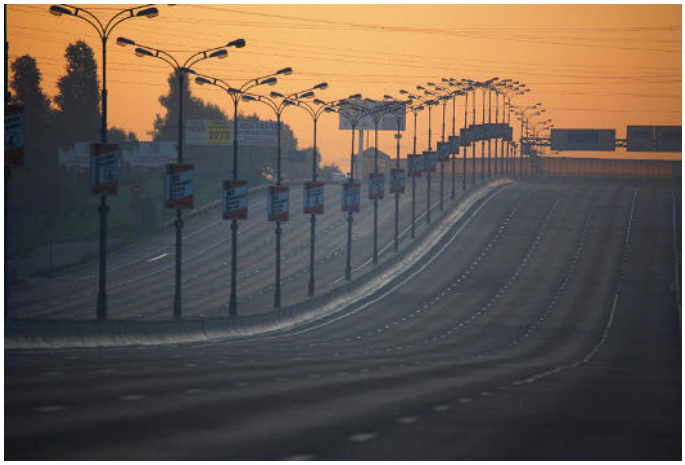
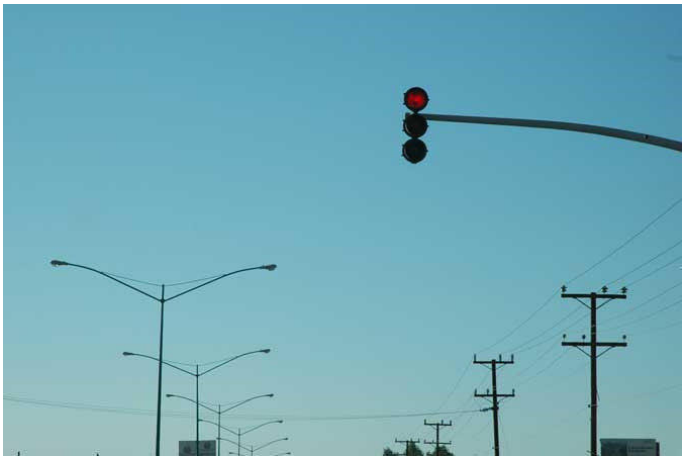
Draft Environmental and Social Impact Assessment (Main Report)

Project Number: 49360-001
September 2018

KAZ: BAKAD PPP Toll Road Project

Prepared by Environmental Resources Management (ERM) Eurasia.


Big Almaty Ring Road (BAKAD)

Environmental and Social Impact Assessment Report (for ADB Disclosure)

Draft report (Rev. 3.1)

Volume II

Prepared for BAKAD Consortium

12 September 2018

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BAKAD Project

Draft

Environmental and Social Impact Assessment Report (for ADB Disclosure)

Volume II

Revision 3.1

Prepared for:

BAKAD Consortium

Prepared by:

ERM Eurasia

12 September, 2018

PROJECT NO. 0457363

at their own risk.

LIST OF ABBREVIATIONS

µg/m³	Microgram per cubic metre
µm	Micron
µS/cm	Microsiemens/centimetre
AAD	Annual Average Day
AADT	Annual average daily traffic
AIDS	Acquired immune deficiency syndrome
AIS	Automatic Identification Systems
Al	Aluminium
ALARP	As Low As Reasonably Practicable
AoI	Area of Influence
As	Arsen
ASCI	Area of Special Conservation Interest
asl	Above Sea Level
AST	Aboveground Storage Tank
ASTM	American Standard Society for Testing Material
ATS	Action Tracking System
Ba	Barium
bgl	Below Ground Level
bn	Billion
BOD	Biological Oxygen Demand
BOT	Build, Operate and Transfer
BP	Before present
BTEX	benzene, toluene, ethylbenzene and xylene
ºC	Celsius
CaCl2	Calcium chloride
CAGR	compound average growth rate
Cat	Category
CBD	Convention on Biodiversity
cc	Cubic centimetre
Cd	Cadmium
CESMP	Construction Environmental and Social Management Plan
CFP	Chance Finds Procedure
CH	Cultural Heritage
CHMP	Cultural Heritage Management Plan

CIA	Cumulative Impact Assessment
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLO	Community Liaison Officer
cm	centimetre
CM	Change Management
CMP	Construction Management Plan / Change Management Plan
CNA	Community Needs Assessment
CO	Carbon monoxide
CO_2	Carbon dioxide
COD	Chemical Oxygen Demand
Cr	Chrome
CR	Critically Endangered
Cu	Copper
dB(A)	Decibel, A-weighted; unit of noise levels
DA	Decare (1,000 m2)
DCMP	Design Change Management Procedure
DD	Data Deficient
DMRB	Design Manual for Roads and Bridges
DO	dissolved oxygen
E	East
ERT	Emergency Response Team
EBRD	European Bank for Reconstruction and Development
EC	Electrical conductivity
eg or e.g.	abbreviation of Latin 'exempli gratia', for example
EHS	Environment, Health and Safety Throughout this document EHS refers to Environmental, Health and Safety, Socio-economic and Cultural Heritage aspects.
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
EN	Endangered
EOMP	Environmental Operation Management Plan
EP	Employment Policy
EPC	Engineering, Procurement and Construction
EPFI	Equator Principles Financial Institutions
EPR Plan	Emergency Prevention and Response Plan
ERP	Emergency Response Plan

ESAP	Environmental and Social Action Plan-
ESIA	Environmental & Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESMMP	Environmental and Social Management and Monitoring Plan
ES	Ecosystem Services
ESR	Ecosystem Services Review
Et al.	Et alli (and other)
etc.	Et Cetera
EW	Early Works
EW	Extinct in Wild
EWCMP	Early Works Construction Management Plan
EX	Extinct
FGD	Focus Group Discussions
FSS	Field Social Survey
FTE	Full Time Equivalent
g kg^{-1}	Gramm per kilogramm
GDP	Gross Domestic Product
GIS	Geographical Information System
GLAC	Guide to Land Acquisition
GM	Grievance Mechanism
GP	Grievance Procedure
GPS	Global Positioning System
GRT	Gross Register Tonnage
H	Shannon index
H&V	Habitat & Vegetation
Ha	Hectare
Hg	Mercury
HGV	Heavy Goods Vehicles
HIV	Human immunodeficiency virus
HM	Heavy Metals
HR	Human Resources
HSE	Health, Safety and Environment
Hz	Hertz
IBA	Important Bird Area
ICH	Intangible Cultural Heritage
ie or i.e.	that is (id est)

IFC	International Finance Corporation
ILO	International Labour Organisation
ISO	International Organization for Standardisation
ISO 14001	International Organization for Standardisation standard for Environmental Management Systems
IUCN	International Union for Conservation of Nature
JV	Joint Venture
KBA	Key Biodiversity Area
km	Kilometre
km/h	Kilometre per hour
km^2	Square Kilometre
kph	Kilometre per hour
KPI	Key Performance Indicator
kV	Kilo Volt
LARFF	Land Acquisition-, Compensation- and Resettlement Framework
LARFP	Land Acquisition-, Compensation- and Resettlement Plan
LC	Least Concern
LEP	Labour / Employment Policy
m	Metre
m/sec; m/s; $m.s^{-1}$	Metre per Second
m^2	Square metre
m^3	Cubic metre
$MgCl_2$	Magnesium Chloride
mg/l; $mg.l^{-1}$	Milligram/litre
mio	million
mm	Millimetre
Mm^3	Million cubic metre
MS	Management System
MSDSs	Materials Safety Data Sheets
N	North
NaCl	Sodium chloride, salt
n.d.	Not determined
N/A	Not Available
NE	Not Evaluated
NGO	Non-governmental Organisation
No	Number

NO_2	Nitrogen dioxide
NOx	Oxides of Nitrogen
NT	Near Threatened
NTS	Non-technical Summary
OECD	Organization for Economic Co-operation and Development
OHSAS	Occupational Health- and Safety Assessment Series
Pa	Pascal
PAH	Polycyclic aromatic hydrocarbons
PAPs	Project-Affected-Persons/People
Pb	Lead
PCB	Polychlorinated Biphenyl
PCU	Passenger Car Units
pH	Pondus Hydrogenii or Potentia Hydrogenii. A scale for the measurement of acid value.
PM_x	Particulate Matter with aerodynamic diametre below x µm
PPE	Personal Protective Equipment
ppt	parts per thousand
PPV	Peak Particle Velocity
PR	Performance Requirement
PR	Public relations
PS	Performance Standard
RAP	Resettlement (and Compensation) Action Plan
RC	Road Contribution
RC	reinforced concrete
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RMF	Road Maintenance Facility
rms	root mean square
ROW	Right of Way
S	South
SDS	Safety Data Sheet
SEIA	Socio-Economic Impact Assessment
SEL	Sound Exposure Level
SEO	Stakeholder Engagement Officer
SEP	Stakeholder Engagement Plan
SCMP	Supply Chain Management Plan
SIA	Social Impact Assessment
SO_2	Sulfur dioxide
Sp.	Species

SPL	Sound Pressure Levels
spp.	Species (plural)
SPNA	Specially Protected Natural Areas
STD	Sexually Transmitted Disease
Subsp.	subspecies
t	ton
tbd	To be decided
TOC	Total Organic Carbon
ToR	Terms of Reference
TPH	Total Petroleum Hydrocarbons
UNESCO	United Nations Educational, Scientific and Cultural Organization
UST	Underground Storage Tank
UTM	Universal Transverse Mercator
V	Volt
Var.	Variety
VAT	Value-added tax
VOC	Volatile organic compound
VOC	Vehicle operating cost
VOT	Value of Time
vs	versus
VU	Vulnerable
WHO	World Health Organisation
WRI	World Resources Institute
Zn	Zinc

1 INTRODUCTION & CONTEXT

1.1 INTRODUCTION TO THE PROJECT

This document – **the Draft ESIA for ADB Disclosure** - has been prepared by ERM Eurasia Limited ("*ERM*" or "*Consultant*") for the Consortium of companies Alarko Alsim Tesisleri ve Ticaret A. Ş., Makyol Inşaat Sanayi Turizm ve Ticaret A. Ş., Korea Expressway Corporation and SK Engineering & Construction Co. Ltd. (hereinafter referred to as "*Consortium BAKAD*" or "*Consortium*").

The document presents the results of the Environmental and Social Impact Assessment of the construction Project of the "Big Almaty Ring Road (BAKAD)" (hereinafter "*Project*" or "*BAKAD*") in line with Lenders' requirements. Lenders are represented by international financial institutions that are considering financing the Project, namely the European Bank for Reconstruction and Development (EBRD), the Asian Development Bank (ADB), the international Finance Corporation (IFC) and the Islamic Development Bank (IsDB).

The main purpose of the construction of BAKAD is to create a ring road at the intersection of the international corridors "Khorgos-Almaty-Beshkek-Taraz-Shymkent-Tashkent" (silk road) and "Almaty - Karaganda –Astana – Petropavlovsk". The construction of the ring road will allow to redirect to it a significant part of the transit traffic flows and redistribute them on public roads suitable to the Almaty city.

The main parties involved in the Project are listed in the table (*Table 1.1-1*).

Table 1.1-1 The Main Parties Involved in the Project

Position	Parties
Concessioner (Client, Consortium)	• Consortium of the Companies: o Alarko Alsim Tesisleri ve Ticaret A. Ş., o Makyol Inşaat Sanayi Turizm ve Ticaret A. Ş. o SK Engineering & Construction Co. Ltd. o Korea Expressway Corporation
Engineering Design Team	• Kazdor Innovatsiaya, LLP
Executive authorities	• Road committee of the Ministry for Investment and Development of the Republic of Kazakhstan (http://roads.mid.gov.kz) • Akimat of Almaty region (http://zhetysu.gov.kz) • Akimat of Talgarsky district (https://www.akimat-talgar.gov.kz) • Akimat of Karasaysky district (http://karasay.zhetisu.gov.kz/) • Akimat of Iliysky district (http://www.iletany.kz/page_lang_r.html)
Lenders	• ADB, EBRD, IsDB, IFC

1.2 CONTEXT OF ALL DOCUMENTS COMPRISING THE ESIA PACKAGE

This document in hand represents the Draft of the main ESIA Report, and is Volume II of the overall multi-volume ESIA package to be prepared for this Project.

I. *Volume I* - The NTS - **Non-Technical Summary**

This will be a stand-alone summary (about 20-25 pages long) written in simple language to explain the key points of the ESIA to a wider public.

II. *Volume II* - The **main ESIA Report**

This is the central document and contains most of the relevant information and key findings for the readers, except for the detailed items in Volume III and the related Annexes thereto. This Volume also describes stakeholder engagement activities conducted during the preparation of this ESIA performed to the date.

III. *Volume III* - **ESIA Appendices**

This volume includes a number of ESIA-related details (eg stakeholder meeting protocols, regulatory specifics, etc), plus a stand-alone "topic assessment chapter" for each major topic (air, noise, etc). These topic chapters contain the technical (baseline) data, methodologies for Impact Assessment, analysis and results, including the "long list" of impacts and the significance. Where appropriate, detailed baseline data sets, calculations etc. are attached as annexes.

IV. *Volume IV* - **ESMP**

The relevant mitigation measures and overall monitoring plan will be compiled in the Environmental and Social Management Plan (ESMP) document. This forms the "umbrella" management plan for the Project and spells out which additional, topic-specific management plans are required as the basis for implementing and monitoring the various mitigation measures.

V. *Volume V* - **LARF**

This volume will comprise the Land Acquisition and Resettlement Framework (LARF) document, which provides the basis and "road-map" for the subsequent implementation and monitoring of the LARF Plan.

VI. *Volume VI* - **SEP**

This volume will comprise the Stakeholder Engagement Plan, which describes the stakeholder engagement process to date and details how the Project will continue to engage with external stakeholders during the following stages of its development including establishment of a Grievance Process.

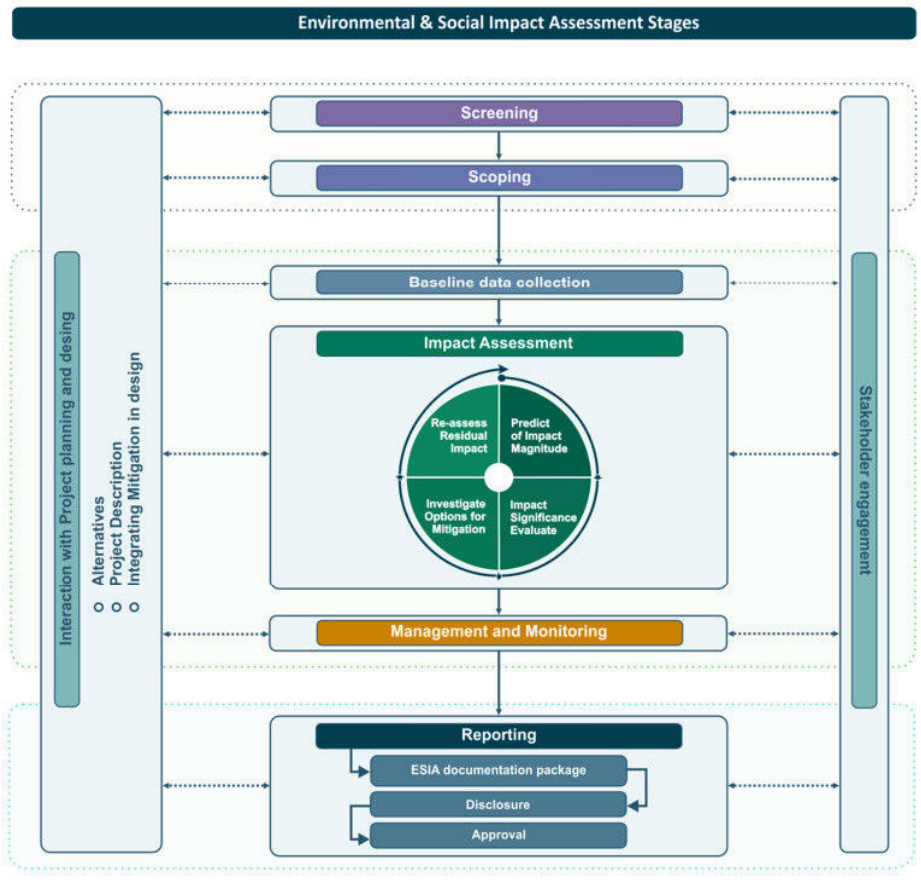
VII. Volume VII – **Set of Environmental and Social Management Plans**

This volume will be comprised from environmental and social management plans developed for the Project, including: Construction Environmental Management Plan (CEMP) (including Spill Response Plan, Site Specifics MP for each Construction Camp, Security), Waste MP, OHS and Labor MP (including HIV/AIDS Preventive Management Plan), Biodiversity MP, Cultural Heritage Framework MP (including Chance Find Procedure), Community Health, Safety and Security MP, Traffic MP, Employment Plan for Displaced Persons and Local Community, Supply Chain MP.

1.3 OVERVIEW OF THE ESIA APPROACH

Figure 1.3-1 sets out the approach that has been adopted for the ESIA study, which reflects ERM's global ESIA methodology that has been well-proven on many successful ESIA projects around the world.

Figure 1.3-1 ESIA Approach



The key process steps of the ESIA are described in the table below, along with a comment about the relevance/context for this Project.

Table 1.3-1 Summary of the ERM ESIA Process and Project Context

ESIA Stage	Description	Project Context
Screening	Screening is the first stage in impact assessment, in which the need for assessment and the level of assessment required is determined for a particular project.	The project has been categorised as A by all Lenders requiring a full scope ESIA under their respective E&S policies.
Scoping	This is where the key issues to be addressed in the ESIA are identified. Scoping ensures that the process is focused on the significant environmental and social (E&S) impacts which may arise from the Project, also taking into account the results of consultations undertaken to date on the Project.	Scoping was performed for this ESIA in 2013 by Kocks company and updated in 2015 by Atkins company. Current ESIA reflects the data gathered from Kazakh EIA and the feedback received during initial ESIA meetings held in May 2018.
Baseline development	For the key issues identified in scoping, available information on the current environmental and social conditions is gathered, and this is supplemented by field studies and surveys where necessary.	Baseline information was collected for various E&S topics, as determined per the results of the Scoping.
Impact assessment	This stage is focused on predicting E&S changes from the baseline as a result of constructing and operating the proposed Project. Each impact is evaluated to determine its significance for the environment and society by reference to established standards and norms. The focus is on identifying the significant impacts (*ie* the most important and the impacts with the potential to cause greatest harm) although the assessment reviews a wider range of possible impactsto determine which are likely to be significant.	The impact assessment is performed as described in this document for the relevant topics and identified potential impacts. Following procedure was used for each topic: - predicting the potential Magnitude of an impact; - evaluating the Sensitivity of the receptors; and - on this basis determining the resulting impact Significance.
Mitigation measures	Following the prediction and evaluation of impacts in the previous stage, solutions (or mitigation measures) are developed to reduce the significant impacts. Mitigation can either be amending the Project design or through methods to be adopted during construction or operation of the project. Mitigation included measures to avoid, reduce or remedy adverse effects, and where this is not possible to provide compensation by offering resources or facilities to replace those that are lost. Mitigation can also include measures to provide environmental and social benefits.	Two types of mitigation measures were defined for this Project: - the "Embedded Controls" representing the many actions and physical measures that will be implemented for the Project in compliance with Kazakh laws and/or are part of the Project design; and - the "Mitigation Measures" that are required on top of the Embedded Controls to further reduce Significance of an impact to an acceptable level.
ESMP and specific Management Plans	The various mitigation measures are compiled in a Commitments Register and presented in an E&S Management Plan (ESMP), describing how the measures will be implemented during the detailed	The Commitments from the Kazakh EIA as well as the mitigation measures defined for the Project as Embedded Controls or additional mitigation measures are compiled

ESIA Stage	Description	Project Context
	design, construction and operation of the project.	within the Commitments Register which is provided as annex of the ESMP. The ESMP which forms Volume IV of the ESIA details the responsibilities and resources for implementation, the timing and monitoring and audit plans to ensure that all the mitigation commitments are met. It also identifies any requirements for training and other capacity building.
Stakeholder Engagement Plan	The Stakeholder Engagement Plan details how the Project will continue to engage with external stakeholders during the following stages of its development including establishment of a Grievance Process	This is developed as a standalone document of the ESIA package.
Resettlement Framework (Land Acquisition and Compensation Resettlement Framework)	The Resettlement Framework Policy (the full name Land Acquisition and Compensation Resettlement Framework – LARF) identifies potential displacement associated with the Project and establishes the principles, procedures, and organisational arrangements by which the Project Sponsor will abide during project implementation	The LARF for the Project has been developed for the BAKAD, and is included as Volume V to this ESIA.

During the ESIA studies the team frequently seeks the views of interested parties so that these can be taken into account in the assessment and reflected in the proposals for mitigation. Once complete, the ESIA Report will be subject to public disclosure and comment and all comments will be taken into account in revising the final ESIA Report and ESMP.

Throughout the ESIA the team carried out ongoing collaboration with the Project designers and engineering team to ensure that potential impacts are accurately assessed and appropriate mitigation is developed.

1.4 NEXT STEPS IN THE ESIA PROCESS

The current stage of this ESIA Report is the "Draft " version. This version has been prepared for the disclosure and comments from the interested parties during the ADB's 120 days disclosure period on ADB web-site.

Since this version has been prepared under the condition of limited availability of the Project design data (please refer to *Section 1.5*) it will be updated as soon as major data gaps will be closed.

Further updates of the impact assessment results will be made within the framework of following Change Mangement Procedure adopted by the Project.

1.5 LIMITATIONS OF THIS REPORT

The report is based on the information available at the time of preparation of this report, which included:

- Preliminary Project Design Documentation developed at the TEO stage in 2009 and being updated in 2018; at the time of the issuing the report only updated PD for the 4th start up complex is available;
- Information provided by personnel of the Consortium during interviews and site visit;
- Environmental and Social Baseline data included Scoping Report (preliminary Environmental and Social Impact Assessment developed by Kocks Engineering in 2013 and amended by Atkins in 2015);
- Environmental Baseline data collected by ERM team partnering with KazEcoProekt, LLP during in May – July 2018;
- Social Baseline information collected by ERM team partnering with Sange Social Research Center during May –July 2018 by data requests, interviews with authorities representatives, in-depth interviews, social survey and focus groups discussion; and
- Observations of the Project site and associated facilities sites.

At the time of issuing this draft version of the ESIA report it is evident that some of the Project design solutions are outdated due to the following major changes in the baseline conditions:

- enhancement of borders of the existing settlements, as well as new residential areas, villages, and cottage estate constructed;
- increase of traffic in suburban areas and on major outbound routes.

This defines the need to come back to some of the Project design solutions, i.e. re-configuration of junctions, designing underpasses or overpasses for pedestrians, providing for additional cattle underpasses and passages for agricultural machinery. Also configuration of linear utilities has been changed and update of previously made approvals of linear facilities relocation is required.

The main gap limiting social baseline assessment is the absence of detailed explication of land plots acquired from private land users.

Final designs have not been completed for the following subjects as of report issue date.

- Final design on of interchange on km 00 (Kyrgauldy settlement). Initially the Project design envisaged the one-level-ring configuration of the interchanges, however to the moment this solution is not relevant any more due to increased traffic in west suburban area of Almaty. The issue here is that the construction of any other type of the interchange will require additional land acquisition from about 10 to 15 private households (depending on the preferred configuration).
- Final design of BAKAD intersection with railroad in Pokrovka settlement. It is not clear yet whether it will be underground or aboveground. The solution requires additional engineering baseline surveys and approvals with "Kazakhstan Temir Zholy" (Kazakhstan Rail Roads).

Additional hydrological and hydrogeological baseline studies are required to identify the measures to prevent the adjacent areas from flooding at the site of the river (Malaya Almatinka) canalization, so current design solution cannot be properly assessed.

The following Project data are not available for correct assessment of impacts and compliance, therefore is marked as data gaps in the text and will be completed within the next revision of the ESIA:

- Updated volume of soil to be used for backfilling;
- Details of open pits (permits, reserves, supply to other projects etc., contracts);
- Detailed information on ground water well (design and parameters);
- Updated quantity of water supply / disposal for construction and operation stages;
- Availability of permits to connect to water supply networks;
- Information on permits to abstract water from rivers;
- Update Project's demand for construction materials for all sections;
- Capacity of fire water tanks;
- Full list of sources of construction materials;
- Delivery routes and distances of personnel, materials, wastes and other cargoes;
- Amounts of construction materials to be transported including vehicle types and capacity;
- Details of waste types and estimated generation for the construction and operation stages;
- Details of waste management techniques based on waste types;
- Details on landfills to be used during the construction stage including licenses, available capacity, etc.;
- Approvals and permissions to transfer of utilities;

- Locations of noise barriers, information on schedule of installation (priority among other construction activities);
- Details on Project requirements in local labor force, subcontractors.

2 PROJECT SUMMARY

2.1 SUBSTANTIATION OF THE PROJECT

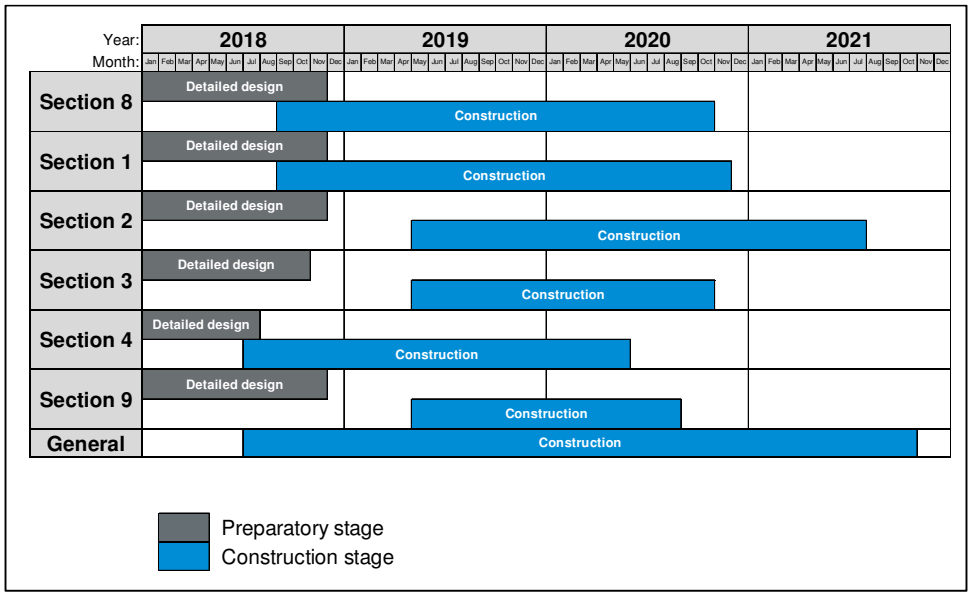
The main purpose of the BAKAD is to create a bypass route at the junction of two international highways, the Khorgos-Almaty-Beshkek-Taraz-Shymkent-Tashkent road (the «Silk Way») and the Almaty-Karaganda-Astana-Petropavlovsk road.

The redirection of a large number of vehicles from the center of Almaty to the ring road will not only facilitate in organization of traffic flows, but also will contribute in reduction of air pollution and noise load in the city.

Decree No 1005 (dated 3 November, 2008) of the Kazakhstan Government included the BAKAD Project in the list of mid-term concession (Built-Operate-Transfer) projects.

BAKAD will be constructed in six start-up sections over two construction phases (*Figure 2.1-1*).

Figure 2.1-1 *Construction schedule of BAKAD*



2.2 KEY DESIGN SOLUTIONS

2.2.1 General Information

BAKAD will be constructed in the Almaty Region and will run along Almaty from the west to the east, along the city's northern border, at a distance of 20-25 km from the city centre on average (see *Figure 2.2-1*).

The road will cross Karasaysky (27.5 km, PK0 – PK275), Iliysky (19.26 km, PK275-467) and Talgarsky (19.24 km, PK467- PK660) districts of the Almaty Region. The total length of the BAKAD road will be 65.491 km

For design purposes the route was sub divided into 6 sections as follows (*Table 2.2-1*).

Table 2.2-1 Description of BAKAD road sections

Section	Location, km+	Description	District
Section 8	PK 0 – PK55 Total length – 5.5 km	Starts with a roundabout at the existing junction km 22+640 of the Almaty – Uzunagash road (A4) to the west (W) of the village Kyrgauyldy and ends at the intersection with the Almaty – Bishkek road (A2). Section 8 crosses river Kyrgauyldy, a side arm of the same river, irrigation channels and ravines/gullies.	Karasaysky district
Section 1	PK 55– PK 240 Total length – 18.5 km	Starts at the Almaty to Bishkek road (A2) and ends at the new interchange in the north (N) of the Almaty – Chamolgan road, E of the village Isaevo. Crosses a number of surface waters such as river Aksai, the Big Almaty Canal (BAC), a side arm of river Kargaly as well as a number of irrigation canals and ravines.	Karasaysky district
Section 2	PK 240 –PK 440 Total length – 20 km	Starts at the interchange in the E of the village Isaevo and ends on the new interchange with the Almaty – Kapchagay highway (A3) in the S of the town Kapchagay. Crosses many large and small rivers and streams and thus includes numerous bridges, including crossings of wastewater ditches and irrigation channels. The construction of the interchange on the 'Zhapek Batyr-Komsomol' road requires the relocation of the bed of the Big Almatinka River.	Iliysky district
Section 3	PK 440 – PK470 Total length – 3 km	Starts at the intersection with the Almaty - Kapchagay Highway (A3) and ends at about 200 m to the E of the AL 17. Crosses the river Karasu (km 44+800) and the railway Almaty-Semei (km 45+500).	Iliysky district/ Talgarsky district
Section 4	PK 470 – PK570 Total length – 10 km	Starts about 200 m to the E of the Almaty-Zhetigen-Kapchagay road (AL 17) in the NE of Pokrovka and ends at the intersection with the Almaty Khorgos road (A2). Crosses the rivers Kartabulak, Almerek 1 and 2 as well as some irrigation and drainage channels and wastewater channels from Talgar rayon.	Talgarsky district
Section 9	PK 570– PK 660 Total length – 9 km	Starts to the SE of the intersection with the Almaty – Khorgos road (A2) and ends at the intersection with the Almaty – Talgar – Evgenyevka road.	Talgarsky district

Based on the national road classification system, BAKAD is a IA[1] road with 4-6 traffic lanes.

In 2048, the estimated traffic intensity will be up to 106,888 vehicles per day on Section 3 max and up to 26,205 vehicles per day on Section 9 min.

The nearest settlements to BAKAD road are given in the Table below (*Table 2.2-2*).

[1] Kazakhstan's Construction Regulations SNiP 3.03-09-2006 "Design of the Roads"

Table 2.2-2 Inventory of the existing settlements along the BAKAD route and other Project facilities

№	Rural Okrug	Settlement	BAKAD (KP) / Quarry/ Transportation route	Distance
		BAKAD RoW		
Karasaysky district				
1.	Raiymbeksky RO	Kyrgauldy	0+000 km (Interchange)	27 m (center of the BAKAD junction)
2.		Gardening Partnerships[1]	1+300 km – 2+000 km	0 m (BAKAD road line)
3.		Raiymbek	1+900 km – 3+300 km	0 m (BAKAD road line)
4.		Bulakty	5+200 km – 5+500 km	927 m (center of the BAKAD junction)
5.	Irgeliysky RO	Gardening Partnerships	7+500 km – 13+700 km	640 m (BAKAD road line)
6.		Kemertogan	7+000 km – 11+700 km	430 m (BAKAD road line)
7.	Yeltaiysky RO	Gardening Partnership Soyuzpechat	19+500 km– 19+900 km	149 m (BAKAD road line)
8.		Gardening Partnership Ogonyok	20+500 km– 20+900 km	380m (center of the BAKAD junction)
9.		Gardening Partnership Pridorozhny	20+900 km– 21+000 km	175 (center of the BAKAD junction)
10.		Razyezd 71 (**Pogranichnik Gardening Partnership according to some sources*)	21+300 km – 21+500 km	0 m (BAKAD road line)
11.		Isayevo	22+500 km – 22+700 km	83 m (BAKAD road line)
Iliysky district				
12.	KazTSIKovsky RO	Komsomol	31+800 km – 32+300 km	750 m (BAKAD road line)
13.		KazTSIK	31+800 km – 32+300 km	979 m (BAKAD road line)
14.	Aschibulaksky RO	Zhapek Batyr	35+600 km – 36+500 km	280 m (BAKAD road line)

[1] Gardening partnerships is an organizational form for dachas settlements communities. These communities have no social infrastructure. Residents may live there permanently or seasonaly. Dachas communities are not included in the list of settlements like villages, towns, etc. and therefore no official statistics are available.

№	Rural Okrug	Settlement	BAKAD (KP) / Quarry/ Transportation route	Distance
15.		Toli be	36+000 km – 36+500 km	2460 m (BAKAD road line)
16.		Mukhametzhana Tuimebayeva (*M. Tuimebayeva*)	36+800 km – 38+200 km	0 m (BAKAD road line)
17.		Kokkainar	36+800 km – 38+200 km	1470 m (BAKAD road line)
18.	Baiserkinsky RO	Zhanadaur	40+500 km – 41+200 km	430 m (BAKAD road line)
19.		Intymak	42+000 km – 42+600 km	992 m (center of the BAKAD junction)/ 35 (RMF site)
20.	Energetichesky RO	Pokrovka	45+400 km – 46+800 km	0 m (BAKAD road line)/ 182 m(center of the BAKAD junction)
21.		Otegen Batyr	46+000 km	280 m (center of the BAKAD junction)
Talgarsky district				
22.	Guldalinsky RO	Zhana Kuat	46+800 km – 47+300 km	330 m (BAKAD road line)
23.		Zhalyn Gardening partnership	50+600 km	1040 m (BAKAD road line)
24.	Panfilovosky RO	Kyzyl Tu 4 (Kyzyl Tu 1, 2, 3, Kurylysshy micro district, Beibitshelik micro district)	52+800 km – 53+000 km	35 m (BAKAD road line)
25.		Nurly Dala Gardening partnership	51+500 km – 52+150 km	238 m (BAKAD road line)
26.		Panfilovo	54+900 km – 55+100 km	40 m (BAKAD road line)
27.	Belbulaksky RO	Taldybulak	64+900 km – 65+300 km	320 m (center of the BAKAD junction)
28.	Alatausky RO	Kyzyl-Kairat	65+300 km – 65+800 km	227 m (center of the BAKAD junction)
Fabrichny Quarry				
Zhambylsky District				
29.	Kargalysky RO	Kargaly	Fabrichny quarry	865 m (boundary of Fabrichny quarry)
Karasaysky District				
30.	Ayteysky RO	Kumaral	Transportation route (A-2 BAKAD)	20 m (road)

№	Rural Okrug	Settlement	BAKAD (KP) / Quarry/ Transportation route	Distance
31.		Aytey	Transportation route (A-2 BAKAD)	375 m (road)
32.	Kaskelen		Transportation route (A-2 BAKAD)	50 m (road)
33.	Zhambylsky RO	Gardening partnerships	Transportation route (M-36 BAKAD)	30 m (road)
34.		Zhambyl	Transportation route (M-36 BAKAD)	15 m (road)
35.	Umtylsky RO	Gardening partnerships	Transportation route (Local road)	6 m (road)
36.		Koldi	Transportation route (Local road)	6 m (road)
Issyk quarry				
Enbekshikazakhsky District				
37.	Boleksky RO	Issyk gardening partnership	Issyk quarry	25-30 m (boundary of Issyk quarry)
38.		Bolek	Issyk quarry	1220 m (boundary of Issyk quarry)
39.	Baitereksky RO	Baiterek	Transportation route (Kuldjinsky trakt)	1 m (road)
40.		Gardening partnership	Transportation route (Kuldjinsky trakt)	1 m (road)

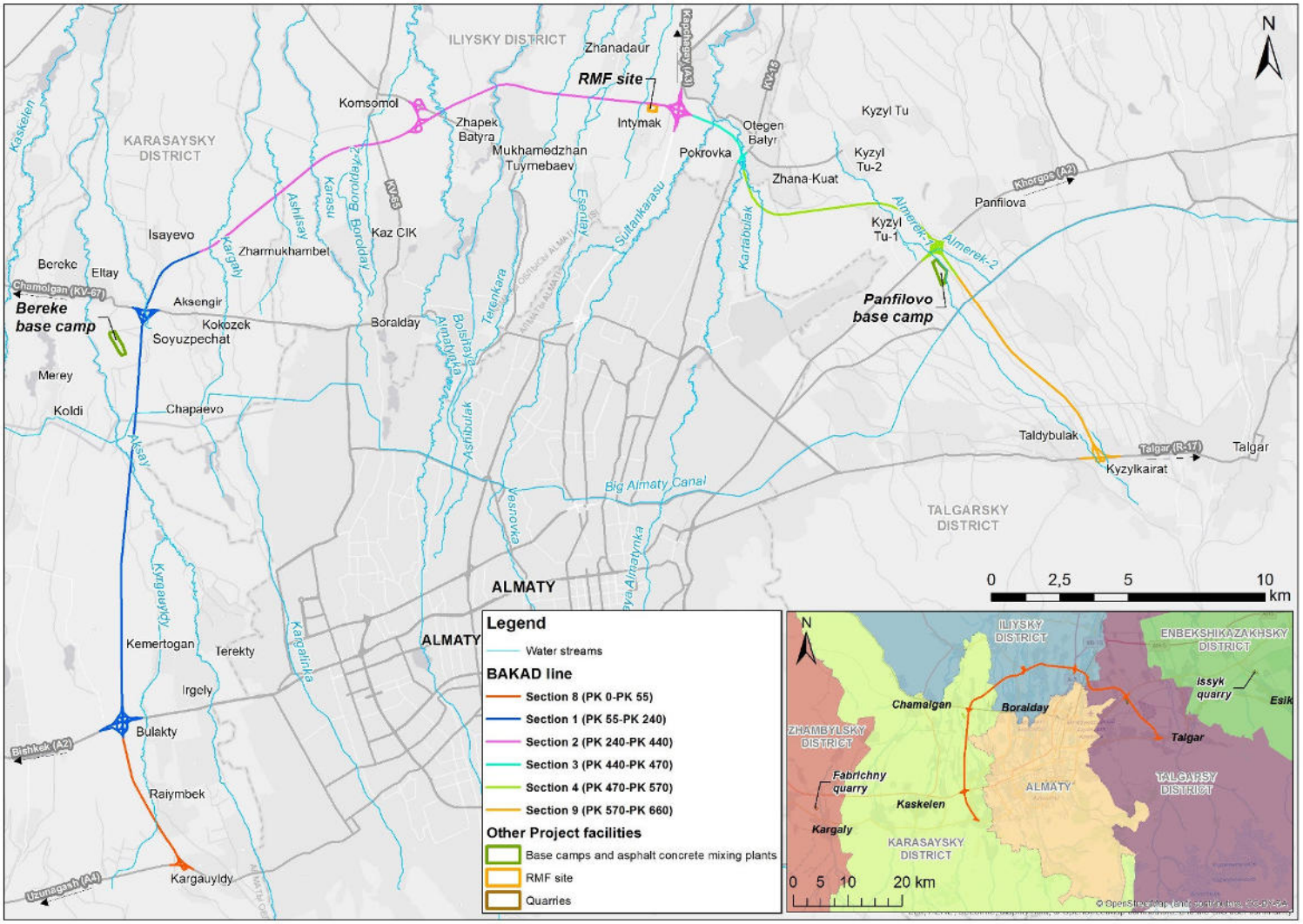


Figure 2.2-1 Location of the BAKAD

2.2.2 *Key Technical Data*

The key technical indicators of BAKAD road are presented in *Table 2.2-3* below.

Table 2.2-3 Key Technical Indicators of BAKAD road

Parameter	Unit	BAKAD Section						
		1	2	3	4	8	9	Total
Road category	No	1a						-
Estimated traffic speed	kph	120/150						-
Number of traffic lanes	No	4				6		-
Traffic lane width	m	3.75						-
Location	Km+	5.5-24.0	24.0-44.0	44.0-47.0	47.0-57.0	0.0-5.5	57.0-66.0	**66**
Road width	m	36	36	36	36	28.5	28.5	**-**
Culverts	units	36	54	3	27	10	24	**154**
Bridges	units	5	19	9	3	1	2	**39**
Interchanges	units	2	2	1	1	1	1	**8**
Ferro-concrete retaining walls in a cut	m	-	-	1314	-	-	-	**1314**
Length of noise barriers	m	760	-	-	800	1470	-	**3030**
Cement-concrete road pavement	m^2	501,143	532,023	43,300	287,722	113,223	261,855	**1,739,266**
Asphalt concrete approaches on to	m^2	47,308	278,962	38,306	16,364	26,778	70,011	**477,729**
Total crushed and sand mixstone	m^3	180,989	267,625	23,980	98,548	39,973	101,815	**712,930**
Total mix gravel sand	m^3	291,240	38,4670	36,456	163,647	64,882	167,124	**1,108,020**
Earthwork: embankment	m^3	1550354	1996568	231038	1335430	365,368	798,640	**6,277,398**
Earthwork: cut	m^3	1261968	217150	770139	510447	3739337	684,240	**7,183,282**
Earthwork: top soil	m^3	423471	461810	18560	291920	249010	318,940	**1,763,711**

2.2.3 *RoW Earthworks, Drainage and Diversion Activites*

The main road body bed was designed in line with national regulations[1] and matches the road category, surfacing type, natural conditions, slope stability conditions, snow exposure and traffic safety.

The total width of the road bed is 28.5-36 m, including:

- Shoulder to shoulder width: 3.75 m (4 traffic lanes on Sections 1-4 and 6 traffic lanes on Sections 8-9);
- Shoulder width: 3.75 m;
- Width of the median strip: 3 m.

Earthworks are estimated at 6,277,398 m^3 embankment, 7,183,282 m^3 cut; 1,763,711 m^3 topsoil.

The road body will use the excavated ground and will consist of ditches, side borrows, and artificial channels. Medium-sized and fine gravel will be sourced from the Fabrichny quarry in Zhambylsky district (around 43 km from Bereke construction camp) and Issyk qarry in Enbekshikazakhsky district (around 25 km from Panfilovo construction camp).

Side or excavation slopes were adopted with consideration of seismic activity in the area of construction (9-10). Before the commencement of the works, the topsoil will be removed and transported to temporary side-piling sites to be used to reinforce the side slopes and revegetating on later stages. The road fill will be raised by bringing soil from pits developed on separate sites located in other districts; lacking soil is brought from the existing soil banks.

For this purpose, individual excavation (up to 36 metres deep) is designed at the section PK28-34. Outer slope of the excavation is turned away from the road with a slope of 10 ‰ until reaching the surface on the hillside. The outer slope on the right has a slope ratio of 1:2, which is why there are terraces in the soft soil (the lower terrace is 10-metres wide, while the other terraces are 5-metres wide), followed by planting of trees and shrubs. Excavation PK47-PK52 is also among individual cuts, taking into account the design of slip roads to transport interchanges with the slope ratio of 2:3.

At the section of PK462 + 00 - PK464 + 20, the proposed road runs for 228 metres in the bed of Malaya Almatinka River. In order to prevent erosion of the sideslope of the road, the design provides for partial straightening of the river channel with protection of a new channel slope with concrete slabs.

Road profiles were designed in line with SNiP 3.03-09-2006 and ensures the road's safe crossing of irrigated farmlands (*Figure 2.2-2, Figure 2.2-3*).

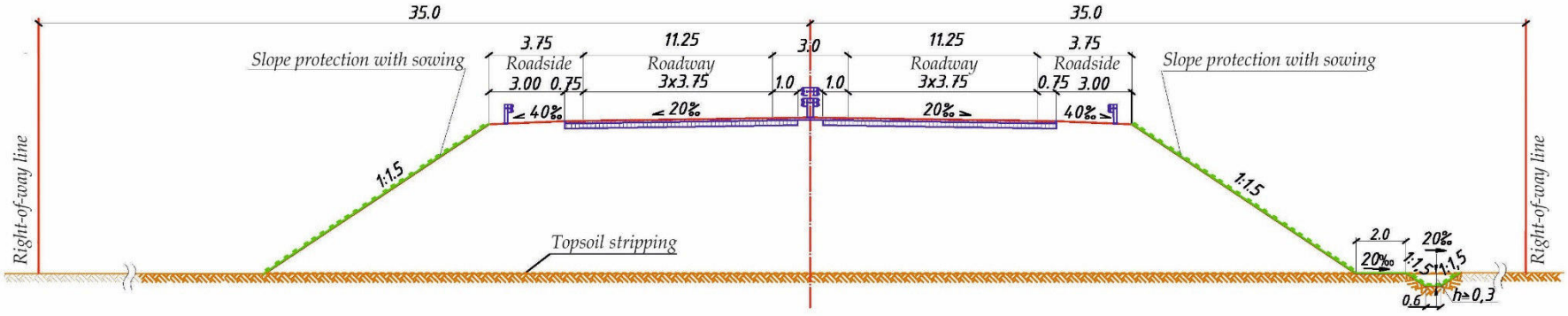
Diversion of surface water will be implemented by means of side ditches discharging the water into culverts. The ditches will be installed on both sides in all earth cuts, and along the high side. The ditches will be 2.0 m wide at the bottom level and 0.4-1.3 m deep but at least 0.2 m from the drainage layer.

[1] Kazakhstan's Construction Regulations SNiP 3.03-09-2006.

