanism
- Monitoring and reporting
- Resources and responsibilities

The SEP defines the stakeholder engagement approach for the Project, the key identified stakeholders and how to provide feedback and how any feedback and comments are addressed. **Any stakeholders requiring to be included within the consultation process should contact the MoT.**

The ESIA Project Team have undertaken several phases of engagement to input to the ESIA Disclosure Package:

- Engagement during site reconnaissance surveys that took place between 24 to 27 November 2020 with Tyup Ak-Suu district officials.
- A series of focus group discussions (business sector in Tyup town, population of Tyup town and farmers in Tyup town) and two “public” meetings (Tyup and Ak-Suu districts), of reduced size due to COVID-19 restrictions, were held between 26 and 29 March 2021 by ESIA Social Team.
- Focused ESIA engagement between 14 to 16 June 2021, comprising further focus group discussions (farmers in Tyup town, vulnerable people in Tyup town and tourism industry in Tyup and Karakol and interviews with different representatives of Ak-Suu District and Tyup District local authorities.

The future Stakeholder Engagement Programme will comprise several phases as follows:

- ESIA Disclosure Phase;
- Pre-construction Phase;
- Construction Phase; and
- Operational and Maintenance Phase.

The purpose of the disclosure will be to ensure that stakeholders have the opportunity to make themselves aware of the environmental and social impacts that may occur and how the Project will avoid, minimise and / or manage these impacts; and feedback any concerns to the Project Team. The Project ESIA Disclosure Package will be provided in English and Russian and posted on the EBRD website (www.ebrd.com) for a period of 120 days in line with EBRD requirements.

Hard copies of these documents will also be available at EBRD offices and MoT offices in Bishkek; and as appropriate local offices. The MoT will also publicly notify how both hard- and soft copies of the Project ESIA documentation can be accessed and comments provided, including electronically and in comment books at local MoT offices and through MoT staff as part of routine consultation activities.

As public consultation is unlikely to be possible at time of disclosure, hard copies of the NTS, SEP and LARF will be shared with the local administrations (Issyk Kul Province, Tyup and Ak-Suu districts) for perusal by interested parties. Where possible, a round of face-to-face meetings (using current safe social distancing practices) will be held with the key administration representatives and/or at *Aiy! Okmotu* meetings; however, if this is not possible a telephone or web conference call will be organized.

The NTS will also be provided at the *Aiy! Aimak* (village) level, and the possibility of using local Facebook groups for sharing information explored.

Where feedback is not possible through meetings or via telephone calls, the option to provide feedback forms and a feedback box will be considered at the local AA levels and these forms will be collected by MoT for review. The MoT will also liaise with local *Aiy! Okmotu* representatives to feedback any comments that may be captured in local meetings.

5.2. Grievance Mechanism

A Grievance mechanism is set out in the SEP. This will be developed and open to all stakeholders to submit complaints or register concerns, and to receive and facilitate resolution of stakeholders' concerns and grievances, in particular, about the Project's environmental and social performance. It will allow the Project to be aware of and respond to stakeholders' concerns related to the Project in a timely manner.

6. Environmental and Social Management

6.1. Project Management and Delivery

The MoT is the Project Owner, and a Project Implementation Unit Consultant will be set up to oversee Project implementation. Within the Project Implementation Unit Consultant, a person responsible for the Environmental and Social Management System (ESMS) will be appointed. This individual will be responsible for ensuring adequate training of the Project Implementation Unit Consultant staff and, where necessary, Construction Contractor staff.

A Construction Contractor will be appointed for the construction of the Project. The Construction Contractor will be expected to undertake monitoring and inspections of their compliance with the Project ESMS documentation.

The MoT will appoint a Supervision Engineer to assist the MoT in the selection of the Construction Contractor and to monitor the Construction Contractor on site.

The Supervision Engineer will monitor the Construction Contractor on site on a day to day basis. The Project Implementation Unit Consultant will undertake regular inspections and audits of the Construction Contractor to ensure compliance with the Project ESMS.

6.2. Environmental and Social Action Plan

An Environmental and Social Action Plan (ESAP) has been prepared for the Project to meet EBRD requirements. The purpose of the ESAP is to detail the objectives, schedule of activities and responsibilities to manage, limit and mitigate negative impacts (and enhance positive impacts) from the Project and set indicators against which Project (and Contractor) performance can be measured.

The ESAP sets out the requirement for the Project to have an ESMS. During construction and operation, Project staff and the Construction Contractor will be accountable for completing work in a way that is compliant with the expectations set out in the ESAP. The ESAP is designed to ensure compliance with Kyrgyz permitting requirements and legislation and EBRD Performance Requirements, and the EBRD ESIA Disclosure Package.

6.3. ESMS and Management Plans

A Project ESMS will be prepared that will provide the framework for the Contractor's construction phase management systems. The ESMS will cover:

- Project environmental and social policies and procedures
- ESIA Report and national EIA (when available)
- Project ESMP
- Environmental and Social Legal and Permit Register
- Project SEP
- Resettlement Action Plan (RAP) and/or Livelihoods Restoration Plan (LRP), if required
- Roles and responsibilities
- Project schedule/programme

As part of the ESIA Report, an ESMP has been developed. It is expected that the ESMP will be updated following the detailed design, to reflect design changes and additional surveys required as part of the design changes – this will become the Project ESMP. The Project ESMP will form a requirement of the tender documents for the Construction Contractor.

The Construction Contractor will be obliged to adopt the Project ESMS and develop a detailed Construction ESMP, which would include more detailed systems and plans to address construction-specific aspects of Project delivery.

A simplified diagram of the Project ESMS and the ESMP at the different Project stages is shown in Figure 6-1.

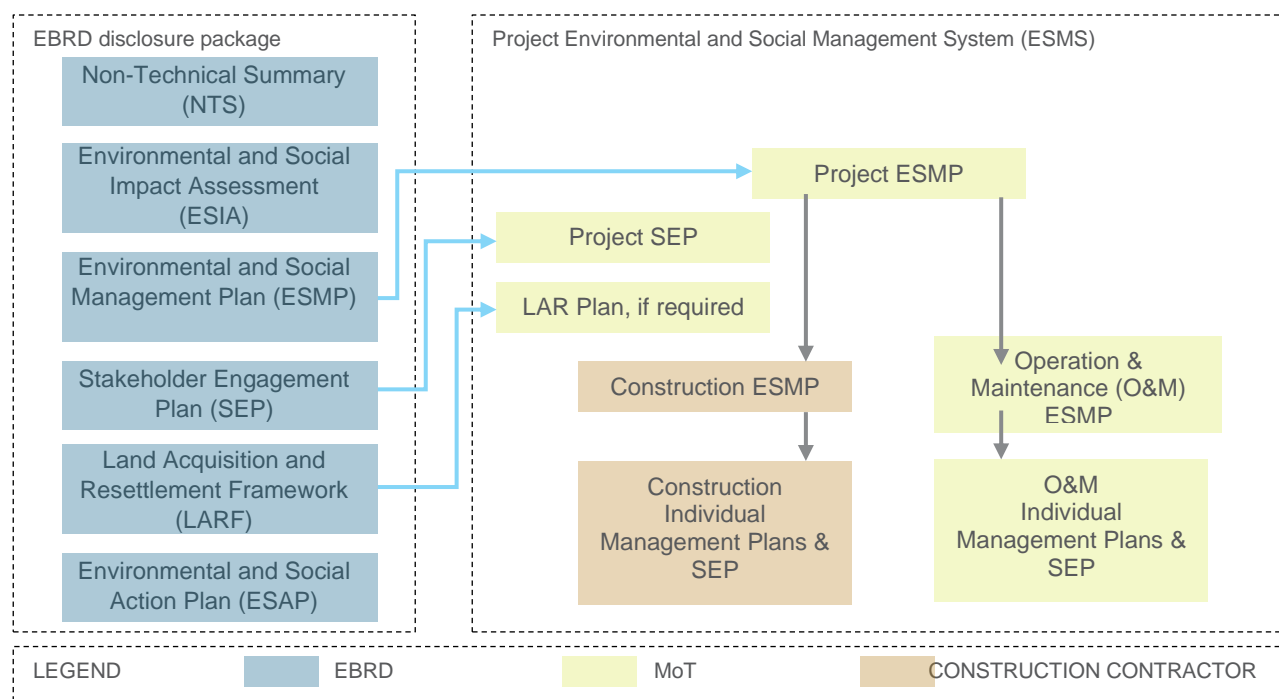


Figure 6-1. Simplified ESMS Structure

6.1. Land Requirements

Whilst the works will likely fall within the existing right of way for the road, and therefore the land is already State property, widening of the road will inevitably result in physical and economic displacement.

All land take activities must be undertaken in line with national requirements and EBRD's Performance Requirement 5 *Land Acquisition, Involuntary Resettlement and Economic Displacement*. This requires that, regardless of the land tenure status, measures are taken to address physical and economic displacement in line with international standards.

As such, a separate Land Acquisition and Resettlement Framework (LARF) has been prepared to report on the findings to date and set out future actions that will need to be taken to meet EBRD requirements.