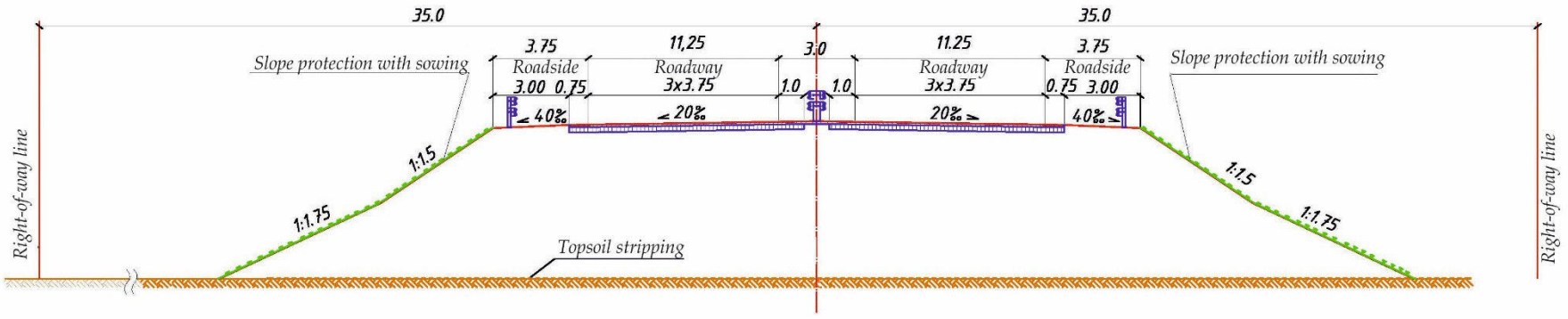
Water from the roadway and bridges will be drained by gravity through longitudinal and lateral gradients. On bridges, water will flow towards kerbs and will then follow the longitudinal gradient along the kerbs to gutters on both sides of the bridge, which are connected to inlet wells, from where water will drain underground.

Areas with lengthy one-way inclinations and uphill gradients and raised curves, water will be removed by means of the edge and discharge gutters.

Type 1. Road embankment, height from 1.0 m to 6.0 m on the virgin land with a ditch on the upper side



Type 2. Road embankment, height from 6.0 m to 12.0 m



Type 3. Road embankment, depth up to 1.0 m with ditches

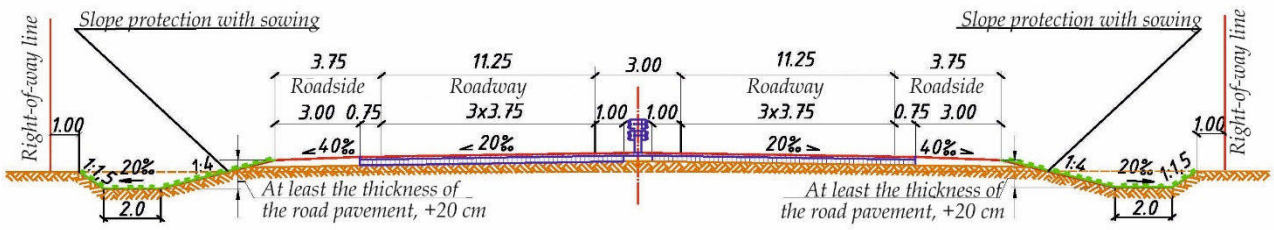
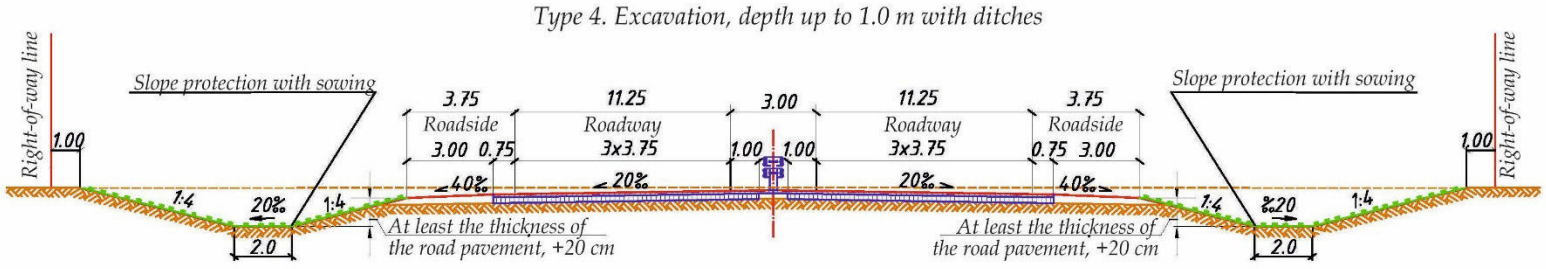
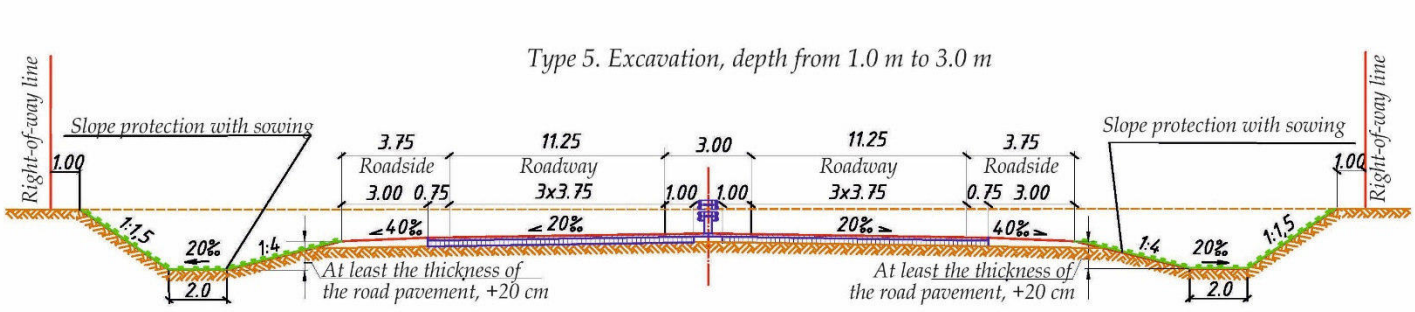


Figure 2.2-2 Road Profiles 1, 2, and 3 (for embankments)

Type 4. Excavation, depth up to 1.0 m with ditches



Type 5. Excavation, depth from 1.0 m to 3.0 m



Type 6. Excavation, depth from 3.0 m to 12 m with ditches

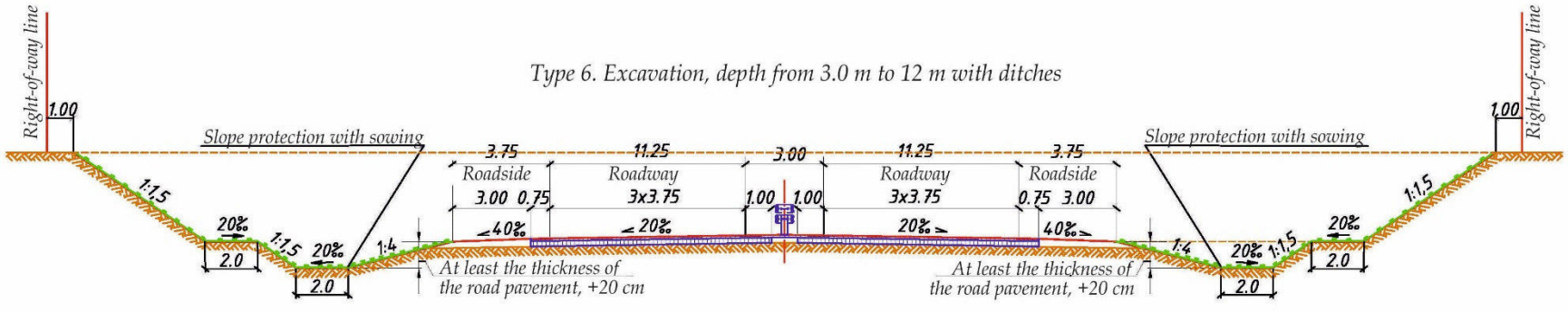


Figure 2.2-3 Road Profiles 4, 5, and 6 (for earth cuts)

2.2.4 *Road Surfacing*

Road surfacing was designed in line with the Kazakh national regulations[1].

The dressing at exits, on acceleration-deceleration lanes and before bridges will be made up of hot-rolled asphalt.

Median safety and roadside breakdown lanes will use the same dressing type.

To prevent water from draining from the median strip to under the surface concrete slabs, the edge of the gravel layer is armed with a geotextile strip and a bitumen coating.

The bottom part of the median strip is filled with C2 gravel mixture 30 cm thick; the middle part is made up by compacted layers of loam. The surface part is reinforced with a 20 cm layer of topsoil with grass planting.

2.2.5 *Junctions and Crossings*

BAKAD crosses 19 existing roads and two railways.

Interchanges at different levels are proposed at 8 intersections with national roads (main radial exits from Almaty), by type:

- Cloverleaf - 5
- Partial Cloverleaf - 1,
- Ring with 2 overpasses over BAKAD - 1
- Pipe-type adjacency - 1.

In addition:

- highway interchanges without slip roads to BAKAD are proposed to be built at 7 intersections with Category III-V technical roads;
- technical roads running along the Grand Almaty Canal (GAC) cross BAKAD (2 intersections) through additional spans of bridges across the GAC;
- an overpass is proposed to be built at a section of the route crossing Tuymebayeva village (Aschibulak) over the highway running to the village of Kokkaynar; it will also provide local
- driveways to houses of the village;
- two railroads are crossed by an overpass near Aksengir station and Pokrovka village with the proposed construction of a railway interchange (metal through girder truss, 1x55, 8 metres) to let the railway pass over BAKAD.

[1] Kazakhstan's Construction Norms 3.03-19-2006 "Design of non-rigid road surfacing" and 3.03-34-2006 "Instruction for design of rigid road surfacing".

The project envisages construction of 19 overpasses and flyovers with a total length of 2,446 running metres and an area of 78,683 m² (see *Table 2.2-4*).

Table 2.2-4 List of interchanges and intersections

No	Location, PK+	Distance, m	Road category/street purpose	Project construction
1	00 + 00	-	Category III road, Almaty-Uzun-Agash	Two-level interchange
2	20 + 79	2,079	Category V local road, Rayimbek village - Kyrgauyldy village	Highway interchange, 1x21
3	58 + 17	3,738	Category 1b road, Almaty-Bishkek (Rayimbek Avenue)	Two-level interchange
4	171 +53	11,336	Service road Category IV along GAC	Reinforced-concrete bridge, 11.9 + 2x24
5	209 +20	3,767	Category II road, and Almaty-Shamalgan railway	Two-level interchange with a 844.1 m long overpass
6	318 +40	10,920	Category IV road, KazCEC village - Komsomol village	Highway interchange, 24.7 +2x24 + 24.7
7	341 +50	2,310	Category I road, Zhapek Batyr – Komsomol village	Two-level interchange
8	349 +70	820	Category IV road, Zhapek Batyr – Brick Factory road (*12 Dekabristov* Street)	Highway interchange, 12 +2x21 + 12
9	374 +90	2,520	Local passage (Category IV) to Tumeybayeva village (Aschibulak)	Highway interchange – overpass, 15x24
10	408 +60	3,370	Category V road from Koyankoz village to Zhanadaur village	Highway interchange, 12 +2x21 + 12
11	434 +10	2,550	Category 1b road, Almaty-Ust-Kamenogorsk (Zhansugurova Street)	Two-level interchange
12	444 +40	1,030	Local passage (Category IV) between cemeteries	Highway interchange, 2x21
13	453 +00	860	Category IV road (street in Pokrovka village)	Highway interchange, 2x21
14	454 +75	175	Railroad haul between Medeu and Zhetysu stations	Railroad highway interchange (metal through girder truss)
15	455 +42	67	Category IV road (street in Pokrovka village)	Highway interchange, 2x21
16	464 +21	879	Category II road Almaty – Baiserke station	Two-level interchange with aring
17	465 +28	107		
18	527 +59	6,231	Category III road between Kyzyltu-1 and Kyzyltu-2 communities	Highway interchange, 4x24
19	556 +45	2,886	Category 1b road Almaty – Khorgos (Koulzhinsky highway)	Two-level interchange

No	Location, PK+	Distance, m	Road category/street purpose	Project construction
20	579 +30	2,285	Category III service road along GAC	Reinforced-concrete bridge, 2x24.11.9
21	590 +57	1,127	Category II road towards Alatau Innovative Technology Park Free Trade Zone	Existing highway interchange over BAKAD, 12 + 2x24 + 12
22	655 +15	6,458	Category II road Almaty-Talghar (Talgharsky highway)	Two-level interchange

In accordance with the Comprehensive Transport System Development Plan for Almaty and surrounding areas Almaty streets are already being designed to cross the route of BAKAD.

The table below provides the list and description of the highways and streets additionally proposed to be constructed (see *Table 2.2-5*).

Table 2.2-5 BAKAD-crossing highways and streets additionally envisaged under the Almaty Suburban Area Development Master Plan

No	Location, PK+	Crossing	Project construction	Road category/street purpose
1	11 + 20	Abai Avenue	Highway interchanges, without intersection with BAKAD	Non-stop traffic highway
2	41 + 90	Tole Bi Street		
3	87 + 95	Ryskulova Street	Two-level interchange	Non-stop traffic highway
4	144 +00	Akyn Sarah Street	Two-level interchange	Freeway
5	189 +47	Momyshuly Street	Highway interchange, without intersection with BAKAD	Non-stop traffic highway
6	264 +54	Sahina Street	Two-level interchange	Freeway
7	289 +10	Unnamed street	Highway interchange, without intersection with BAKAD	Street with regulated traffic
8	321 +70	Tlendiyeva Street		
9	388 +18	Severnoye Polukoltso street	Two-level interchange	Freeway
10	578 +65	Akyn Sarah Street	Highway interchange, without intersection with BAKAD	Street with regulated traffic
11	633 +75	Unnamed street	Two-level interchange	Freeway

For the majority of highway interchanges, it is proposed to install uncut prestressed spans of various pattern made of reinforced concrete. Spans on highway interchanges are made of a single string, while spans on overpasses are made of a range of strings. Such spans are concreted at the scaffolds with canals for beams of high-strength ropes K-7 to be dragged through these canals when concrete acquires sufficient strength, and pulled on concrete.

Due to the low bearing capacity of the soil at great depths, foundation of the highway interchange arms, just like that of the most of the bridge arms, is made on the bored deep foundation pillars. Only for the section from Pokrovka village to Talgharsky tract it is proposed to build arms of prismaticpiles or on natural foundation with replacement of macroporous loam of low bearing capacity.

At the section of PK454 + 74, BAKAD crosses Category II technical railway Almaty –Semey. Construction of the railway overpass provided is proposed at a distance of 14 metres to the left of the existing railway line with a permanent 652-metre long bypass.

Highway interchange at the railway is proposed with a metal superstructure (truss with riding on wooden crossbeams, 1x55, 782 metres) according to the standard project.

Abutments are proposed to be built on bored piles ⌀1.5 m with monolithic concrete tips.

Proposed bridge clearance is 6.35 metres; angle of intersection with the highway is 71°.

2.2.6 Culverts

It is proposed to construct 168 culverts (with a total length of 7506 metres) for seasonal streams and the irrigation network.

Culverts structures are designed in accordance with standard solutions:

- for round pipes - 3.501.1-144 "Assembled round concrete culvert pipes for railways and roads (with flat support)";
- for rectangular pipes - 3.501.1-177.93 "Prefabricated rectangular concrete pipes for roads and railways".

Culverts for streams with slopes exceeding 2% are designed according to the standard solutions: 501-96 "Hillside pipes on the roads" with construction of gullies and dampers to prevent erosion on the inlet and outlet pipe sections.

It is proposed to construct 21 new bridge crossings across permanent streams (see *Table 2.2-6*).

Table 2.2-6 Bridge crossing characteristics

No	PK+	Name of water course	Bridge crossing characteristics				
			Pattern	Bridge length, m	Q1% m3/sec.	Land abutments	Intermediate support poles
1	153 +89	Aksai	8x24	198.49	108 (65.0)	Arched abutmenton reinforcedconcrete foundation	End-bearing caissons (1.2 metres) with reinforcedconcrete raft
2	171 +53	GAC (with the passage)	11.9 + 2x24	65.72	25.0 (as per the reference)	End-bearingcaissons	
3	235 +86	Kargaly	1x21	26.1	26.3 + (7.0 as perthe reference)	Two-column arched abutments	
4	244 +77	Kargaly	2x24	55.95	54.9	End-bearing caissons, ⌀ 1.2 m	
5	275 +10	Aschilisay	1x24	31.8	25.3		
6	292 +10	Karasu	4x24	104.25	50.7 (220 at the breakthrough)		
7	312 +15	Boraldai 1	2x21	49.95	50		
8	314 +45	Boraldai 2	2x21	49.95	50		
9	327 +30	Sanitary canal 1	1x24	31.8	structurally		
10	346 +50	B. Almatinka	3x21	71.1	91.4		
11	346/18+ 84	B. Almatinka at Zhapek Batyr road	3x21	71.1	91.4		
12	356 +32 / 356+43	Sanitary canals 2,3	2x24	55.95	12.0 + (4.0 as per the reference)		
13	366 +79	Aschibulak	3x24	80.1	36.5 (180 at the breakthrough)		
14	389 +95	Terenkara	2x21	49.95	36.5 (165 at the breakthrough)		
15	401 +31	Essentai 1	3x24	80.1	33.2		
16	406 +44	Essentai 2	3x24	80.1	33.2		

No	PK+	Name of water course	Bridge crossing characteristics				
			Pattern	Bridge length, m	Q1% m3/sec.	Land abutments	Intermediate support poles
17	447+ 97	Karasu (Vesnovka)	3x24	77.45	81.4	Arched abutmenton reinforcedconcrete foundation	End-bearing caissons, ⌀ 1.2 m
18	464 +90(road exits)	M. Almatinka	1x21	27.15	98	Bearing walls	
19	467 +21	M. Almatinka	3x21	68.2	98	End-bearing caissons, ⌀ 1.2 m	
20	529 +38	Almerekh 1	1x24	29.12	31.4		
21	579 +30	GAC with the passage	2x24 + 11.9	65.72	90		

It is proposed to straighten stream channels in order to reduce the number and length of bridges, as well as improve their hydraulic characteristics (Table 2.2-7).

Table 2.2-7 Characteristics of the straightened sections of riverbeds

Water course	Water course location, PK+		Length, m	Bottomwidth, m	Note
Bolshaya Almatinka	346+50	346/18 +84	1,250	14-25	between bridges across the main road on PK346 + 50 and on the road from Komsomol village to Zhapek Batyr village
Malaya Almatinka	462+00	464+20	220	20	At the foot of the embankment,on the left
	466+56	466+76	68	20	New channel bed at a bridge, on the right
	467+50	469+22	272	20	
Kartabulak	474+20	477+00	272	20	At the foot of the embankment, on the left

2.2.7 *Road Facilities*

Road Maintenance Facility

As part of the Project, a designated Road Maintenance Facility (RMF) will be created for BAKAD. It will be stationed at the PK 423-426 mark of BAKAD near the village of Yntymak and the proposed junction with the Almaty-Kapshagay road PK 434+10.

Main purpose of the Road Maintenance Facility (RMF) is the repair and maintenance of roads, bridges, highway interchanges and overpasses, and implementation of measures to ensure safety on the road.

There will be a total of 57 members of staff at RMF working one shift.The RMF will be repairing and maintaining the road, bridges, overpasses and junctions, and will be responsible for ensuring traffic safety.

The assets of RMF will include an administrative building, the control centre for the Intelligent Traffic and Toll System (ITTS), a garage, a warehouse, a boiler house, a mechanical workshop (6x12 m), a handling pad with a crane rack (18x9 m), checkpoints (2 units 3x6 m), a storage for de-icing materials (128x24 m), a diesel-fired power plant (200 kilowatt), a domestic and fire pumping station (9x15 m), cesspool (100 m^3), an exploratory well for non-centralised supply of domestic and potable water 49 m^3/day (2 wells).

BAKAD's Intelligent Traffic and Toll System

BAKAD's Intelligent Traffic and Toll System (ITTS) will be created to automate traffic count, toll payments, traffic control, and generate periodic and statistical reports.

The project proposes arrangement for an closed system of tolls for the passage of vehicles at the entrance to BAKAD with selective control of axle load of freight vehicles at the entrance for major cargo flow directions.

The proposed ITTS shall be implemented along the coverage area and connected with related subsystem tobe cooperated each other and providean operational information to the system operators for the accurate, fast, efficient road infrastructure management (*Figure 2.2-4*).

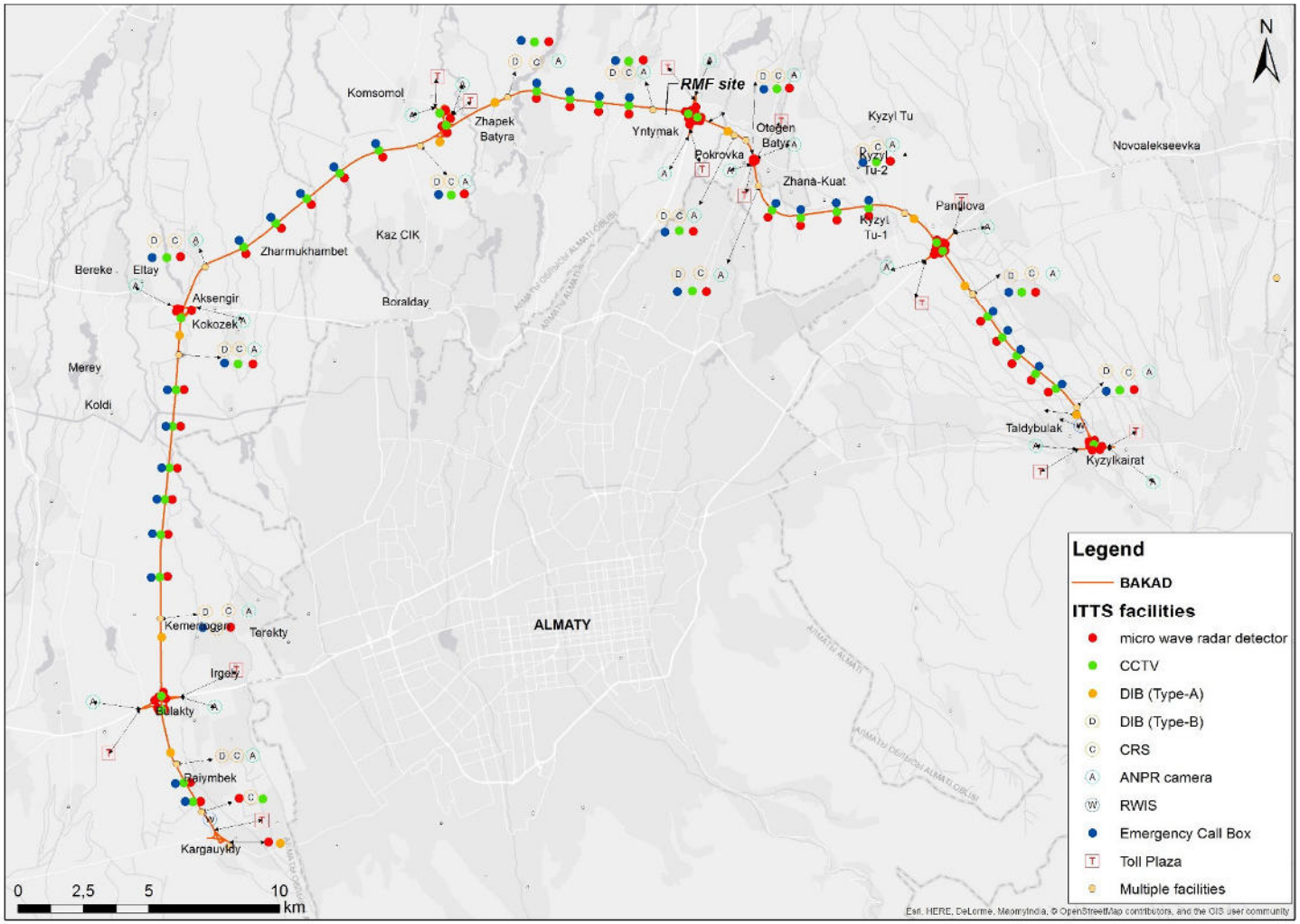


Figure 2.2-4 Illustration of ITTS Coverage Area

The system's control system and main equipment block are located in the administrative building of the RMF.

Toll gates will be installed before junctions on the main roads leading from the city. Before a toll gate, the road will have 4-6 lanes with an operator booth for each lane.

The 15 toll gates are proposed under the Project, of which:

- TG 10.2.2 - 4 (interchanges at PK 341 + 50, PK 434 + 10)
- TG 8.2.2 - 4 (interchanges at PK 58 + 27 and PK 556 + 10)
- TG 4.2.2 - 7 (interchanges at PK 0, PK 209 + 20, PK 464 + 90, and PK 655 + 15).

In addition, the Almaty Suburban Area Development Master Plan proposes additional construction of traffic interchanges with 8 additional TGs for other titles.

ITS staff consists of the TDC staff (32 persons) and staff serving the 23 TG (189 persons).

Facilities of the traffic management system include:

- controlled road signs – CRS type A - 40 units, CRS type BC - 26 units;
- nonintrusive sensors of traffic parameters (up to 12 control zones or lanes) based on the
- microwave radar technology - 51 units,
- facilities for videorecording of speed infringements - 89 units;
- automatic road weather stations with pavement condition sensors - 2 units;
- signal and call speakers for emergency communication with a road dispatcher - 26 units;
- remote camcorders – 5 units;
- tools for automatic detection of traffic incidents by analyzing the video stream - 11 units;
- Toll gate (TG) is a combination of the following elements:
- access and exit paths with road markings and fences;
- controlled vehicle passing lanes with canopies over them;
- TG office;
- parking area next to the TB office with access roads.

Noise Barriers and Landscaping

In accordance with the Development Master Plan for the Almaty Suburban Area, a protective green belt will be created along BAKAD. The belt will include local driveways, pathways and bicycle lanes. The minimum width of the protective belt will be 150 m between the red lines.

Based on the estimates (see Section 6.8) of noise level caused by transport passing sections in the areas with residential buildings located close to the road, it is proposed to build acoustic barriers near the villages of Pokrovka, Isayevo, Kokkaynar, Aksengir station, summer communities and cottage villages.

Protective measures envisaged by the Project to protect populated areas along the road and introduce additional vegetation include 3,030 m of noise barriers, a lawn covering 1,890,053 m^2 and 58,560 new shrubs and trees.

Fencing and Road Signs

A safety barrier will be installed on both sides of the road and along the median strip. On slopes and depressed terrain locations, a screen mesh will be installed to restrict access of humans and animals.

In order to arrange for high-speed traffic on BAKAD, the Project eliminates possibility of pedestrians getting into the road within easement areas. Buses are not allowed to stop when travelling in transit at road sections.

The road will have necessary marking and signs (including temporary signs like traffic patterns, emergencies, weather conditions etc.).

According to the Almaty Suburban Area Development Master Plan, it is proposed to build auto stations in the area of transport interchanges at slip roads (exits) from BAKAD, as well as rest areas and trolley stops.

Sites for building petrol stations are proposed at PK 28, 31, 426, 427, 565, 568. Design and construction of petrol stations should be funded by private investors during implementation of the Project.

Power Supply and Illumination

Power Supply

The road facilities will be powered by existing 10 kV lines operated by several substations (35/10 kV Substation N 70a Teplichnaya; 110/35/10 kV Substation N 55I Panfilova; 110/10 kV Substation No 101I Shimbulak) as per specifications issued by AO Alatau Zharyk Company.

- Karasaisky district (PK 0-309) TU #211-1101 dated 03.21.2008, as amended by #211-2045 dated 05.21.2009, #25.1-5752 dated 12.20.2012;
- Iliysky district (PK 309-467) TU #25.1-466 dated 02.04.2013;
- Talgharsky district (PK 467-660) TU #211-1099 dated 03.21.2008, as amended by #211-2046 dated 05.21.2009, #25.1-5754 dated 12.20.2012.

Validity of technical conditions is one year, after which they are subject to be updated or extended.

Transformer substations 10/0.4kV (TS), as well as complete outdoor 10kV switchgear (ODSG-10kV) are purchased in form of increased readiness and assembled at an installation site. Proposed ODSG-10kV mounted on the

existing supply TS (35 kV or more) are SCC KPH-III-10 and KPH-IV-10 with stationary vacuum circuit breakers BB/TEL, with microprocessor-based protection against alternating control power (MiCOM series) and electronic power supply metres (EuroAlpha).

Proposed TS-10/0.4kV are SFTS (kiosk type) with 2 transformers, transmission or terminal type with 10kV cable inlets, 0.4 kV cable outputs, climatic category YXL1 (boreal climate), GOST 15150-69.

Power for the transport interchange, video surveillance and checkpoints will be supplied from the proposed SFTS via cable lines laid along the median strip of the road. For control and power supply of lighting fixtures, outdoor lighting control cabinets are installed at SFTS (OLCC).

To provide an independent source of power supply for the RMF, it is proposed to install RP-10kV, two cells of which are designed for connecting cable АСБУ-10kV, with a cross section of 3x120 mm2, to supply TP-400 RMF.

Freestanding substation in a metal case is designed for installation of two 400 kVAtransformers.

Illumination

Total installed lighting power at the sections is 413.25 kW. Lighting pattern is two-row rectangular along road axis. Single-row lighting is proposed for the slip roads. Pole height is 8 metres; interval between poles is 40 metres.

The feeder line supplies 380/220V via cable line from the proposed transformer substations; power supply category - II.

Electric lighting is based on fixtures with ES-Sistem sodium lamps on metal poles.

Section	Location	Start, PK	End, PK	Length, m
8	Pipe-type interchange at Almaty - Uzunagash road	0	2 + 50	250
1	Interchange at PK58 + 17 from Almaty – Bishkek road	53 + 20	62 + 50	930
	Interchange at PK 209 from Almaty-Shamalgan road, and overpass across railway near Aksenghir station (PK 208 + 06-216 + 49)	202 +90	216 +90	1,400
	Interchange at PK 341 + 50 from Zhapek Batyr -Komsomol village road	334+70	349+40	1,470
	Overpass PK 374 + 54-378 + 17 in Tumeybayeva village (Aschibulak)	374 +60	378 +30	370
	Interchange at PK 434 + 10 from Almaty – Ust-Kamenogorsk road	429 +90	439 +10	920
3	Intersection with the street in Pokrovka village at PK 453	449 +50	449 +50	1,930

Section	Location	Start, PK	End, PK	Length, m
	Intersection with Medeu-Zhetysu railroad at PK 454 + 74			
	Intersection from Pokrovka - Talghar road at PK 455 + 42			
	Interchange at PK 434 + 10 from Almaty – Baiserke road (at the ring PK 464 + 51-465 + 28)			
4	Interchange at PK 556 + 45 from Almaty – Kuldzha road – Khorgos	551+40	561+40	1,000
9	Interchange at PK 655 + 15 from Almaty-Talghar road	648+40	659+20	1,080

2.3 CONSTRUCTION STAGE

2.3.1 Construction Activities

The construction stage will involve the following activities:

- Preparatory works (RoW clearance, tree felling, topsoil removal and stockpiling, construction of temporary facilities and access roads etc.);
- Construction of the roadbed (backfilling of the top and bottom layers, construction of water drains, ditches etc.);
- Construction of the road surfacing (installation of hot-rolled asphalt etc.);
- Construction of the road facilities and protective structures (land reclamation, landscaping, noise barriers).

In accordance with the specifications received from the owners, the following infrastructure will be subject to relocation:

- 79 power lines, 0.4-220 kW,
- 47 overhead and cable communication lines,
- 10 gas pipelines,
- 20 water supply network lines,
- 3 sludge extraction lines,
- 3 sewer lines,
- transfer of 2 water wells.

2.3.2 Water Abstraction and Wastewater Management

Construction of BAKAD will require potable, process and fire water supply.

For example, the estimated needs for Early Works Section 4 are 1,153,513 m^3 of process water and 14,868 m^3 of potable water.

Water consumption rates for the construction stage were estimated based on the estimated duration of construction and the rate of 27 litres of water per day per worker as per SNiP 4.01-41-2006.

Potable water will be delivered in bottles from nearby populated areas. The quality of potable water should be conformant to Kazakh GOST 2761-81.

There has not been a final solution for process water supply as of the time of this Review, although several options are possible:

- Abstraction of water from existing sources of water supply in populated area and delivery to the site in water trucks;
- Abstraction of water from rivers to be crossed by roads and delivery to the site in water trucks;
- Construction of an underground water intake facility at the construction camp.

To reduce dusting from vehicle traffic, dust suppression will be done regularly to minimize the dust emissions impacts caused by vehicle traffic at the rate of 12 l/m^2.

Domestic wastewater will be collected into impervious septic tanks and then taken offsite to treatment facilities by specialised contractors.

2.3.3 Demand for Construction Personnel

The maximum number of employees involved in the construction of the BAKAD (all sections) will be 1,512 people, of which 76% will be sources locally (*Table 2.3-1*).

Table 2.3-1 Maximum Number of Personnel during the Construction Stage

Personnel category	Foreign	Local	Total
Administrative	106	62	*168*
Direct	176	587	*762*
Indirect	19	30	*49*
Subcontractor	60	473	*533*
Total	*361*	*1,152*	***1,512***

Construction activities will be physically performed by contractors to be selected through tenders. Personnel will work in two shifts on a six-day working week schedule.

Construction personnel will live in accommodation camps to be constructed at areas free of construction operations. Construction contractors will be transporting their staff to areas of work and back to camps.

2.3.4 Demand for Materials

The demand for construction materials is presented below in *Table 2.3-2*.

Table 2.3-2 The Project's Demand for Construction Materials for Section 4

Material	Demand
Macadam	28,117.71 m^3
Bitumen-coated macadam	28,085.74 t
Natural sand	15,562.71 m^3
Sand and gravel mix	181,964.24 m^3
Gravel	447.26 m^3
Heavy-weight concrete	98,999.37 m^3
Heavy-weight premixed brick mortar	247.1 m^3
Bitumen	464,3064 t
Soil	1,412,760 m^3
Vegetable soil	26,028.06 m^3
Water	141,699.19 m^3

2.3.5 *Temporary Facilities*

During the period of construction several temporary stockyards will be installed along the route in order to store building materials, road construction equipment, bridge structures and culverts, etc.

It is proposed to use two construction camps: "Bereke" and "Panfilovo".

The following temporary facilities will be placed in Bereke construction camp km 19+000 (*Figure 2.3-1*):

- Shift camp for staff, designed for accommodation of 300-500 people;
- Parking for vehicles and construction equipment, warehouses;
- Concrete batch plant with a capacity of 105-115 m3/h and aggregate stock area;
- Asphalt plant with a capacity of 170 t/h and aggregate stock area;
- Premix plant with a capacity of 400 t/h.

The following temporary facilities will be placed in Panfilovo construction camp km 56+000 (*Figure 2.3-2*):

- Shift camp for staff, designed for accommodation of 300-500 people;
- Parking for vehicles and construction equipment, warehouses;
- Two concrete datch plants with a capacity of 105-115 m^3/h;
- Asphalt plant with a capacity of 170 t/h;
- Premix plant with a capacity of 400 t/h.

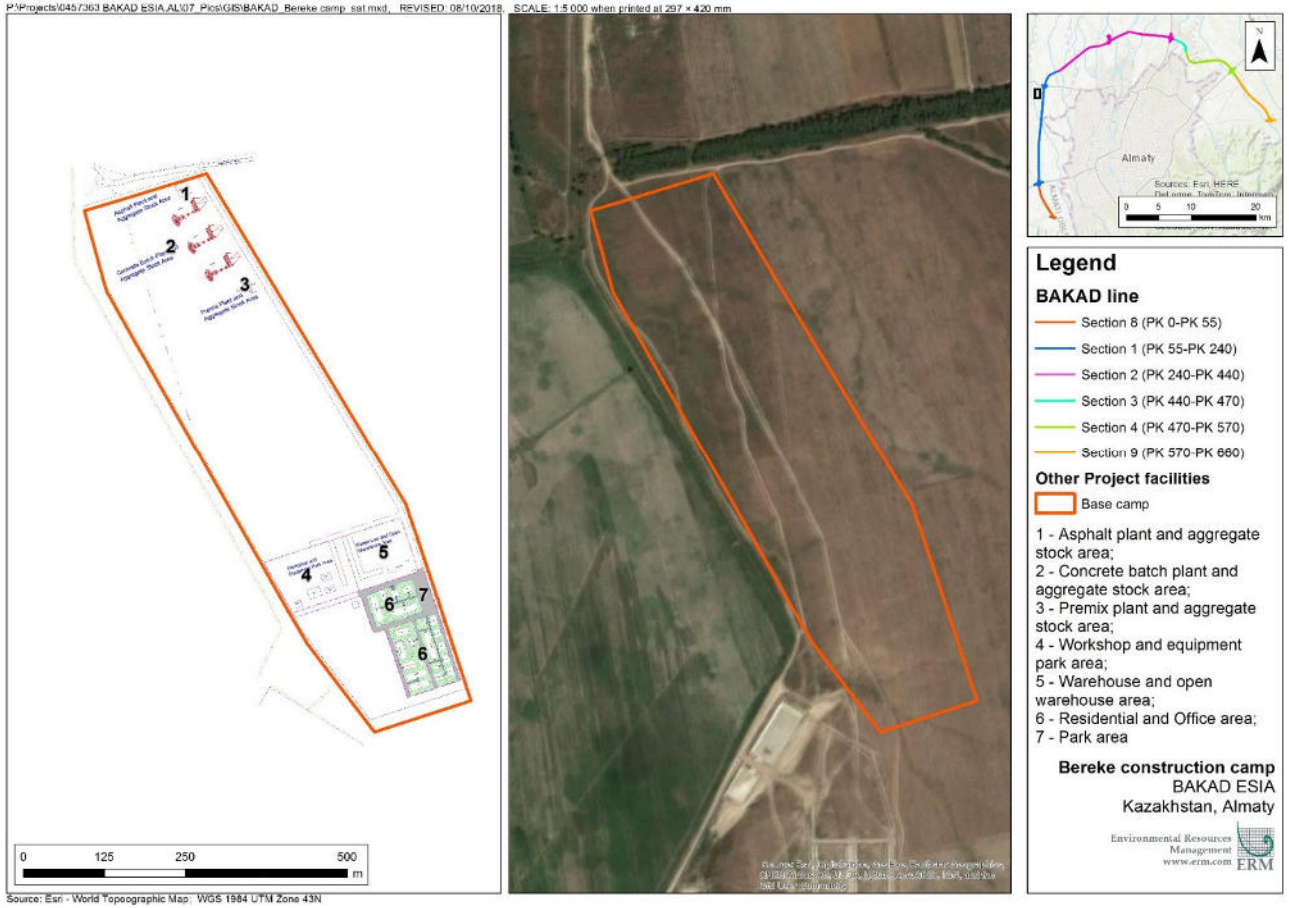


Figure 2.3-1 Location of Bereke Construction Camp

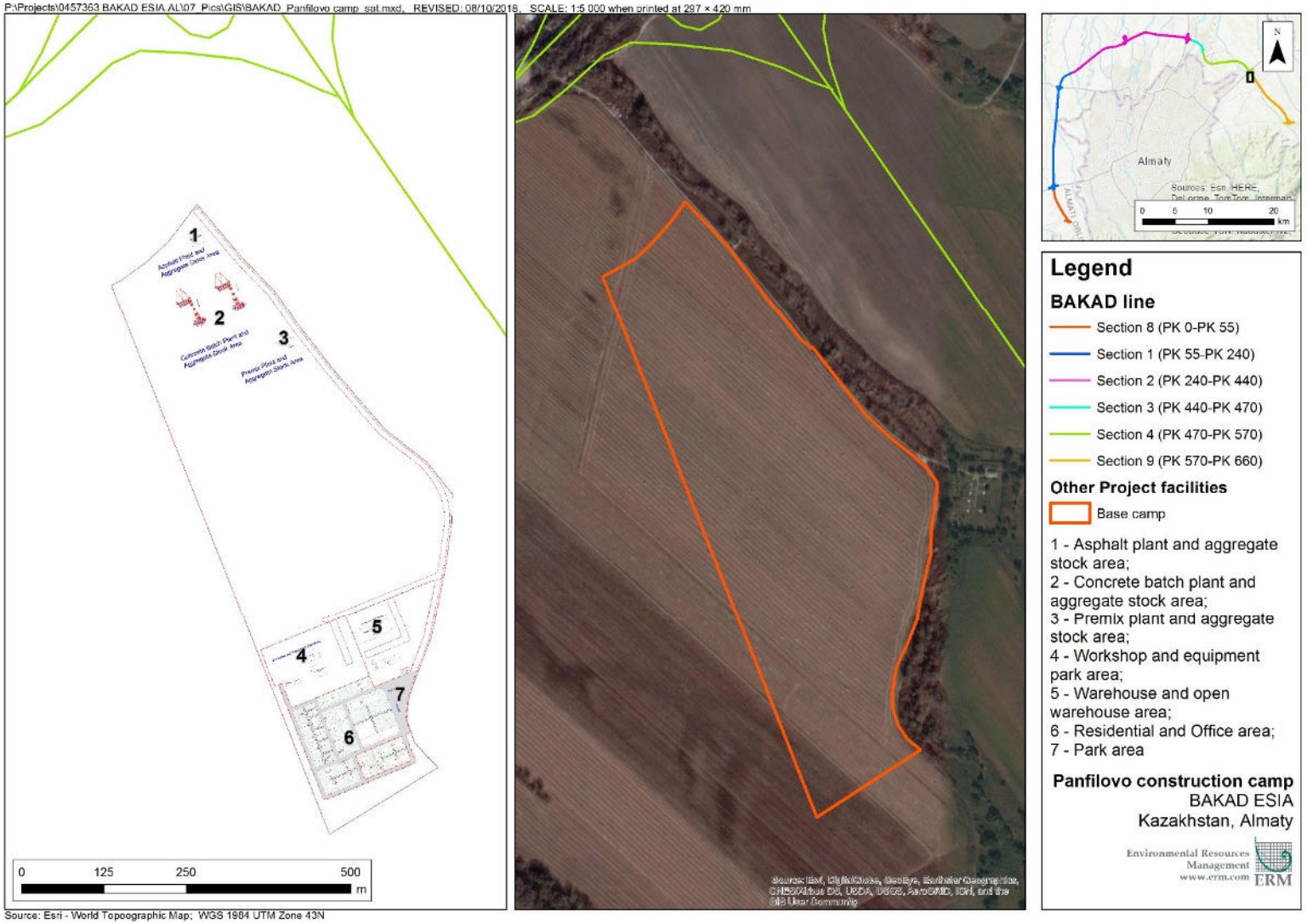


Figure 2.3-2 Location of Panfilovo Construction Camp

2.3.6 *Delivery of Construction Materials*

In accordance with the information provided during the meeting with representatives of the Consortium in April 2018, it is planned to excavate sand and gravel mixture from the Fabrichny and Issyk quarries (not in use at the time of the Report).

The Issyk quarry is located in the Enbekshikazakh district, near the gardening association (dachas community) Issyk (*Figure 2.3-3*).

The Fabrichny quarry is located in the Kargaly rural district of the Zhambyl district; the nearest settlement Kargaly is located in 1 km to the south.

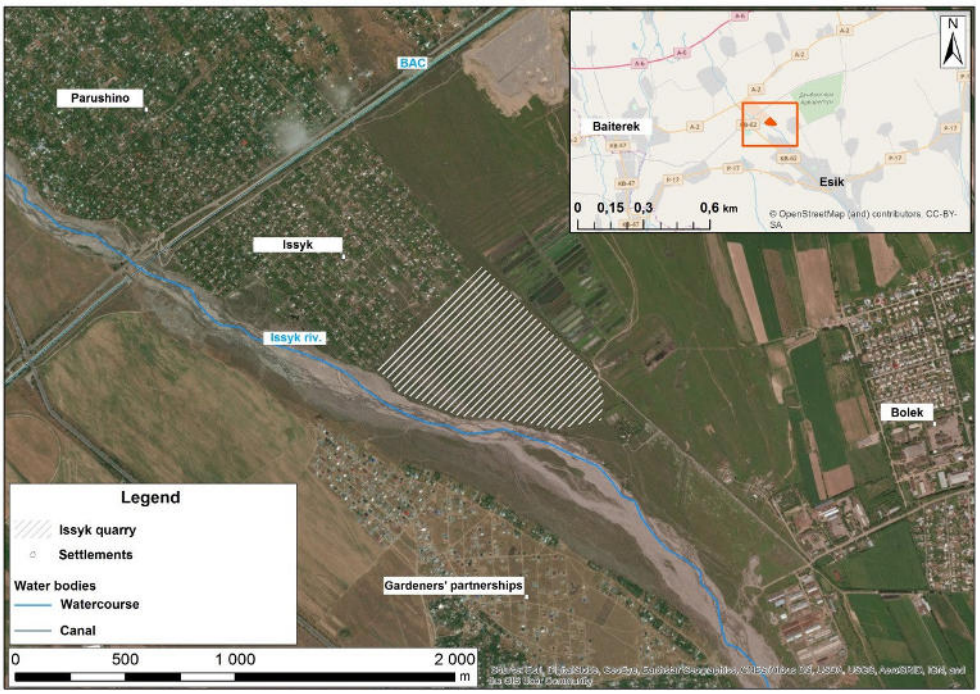


Figure 2.3-3 ***Location of the quarry near Issyk***

The Project envisages construction of access roads made of a sand and gravel layer 15 cm thick. These roads will then be liquidated, and the lands will be reclaimed.

Construction materials will be delivered along existing public roads with an asphalt coating. Trasportation routes from Issyk and Fabrichny quarries are given in figures below (*Figure 2.3-4, Figure 2.3-5*).