Depending on the final design, a Resettlement Action Plan (RAP) and/or Livelihoods Restoration Plan (LRP) may be required to cover the Project and/or any temporary land requirements that could result in involuntary economic or physical displacement. The actions related to this are set out in the LARF.

6.2. Temporary Site Requirements

At the time of writing, no information is available on the location of the Contractor laydown areas, workers' accommodation camps(s) or other temporary sites such as haul/access roads. The Construction Contractor will be required to select sites on the basis of minimal environmental and social impacts, and assess final sites chosen so that, where necessary, additional mitigation measures can be applied to reduce adverse impacts.

6.3. Legislation and Permits

The Project will need to comply with national and EBRD requirements. In addition, a number of permits will be required for construction.

A Legal and Permit Register shall be developed by the MoT and issued to the Construction Contractor.

The Construction Contractor will be required to ensure that all necessary permits to are in place prior to the start of permitted activities (e.g., construction camps, borrow pits, etc.).

The MoT will monitor Construction Contractor compliance with the Legal and Permit Register.

6.4. Site Handover

Prior to handover of the site from the Construction Contractor to the MoT after the construction works, the Construction Contractor will be required to undertake rehabilitation of sites including all temporary works areas and removing all wastes from the Project corridor, to the satisfaction of the MoT.

6.5. Road Safety

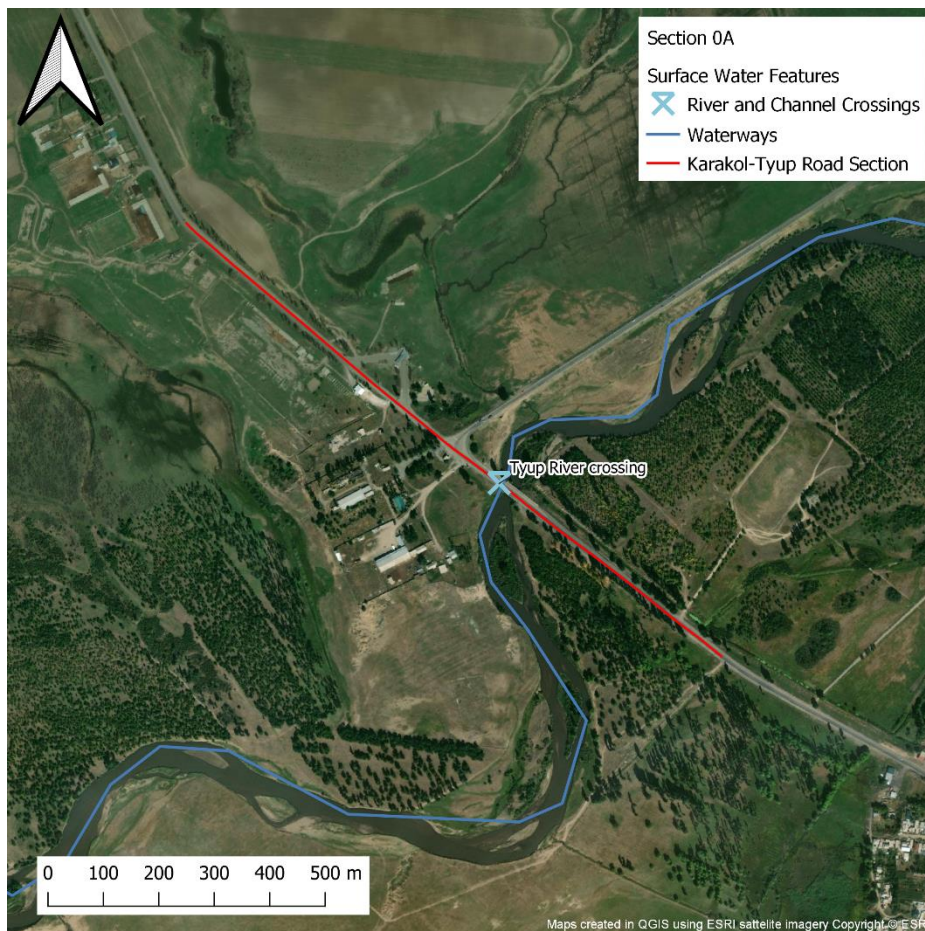
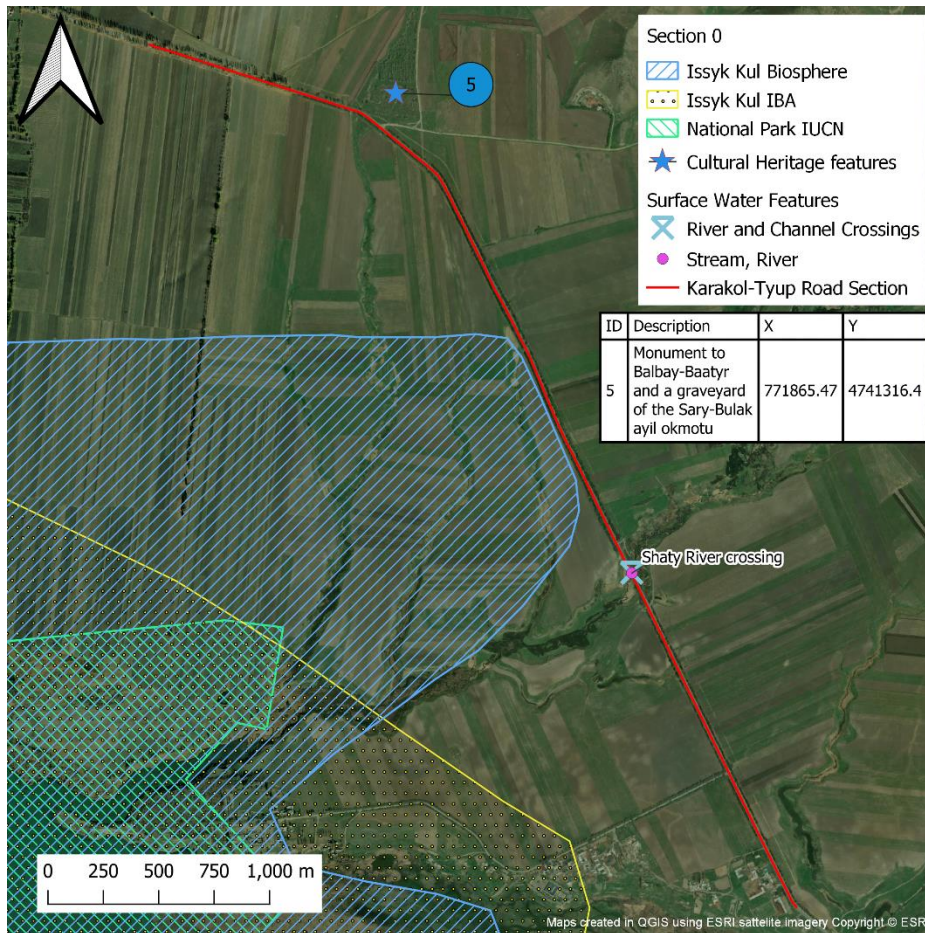
The MoT, with assistance from the PIU Consultant, will develop and implement a programme of road safety audits to assess safety performance along the alignment and village access roads, and to identify any unsafe conditions. This should include:

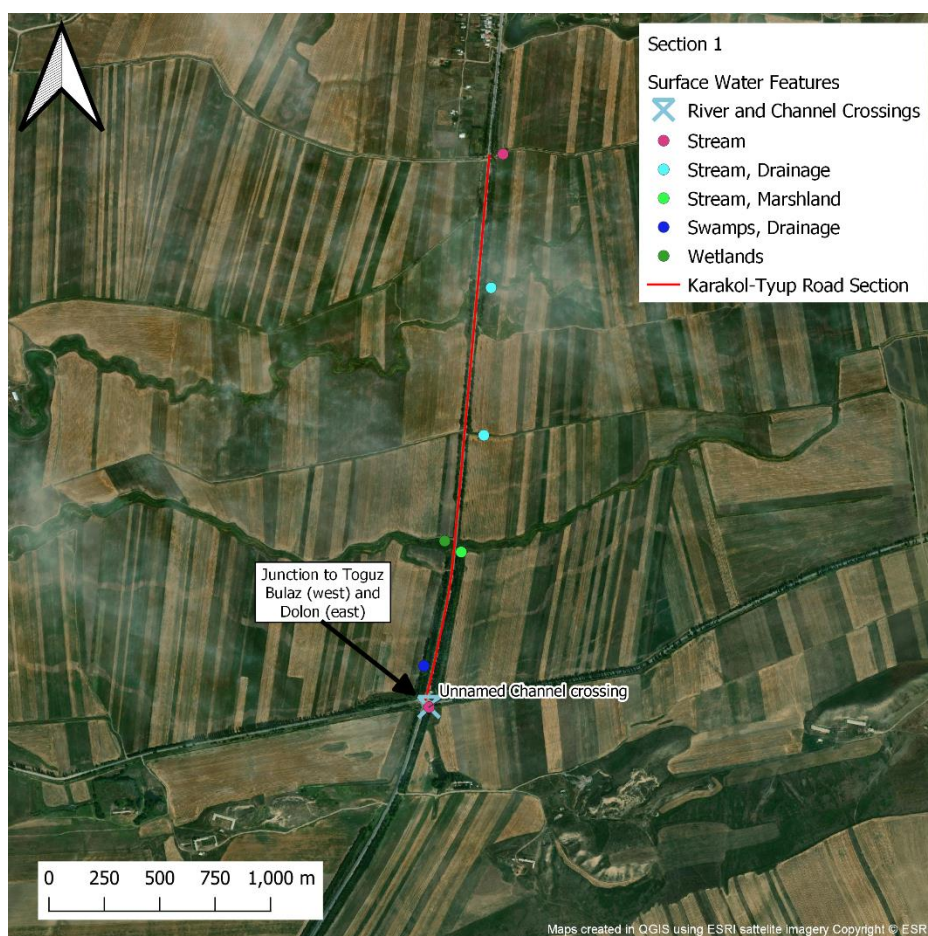
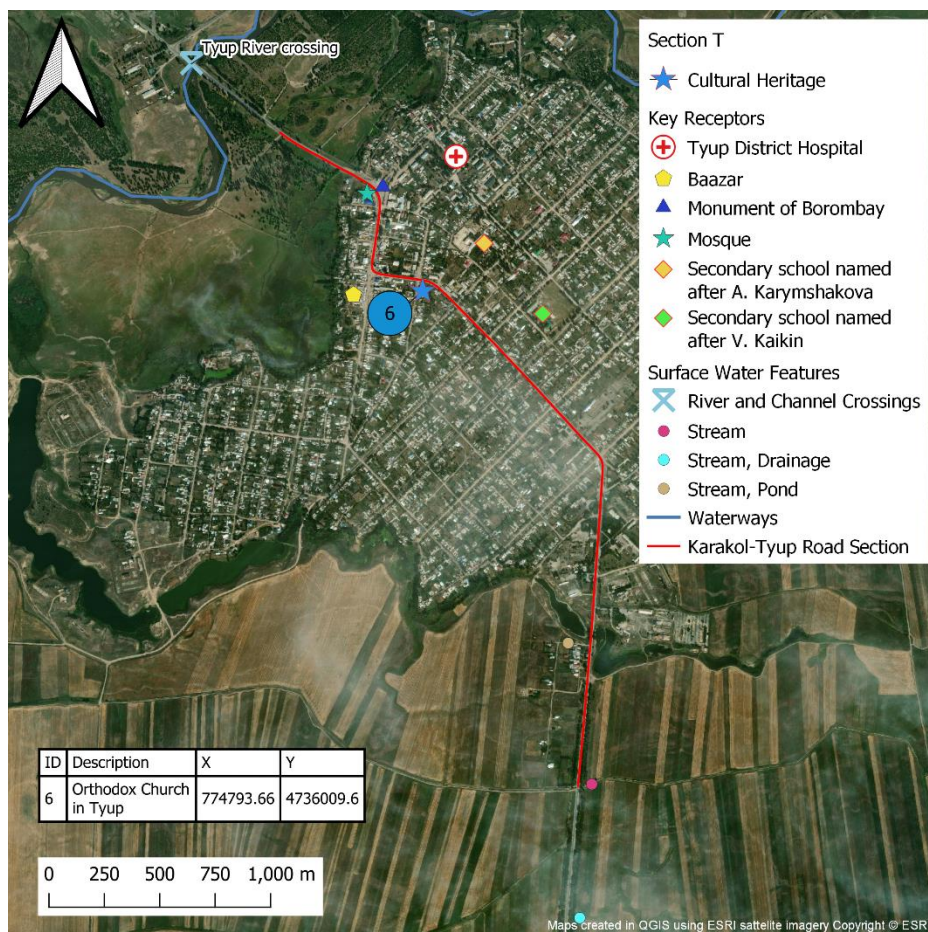
- An independent Road Safety Audit on the Detailed Design;
- A Road Safety Audit at Pre-Opening/Post Construction to confirm recommendations accepted during the design stage Road Safety Audit have been implemented;
- A Road Safety Audit should be undertaken 12 months post opening; and
- A road Safety Audit periodically every 3 years to assess road traffic collisions along the road and identify any trends/blackspots that required remedial actions.