Figure 2.3-4 *Transportation routes from Fabrichny quarry*

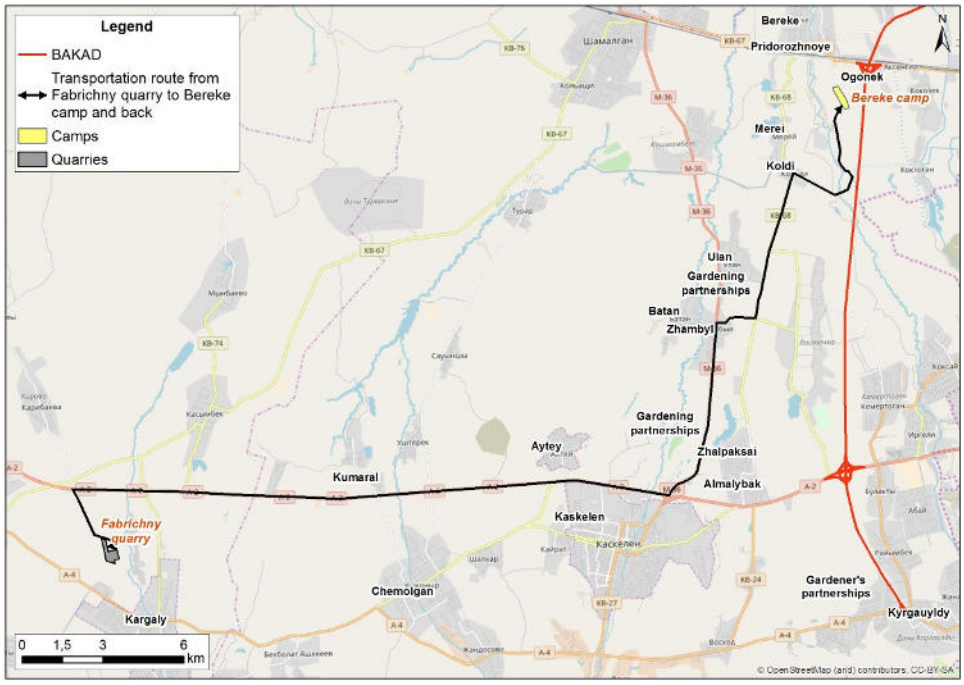
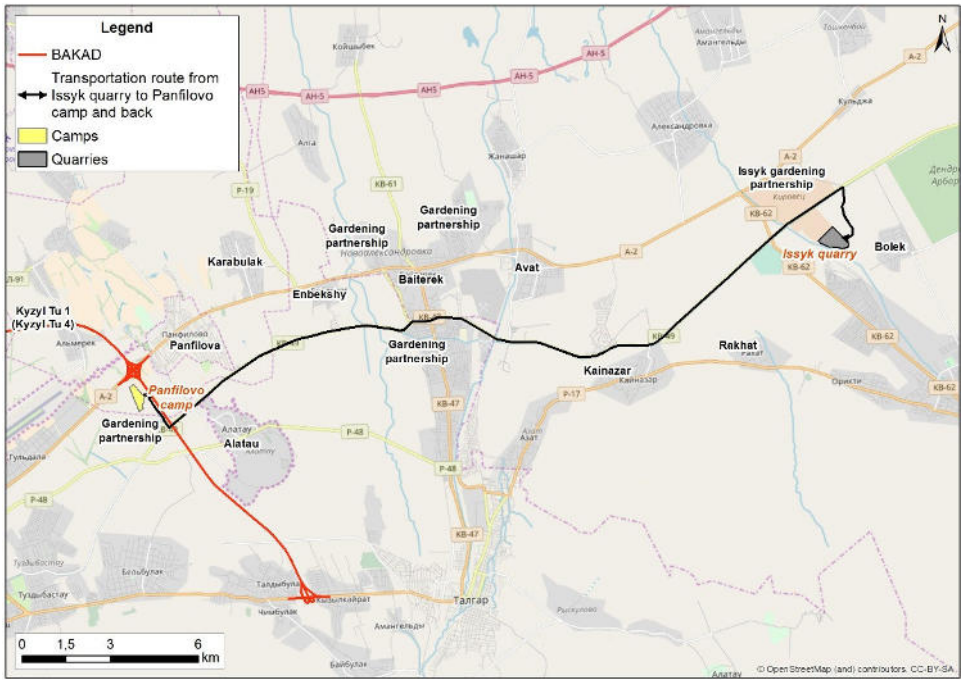


Figure 2.3-5 *Transportation routes from Issyk quarry*



As of the time of this document, the delivery routes for other construction materials and structures and the cargo traffic intensity have not been defined.

2.3.7 Waste Management

Construction activities will generate construction waste and solid domestic waste; also subsoil and topsoil will be removed.

The following construction waste will be generated during the construction and operation of the road:

- Inert materials like padding soil, sand and gravel mix, concrete, macadam – which will be processed and used as a construction material in backfilling, shaping and landscaping operations;
- Potentially harmful and hazardous substances such as construction camp waste, crushed stone from crushing, empty containers used to store fuel, lubricants and chemicals, ferrous scrap, electrode stubs – these waste have to be properly disposed of as per national regulations;
- Timber waste from tree felling and other organic substances from site clearing – these should be stockpiled at designated areas outside construction sites and removed during the period of felling and grubbing. A possible solution is to sell these materials as fire wood to local residents.

The amount of solid domestic waste from personnel for the construction stage was estimated based on national standards and was taken at 0.07 tpa or 0.006 tpm per worker.

Generation of construction waste is estimated at 12,444.75 tpa; of solid domestic waste – at 121.6700 tpa (see *Table 2.3-3*).

The construction waste and excavated soil will be transported subject to prior consent of local authorities.

All waste generated will be removed by specialised contractors for further processing or burial at waste landfill sites.

The amount of topsoil to be removed and stockpiled is estimated at 1,763,711 m^3. This material will then be used in land reclamation after liquidation of temporary roads and in landscaping activities.

The Project also envisages construction of temporary waste storage areas. The Project's design documents specify how these wastes will be delivered to landfills or treatment facilities or sold. Different waste types will be stored separately. Waste suitable for recycling at the construction site will be clearly marked.

The design documentation prohibits burning of any waste without special permits. All waste generated is to be timely removed for disposal or processing.

Table 2.3-3 Waste Management during the Construction Stage

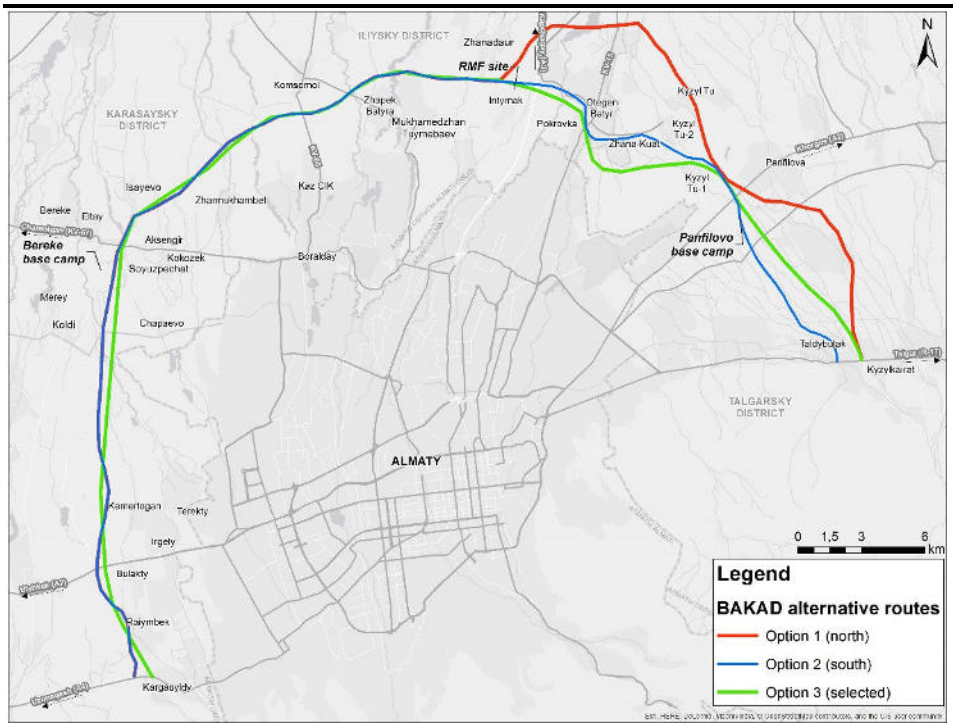
Waste	Source of generation	Estimated generation rate	Hazard Class	Physical and chemical parameters, toxicity	Composition	Storage, disposal or burial site	Section Annual generation, tpa						
							1	2	3	4	6	8	9
Construction waste	Construction activities		IV	Fire-safe, solid, insoluble	Breakage of concrete, bricks, glass, construction debris	Temporary storage at outdoor areas. To be transferred to a specialised organisation for disposal.	3921.657	3550.13	3486.047	504.5615	260.8449	255.9267	465.5829
Stubs of welding electrodes	Welding	0.15 of an electrode's weight	IV	Solid, non-flammable	96-97% iron, 2-3% lubricants	Temporary storage at a scrap storage area. To be transferred to a specialised organisation for disposal.	0.96	0.5547	0.2169	0.1092	0.9719	0.0065	0.07919
Solid domestic waste	Construction support activities	0.07 tpa or 0.006 tpm	IV	Solid, fire hazardous, insoluble, non-toxic	60% paper and timber, 7% rags, 10% food waste, 6% glass breakage, 5% metals, 12% plastics.	Temporary storage in containers. To be taken offsite to a solid domestic waste landfill.	25.056	34.12	16.54	14.628	7.41	8.736	15.18
TOTAL:							3947.673	3584.805	3486,264	519.299	269.227	264.669	480.842
SUB-TOTAL							**12552.778**						

2.4 REVIEW OF ALTERNATIVES

2.4.1 Alternative Routes

Three alternative routes for the BAKAD Project road were analysed in the feasibility study developed in 2007 to minimise resettlement of population (see *Figure 2.4-1*).

Figure 2.4-1 BAKAD's Alternative Routes



The routing options were discussed in a high-level meeting involving MTS, the akim of the Almaty Region, akims of affected districts, and Project's managers and consultants.

After a thorough review, Option 3 was selected based on the minimal resettlement requirements, road length, technical and financial estimates (*Table 2.4-1*).

Table 2.4-1 Alternative Routes of BAKAD

Parameter	Option 1	Option 2	Option 3
Road length, km	69.852	64.0	65.993
Traffic speed, kph (initially, the road was designed as a 1B road with the speed limit of 120 kph; this was later changed to a 1A road with the speed limit of 150 kph)	120	120	150
Starting point	The 23+600 km mark of the A4 BAKAD	The 23+600 km mark of the A4 BAKAD	The 22+640 km mark of the A4 BAKAD
Number of affected residential houses at the starting point	50	50	6
Number of affected residential houses in the village of Pokrovka	None	110	Few

In 2013, additional technical estimates were added to the feasibility study and Option 3 (Alternative 3) was selected considering the overall quantity of the earthworks and the cost of the Project.

2.4.2 *Zero Alternative*

As part of this Review, environmental and social implications were compared between the Zero Alternative (full abandonment of the Project) and the overall Project (i.e. without impacts of individual construction phases and start-up complexes).

If the Project is pursued, its adverse impacts will mainly be associated with the construction stage. However, the duration of these impacts will be rather low given the short period of construction activities (around 23 months). At the same time, the Project's positive impacts will be long-term and last for as long as the road is used. The comparison is presented below in *Table 2.4-2*.

Table 2.4-2 Comparison of Environmental Impacts between the Zero Alternative and the Project

	BAKAD Project		Zero Alternative	
	Positive impacts	**Adverse impacts**	**Positive impacts**	**Adverse impacts**
Impact on ambient air	Intensity of traffic in the city will improve as transit flows will be diverted outside the city. This will reduce emissions (from vehicles and reduce GHG emissions as average traffic speed will increase.	• The relevant temporary pollutants associated with construction activities which may adversely affect receptors along the project route are dust, nitrogen dioxide and organic compounds. Dust emissions from construction tend to cover a wider range of particle sizes than emissions from traffic. • Adverse effects can also be caused by air emissions from combustion engines of construction machines and trucks carrying materials to and from the construction sites.	Absence of adverse impacts associated with the Project.	High level of air emissions associated with acceleration and deceleration of vehicles, and low traffic speed due to congested traffic in Almaty.
Noise impact	If noise protection measures are implemented, it will be improve the noise stress in Almaty.	Possible minor increase in noise levels at areas previously not affected by traffic.		Potential increase in noise stress in Almaty due to gradual intensification of traffic flows crossing the city.
Impact on soils, lands, surface and underground water, vegetation	Use of latest construction techniques will minimise migration of chemical and mechanical pollutants from the road onto adjacent lands and water bodies. Reclamation of temporary disturbed lands and slopes with plant species preventing water and wind erosion.	• Impacts on people, households and communities resulting from physical displacement to facilitate the operation of the road. • Indirect land use changes during the operations. • Vehicle traffic emissions • Pollution caused by vehicles on the road surface, and carried into the road drainage system, and activities like de-icing agents during operation. • Spills during road accidents and spillages, leakages from petrol stations and service areas.	Absence of adverse impacts associated with the Project.	Continued significant contamination associated with vehicle traffic.

	BAKAD Project		Zero Alternative	
	Positive impacts	Adverse impacts	Positive impacts	Adverse impacts
		• Runoff generated from the road elements (asphalt surface, drains) • Deeper excavations leading to permanent dewatering to keep the ground water at least 1.50 m below the foundation of the road structures or permanent changes to the groundwater flow regime.		
Social impact	Reduction of the number of road accidents. Development of roadside services, opportunities for new businesses, creation of new jobs, social and economic development of the region.	• People, households and communities affected by the Project's permanent or temporary land take. • People, households and communities affected by construction activities and operations. • Potential impacts with Community health and safety especially during construction phase. • Potential Worker-Community Conflicts • The physical presence of the road will cause severance and fragmentation of agricultural lands and possibly other holdings making them less viable due to the limited access.		Lost profit if the Project is abandoned.
Impact on transport conditions	Increased cargo traffic outside the city. Reduction of transport-associated costs (fuel, oils, spare parts, servicing, depreciation, driver salaries, overheads etc.).	An adverse impact on transport conditions during the construction stage.	Absence of adverse impacts associated with the Project.	Cost of repairs of the existing road.

2.5 *MEASURES ENVISAGED IN THE DESIGN TO PREVENT AND/OR MINIMISE POTENTIAL ENVIRONMENTAL IMPACTS*

The Project design proposes a number of measures to prevent and/or minimise potential environmental impacts. These measures proposed for the construction and operation stages are presented below in *Table 2.5-1* and *Table 2.5-2*.

Additional measures to prevent and/or minimise potential environmental and social impacts are provided in relevant sections of this ESIA.

Table 2.5-1 Design measures to Prevent and/or Minimise Potential Environmental Impacts during the Construction Stage

Environmental component	Proposed activities
Ambient air	• Mandatory compliance of fuels, materials, products, equipment, construction processes and operations with national laws and regulations • Timely and proper construction of permanent and temporary access and earth-delivery roads before construction commences. • Construction machinery and vehicles to strictly follow designated routes; adherence to speed limits on access roads without hard surfacing; • Dust suppression by watering of soils, roads, vehicle and machinery parking lots; • Transportation and storage of loose materials and small piece materials (blocks, tiles etc.) in containers; • Transportation of bitumen-based binders in bitumen spreading trucks.
Noise impact	• Mandatory compliance of construction equipment, mechanisms, vehicles, processes and operations with national laws and regulations; • Construction machinery and vehicles to strictly follow designated routes; adherence to speed limits on access roads. •
Surface and underground water	• Mandatory compliance of activities within protected shoreline belts and water protection zones with national laws and regulations; • Collection of domestic wastewater into tanks / chemical toilets and further removal in sewerage trucks to wastewater treatment facilities; • Construction of wash stations for vehicle wheels and open-type mechanisms capable of serving two vehicles simultaneously, at the construction site; • Collection and treatment of wastewater to remove suspended particles and petroleum products at a treatment station consisting of a wash station and a Ø=1000 mm inlet well; regular draining of the inlet well and removal of sludge in sewerage trucks to the existing wastewater treatment facilities;

Environmental component	Proposed activities
	• Collection of petroleum products using a swing-type oil catcher into an oil tank, which will be periodically drained manually, and oil will be removed offsite; • Timely housekeeping and removal of construction and demolition waste; • Adherence to the rule prohibiting discharge of oils from construction machinery onto the ground; limitation of idle runs of machinery; use of only properly functioning vehicles, machinery and mechanisms
Land resources and soils	• Minimisation, where possible, of land withdrawal during the design stage; adherence to allocated land boundaries during construction; • Reclamation of temporarily withdrawn lands and their return to original users; • Removal, stockpiling and reuse of topsoil in reclamation and reinforcement of roadbed slopes; • Temporary storage of waste from vehicle and machinery maintenance operations at designated areas with subsequent removal of waste to solid domestic and industrial waste landfills or transfer to specialised organisations for disposal / recycling; • Collection of wastewater from vehicle washing into a settlement pond to trap suspended particles and petroleum products. Collection of sludge from the settlement pond into a container followed by its offsite removal and reuse in road construction; • Temporary storage of all wastes generated at the construction site at designated areas followed by their timely removal to landfills or transfer to specialised organisations for disposal / recycling.
Vegetation	• Storage of construction materials and structures at designated areas; • Adherence to allocated land boundaries during implementation of the Project; • Compensatory vegetation planting for tree losses; • Stockpiling of felling residue at designated areas followed by its removal; • No burning of felling residue.
Wildlife	• Not envisaged in the Design

Table 2.5-2 Design measures aimed to Prevent and/or Minimise Potential Environmental Impacts during the Operation Stage

Environmental component	Activities
Ambient air	• Timely repairs of the roadbed.
Noise impact	• Landscaping along the right-of-way; • Installation of noise barriers.
Surface and underground water	• Diversion of storm run-offs from the road into catch wells.
Land resources and soils	• Installation of culverts and drain ditches in the roadbed; • Reinforcement of roadbed slopes and bottoms of drainage ditches; • Reinforcement of slopes with grass planting to prevent water and wind erosion.
Vegetation	• Timely maintenance of landscaped areas.
Wildlife	• Installation of culverts and drain ditches in the roadbed enabling crossing by animals; • Installation of mesh fences to prevent animal access

2.6 MEASURES PROPOSED IN THE DESIGN TO PREVENT AND/OR MINIMISE POTENTIAL SOCIAL IMPACTS

The Project provides for a number of measures aimed at preventing and reducing potential impacts on the social sphere.

The activities proposed for the construction and operation stages are listed in the tables below (*Table 2.6-1 and*

Table 2.6-2).

Table 2.6-1 Design Measures to Prevent and/or Minimise Potential Social Impacts during the Construction Stage

Social component	Activities
Transport infrastructure	• Selection of quarries of building materials, among other factors, was based on the maximum reduction of the delivery distance
Land use	• The design of the BAKAD route, driveways and overpasses was carried out under the condition of a minimum land acquisition.
Cultural heritage	

Table 2.6-2 Design Measures to Prevent and/or Minimise Potential Social Impacts during the Operation Stage

Social component	Activities
Public health	• Reduction of noise levels in the residential area through the installation of noise protection screens;
Road safety	• Exclusion of one-level intersections; • Instalation of the separating barrier; • Instalation of fences in order to prevent accidental exit of children and domestic animals on the high-speed route.

2.7 PERMITTING STATUS

In accordance with the Lenders' requirements, the Project must comply with the requirements of national legislation. The status of obtaining permits required for the construction of the Section 4 is presented in the table below (*Table 2.7-1*).

Table 2.7-1 Permitting Status

Permission		Status
Permission for the construction of the Section 4 (based on approval of Kazakh EIA) Permission for the construction of other Sections		Obtained Should be obtained by 02/2019
Approvals and permissions for transfer of utilities	Power lines	Should be approved by 09/2018
	Communication networks	Should be approved by 09/2018
	Water and sewerage	Should be approved by 09/2018
	Gas pipeline	Should be approved by 09/2018
Permission for the use of subsurface resources: quarry of construction materials		Approved
Permission for the use of subsurface resources: well (provision of a construction camp with domestic water)		Approved
Approval for connection to the water supply network (provision of a construction camp with drinking water)		Approved

3 SUMMARY OF STAKEHOLDER ENGAGEMENT TO DATE

3.1 INTRODUCTION

This Chapter summarizes information concerning all of the various stakeholder engagement activities performed to date as part of the development of the ESIA.

Please note that this Chapter solely describes stakeholder engagement activities conducted to date during the preparation of this Draft ESIA. All proposed *future* stakeholder meetings, notices, etc. are included in the Stakeholder Engagement Plan – SEP, which is prepared as *Volume VI* of this ESIA Package.

3.2 STAKEHOLDER ENGAGEMENT HISTORY

3.2.1 2006-2008

Studies on BAKAD have been initiated from 2006 and land acquisition was initiated from 2007. But until 2013, no public consultations were reported as being conducted by the executing and implementing agencies to involve the public in project planning and developing process, nor land acquisition and resettlement process. A brief public notice was given in June 2008 by the detailed design consultant that the BAKAD TEO was submitted to Ministry of Environmental Protection, but no project related information was disclosed nor made accessible to the public.

3.2.2 2008-2013

There was a period of uncertainty about the future of the Project in the period of 2008-2013 hence there were no public engagement activities during this period except for the engament with land-owners which is described in Section 7.7.

3.2.3 2013

Starting from 2013 the number of stakeholder engagement events was conducted within the framework of the Feasibility (TEO) study development, including:

- Public hearings in Karasaysky, Ilisky and Talgarsky district;
- Focus groups with local communities representatives;
- Focus groups with authorities' representatives at district level.

Public consultations were initiated in 2013 by Ministry Transport and Communication (MTC as of 20013) during 2013 TEO study. A public notification was given in April 2013 announcing public hearings for the Project. The public consultations were attended by the representatives of district administrations' office, Almaty Oblast Committee of Roads (CR) and Land Committee, and EIA consultants KazNIPIDortrans.

Table 3.2-1 Participants of public consultations[1]

Location	Date	Participants		
		Male	Female	Total
Otegen Batyr Ilisky District	May 3, 2013	12	15	27
Talgarsky District	May 3, 2013	10	5	15
Karasaysky Districts	May 4, 2013	20	9	29
Total		42	29	71

During the public hearings, the following questions were raised:

- The route of the BAKAD highway along the districts;
- Accessibility to land plots;
- Location of underpasses for livestock;
- Removal and relocation of utilities;
- Land acquisition and demolition of buildings (clarification of the cost);
- Obtaining permission for construction of service facilities along the BAKAD, etc.

Particular attention was paid to measures aimed at reduction and elimination of negative impact on the environment.

In addition, focus groups discussions were held in each of the districts involved in BAKAD Project (there were held 6 focus groups). Research tasks included identification of Project induced impacts and discussion of land acquisition issues.

The following concerns were raised by the focus groups:

- Concern that there are violations of constitutional rights;
- Land Acquisition process is unfair (unequal compensations being offered) for land plots and property;
- Unfair valuations and inadequate compensation for land;
- No consultations on BAKAD/ No access to information;
- Decreasing trust on the local and national government;

[1] Data from Feasibility Study (TEO) of the Big Almaty Ring Road (BAKAD) Concession Project, Environmental section, Kocks report, November 2015

- Concern on misuse of authority by officials and delinquency/Fear of intimidations;
- Concern on insufficient and low compensation of residential structures;
- Loss of livelihood, loss of income (economic displacement);
- Increased social tensions and disturbed residential stability;
- Benefit sharing.

During the focus groups interviews in 2013 representatives from districts authorities showed their dissatisfaction with long term land acquisition procedure, which was followed by the Project delays and increase in the social tension.

3.3 STAKEHOLDER ENGAGEMENT DURING ESIA PREPARATION

The details of stakeholder engagement is split between the ESIA Report and the standalone "Stakeholder Engagement Plan – SEP" document. The discussion in this chapter is limited solely to describing the past stakeholder engagement /public disclosure activities, whilst all of the planned future actions are compiled in the SEP document. The SEP document will be further developed and implemented in future stages, and the SEP is being disclosed with this ESIA Report as part of the overall "ESIA Package".

Within the framework of the ESIA development, the number of stakeholder engagement activities have been conducted, including:

- Consultations with district authorities representatives;
- Consultations with rural okrugs' authorities representatives;
- In-depth interviews with heads of departments of district and rural okrug akimats;
- Focus groups with representatives of farmers, the elderly, vacationers, the enterprises of small and average business, representatives of vulnerable categories of citizens;
- Survey of households located in the project area of influence;
- Survey of land users and/or residents of the plots that were expropriated for the Project.

Summary of stakeholder engagement activities is provided below.

3.3.1 Socio economic baseline data collection

The preparatory period of social baseline study included the preparation and submission of data requests for socio-economic conditions and statistics of the Project area to the regional, district and local (rural okrug) authorities. In total 14 data requests have been prepared and sent.

After sending requests, meetings were scheduled with the heads of the three administrative districts - Talgarsky, Iliyski and Karasaisky.

Since on the territory of Enbekshikazakhsky and Zhambylsky districts there are only Project associated objects (quarries), meetings with representatives of the district administration were not held. Sections on socio economic baseline conditions are informed with statistical data obtained by requests, from open sources, as well as resulted from interviews with residents of nearby settlements living near quarries.

3.3.2 Field Social Survey and Consultations

A Field Social Survey (FSS) was undertaken between 22th June and 19th July 2018 as part of the wider ESIA process.

The main objective of the FSS was to determine the areas affected by the Project, identify Project Affected Persons (PAPs) and vulnerabilities among these, collect socio-economic data and through these activities establish a baseline for the Project in advance of construction activities. The collected baseline data was integrated into the ESIA as well as the Stakeholder Engagement Plan (SEP).

A brief summary of the engagement is given below.

3.3.3 Consultations with Representatives of District and Rural Administrations

Kick-off meeting with the Deputy Head of Talgarsky district and representatives of Talgarsky district administration on 22 June 2018. Meeting with the Deputy Head and representatives of administration of Ilisky district was held on 26 June 2018, in Karasaisky district -- 26 June 2018.

After the inception meetings in district administrations, ERM consultants conducted a series of in-depth interviews with specialists in the departments of district administrations and in rural okrug akimats.

25 in-depth interviews with the representatives of local authorities were conducted in Talgarsky district, 16 in Iliysky and 16 in Karasaysky district. The following key issues were raised during the discussions:

- pressure of increasing residential areas onto the agricultural lands;
- intersections and fragmentation of residential area;
- access to the local roads;
- noise pollution and dust emissions;

A summary of the discussion is provided in *Appendix 1* to the SEP.

The aspects raised during the consultation meetings have been addressed, as appropriate, in this ESIA Report in the chapter relevant for the respective topic.

In the course of the preparation of the FSS, face to face meetings with the headmen of rural administrations of the 13 villages have been conducted. These villages are located along the route and will be directly affected by the Project, therefore they were included in the scope of the FSS.

3.3.4 Focus group discussion

Focus group interviews were held in the villages with the following target groups:

- farmers,
- aksakals (elder people having authority within other population of the community),
- representatives of small businesses,
- representatives of vulnerable groups.

The attendees of focus groups were selected/recommended by the respective akimats (rural okrug administration).

In total, 19 focus groups were conducted - 5 in Talgarsky district, 6 in Karasaysky district, 8 in Iliysky district.

Focus groups were held in rural schools, the size of focus groups ranged from 4 to 10 people, there were no restrictions on gender, age or social status. The criterion for participation in the focus group was belonging to a group of stakeholders. Administration representatives did not participate in the discussions.

Due to the fact that large agricultural companies have received compensation in 2013, to date they have already reoriented their business and refused to participate in the interview due to the lack of need to discuss the historical process of compensation.

Selected examples of the key issues raised during the FSS are summarized as follows):

- Most headmen of rural administrations and community members were aware about the Project but few had information about the specific Project route;
- All stakeholders interviewed expressed the need to provide information about the Project, the technical characteristics of the BAKAD Route, the activities and plans of the BAKAD Consortium within the project in their responses.
- All interviewed stakeholders requested to provide information about the Project, the technical characteristics of the BAKAD Route, the activities and plans of the BAKAD Consortium.
- Public awareness is limited to general knowledge of the Project existence. . The Company is currently establishing a functioning grievance mechanism to allow interaction with representatives of the authorities, the public and other representatives of stakeholders as well as to help stakeholders to obtain sufficient information about the Project.
- The fragmentation of small agricultural lands and limitation of the access to them are perceived as the biggest impacts to a group of farmers.
- The residents of Taldybulak, Kyzyl Kairat, Kyzyl TU 1, Kyzyl TU 2, Kyzyl TU 3 were concerned that as a result of the road construction, small irrigation channels will be blocked. [*The issue is that residents built and*

maintain these irrigation channels by their own and these channels are not managed by municipal entity "Talgarirrigatsiya". All channels managed by municipal entity will be relocated during the BAKAD construction, but private channels were not considered by the engineering design.] Blocking of small irrigation channels will result in the cessation of household irrigation.

- All residents and especially women were concerned about the noise impacts on social facilities (M. Tuymebayeva) and dacha communities (Pogranichnik) during the construction and operation of the Project.
- The influx of workers does not cause tension by local population, however, in most cases, respondents consider it necessary that the construction camp is fenced.
- Most households receive incomes from agricultural activities, despite differences in living standards and income.

Research activities conducted in the settlements and interviews with stakeholders reveal some expectations in terms of the opportunities provided by the project to the region. These are as follows:

- Due to the proximity of study areas to Almaty agglomeration positive effects from the BAKAD construction associated with reduced use of existing outbound routes - Talgar, Kuljinsky, Iliysky paths, the Almaty - Bishkek route.
- About 30 to 50% of the working age population work in Almaty and they expect that the construction of the BAKAD road will reduce their travel time to work.

3.3.5 Questionnaire Survey

Survey of population within the Project Area of Influence

Field social studies included a survey of the population permanently residing in the settlements within the Project area of Influence (~ 1 km to each side of the RoW). The survey was conducted from 6 to 13 July 2018 and covered 298 respondents.

The questionnaire included the following categories:

- Assessment of well-being, including community health and accessibility to public healthcare and education facilities, social support, employment and small business, environment, local government, security, housing, roads and safety.
- Social problems of the population.
- Assessment of the livelihood.
- Expectations from the project.

Analysis of survey results is provided in the section of social baseline of settlements within the Project Area of Influence.

Main findings of the survey results are as following:

- Public awareness is limited to general knowledge about the Project.
- All respondents were interested in receiving information about the Project, including technical characteristics of the BAKAD route, activities and plans of the BAKAD Consortium.
- Preferred channels of information for the public (descending preferences) are: television, placing ads on the company's website, in social networks, in public places.
- The Project is positively evaluated by the majority of the population.

Survey of land users affected by the Project

Owners living on land plots, as well as tenants of land plots were interviewed

in the period from June 20 to July 3, 2018.

A total of 15 respondents were interviewed in Talgar district - in the village of Kyzyl Kairat, Kyzyl Tu-4.

In Karasai district 12 respondents were interviewed in the "Ogonyok" dacha community and "Pridorozhnoye" dacha community.

In the Iliysky district 18 respondents interviewed – 7 people in Kokkaynar and 11 respondents in Pokrovka.

The study was aimed at identification of reasons why people are still residing in the houses which reportedly were already expropriated for the Project needs and compensations provided, as well as understanding the conditions for relocation of households from the RoW.

In summary the following information has been obtained from the survey:

- The average time of comfortable preparation to the move is 2-3 months;
- Preferred method of communication is targeted information by phone;
- All leaseholders residing within the RoW have the information that housing will be removed at the stage of preparatory works for BAKAD construction.

As a result of the survey, two land owners were identified who did not receive compensation - one in Kyzyl Kairat, the other in Pokrovka. These cases require engagement with the district akimats with the participation of the Consortium. In both cases land users belong to the vulnerable categories of population.

3.3.6 Project Website

To date, the Company is in the process of development of its own web-site, which will contain contact information, project documentation, updated data on the current activities of the Company in Kazakh/Russian/English.

3.3.7 *Community Liaison officer*

The company is in the process of appointment of a specialist responsible for the stakeholder engagement who will be coordinating the feedback process to ensure the interaction of the Consortium with the government of Kazakhstan.

3.4 *STAKEHOLDER ENGAGEMENT DURING THE NATIONAL EIA PROCESS*

In accordance with the requirements of national legislation, public hearings are required within the framework of the national EIA. Since the Project design documentation is prepared for each of the start-up Sections, public hearings are held as soon as the Project documentation is developed, separately in each of three districts.

Public hearings in Talgar district

Public hearings on EIA for the Start-up complex 4 were held in March 2018. EIA materials were submitted to the local executive bodies of the Talgar District.

Public hearings were organized by the Roads Committee of the Ministry of Investments and Development in cooperation with the akimat of Talgar district. The announcement of the hearings was posted in the note of the "Express K" newspaper dated February 9, 2018. Public hearings were attended by 15 people.

During the hearings, the representative of the engineering design company "Kazdoriinovatsiya" informed about the proposed road and measures on environmental protection.

The design company have provided the contact number to receive feedback on the Project design solutions. However, no appeals from stakeholders have been received as of July 31, 2018.

Public hearings in Karasaysky district

Public hearings in Karasaysly district were held in the Community center in Irgeli village on July 20, 2018. The hearings were attended by 44 people.

Public hearings were initiated by the engineering design team "Kazdorinnovatsija". The hearings were conducted by the head Irgely rural okrug, Deputy head of the Karasaysky district administration, the representative of the BAKAD Consortium, the engineering design team and the ESIA team.

The following categories of questions have been discussed during the meeting:

- Need for relocation of linear utilities used by dacha communities,
- Land plots compensation,

- Possibility of provision of alternative land plot as a compensation for expropriated one;
- Providing year-round access to fragmented agricultural land of small farms;
- Issues of ensuring the safety of dacha communities located in the vicinity of the construction camp;
- Issues on fragmenting dacha community "Pogranichnik";
- Ensuring the exit of internal roads of dacha communities "Ogonyok" and "Soyuzpechat'";
- Ensuring the access to Isayevo village and Pepsi Cola industrial site by the local road.

Application and contact details of stakeholders were collected during the meeting. All of the issues and questions of concern proposed to be discussed in the individual manner with the design team. All issues related to past land acquisition and prospective land use were transferred to the representatives of the Karasaysky district administration.

Public hearings in the Ilysky district

Public hearings in the Iliysky district will be conducted in September, 2018.

3.5 STAKEHOLDER ENGAGEMENT

A series of consultations (10) were held with the population in each locality within the Project's Area of Influence.

The following topics were discussed with stakeholders:

- Project information, technical specifications;
- Information on activities related to the completion of land acquisition and relocation of land users;
- Cohesion of settlements and impact of the Project on it;
- Change of the access routes to agricultural lands;
- Grievance mechanism disclosure.

In line with Lenders' requirements, the Draft ESIA Report, Non-Technical Summary (NTS), Stakeholder Engagement Plan, Environmental and Social Management Plan (ESMP), ESIA Brochure, and Grievance Form will be subject to public disclosure and comment.

4 LEGAL FRAMEWORK

4.1 INTRODUCTION

This chapter describes the environmental and social Requirements of International Financial Institutions (IFIs) and National legislation of the Republic of Kazakhstan applicable to BAKAD Project.

EBRD, IFC, ADB, IsDB seek to ensure that the projects they finance are designed and operated in compliance with applicable regulatory requirements and good international practice related to sustainable development.

Requirements covering key areas of environmental and social impacts and issues are established in the IFI's E&S policies and specific standards. The integral element of requirements of all the IFIs is the requirement for compliance with the national legislation.

Consequently, for the Project to be financed by the IFIs it must meet the requirements and standards established in the following documents:

- EBRD Environmental and Social Policy (2014) and Performance Requirements established in this policy document;
- International Finance Corporation (IFC) requirements;
- The Safeguard Policy Statement (SPS) of the Asian Development Bank. ADB's SPS sets out the policy objectives, scope and triggers, and principles for the following key safeguard areas: the involuntary resettlement safeguards and the environmental safeguards.
- International Conventions.
- National laws and regulations.

4.2 IFIS REQUIREMENTS TO THE PROJECT

4.2.1 EBRD Requirements

EBRD operates under the number of policies, including the **Environmental and Social Policy (2014).**

EBRD requires that all projects it finances shall have an environmental and social appraisal that "will be appropriate to the nature and scale of the project, commensurate with the level of environmental and social impacts and issues, and with due regard to the mitigation hierarchy".

The EBRD E&S Policy states, "The EBRD categorises each project to determine the nature and level of environmental and social investigations, information disclosure and stakeholder engagement required. This will be commensurate with the nature, location, sensitivity and scale of the project, and the significance of its potential adverse future environmental and social impacts.

Past and present environmental and social issues and risks associated with project-related existing facilities will be subject to environmental and social appraisal regardless of the categorisation.

A project is categorised A when it could result in potentially significant adverse future environmental and/or social impacts which, at the time of categorisation, cannot readily be identified or assessed, and which, therefore, require a formalised and participatory environmental and social impact assessment process."

Based on the definition above and a list of indicative Category A projects presented in Appendix 2 to the EBRD E&S Policy, BAKAD Project shall be classified as Category A project.

A full ESIA Report and related documents have to be prepared and disclosed on the EBRD website. ESIA report shall be made available to the affected community in local language.

EBRD E&S Policy is defined by the Performance Requirements (PRs). Brief description of PRs and their applicability to the BAKAD Project are discussed in the table below (Table 4.2-1).

Table 4.2-1 EBRD Performance Requirements and their Applicability to BAKAD

EBRD Performance Requirements	Applicability to BAKAD
PR1: Environmental Social Appraisal and Management PR1 outlines the client's responsibilities in the process of appraising, managing and monitoring environmental and social issues associated with projects proposed for EBRD financing. Environmental and Social Action Plan (ESAP) is to be prepared for the Projects	**Applicable.** BAKAD is a greenfield project. A full ESIA Report has to be prepared in compliance with EBRD guidelines. The ESIA shall be disclosed and EBRD websites and shall be made available to the affected community in local language.
PR2: Labour and Working Conditions EBRD will seek to support, through its operations, the initiatives of other institutions such as the ILO and the EU to promote the decent work agenda.	**Applicable.** An Occupational Health and Safety (OHS) Plan has to be prepared and implemented as part of the Project's Environmental Management Plan (EMP). OHS Specialists shall be retained by the consortium BAKAD and its subcontractors.
PR3: Pollution Prevention and Abatement Avoid or where avoidance is not possible, minimize adverse impacts on human health and the environment by avoiding or minimizing pollution directly arising from Projects. Projects shall comply with EU environmental standards (or IFC EHS guidelines, where EU standards do not exist).	**Applicable.** Management plans will be prepared as part of the ESIA process and implemented by the consortium to minimize pollution and waste generation. Environmental screening criteria will be included in the pre-qualification criteria of the contractors.
PR4: Community Health, Safety, and Security Avoid or minimize the risks and adverse impacts to community health, safety and security that may arise from the project activities.	**Applicable.** Community health, safety and security risks will be assessed within the ESIA framework and will be a part of the Management Plan.

EBRD Performance Requirements	Applicability to BAKAD
PR5: Land Acquisition, Involuntary Resettlement and Economic Displacement Avoid involuntary resettlement and when avoidance is not possible, minimize displacement by alternative project designs; and avoid forced eviction. Mitigate adverse social and economic impacts from land acquisition by providing compensation at replacement costs and implementing the resettlement activities with participation of affected people; and improve or restore the livelihoods and standards of living of displaced persons	**Applicable.** A Land Acquisition and Resettlement Framework (LARF) will be prepared as a part of the ESIA and income and livelihood restoration plan shall be prepared and implemented.
PR6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. EBRD recognizes the need for the protection and conservation of biodiversity in the context of projects in which it invests	**Applicable.** Protection of endemic fish species is required. However, no protected areas or forests are located within the area of influence of the BAKAD project.
PR7: Indigenous Peoples **Identify whether indigenous** peoples are affected by the project and, if so, ensure full respect to their culture during project implementation; avoid, immunize, mitigate or compensate for impacts; enable them to benefit from the project; and carryout continuous consultations	**Not applicable.** No indigenous people are located in the project area
PR8: Cultural Heritage Support the conservation and protection of cultural heritage in the context of EBRD-financed projects	**Applicable.** Conservation and protection of affected archaeological monuments is required. However, no critical cultural heritage sites are located in the project area.
PR9: Financial Intermediaries EBRD doesn't finance certain types of Projects	**Not Applicable.**
PR10: Information Disclosure and Stakeholder Engagement Stakeholder engagement is an ongoing process through project implementation and appropriate information shall be disclosed to the public.	**Applicable.** All necessary information related to the social and environmental issues are to be disclosed to the public. A communication plan shall be prepared and implemented to disseminate relevant information throughout the Project implementation period.

4.2.2 *IFC Requirements*

Social and environmental safeguard policyof IFC is defined by the performance standards (PSs) of IFC. A brief description of PSs their applicability to the BAKAD project are discussed in the following table.

IFC Performance Standards	Applicability to BAKAD
PS1: Assessment and Management of Environmental and Social Risks and Impacts. Identify and evaluate project's social and environmental risk and prepare mitigation measures. Promote and provide means for engagement of affected community and disclosure of information.	**Applicable**. BAKAD is a greenfield project. A full ESIA Report has to be prepared in compliance with IFC guidelines. The ESIA shall be disclosed and IFC websites and shall be made available to the affected community in local language.
PS2: Labor and Working Conditions The requirements set out in this PS have in part guided by a number of international conventions and instruments, including those of the International Labour Organization (ILO) and the United Nations.	**Applicable.** An Occupational Health and Safety (OHS) Plan has to be prepared and implemented as part of the Project's Environmental Management Plan (EMP). OHS Specialists shall be retained by the consortium BAKAD and its subcontractors.
PS3: Resource Efficiency and Pollution Prevention Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; promote more sustainable use of resources, including energy and water; and reduced project related greenhouse gases emissions. Projects shall comply with either Environmental Health and Safety (EHS) or host country standards (whichever is more stringent)	**Applicable.** Management plans will be prepared as part of the ESIA process and implemented by the consortium to minimize pollution and waste generation. Environmental screening criteria will be included in the pre-qualification criteria of the contractors.
PS4: Community Health, Safety, and Security Anticipate and avoid adverse impacts on the health and safety of the affected community during the project life from both routine and non-routine circumstances.	**Applicable.** Community health, safety and security risks will be assessed within the ESIA framework and will be a part of the Management Plan.
PS5: Land Acquisition and Involuntary Resettlement Avoid involuntary resettlement where possible and avoid forced eviction. Where necessary or acquisition of land or other assets is necessary, the	**Applicable.** A Land Acquisition and Resettlement Framework (LARF) will be prepared as a part of the ESIA and income and livelihood restoration plan (ILRP) shall be prepared and implemented.

standard sets out requirements for participation in resettlement planning, mandates compensation for assets at replacement cost, and expects the borrower to see that incomes and standards of living of affected persons are improved or at least restored to what they were prior to displacement.	
PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources potential impacts on biodiversity and the policy strictly limits circumstances under which conversion or degradation of natural habitats can occur as well as prohibiting projects which are likely to result in significant loss of critical natural habitats	**Applicable.** Protection of endemic fish species is required. However, no protected areas or forests are located within the area of influence of the BAKAD project.
PS7: Indigenous Peoples Identify whether indigenous peoples are affected by the project and, if so, to undertake specific consultation activities and to avoid or mitigate impacts on this potentially vulnerable group.	**Not applicable.** No indigenous people are located in the project area
PS8: Cultural Heritage Protect cultural heritage from the adverse impacts of project activities and support its preservation. Promote the equitable sharing of benefits from the use of cultural heritage.	**Applicable.** Conservation and protection of affected archaeological monuments is required. However, no critical cultural heritage sites are located in the project area.

Environmental and Social Sustainability Policy (dated January 01, 2012) defines responsibilities, role and obligations of the IFC in regards to ensuring environmental and social sustainability.

Environmental and Social Sustainability Performance Standards (dated January 01, 2012) set recommendations to identify project risks and impacts. The standards are aimed to facilitate prevention and management of risks and impacts, and to mitigate the consequences to ensure sustainability of the business.

They also outline customer's accountabilities in regards to stakeholders' interaction and disclosure of operational information about the Project. Performance standards that can be applicable to the Project are indicated below:

IFC' s Performance Standards and Guidlines	Overview of requirements
Environmental and Social Sustainability Performance Standards (dated January 01, 2012)	Performance Standards set recommendations to identify project risks and impacts. The standards are aimed to facilitate prevention and management of risks and impacts, and to mitigate the consequences to ensure sustainability of the business. They also outline customer's accountabilities in regards to stakeholders' interaction and disclosure of operational information about the Project.
General Guidance on Environment Protection, Health and Safety (dated April 30, 2007)	General Guidance is a technical reference that contains general examples of proper international industrial practices. These guides set requirements for: • Environmental protection; • Health and safety of employees; • Local public health and safety. Also the Guidance defines maximum allowable emissions and discharges, indicators of resources consumption efficiency and efficiency of measures aimed to mitigate risks and impacts, monitoring program. The following is a part of the Guidance: • Measures to reduce, prevent and control air emissions; • Methods for waste water discharge and measures to reduce its toxicity, examples of treatment approaches; • Recommendations for handling hazardous substances including loading/unloading, storage and transportation; • Recommendations for waste management; • Manufacturing factors most hazardous to health and safety of employees, and safety measures; • Measures to manage and mitigate risks for local public. According to the Guidance, major risks shall be managed in accordance with international standards and best practices (e.g. recommendations of OECD[1], EU Seveso II[2] directive, risk management program of US EPA[3]).
Environmental, Health, and Safety Guidelines for Toll Roads (rev. dated April 2007)	**Guidelines** is a technical reference providing additional specific for industry requirements for environmental protection and industrial safety, not disclosed in the General Guidelines.

[1] OECD, Guiding Principles for Chemical Accident Prevention, Preparedness and Response, Second Edition, 2003.

[2] EU Council Directive 96/82/EC, Seveso II Directive, extended by the Directive 2003/105/EC).

[3] EPA, 40 CFR Part 68, 1996 — Chemical accident prevention provisions.

4.2.3 *Asian Development Bank Requirements*

The ADB applies principles of internationally accepted environmental and social standards for project financing.

ADB's Social Protection Strategy- includes a range of approaches to manage social risk. Under this policy ADB projects are designed and implemented in accordance with national labor laws and internationally-recognized core labor standards (CLS).

ADB's Policy on Gender and Development (1998)-- adopts gender mainstreaming as a key strategy for promoting gender equity, and for ensuring that women participate in and that their needs are explicitly addressed in the decision-making process for development activities.,

ADB's Policy on Cooperation with Civil Society Organizations (1998) recognize that NGOs can contribute valuable advice on the design of projects and can participate directly in implementation. To support effective cooperation with NGOs, the policy indicates that as appropriate, mechanisms to expand and strengthen interaction with NGOs in loan and technical assistance activities will be identified and existing mechanisms for consultation and dialogue with NGOs will be pursued and strengthened. Under this policy and the 2009 SPS, the Borrower is expected to carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation.; and

ADB's Public Communications Policy (2011)- promotes greater transparency and accountability by enabling ADB's stakeholders—especially people affected by development activities—to better participate in the decisions that affect them. ADB-assisted activities are expected to consider the right of people to seek, receive, and impart information and ideas, and consider feedback from its stakeholders, including affected people. Information shall be given to affected people early enough for them to provide meaningful inputs into project design and implementation.

For the purposes of the loan application the ADB is guided by the **Safeguard Requirements** outlined in the **Safeguard Policy Statement** (June, 2009).

4.2.4 *ADB Safeguard Policy Statement, 2009*

In July 2009, ADB's Board of Directors approved the new Safeguard Policy Statement (SPS) governing the environmental and social safeguards of ADB's operations. The SPS builds upon ADB's previous safeguard policies on the Environment, Involuntary Resettlement, and Indigenous Peoples, and brings them into one consolidated policy framework with enhanced consistency and coherence, and more comprehensively addresses environmental and social impacts and risks. The SPS also provides a platform for participation by affected people and other stakeholders in the Project design and implementation.

The SPS applies to all ADB-financed and/or ADB-administered Projects and their components, regardless of the source of financing, including investment

Projects funded by a loan; and/or a grant; and/or other means, such as equity and/or guarantees. ADB works with borrowers and clients to put into practice the requirements of SPS.

The objectives of ADB's safeguards are to:

- Avoid adverse impacts of Projects on the environment and affected people, where possible;
- Minimize, mitigate, and/or compensate for adverse Project impacts on the environment and affected people when avoidance is not possible; and
- Assist borrowers and clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

ADB's SPS sets out the policy objectives, scope and triggers, and principles for three key safeguard areas:

- Environmental safeguards;
- Involuntary Resettlement safeguards; and
- Indigenous Peoples safeguards.

To help borrowers and clients and their Projects achieve the desired outcomes, ADB adopts a set of specific safeguard requirements that borrowers and clients are required to meet in addressing environmental and social impacts and risks. These safeguard requirements are as follows:

- Safeguard Requirements 1: Environment (Appendix 1 of SPS);
- Safeguard Requirements 2: Involuntary Resettlement (Appendix 2 of SPS);
- Safeguard Requirements 3: Indigenous Peoples (Appendix 3 of SPS); and
- Safeguard Requirements 4: Special Requirements for Different Finance Modalities (Appendix 4 of SPS).

In addition, ADB does not finance activities on the prohibited investment activities list (Appendix 5 of SPS). Furthermore, ADB does not finance Projects that do not comply with its safeguard policy statement, nor does it finance Projects that do not comply with the host country's social and environmental laws and regulations, including those laws implementing host country obligations under international law.

4.2.5 ADB Safeguard Categorization

The Projects are screened on the following criteria:

1. *Environment* -Proposed Project was screened according to type, location, scale, and sensitivity and the magnitude of their potential environmental impacts, including direct, indirect, induced, and cumulative impacts.
2. *Involuntary Resettlement* - The involuntary resettlement impacts of an ADB-supported Project are considered significant if 200 or more persons will be physically displaced from home or lose 10% or more of their productive or income-generating assets.

For those involving involuntary resettlement, a resettlement plan is prepared that is commensurate with the extent and degree of the impacts: the scope of physical and economic displacement and the vulnerability of the affected persons.

3. *Indigenous People* - The impacts of an ADB-supported Project on indigenous peoples is determined by assessing the magnitude of impact in terms of
    - Customary rights of use and access to land and natural resources;
    - Socioeconomic status;
    - Cultural and communal integrity;
    - Health, education, livelihood, and social security status; and
    - The recognition of indigenous knowledge; and
    - The level of vulnerability of the affected Indigenous Peoples community.

ADB provides idea that effective communications and exchange of information and ideas with stakeholders is a vital component of effective and sustainable development.

4.2.6 Islamic Development Bank Requirements

The Islamic Development Bank does not currently have its own policies and standards in the field of environmental and social protection. However, the IsDB group is fully committed to the Sustainable Development Goals (SDGs), signed at the UN initiative in September 2015, and aimed to improve the quality of people's lives in a number of ways: eradicating poverty and hunger; promoting health and education; reducing inequality and gender disparities; building sustainable infrastructure and making cities more sustainable; combating climate change; protecting oceans, forests and bio-diversity.

4.2.7 *International Conventions*

The following international conventions and agreements signed and ratified by the Republic of Kazakhstan are applicable to the Project:

Title	Date and place of signature	Comments on the applicability to the Project and summary of requirements
Climate and Air		
UN framework convention on climate change	1992, Rio de Janeiro	The Client will evaluate predicted GHG emissions and provide for avoidance or mitigation of adverse effects.
Vienna Convention for the Protection of the Ozone Layer and Montreal Protocol on Substances that Deplete the Ozone Layer	1985, Vienna 1987, Montreal	The Project must not result in "adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer".
Convention on Long-range Transboundary Air Pollution	1979, Geneva	The Project design must provide for measures to limit and, as far as possible, reduce air pollution including long-range transboundary air pollution.
Flora and Fauna		
Convention on Biological Diversity	1992, Rio de Janeiro	The Project must be implemented with due regard to the following principles: • Conservation of biodiversity • Sustainable biodiversity use/management • Equitable sharing of the benefits from the use of genetic resources
Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)	1979, Bonn	The Project must be implemented with due regard to the principle of conservation of migratory species of wild animals and their habitats.
Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)	1971, Ramsar	The Client will establish if any ecosystems covered by this Convention exist within the Project or in the immediate proximity to the project facilities and will take the adequate protection/conservation measures if required.
Land		
UN Convention to Combat Desertification/ Land Degradation	1994, Paris	The Project (Client) will provide for measures to improve productivity of land, and the rehabilitation, conservation and sustainable management of land and water resources.
Cultural Heritage		
Convention concerning the Protection of the World Cultural and Natural Heritage	1972, Paris	The Client will identify whether objects of cultural and natural heritage covered by this Convention exist within immediate proximity to the project facilities and will take the

Title	Date and place of signature	Comments on the applicability to the Project and summary of requirements
		adequate protection/conservation measures if required.
Social Aspects / Consultations		
Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters	1998, Aarhus	The Client will provide for: • access to the Project information; • public participation in decision-making; and • access to justice in environmental matters.
Health and Safety		
ILO C148 - Working Environment (Air Pollution, Noise and Vibration) Convention	1977, Geneva	The Project/Client will provide for measures for the prevention and control of, and protection against, occupational hazards in the working environment due to air pollution, noise and vibration.
ILO C155 - Occupational Safety and Health Convention	1981, Geneva	The Project will provide for measures to prevent accidents and injury to health arising out of, linked with or occurring in the course of work, by minimising, so far as is reasonably practicable, the causes of hazards inherent in the working environment.
ILO Conventions 29 and 105 (Forced or Compulsory Labour), 87 (Freedom of Association), 98 (Right to Organise and Collective Bargaining), 100 and 111 (Discrimination), 138 (Minimum Age), and 182 (Worst Forms of Child Labour)	-	The Project/Client will provide for measures to prevent discrimination, forced or compulsory labour, or child labour.
Convention on Road Traffic	1968, Vienna	The Project will facilitate international road traffic and increase road safety through the adoption of uniform traffic rules
Convention on Road Signs and Signals	1968, Geneva	The Project will uniformity of road signs, signals and symbols and of road markings is necessary in order to facilitate international road traffic and to increase road safety
Europeam Agreement concerning the work of Crews of Vechicles engaged in International Road Transport (AETR)	1970, Geneva	The Project will reduce road accidents due to fatigue, uniform working conditions

4.2.8 Requirements of other International Financial Institutions

In accordance with EBRD ESP, the Project must be in compliance with the requirements of good international practice reflected in requirements of other

international financial institutions. Such guidelines should apply if certain requirements are not specified in the EBRD standards.

Guideline Title	Overview of Guideline
Environmental assessment. Operational Policy (OP 4.01) and Bank Procedure (BP 4.01) for environmental and social assessment of projects (January, 1999)	This standard for environmental assessment of projects includes the following main requirements: - Scale and methods are dependent on the potential environmental impacts of the proposed project (4 categories of projects reflecting the potential environmental risk); - It is required to consider project alternatives; - Among priorities is search for project design solutions aimed at prevention, minimization, mitigation of or compensation for negative environmental impacts and enhancement of favourable effects on the environment; - Environmental assessment should take into account the natural environment (air, water and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples; and physical cultural resources; and transboundary and global environmental aspects. Natural and social aspects are to be considered in an integrated way.
Natural habitats. Operational Policy (OP 4.04) and Bank Procedures (BP 4.04) referring to natural habitats (June, 2001)	In order to ensure conservation of natural habitats and maintain their functions Client of the Bank must: - Prevent significant conversion or degradation of critical natural habitats; - implement the appropriate conservation and mitigation measures.

4.3 NATIONAL LEGISLATION OF THE REPUBLIC OF KAZAKHSTAN

Environmental protection and public welfare in the Republic of Kazakhstan is regulated by the following legal acts and regulations:

- International contracts, conventions, agreements and other international legal acts wherein the Republic of Kazakhstan is a participant (assignee);
- the Republic of Kazakhstan Constitution;
- the Republic of Kazakhstan Codes and Federal Laws;
- the Republic of Kazakhstan President Decrees, the RK Government Regulations (Orders);
- the Republic of Kazakhstan Subjects' Laws;
- Orders issued by the heads of executive bodies of the Republic of Kazakhstan subjects;
- Systems of state sanitary-hygienic norms and rules (SanPiN, GN), State Standards (GOSTs) and Building Codes (SNiPs), Code of Conduct (SN); and

- Systems of interdepartmental and departmental research documentation.

Given that the number of regulations directly or indirectly applicable to the Project is fairly high, this section lists only the key laws in which the fundamental requirements to the Project are described.

This section covers general legal and regulatory requirements to environmental and public health protection, as well as the requirements regulating the following activities and aspects:

- Development of design documentation;
- Environmental Impact Assessment process and State Environmental Review;
- Participation of the public in the decision-making process;
- Land expropriation and resettlement process;
- Spatial constraints;
- Protection of environmental components (air, surface water, soil, etc.);
- Waste management;
- Sanitary and epidemiological welfare of population;
- Labour & working conditions and Industrial safety;
- Protection of cultural heritage;
- Requirements to roads construction and operation.

4.3.1 General environmental and public health protection requirements

The main environmental and social principles of the Republic of Kazakhstan are set out in the **Constitution of the Republic of Kazakhstan**[1], the **Environmental Code**[2] and the **Law On Architectural, Town-Planningand Construction Activity in the Republic of Kazakhstan**[3].

4.3.2 Development of design documents, State Expertise (Review)

In line with article 9 of the **Law On Architectural, Town-Planningand Construction Activity in the Republic of Kazakhstan**[4], design documents should include chapters (sections) regarding environmental management and the efficient use of natural resources, as architectural, town-planning, and construction activity shall be carried out taking into account assessment of its environmental impact according to the classification of sites and stipulate

[1] accepted August 30, 1995

[2] No. 212 dated January 9, 2007

[3] No. 242-II dated July 16, 2001

[4] No. 242-II dated July 16, 2001

actions for the efficient use of natural resources and ensuring environmental safety and Environment.

Projects being developed in the Republic of Kazakhstan should go through a process of the State Expertise (Review). It is required that State Expertise (Review) of all technical design documentation to assess whether the proposed designs meet the appropriate technical and other applicable regulations. Among others, this includes review and compliance of the following aspects:

- Industrial and occupational safety;
- Public safety;
- Environmental protection;
- Protection of cultural and archaeological heritage; and
- Fire safety, etc.

4.3.3 Environmental Impact Assessment and State Environmental Review

According to the **Environmental Code**[1], Environmental Impact Assessment (EIA or OVOS) is mandatory procedure "for all economical or other activities which may have direct or indirect environmental impacts" (Article 36, Section 6). All EIA requirements are included in the Environmental Code. The basis of EIA development is **Procedure for the environmental impact assessment of proposed economic and other activities when developing pre-planning, planning, pre-design and project documentation** [2].

Development and implementation of projects that affected the environment is prohibited without EIA (OVOS). The results of the EIA (OVOS)are an integral part of pre-planned, planned, pre-project and project documentation and are submitted for approval by the State Environmental Expertise (Review). The procedure for EIA (OVOS) and further approval is determined in accordance with the category of the activity. Public hearings are a part of the national EIA procedure.

All materials supporting decision-making on regulatory requirements (EIA (OVOS) study and statement, minutes of public hearings, permit applications and other supporting documents) must be reviewed by competent environmental authorities within a procedure known as State Environmental Expertise (Review). The EIA procedure is a two-phase process: the proper EIA and then State Environmental Expertise (Review). Once the EIA is approved, the developer should apply to the State Environmental Expertise (Review). It is forbidden to implement projects for economic and activities or to finance it by banks and other financial institutions without a positive resolution of the State Environmental Expertise (Review).

[1] No. 212 dated January 9, 2007

[2] approved by the Order of the Minister of MEP, 28 June 2007, No.204-p"

4.3.4 *Involvement of the public in environmentally significant decisions*

The **Environmental Code of the Republic of Kazakhstan**[1], secure the right of the public (citizens) to obtain timely, complete and accurate information about the condition of the environment, and the right to participate in environmental decision-making at all stages of an economic activity.
Public hearings are a part of the national EIA procedure. Public hearings are carried out in accordance with the **Rules of conducting of public hearings**[2].

4.3.5 *Land expropriation and resettlement process*

Requirements to land expropriation and resettlement process regulates by the **Land Code of the Republic of Kazakhstan**[3].

Land in the Republic of Kazakhstan is the property of the state. However, land plots can be of private property, or leased to individuals for a short-term (up to 5 years) or a long-term (5-49 years) periods.

According to the article 81 of the Land Code, in case of acquisition of the land plot for public/state use the involuntary expropriation of property or termination of land use rights is possible.

Construction of the road is one of a few grounds for expropriation of a land plot for public use (Article 84, paragraph 2, subparagraph 4).

Starting from 2011 the expropriation of land for the Project needs was governed by the **Law On State Property**[4].

4.3.6 *Spatial constraints*

The design solutions should take into account the planning constraints due to the categories of land, the boundaries of zones, areas that have a protective and other special status, mandatory to comply with.
The following laws regulates spatial constraints:

- **Law On Architectural, Town-planning and Construction Activity in the Republic of Kazakhstan**[5];
- **Law On Specially Protected Natural Areas**[6];
- **Water Code of the Republic of Kazakhstan**[7];
- **Law on the preservation and use of historical and cultural heritage**[8].

[1] No. 212 dated January 9, 2007

[2] dated may 7, 2007 № 135-II

[3] dated 20 June, 2003 No.442

[4] dated 01 March 2011 №413-IV

[5] dated 16 July, 2001 No. 242

[6] dated 7 July 2006 No. 175

[7] dated 9 July, 2003 No 481

[8] dated 2 July 1992, No. 1488 – XII

4.3.7 Protection of environmental components

The main environmental protection legal regulation is **Environmental Code**[1] of the Republic of Kazakhstan.

In line with article 7 of the Ecological Code, land, subsoil, surface and ground water, atmospheric air, forests and other vegetation, wildlife, gene pool of living organisms, natural ecological systems, climate and the ozone layer are to be protected against destruction, degradation, damage, pollution and other harmful impacts. Specially protected natural areas and sites of national natural reserve are subject to enhanced protection.

The Environmental Code was created in 2007 in order to substitute several laws regarding environmental protection and to combine them in one legal document that would summarize environmental goals and objectives of the Republic of Kazakhstan. Environmental Code sets forth the legal basis of the environmental policy to ensure environmental protection, rehabilitation, preservation and rational use of natural resources on the territory of the Republic of Kazakhstan. It also comprises the list of the legal normative documents which are to be accepted under the implementation of the Environmental Code. It covers most of the environmental aspects, defines environmental norms and approvals. Examples of the articles covered by the Environmental Code are provided below:

- Chapter 6: Environmental Impact Assessment (OVOS)
- Chapter 8: Environmental Permits
- Chapter 14: Industrial environmental supervision
- Chapter 33: Environmental requirements on water bodies use
- Chapter 35: Environmental requirements on fauna
- Chapter 42: Environmental requirements on domestic and industrial waste

Furthermore, there are a number of specific environmental protection acts and regulations, including the following documents:

Land Code

The Land Code[2] defines the main directives for management and use of state lands, including those allocated for various purposes, such as agriculture, urban construction, industry and mining, energy production, transmission and communication lines, transport and other purposes. The Code defines the lands under the specially protected areas as well as forested, watered and reserved lands. It also establishes the measures aimed to the lands protection, as well as the rights of state bodies, local authorities and citizens towards the land.

[1] No. 212 dated 9 January 2007

[2] dated 20 June, 2003 No.442

Water Code

The main purpose of the Water Code[1] is to provide the legal basis for the protection of the country's water resources, the satisfaction of water needs of citizens and economic sectors through effective management of water resources, and safeguarding the protection of water resources for future generations. The Water Code addresses the following key issues: responsibilities of state/local authorities and public, water cadastre and monitoring system, public access to the relevant information, water use and water system use permitting systems, transboundary water resources use, water quality standards, hydraulic structures, operational safety issues, protection of water resources and state supervision.

Forest Code

The Forest Code[2] shall regulate relations connected with sustainable forest management - guarding, protection, rehabilitation, afforestation and rational use of forests and forest lands of the Republic of Kazakhstan as well as with forest stock-taking, monitoring, control and forest lands.

Law On Fauna

The Law On Fauna[3] defines RoK state policy in the field of maintenance, protection, usage and regeneration of fauna. The law defines the objectives of survey of the fauna, state monitoring, state inventory, requirements and approaches of red book preparation on fauna, conditions, peculiarities, limitations of allocation of fauna objects for purposeful usage, basis of termination of the right to use, provisions on fauna maintenance, and economic encouragement of usage and implementation of supervision. The law also defines the rights and obligations of the state governance and local governmental bodies in the field of flora maintenance, protection, reproduction and usage.

Law On Specially Protected Natural Areas

The Law on Specially Protected Natural Areas [4] defines the legal basis and relations of state policy for development, restoration, maintenance, reproduction and use of natural complex and separate objects, as well as ecosystems of specially protected natural areas of the Republic. According to the law, specially protected natural areas are divided into four categories, National parks, State Reserves, Natural museums and the forth category is divided into three separate types: areas of international, republican and local importance. The law defines concepts, regimes of maintenance, principles of

[1] 9 July, 2003 No 481

[2] dated 8 July, 2003 No. 477

[3] dated 9 July, 2004 No.593

[4] dated 7 July 2006 No. 175

preparation of specially protected natural areas management plans, monitoring, calculation and state registrar, as well as the requirements of usage, limitations and principles, rights and obligations of state governmental and local governmental bodies, maintenance bodies of the protected areas, the rights public to get information on protected areas, financial sources of protected areas, requirement of supervision and responsibility for violating the Law on Specially Protected Natural Areas.

4.3.8 Waste management

The handling of the waste is regulated by the **Environmental Code**[1].

4.3.9 Sanitary and epidemiological welfare of population

Community health aspects are governed by the following laws:

- **Law on Civil Protection**[2]. The main objectives of this law are protection of population, environment and facilities management from emergency situations and the consequences caused by them.
- **Law on public health and healthcare system**[3]. The Code sets forth (inter alia) key 17 principles of the national health care policy (Article 4), public health monitoring and control and general responsibilities of businesses and organisations in preventive measures and public health control (Article 90).
- Sanitary norms "**Sanitary requirements for radiation safety**" approved by RK Government Decree[4].

4.3.10 Labour and working conditions and Industrial safty

The Labour Legal Framework in Kazakhstan is based on the **Constitution of the Republic of Kazakhstan**[5], the **Labour Code**[6] and includes other laws and regulations of the Republic of Kazakhstan.

Health and safety conditions at workplaces and industrial safety are governed by the **Law on machine and equipment safety**[7], **Fire safety rules**[8], etc.

[1] No. 212 dated 9 January 2007

[2] N188-V ZRK dated 11 April 2014

[3] dated September 18, 2009 Code No. 193-IV

[4] № 201 dated February 3, 2012

[5] accepted August 30, 1995

[6] dated 23 November, 2015 no. 414-V

[7] № 305-III ЗРК, 21 July 2007

[8] № 1077 dated 9 October 2014

4.3.11 *Protection of cultural and historical heritage*

Preservation, utilisation, popularisation and state protection of cultural heritage (historical and cultural monuments and sites) of the peoples inhabiting the Russian Federation are governed by **Law on the preservation and use of historical and cultural heritage**[1] and the **Law On architectural, town-planning and construction activities in the Republic of Kazakhstan**[2]**.**

4.3.12 *Requirements to roads construction and operation*

The Law of Republic of Kazakhstan 'On the road' dated 17 July 2001 laid out the basic legal, economic and organizational principles of governance roads in the Republic of Kazakhstan. The Road Law covers all aspects of the development and use of roads including design, engineering, traffic requirements, dimensions and providing land.

[1] dated 2 July 1992, No. 1488 – XII

[2] No. 242-II dated July 16, 2001

5 ESIA METHODOLOGY

5.1 INTRODUCTION

The Consortium is seeking funding from the international finance institutions which specify ESIA requirements introduced by the International Finance Corporation (IFC), EBRD, ADB and IsDB. Accordingly, Consortium has committed to complying with both the Kazakh EIA process, as well as with IFC, EBRD, ADB and IsDB requirements. The term ESIA will therefore be used to denote this dual-impact assessment process.

This Chapter describes the ESIA methodology that has been followed for the Project.

5.2 ESIA PURPOSES

The key objectives of the ESIA are to assess the potential environmental and social impacts associated with the planning, construction, operation and decommissioning and closure phases of the Project and, to identify measures that can be adopted to avoid, minimise or offset adverse impacts and enhance beneficial impacts.

Consideration of environmental and social factors throughout the entire lifecycle of the Project (preparatory works, construction operations, production operations, and decommissioning) is an essential prerequisite to Project implementation in accordance with the sustainable development concept. The environmental and social impact assessment (ESIA) in early stages of the Project is recognized as the most effective way to ensure such consideration.

The following ERM's approach to the ESIA has been developed in accordance with the requirements of the Lenders which were used to define the scope and content of the present ESIA.

The ESIA is an iterative process which comprises prediction and evaluation of potential impacts of the Project on "physical" and "biological" components (indicators) of the environment and on social and socioeconomic components.

It should be noted that the ESIA is not linear, but consistent cyclical process. The ESIA findings are detailed, revised and adjusted as Project's technical aspects are developed and the ESIA is carried out.

The overall ESIA approach is illustrated in *Figure 5.2-1.*

The main stages of the ESIA and the basic steps carried out at each stage are presented in *Figure 5.2-2.*

Figure 5.2-1 Overall ESIA Approach

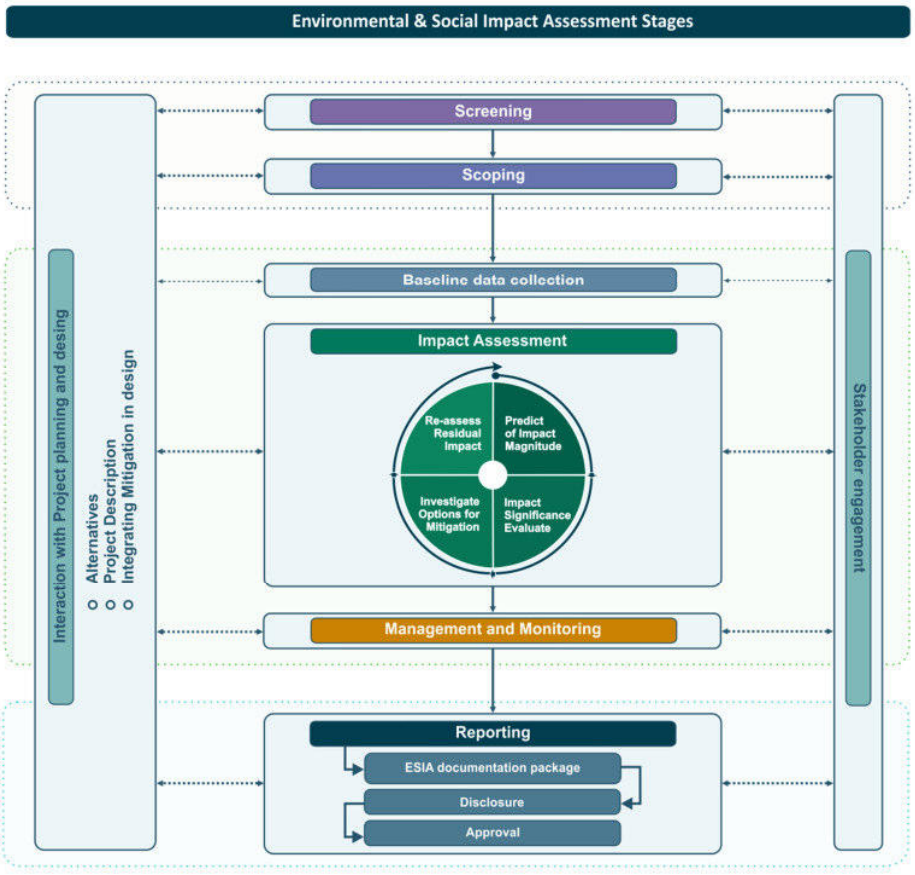
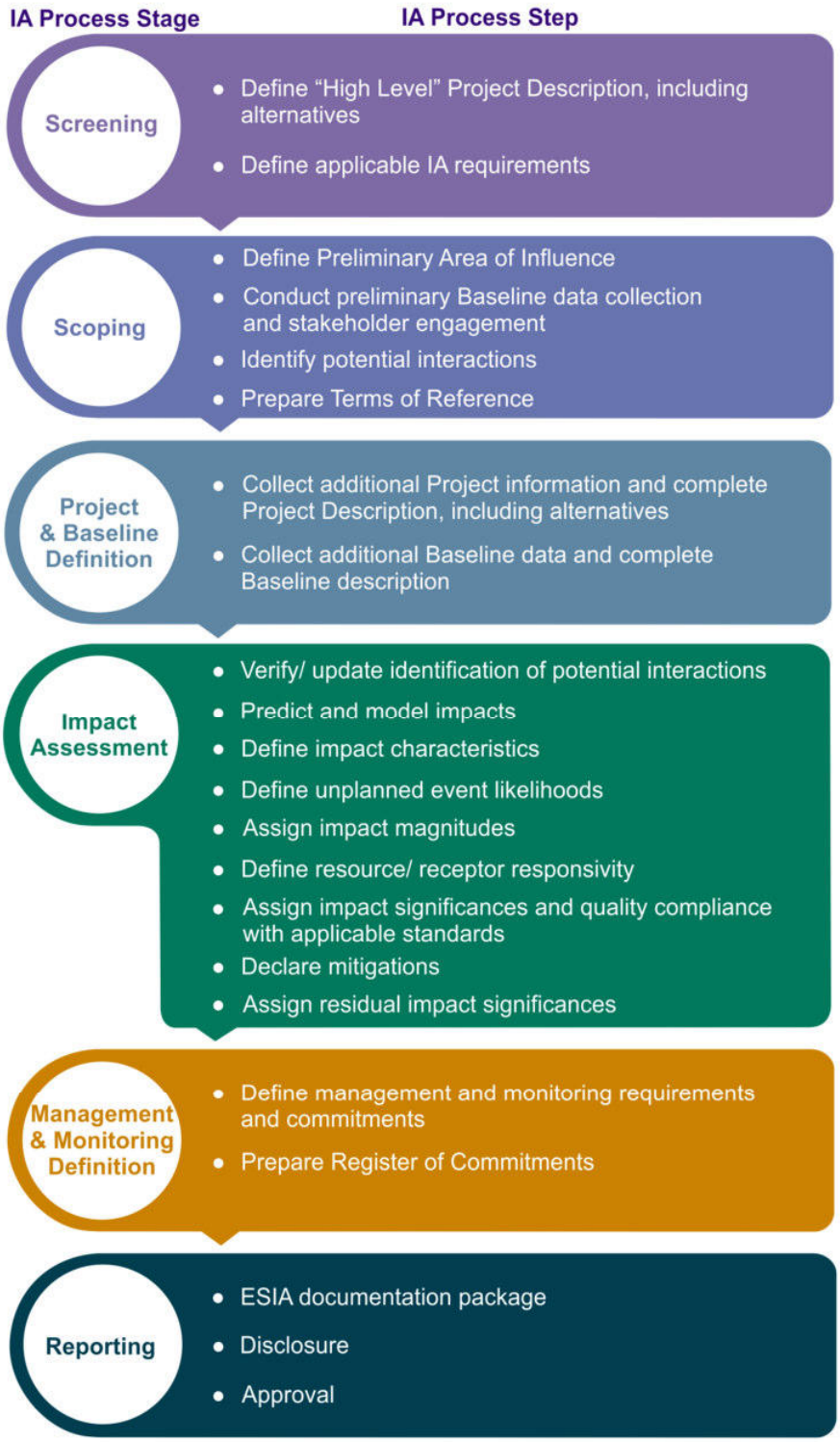


Figure 5.2-2 ESIA Stages



5.3 *SCREENING*

Screening is the initial stage of the ESIA provided preliminary information of what legal and other requirements apply to the Project. This step is conducted utilising a description of the Project and its associated facilities.

5.4 *SCOPING*

The key task of ESIA scoping is to determine potential significant aspects of the Project's impact on the natural and social environment which will require further study. The scoping usually is implemented at the ESIA preparatory stages, and the findings are presented to the consideration of the Project design team.

5.5 *PROJECT DESCRIPTION, ALTERNATIVES AND INTERACTION WITH PROJECT PLANNING AND DESIGN*

The Project description is provided in order to identify the impacts of design and technological features, as well as all alternative design solutions are analyzed in an effort to select the optimal Project implementation option based on the sustainable development concept.

The ESIA process requires continuous interactions with Project designers at all stages of the Project design lifecycle in order to take into consideration the ESIA findings when making design solutions.

5.6 *BASELINE STUDIES*

Primary and secondary environmental and social data were collected during the baseline studies in order to enhance understanding of the Project's receiving environment. The baseline highlighted the existing environmental and social issues and formed the background against which impacts were identified and evaluated. In particular, the baseline aims to provide information to enable the following:

- the identification of key conditions and sensitivities within the proposed Project area;
- the prediction and evaluation of possible impacts resulting from the proposed Project;
- the understanding of stakeholder concerns and analysis of perceptions and expectations; and
- the provision of a benchmark from which to assess future changes resulting from the proposed Project and monitor the effectiveness of mitigation measures.

5.7 IMPACT ASSESSMENT

During the impact assessment phase, the ways in which the Project will interact with the physical, biological, cultural and social environments to produce impacts to resources/receptors were assessed. This involved a number of stages as set out below.

The general impact assessment methodology comprises the three main determination steps as summarised further below.

I. Determination of Impact *Magnitude* of Impact factor.
II. Determination of the *Sensitivity* of Impact Recipient.
III. Determination of *Impact Significance*: this final step is conducted qualitatively in a matrix based on the interplay of the previous results of the Recipient *Sensitivity* and *Impact Magnitude*, with the results expressed as *Negligible*, *Minor*, *Moderate* or *Major*.

Prediction of Magnitude

The magnitude of each impact was predicted as falling into one of the following designations: negligible, small, medium or large. The 'magnitude' encompasses various possible dimensions of the predicted impact, such as:

- extent (ie local, regional or international);
- duration (ie temporary, short-term, long-term or permanent);
- scale or size (no fixed designations);
- frequency (no fixed designations); and
- likelihood, for unplanned events only (ie unlikely, possible, likely).

Each ESIA topic area (eg noise, biodiversity, social, etc) adopted a different methodology for defining the magnitude of change as appropriate to the discipline however, the designations used were consistent. For example, for readily quantifiable impacts, such as noise, numerical values were used to define its size, whilst for other topics, eg social impacts, a more qualitative classification was necessary.

In the case of positive impacts, no magnitude was assigned.

Sensitivity of Resources and Receptors

The sensitivity (or vulnerability / importance) of the impacted resource or receptor was also defined using one of the followings designations: low, medium or high. As per the magnitude rating, the definition for each designation varied on a resource/receptor basis. Where the resource is physical (for example, a water body) its quality, sensitivity to change and importance (on a local, national and international scale) are considered.

Where the resource/receptor is biological or cultural, its importance (for example, its local, regional, national or international importance) and its sensitivity to the specific type of impact are considered.

Where the receptor is human, the vulnerability of the individual, community or wider societal group is considered. The sensitivity definition for each resource / receptor is defined in more detail in the individual topic assessment chapters.

Evaluation of Significance

Once the magnitude of the impact and sensitivity of the resource/receptor has been characterised, the impact significance is assigned using the significance matrix presented in *Figure 5.7-1*.

Figure 5.7-1 ***Impact Significance Matrix***

		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

Table 5.7-1 provides context for what the various impact significance ratings signify.

Table 5.7-1 Context of Impact Significance

Significance Designation	Significance Context
Negligible	A resource/receptor (including people) will not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.
Minor	A resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.
Moderate	Has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit.
Major	An accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors.
Positive	There will be a beneficial impact to a resource/receptor. (note: no magnitude is assigned for positive impacts).

Identification of Mitigation Measures

Where significant impacts were identified (ie those with a minor, moderate or major rating), mitigation measures have been developed to find practical ways of addressing negative impacts and enhancing positive impacts. The key objective was to mitigate impacts to a level that is 'as low as reasonably possible' (ALARP).

A hierarchy of mitigation options is considered, with avoidance at the source of the impact as a priority and compensatory measures or offsets to reduce the impact significance as a last resort. The mitigation hierarchy that is utilised in this ESIA is presented in *Figure 5.7-2.*

The preference is to avoid the impact at source, and least desirable option is to provide compensation or an offset for residual impacts that cannot be further reasonably avoided.

Embedded controls (i.e., physical or procedural controls that are planned as part of the Project design and are not added in response to an impact significance assignment), were considered as part of the Project (ie prior to the

impact assessment stage of the ESIA Process). Accordingly, they are not described as mitigation measures in the individual topic assessment chapters.

All the mitigation measures outlined within the ESIA and those commitments made under the Kazakh EIA process will be collated and listed within the Commitments Register for the Project which is annexed to ESMP - *Volume IV* of this ESIA.

Volume IV of this ESIA will outline the Environmental and Social Management Plan (ESMP) for the project and presents an overview of how the mitigation measures for this Project will be implemented by Project and its contractors during construction and operation.

Figure 5.7-2 Hierarchy of Options for Mitigation

THE MITIGATION HIERARCHY FOR PLANNED PROJECT ACTIVITIES
Avoid at Source; Reduce at Source Avoiding or reducing at source is designing the project so that a feature causing an impact is designed out (eg, a waste stream is eliminated) or altered (eg, reduced waste volume).
Abate on Site This involves adding something to the design to abate the impact (eg, pollution controls).
Abate at Receptor If an impact cannot be avoided, reduced or abated on-site then measures can be implemented off-site (eg, noise or visual screening at properties).
Repair or Remedy Some impacts involve unavoidable damage to a resource. Repair essentially involves restoration and reinstatement type measures.
Compensate/Offset in Kind Where other mitigation approaches are not possible or fully effective, then compensation, in some measure, for loss or damage might be appropriate.

Identification of Mitigation and Enhancement Procedures

Once the significance of an impact has been characterised, the next step is to evaluate what mitigation and enhancement measures are warranted. For the purposes of this IA, ERM has adopted the Mitigation Hierarchy as presented in *Figure 5.7-2* above and described below:

- Avoid at Source, Reduce at Source: avoiding or reducing at source through the design of the Project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).
- Abate on Site: add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimetre screening and landscaping).
- Abate at Receptor: if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce

noise impact at a nearby residence or fencing to prevent animals straying onto the site).

- Repair or Remedy: some impacts involve unavoidable damage to a resource (e.g. agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.
- Compensate in Kind, Compensate Through Other Means: where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).

The priority in mitigation is to first apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

Assessment of Residual Impact

Following the identification of mitigation measures, impacts are re-assessed to determine their residual impact. This is essentially a repeat of the impact assessment steps discussed above, albeit with a consideration of the assumed implementation of the mitigation measures.

Cumulative Impacts

Assessment of cumulative effects is an integral part of the ESIA process and ensures that all aspects of potential effects from the Project have been, or will be, addressed. Cumulative effects result from incremental changes caused by other past, present or reasonably foreseeable developments together with those from the construction and operation of the Project.

In most instances, past and present developments will have been captured in the baseline for the Project (for example, through noise measurements, traffic counts) and the normal practice of 'adding' impacts from the Project to the baseline will assess the cumulative effect.

The cumulative assessment approach is based on a consideration of the approval status or existence of the 'other' activity and the nature of information available to aid in predicting the magnitude of impact from the other activity.

5.8 *MANAGEMENT & MONITORING*

On the final stage in the IA Process the basic management and monitoring measures are defined that are needed to identify whether: a) residual impacts or their associated Project objects remain in conformance with applicable standards; and b) mitigation measures are effectively addressing impacts and compensatory measures and offsets are reducing effects to the extent predicted.

5.9 *STAKEHOLDER ENGAGEMENT*

An effective ESIA Process requires engagement with relevant stakeholders throughout the key stages. This assists in understanding stakeholder views on the Project and in identifying issues that should be taken into account in the prediction and evaluation of impacts.

Such consultations are directing to obtain the comments regarding the Project and its impacts with subsequent consideration of these comments while forecasting, assessing impacts, developing mitigation measures and informing about consultations to be conducted. In addition, consultations are of importance for obtaining data and information about the concerned territory.

Periodic engagement is being undertaken with stakeholders throughout the ESIA process and stakeholders views have been incorporated into the assessment process. The engagement process is described in more detail in *Chapter 3, Section*. The Stakeholder Engagement Plan developed for the Project (refer to *SEP, Volume VI*) provides a list of stakeholders that were consulted throughout the ESIA process.

6.1 INTRODUCTION

This Chapter provides a summary of the environmental impacts which were identified during the ESIA study. For more information on other impacts please see the relevant technical appendices to *Volume III* of this ESIA. The methodology used to identify and assess impacts is described in detail in *Section 5* of this ESIA.

The following Project activities are relevant for the construction phase:

- construction and operation of concrete and asphalt plants, worker camps, access roads (emissions, noise and etc.);
- employment of personnel and procurement of goods and services (from local market);
- physical presence of construction workers;
- construction traffic (transportation of workers and materials);
- pile driving of the foundations;
- operation of construction machinery, equipment and generators, hazardous materials;
- borrow pits/quarry mining;
- wastes/ wastewater handling and disposal.

In the time of the preparation of this draft ESIA report information on many of the specifics regarding quarries and waste management was not available. Therefore, a site-specific impact assessment could not be conducted exclusively for this section. Quarries that will be used and information on waste management (ie. which waste disposal facilities will be used) will be either determined later by the Consortium or will be up to the EPC Contractor. The assessment of these topics will then be handled in accordance with the Design Change Management Plan and the applicable Management Plans under the ESMP.

The relevant activity for the operation phase is the maintenance of the road, bridges and other associated facilities.

6.2 GEOLOGY AND SOILS

6.2.1 Introduction

This Chapter presents an assessment of the potential impact of the Project related to geology and soils. In the scoping phase of the assessment and subsequent review, the following types of impacts were identified as relevant to the Project:

- risks of increase in land instability/erosion;
- risks associated with seismic activity;
- risks associated with presence of contaminated land/dumpsites;
- impacts on surrounding soils/landscape from contaminated roadway runoff.

6.2.2 Summary of Baseline Findings

The field geology and soil surveys of the Project area were undertaken in June 2018 by ERM. The survey covered a 500 m strip on each side of the axis of the BAKAD route (the detailed description of survey results, baseline conditions and maps will be given Volume III of ESIA Report).

The length of walkover surveys totalled 140 km. The work included establishment of 17 soil sections and a number of open test pits along the BAKAD route, worker camps and quarries.

The data below is given based on the results of these surveys and the data from opened sources and previous investigations within the Project area.

Site Geology and Seismic Risk

The Project area is located on the sloping alluvial plains of foothills of the Zailisky Alatau Mountains which form part of the Tien Shan Mountain range (a large system of mountain ranges located in Central Asia with a highest peak of 7,439 m above mean sea level). The surface gradually drops from these mountains and foothills to the north and more gently from west to the east.

Ground elevation along BAKAD RoW varies from 615 m to 970 m above mean sea level (masl). Due to numerous dissecting rivers and gullies, the topography is undulating and rugged at some locations.

Geologically, the Project area is located in a quaternary piedmont plain adjacent to a high mountain system. The sequence of the shallow geological strata, based on geotechnical investigations carried out under earlier studies, generally consists of (Dortrans TEO, 2013):

- 15 m of semi loam deposits
- layers (up to 0.3 m) of high plastic loamy soils
- 0 to 9 m of soft plastic soils
- 0 to 3.4 m of plastic loams
- 2 to 3 m of pebbles.

The thickness of the layer of Quaternary formations, which have an alluvial and proluvial origin and which form the route of the proposed road from the surface downwards, is tens of metres.

In the upper part of alluvial cones, on a piedmont bench, the Quaternary formations are represented by boulder, pebble and gravel deposits, which are replaced, from the mountains to the valley, with predominantly loamy sections alternating with sandy loams, sands of various coarseness and, rarer, gravel and pebble bands.

Encountered throughout the area is a cover of loess loams and, rarer, sandy loams, the thickness of which increases with the distance from the upper parts of alluvial cones, where it amounts to several metres.

The Zailiysky Alatau Ridge, whose submontane area will be crossed by BAKAD, is the northern branch of Tian Shang Mountains dating back to the Caledonian orogenesis. Local neotectonic processes are mainly manifested through elevated seismic activity.

The southern part of the Project Area scores 9 on the seismic activity scale; the northern part scores 8. In terms of geological soil conditions (SNiP RK 2.03.30-2006), seismicity of almost all locations where artificial structures will be constructed is taken at 9.

Soil Characteristics and Erosion Risk

Loess like loams, sandy loams, occasionally with sand, gravel, silty clays, characterized by high silt (50%) content and presence of subsidence properties dominate on the construction area.

The area is classified as a piedmont steppe landscape, most of which is cultivated. Hence, soils and vegetation have considerably changed their natural characteristics and demonstrate high variety.

Piedmont areas, where elevations vary from 600-700 to 1500 m above sea level, are mainly formed by sierozems, light and dark chestnut soils; glasswort and sage vegetation is replaced by sage-grasses and herb-grasses.

The northern part of the area is dominated by light sierozems covering loessial soil. Further to the south, they are replaced with chestnut soils covered by meadow-steppe vegetation.

In terms of mechanical composition, light loamy soils prevail; sandy loams occur rarer, while sandy soils are scarce (e.g. the lowland terrace of the river Bolshaya Almatinka).

Other types of soils are meadow-chestnut and alluvial-meadow soils, which are confined to lowlands and waterways; also found are common light chestnut, meadow-light-chestnut, and meadow-bog sierozems.

Due to the prevalence of light particle-size composition and loessal parent rock, soils along the BAKAD route are exposed to wind and occasional water erosion. Anti-erosion measures must include the early sowing of perennial grasses over the proposed road slopes and drainage of the roadbed to prevent potential washout of soil in adjacent areas.

6.2.3 *Project Activities and Related Impacts*

Natural topography along the BAKAD will be subject to change due to earth works and construction of an embankment. About 8,946,993 cubic metres of earth (including top soil) will be excavated along the right of way of the alignment. An embankment of up to 6 m height will be constructed using the 6,277,398 cubic metres of excavated material.

Natural topography at the quarry sites will be subject to change due to the large scale excavation.

Changes in natural topography will impair the natural landscape and induce a series of impacts related to changes in slopes such as soil erosion, landslides and changes in drainage pattern and groundwater recharge. Soil erosion from the disturbed areas and excavated rock stock piles will increase the sediment load of surface water.

Surface soils in the Project area are chestnut soils with high humus content and are generally fertile for agricultural and horticultural development. About 1,763,711 m^3 of top soil will be excavated during earth works in the right of way of Project alignment.

6.2.4 *Summary of Potential Impacts and Identified Project Mitigation Measures*

The impacts from the construction and operation stages are summarized in *Table 6.2-1*. Mitigation measures identified in the Project documentation and additional mitigation measures will be included in the ESMP are also given in the table below.