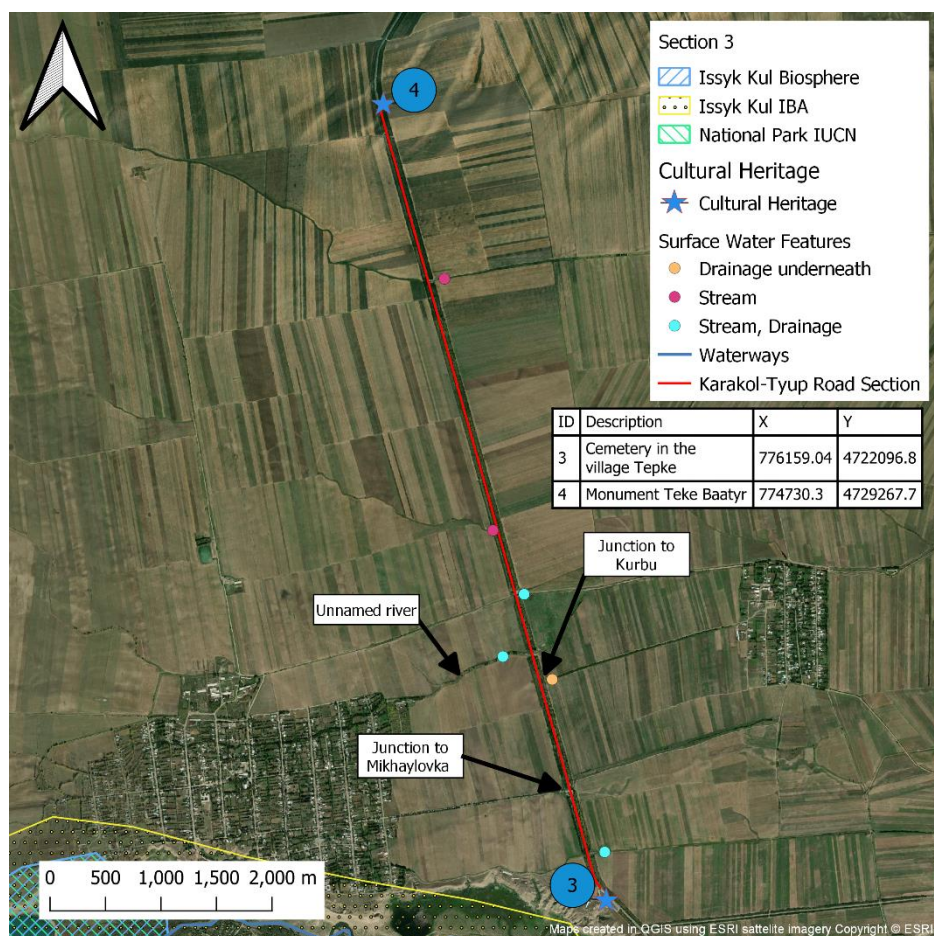
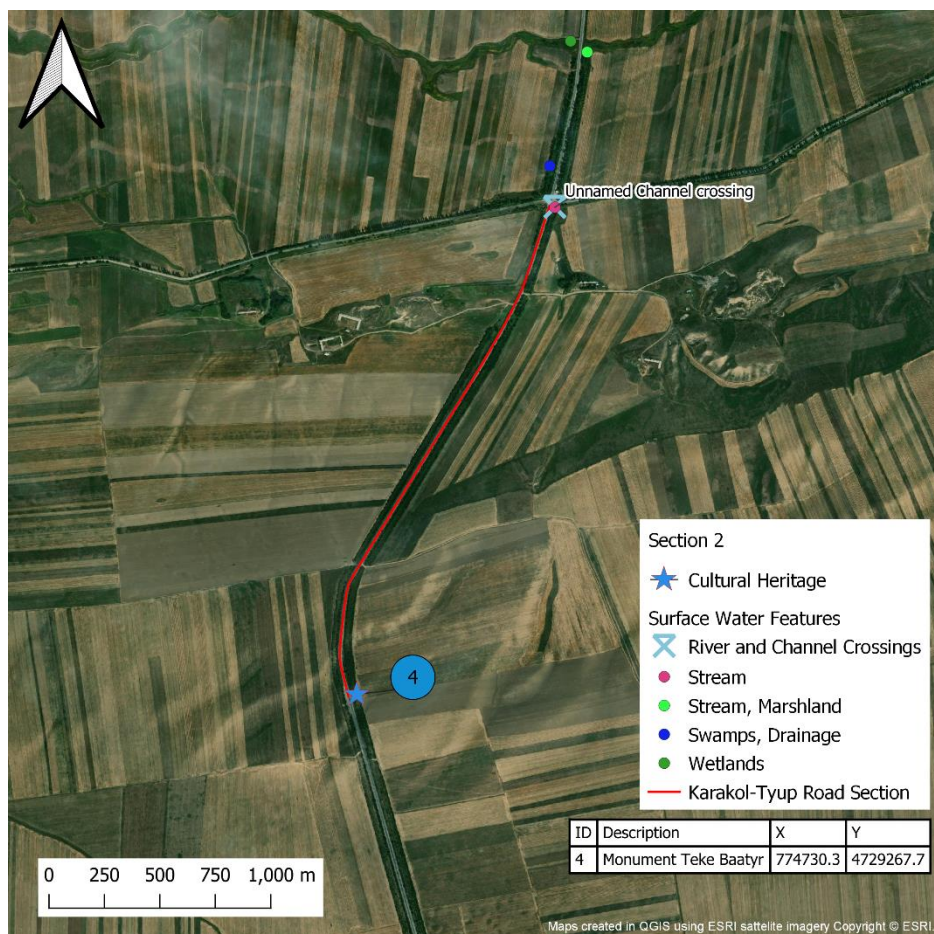
All Road Safety Audits will be approved by the EBRD.

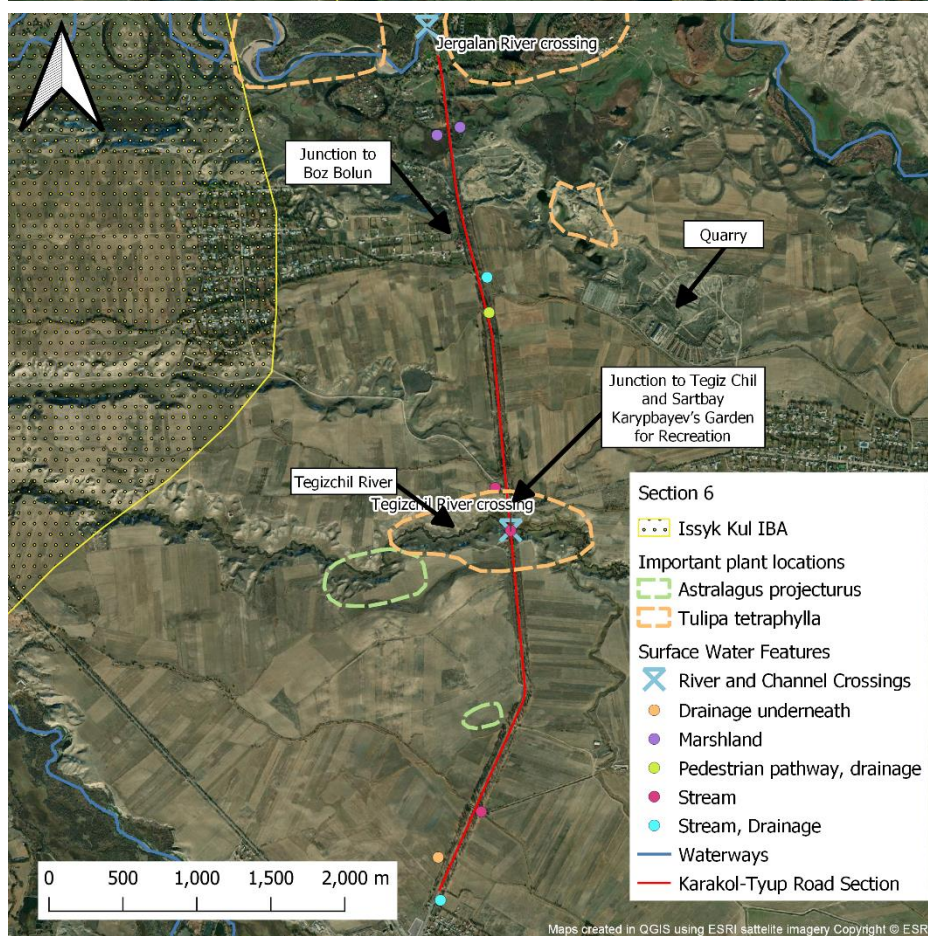
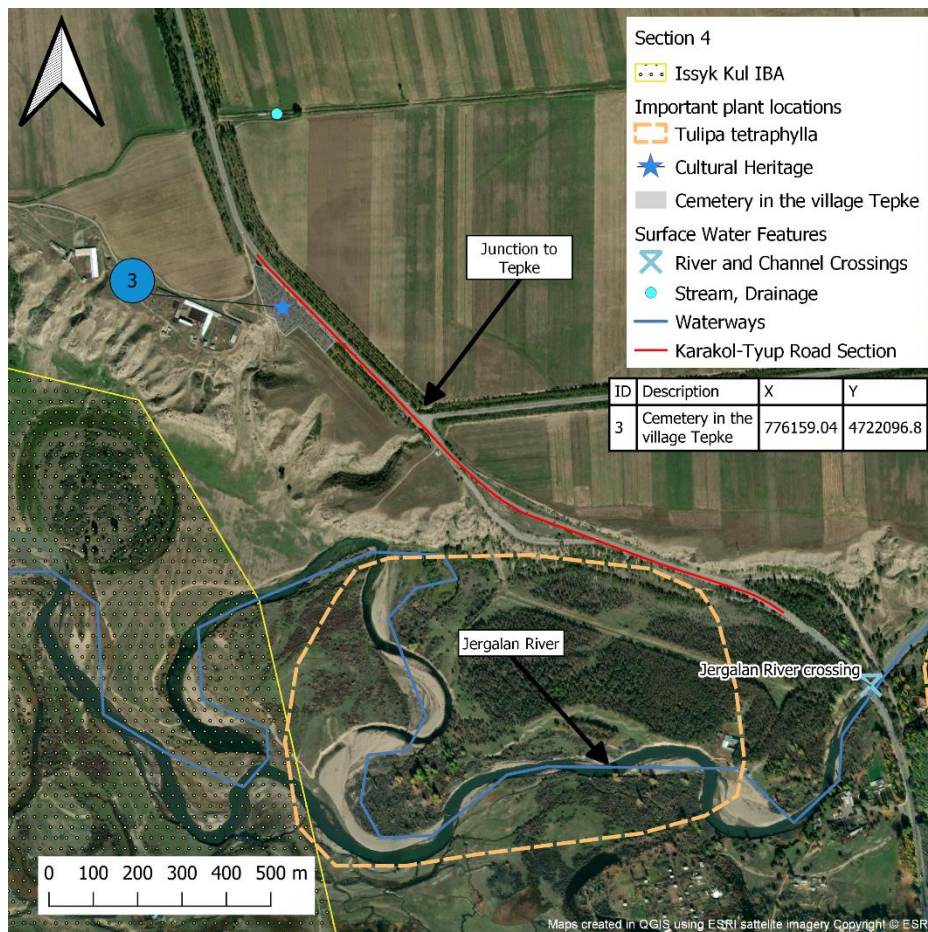
APPENDICES