Table 6.2-1 Construction and Operation Geology and Soil Impacts and their Mitigation

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
1	**Potential adverse geological processes and seismic risk** Wind and water erosion, screes, landslides and etc. potential adverse geological processes can be caused by site preparation (removal of topsoil), excavation work (replacement of soil, filling canvases). Most vulnerable areas are confined to the interchange construction sites, bridge crossings over watercourses and relocation of river channels (Bolshaya Almatinka, Malaya Almatinka and Kartabulak). Construction of interchanges is associated with the need to fill the road bed and reinforce slopes/ ramps using both mechanical means (geowebs) and biological methods, e.g. sowing of perennial grasses over road slopes. Earthquake may occur either during the construction or the operation of the Project. The Project site is located on the 9 seismic activity zone.	**Moderate to Major** Given the BAKAD length and a large number of interchanges and bridges that need to be constructed, potential impact may be assessed as 'moderate to major'. The most sensitive areas within the BAKAD route: - two-level interchanges: PK 00, PK 58, PK 209, PK 341, PK 434, PK 464, PK 556, PK 655 - bridges: PK 153, PK 171, PK235, PK 244, PK 275, PK292, PK312, PK 314, PK 327, PK 346, PK 356, PK 366, PK 389, PK 401, PK 464, PK 467, PK 529, PK 579; - straightened sections of riverbeds: PK 346, PK 462-467, PK 474.	**Construction stage:** • To prevent the development of unfavorable geological processes, the Project provides for the strengthening of the roadbed, depending on the height of the mound and the angle of slope, followed by sowing of herbs. • To prevent waterlogging of the roadbed by surface water and possible water erosion, the Project provides for a system of surface drainage, including water drainage from the sole of the embankment with ditches. • Culverts for streams with slopes exceeding 2% are designed according to the off-the-shelf solution: 501-96 "Hillside pipes on the roads" with construction of gullies and dampers to prevent erosion on the inlet and outlet pipe sections. • The Project provides for 513,175 m2 of grass seeding. • The Project design will consider the relevant national regulatory requirements related to seismic design and risk assessment and also the findings of the site specific geological/ geotechnical investigation study. • The seismic design for the Project and all related structures such as interchanges, culverts, bridges based on the 9 seismic	**Residual Impact:** • Permanent residual impacts due to the physical excavation of the soils and other existing surface structures along the Right of Way and the required cuts and fills of the existing topography. • Despite the planned mitigation measures for the construction stages, runoff from stockpiles and cut and fill areas may result in soil erosion, especially in the vicinity of the construction areas, access roads and quarry and borrow pit operation areas. **Mitigation Measures**: No additional measures are required.

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
			activity scale in accordance with SNiP RK 2.03.30-2006.	
2	**Soil fertility degradation due to removal of soil-vegetation layer** As the BAKAD route will cross predominantly arable land, general decline in the fertility of land within the Project implementation area will occur due primarily to the acquisition/ withdrawal and fragmentation of ploughland. Local losses of fertile topsoil will also occur in areas that will be affected by temporary disturbance during construction.	**Minor to Moderate** In the course of preparatory work on the territory of the BAKAD, it is planned to remove the topsoil to a different depth of 0.20-0.60 m (depending on the physical and chemical characteristics and the power of the topsoil). The approximate volume of the removed topsoilwill be 1,763,711 m^3. Soil reserves are located along the BAKAD route (soil reserve-digging PK 27-PK36, soil-reserve #3 PK43 – PK55, soil-reserve #5 PK283, soil-reserve #1 PK440, soil-reserve digging PK451-PK470).	**Construction stage:** • Minimisation, where possible, of land withdrawal during the design stage; adherence to allocated land boundaries during construction; • It is proposed a layer-by-layer removal of topsoil, avoiding of mixing with underlying infertile horizons and construction waste. • Removed topsoilis planned to be stored in burts (only for the construction period, height of the burts shall ideally not be more than 3 m if possible depending on the topographical conditions and land availability to avoid any fertility lose) at the designated areas on the row, every 0.5 km. Additional measures will be taken such as erosion control measures, drainage and re-seeding in case the bursts are higher than 3 metres. • Temporary land allotment will be recultivated at the end of the construction period. • Further topsoil will be used for rehabilitation works of road embankments and land reclamation. • Land restoration is carried out in two stages: technical (land planning and application of topsoil) and biological (complex of agrotechnical measures and sowing of perennial grasses).	**Residual Impact: Negligible** **Mitigation Measures**: **Construction stage:** • Control of land rehabilitation/ reinstatement activities as detailed in the ESMP. **Operation stage** • Control of application of deicing agents and monitoring of the chlorides content in soil.

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
3	**Change of water regime of soils** As a result of excavation and construction of the roadway embankment, it is expected that the water regime (mainly towards waterlogging) of the soil on the sections adjacent to the BAKAD highway will change. The changes will be due to the overlap of the natural flow of groundwater, which within the construction site is close enough to the surface.	**Minor to Moderate** It is proposed to construct 168 culverts (with a total length of 7506 metres) for seasonal streams and the irrigation network. The most sensitive areas within the BAKAD route: PK 153, PK 171, PK235, PK 244, PK 275, PK292, PK312, PK 314, PK 327, PK 346, PK 356, PK 366, PK 389, PK 401, PK 464, PK 467, PK 529, PK 579 and others parts of the road in depressed landscape and next to irrigation network.	**Construction stage:** • Construction of culverts and bridges crossing permanent watercourses; • Land restoration.	**Residual Impact: Negligible** **Mitigation Measures**: **Operation stage** • Control of the serviceable condition of culverts/drainage ditches, etc.
4	**Soil fertility degradation as result of pollution** During construction, potential soil pollution in adjacent areas will be caused by emissions from construction equipment and production/ transportation of building materials. Other potential impacts include spills of pollutants/ fuels and oils, littering of construction sites and surrounding areas including construction camps. During operation, potential soil pollution in adjacent areas will be predominantly caused by emissions from vehicles. Most emissions/ pollutants will be dispersed via air (gases) or will be quickly transformed in soil (organic substances). Long-term accumulation in soil during the entire operation period may be characteristics	**Moderate to Major** Along the BAKAD route in the immediate vicinity of the road there are plots of agricultural land (arable land). Such areas, along with floodplain areas, are the most vulnerable to pollution. The magnitude of the impacts on the soil media of spills and runoff arising during the construction and operation activities ranges from small to large depending on the concentrations of pollutants.	**Construction stage:** • Use of serviceable construction equipment: • Construction of water-resistant coatings on equipment maintenance sites • Temporary storage of waste from vehicle and machinery maintenance operations at designated areas with subsequent removal of waste to solid domestic and industrial waste landfills or transfer to specialised organisations for disposal / recycling; • Collection of wastewater from vehicle washing into a settlement pond to trap suspended particles and petroleum products. • Collection of sludge from the settlement pond into a container followed by its offsite removal and reuse in road construction;	**Residual Impact: Minor** **Mitigation Measures**: **Operation stage** • Confining of application of deicing agents to within the roadbed • Limitation of the quantity of applied agents with consideration of weather conditions and season • Control of application of deicing agents and monitoring of the chlorides content in soil • In case of high concentration of chlorides in adjacent farmland areas, measures must be undertaken to reduce/ mitigate adverse impacts on vegetation (e.g. loosening, watering, organic manuring, etc.) • Measures for the case of lorry spills, fire, etc. involving

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
	mainly of heavy metals (due to the wear of tyres, metal parts, etc.). An additional source of potential soil pollution in the immediate proximity to roads may be created by the use of deicing agents which will be carried beyond road shoulders due to heavy and fast traffic flow.		• Temporary storage of all wastes generated at the construction site at designated areas followed by their timely removal to landfills or transfer to specialised organisations for disposal / recycling. • Fuels, oils and chemicals will be stored on an impervious base protected by a bund, and drip trays will be used for fuelling mobile equipment. No USTs will be used during construction stage. • The soil contaminated due to spillages during handling fuel and other hazardous liquids will be removed from the site for suitable treatment and/or disposal. **Operation stage** • The rest areas/ petrol stations/TGs along the BAKAD road must include appropriate treatment of liquid and solid wastes to avoid contamination of local soils/ecology near these facilities; • Store appropriately by following good hazardous materials storage and handling management practices.	hazardous/polluting substances along the BAKAD route to prevent and clean up any significant impacts from drainage of contaminated liquids and fire-fighting water.
5	**Soil Erosion Risk** Several soil erosion areas were identified along the BAKAD route (PK19, PK25-26, PK38, PK42, PK45). There are areas along the Project which have a natural erosion risk due to their subsurface characteristics, areas which are prone to subsidence (alluvial soils) and wind erosion	**Negligible to Moderate** The significance of the impact will vary between depending on the source and receptor setting. The section of moderate erosion area (medium magnitude) is identified as mostly agricultural area which very close to residential	**Construction stage:** • The road design is optimized to limit the gradient of the access roads to reduce runoff-induced erosion, and provide adequate road drainage based on road width, surface material, compaction and maintenance.	**Residual Impact: Negligible** **Mitigation Measures**: **Operation stage** • Erosion, sediment and pollution control, management of upper soil, as well as storm water run-off.

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
	(sandy soils), areas at risk from excavation works and soil movement such as steep slopes at cut and fill sections, and risks related to medium stable soils which are present in fault zones.	districts. Together, the Project can have a major impact in this area.	• Culverts for streams with slopes exceeding 2% are designed according to the off-the-shelf solution: 501-96 "Hillside pipes on the roads" with construction of gullies and dampers to prevent erosion on the inlet and outlet pipe sections; • The Project provides for 513,175 m2 of grass seeding. • The Project provides for the strengthening of the roadbed, depending on the height of the mound and the angle of slope, followed by sowing of herbs. • To prevent waterlogging of the roadbed by surface water and possible water erosion, the Project provides for a system of surface drainage, including water drainage from the sole of the embankment with ditches.	

6.3 HYDROGEOLOGY AND GROUND WATER

6.3.1 Introduction

This chapter presents an assessment of the potential impact of the proposed Project on groundwater. In scoping the assessment, the following types of impact were identified as potential consequences of the Project:

- potential impacts on the hydrology or quality of the water environment from physical intervention and intentional and accidental discharges to water during construction; and
- potential impacts on the water environment during operation of the project including at bridges, underpasses, viaducts and culverts.

6.3.2 Summary of Baseline Findings

The 2013 feasibility study included the sampling of groundwater from a number of points along the road. In June 2018, samples of groundwater were taken from 9 sampling points for laboratory analysis to assess water quality (key physical, chemical, radiological and microbiological groundwater properties) and agressivness within the BAKAD construction area. The sampling points were located next to: Kyrgauldy, Asel gardening partnership, sampling depth 110 m, Irgeli, Komsomol, Pokrovka, well No. 1, sampling depth 145–162 m, Otegen Batyr, well No. 258, sampling depth 152 m, Panfilovo, well No. 3, sampling depth 60 m, Kysylkairat, Parushino, Area of the proposed Bereke construction camp.

The data below is given based on the results of these surveys and the data from opened sources and previous investigations within the Project area. The detailed description of survey results, baseline conditions and maps will be given in Volume II of the ESIA Report.

The Project Area has a fairly complex geomorphological structure and a very diverse terrain as it is located between the high ridges of Northern Tian Shang in its southern part, the southern lowlands of Lake Balkash to the north-west, and a river valley in its north-eastern part.

The road is confined to a single geomorphological element – a piedmont inclined alluvial-proluvial plain. Absolute elevations vary from 615 to 970 m, with a downward gradient in the south-north and east-west directions.

Local morphological conditions in the valley of Ili, where it narrows down, are determined by the flow of northern waterways. Mountains act as the first barrier for the moist air masses coming from the north-west, and so their water coverage is very high.

Alluvial sandy bars along the riverbed lowlands have been transformed by winds into barkhan and hilly aeolian sands, especially in the eastern part of the road.

Geological diversity and complexity of the Quaternary deposits within the piedmont plain have preconditioned the complex hydrogeology of the area.

Alluvian groundwater deposits are abundant throughout the inclined piedmont plain. Drilling reports from the proposed route indicate that the depth of the shallowest aquifer is 12-20 m. Waterborne rocks are represented by sands of various coarseness taking the form of lenses and interlayers in seams of loams and sandy loams. Groundwater occurs in artesian conditions since aquifer zone is overlaid by up to 9 m of plastic clay loams. In some sections along BAKAD, near depression and lower river terraces, shallow groundwater zones occur at a depth 0.5 to 6 m (sections PK 40.01 to 40.7 and PK 49.7 to 51, the ground water level occurs at a depth between 0.3 to 1 m below ground level). Quality-wise, the groundwater is mainly fresh and of the hydrocarbonate-calcium type, with up to 1 g/l of dry residue.

Perched groundwater is also present here (PK 154, PK236, PK 245, PK367, PK 448). Isolated lenses of perched water are encountered at the depths of 0.5 to 6.0 m. This water is characterised by highly varying chemical properties. The prevailing type is low to moderately brackish water (1.5-5.0 g/l of salts). This relatively high mineralisation is caused by the water's stagnation and it being confined to sandy-loam solonchak soils.

Artesian waters are present within this alluvial-proluvial plain, which has a layered structure with a prevalence of loamy soils acting as relative aquicludes within interlayers of sands and gravel-pebble layers. The depth of groundwater is regulated by the distance from the ground surface to drainage bases, i.e. the water line in the river valleys that cross the plain from south to north. Within watersheds, the groundwater occurrence depth generally exceeds 3-5 m. Along bottoms of shallow gullies and low river terraces, groundwater is close to the daylight surface.

There is no monitoring of the fluctuation of groundwater level. Based on groundwater level measurements taken in August-November 2007 and March-April 2008, the fluctuation amplitude does not exceed 1 metre.

Groundwater is fresh or slightly brackish; mineralisation is in the range of 876-2422 mg/dm^3. In terms of chemical composition, the water is of the sulphate-hydrocarbonate-sodium type, fresh or slightly brackish, not aggressive of slightly aggressive to W4-grade concrete (in terms of permeability) and not aggressive to W6-grade concrete.

Microbiological, parasitologhic and radiologic water properties in samples taken along the proposed BAKAD route in June2018 to assess baseline groundwater quality are in confirmity with requirements of the RoK Sanitary Standards and Rules No. 209 of 16 March 2015.

6.3.3 *Project Activities and Related Impacts*

Groundwater occurs at very shallow depths at some sections of the alignment (PK 40.01 to 40.70 and PK 49.7 to 51). Depth of excavation in these sections will approximately go up to 5 m below groundwater table. Thus a large amount of dewatering is expected during earth works. Poorly planned groundwater dewatering can lead to significant delays and cost increases during construction.

Groundwater dewatering if uncontrolled will lower the groundwater levels and effect the regional groundwater environment. The Project provides for the construction of culverts in some road- adjacent areas to reduce any changes of hydrogeological regime.

6.3.4 *Summary of Potential Impacts and Identified Project Mitigation Measures*

The impacts from BAKAD's construction and operation activities are summarised in *Table 6.3-1*. Mitigation measures identified in the Project documentation and additional mitigation measures as subject to be included in ESMP are also given in the table below.

Table 6.3-1 Construction and Operation Hydrogeology and Ground Water Impacts and Mitigation

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
1	**Change in level and ground water conditions** Change in level and ground water conditions can be caused by carrying out preparatory, earth and construction works. A slight change in groundwater level is expected due to disturbance and local reduction in the area of natural infiltration of precipitation and linear overlap of gravity flow down the terrain. The processes of intensification of waterlogging/desiccation associated with the construction work will be local depending on the hydrological conditions of the territory. If necessary, in such areas it is recommended to use drainage systems with temporary drainage.	**Minor to Moderate**	**Construction stage:** • To prevent the development of unfavorable geological processes, the Project provides for the strengthening of the roadbed, depending on the height of the mound and the angle of slope, followed by sowing of herbs. • To prevent waterlogging of the roadbed by surface water and possible water erosion, the Project provides for a system of surface drainage, including water drainage from the sole of the embankment with ditches. • The subsequent monitoring of water quality at the construction stage • Conduct quality control of remediation; • Carry out monitoring of environmental mitigation measures implementation especially in shift camping area, and the sites with most volume of time and work and quantity of involved equipment; • Construction of culverts in some road-adjacent areas; • Land restoration.	**Residual Impact: Minor** **Mitigation Measures:** **Construction stage** In case of underground water supply for the construction camp and concrete plant it's necessary to equip a well in order to prevent potential aquifer contamination
2	**Deterioration of groundwater quality during construction stage** Impact on groundwater quality is a result of pollution caused by emissions and leaks from	**Minor** Despite the fact that fuel leackages cannot be avoided, their impacts	**Construction stage:** • Minimisation, where possible, of land withdrawal during the design stage; adherence	**Residual Impact: Minor** **Mitigation Measures:**

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
	construction equipment, maintenance of vehicles, operation of construction camp. However, the ingress of pollutants into the ground water can not be completely excluded due to the length of the construction site and the lack of a complete waterproof coating on the construction sites Large construction sites, if not properly managed and operated, can lead to significant impacts on groundwater quality. The main risk of contamination is intentional discharges or accidental leaks and spills of liquid cement, fuel oils and lubricants from construction. The following identifies the main potential issues that have been considered in the assessment on groundwater quality and quantity which can arise in the absence of appropriate mitigation and controls: • There is a possibility of contamination of aquifers in the event of intentional or accidental discharges of hazardous materials to the ground during construction, particularly in shallow overburden areas. • The bedrock aquifers may be impacted by various activities involving site clearance / earthworks, and spillages / leakages	will be minor due to significant depth and size of the acquifer	to allocated land boundaries during construction; • No fuelling of vehicles or equipment will take place within excavated areas. • If heavy equipment cannot be moved to appropriate fuelling points, an impervious surface (such as a drip-tray) will be used for refuelling this equipment to prevent accidental releases to groundwater aquifers. • Use of serviceable construction equipment. • Construction of water-resistant coatings on equipment maintenance sites • Temporary storage of waste from vehicle and machinery maintenance operations at designated areas with subsequent removal of waste to solid domestic and industrial waste landfills or transfer to specialised organisations for disposal / recycling; • Collection of wastewater from vehicle washing into a settlement pond to trap suspended particles and petroleum products. • Collection of sludge from the settlement pond into a container followed by its offsite removal and reuse in road construction; • Temporary storage of all wastes generated at the construction site at designated areas followed by their timely removal to landfills or transfer to specialised organisations for disposal / recycling. • Fuels, oils and chemicals will be stored on an impervious base protected by a bund, and drip	**Construction stage:** • Quality control of land rehabilitation/ reinstatement work. • The periodic monitoring of the groundwater resources should be conducted. • Identification of existing extraction wells (irrigation, domestic and public use) within the zone of influence • Periodic monitoring of ground water use quantity during construction period • Periodic monitoring of ground water quality during construction period and operation period Periodic monitoring of groundwater discharge locations (stream or lake monitoring) and operation period • The size and duration of exposure of areas of open ground will be kept to the minimum.

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
	from construction plant and at refuelling and storage depots located on site. • Construction accommodation compounds along the route will be developed to house construction workers. All wastewater from these compounds poses a risk to the water environment if not treated prior to discharge (either by on-site treatment or removal for disposal via the local sewage network, if available).		trays will be used for fuelling mobile equipment. No USTs will be used during construction stage. • The soil contaminated due to spillages during handling fuel and other hazardous liquids will be removed from the site for suitable treatment and/or disposal.	
3	**Deterioration of groundwater quality during operation stage** There may be a reduction in the quality of groundwater locally as a result of contaminated operational road runoff infiltration entering the groundwater environment via proposed filter drains. Runoff from the road pavement is likely to contain some degree of silt/dust and pollutants from atmospheric deposition, vehicle emission, litter and general road maintenance, as well as from possible accidental road spillage incidents. Fill sections may also have an impact, in particular from potentially contaminated material. Any surface water runoff has the potential to infiltrate the subsoil and migrate into the groundwater.	**Minor**	**Operation stage:** • The rest areas/ petrol stations/TBs along the BAKAD road must include appropriate treatment of liquid and solid wastes to avoid contamination of local soils/ecology near these facilities; • Store appropriately by following good hazardous materials storage and handling management practices.	**Residual Impact: Negligible** **Mitigation Measures:** **Operation stage** • Control of application of deicing agents and monitoring of the chlorides content in soil • Confining of application of deicing agents to within the roadbed • Limitation of the quantity of applied agents with consideration of weather conditions and season • Control of application of deicing agents and monitoring of the chlorides content in soil • In case of high concentration of chlorides in adjacent farmland areas, measures must be

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
				undertaken to reduce/ mitigate adverse impacts on vegetation (e.g. loosening, watering, organic manuring, etc.) • Measures for the case of lorry spills, fire, etc. involving hazardous/polluting substances along the BAKAD route to prevent and clean up any significant impacts from drainage of contaminated liquids and fire-fighting water. • Control of the serviceable condition of culverts/drainage ditches, etc. • Identification of existing extraction wells (irrigation, domestic and public use) within the zone of influence • Periodic monitoring of ground water quality during operation period

6.4 SURFACE WATER

6.4.1 Introduction

This chapter presents an assessment of a potential impact of the proposed Project on surface waters. In scoping the assessment, the following types of impact were identified as potential consequences of the Project:

- potential impacts on the hydrology or quality of the water environment from physical intervention and intentional and accidental discharges to water during construction; and
- potential impacts on the water environment during operation of the BAKAD including at bridges, underpasses, viaducts and culverts.

6.4.2 Summary of Baseline Findings

Samples of surface water were taken in June 2018 from 16 sampling points for laboratory analysis to assess water quality (key physical, chemical and microbiological water properties). The sampling points were confined to te following watercourses: Kargaly, Aksai, Karasu, Boraldai, B. Almatinka, Aschibulak, Essentai 1,2, Karasu, M. Almatinka, Almerekh. The detailed description of survey results, baseline conditions and maps will be given in full ESIA report).

The data below is given based on the results of these surveys and the data from opened sources and previous investigations within the Project area.

The local river network has a highly uneven distribution, with the highest number of rivers concentrated in the mountainous part of the region and few rivers in the flat part. The largest river is Ili, which flows into Lake Balkhash. Rivers Talgar, Kaskelen, Bolshaya Almatinka, Malaya Almatinka, Aksay, Yesentai and others run along the northern slope of Zailiysky Alatau towards Ili.

Most of the rivers are perennial and are fed by snow and glacier melt and rains. The major rivers are Big Almatinka (Ulken Almaty) and Aksai with a maximum discharge rate of more than 90 m3/s. Generally these rivers have two peaks in discharges, one during spring when there is snow melt and other peak in summer, when there is a glacier melt. Short term floods may occur in the period from March to June due to snow and glacier melting and rainfall.

Piedmont rivers are mainly fed by springs on shelves. In their middle and lower reaches, these rivers are strongly replenished by groundwater. Piedmont and lowland areas often host karasus: small waterways formed by discharging groundwater.

Some of the rivers such as Boroldai, Karasu, and Terenkara are fed by the rainfalls and groundwater base flows. The river flows for the most part is

regulated due to development of irrigation network. Big Almaty Canal is the major irrigation canal, which crosses the road twice at PK 17.1 and PK 61.25.

Another typical feature of local rivers is high year-to-year variability of the flow. The monthly average flow of Ili varies from 168 to 901 m3/s over a year; for other rivers this parameter varies from 0.033 to 143 m3/s (the lowest reported flow is 0.027-68 m3/s).

Mineralisation of river water is determined by how these rivers are fed and the area's physical and geographical setting. In general, mineralisation is low to medium, making the rivers suitable for all types of water use.

6.4.3 *Project Activities and Related Impacts*

BAKAD will cross the following watercourses by the bridge construction:

PK+	Name of water course	PK+	Name of water course
153 +89	Aksai	356 +32	Sanitary canal 2
171 +53	GAC (with the passage)	356+43	Sanitary canal 3
235 +86	Kargaly	366 +79	Aschibulak
244 +77	Kargaly	389 +95	Terenkara
275 +10	Aschilisay	401 +31	Essentai 1
292 +10	Karasu	406 +44	Essentai 2
312 +15	Boraldai 1	447+ 97	Karasu (Vesnovka)
314 +45	Boraldai 2	464 +90	M. Almatinka
327 +30	Sanitary canal 1	467 +21	M. Almatinka
346 +50	B. Almatinka	529 +38	Almerekh 1
346 + 84	B. Almatinka at Zhapek Batyr road	579 +30	GAC with the passage

Bolshaya Almatinka River is one of the major rivers in the project area and it crosses the project alignment twice near an interchange. Due to its meandering nature at this location, very long bridges are anticipated. Some other rivers like Malaya Almatinka and Kartabulak also crosses the alignment more than once. In order to reduce the number and length of bridges, it was proposed in engineering design to straightenthe river paths through realignment of stream courses ('river modification' is other technical word for such works). Locations and lengths of realignment of rivers are given in the *Table 6.4-1* below.

Table 6.4-1 ***Locations and lengths of realignment of rivers***

Water course	Location, PK+		Length, m	Bottom width, m	Note
Malaya Almatinka	462+00	464+20	220	20	At the foot of the embankment,on the left

Water course	Location, PK+		Length, m	Bottom width, m	Note
	466+56	466+76	68	20	New channel bed at a bridge, on the right
	467+50	469+22	272	20	
Kartabulak	474+20	477+00	272	20	At the foot of the embankment, on the left

Realignment of Malaya Almatinka and Kartabulak rivers will cause the following impacts on river morphology and aquatic habitat:

- increased flow velocity;
- increased downstream sedimentation;
- adverse effects on aquatic ecosystems or sensitive species; and
- prevention of fish migration from downstream to upstream due to high velocity.

The BAKAD Consortium is considering the option of crossing the Malaya Almatinka with an overpass in order to avoid the alignment of the river and reduce the associated negative impacts. Only temporal realignment will be required during the construction stage.

This is a preferable option, however, no details are currently available on it's design.

River flows will be affected due to construction of temporary coffer dams in the rivers to facilitate construction of piers the bridges in the river. River flows could also be affected by the increased sediment flow into the rivers due to construction activities in the river and storm water runoff from the construction areas and material storage sites.

Preliminary estimates of pollution of roadbed runoff (based on analysis of the typical pollutants and concentrations depending on number of vehicles per day) given in the Project design documentation are presented in the *Table 6.4-2* below.

Table 6.4-2 ***Preliminary estimates of pollution of roadbed runoff (Project design data)***

Parameter	Concentarion	Pollution of superficial drain during rain	Pollution of superficial drain during snowmelt
Weighted substances	mg/l	1310	2700
Ether-soluble agents	mg/l	60	65
Lead (Pb)	mg/l	0.3	0.3
Oil products	mg/l	24	26

6.4.4 Summary of Potential Impacts and Identified Project Mitigation Measures

The impacts are summarised for the construction and operation in *Table 6.4-3*. Mitigation measures identified in the Project documentation and additional mitigation measures as subject to be included in ESMP are also given in the table below.

Table 6.4-3 Construction and Operation Surface Water Impacts and Mitigation

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
1	**Change in regime of streams** The Project envisages the construction of 21 bridges across the watercourses providing a maximum discharge of 1% water security in free-flow mode and 168 culverts across the seasonal streams/irrigation network. Culverts and pipes can be used to provide ways for the migration of animals. Construction of the bridge on a single-span scheme on small rivers and streams (as well as when the coastal cones and intermediate supports do not affect the river beds and flooded part of the floodplain) will exclude a direct negative impact on the hydrological regimes of watercourses. The most significant impact on water regime is related to the reconstruction of sections of riverbeds of Malaya Almatinka and Kartabulak. During the construction of the bridge and strengthening the river beds with concrete slab there is a possibility of activation of channel processes and sedimentation in the bed of the watercourse as a result of changes to the coastline. Relocation of channels may affect (reduce) the natural water flow due to construction of artificial structures and barriers. This may result in siltation of river bed, flowage	**Moderate to Major** The most sensitive streams are Bolshaya Almatinka (PK 346), Malaya Almatinka (PK 462-467) and Kartabulak (PK 474) due to the reconstruction of riverbeds. The channel relocation design was approved by BAVI. This design takes into account the maximum possible high water level and hydrological characteristics of the rivers. Also the following watercourses crossed by BAKAD bridges are impacted: Aksai (PK 153), GAC (with the passage) PK 171, Kargaly (PK235, PK 244), Aschilisay (PK 275), Karasu (PK292), Boraldai 1 (PK312), Boraldai 2 (PK 314), Sanitary canal 1(PK 327), B. Almatinka (PK 346,), Sanitary canals 2,3 (PK 356), Aschibulak (PK 366), Terenkara (PK 389), Essentai 1 (PK 401), Essentai 2 (PK 406), Karasu (PK 447), M. Almatinka (PK 464, PK 467), Almerekh 1 (PK 529), GAC with the passage (PK 579).	**Construction stage:** • Minimization of the areas of temporary alienation of the territory of water protection zones and water areas of water bodies in the course of work; • Timely dismantling and removal of auxiliary structures and reclamation of disturbed shores; • To prevent the development of unfavorable geological processes, the Project provides for the strengthening of the roadbed, depending on the height of the mound and the angle of slope, followed by sowing of herbs. • To prevent waterlogging of the roadbed by surface water and possible water erosion, the Project provides for a system of surface drainage, including water drainage from the sole of the embankment with ditches. • The subsequent monitoring of water quality at the construction stage; • Temporary land allotment and temporary access roads will be recultivated at the end of the construction period. • Conduct quality control of remediation. • Protection measures to prevent soil erosion after the finalisation of the earth work will be implemented where required such as: use of grass turf to cover the soil surface;	**Residual Impact: Minor** **Mitigation Measures:** **Construction stage:** • Culverts will be designed to maintain the natural riverbed width and the natural riverbed level. If it is not feasible to use bottomless culverts then the culvert base will be buried to restore the riverbed as described in the Good Practice Guides for Engineering in the Water Environment of the Scottish Environment Protection Agency (SEPA 2009)" • Where possible the natural riverbed depth and courses, bottom sediments and flooding plain and regime will be maintained. Natural materials will be used for bank protection and stabilisation (e.g. vegetation fringes and bankside trees instead of concrete or steel reinforcements. • Foundation works for the bridges, viaducts, retaining walls and other structures at or close to particularly sensitive

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
	during the high-water period or heavy rains, etc. The project provides for permanent and temporary withdrawal of floodplain areas of watercourses for placement of supports, coastal cones and road embankments. Increased turbidity of streams will lead to deterioration of habitat conditions of aquatic organisms. Impact assessment on aquatic organisms as a result of the excavation is discussed in Section 6.5.		• Use of erosion-control blankets or mats; renaturation as soon as feasible.	surface water bodies should not take place during the high-water season; • Work on stream crossings should be carried out, where technically feasible, from the banks above the channel and avoiding direct intervention in the watercourse, unless the existing bank reinforcement needs to be replaced. • Sensitive areas of rivers and drains should be protected from impacts of vehicles and other construction activities via fencing or other appropriate means. • Driving within rivers, streams or on their banks should be forbidden except if unavoidable to construct a particular structure. Then appropriate measures will be implemented to protect sensitive areas, for example by placing with metal plates to drive on. • Where practicable small drains within the construction area should be covered with metal plates which can be passed over by construction machines, to protect them against disturbance, or conveyed to

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
				have free flow through the pipes placed for this purpose.
2	**Surface water quality degradation during construction stage** During the construction stage impacts on surface water quality and quantity are considered to be temporary and include the following: • Silty/soiled water from excavations (e.g. cut and fill), exposed ground, stockpiles of soil, quarries, topsoil placing and excess material, plant and wheel washings, construction roads, washing of finished road surfaces to remove accumulated soil and disturbance of drains and streambeds (i.e. in-stream construction of culverts and channel diversions/improvement works), and landscaping e.g. of road embankments. • If a construction site or a refuelling and storage depot is located near a surface water body, the surface water is at risk from the spill of hazardous substances. Liquid cement (and associated wastewater run-off), due to its high alkalinity and corrosive nature, is highly polluting and can give rise to major fish kills in aquatic environments. The accidental spillage of cement and of fuel, oils and lubricants can have significant water quality consequences on watercourses,	**Moderate to Major** The following watercourses crossed by BAKAD bridges are impacted: Aksai (PK 153), GAC (with the passage) PK 171, Kargaly (PK235, PK 244), Aschilisay (PK 275), Karasu (PK292), Boraldai 1 (PK312), Boraldai 2 (PK 314), Sanitary canal 1(PK 327), B. Almatinka (PK 346,), Sanitary canals 2,3 (PK 356), Aschibulak (PK 366), Terenkara (PK 389), Essentai 1 (PK 401), Essentai 2 (PK 406), Karasu (PK 447), M. Almatinka (PK 464, PK 467), Almerekh 1 (PK 529), GAC with the passage (PK 579).	**Construction stage:** • Use of serviceable construction equipment: • Construction of water-resistant coatings on equipment maintenance sites • Temporary storage of waste from vehicle and machinery maintenance operations at designated areas with subsequent removal of waste to solid domestic and industrial waste landfills or transfer to specialised organisations for disposal / recycling; • Collection of wastewater from vehicle washing into a settlement pond to trap suspended particles and petroleum products. • Collection of sludge from the settlement pond into a container followed by its offsite removal and reuse in road construction; • Temporary storage of all wastes generated at the construction site at designated areas followed by their timely removal to landfills or transfer to specialised organisations for disposal / recycling. • Fuels, oils and chemicals will be stored on an impervious base protected by a bund, and drip trays will be used for fuelling mobile equipment. No USTs will be used during construction stage. • The soil contaminated due to spillages during handling of fuel and other hazardous liquids will be removed from the site for suitable treatment and/or disposal.	**Residual Impact: Minor** **Mitigation Measures:** **Construction stage:** • Removal of topsoil during the warm period of the year • Control of land rehabilitation/ reinstatement activities • Where practicable, local perimetre drains should be constructed around working areas to collect suspended run-off. • Consideration of the management of the construction sites during periods of heavy rainfall. High sediment generating activities such as road paving will be avoided and exposed surfaces and stored materials covered if necessary to reduce erosion of sediments into surface waters. • Mud generated from the concrete batch plant operation operations and washing of cement trucks will be tested for hazardous characteristics and will be disposed of in line with national regulations.

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
	aquatic ecology and downstream users. • Other sources of contamination during the construction phase arise from the use of bitumen compounds in the wearing course of the road and materials used for waterproofing of concrete surfaces. • Waste from construction activities and wastewater generation from construction accommodations may impact the surface water quality. All wastewater from these compounds poses a risk to the water environment if not treated prior to discharge (either by on-site treatment or removal for disposal via the local sewage network, if available). • Use of surface water supply sources to obtain water supply needs for the construction process		• Hazardous materials will not be stored in excavated areas • Removed topsoil is planned to be stored in Burt (only for the construction period) at the designated areas on the row, every 0.5 km. • Land restoration is carried out in two stages: technical (land planning and application of topsoil) and biological (complex of agrotechnical measures and sowing of perennial grasses). • To prevent contaminated surface runoff, the Project provides for the placement of construction equipment and temporary buildings outside water protection zones, the use of serviceable equipment and pallets for mechanisms and other activities). • Shift camps are equipped with bio-toilets and domestic waste water storage tanks to prevent the discharge of untreated wastewater into surface water bodies and on the terrain.	• Monitoring of surface water quality, drainage infrastructure assessment as well as ground water. quality procedures. • Treated wastewater should be reused where possible (eg. for local watering of vegetation, dust control or as fire-fighting reserve). • An Emergency Response Plan (ERP) should be developed in line with Environmental, Health, and Safety (EHS) Guidelines: General EHS guidelines (IFC, 2007) for handling spills of hazardous materials including fuels that will be handled during construction works.
3	**Surface water quality degradation during operation stage** Surface water can be affected during operation by routine deposits from vehicles (e.g. tyre and brake deposits, hydrocarbons from engines, liquid exhaust emissions etc.) being deposited on the road surface and carried into the road drainage system. The road induced sources are leakage of the road body itself (tar oils) and road marking materials. Local receiving streams may be negatively affected in case the wastewater discharge	**Negligible to Moderate** The following watercourses crossed by BAKAD bridges are impacted: Aksai (PK 153), GAC (with the passage) PK 171, Kargaly (PK235, PK 244), Aschilisay (PK 275), Karasu (PK292), Boraldai 1 (PK312), Boraldai 2 (PK 314), Sanitary canal 1(PK 327), B. Almatinka (PK 346,), Sanitary canals 2,3 (PK 356), Aschibulak (PK 366),	**Operation stage** • The rest areas/ petrol stations/TBs along the BAKAD road must include appropriate treatment of liquid and solid wastes (in accordance with the national legislation RK Law on Production and Consumption Waste) to avoid contamination of local soils/ecology near these facilities; • Store appropriately by following good hazardous materials storage and handling management practices (IFC Industry Sector Guideline Toll Roads).	**Residual Impact: Negligible** **Mitigation Measures:** **Operation stage** • Control of application of deicing agents and monitoring of the chlorides content in soil • Confining of application of deicing agents to within the roadbed and limitation of the quantity of applied agents with

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation Measures to be included in the ESMP
	from the Service Areas (including petrol filling stations, restaurants, sanitary facilities, etc) is not adequately treated in line with national and international standards/guidelines	Terenkara (PK 389), Essentai 1 (PK 401), Essentai 2 (PK 406), Karasu (PK 447), M. Almatinka (PK 464, PK 467), Almerekh 1 (PK 529), GAC with the passage (PK 579).		consideration of weather conditions and season • In case of high concentration of chlorides in adjacent farmland areas, measures must be undertaken to reduce/ mitigate adverse impacts on vegetation (e.g. loosening, watering, organic manuring, etc.) • Measures in the case of lorry spills, fire, etc. involving hazardous/polluting substances along the BAKAD route to prevent and clean up any significant impacts from drainage of contaminated liquids and fire-fighting water. • Permanent erosion and runoff control features will be regularly inspected and maintained during operation.

6.5 BIODIVERSITY

6.5.1 Introduction

This chapter presents an assessment of the impacts of the proposed Project on terrestrial ecology and biodiversity within the Project.

The chapter will set out the methods and criteria for assessing ecological impacts arising from the proposed Project, and report on the ecological baseline identified through fieldwork and desktop studies. Mitigation for impacts are identified, and residual and cumulative impacts are addressed.

6.5.2 Summary of Baseline Findings

The field geobotanic, mamal, ornithology, entomology and herpetology surveys of the Project area were undertaken along the BAKAD route in June 2018 by ERM . The detailed description of survey results, baseline conditions and maps will be given in Volume II of the ESIA Report.

The data below is given based on the results of these surveys and the data from opened sources and previous investigations within the Project area.

Flora

BAKAD will be crossing a piedmont dessert-steppe zone[1], which is mainly represented by chestnut soils, sierozems, and meadow-sierozem soils.

The Project implementation area is characterised by scarcity of flora and peculiar structure of vegetation cover which has been formed as a result of a long-lasting anthropogenic impact (e.g. ploughing, grazing, building development, clearance, etc.).

Most of the Project area are agricultural fields and abandoned/ fallow farmland of different age covered by secondary vegetation. These are lowlands with alluvial-meadow, light chestnut, meadow-sierozem and sierozem soils. Abandoned ploughland is covered by weed communities. The dominant species are annual plants of the grass family (e.g. the Cheatgrass (*Anisantha tectorum*) and the Japanese brome (*Bromus japonicus*)) and miscellaneous herbs (e.g. the Annual ragweed (*Ambrosia artemisiifolia*) (quarantine weed), the Annual mugwort (*Artemisia annua*) and the Turkish wartycabbage (*Bunias orientalis*)).

[1] E. Rachkovskaya. Botanic geography of Kazakhstan and Central Asia. 2003.

On small uplands (around 600 m high), vegetation is dominated by salt-resistant shrubs[1] like tamarix (*Tamarix sp.)* and mugworts (*Artemisia sp.)*. Typical plants are magwort (*Artemisia sp.)* and saltwort (*Salsola sp.)*.

On higher grounds, these plants are gradually replaced with Volga fescue (*Festuca valesiaca),* grass-like sage (*Salvia sp.)* and mixed herbs with grasses prevailing. Abundant are sheep fescue (*Festuca ovina)* and stipa pinnate (*Stipa pennata)*. Grasses represent the main diet of cattle; these include koeleria (*Koeleria gracilis)*, wheat grass (*Agropirum dasystachium)* and agropyron (*Agropiron cristatum)*. Sierozems are mainly overgrown with mugwort (*Artemisia)*, which is almost everywhere joined by cypress (*Kochia sp.)*, elymus (*Elymus sp.)* and ceratocarpus (*Ceratocarpus sp.*).

Ephemeridae play a large role in forming the natural vegetation cover of the area and are mainly represented by meadow grass (*Poa bulbosa)*, brome grass (*Bromus sp.)*, as well as poppies (*Papaveraceae sp.*), tulips (*Liliaceae sp.)* and saffron (*Crocus sp*.) (in springtime).

Piedmont areas are very suitable for irrigated and non-irrigated farming. Shrubs are abundant in river valleys and are represented by willow (Salix sp.), oriental buffalo berry (*Elaeagnus orientalis*), rose (*Rosa spec*.), spiraea (*Filipendula*) and other species. Typical trees are poplar (*Populus*), tatarian maple (*Acer tataricum*), elm tree (*Ulmus campestris / Ulmus parvifolia*), oleaster (*Elaeagnus angustifolia* and *Elaeagnus commutate*)..

Shallow groundwater zones, as well as valleys of certain rivers like Aschibulak, Kargaly and Kartabulak, are generally covered by extensive reed shrubs.

The vast majority of the road's proposed route is represented by cultivated lands seeded with grain crops (soybeans, corn, wheat), clovers, vegetables and melons (although rarer), pastures and haylands. Sporadically, abandoned areas occur, which have not been cultivated for a long time and which are overgrown with weeds like thistle, sage, agrimony etc.

Altogether 108 species of 40 families and 93 genera were identified during the field work in the Project area.

The most numerous are species of the grass family (Poaceae), composite flowers (Asteraceae), legumes (Fabaceae), wild rose flowers (Rosaceae) and crucifers (Brassicaceae).

No species from the national Red Data Book or the IUCN Red List were identified.

According to the geobotanical study, the following plant associations prevail along the BAKAD route:

- More than 80% of the entire area is occupied by agricultural systems (agricultural fields and abandoned / fallow ploughland) characterised by completely changed composition and structure of flora with

[1] E. Rachkovskaya. National Atlas of Kazakhstan. Map of vegetation and ecosystems. 2007.

occasional occurrence of native plant species. These are combined with tree groups (elm tree (*Ulmus pumila*), black poplar (*Populus nigra*),

- ash pensilvanian (Fraxinus pennsylvanica), maple (*Acer negundo*), white willow (*Salix alba*) with associations of miscellaneous herbs and gramineous plants (wheat-grass (*Elytrigia repens),* meadow grass (*Poa stepposa),* red raspberry *(Rubus idaeus)*) on meadow soils in narrow gullies.
- Approximately 10% of the area are the land under settlements with irreversibly transformed vegetation.
- Less than 5% are covered by associations of miscellaneous herbs and gramineous plants (meadow grass (*Poa stepposa), cocksfoot (Dactylis glomerata),* wheat-grass (*Elytrigia repens),* spurge (*Euphorbia lamprocarpa),* old-mans-pepper *(Achillea millefoilum)*) on dark chestnut soils.
- Less than 3% are covered by associations of miscellaneous herbs with gramineous plants (meadow grass *(Poa stepposa),* goat grass *(Aegilops cylindrical),* wormwood *(Artemisia sublessingiana*) and bluegrasses (*Poa stepposa*) on light chestnut soils of watersheds in combination with associations of bromegrasses and miscellaneous herbs (awnless brome grass (*Bromopsis inermis),* desert sage *(Salvia deserta)*) on ridge slopes and in depressions; associations of bluegrasses with miscellaneous herbs (meadow grass (*Poa stepposa),* old-mans-pepper *(Achillea millefoilum),* broad-leaved clover *(Trifolium pratense*) on southern chernozems; *heavily transformed weed communities (brome grass (*Anisantha tectorum),* broad-leaved clover *(Trifolium pratense*).

Fauna

The fauna of suburban areas of Almaty and the composition of wildlife species are highly influenced by topographical elevation and environmental characteristics like land use and vegetation.

Birds.

Based on a review of scientific literature, around 182 bird species are registered in Almaty and its surroundings. Birds include nesting, wintering and other migratory species.

Most of the typical nesting species live in trees and shrubs in piedmont area; these include reed-bird (*Spizella pusilla),* starling *(Sturnus),* oriole *(Oriolus Linnaeus),* shrike *(Laniidae),* barred warbler *(Sylvia nisoria),* blackbird *(Turdus merula),* common nightingale *(Luscinia megarhynchos),* turtledove *(Streptopelia),* great tit *(Parus major), and* raven *(Corvus corax).* European roller *(Coracias garrulous),* raven *(Corvus monedula)* and common kingfisher *(Alcedo atthis)* build their nests in holes on clay slopes of rivers.

Larger water reservoirs attract various aquatic birds including duck and diver subspecies like great-crested grebe (*Podiceps cristatus).*

Also present are several species of resident nesting birds including Passer montanus and house sparrow (*Passer domesticus),* turtledove (*Streptopelia decaocto),* great tit (*Parus major),* magpie *(Pica pica*), and raven *(Corvus corax).*

Among migratory birds, the largest populations are attributed to black kite (*Milvus migrans),* common beechnut *(Merops apiaster),* starling *(Sturnus roseus),* spotted flycatcher *(Muscicapa)* and chiff-chaff *(Phylloscopus).*

Almaty's suburbs lie on the migration path of demoiselle (*Antropoides virgo)*, which is included in the Red Lists of Kazakhstan and the Almaty Region[1]. According to the IUCN classification, European roller (*Coracias garrulous)* is classified as a critically endangered species.

However, no birds from the Red Lists of Kazakhstan were observed.

During the observations only the following birds listed in CITES as Least Concern (LC) category – black kite (*Milvus migrans*), hobby (*Falco subbuteo*), common kestrel (*Falco tinnunculus*) and long-eared owl (*Asio otus*).

Wild birds, pigeons and small rodents living in the city attract birds of prey like goshawk (*Accipiter)*, common kestrel (*Falco tinnunculus*) and owls (long-eared owl (*Asio otus*), scops owl (*Otus scops*) and owls (*Strigiformes).*

Altogether 61 bird species of 13 orders were identified during the field survey of the subject area. Sparrows and similar small birds *(Passeriformes)* are represented by 31 species accounting for 50.8 % of the total number of species identified. Shore birds *(Charadriiformes)* are represented by of seven species (11.5%) and doves *(Columbiformes)* by four species (6.6%). Diversity of storks *(Ciconiiformes)*, falcons *(Falconiformes)* and rollers *(Coraciiformes)* is limited to two species each (4.9%). The orders of anseriformes (*Anseriformes),* galliformes *(Galliformes)* and gruiformes (*Gruiformes)* each feature two species (3.3%). The orders of grebes (*Podicipediformes),* cuculiformes (*Cuculiformes),* owls (*Strigiformes)* and hoopoes (*Upupiformes)* each have one species (1.6%).

[1] The Red List of the Almaty Region. Animals. Ministry of Education and Science of the Republic of Kazakhstan. Centre of Biological Research. Almaty, 2006.

Biotope	Associated bird species
Water bodies and floodplains	Great-crested Grebe, Little Bittern (Kioriki), Night Heron, Common Heron, Mallard, Gadwall, Black Kite, Common Moorhen, Common Coot, Little Ringed Plover, Lapwing, Oyster Catcher, Black-headed gull, Caspian Gull, Black Tern, Common Tern, Common Cuckoo, Kingfisher, Common Sand Martin, Pale Sand Martin, Magpie, Hooded Crow, Cetti's Warbler, Jerdon's Reed Warbler, European Reed Warbler, Great Reed Warbler.
Forests, forest strips, brushwood	Black Kite, Eurasian Hobby, Pheasant, Ringdove, Eastern Turtle Dove, Common Cuckoo, Long-eared Owl, Golden Oriole, Common Starling, Magpie, Jackdaw, Rook, Eurasian Whitethroat, Common Nightingale, Great Tit, Turkistan Tit, Spanish Sparrow, Eurasian Tree Sparrow
Piedmont steppe	Common Kestrel, Pheasant, Hoopoe, Crested Lark, Greater Sort-toed Lark, Calandra Lark, Eurasian Sky Lark, Turkistan Red-backed Shrike, Lesser Gray Shrike, Rose-coloured Starling, Jackdaw, Stonechat, Corn bunting, Red-headed Bunting
Settlements	Rock Dove, Senegal Turtle Dove, Hoopoe, Common Sand Martin, Masked Wagtail, Common Starling, Common Myna, Magpie
Clay clifs	Rock Dove, Roller, Common Bee Eater, Common Sand Martin, Pale Sand Martin
Fields	Quail, Rock Dove, Eastern Turtle Dove, Corn Bunting

Mammals.

Suburbs of Almaty are inhabited by around 50 mammal species. Predators like weasel (*Mustela nivalis*), (*Mustela ermine*), corsac fox (*Vulpes corsac*), and mole lemming (*Ellobius talpius*) live within 3-5 from the city.

Most common rodents include squirrels (*Sciurus sp.*), chipmunks (*Tamias sp.*), gophers (*Citellus sp.*), hares (*Lepus sp.*), hamsters (*Cricetidae sp.*), muskrats (*Ondatra sp.*) and water rats (*Arvicola sp.*). Also present are hedgehogs (*Erinaceus sp.*), and shrews (*Soricidae sp.*) and several snake and lizard species.

Amphibians and reptiles.

The subject area lies within the zone of contact between semidesert, steppe and piedmont fauna. According to literature the area is inhabited by four amphibian species of two families and three genera and 15 reptile species of six families and 12 genera.

Snakes of the *Colubridae* family are the most abundant with regard to species diversity (33.3%). The *Viperidae* family is represented in full (2 species). Four lizard species of the *Lacertidae* family account for approximately 26.6% of the regional herpetofauna. Other families are represented by one or two species (approximately 7% each).

From among amphibians, green toad (*Bufo viridis*) and frog (Rana spec.) are highly abundant and quickly settle at ponds and irrigation channels. Occassionally, lake frog (*Pelophylax ridibundus) and* asian frog *(Rana asiatica)*, a native species for the area, is encountered.

The survey of the project area indicated presence of a small number of habitats of reptiles and amphibians. The major part of the area is either cultivated for crops or consists of old abandoned land with already disturbed biocenoses, a developed system of paved and dirt roads, settlements and dachas.

No critical habitats of protected, migrating or endemic species as per criteria established in IFC PS6/ EBRD PR6 were identified or exist.

Due to the small number of amphibian and reptile habitats that will affected by the proposed construction activities, it is unlikely that these activities will have any significant impact on the species diversity, abundance and conditions of amphibian and reptile populations.

Aquatic Biota.

Most typical and abundant representatives of aquatic wildlife are fish living in the rivers to be crossed by BAKAD: scaleless osman (*Gymnodiptychus dybowskii*) and gubach (*Triplophysa strauchii*). Some of these rivers are also inhabited by several native fish species, which are endemic to the basin o Lake Balkhash: Balkhash perch (*Perca schrenkii*), marinka (*Schizothorax pseudoaksaiensis pseudoaksaiensis*), common minnow (*Phoxinus brachyurus*) and Balkhash minnow (*Rhynchocypris poljakowii*)[1]. Balkhash perch (*Perca schrenkii*) *and* marinka (*Schizothorax pseudoaksaiensis pseudoaksaiensis*) are registered in the Red Book of Kazakhstan[2] and the Almaty Region[3]. The regional Red List also includes Phoxinus brachyurus. The species are encountered in the rivers that will be crossed by BAKAD: Bolshaya Almatinka, Aschibulak, Terenkara, Karasu.

According to the survey results, rivers and ponds in the area of the proposed BAKAD are characterised by the scarcity of benthic biocenoses with regard to their quantitative parameters and species diversity.

6.5.3 Project Activities and Related Impacts

Common tree species noticed along the RoW are maple (*Acer tataricum), elm (Ulmus campestris* and *Ulmus parvifolia*), and olive (*Elaeagnus angustifolia* and *Elaeagnus commutate*). In addition, about 88 ha of grazing land consisting of various grasses (thick spike wheatgrass (*Agropyrum dasystachium*), fairway

[1] N. Mamilov et al., 2010. Distribution of alien fish species in small reservoirs within the basin of Lake Balkhash. Russian journal of biological invasion. Volume 1, Edition 3, pages 181-186.

[2] Decree No 1034-16 dated 31 October 2006 of the Government of Kazakhstan approving the list of rare and endangered plant and animal species.

[3] The Red List of the Almaty Region. Animals. Ministry of Education and Science of the Republic of Kazakhstan. Centre of Biological Research, Zoological Institute. Almaty, 2006.

crested grass (*Agropyron cristatum*) and Koeleria (*Koeleria gracilis*)) will be impacted by the project.

Table 6.5-1 ***Project Impact on Vegetation***

Parameter	Unit	Quantity
Cutting of trees	pc	Section 1 – 4,336 Section 2 – 13,772 Section 3 – 41 Section 4 – 480 Section 8 – 102 Section 9 - 325 **Total: 19,056**
Compensatory tree planting	pc	57,168
Planting of trees and shrubs landscaping	pc	8,462
Green grass landscaping	m^2	513,175

Clearance of vegetation from the construction areas may impact shelter, feeding and/or breeding and/or physical destruction of bird and small mammal habitat.

6.5.4 Summary of Potential Impacts and Identified Project Mitigation Measures

The impacts from the construction and operation are summarised in *Table 6.5-2*.

Embedded controls proposed in the Project design and additional mitigation measures to be included in the ESMP are also given in the table below.

Table 6.5-2 Construction and Operation Flora and Fauna Impacts and Mitigation

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation measures to be included in the ESMP
1	**Fragmentation of vegetation cover/land clearing** The Project provided the cutting of 19,065 trees and the compensatory tree planting of 58,560 trees. Given the large extent of modification of plant communities in the BAKAD area, the value and vulnerability will be lower than in natural undisturbed communities.	**Minor to Moderate** Minor for common tree species: maple (*Acer tataricum), elm (Ulmus campestris* and *Ulmus parvifolia*), and olive (*Elaeagnus angustifolia* and *Elaeagnus commutate*). Moderate for floodplain vegetation which will be affected locally, but it is more sensitive to the impact associated with the bridge construction over rivers.	**Construction stage:** • Carrying out cutting down and clearing of the territory within the land allotment and in the winter season; • Use of temporary or existing roads for delivery of construction materials; • Storage of construction materials, products and structures on specially equipped sites • After the completion of construction work, temporarily disturbed areas are subject to reclamation with sowing of perennial grasses. • Delimitation of areas to be cleared before the beginning of the construction activities in order to limit as much as possible the surface of vegetation to be cleared. • Access roads will be defined before the beginning of the construction activities. Some of the public roads may need to be used for access. Driving out of the access roads by the construction vehicles taking part of the construction activities will not be allowed.	**Residual Impact: Minor**
2	**Deterioration of vegetation growth at the construction stage** At the construction stage, the main factor for the deterioration of plant growth conditions will be dust emissions during loading and	**Moderate** Given the low pollutant concentrations and compliance provided by the Project conservation measures, the possibility of contamination of	**Construction stage:** • conduct construction works and movement of vehicles strictly within the land allocation; • timely repair of road machinery and equipment to minimize air pollution by exhaust gases;	**Residual Impact: Negligible**

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation measures to be included in the ESMP
	unloading, emissions of construction equipment. The most affected areas will be vegetation near construction sitesIt is expected that the maximum concentrations of dust emissions will be observed at a distance of up to 30 m . Given the limited duration of construction and regular precipitation, the probability of accumulation of pollutants in/on the plant surface is reduced.	the vegetation cover of adjacent territories is low.	• watering of the road, as well as limiting the speed of traffic on the roads to prevent dusting; • Wastes and any other product containing hazardous chemical substances (i.e. fuel) will not be stored in the proximity of freshwater features. Avoidance of any spill affecting to the freshwater ecosystems.	
3	**Impact on vegetation during operation stage** At the operation stage, the main sources of impact on vegetation cover will be emissions from motor vehicles and anti-icing reagents. The dispersion of anti-icing reagents outside the roadway can lead to soil salinization. The increase in total salinity leads to slower plant growth and morphological changes. However, it is expected that most of the reagents will drain with the surface runoff in wastewater storage pits, in addition, the Project provides for a limitation of use of reagent depending on weather conditions.	**Negligible to Minor** The most vulnerable vegetation areas are located within 100 m to 150 m of the roadbed, drainage outlets, bridges and near filling stations. The most vulnerable species are water and near-water plants and agricultural crops.	**Operation stage:** • Storage of deicing agents using good management practices.	**Residual Impact: Negligible** **Mitigation measures:** **Operation stage** • Control of application of deicing agents and monitoring of the chlorides content in soil
4	**Decrease in the flora diversity** The impact can be caused by the preparation of the site for the construction, which may lead to a reduction in the number of individuals.	**Minor to Moderate** The most vulnerable to impacts are rare and protected species with limited range.	**Construction stage**: • Delimitation of areas to be cleared before the beginning of the construction activities in order to limit as much as possible the surface of vegetation to be cleared.	**Residual Impact: Negligible** **Construction stage:** • Introduction of a ban on unauthorised gathering of

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation measures to be included in the ESMP
			• Access roads will be defined before the beginning of the construction activities. Some of the public roads may need to be used for access. Driving out of the access roads by the construction vehicles taking part of the construction activities will not be allowed. • Minimisation, where possible, of land withdrawal during the design stage; adherence to allocated land boundaries during construction.	plants near construction sites and worker camps.
5	**Fragmentation / reduction of fauna habitats** The fragmentation and reduction of habitats will be caused by preparation of the construction site (vegetation clearance, excavation, construction of temporary access roads). The main habitats that will be affected are arable land and floodplain areas. Additionally, the reconstruction of river beds (M. Almatynka 560 m, Kartabulak 272 m) and construction of bridges and laying culverts across the rivers and streams will decrease in size and disturb areas of the bottom habitat of benthos which are forage for fish. Habitat of the endemic protected fish species of Balkash Perch, Ili Marnikov and Seven River's Minnows in Bolshaya and Malaya Almatinka rivers will be impaired by the realignment and other construction activities in those rivers.	**Minor** Depending on the species and size of the animals, the spatial boundaries and habitat patterns are different, so the impacts are also variable. Large livestock are less sensitive to the reduction and fragmentation of grazing areas, as noise and the need for passage under the road way can be a major concern. No significant impact is expected to occur as the proposed BAKAD route will mostly cross areas occupied by modified associations (farmland, environs of settlements, etc.)	**Construction stage:** • Construction of culverts that can be used by small species of animals for passage; • Construction of fence to minimize accidents with animals; • Land restoration of temporary land allotment and temporary roads with a set of technical and biological remediation measures. • Cattle lanes are proposed at PK14, PK19 (Kirgauldy river), PK153 (Alsai river), PK189 (channel), PK235, PK244 (Kargaky river), PK275 (Ashilysay river), PK292 (Karasu river), PK312, 314 (Boralday river), PK346 (B. Almatinka river), PK366 (Ashibulak river), PK389 (Terenkara river), PK406 (Esentay river-2), PK447 (Karasu river), PK467 (M.Almatinka river), PK485 (Kartabulak river), PK529 (Almerek river-	**Residual Impact: Negligible** **Construction stage:** • Prohibition of work in riverbeds during spawning and breeding seasons • Execution of construction work during a season characterised by the minimal impact on amphibians and reptiles (late summer, autumn or winter) • Briefings of drivers and all construction personnel aimed at minimising destruction of amphibians and reptiles on roads and explaining the need for

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation measures to be included in the ESMP
	Habitat of these protected species in the rivers of Ashibulak, Terenkara and Karasu will also be affected by the in stream construction activities such as bridge piers and temporary coffer dams, and waste water releases to the river. Construction activities have potential to adversely affect aquatic biota by release of high concentrations of sediment, fuels/oils and other toxic compounds, and solid waste. **Barrier effect** The linear infrastructures, such as BAKADs projects, contribute significantly towards the habitat fragmentation by creating barriers to fauna animal movement and the isolation of their populations. The barrier effect created by such linear infrastructures can affect the dispersion and movement capacity of the fauna. This affects indirectly to their capacity for searching food, shelter or other individuals of their same species during the breeding season. These factors are linked with the species populations dynamic and can influence in the survival of threaten species.		1), PK539 (water channel), PK557 (Almerek river-2), PK559 (water channel). • Culverts will be designed to maintain the natural riverbed width and the natural riverbed level. If it is not feasible to use bottomless culverts then the culvert base will be buried to restore the riverbed as described in the *Good Practice Guides for Engineering in the Water Environment of the Scottish Environment Protection Agency (SEPA 2009).* • Where possible the natural riverbed depth and courses, bottom sediments and flooding plain and regime will be maintained. Natural materials will be used for bank protection and stabilisation (e.g. vegetation fringes and bankside trees instead of concrete or steel reinforcements. New channels will be made sinuous (and not straight) with asymmetrical cross sections. Where technically applicable dredging will be used positively, e.g. for landscaping or habitat creation.	conservation and careful treatment of herpetofauna **Operation stage** • Control of the condition of culverts/drainage ditches, etc. • Noise impact will be limited by installation of the noise screens.
6	**Degradation of habitat conditions during construction stage** During the construction stage habitat degradation will be caused by disturbance, as well as as as a result of potential environmental pollution.	**Minor** Large and medium-sized mammals and birds are the most sensitive to the listed disturbance factors.	**Construction stage:** • Use of proper construction equipment; • Use of fences in the construction sites will also avoid the entrance of fauna in them, avoiding accidents;	**Residual Impact: Minor** **Construction stage:**

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation measures to be included in the ESMP
	The disturbance factors for animals are noise, light exposure due to the work of construction equipment and vehicles within the construction site, access roads, and the presence of people on construction sites. Some birds may abandon their nests and even nestlings. During the construction of the bridge and culverts, the increased turbidity may occur, which will lead to a deterioration of the habitat conditions of aquatic organisms. It is also possible to potentially contaminate surface water and bottom sediments with petroleum products from operating and maintenance equipment.	However, taking into account the existing anthropogenic load on the territory as a whole (arable land, settlements, etc.), animals partially adapted to the presence of man and transport. The impact of noise and disturbance will be on the same level.	• Construction of water-resistant coatings on equipment maintenance sites; • Collection of wastewater from vehicle washing into a settlement pond to trap suspended particles and petroleum products. • Fuels, oils and chemicals will be stored on an impervious base protected by a bund, and drip trays will be used for fuelling mobile equipment. No USTs will be used during construction stage. • The soil contaminated due to spillages during handling of fuel and other hazardous liquids will be removed from the site for suitable treatment and/or disposal. • If any cranes will be noticed during the construction (short rest during the fly path) the presence of people and construction machinery will be limited until the cranes fly away.	• Vegetation clearance should avoid, whenever feasible, the breeding period; • If possible, gradual vegetation clearance should be conducted, to enable fauna to move to other areas.
7	**Degradation of habitat conditions during operation stage** At the operation stage to reduce the noise impact of vehicles, the Project provides for the installation of noise barriers (3030 m length). A detailed assessment of the effectiveness of reduction of disturbance factor will be performed after obtaining information about the spatial location of noise screens with reference to specific habitats and areas where animals can cross the road, etc.	**Minor** No significant impact is expected to occur as the proposed BAKAD route will mostly cross areas occupied by modified associations (farmland, environs of settlements, etc.)	**Operation stage** • Installation of noise barriers of 3,030 m length within Sections 1,4,8; • The rest areas/ petrol stations/TBs along the BAKAD road must include appropriate treatment of liquid and solid wastes to avoid contamination of local soils/ecology near these facilities; • Store appropriately by following good hazardous materials storage and handling management practices;	**Residual Impact: Negligible** **Operation stage** • Limitation of application of deicing agents to the roadbed • Limitation of the quantity of applied agents with consideration of weather conditions and season • Control of application of deicing agents and

No.	Impact Description	Impact Assessment	Embedded Controls	Residual Impact / Mitigation measures to be included in the ESMP
			• Using less toxic deicing materials such as calcium chloride, phosphate inhibited or calcium magnesium acetate, which do not cause irreversible changes in photosynthesis and subsequent destruction of tissues of plants and animal deaths.	monitoring of the chlorides content in soil • Permanent erosion and runoff control will be regularly inspected and maintained during operation.
8	**Impact on fauna** During the construction stage the death of individuals of small mammals, birds, amphibians, reptiles and hydrobionts may be possible. Within the watercourse beds and in the floodplain areas, the construction of bridges and the laying of culverts will represent disturbance for fish. At the operation stage there may be cases of death of individuals as a result of their falling on the road (mainly birds, small mammals and amphibians), but these cases are episodic. The road fence significantly reduces the risk of the death of animals. Subject to the implementation of the Project environmental measures, the impact is assessed as insignificant.	**Minor to Moderate** No significant impact is expected to occur as the proposed BAKAD route will mostly cross areas occupied by modified associations (farmland, environs of settlements, etc.) **Moderate** impact on red listed fish species (*Balkash Perch, Ili Marnikov* and *Seven River Minnows* and *Balkhash minnow*) due to construction activities in Bolshaya Almatinka, Ashibulak, Terenkara, Malaya Almatinka and Karasu Rivers.	**Construction stage** • Limitation of speed, in order to limit emission of dust on non paved access roads and in order to limit the risk of accidents with fauna; • A safety barrier will be installed on both sides of the road and along the median strip. • On slopes and depressed terrain locations, a screen mesh will be installed to restrict access of animals; • Strict limitation of the work outside of the land allocation.	**Residual Impact: Minor** • Prohibition of carrying out work during terms of spawning and feeding of young fish. • Fauna passages (i.e. Culverts) should be installed along the BAKAD. • This measure shall be applied in the proximity of the surface water features, where the presence of amphibians may be higher.

6.6 AIR QUALITY

6.6.1 Introduction

The full assessment of the impacts on air and climate are presented in *Appendix 2.5* of *Volume III* of this ESIA Report. The Appendix presents a detailed description of the air quality modelling, description of impacts and mitigation measures (where applicable). The sections below summarize the findings of this assessment.

6.6.2 Summary of Baseline Findings and Sensitive Receptors

Air quality observations in Almaty are conducted by national hydrometeorology service (Kazhydormet) at 11 monitoring stations, in 5 manual sampling points and in 4 points by mobile laboratories. The exceedances of the average daily MPC (MPC_{DA}) and maximum permissible/allowable non-recurrent concentration (MPC_{MNR}) are regularly recorded, however all of the monitoring points are located in the center of the city and far from the BAKAD RoW.

Air quality baseline survey was conducted in June 2018 to obtain specific baseline data on air quality along the BAKAD RoW. The survey was performed at 14 points (1-time sampling (20 minutes average) and 4-time sampling (24-hour average) per point) in accordance with the national regulatory requirements. Location of the air quality sampling points is shown in the figure below (*Figure 6.6-1*).

Analysis of the air samples showed that the concentrations of carbon monoxide, nitrogen oxide, nitrogen dioxide, sulfur dioxide and particulate matter in most of the samples were below laboratory detection limit and are significantly below the established standards (*Table 6.6-1*).

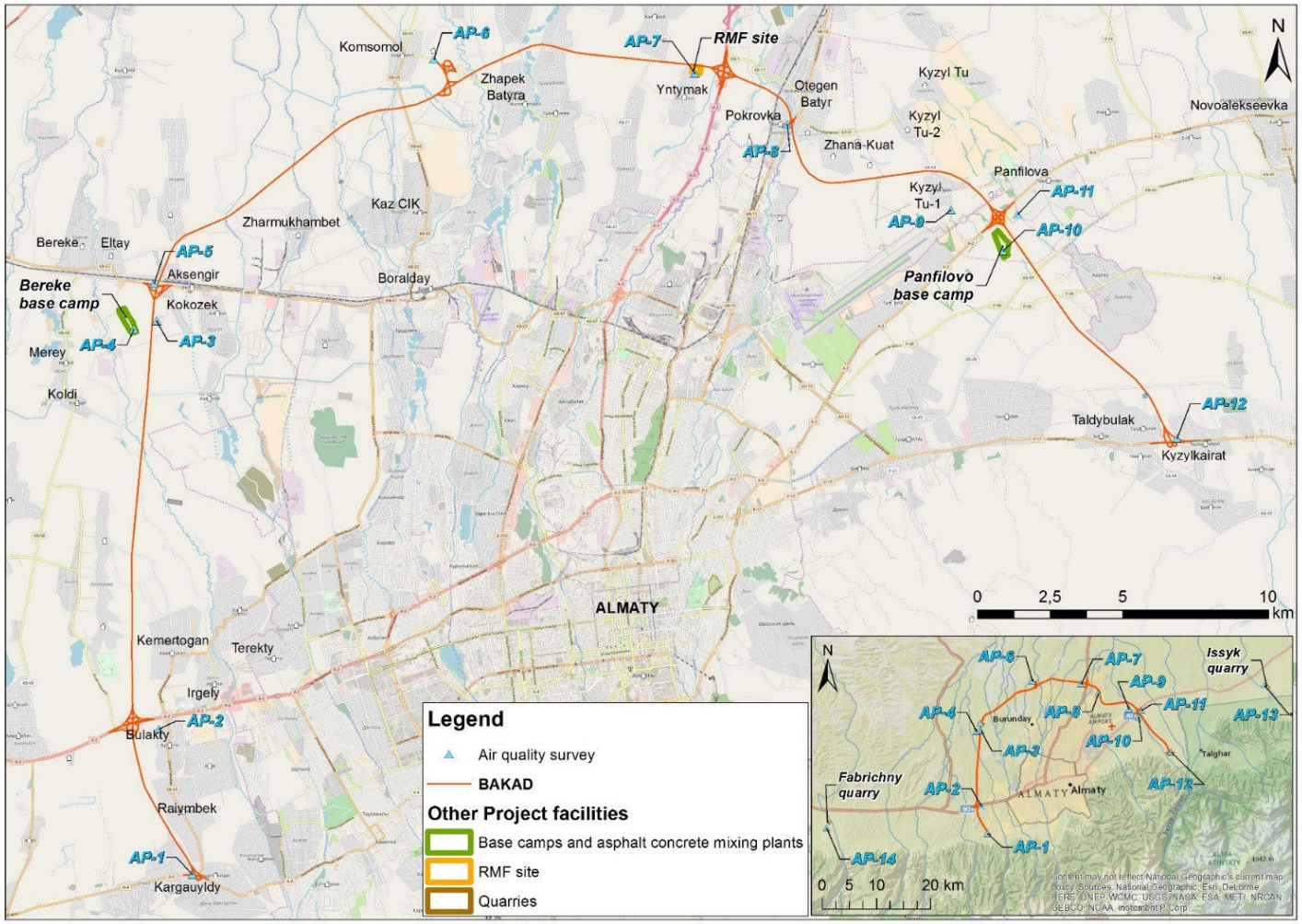


Figure 6.6-1 Location of the air quality survey points

Table 6.6-1 Baseline concentrations of air pollutants based on the analysis of samples taken in 2018

Air quality survey points	Carbon monoxide		Sulphur dioxide		Nitrogen oxide		Nitrogen dioxide		PM*	
	DA	MNR	DA	MNR	DA	MNR	DA	MNR	DA	MNR
AP-1 Kyrgauyldy	<1.5**	<1.5	<0.025	<0.025	<0.03	<0.03	<0.02	<0.02	<0.075	<0.075
AP-2 Bulakty	<1.5	<1.5	<0.025	<0.025	<0.03	<0.03	<0.02	<0.02	<0.075	<0.075
AP-3 Soyuzpechat gardener' partnership	<1.5	<1.5	<0.025	<0.025	<0.03	<0.03	<0.02	<0.02	<0.075	<0.075
AP-4 Bereke shift camp	<1.5	<1.5	<0.025	<0.025	<0.03	<0.03	<0.02	<0.02	<0.075	<0.075
AP-5 Aksengir	<1.5	<1.5	<0.025	<0.025	<0.03	0.31	<0.02	<0.02	<0.075	0.13
AP-6 Nurbereke gardener' partnership (near Komsomol)	<1.5	<1.5	<0.025	0.04	<0.03	0.31	<0.02	<0.02	<0.075	<0.075
AP-7 Yntymak	<1.5	<1.5	<0.025	0.03	<0.03	<0.03	<0.02	<0.02	<0.075	0.01
AP-8 Pokrovka	<1.5	<1.5	<0.025	0.03	<0.03	<0.03	<0.02	<0.02	<0.075	0.2
AP-9 Kyzyl Tu-1	<1.5	<1.5	<0.025	0.05	<0.03	0.05	<0.02	<0.02	<0.075	<0.075
AP-10 Panfilovo shift camp	<1.5	<1.5	<0.025	0.03	<0.03	<0.03	<0.02	<0.02	<0.075	<0.075
AP-11 Panfilovo	<1.5	<1.5	<0.025	0.04	<0.03	<0.03	<0.02	<0.02	<0.075	<0.075
AP-12 Kyzylkairat	<1.5	<1.5	<0.025	0.04	<0.03	<0.03	<0.02	<0.02	<0.075	<0.075
AP-13 Issyk gardener' partnership (Issyk quarry)	<1.5	<1.5	<0.025	<0.025	<0.03	<0.03	<0.02	<0.02	<0.075	<0.075
AP-14 Kargaly (Fabrichny quarry)	<1.5	<1.5	<0.025	<0.025	<0.03	<0.03	<0.02	<0.02	<0.075	<0.075
MPC (National)	**3**	**5**	**0.05**	**0.5**	**0.06**	**0.4**	**0.04**	**0.2**	**0.15**	**0.5**
IFC (WHO) Guideline value [7], [8], [9]	**-**	**100 (15-minutes)**	**0.125 (24-hour) [8] 0.02 (24-hour) [9]**	**0.5 (10-minutes)**	**-**	**-**	**0.04 (annual)**	**0.2 (1-hour)**	**-**	**-**

Note: * - suspended matter - undifferentiated dust/aerosol; ** < - below laboratory detection limit

Based on the air quality survey data, the ambient pollutant concentrations sampled during the baseline study were well below the relevant standards at each location.

To calculate the impact on receptors located close to Project interchanges, current traffic intensity was considered and summarized with the expected construction activities and predicted traffic through BAKAD. Current traffic intensity was observed in the baseline survey that considered regulate traffic conditions and peak traffic on work days and weekend. Traffic intensity was measured at all 8 locations of Project interchanges.

Sensitive receptors

Table 6.6-2 lists the locations (residential areas, dachas and construction camps) considered to contain sensitive receptors which were included in the assessment.

Sensitivity of the identified Receptors to short-term increases of concentrations was determined as medium for the permanent residents and low for construction workers in the shift camp.

No hospitals, schools, or care homes were identified within 200 m of the Project RoW. No sensitive environmental receptors within the BAKAD RoW were identified either.

Table 6.6-2 Sensitivity of the Receptors to air quality impacts

Receptor location	Sensitivity
Abay	Medium
Aksengir	Medium
Alatau	Medium
Bereke (construction camp)	Low
Bereke (village)	Medium
Bulakty	Medium
Chimbulak	Medium
Dachas (21-22 km)	Medium
Dachas (7 km)	Medium
Eltay	Medium
Irgeli	Medium
Isayevo	Medium
Issyk gardener' partnership	Medium
Kargaly	Medium
Kemertogan	Medium
Kokzek	Medium
Koyankus	Medium
Kyrgauyldy	Medium
Kyzylkairat	Medium

Receptor location	Sensitivity
Kyzyl-Tu-1	Medium
Kyzyl-Tu-2	Medium
Mukhametzhan Tuymebaev	Medium
Nurbereke gardeners' partnership	Medium
Ogonek	Medium
Otegen Batyr	Medium
Panfilovo (construction camp)	Low
Panfilovo (village)	Medium
Pokrovka	Medium
Rayimek	Medium
Soyuzpechat' dacha community	Medium
Taldybulak	Medium
Yntymak	Medium
Zhapek Batyr	Medium
Zhana Kuat	Medium
Zhanadaur	Medium

6.6.3 *Project activities and Related Impacts*

Based on the results of the Scoping exercise, the following activities during the construction stage were subject to further impact assessment:

- earth moving and ground preparation;
- movement of vehicles over open ground, on unpaved roads and on the surrounding road network; and
- on-site concrete batching, handling of friable materials and stockpiling.

During the operational stage, main impact on air quality will result from the vehicles' exhaust emissions.

Since the air quality impacts are related to changes in concentration of pollutants in the ambient air, criteria for magnitude determination are based on the numerical values of pollutants' concentrations expressed as portions of MPCs (*Table 6.6-3*).

Table 6.6-3 Criteria for evaluation of the Magnitude of air quality impacts

Magnitude of impact	Criteria
Negligible	< 0.25 MPC_{MNR}
Small	0.25-0.50 MPC_{MNR}
Medium	0.50-1.00 MPC_{MNR}
Large	>1.00 MPC_{MNR}

Construction Stage

The construction of the road is expected to last within 34 months. The main emission sources will be engines of vehicles and construction equipment, asphalt concrete and concrete plants.

The major impact on the ambient air is expected during the most intensive stages of construction, therefore these were considered for the assessment of air pollution. The details of scenario are presented in *Appendix 2.5* of *Volume III* of this Draft ESIA Report.

A dispersion modelling was performed with the use of AERMOD model.

Modelling results showed that the most intense construction activities will not result in the extremely elevated concentrations of a number of pollutants, including sulphur dioxide and carbon monoxide. However, nitrogen dioxide and dust (particulate matter) concentrations in the ambient air will in some cases be close to or even exceed the national threshold levels at sensitive receptors.

Most of the predicted concentration values will be below 10% of the relevant air quality standards, therefore the corresponding impact magnitude will be negligible. At some receptors, NO_2 and PM concentrations will be significantly higher than that of the other pollutants, and relevant magnitude will vary from small to medium.

Based on the impact magnitude and sensitivity of receptors, impact significance was determined. Summary of impacts on air quality during construction is presented in the *Table 6.6-5* below.

Operation Stage

The main source of the impact on air quality during the Project operation will be vehicular traffic on BAKAD and adjacent roads.

The impact of traffic was estimated for the year 2045, when traffic intensity is expected to be at its highest (reaching 80-90 thousand vehicles per day at specific parts of the road). By this time, traffic intensity will be three times of what is expected during the first year of the road's operation, although emissions are expected to halve as vehicles will be going "greener".

Table 6.6-4 presents the total projected annual emissions of CO, NOx, hydrocarbons (HC), SO_2 and PM in the Project area by 2045.

Table 6.6-4 *Total annual emissions of pollutants by 2045*

BAKAD section	Section length, km	Traffic intensity, veh./day	Emissions, t/year				
			CO	NOx	HC	PM	SO_2
8 PK0 -PK55	5.5	39,819	153.5	16.9	9.9	0.09	2.24
1 PK55 - PK240	18.5	41,355	684.2	90.8	60.9	0.53	10.4
2 PK240 – PK440	20	78,567	1,370	177.7	118.6	1.03	20.6
3 PK440 – PK470	3	92,863	207.1	24.8	15.3	0.14	3.2
4 PK470 – PK570	10	81,692	599.3	70.5	45.3	0.39	8.7
9 PK570 – PK660	9	22,767	89.0	9.6	3.0	0.07	1.9
Total:	**66**	**-**	**3,103.1**	**390.3**	**253**	**1.22**	**47**

In accordance with the IFC General EHS Guidelines, BAKAD will be a **source of minor emissions** of air pollutants in 2045.

Concentrations of pollutants resulting from the BAKAD operation were calculated by dispersion modelling with the use of AERMOD.

Based on the modelling results, the highest air pollution levels are expected at the northern section of BAKAD (PK24-PK45), where the highest intensity of traffic is anticipated.

Emissions of nitrogen oxides will be the biggest contributor to air pollution. In the immediate vicinity of the road (at a distance of 50-250 metres), the maximum one-time concentrations of NO_2 in the ambient air may reach 0.7-0.9 MPC, whilst concentrations of NO may be as high as 0.6 MPC. At residential areas, these pollutants will be in lower concentrations. NO_2 concentrations will be below 0.8 MPC, and that of NO will not exceed 0.4 MPC.

Average annual concentrations of nitrogen oxides in the air of residential areas will be significantly lower: up to 0.5 MPC for NO_2 and 0.1-0.2 MPC for NO.

Concentrations of CO, SO_2 and hydrocarbons will be low, within 0.1-0.2 MPC at most of the residential areas. Within 150 m from the road, concentrations may reach 0.3 MPC for CO, 0.4 MPC for SO_2, and 0.5-0.7 MPC for hydrocarbons.

Pollution with PM_{10} and $PM_{2.5}$ particulate matter is expected to be negligibly low, with concentrations below 0.05 MPC.

Thus, even with the highest traffic intensity expected during the operation of BAKAD, air quality standards will not be exceeded at residential receptors in the Project area.

In relation to the potential effects at the identified habitats adjacent to the Project corridor, no significant ecological effects are anticipated along the entire route.

All predicted concentration values vary between 15% and 80% of the relevant air quality standards, therefore the magnitude of air quality impacts will vary from negligible to medium.

Based on the impact magnitude and sensitivity of receptors, impact significance was determined. Summary of impacts on air quality during operation presented in the *Table 6.6-5* below.

6.6.4 Summary of Significant Impacts

Significant impacts are summarized for the construction and operation in *Table 6.6-5.* For the assessment of impacts of minor or negligible significance see *Appendix 2.5* of *Volume III.*

Table 6.6-5 Significant of the Air and Climate Impacts and Mitigation

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
1	**Construction dust** The unpaved road network used across the Project Site prior to works completion, is likely to be constructed from a mixture of rocks, stone, gravel, sand and silt, and can be particularly dusty when disturbed by vehicle movements. The elevated wind speeds occurring in the region together with the absence of natural barriers at the Project Site further increase the high potential for dust generation. Total construction volume >100,000m^3, on-site concrete batching and use of dusty construction materials will cause increase in PM concentrations at sensitive receptors.	**Moderate** (Panfilovo, Soyuzpechat' and Mukhametzhan Tuymebaev)	The control and mitigation of dust is identified to be of primary consideration within the assessment and will be achieved by implementing following embedded mitigation measures: • where unpaved roads are utilized by vehicles, surface binding agents should be used, options include salt for road encrusting and oil-based agents; • a speed limit of 30kph on unpaved surfaces should be used; • vehicles should be kept clean to avoid tracking dirt around and off the site; • vehicles transporting friable materials should be covered; • where feasible, surface binding agents should be used on exposed open earthworks; • exposed ground and earthworks areas should be covered as much as possible, for example with sheeting or boarding, or the use of chemical binders should be investigated; • where ground and earthworks are covered or surface binders are used, the smallest possible area for working should be exposed; • use of localised dampening and activity specific dampening should be used to reduce localised emissions of dust; • stockpiling of material, for example, rocks, sand and soils should be minimised; • stockpiles should be enclosed or sheeted as much as possible; • stockpiles should be located as far away from receptors as possible;	**Minor**

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
			• the design of stockpiles should be optimised to retain a low profile with no sharp changes in shape; and • wind breaks should be erected around the key construction activities and, if possible, in the vicinity of potentially dusty works, to minimise impacts at nearby residential receptors.	
2	**Ambient air quality in the residential area nearby BAKAD during the operation stage** Exhaust emissions from the road traffic will affect the ambient air quality along the BAKAD. Intensive vehicular traffic moving along BAKAD and adjacent roads will annually generate over 3,000 t of emissions (CO, NOx, hydrocarbons, SO_2 and PM) by 2045 On an average, the ambient air quality along the BAKAD will increase by 0.15 to 0.80 of the relevant MPCs. The main pollutants of concern will be nitrogen oxides and NO_2 in particular.	**Minor to Moderate** For residents living in proximity to BAKAD	**Operation stage:** • Excluding transport stops at intersections and junctions of roads, improved visibility, increased radius for high speed driving and reducing toxic emissions; • Longitudinal slopes on road surface not exceeding 10% of radius curves, providing highly functional operating conditions; • Road signs, markings, guard rails to ensure free traffic flow and reduce the emission of harmful exhaust of vehicles. • Effective monitoring over maintenance and driving vehicles (non faulty operated, properly adjusted engine emits 10 times less carbon monoxide than faulty); • One of the most simple methods to reduce toxic exhaust gas (EG) is converting vehicles for liquefied gas, whereby NOx concentration in emissions is reduced by 4-10 times; • According to the law each vehicle must pass technical inspection for emission standards once a year. Inspection ticket shall permanently stay in the vehicle and be checked by traffic police when required; • Use of fuel not containing lead is becoming common in Kazakhstan, it will significantly reduce emissions of lead and its compounds to the environment.	**Minor**
3	**Decreasing of traffic jams** The BAKAD operation will lead to a decreasing of traffic jams to the Almaty center and an	**Positive**	**Not required**	**Positive**

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
	increasing in the average speed of motor transport in the city. As a consequence, there will be a decrease in average fuel consumption, which will lead to a general reduction in greenhouse gas emissions. Since the growth in the number of vehicles in the future is inevitable, even a slight decrease in greenhouse gases in general through the implementation of the Project is a positive impact.			

6.7 PROJECTED GHG EMISSIONS

6.7.1 Estimation of GHG emissions during the construction stage

The assessment of greenhouse gas emissions during the construction period was carried out in accordance with «Guideliens for National Greenhouse Gas Inventories. - IPCC, 2006».

According to this guideline, the relevant emission of diesel fuel combustion is presented below (*Table 6.7-1*):

Table 6.7-1 ***Specific GHG emissions***

Fuel	GHG emissions, t/t_{fuel}		
	CO_2	CH_4	N_2O
Diesel fuel	3,13	0,000129	0,000026

The global warming potential in equivalent CO_2 units is 21 CO_2-equivalent units for methane and 310 units for nitrogen oxide.

Diesel fuel consumption of construction equipment and dump trucks during transportation of bulk materials is 8,400 tons per year and greenhouse gas emissions is 26,383 tons of CO_2-equivalent per year .

Thus the annual emission of GHG will during construction phase will temporary (during 3 years) and slightly exceed the the critical level of 25 thousand tons of CO_2-equivalent per year established by IFC performance Standards.

6.7.2 Estimation of GHG emissions during the operation stage

The forecast assessment of greenhouse gas emissions during the operation phase of BAKAD was carried out in accordance with the "Calculation instruction (methodology) for the inventory of emissions of pollutants from vehicles in the largest cities, M. NIIAT, 2012".

This Methodology is based on the international Guidelines of EMEP/CORINAIR and the COPERT 4 program (version 9.1). It also takes into account the main features of road traffic flows in biggest cities (over than 1 million of people).

The estimation of GHG emission was made for the year 2045, when the highest traffic intensity is expected, and following the formula below:

$$Gi = Mi\ [g/km] \cdot L\ [km] \cdot N\ [vehicles/day] \cdot 365\ [days/year] \cdot 10^{-6}\ (tons/year),$$

$$\mathbf{Gi = Mi\ [g/km] \times L\ [km] \times N\ [vehicles/day] \times 365\ [days/year] \times 10^{-6}\ (tpy),}$$

where

Mi - is the running exhaust emissions of Substance "i" by one vehicle, weight-averaged to the traffic structure, in g/km;

L - is the length of a section of BAKAD, in km; and

N - is the traffic intensity within this section, in vehicles per day.

Table 6.7-2 Annual GHG emissions during the operational stage of BAKAD

Section	L, km	N, vehicles/day	CO_2		CH_4		N_2O	
			g/km	tpy	g/km	tons/year	g/km	tons/year
8	5.5	32,391	538.4	35,000	0.0157	8	5.5	32,391
1	18.5	29,216	818.1	161,170	0.025	1	18.5	29,216
2	20	57,858	755.9	319,000	0.023	2	20	57,858
3	3	75,047	583.7	47,860	0.017	3	3	75,047
4	10	70,288	477.1	122,600	0.014	4	10	70,288
9	8.5	20,278	384.6	24,230	0.0096	9	8.5	20,278
Total:				**709,860**		**18.2**		**Total:**

Given the global warming potential of methane and nitrogen oxide, the cumulative emission of greenhouse gases during the operational phase may amount to 716,130 tonnes of CO_2 equivalent annually, which should be viewed as a significant level.

To assess the significant of the risk associated with this impact, the emission estimate should be compared against the national quota for Kazakhstan. According to official data[1], the base GHG emissions for 1990 are set at 358.38 million tonnes of CO_2 equivalent annually. The forecast is that by 2030, the quota for free emissions of greenhouse gases will only amount to 5% of the base level, i.e. 17.92 million tonnes of CO_2 equivalent annually.

According to our estimates, GHG emissions from road transport on BAKAD may amount in 2030 to 0.365 million tonnes of CO_2 equivalent annually (or 2% of the national quota).

6.8 NOISE AND VIBRATION

6.8.1 Introduction

The full assessment of the impacts generated by noise and vibration is presented in *Section 2.2* of *Volume III* of this ESIA Report. The Appendix presents a detailed description of the existing acoustic environment, significant impacts and mitigation measures. The sections below summarise the findings of this assessment.

[1] The first biannual report by Kazakhstan presented in accordance with Resolution 1/CP.16 of participants of the UN Framework Convention on Climate Change (Astana, 2014).

6.8.2 *Summary of Baseline Findings and Sensitive Receptors*

The assessment of noise load within the Project area included the measurement of the equivalent and maximum noise level in accordance with the national regulatory requirements (GOST 23337-78 Methods of noise measurement in residential areas and in residential and public buildings and GOST 31297-2005 Noise. Technical method for determining the sound power levels of industrial enterprises with multiple noise sources to assess the sound pressure levels in the environment).

The measurements were performed in June 2018 using the noise analyzer "Ekofizika-110A".

The measurement points are located on the borders of the residential areas closest to the BAKAD route and other Project facilities (quarries, RMF site, shift camps), taking into account existing noise sources. In addition, the measurements were carried out also on the boundaries of the residential areas of projected shift camps for further potential impact assessment of the asphalt concrete mixing plant on the working staff.

In total, 28 measurements were conducted (14 measurements during daytime and 14 measurements during nighttime). Location of the measurement points is presented in *Section 2.2* of *Volume III* of this ESIA Report.

Measurement results

The main noise sources at the measurement points are vehicles moving along local roads and rail transport.

The assessment of noise load within the Project area was carried out in relation to the national standards (GN "Hygienic standards of noise and infrasound levels in residential, public buildings and residential areas" (approved by order of the Minister of health of the Republic of Kazakhstan dated December 3, 2004 № 841) and standards recommended by international institutions ((WHO), 1999). Measurement results are presented in table below (*Table 6.8-1*).

Table 6.8-1 Background noise levels within the Project area

No	Measurement points	Background noise level			
		Daytime (7.00-23.00)		*Nighttime (23.00-7.00)*	
		L_{EQV}, dBA	L_{MAX}, dBA	L_{EQV}, dBA	L_{MAX}, dBA
1.	NP-1 Kyrgauyldy	**66.8**	**78.4**	**63.9**	**78.4**
2.	NP-2 Bulakty	52.8	66.4	**51.7**	59.1
3.	NP-3 Soyuzpechat gardener' partnership	44.3	55.1	40.8	54.2
4.	NP-4 Bereke shift camp	46.9	61.2	37.6	51.9
5.	NP-5 Aksengir	**58.2**	66.0	**57.4**	**70.0**

No	Measurement points	Background noise level			
		Daytime (7.00-23.00)		*Nighttime (23.00-7.00)*	
		L_{EQV}, dBA	L_{MAX}, dBA	L_{EQV}, dBA	L_{MAX}, dBA
6.	NP-6 Nurbereke gardener' partnership (near Komsomol)	51.9	62.3	**47.1**	57.6
7.	NP-7 Yntymak	43.6	54.6	44.0	50.7
8.	NP-8 Pokrovka	**63.6**	**82.0**	**62.3**	**71.6**
9.	NP-9 Kyzyl Tu-1	**59.5**	**72.5**	**59.6**	**69.2**
10.	NP-10 Panfilovo shift camp	46.1	59.0	43.1	51.3
11.	NP-11 Panfilovo	**69.1**	**85.0**	**64.6**	**78.0**
12.	NP-12 Kyzylkairat	46.3	52.7	**50.7**	59.2
13.	NP-13 Issyk gardener' partnership (Issyk quarry)	41.3	55.6	**48.0**	59.2
14.	NP-14 Kargaly (Fabrichny quarry)	44.5	55.0	40.5	52.1
*National standards**		*55*	*70*	*45*	*60*
*IFC/WHO standards **		*55*	-	*45*	-

Note: * The standard values refer to the outdoor noise level

According to the measurement results, the equivalent noise level exceed the established national and international standards in 5 measurement points during daytime (NP-1, 5, 8, 9, 11) and in 9 measurement points during nighttime (NP-1, 2, 5, 6, 8, 9, 11, 12, 13). The measured maximum noise levels are exceed the established national standards in 4 measurement points during daytime (NP-1, 8, 9, 11) and in 5 measurement points during nighttime (NP-1, 5, 8, 9, 11).