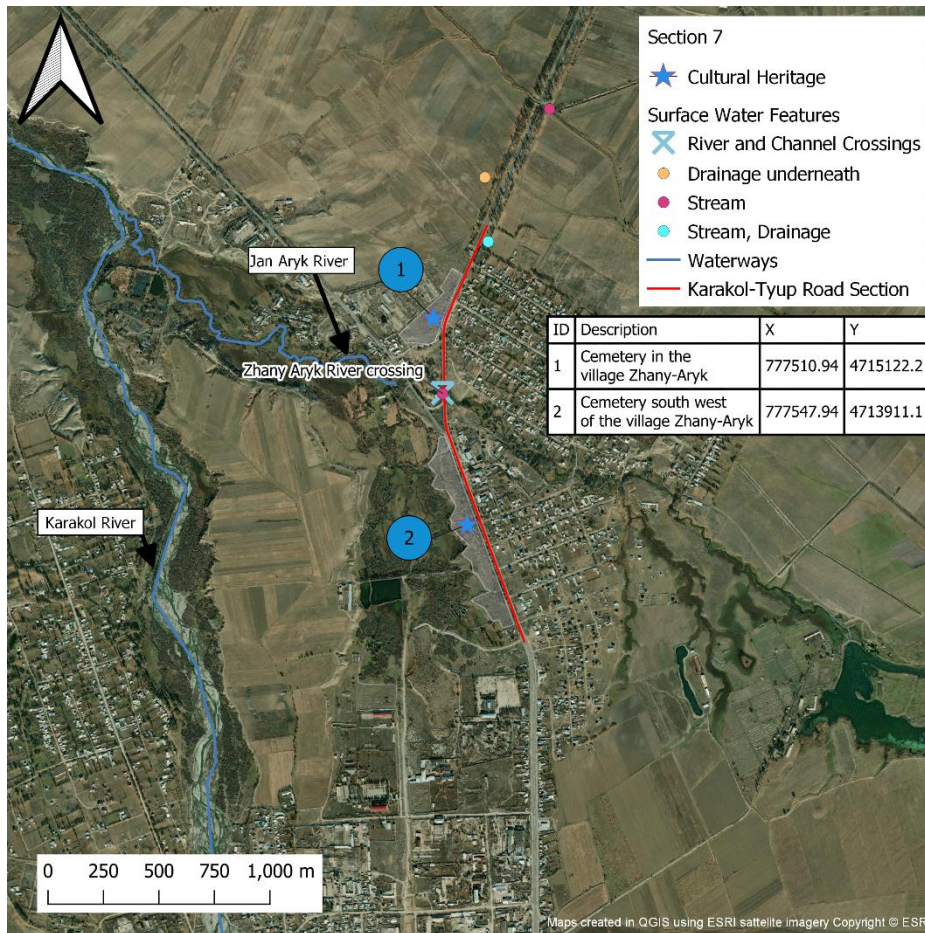
Appendix A. Key Sensitive Receptors











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