Sensitive receptors

Table 6.8-2 lists the locations (residential areas, dachas and construction camps) considered to contain sensitive receptors and included in the assessment.

Sensitivity of the identified Receptors to noise impacts was determined as medium for the permanent residents and low for construction workers in the shift camp.

Table 6.8-2 Sensitivity of the Receptors of noise impacts

Receptor location	Sensitivity
Abay	Medium
Aksengir	Medium
Alatau	Medium
Bereke (construction camp)	Low
Bereke (village)	Medium
Bulakty	Medium

Receptor location	Sensitivity
Chimbulak	Medium
Dachas (21-22 km)	Medium
Dachas (7 km)	Medium
Eltay	Medium
Irgeli	Medium
Isayevo	Medium
Issyk gardener' partnership	Medium
Kargaly	Medium
Kemertogan	Medium
Kokzek	Medium
Koyankus	Medium
Kyrgauyldy	Medium
Kyzylkairat	Medium
Kyzyl-Tu-1	Medium
Kyzyl-Tu-2	Medium
Mukhametzhan Tuymebaev	Medium
Nurbereke gardeners' partnership	Medium
Ogonek	Medium
Otegen Batyr	Medium
Panfilovo (construction camp)	Low
Panfilovo (village)	Medium
Pokrovka	Medium
Rayimek	Medium
Soyuzpechat' dacha community	Medium
Taldybulak	Medium
Yntymak	Medium
Zhapek Batyr	Medium
Zhana Kuat	Medium
Zhanadaur	Medium

6.8.3 *Project activities and Related Impacts*

Noise impact from the Project construction activities will arise principally from the following activities:

- construction of the BAKAD road itself;
- construction of other structures (e.g. services areas, camps, storage areas etc.);
- excavation and preparation of construction materials in quarries or borrow pits; and
- transportation of excavated and construction materials.

Noise impacts can be caused by noise emissions from construction equipment (earthmovers, etc.), and construction vehicles carrying materials and spoil to and from the locations where work is taking place along the BAKAD.

During the operational stage, noise impact will result from the traffic along the BAKAD and the nearby roads.

The sections below summarise the findings of the Noise Impact Assessment.

Construction Stage

Construction of BAKAD is expected to take 34 months.

The main sources of noise during this period will be vehicles, road construction machinery, and asphalt and concrete plants.

Works will be carried out sequentially at each section of the road and will be separated in time. Therefore, for assessing the noise impact during the construction of the road, the most intense stages of construction were considered, when the greatest number of simultaneously running road-building machinery will be involved at small construction sites.

To determine equivalent noise levels (LAeq) resulting from the Project construction, noise modelling was performed.

Modelling results showed that in the nearest residential areas (Kargaly, Nauryz, Parshino, Bolek, dachas), equivalent levels of sound generated by road construction equipment in quarries will not exceed 55 dB(A). The maximum sound levels in these areas will not exceed 60 dB(A). The noise impact of the asphalt plant and concrete plants in the residential areas of accommodation camps will not exceed 48 dB(A) for equivalent and 58 dB (A) for maximum sound levels. The equivalent and maximum sound levels will not exceed 46 dB(A) and 57 dB(A) respectively at the nearest residential development (Panfilovo and Soyuzpechat).

Thus, exceedance of permissible sound levels during the construction of linear sections of the road is not expected.

Operation Stage

The assessment of the noise impact of traffic flows on BAKAD was carried out for the year 2045, when the maximum traffic intensity is expected (up to 80-90 thousand vehicles cars per day on certain sections of the road).

Results of the calculations were section-specific, as described in the table below (*Table 6.8-3*).

Table 6.8-3 Results of noise level calculations

Section #	Section start/end	Description
1	1-4 km	Noise within the residential areas near the road will significantly exceed threshold levels. In residential areas located 50 m from the road, the exceedance of the equivalent sound level will comprise up to 12 dB(A) during the day and up to 19 dB(A) at night. Equivalent sound levels attenuate to the permissible level at a distance of more than 250 m from the road during the day and 650 m at night. Maximum daytime sound levels may exceed the sanitary standard by 8 dB(A), and at night the exceedance of the maximum sound level can reach 7-18 dB(A).
2	5-8 km	Within the residential areas, equivalent sound levels generated by traffic will not exceed threshold levels in the daytime. In the night-time, exceedance can be 4 dB(A). Maximum sound levels will be below the permissible level during day and night.
3	20-23 km	Equivalent sound levels within the residential area is likely to exceeded threshold values during the daytime by 4-13 dB(A), while at night exceedance can be 10-17 dB(A). Maximum sound levels in the daytime may be exceeded by 5 dB(A), and at night the exceedance can reach 8-15 dB(A).
4	36-39 km	Most of the residential area will be impacted not only by BAKAD, but also by radial roads – Almatinskaya and Altayeva Streets. Equivalent sound levels in these areas will exceed the standard by 3-11 dB(A) in daytime and by 8-15 dB(A) at night. Daytime maximum sound levels will not exceed the standard, while at night the exceedance can reach 4-12 dB(A).
5	41-44 km	Equivalent sound levels will exceed the standard by 6-15 dB(A) during the day and by 10-18 dB(A) at night. Maximum sound levels during the daytime may be exceed the standard by 5 dB(A), and at night by 8-15 dB(A).
6	45-51 km	Equivalent sound levels may exceed the standard by 2-17 dB(A) in daytime and by 6-21 dB(A)at night. Maximum sound level standard in the daytime can be exceeded by 7 dB(A). At night the exceedance can reach 2-17 dB(A). **Section 7 (52-57 km)** Equivalent sound levels may exceed the standard by 15 dB(A) in daytime, at night - by 5-18 dB(A). The maximum levels of sound in the daytime can be exceeded by 5 dB(A), at night the exceedance can reach 2-15 dB(A).
7	52-57 km	Equivalent sound levels may exceed the standard by 15 dB(A) in daytime, at night - by 5-18 dB(A). The maximum levels of sound in the daytime can be exceeded by 5 dB(A), at night the exceedance can reach 2-15 dB(A).
8	58-61 km	In the residential area, equivalent sound levels during the day will not exceed the standard, and at night, an exceedance of 8 dB(A) is possible. The maximum sound levels may be exceeded at night by 7 dB(A).
9	63-95 km	Within the residential area, equivalent sound levels may exceed the standard by 6 dB(A) in daytime, at night - by 11 dB(A). The maximum levels of sound in the daytime can be exceeded by 2 dB(A), at night the exceedance can reach 3-12 dB(A).

6.8.4 Summary of Significant Impacts

Significant impacts are summarised for the construction in *Table 6.8-4* and for operation in *Table 6.8-5*. For the assessment of impacts of minor or negligible significance see *Appendix 2.6* of *Volume III.* Data supporting noise assement results are provided in Appendix A to Volume II.

Table 6.8-4 Significant Construction Noise Impacts and Mitigation

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
1	**Noise generated at BAKAD Construction Sites (including main or satellite construction sites and structures)** Construction of the BAKAD will result in a noise impact on a short-term basis as the construction approaches and moves past each settlement. Noise resulting from general construction work to build structures, such as bridges and viaducts, is covered by the road construction site assessments. It has been assumed that driven piling will not be used. Instead, hydraulic pile driving "silent piling" or bored piling will be used, which has lower noise levels than the percussive piling methods.	**Minor** Refer to *Appendix 2.6* of *Volume III* of this ESIA Report	Refer to *Appendix 2.6* of *Volume III* of this ESIA Report	**Minor**

Table 6.8-5 Significant Operation Noise Impacts and Mitigation

No.	Impact Description	Impact Assessment for the Social Area of Influence (SAoI)	Embedded controls/Mitigation Measures	Residual Impact
1	**Road Traffic Noise from Traffic on the BAKAD** Calculated sound levels (equivalent and maximum) the will be generated by the traffic flow on BACAD and large radial roads will significantly exceed sanitary standards both during the day and at night. At the nearest residential buildings (less than 100 m from the roads), the limits may be exceeded by 10-20 dB(A), especially if they are exposed to the noise impact of several roads.	**Moderate** at residential properties	• maintain the road surface in good condition; • follow the provisions of the 'Regulation on Assessment and Management of Environmental Noise'; • take advantage of the natural topography for noise shielding; • introduce and manage noise control plantings on the road side along residential properties; • install noise barriers along all residential properties within the distance of 500 m from the road; • improve the housing isolation (e.g. sound proofing of windows and walls).	**Minor**

7 SOCIAL IMPACT ASSESSMENT

7.1 AREA OF INFLUENCE

The Social Area of Influence (SAoI) has been defined as the area likely to be affected by the Project activities during the construction (construction is currently estimated to last approximately 4.7 years) and operation of the Project (not limited in time).

The BAKAD construction corridor varies between 70 m (right-of-the-way) and 500 m (interchanges), where the land withdrawal will take place. The size of the corridor has been selected to accommodate construction works of BAKAD RoW and interchanges.

The Project passes through the Karasaysky, Iliysky and Talgarsky districts (Almaty suburban area). Quarries and transportation routes are located in Enbekshikazakhsky and Zhambylsky districts.

In general it can be concluded that people living or working directly along the Project route or in the near vicinity will experience both positive and negative impacts, whilst the impacts will be mainly positive from a wider, regional or even national perspective.

The SAoI for construction stage in general includes:

- The city of Almaty,
- Almaty Region:
    - Karasaysky district,
    - Iliyski district,
    - Talgarsky district,
    - Enbekshikazakhsky district,
    - Zhambylsky district.

The SAoI for operation stage in general includes:

- The city of Almaty,
- Almaty Region:
    - Karasaysky district,
    - Iliyski district,
    - Talgarsky district.

The SAoI of the Project for socio-economic impacts such as taxes revenue, impacts on local economy and employment has been defined to include Almaty suburban area and nearest districts as well as Almaty region and Kazakhstan in general.

The SAoI of the Project for community health and safety issues, community cohesion, access to nearest territories and facilities, etc. will cover the major communities potentially to be affected by the Project (in addition to users of BAKAD during operation) is as follows:

- the primary Project site which encompasses a corridor of 2,000 m (being 1,000 m on each side of the BAKAD centreline);
- the extended Project area would include access roads, quarries and construction camps realized due to the Project.

Based on these conditions, the settlements[1] whose resident areas are within or in close proximity to the 1000 m corridor have been assessed with respect to potential impacts from BAKAD are provided in the *Table 7.1-1* below.

Table 7.1-1 ***Settlements located within the SAoI***

№	Rural Okrug	Settlement	BAKAD (KP) / Quarry/ Transportation route	Population (2017)
BAKAD RoW				
Karasaysky district				
41.	Raiymbeksky RO	Kyrgauldy	0+000 km (Interchange)	7,743
42.		Gardening Partnerships	1+300 km – 2+000 km	No data
43.		Raiymbek	1+900 km – 3+300 km	6,458
44.		Bulakty	5+200 km – 5+500 km	5,308
45.	Irgeliysky RO	Gardening Partnerships	7+500 km – 13+700 km	No data
46.		Kemertogan	7+000 km – 11+700 km	2,896
47.	Yeltaiysky RO	Gardening Partnership Soyuzpechat	19+500 km– 19+900 km	No data
48.		Gardening Partnership Ogonyok	20+500 km– 20+900 km	No data
49.		Gardening Partnerships	20+900 km– 21+000 km	No data
50.		Razyezd 71 (**Pogranichnik Gardening Partnership according to some sources*)	21+300 km – 21+500 km	431
51.		Isayevo	22+500 km – 22+700 km	1,765
Iliysky district				
52.	KazTSIKovsky RO	Komsomol	31+800 km – 32+300 km	3,080
53.		KazTSIK	31+800 km – 32+300 km	13,225
54.	Aschibulaksky RO	Zhapek Batyr	35+600 km – 36+500 km	8,916
55.		Toli be	36+000 km – 36+500 km	1,147
56.		Mukhametzhana Tuimebayeva (*M. Tuimebayeva*)	36+800 km – 38+200 km	15,207
57.		Kokkainar	36+800 km – 38+200 km	3,929
58.	Baiserkinsky RO	Zhanadaur	40+500 km – 41+200 km	3,030
59.		Intymak	42+000 km – 42+600 km	4,650
60.	Energetichesky RO	Pokrovka	45+400 km – 46+800 km	7,045
61.		Otegen Batyr	46+000 km	21,380
Talgarsky district				
62.	Guldalinsky RO	Zhana Kuat	46+800 km – 47+300 km	3,500
63.		Zhalyn Gardening partnership	50+600 km	No data

[1] With the term "Settlements" villages, quarters, small towns are referred to.

№	Rural Okrug	Settlement	BAKAD (KP) / Quarry/ Transportation route	Population (2017)
64.	Panfilovosky RO	Kyzyl Tu 4 (Kyzyl Tu 1, 2, 3, Kurylysshy micro district, Beibitshelik micro district)	52+800 km – 53+000 km	5,357
65.		Nurly Dala Gardening partnership	51+500 km – 52+150 km	No data
66.		Panfilovo	54+900 km – 55+100 km	10,843
67.	Belbulaksky RO	Taldybulak	64+900 km – 65+300 km	5,004
68.	Alatausky RO	Kyzyl-Kairat	65+300 km – 65+800 km	7,964
Fabrichny Quarry				
Zhambylsky District				
69.	Kargalysky RO	Kargaly	Fabrichny quarry	24,000
Karasaysky District				
70.	Ayteysky RO	Kumaral	Transportation route (A-2 BAKAD)	650
71.		Aytey	Transportation route (A-2 BAKAD)	3,081
72.	Kaskelen		Transportation route (A-2 BAKAD)	66,442
73.	Zhambylsky RO	Gardening partnerships	Transportation route (M-36 BAKAD)	No data
74.		Zhambyl	Transportation route (M-36 BAKAD)	2,504
75.	Umtylsky RO	Gardening partnerships	Transportation route (Local road)	No data
76.		Koldi	Transportation route (Local road)	1,531
Issyk quarry				
Enbekshikazakhsky District				
77.	Boleksky RO	Issyk gardening partnership	Issyk quarry	No data
78.		Bolek	Issyk quarry	4,355
79.	Baitereksky RO	Baiterek	Transportation route (Kuldjinsky trakt)	17,429
80.		Gardening partnership	Transportation route (Kuldjinsky trakt)	No data

7.2 METHODOLOGY

The objective of the socio-economic impact assessment is to identify and assess direct, indirect and induced socio-economic impacts potentially caused by the Project and to define – where relevant – suitable mitigation measures to be applied by Consortium. To achieve this, the following information is taken into consideration:

- the proposed Project location/ delineation and the technical design;
- existing and already defined embedded controls; and

- the Field socio-economic baseline / social survey, which was carried out in July 2018 within the defined SAoI.

The assessment methodology applied in this chapter follows the general guidance presented in *Chapter 4*. Accordingly the assessment of impacts comprises four sequential stages: impact prediction, impact evaluation, identification of mitigation measures and assessment of residual impacts.

The evaluation of significance of the Project's socio-economic impacts has been developed on the basis of the criteria of the expected magnitude of impacts and the sensitivity of socio-economic resources or receptors.

Determining magnitude

Magnitude factors and the typical descriptors that would be considered to estimate overall magnitude for impacts under the relevant chapters of this ESIA are provided in *Table 7.2-1* below.

Table 7.2-1 Magnitude Factors Assessment

Magnitude factors		Description
Duration	*Instantaneous*	Impact during several months
	Short-term	Less than 1 year
	Medium-term	1-3 years
	Long-term	More than 3 years
	Permanent	Permanent change in the characteristics of objects
Frequency	*One-off*	Impact occurs once during the project lifecycle, as a rule - during the construction phase
	Rare	Impact occurs 2 or 3 times per year
	Occasionally	Impact occurs at least 4 times per yea
	Frequently	Impact occurs at least once per month
	Continuous	Means static impacts during a definite period of time
Footprint / Geographic Extent	*Local*	<1.000 m at each side of the BAKAD axis
	Regional	Affecting Almaty suburban area
	National	Affecting national significant territories and sustainable development of nations (Republic of Kazakhstan)
	International	Affecting the territory and processes of international importance
Scale	*Negligible*	Singular events/ negligible damage to culture/ wellbeing
	Small	Several events/ minor damage to culture/ wellbeing
	Medium	Several events/moderate damage to culture/ wellbeing
	High	Multiple events/serious damage to culture/ wellbeing

As different impacts appear on a different administrative level, they are divided further in the assessment into several sections as follows:

- Socio-economic impacts, which will primary effect districts, regional and national level processes (regional and national levels);
- Community health and safety, which will cover community and district level processes (local and regional);
- Impacts on local communities provides for assessment of Project construction and operation impacts on nearest settlements (local extent).
- Displacement of existing land, use, property and people is to assess impacts, related to land acquisition in three districts (local and regional extent).

Determining sensitivity/vulnerability

Typical criteria that would be considered to describe specific sensitivity/vulnerability criteria for human receptors are provided in ***Table 7.2-2***.

Table 7.2-2 Typical Criteria to be Considered in Assigning Individual Value/Sensitivity Criteria

Value/ Sensitivity Level	Typical Criteria
Low	Low importance and rarity, local scale, high ability to adapt to changing conditions under the impact of the Project and associated activities
Medium	Medium sensitivity, limited ability to adapt to changing conditions under the impact of the Project and associated activities
High	High sensitivity, adaptation to changing conditions under the impact of the Project and associated activities is extremely difficult / impossible

Impact significance assessment

The category of *significance* is identified based on the combinations of *magnitude* and *responsivity* of receptors/environmental components in accordance with *Table 7.2-3*.

Table 7.2-3 Determination of Impact Significance

Magnitude of Impact	Responsivity of Resources&Recipients		
	Low	*Medium*	*High*
Insignificant	Negligible		
Low		Minor	
Medium		Moderate	
Large		Major	

Five categories of significance are applied in the evaluation of impacts before and after mitigation (*Table 5*.7-1).

Table 7.2-4 Categories of Impact Significance

Significance Designation	Significance Context
Negligible	Impacts practically do not change the social baseline conditions, local in extent and temporary or short-term in duration
Minor	Short-term inconveniences caused by Project implementation to individuals and communities, but with no consequences to long-term change of livelihood or quality of life. Receptors either easily in part adapt to changes brought by the Project or proceed with previous livelihood
Moderate	Direct and indirect impacts on livelihood and quality of life of the local communities or individuals. Receptors may undergo some difficulties to adapt to changes and they will be able to return to their former livelihood under condition of some support (for instance, compensation**)**
Major	Widely spread adverse direct and indirect impacts on both individuals and local communities which are practically cannot be mitigated or compensated. Affected receptors are not able to adapt to changes or proceed with previous livelihood
Positive	There will be a beneficial impact to a resource/receptor (note: no magnitude is assigned for positive impacts)

The identification of measures to mitigate potential adverse socio-economic impacts in this chapter has been conducted in the context of the general socio-economic setting of the Project area, taking into national and international standards, guidelines and policies.

7.3 SUMMARY OF SOCIO-BASELINE FINDINGS

7.3.1 *Administrative Division*

In administrative terms, the territory of the BAKAD SAoI belongs to the Karasaysky, Iliysky and Talgarsky districts of the Almaty region (Almaty suburban area). During the construction phase, construction materials will be taken from the quarries, which are located in the Enbekshikazakhsky and Zhambylsky districts.

The planned section and the quarry will be located near settlements and dachas communities (see *Table 7.3-1* below).

Table 7.3-1 Communities within the Project Implementation Area

№	Rural Okrug	Settlement	Population (2017)
		BAKAD RoW	
Karasaysky district			
1.	Raiymbeksky RO	Kyrgauldy	7,743
2.		Gardening Partnerships	No data
3.		Raiymbek	6,458
4.		Bulakty	5,308
5.	Irgeliysky RO	Gardening Partnerships	No data
6.		Kemertogan	2,896
7.	Yeltaiysky RO	Gardening Partnership Soyuzpechat	No data
8.		Gardening Partnership Ogonyok	No data
9.		Gardening Partnerships	No data
10.		Razyezd 71 (**Pogranichnik Gardening Partnership according to some sources*)	431
11.		Isayevo	1,765
Iliysky district			
12.	KazTSIKovsky RO	Komsomol	3,080
13.		KazTSIK	13,225
14.	Aschibulaksky RO	Zhapek Batyr	8,916
15.		Toli be	1,147
16.		Mukhametzhana Tuimebayeva (*M. Tuimebayeva*)	15,207
17.		Kokkainar	3,929
18.	Baiserkinsky RO	Zhanadaur	3,030
19.		Intymak	4,650
20.	Energetichesky RO	Pokrovka	7,045
21.		Otegen Batyr	21,380
Talgarsky district			
22.	Guldalinsky RO	Zhana Kuat	3,500
23.		Zhalyn Gardening partnership	No data
24.	Panfilovosky RO	Kyzyl Tu 4 (Kyzyl Tu 1, 2, 3, Kurylysshy micro district, Beibitshelik micro district)	5,357
25.		Nurly Dala Gardening partnership	No data
26.		Panfilovo	10,843
27.	Belbulaksky RO	Taldybulak	5,004
28.	Alatausky RO	Kyzyl-Kairat	7,964
		Fabrichny Quarry and Transportation Route	

№	Rural Okrug	Settlement	Population (2017)
Zhambylsky District			
29.	Kargalysky RO	Kargaly	24,000
Karasaysky District			
30.	Ayteysky RO	Kumaral	650
31.		Aytey	3,081
32.	Kaskelen		66,442
33.	Zhambylsky RO	Gardening partnerships	No data
34.		Zhambyl	2,504
35.	Umtylsky RO	Gardening partnerships	No data
36.		Koldi	1,531
Issyk quarry and Transportation Route			
Enbekshikazakhsky District			
37.	Boleksky RO	Issyk gardening partnership	No data
38.		Bolek	4,355
39.	Baitereksky RO	Baiterek	17,429
40.		Gardening partnership	No data

7.3.2 *Demographics*

Key baseline information to consider the demographical situation in the settlements listed above is presented below:

- **Growing population:** during 2015-2017 there was an increase in the population both in settlements listed above and in the districts of Almaty suburban area as a whole. Growth of Almaty population was simultaneous with the expansion of the city's borders. Therefore several nearest settlement of Karasayskyand Talgarsky districts became part of the Almaty city in 2014-2016.
- **Natural population growth:** proximity to a major city, as well as family traditions, determines the natural growth of the population in the settlements of the Talgarsky, Ilysky and Karasaysky districts.
- **Positive migration balance:** the subjected settlements are included in the suburban zone of Almaty, which results in the stable positive migration balance. Migrants predominantly arrive in the district from other areas of Kazakhstan and CIS countries.
- **Gender distribution:** in suburban area of Almaty the number of women exceeds the number of men in total. However the proportion of young men and boys (age of 0 to 29) is higher than young women and girls. Proportion of women is greater among adults and elderly (age of 30 and elder).

- **Ethnic distribution:** Kazakhs are the predominant nationality (58% in Talgarsky, 58% in Iliysky and 75% in Karasaysky districts), the second largest group is Russian (23% in Talgarsky, 27% in Iliysky and 13% in Karasaysky districts), followed by Uighurs (1-10%), Turks (2-5%) and other nationalities. No ethnic minorities are present in Almaty region.

7.3.3 Economy, Employment and Income

Key baseline information to consider for the assessment of impacts on the local and national economy includes the following:

- **Local economy in Talgarsky district:** The Talgar region specializes in agriculture: the gross agricultural output is 46.8 billion KZT (141.9 million USD[1]), while industrial production accounts for 30.4 billion KZT (92.2 million USD). Industrial production is represented by the industry of building materials, processing of agricultural products, light industry, etc.
- **Local economy in Iliysky district:** Industrial sector in Ilysky District prevails over agricultural sector. One of the major drivers of economy is the District's vicinity to Almaty. The district's industrial sector accounts for 34% of the Region's production of commodities. In 2017, the total volume of sales in industrial sector amounted to KZT 250.6 billion, the index of physical volume of production being 98.8%.
- **Local economy in Karasaysky district:** In Karasaysky district Industry plays the main part in the economic structure (209 bln KZT), trade comes second (103 bln KZT) and agriculture is the third (45 bln KZT).
- **Employment and Unemployment rates:** Official unemployment rate in the Talgar district as well as in Iliysky district in 2017 was 4.3%, in Karasaysky district is 4.5%. According to official statistics, the tough situation in the country's economy has not affected the unemployment rate, which in 2017 was 4.9% having decreased by 15.5% within 7 years with the labour force size growing by 4.8%. However, households with low income are especially vulnerable to growing prices, falling real wages and shrinking job opportunities
- **Income:** The average nominal per capita income has increased during these years by 105%. However, the growth of the average per capita income adjusted for inflation amounted to only 21.6% compared to 2010. The average nominal monthly wages have been also sustainably growing. However, this figure in US dollars has been rapidly decreasing from 2014 until 2017. The transition to a flexible exchange rate in August 2015 sharply depreciated the Kazakhstani tenge (KZT) and increased inflation, which rate increased from 3.8% in August 2015 to 16.7% in May 2016 on a year-on-year basis. This dramatically reduced real wages and purchasing power of consumers. The average monthly wage in the Almaty region in 2017 was 106 thousand KZT (323.8 USD) with a poverty treshold of 25 thousand KZT (76.3 USD).

[1] Hereinafter calculated at the rate as of May 29, 2018: 1 USD = 329,38 KZT

Particularly vulnerable categories of the population receive state support in the form of social payments.

7.3.4 Infrastructure and Public Services

- **Transport infrastructure:** All the settlements along the BAKAD are connected to district centres through asphalt roads and distances to these centres vary between 3 km – 35 km. Internal community roads are mainly asphalted; however, roads made of stone or dirt roads are also quite common especialy on agricultural lands.
- **Healthcare infrastructure:** The nearest health facilities in Talgarsky district located close to the proposed BAKAD route are rural ambulatory care clinics in Kyzyl Kairat, Belbulak, Taldybulak, Guldala, Kyzyl Tu, the rural hospital in Panfilovo and the central district hospital in Talgar. In Iliysky distict there are two distict hospitals (Otegen Batyr), nine rural ambulatory care clinics in Energetichesky, Aschibulaksky, Kaztsikovsky and Baiserkinsky okrugs and six health posts close to the proposed BAKAD route. There 43 health agencies in the district, the district hospital in Kaskelen (for 290 patients), 2 rural hospitals for 15 and 40 patients, 17 outpatient clinics, 8 first-aid stations in villages and 8 dispensaries.
- **Education infrastructure**: each settlement within the SAoI has at least one school: either primary or secondary. However some settlements will be crossed by BAKAD in such a way that there will be residential areas will without scholls. For example, secondary school No. 24 located in the micro district Kyzyl Tu 2 covers pupils of all microdistricts of Kyzyl Tu 4 and in particular Kyzyl Tu 1. In addition there are no schools in the gardening partnerships (dachas communities) therefore children go to schools by foot or travel by bus covering significant distances.
- **Public Services:** The residential sector in settlements is represented by private buildings. Settlements are partially equipped with centralized water supply and sewage system. During the construction stage, water supply and sewerage systems, crossed by the BAKAD route, are supposed to be transferred. It is also planned to transfer power lines gas pipelines.
- **Irrigation infrastructure:** BAKAD route will cross Big Almaty Canal near the PK 570, and small drainage canals in Talgarsky, Iliysky and Karasaysky districts.
- **Solid waste landfill:** TOO KAZ Waste Conversion Company is located in Karasai district, Almaty region, 28 km from Almaty (from the intersection of Sain and Raiymbek streets), 2.3 km north of the road Almaty-Bishkek. The total area of the landfill is 206 hectares. The daily volume of solid waste is 7,500-10,000 m^3.

7.3.5 Vulnerable Groups

Identification of vulnerable groups

Vulnerable groups among the Project affected population were identified through the Field Social Study (FSS) work. The FSS included several activities such as data requests to akimats, interviews with representatives of district and local akimats, focus group discussion and social survey conducted in settlements within the SAoI.

The FSS included focus group discussions (FGD) with vulnerable groups. In total four FGD were conducted in Raiymbeksky RO, Panfilovsky RO, Aschibulaksky RO and Energetichesky RO. In order to reach women and vulnerable people, small focus group meetings were organized. The representatives for discussions were selected/recommended by local Akims. In total FGD involved 29 vulnerable people including unemployed people, veterans, disabled people, representatives of large families and single parent families.

Identified socially vulnurerable groups within the SAoI are represented by the following categories of the population receiving social benefits from the state:

- Economically vulnerable groups:
    - unemployed and/ or individuals without steady source of income,
    - disadvantaged (low-income), large and/ or single-parent families,
    - senior citizens/ pensioners, and
    - people with disabilities,
    - oralmans;
- People with limited mobility:
    - senior citizens/ pensioners,
    - people with disabilities;
- People who suffer from acute/chronic illness and elderly people;

According to the data provided by district and local akimats as response to data requests and during interviews representatives of all vulnerable groups are living in SAoI settlements (see *Table 7.3-2* below).

Table 7.3-2 ***Vulnerable people within the SAoI***

Settlements of SAoI		Pensioners	Oralmans	Unemployed	Veterans	Disabled	Large families	Low income families	Single-parent family
Karasaysky District	***Raimbeksky RO***								
	Raimbek	1,210	61	640	1	63	31	31	n/d
	Kyrgauldy	780	40	320	1	74	37	67	n/d
	Bulakkty	310	44	62	0	0	99	52	n/d
	Irgeliysky RO								
	Kemertogan	265	*n/d*	53	0	14	84	25	n/d
	Eltaisky RO								
	Isaevo	184	*n/d*	17	1	10	27	8	n/d
	Aksengir	14	*n/d*	13	1	7	21	6	n/d
Iliysky District	***Kaztskikovsky RO***								
	KAztsik	247	20	182	1	100	166	105	n/d
	Komsomol	58	5	43	0	24	39	25	n/d
	Aschibulak RO								
	Tole Bi	18	***n/d***	145	0	3	4	24	n/d
	Zhapek Batyr	164	17	210	0	24	31	187	n/d
	Kokkainar and M.Tuymebaev	314	34	244		50	63	380	n/d
	Bauserkinsky RO								
	Zhanadaur, Koyankus, Yntymak	302	9	101	2	85	143	151	n/d
	Energetichesky RO								
	Pokrovka and Otegen Batyr	2473	62	1040	6	341	284	227	n/d
Talgarsky District	***Panfilovo RO***								
	Kyzyl Tu - 4 (Kyzyl Tu-1, Kyzyl Tu- 2, Kyzyl Tu-3)	743	n/d	87	1	150	56	17	n/d
	Panfilovo	1,288	n/d	186	2	290	44	21	n/d
	Belbulak RO								
	Taldybulak	430	15	784	1	58	30	30	18
	Alatau RO								
	Kyzyl Kayrat	897	65	712	3	96	86	39	25
	Guldalinsky RO								
	Guldala	748	0	56	55	138	50	16	n/d

Pensioners. Due to age and related vulnerabilities such as health condition and low income level, they may not be able to take care of themselves and, in absence of someone, who can provide support, these vulnerabilities can negatively impact their lives.

The largest share of the recipients of the benefit falls on pensioners. The average share of pensioners is 10-15% in every district from all number of population in every district. Maximum share of pensioners live in Panfilovo, Isaevo, Raiymbek settlements; it is over 18% of total population of RO.

In the absence of a settlement cohesion (Kyzyltu, Isaevo, Raiymbek, Kyzylkairat, Taldybulak), it will be difficult for pensioners to meet with relatives and to reach to social facilities.

Oralmans. There is specific minority living in Almaty suburban area, named Oralmans. Oralmans are ethnic Kazakh-repatriate who migrate to Kazakhstan from neighboring countries (Uzbekistan, China, Turkmenistan, Russia, Kyrgyzstan, Mongolia, Iran, Afghanistan, Pakistan, etc.). 'Oralman' status is temporal and can be given to a persons of family for a period not exceeding one year. As oralmans are ethnic kazakhs they are not considered as ethnic minority. However oralmans is considered vulnerable as people who haven't been entirely integrated to community.

Disabled people. The average part of disabled people from total population of SAoI settlements varieties from 0.4% to 4.2% from total population of RO. The maximum values belong to Kyzyl Tu and Panfilovo settlements.

According to the results of the survey, residents of Kyzyl Tu complained of long wait for emergency care, remoteness of the medical centre and pharmacies to their households. Most of disabled people have a lack of mobility to social infrastructure facilities. Quality of live hood can be decrease for disable people during construction stage for need of regular medical care.

Large families/Single parent families. On average, the share of large families/ single parent families in SAoI settlements is not more than 1% of RO population.

ERM has chosen, based on the results of questionnaire survey and statistics data, the SAoI settlements with the largest number of large families and limited access to the social infrastructure facilities. They are Kyzyl Tu, Bulakty, Isaevo, Zhanadaur, Yntymak, Koyankus.

Unemployed people. Official unemployment rate in the Talgar district as well as in Iliysky district in 2017 was 4.3%, in Karasaysky district is 4.5%. Based on the data from rural akimats the unemployment rate for SAoI settlements has wider spread from 0.5% to 18% of RO population. The highest rates refer to gardener partnerships (Ogonyok, Pridorozhny gardener partnerships) where there is high share of self-employed persons that are dependent on land resources and their livelihood is closely connected to agriculture/land-based livelihoods.

Most of unemployed persons of Kyzyl Kayrat, Taldybulak, Raiymbek are working in the agriculture sector, such as farm laborers, or seasonal construction works, although given their temporary and adhoc working nature their exact income varies considerably month to month.

Unemployed people of Kyzyl Kayrat, Taldybulak, Raiymbek settlements will be negatively affected due to impact of project activities such as limited or restricted access to the area.

Low income persons. On average, the share of low income persons in SAoI settlements is 0.5-1%. Low-income persons from Tole Bi, Zhapek batyr, Koyankus, Zhanadaur, Yntymak, Kakkainar, M. Tuymebaev settlements will have limited access to the social infrastructure facilities during the BAKAD construction stage. Construction activities can cause decrease of livelihood in selected settlements, especially for low-income persons who can't change their location due to the stress of money.

7.4 SOCIO-ECONOMIC IMPACTS

This chapter assesses the potential socio-economic impacts of the BAKAD Project on the suburban area of Almaty city including Karasaysky, Iliysky and Talgarsky districts. The following impact areas were identified for the Project:

- Community Demographics;
- Local and National Economy and Employment;
- Transport Infrastructure.

These above impact areas may entail both positive and negative impacts.

7.4.1 *Assessment of Impacts on Local and National Economy and Employment*

This section assesses the potential economic and employment impacts associated with the construction and operation of the Project. The assessment is divided into construction and operation and specific mitigation measures are identified followed by an analysis of residual impacts, which takes into account the application of the mitigation.

Affected population

Potentially impacted receptors are primarily businesses and workforce in the SAoI, regional and national workforce, and the regional and national government of Kazakhstan.

Construction

This section assesses the potential impacts on the economy and employment at local, regional, and national levels as a result of the construction phase of the Project. The key construction activities which have been identified to have a potential effect on local and national economy are listed below:

- employment of personnel and procurement of goods and services (from local market);
- the physical presence of construction workers;

- construction and operation of worker camps, access roads and quarries; and
- construction traffic (transportation of workers and materials).

Employment opportunities and procurement of services

The construction of the BAKAD will result in temporary employment for the duration of the construction programme at the local, regional, and national levels. This includes people employed by the Project as well as contractors and subcontractors for pre-construction and construction works (direct). The maximum number of employees involved in the construction of the BAKAD (all sections) will be 1512 people, of which foreign labor will be 24% (361 people) and local workers - 76% (1152 people).

Employment opportunities also include jobs supplying the goods and services needed to support the construction process, including food and transport services and support staff in the construction camp (indirect). In addition, the increased income of the employees will lead to an increase in general spending on goods and services as well as potentially related job creations (induced).

The extent to which lower income, less educated population will benefit from employment opportunities created by the Project will depend, partially, on the skill-level of the positions to be filled.

Therefore it is considered that the impacts related to employment opportunities during the construction phase prior to the implementation of mitigation measures will be *Positive*.

The construction of the Project will result in temporary economic impacts from procurement of goods and services by the Project in construction and related industries (construction vehicles and machinery, construction materials, etc.) and goods and other services such as transport, catering, laundry, food supply, security services, etc. (direct). Procurement of goods and services for the project is expected to contribute to the economy to the extent that these outputs are purchased locally, regionally, or nationally. Considering that the construction industry is a relatively important sector in the region, this seems possible.

Temporary economic impacts will also stem from induced economic effects of spending on goods and services by construction workers who will have increased disposable income and the ability to spend more money in the local economy (indirect). The magnitude of worker spending will depend on the percentage of local or regional (resident) vs. national vs. foreign workers and the duration of their contracts.

This impact is therefore considered as *Positive*.

Capacity Enhancement of Workforce

The Project will result in long-term capacity enhancement for the local workforce during the construction period. Specifically, this includes long-term benefits from on-the-job and formal training opportunities for individual workers (direct), and the possibility for capacity enhancements for local and national companies who would have won tenders for work on components of the BAKAD. These companies would also reap reputational benefits from working on a major Project with specialised technology (direct).

In turn, capacity enhancement of local and national workforce and companies will also contribute to creating long-term employment opportunities for individuals and businesses, independent of the project (indirect).

The Project impact on capacity enhancement during construction is therefore considered *Positive*.

Local economic inflation and income inequalities

The Project may result in local economic inflation and income inequality between Project workers and community residents if the salaries paid to workers are significantly higher than average regional incomes along the BAKAD route. This may then result in rising prices for local goods and services and disproportional impact on residents along the route. Given that villages along the BAKAD are located at an accessible distance from larger towns and district centres where commerce is sufficiently diverse, village residents have access to competitive prices, which would also deter local shop keepers to charge higher prices to avoid losing their customers to larger towns.

Residents of rural communities along the BAKAD may be more sensitive to price increases as their income is more vulnerable. In this sense the sensitivity of the local receptors is considered *medium*.

The magnitude of the impact on local price inflation and income inequalities is considered *small* with a continuous frequency, long-term duration and a local extent. The scale is considered small because the construction workforce will be housed and supplied with convenience goods in construction camps and compounds, the camps will be temporary for the duration of construction activities at certain, punctual locations and the overall extent of commercial activities is considerable in the SAoI.

As the impact magnitude is *Medium* and the sensitivity is *Medium* the overall impact significance is *Moderate*.

Operation

This section assesses the potential impacts on the economy and employment at local, regional, and national levels as a result of the operational stages of the Project. The key operation activities which have been identified, at the ESIA

scoping stage, to have a potential effect on local and national economy are listed below:

- employment of personnel and procurement of goods and services (from local market);
- road traffic (taxes revenue);
- operation of the BAKAD, tolls, and service stations; and
- maintenance of road.

Employment opportunities

Under Project operation, employment for the operation and maintenance activities of the BAKAD and tolls will be required, resulting in long-term employment opportunities for the local, regional and national workforce. However, employment opportunities will be limited to personnel required for Road Maintenance Facility (RMF) located near village Yntymak and the proposed junction with the Almaty-Kapshagay road. About 60 persons required for the RMF.

The Project impact on employment opportunities during operation is therefore considered as *Positive.*

Improved connectivity and accessibility

The operational stage of the Project is expected to improve connectivity for the transport of goods, services and people between the districts of the Almaty region leading to a better economic growth potential of the region (indirect). This would include better accessibility for businesses in the region to expand their geographical markets and resources to other areas and countries.

The Project impact on connectivity and accessibility is therefore considered as *Positive.*

Taxes revenue

The Project will generate tax revenue for the Kazakhstan government, which will contribute to the national budget. Tax revenues will be generated through income taxes and corporate taxes on expenditures, operational and corporate revenues and incomes of employees. Operational revenues will be generated primarily through toll fees on the BAKAD after 16 years of operation.

Project impact on taxes revenue is therefore considered as *Positive.*

Enhancement/Mitigation of Potential Impacts related to Project Construction and Operation

As described above, most of the potential economic impacts of Project construction and operation are likely to be positive with one minor expected

negative impact on economic inflation and income inequalities. A number of measures have been identified to enhance the positive impacts of the projects.

In order to enhance local employment and procurement opportunities, the Consortium shall develop and agree an Employment Policy, which to include provisions on local content and employment strategy and subsequent plans and procedures (e.g. Labor Management Plan) with primary contractors. Specific measures will include the following measures:

- Conduct a comprehensive demand-and-supply-side analysis to identify and quantify local content potential, identify potential employees, Contractors and suppliers.
- Recruitment procedures will aim to provide opportunities for employment of local workforce to the extent possible considering unskilled, semi-skilled and skilled workforce, and giving priority to vulnerable persons. Priority will be placed on hiring skilled, semi-skilled and unskilled labour from within the SAoI, then the Almaty region, then Kazakhstan.
- Seek to maximise the benefits from the BAKAD to local communities in terms of direct and indirect employment, and purchasing of local good and services during construction. This will include measures such as adopting local employment and purchasing policies, establishing tenders for procurement of subcontracted goods and services at a scale that local businesses can respond to, ensuring opportunities are advertised locally, and providing training for local people to allow them to obtain jobs with the Project as much as possible.
- Outline and require a fair and transparent, gender neutral recruitment process for all openings.
- Seek to employ local personnel residing in project-affected communities on different sections of the BAKAD. Subcontractors will be encouraged to employ local personnel.
- Provide advance information on tendering opportunities to local businesses through trade and industry chambers and local business organizations in the region.
- Break tendering opportunities into smaller components to increase the likelihood of granting individual pieces of work to Kazakh companies.
- In order to enhance Project impacts on long-term employment and procurement during operations, the Project proponent will implement the Employment Policy and subsequent plans and procedures (e.g. Labor MP), which will outline and require a fair and transparent recruitment process for all openings.
- Consortium will also seek to promote local employment (including job training) and purchase local goods and services during the operation of the BAKAD to the extent possible. Measures will include the facilitation of access to alternative employment for people affected by the loss of jobs through the Project, for people directly affected by past and future land acquisition impacts causing loss of access to

employment. Specific resettlement and livelihood restoration measures should be developed as a part of Livelihood Restoration Action Plan.

Measurers to mitigate local economic inflation and income inequalities include:

- Consider providing separate food and services and additional social facilities for construction workers to avoid rising prices with subsequent economic inflation in the local economy along the route. The supply of goods and services will be based to the extent possible on local enterprises.

Residual impacts

Construction

Specific mitigation measures to address local economic inflation and income inequalities have been identified and are listed above. The residual impact of the Project on economic inflation after implementation of the mitigation measure listed above may be brought down to *Negligible.*

Operation

Project impact on local economy and employment during operation remains positive. Specific enhancement measures are listed above.

7.4.2 Assessment of Impacts on Transport Infrastructure

This section assesses the potential impacts on transport infrastructure associated with the construction and operation of the Project. The assessment is divided into construction and operations and specific mitigation measures are identified followed by an analysis of residual impacts, which takes into account the application of the mitigation.

Affected population

Potentially impacted receptors are primarily the users of the road and the settlements located along the BAKAD and near the construction, shift camps and quarries in the SAoI.

Construction

The key construction activities which have been identified to have a potential effect on transport infrastructure are listed below:

- construction traffic (transportation of workers and materials);
- construction of temporary access roads.

Damage and disruption to road transport and infrastructure

The main potential impacts on the local road network as a result of project construction activities (transport of personnel, material and equipment, waste disposal, etc.) are disruption to traffic and transportation due to road crossings, and damage to local roads from heavy truck movement to and from construction sites, worker camps, landfill areas, etc. Disruption to road infrastructure and reduced access due to road cuttings could result in impacts to livelihood or quality of life and if unmanaged properly and in time, could result in health impacts (e.g. inability to pass roads in an emergency etc.).

The Project will use existing roads with asphalt concrete pavement. Given the ongoing frequency and temporary time frame of construction activities, and the regional extent of the works, the impact magnitude may be assumed as *Medium.* Considering the importance of the road network to ensure mobility between rural settlements along the SAoI and the district centres and access to services such as education and health, as well as access to agricultural fields for the labourers and farmers, sensitivity of receptors is considered as *Medium*. Potential impacts on road traffic and infrastructure are therefore rated as *Moderate* prior to mitigation.

Operation

Sustained road traffic may also result in damage to the road, which is addressed through maintenance works as an embedded measure in Project design. These potential impacts have therefore been scoped out from the assessment.

Specifically, regarding road traffic, the Project operation is expected to result in improved traffic and better connectivity and accessibility of Almaty suburban area. This impact is addressed under economic impacts in *Section 7.4.1* above.

Reduced access to agricultural fields

The operation of the BAKAD has the risk of reducing access to agricultural fields if appropriate road underpasses are not put in place. Stakeholder consultations during the field survey have also raised the potential of reduced access to agricultural fields bisected by the BAKAD during operation. In particular, the perception is common among residents that the agricultural lands will be divided into two by the BAKAD, which would inevitably limit access to the agricultural and pasture lands. They were also suspicious about the solution of building an underpass. The common concern is that only a few underpasses will be built and that they may not be located close enough to the affected fields, which would not solve the issue of reduced access and in fact lead to increased costs to the farmers who would have to spend more money on fuel. This being said, the construction of underpasses is an embedded measure in Project design, with the aim to mitigate such potential impacts.

This impact if it were to occur would therefore be local, small in scale, but permanent which leads to a *Medium* magnitude. The sensitivity of the receptor however is considered *High.* The significance of the impact before mitigation is therefore *Major* before mitigation.

Enhancement/Mitigation of Potential Impacts related to Project Construction and Operation

The following measures have been identified to mitigate impacts on road traffic and infrastructure:

- Provision of annual repaire works at damaged sections of local road used for transportation (if agreed with local authorities);
- Installation of additional road signs (if applicable and agreed with local authorities);
- Engagement with local authorities on the issue of traffic movement during construction and development of additional measures if required.

The following measures have been identified to mitigate impacts related to reduced access to agricultural fields:

- Installation of additional underpasses and viaduct in accordance with the need of agricultural land users;
- Construction of local passages along the BAKAD from the underpasses to remoted felds.

A Project specific Grievance Mechanism will be used to record and solve the relevant incidents results.

Residual impacts

Construction

Specific mitigation measures to address potential damage to local roads have been identified and are listed above. The residual impact after implementation of the mitigation measure listed above may be brought down to *Negligible.*

Operation

Project impact on related to reduced access to agricultural fields during operation after implementation of the mitigation measure listed above may be brought down to *Negligible*. Specific mitigation measures are listed above.

7.5 COMMUNITY HEALTH AND SAFETY

This chapter assesses how the Project may change the community exposure to risks and impacts arising from traffic flows, equipment accidents, structural failures, exposure to diseases and the activities of workers. It also defines relevant mitigation measures so that the respective risks are prevented or minimised.

The impacts identified in relation to community H&S are the following:

- Traffic accidents,
- Community health and nuisance related to air and noise emissions,
- Injury from unsafe equipment use,
- Community exposure to disease and anti-social behaviour,
- Conflict with security personnel.

Source of potential impacts on community H&S that have been identified are the following Project activities:

- Construction activities (e.g. dust, noise, use of hazardous materials, machinery operations and truck traffic);
- BAKAD operation during operation (e.g. dust, noise);
- Traffic movements during construction and operation resulting in accidents;
- Presence of construction personnel in the area during construction;
- Security personnel.

7.5.1 *Assessment of Impact on Traffic Accidents*

Construction

This section assesses the potential impacts on traffic accidents with the following construction activities:

- Transportation of materials, personnel, wastes etc.
- The physical presence of construction equipment and machinery.

Health and safety risks involving the public associated with construction could include impacts from construction traffic and accidents involving construction equipment and machinery movements. The following types of transportation will be relevant for the Project:

- Transportation of sand and gravel mix from quarries to construction camps (see Chapter 1.1),
- Transportation of soil for embankment from quarries to construction camps (*soil quarries and their locations have not been determined at the time of the report*),
- Transportation of other construction materials and cargoes (including concrete steel, noise barriers, fencing materials, parts of bridge structures, cables and other constructions and materials) from

suppliers to construction camps (*suppliers and their location have not been determined at the time of the report*).

- Transportation of wastes from construction sites to waste landfills (*landfills and their locations have not been determined at the time of the report*);
- Transportation of personnel between settlements (local workers), camps (shift workers), construction sites, etc. (*settlements, those population will be involved in employment, have not been determined at the time of the report*);
- Transportation and operation of construction equipment and machinery (*transportation routes have not been determined at the time of the report*).

The construction phase of the Project is likely to affect adversely the current traffic situation, causing congestions in some areas and increasing the risk of traffic accidents.

The magnitude of the construction traffic impact may be *Major* at certain locations due to long-term duration (earth works and pavement works for different sections will last for 15-22 months) and the large amount of material and waste transport trucking that will use existing roads. These locations will include, but not limited to[1], the following settlements:

- *Issyk quarry*: Issyk gardening partnership and Bolek (both are Enbekshikazakhsky District),
- *Fabrichny quarry*: Rahat Sayyaylary gardening partnership, Zhambyl, Koldi (all Karasaysky District).

Children and youths are amongst those vulnerable to the physical hazards associated with construction traffic, for example, especially in event of unauthorised entry to construction site or in proximity to roadways.

The receptors using the community roads can be considered have *High* sensitivity with respect of potential traffic related impacts and the low level of existing traffic. As the impacts of traffic accidents are occasional however the duration of the risks will persist during the construction period the significance of the impact is considered as *Moderate to High*.

Operation

During the operation stage risks of traffic accidents will be associated with the following factors:

- Technical characteristics of the BAKAD;
- Repair and maintenance activities;
- Traffic accidents due to accidental access to the BAKAD.

[1] As there are significant data gaps regarding transportation routes, is it expected that additional settlements will be impacted during construction period.

Due to the anticipated higher average vehicle speed on the BAKAD (as compared to state roads), there is a potential that there may be more frequent high-speed accidents and correspondingly more severe injury implications; on the other hand, the risk of frontal collisions is greatly reduced for the BAKAD as compared to the state roads. The impacts on traffic safety will likely be *Positive* for the overall scope of the BAKAD.

The impact significance of traffic accidents induced from repair and maintenance activities of the BAKAD is considered as *Moderate* because the impacts is expected to be occasional, seasonal (short duration) and limited to construction sites. Repair activities may include road resurfacing waste (e.g. removal of the old road surface material) which would physically reduce the BAKAD lanes and have physical presence of personnel and equipment on the BAKAD.

Accidental access to the BAKAD is another potential risk that may be present during the operation phase. Children and youths are again amongst those vulnerable to the physical hazards associated with unauthorised entry to the BAKAD. Embedded design includes the presence of permanent obstacles (including wire fence) along the BAKAD. Also, the Project envisaged viaducts (intersections with local roads) and cattle underpasses which could be used by pedestriants. However the use of some cattle underpasses will be limited to dry seasons onle due to their located on intersections with rivers.

The presence of these obstacles and underpassess will limit the significance impact to *Negligible*.

Measures to Avoid and Minimise Potential Risks and Impacts and Promote Benefits

In order to minimize risks of traffic accidents, the Traffic Management Plan will be developed as a part of the ESIA process. Traffic Management Plan will be agreed and implemented by the Consortium and will be applied for contractors. Specific measures will include the following measures:

- Measures will be in place to prevent members of the local community, especially children, from unauthorised entry to Project-related sites/installations, thus prevent or lower the risks of accidents. Such measures will include, e.g.:
    - Awareness training about construction site hazards to children/youths in nearby village schools;
    - Placement of fencing or other barricades around dangerous construction installations with warning signs of the hazards;
    - Use of professionally trained security guards at construction sites.
- Temporary traffic control planning for the continuity of the movement of vehicles and transit operations will be developed when the normal function of the BAKAD is suspended. The traffic control planning will have the objective to provide for safe and efficient movement of road

users through and around temporary traffic control zones protecting workers, responder to traffic incidents and equipment.

- The stakeholder engagement activities will serve to inform the local communities regarding potential health and safety issues during the construction period. Community health and safety information will be disclosed to the communities in line with the Stakeholder Engagement Plan (SEP). The stakeholder engagement activities will include:
    - community meetings with the vulnerable groups such as children and young persons (including visits to schools) and
    - local postings to inform the public regarding the relevant hazards for their particular locations.
- Monitor driver behaviour, especially for routes that are subject to frequent accidents, and implement corrective action to prevent recurrence.
- When planning transportation routes, give priority to roads by-passing settlements;
- Prohibition of night-time traffic through settlement;
- Improve local traffic signage by collaboration with the responsible local authorities and communities;
- Coordinate with emergency responders to ensure that appropriate first aid is provided in the event of accidents;

Project design will provide for sufficient passages (vehicle and pedestrian) crossing the BAKAD to ensure that pedestrians or others do not enter the highway at unauthorized points.

Residual impacts

Construction

Specific mitigation measures to address traffic accidents during construction have been identified and are listed above. The residual impact of the Project on traffic safety taking into account proposed mitigation measures will be *Minor to Moderate.*

Operation

Project impact on traffic safety will be both positive and negative. Specific mitigation measures were defined for repair and maintenance activities and accidental access to the BAKAD. Residual impact for risk of traffic accidents due to repair activities taking into account proposed mitigation measures will be *Minor to Moderate*, while residual impact significance for accidental access to BAKAD will remain *Negligible*.

7.5.2 *Assessment of Impact on Dust, Air and Emissions Disturbance and Nuisance*

Assessment of impacts on air quality are presented in *Section 6.6* and considered separedly in Section 7.6. together with impacts related to nuisance for settlements located within the SAoI.

7.5.3 *Assessment of Impact on Community Exposure to Disease and Anti-Social Behaviour*

Construction

As with other large construction projects, the potential exists that the social/recreational activities of construction workers might lead to anti-social behaviour (such as noise/rowdiness, drinking, brawls, socially inappropriate relationships/ prostitution etc.) between each other and/or with local residents.

The local communities can be vulnerable to the potential increase of communicable diseases, such as tuberculosis and influenza, for example. In addition, in general, workers may cause the spread of HIV/AIDS and other sexually-transmitted diseases (STDs) amongst the population of local towns/villages.

According to the UNAIDS data[1], the AIDS affected population has increased in Kazakhstan in the last 15 years. The incidence rate of 19 new cases per 100,000 people. Influx of labourers working on arotating scheme for a quite long period (construction is estimated to last for about 4,7 year) may result in spread of infectious diseases, HIV/AIDS, sexually transmitted diseases.

The receptors of the impact are primarily the residents of settlements located near Bereke and Panfilovo construction camps as interactions between workers and residents will be more likely during worker's visits to settlements and social facilities in their off-work time. Secondary, the receptors of the impact will be the residents of settlements located near BAKAD RoW, where the main construction works will be carried out.

The risk of community exposure to disease and anti-social behaviour will be limited to construction period: 4.7 years for overall construction and 15 to 22 months for different sections. This impact will affect settlements, included in SAoI and will be related to occasional visits of workers to social facilities. The magnitude of the impact is therefore considered to be *Moderate to High.* As the life and health of human is considered as the highest priority, the receptor sensitivity is assessed to be *High.* The significance of the impact before mitigation is considered to be *Major*.

[1] Source: http://www.unaids.org/sites/default/files/media_asset/unaids-data-2018_en.pdf. Data of reference: July 15, 2018

Measures to Avoid and Minimise Potential Risks and Impacts

The construction workforce is planned to be recruited locally as much as possible, and measures and actions in order to enhance local employment opportunities are described in *Section 7.4.1*.

The risks of antisocial incidents by Workers can be minimised through the provision of training with appropriate discipline measures in place, and to ensure that they are understood. The issue will also be addressed during the community engagement process, which will entail consultation with the local representatives, including women's groups and local authorities, to address their concerns regarding any critical aspects of the Project that may be encountered during the construction phase.

In addition to cooperation with the local government and stakeholder groups (e.g. local NGOs, community councils and schools), health awareness trainings amongst the workers, training of health workers in disease treatment, the provision of health services and performing immunisation programmes for workers will also be undertaken to minimise the risks of the spread of STDs and other communicable diseases in the local communities.

EPC and its subcontractors is also required to develop and implement a code of conduct for the workers, which will include appropriate behavior amongst workers and with communities. This code of conduct should be attached to the contracts with workers.

The construction contractors will be required to provide orientation training to their workforces that underline the potential risks/impacts that exist with respect to the relations with the local communities, and the appropriate preventive measures.

Complaints by the public (or other workers) with respect to behaviour of the workforce can be made via the Grievance Procedures for public and workers (*see SEP).*

Prior to commencement of operations, the *Community Health & Safety & Security MP* will be developed and implemented on the topic of potential impacts from communicable diseases and other impacts of the BAKAD operations (similar to the above-described aspects during construction).

Residual Impacts

Specific mitigation measures to address community exposure to disease and anti-social behaviour have been identified and are listed above. The residual impact of the Project after implementation of the mitigation measure listed above may be brought down to *Moderate.*

7.5.4 Assessment of Impact on Conflict with Security Personnel

Construction

Security personnel will be hired by Consortium mainly during construction to prevent unauthorized access to the construction sites. The risk of security personnel is that if they are not appropriately trained, they may misuse their status and be abusive to local persons, or apply excessive force in their handling/apprehension of potential trespassers or other unauthorised persons.

The significance of the impact will be *Major*, given that the magnitude of the impact will be *Medium* and receptor sensitivity up to *High* depending on the location of the settlement related to the construction camps and construction activities.

Measures to Avoid and Minimise Potential Risks and Impacts

A strong community engagement can benefit the security strategy for the Project by facilitating good relations between the workers and the communities. This will be achieved by communicating security arrangements to the workers and the affected communities, and involving workers and communities in the discussions on security arrangements. Consortium will establish a *Community Health & Safety & Security MP* to set out the security measures, particularly for the Construction Stage of the Project.

In compliance with best practices (Voluntary Principles on Security), the Consortium should undertake background review and assessment for candidates, are adequately trained in the use of force, should apply the correct conduct towards workers and members of the public and act within all applicable laws. Violation of the required standards should result in corrective actions, including termination of sub-contracts with security firms. Sufficient training including clear instructions on the objectives and the permissible actions should be provided to the security personnel. The instructions should be based on the relevant RK law and should be communicated as terms of employment and reinforced through periodic professional training. Given regular contact with the local populations, training on Grievance Procedures, such as handling of community grievance should also be provided to the security staff as part of their periodic professional training.

Complaints by the public (or other workers) with respect to behaviour of Security Personnel can be made via the Grievance Procedures for public and workers (*see SEP).*

Residual Impacts

Specific mitigation measures to address risks related to conflict with security personnel have been identified and are listed above. The residual impact of

the Project after implementation of the mitigation measure listed above may be brought down to *Minor.*

7.6 IMPACTS ON LOCAL COMMUNITIES

7.6.1 Introduction

This chapter assesses the potential socio-economic impacts of the BAKAD Project on the settlements located in the vicinity if the BAKAD RoW and the quarries. The following impact areas were identified for the Project:

- Pre-Construction and Construction:
  - Land acquisition;
  - Community Cohesion, Nuisance;
  - Noise, dust;
  - Loss of income of small and medium-sized businesses;
  - Relocation of cemeteries.
- Operation:
  - Cohesion of settlements;
  - Walking accessibility of and vehicle access to residential areas;
  - Division (fragmentation) of agricultural lands;
  - Noise, dust;

Tables below provide for assessment of impacts for each affected community (*Table 7.6-1 – Table 7.6-18*).

7.6.2 *Karasaysky District*

Raiymbeksky Rural Okrug

Table 7.6-1 Assessment of Impacts on Kyrgauldy (0+000 km - 1+900 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kyrgauldy			
CONSTRUCTION			
Land acquisition A two level trumpet interchange connecting BAKAD with the Almaty-Uzun-Agash road will be constructed within the boundaries of Kurgauldy. No final decision on the interchange configuration was made by the Consortium at the time of preparation of the Report with two options being reviewed. According to the Design Contractor, *additional land plots are to be leased* to implement either of these options. Owners of households located within the required land lease interviewed by the Consultant indicated that they were not aware of any eventual changes to the interchange configuration. Land plots for these purposes have not been acquired from either physical or legal persons. No lease statements evidencing the handover of land plots to the Consortium are available to the Consultant. As the acquisition of land plots will be permanent, local in extent and will be moderate/large in scale for residents (depending on the property to be acquired: moderate for acquisition of a land plot only, large for acquisition of the both land plot and house) whose land plots will be acquired, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to permanent impact. Particularly vulnerable groups of residents are people with low level of income, people, who have no legal	Moderate to Major	• Acquisition of additional land plots is to be in line with the requirements of the Lenders (set forth in the Land Acquisition and Resettlement Framework); • A Resettlement Action Plan is to be developed and approved by the Consortium and the RoK Government. Control of the implementation of impact mitigation measures set forth in the RAP must be included in the Consultant's ToR.	Moderate

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kyrgauldy			
right for property and people who suffer from acute/chronic illness an elderly people. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with land acquisition and potential relocation.			
Cohesion of settlements, nuisance Interchange construction work could cause nuisance for Kyrgauldy community, as the Almaty-Uzun-Agash road is the main access road, which is used by local people to reach both Almaty and Kaskelen (the centre of the Karasaysky District). Nuisance will be related to physical presence of workers and equipment, limitation for pedestrians and traffic movement, which could cause traffic jams. As the duration of the construction works of Section 8 will last for 26 months, will be continuous, local in extent and will cause moderate nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Provision of the construction schedule, schedule of restrictions and detour schemes for Almaty-Uzun-Agash road, developed in cooperation with local authorities; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required.	Moderate
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate
OPERATION			
Cohesion of settlements No separation of residential buildings in Kyrgauldy is expected during the operation stage.	Not assessed	Not required	Not assessed

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kyrgauldy			
Walking accessibility of and vehicle access to residential areas Construction of the interchange within a densely populated residential area will impair the connectivity of residential communities west and east of the proposed interchange. No confirmation on the proposed interchange configuration and possibilities for pedestrians to pass along the Almaty-Uzun-Agash road (under the interchange) and cross it (within the interchange construction area) was available at the time of preparation of the Report. As the interchange operation doesn't have any time limitation the impact is considered permanent, local in extent and will cause large nuisance for local residents if pedestrian safety are not managed properly. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to changes in walking accessibility. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility.	Major	Design of Section 8 must provide for construction of facilities enabling pedestrians to pass along and cross the Almaty-Uzun-Agash road.	Negligible
Division (fragmentation) of agricultural lands No agricultural lands will be crossed by BAKAD near Kyrgauldy	Not assessed	Not required	Not assessed
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Table 7.6-2 Assessment of Impacts on Raiymbek (1+900 km – 3+300 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Raiymbek and Gardening Partnerships			
CONSTRUCTION			
Cohesion of settlements, nuisance Construction work could cause nuisance for communities of Raiymbek and Gardening partnerships due to physical presence of workers and equipment, limitation for pedestrians and traffic movement between settlement and gardens (dachas). As the duration of the construction works of Section 8 will last for 26 months, will be continuous, local in extent and will cause moderate nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers.	Moderate
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate
OPERATION			
Cohesion of settlements The proposed BAKAD route will pass west of Raiymbek. It will cross land plots, which at the time of preparation of the Report are prospective development areas. About 400 households of Raiymbek area have not yet been built, the height of the projected cattle underpasses for BAKAD will	Major	• Consider the construction of a viaduct at KP04+50 during the design of the Section 8 • Provision of the year-round use for cattle underpasses to be constructed	Negligible

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Raiymbek and Gardening Partnerships			
not be enough to transport construction materials during construction of these households. The Project provides for construction of two cattle underpasses at the BAKAD intersection with the Kyrgauldy River (KP11+51 and KP19+90) and a viaduct (KP20+79). As the BAKAD operation doesn't have any time limitation the impact is considered permanent, local in extent and large in scale due to interruption of community cohesion to several residential quarter and land plots of perspective dwelling construction. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to changes in walking accessibility and vehicle access. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility.			
Walking accessibility of and vehicle access to residential areas The BAKAD route will cross several local driveways. According to information provided during the meeting with the Akim of Raiymbeksky Rural Okrug, the driveway at KP 04+50 is most intensively used to access garden plots, the cemetery and pastures south-west of BAKAD as well as social infrastructure facilities north-east of BAKAD. As the BAKAD operation doesn't have any time limitation the impact is considered permanent, local in extent and large in scale due to interruption of vehicle access to several houses. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to changes in walking accessibility and vehicle access. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High*	Major		Negligible

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Raiymbek and Gardening Partnerships			
due to their vulnerability to impacts, associated with interruption of walking accessibility.			
Division (fragmentation) of agricultural lands BAKAD will cross several fields near Raiymbek. Only one cattle underpasses at the BAKAD intersection with the Kyrgauldy River (KP19+90) is envisaged by the Project for these fields. As the BAKAD operation doesn't have any time limitation the impact related to loss of access to these fields is considered permanent, local in extent and large in scale due to overdrive or entire loss of access. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.	Major	Consider the construction of passagesto fields along BAKAD during the design of the Section 8	Negligible
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Table 7.6-3 Assessment of Impacts on Bulakty (5+200 km – 5+500 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Bulakty			
CONSTRUCTION			
Cohesion of settlements, nuisance Construction work could cause nuisance for agricultural enterprises due to physical presence of workers and equipment, limitation for machinery and cattle movement across BAKAD. As the duration of the construction works of Section 8 will last for 26 months, will be continuous, local in extent and will cause moderate nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Low*.	Moderate	• Installation of fencing around the construction sites, which will limit movements of equipment and workers. • Provision of a temporary access way across BAKAD to agricultural machinery and cattle	Minor
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate
OPERATION			
Cohesion of settlements The proposed BAKAD route will pass west of Bulakty crossing dry-land farmlands between KP21+50 and KP58+10. The cohesion of residential area of Bulakty will not be disturbed during the construction of BAKAD.	Not assessed	Not required	Not assessed
Walking accessibility of and vehicle access to residential areas	Not assessed	Not required	Not assessed

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Bulakty			
BAKAD doesn't intersected any local roads used by residents. Impact related to fragmentation of agricultural lands is considered below			
Division (fragmentation) of agricultural lands BAKAD will cross several fields near Bulakty. The Project provides for construction of 1.5 m and 2 m culverts (4 culverts and 1 culvert respectively) between KP21+50 and KP58+10. However, this section will be void of cattle underpasses and passage ways for agricultural machinery. As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to fields is considered permanent, local in extent and large in scale due to overdrive or entire loss of access. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.	Major	Design of Section 8 should provide for construction of passage ways to fields along BAKAD for agricultural machinery in line with needs of agricultural enterprises	Negligible
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Irgeliysky Rural Okrug

Table 7.6-4 Assessment of Impacts on Bulakty (5+200 km – 5+500 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kemertogan			
CONSTRUCTION			
Cohesion of settlements, nuisance Construction work could cause nuisance for communities of Kemertogan and Gardening Partnerships due to physical presence of workers and equipment, limitation for pedestrians and traffic movement between settlement and gardens (dachas) and through for M36 Almaty-Bishkek road (Tashkentsky Tract). As the duration of the construction works of Section 1 will last for 27 months, will be continuous, local in extent and will cause medium nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Provision of the construction schedule, schedule of restrictions and detour schemes for Tashkentsky Tract road, developed in cooperation with local authorities; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required.	Minor
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kemertogan			
OPERATION			
Cohesion of settlements The proposed BAKAD route will pass west of the settlements of Irgeliysky Rural Okrug: Kemertogan, Irgeli and Koksai. Kemertogan will be the nearest settlement. West of the proposed BAKAD route are lands of 18 gardening partnerships (with many land plot owners using their allotments for permanent residency) and the Olympic reserve training centre. The cohesion of residential area of Kemertogan will not be disturbed during the construction of BAKAD.	Not assessed	Not required	Not assessed
Walking accessibility of and vehicle access to residential areas The main transport corridor used by residents of gardening allotments to access Almaty and Kaskelen is the "19th Km" road terminating at M36 Almaty-Bishkek road (the Tashkent Tract). "19th Km" road will not be crossed by BAKAD and is used by ambulance cars stationed in Koksai and school busses collecting children living in the territories of gardening partnerships. The proposed BAKAD route will cross dirt roads connecting Kemertogan with lands of gardening partnerships. These roads are used by the locals to access their allotments. According to information provided by the Akimat of Irgeliysky Rural Okrug, the most important road crossed by the proposed BAKAD route is the one connecting the Olympic reserve training centre with the south-western part of Kemertogan where a new school is located. Lands along the proposed BAKAD route (both sides) will be used for perspective residential development. The proposed BAKAD route will cross local driveways of which most extensively used roads are located at KP65+90, KP85+90 and KP116+90. The Project provides for construction of a viaduct (a two level interchange on the Almaty-Bishkek road) at KP58+17. Other viaducts or cattle underpasses will not be constructed between KP58+17 and KP140+00.	Moderate	• Design of Section 1 should provide for crossing of the proposed BAKAD route by local driveways at KP65+90, KP85+90 and KP116+90; • Surfacing of the local driveway crossed by the proposed BAKAD route at KP65+90 is recommended as a measure to compensate negative effects on communities (between the "19th Km" Road and the secondary school of Kemertogan) as advised by the Akim of Irgeliysky RO; • Design of Section 1 should provide for construction of cattle underpasses and/or passage ways for agricultural machinery in consultation with agricultural enterprises.	Minor

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kemertogan			
As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to residential areas is considered permanent, local in extent and large in scale due to overdrive. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Low*.			
Division (fragmentation) of agricultural lands The Project provides for construction of 1.5 m culverts (6 culverts) between KP58+17 and KP140+00. However, no pedestrian crossings, cattle underpasses or passage ways for agricultural machinery will be in place. As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to fields is considered permanent, local in extent and large in scale due to overdrive or entire loss of access. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.	Major		Minor
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Yeltaisky Rural Okrug

Table 7.6-5 Assessment of Impacts on Isayevo, Aksengir, Pogranichnik Gardening Partnership (or "Razyezd 71" according to some sources), Pridorozhny, Ogonyok, Soyuzpechat (19+500 km – 22+700 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Isayevo, Aksengir, Pogranichnik Gardening Partnership (or "Razyezd 71" according to some sources), Pridorozhny, Ogonyok, Soyuzpechat			
CONSTRUCTION			
Cohesion of settlements, nuisance Construction work could cause nuisance for communities of Isayevo, Aksengir, Pogranichnik Gardening Partnership (or "Razyezd 71" according to some sources), Pridorozhny, Ogonyok, Soyuzpechat due to physical presence of workers and equipment, limitation for pedestrians and traffic movement between settlement and gardens (dachas) and through for Sorbulak Route. As the duration of the construction works of Section 1 will last for 27 months, will be continuous, local in extent and will cause large nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Provision of the construction schedule, schedule of restrictions and detour schemes for Sorbulak Route, developed in cooperation with local authorities; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required.	Minor

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Isayevo, Aksengir, Pogranichnik Gardening Partnership (or "Razyezd 71" according to some sources), Pridorozhny, Ogonyok, Soyuzpechat			
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate
OPERATION			
Cohesion of settlements A two level interchange will intersect the Sorbulak Route and the Almaty-Shamalgan railroad at km 21 of the proposed BAKAD route within the boundaries of Yeltaisky Rural Okrug. East of BAKAD will be Aksengir and lands of gardening partnerships Ogonyok and Soyuspechat. Less than 100 m west of the proposed BAKAD route are lands of gardening partnerships Pridorozhnoye and Pogranichnik. Isayevo will be located 100 m north-west of BAKAD. Aksengir forms a dense cluster between the Almaty-Shamalgan railroad and the Sorbulak Route. No impact minimization measures are required. Cohesion of settlement is applicable to Pogranichnik gardening partnerships, where the BAKAD divides 5 houses from the main part of gardening partnership. The proposed BAKAD route will cross a local driveway within the boundaries of Pogranichnik gardening partnership separating five households from the main area of the partnership. Once BAKAD is constructed, these households will be void of vehicle access as this gardening partnership is located between a railroad in the south and a gully in the east and north. As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to residential areas is considered permanent, local in extent and large	Major	• Provide the possibility of preserving the access to the five homes of Pogranichnik gardening partnerships yo the north from the railway; • Design of Section 1 should provide for preservation of vehicular traffic (including commercial vehicles) on the access road to Isayevo; • Provision of access from Ogonyok and Soyuzpechat gardening partnerships to the regional road Almaty-Shamalgan (the Sorbulak Route) as the inthersection on KM 20+80 may detoraorate existing access to road;	Minor

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Isayevo, Aksengir, Pogranichnik Gardening Partnership (or "Razyezd 71" according to some sources), Pridorozhny, Ogonyok, Soyuzpechat			
in scale due to entire loss of access. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *High*.			
Walking accessibility of and vehicle access to residential areas The exit road of the municipal BAKAD adjoining the Sorbulak Route is the main transport corridor for the residents of Isayevo. The road will be two times intersected by the proposed BAKAD route between km 22 and km 23 in the immediate vicinity to the exit from the southern part of the settlement. This road is used by all emergency and rescue services as well as ambulance cars stationed in Bereke. Personnel of Pepsi "RG Brands"is also brought to and from work via this road. Ogonyok and Soyuzpechat gardening partnerships are interconnected by dirt roads, which now have access to the Sorbulak Route. This access will be barred by the proposed interchange at KP209+20 as no alternative connection is planned between these gardening partnerships and the regional road. As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to residential areas is considered permanent, local in extent and large in scale due to entire loss of access. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *High*.	Major		Minor
Division (fragmentation) of agricultural lands The Project provides for construction of cattle underpasses within Yeltaisky Rural Okrug: a dry season underpass at KP189+90, a dry season underpass at KP235+86 (at crossing of the Kargaly River) and a year-round underpass at KP244+77. No construction of pedestrian crossings or passage ways for agricultural machinery is proposed.	Major	Design of Section 1 should provide for construction of passage ways to the fields along BAKAD for agricultural machinery in consultation with agricultural enterprises.	Negligible

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Isayevo, Aksengir, Pogranichnik Gardening Partnership (or "Razyezd 71" according to some sources), Pridorozhny, Ogonyok, Soyuzpechat			
As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to fields is considered permanent, local in extent and large in scale due to overdrive or entire loss of access. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.			
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

7.6.3 *Iliysky District*

KazTSIKsky Rural Okrug

Table 7.6-6 Assessment of Impacts on Kaztsik and Komsomol (31+800 km – 32+300 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kaztsik and Komsomol			
CONSTRUCTION			
Cohesion of settlements, nuisance Construction work could cause nuisance for communities of Kaztsik and Komsomol due to physical presence of workers and equipment, limitation for pedestrians and traffic movement between settlement. As the duration of the construction works of Section 2 will last for 29 months, will be continuous, local in extent and will cause small nuisance for local residents, the Impact Magnitude is considered *Medium*. Responsivity of receptors is considered *Medium*. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance	Moderate to Major	• Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required.	Negligible to Minor
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kaztsik and Komsomol			
OPERATION			
Cohesion of settlements The proposed BAKAD route will pass between Kaztsik and Komsomol. A viaduct will be built at the intersection of the KV 65 Kaztsik – Komsomol road and BAKAD (at KP318+40). Besides, BAKAD will cross an access road Komsomol-Zhapek Batyr. A two level interchange will be built at this intersection. At KP309+00 BAKAD will also cross an access road to AO Adal, a farm enterprise located south of BAKAD. The cohesion of the residential areas of the Kaztsik, and the Komsomol will not be disturbed during the construction of BAKAD.	Not assessed	Not required	Not assessed
Walking accessibility of and vehicle access to residential areas The Project does not provide for construction of a viaduct or passage ways for agricultural machinery/cattle underpasses near the crossed access road to the farm of AO Adal. As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to enterprise is considered permanent, local in extent and large in scale due to entire loss of access. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *High*.	Major	Design of Section 1 should provide for construction of a passage way along BAKAD for agricultural machinery to KP312+00.	Negligible
Division (fragmentation) of agricultural lands The farmer enterprises are located between Caztsik and Komsomol. According to the results of the interview, there is information about the division of the "Farmer enterprise named after Kasanov". The farm enterprise will be divided into two parts by BAKAD, based on the technical	Major	Design of Section 1 should provide for construction of passage ways along BAKAD for agricultural machinery in line with needs of agricultural enterprises	Negligible

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kaztsik and Komsomol			
solutions of the Project there are restrictions on access of agricultural vehicles to the land plots of the farm. As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to fields is considered permanent, local in extent and large in scale due to overdrive or entire loss of access. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.			
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Table 7.6-7 Assessment of Impacts on Tole bi (36+000 km – 36+500 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Tole bi			
CONSTRUCTION			
Cohesion of settlements, nuisance The proposed BAKAD route will pass 2 km south of Tole Bi. Cohesion of Tole Bi residential area with other settlements of Aschibulaksky rural okrug will be not disturbed. No nuisance is expected during construction.	Not assessed	Not required	Not assessed
Noise, dust Noise and dust impacts on nearby residential areas of Tole Bi during construction are not expected.	Not assessed	Not required	Not assessed
OPERATION			
Cohesion of settlements The proposed BAKAD route will pass 2 km south of Tole Bi. A viaduct will be built at the intersection of BAKAD and the access road to this settlement at KP349+70. Cohesion of Tole Bi residential area with other settlements of Aschibulaksky rural okrug will be not disturbed.	Not assessed	Not required	Not assessed
Walking accessibility of and vehicle access to residential areas No impact is expected	Not assessed		Not assessed
Division (fragmentation) of agricultural lands No agricultural land will be crossed by BAKAD near Tole bi.	Not assessed		Not assessed
Noise, dust Noise and dust impacts on nearby residential areas of Tole Bi during operation are not expected.	Not assessed		Not assessed

Table 7.6-8 Assessment of Impacts on Zhapek Batyr (36+000 km – 36+500 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Zhapek Batyr			
CONSTRUCTION			
Cohesion of settlements, nuisance Construction work could cause nuisance for Zhapek Batyr community, as the local road, which is used by local people to reach northern part of Aschibulaksky Rural Okrug, will be crossed by BAKAD route. Nuisance will be related to physical presence of workers and equipment, limitation for pedestrians and traffic movement, which could cause traffic jams. As the duration of the construction works of Section 2 will last for 29 months, will be continuous, local in extent and will cause moderate nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Provision of the construction schedule, schedule of restrictions and detour schemes for local road, developed in cooperation with local authorities; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required.	Minor
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate
OPERATION			
Cohesion of settlements	Not assessed	Not required	Not assessed

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Zhapek Batyr			
Cohesion of Zhapek Batyr residential area with other settlements of Aschibulaksky rural okrug will be not disturbed. The proposed BAKAD route will pass 340 m off the residential quarters of Zhapek Batyr. The areas adjoining BAKAD in the north and south will be used for perspective residential development.			
Walking accessibility of and vehicle access to residential areas BAKAD will cross the access road to lands of gardening partnerships north of Zhapek Batyr (KP363+00), which will impair vehicle access to residential areas. The Project provides for construction of a viaduct between KP345+00 and KP367+00 (at KP349+70 for the access road to Tole Bi) and a cattle underpass (KP366+79). No construction of a viaduct is proposed at the intersection of BAKAD and the access road to lands of gardening partnerships (KP363+00). As the BAKAD operation doesn't have any time limitation, the impact is considered permanent, local in extent and will cause large nuisance for local residents due to loss of access road to gardening partnerships. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to changes in walking accessibility. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility.	Major	• Design of Section 2 should provide for construction of a passage way along BAKAD to viaduct and cattle underpass to for agricultural vehicles, pedestrians and vehicles.	Negligible to Minor
Division (fragmentation) of agricultural lands BAKAD will cross agricultural lands and will divide several fields into two parts. As described above, two cattle underpasses is envisaged by the Project near Zhapek Batyr, however there are remoted fields and	Major	• Design of Section 2 should provide for passage ways along BAKAD from cattle underpasses to remoted fields	Negligible

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Zhapek Batyr			
outbuildings, which have no access to these cattle underpasses. Thus BAKAD construction could lead to loss of access to remoted fields and outbuildings. As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to fields is considered permanent, local in extent and large in scale due to overdrive or entire loss of access. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.			
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Table 7.6-9 Assessment of Impacts on Kokkainar and Mukhametzhana Tuimebayeva (36+800 km – 38+200 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kokkainar and Mukhametzhana Tuimebayeva			
CONSTRUCTION			
Cohesion of settlements, nuisance Construction work could cause nuisance for communities of Kokkainar and Mukhametzhana Tuimebayeva, as the local road, which connects these two settlements, will be crossed by BAKAD route. Nuisance will be related to physical presence of workers and equipment, limitation for pedestrians and traffic movement, which could cause traffic jams. As the duration of the construction works of Section 2 will last for 29 months, will be continuous, local in extent and will cause moderate nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Provision of the construction schedule, schedule of restrictions and detour schemes for local road, developed in cooperation with local authorities; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required.	Minor
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate
OPERATION			
Cohesion of settlements Cohesion of Kokkainar and Mukhametzhana Tuimebayeva residential area with other settlements of Aschibulaksky rural okrug will be not disturbed as there will be a viaduct at KP374+90 at the intersection of BAKAD with the main street connecting these settlements.	Not assessed	Not required	Not assessed

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kokkainar and Mukhametzhana Tuimebayeva			
Walking accessibility of and vehicle access to residential areas The proposed BAKAD route will pass between Kokkainar and Mukhametzhana Tuimebayeva. The Project provides for construction of a viaduct at KP374+90 at the intersection of BAKAD with the main street connecting these settlements. BAKAD will pass near a school №20, which is located about 30 m away from the BAKAD RoW in M. Tuimebayeva. The school is attended by children living in M. Tuimebayeva and gardening partnerships located to the north. Kokkainar has its own schools. There is viaduct estimated in the project at KP 374+90. Total length is 300 metre ensures there is no limitations in access of students from neighboring gardener partnerships. The ponds north and south of the proposed BAKAD route at KP366+79 provide ecosystem services for the local community being used for recreation and fishing. The access to the ponds will not be limited as the Project provides for construction of a cattle underpass.	Not assessed	Not required	Not assessed
Division (fragmentation) of agricultural lands BAKAD will cross agricultural lands and will divide several fields into two parts. Project provides for construction of a bridge and a cattle underpass for dry season on a river Terenkara. The impact on local agricultural landusers will be related to overdrives. As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to fields is considered permanent, local in extent and large in scale due to overdrive. The Impact Magnitude therefore is considered *Medium*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.	Moderate	• Design of Section 2 should provide for passage ways along BAKAD from cattle underpasses to remoted fields	Negligible
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Baiserkinsky Rural Okrug

Table 7.6-10 Assessment of Impacts on Zhanadaur, Intymak, Koyankus (40+500 km – 42+600 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Zhanadaur, Intymak, Koyankus			
CONSTRUCTION			
Cohesion of settlements, nuisance Construction work could cause nuisance for community of Zhanadaur, Intymak, Koyankus, as the local road, which connects these settlements, will be crossed by BAKAD route. Nuisance will be related to physical presence of workers and equipment, limitation for pedestrians and traffic movement, which could cause traffic jams. As the duration of the construction works of Section 2 will last for 29 months, will be continuous, local in extent and will cause moderate nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Provision of the construction schedule, schedule of restrictions and detour schemes for local road, developed in cooperation with local authorities; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required.	Minor
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Zhanadaur, Intymak, Koyankus			
OPERATION			
Cohesion of settlements Cohesion of Zhanadaur residential area with other settlements of Baiserkinsky rural okrug will be not disturbed. Zhanadaur is located 100 m north of BAKAD. The distance to Koyankus is over 1.2 km. The shortest distance from BAKAD to the outermost houses of Intymak may be less than 50 m.	Not assessed	Not required	Not assessed
Walking accessibility of and vehicle access to residential areas The Project provides for construction of a viaduct, which will preserve the regional road between Zhanadaur and Koyankus and, therefore, these two settlements will not be disconnected. No impact is expected	Not assessed	Not required	Not assessed
Division (fragmentation) of agricultural lands BAKAD will cross agricultural fields and divide them into several parts. The Project provides for construction of a 3x24 bridge over the Yesentai River at KP406+44. Residents of Yntymak will be able to use it as a cattle underpass during the dry season. However, the height of the bridge is to be no less than 3.5 m to ensure a free passage of agricultural machinery. Another 2x21 cattle underpass will be available at KP389+95 where BAKAD will cross the Terenkara River. As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to fields is considered permanent, local in extent and large in scale due to loss of access to agricultural lands. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.	Major	• Design of Section 2 should provide for passage ways along BAKAD from viaduct at KP 408+60 to remoted fields for agricultural machinery.	Negligible
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Energetichesky Rural Okrug

Table 7.6-11 Assessment of Impacts on Pokrovka and Otegen Batyr (45+400 km – 46+800 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Pokrovka and Otegen Batyr			
CONSTRUCTION			
Cohesion of settlements, nuisance Construction work could cause nuisance for community of Pokrovka and Otegen Batyr, as the Iliysky Route, which connects these settlements, will be crossed by BAKAD route. Nuisance will be related to physical presence of workers and equipment, limitation for pedestrians and traffic movement, which could cause traffic jams. As the duration of the construction works of Section 3 will last for 20 months, will be continuous, local in extent and will cause large nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Provision of the construction schedule, schedule of restrictions and detour schemes for Iliysky Route, developed in cooperation with local authorities; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required.	Moderate
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Pokrovka and Otegen Batyr			
Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.			
Loss of income of small and medium-sized businesses Shop TOO "Aspan", TOO "Trading house Asia-Furniture", LLP "Dostar Concrete invest" are located in Pokrovka. According to the revised Project sollutions, existing road remained as it is. All the levels are increased especially for this section so there will be access ways continuesslly for these business centers. As the duration of the construction works of Section 3 will last for 20 months, will be continuous, local in extent and will cause minor nuisance for the enterprises, the Impact Magnitude is considered *Small*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact.	Minor	• Conduct additional consultation with affected businesses to address individual issues. • Compensation for loss of earnings (if applicable) during the period of access deprivation should be considered in Livelihood Restoration Action Plan.	Negligible
Relocation of a cemetery The proposed BAKAD route will cross the territory of a cemetery between km 44 and km 45. Because the locals still use the officially closed cemetery for unauthorised burials. According to the revised Project sollutions, BAKAD will pass between the cemeteries by the viaduct. The distance between BAKAD and cemeteries are 30 metres. In case that some unauthorized remains will be subject to relocation as a result of Project-related construction activities, the impact is characterised as permanent of local extent, however large in scale due to religious traditions of local people. Therefore, the impact magnitude is considered *Large*. Responsivity of receptors is considered *High* as the cemetery and peace of dead relatives is the one of the most important religious	Major	• More detailed information related to boundaries of burial sites is to be provided based on archaeological field surveys following the final delineation of the boundaries of land plots leased to the Consortium for the BAKAD construction; • In case the highway construction area including a 20 m wide sanitary buffer zone will encompass burial sites, re-location measures are to be defined including consultations with the local relatives of the buried (which might involve payment of compensations), consultations with the local executive authorities, identification of reburial places, securing of the necessary permissions, the relocation procedure itself in line with religious ceremonies depending on the requests of the relatives.	Moderate

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Pokrovka and Otegen Batyr			
traditions of local people and the impact on the cemetery can cause significant anxiety within the community.			
OPERATION			
Cohesion of settlements Pokrovka is located 200 to 300 m south of Otegen Batyr, an administrative centre of the Ili District. It is separated from Otegen Batyr by a river. Transport connection between these settlements relies on a single BAKAD (the Iliysky Route). Pokrovka is crossed by a railroad dividing the settlement into two parts. The eastern part comprises residential areas, a paramedic/obstetric first aid station and driveways to the Ili Route. The western part, apart from residential houses, is comprised by premises of industrial enterprises: TOO "Trading house Asia-Furniture" Mebel and an asphalt plant. West of the railroad is a cemetery, which is still used by the local community for burying although it is officially closed. The nearest railway crossing is located 4.5 km south of the northern boundary of Pokrovka. Therefore, the local residents and businesses use a dirt road under the railway bridge for vehicular traffic. No specially equipped pedestrian crossings over the railroad are in place and the locals have to walk over the railway along its entire length. There are no schools in Pokrovka. Therefore, children attend schools in Otegen Batyr. They have to walk to school or use public transport. Children living in the western part of Pokrovka have to cross the railroad, which is void of specially equipped pedestrian crossings, or walk under the railway bridge before taking public transport on the Ili Route.	Not assessed	• Not required	Not assessed

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Pokrovka and Otegen Batyr			
The proposed BAKAD route will cross the settlement. However, according to the revised Project sollutions, all the levels are increased especially for this section, and approximately 350 metre viaduct will be contructed there so there will be no separation between household and main residential area.			
Walking accessibility of and vehicle access to residential areas In two places BAKAD will intersect local driveway used by the local community to cross the railroad. The Project provides for construction of two 2*21 viaducts. Therefore, no impairment of transport connection between the eastern and western part of the settlement is expected. Besides, BAKAD will cross a local driveway between cemeteries, which is also used by vehicles of the asphalt plant. The Project provides for construction of a 2*21 viaduct therefore, no impairment of transport connection is expected at PK 444+40.	Not assessed	Not required	Not assessed
Division (fragmentation) of agricultural lands No impact is expected	Not assessed	Not required	Not assessed
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

7.6.4 *Talgarsky District*

Guldalinsky Rural Okrug

Table 7.6-12 Assessment of Impacts on Zhana Kuat (46+800 km – 50+600 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Zhana Kuat residential district and Zhalyn gardening partnership			
CONSTRUCTION			
Cohesion of settlements, nuisance The proposed BAKAD route will pass at the distance of about 250 to 300 m from the boundary of Zhana Kuat residential district and 180 to 200 m from land plots of Zhalyn gardening partnership. Nuisance for local residents will be related to physical presence of workers and equipment. As the duration of the construction works of Section 4 will last for 23 months, will be continuous, local in extent and will cause moderate nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Disclosure of the construction schedule to local residents.	Moderate
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	• Installation of the noise barrier before the start of the construction works.	Minor to Moderate

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Zhana Kuat residential district and Zhalyn gardening partnership			
OPERATION			
Cohesion of settlements The proposed BAKAD route will pass at the distance of about 250 to 300 m from the boundary of Zhana Kuat residential district and 180 to 200 m from land plots of Zhalyn gardening partnership. No division (fragmentation) of residential areas is expected. All social infrastructure facilities are located within the residential district. No impact is expected	Not assessed	Not required	Not assessed
Walking accessibility of and vehicle access to residential areas Emergency medical (ambulance) service is stationed in Guldala. The transport link to Guldala is the Kuldzha Route before turning to the Kyzyl Tu 1 – Kyzyl Tu 2 road. The Project provides for construction of a viaduct at KP527+59. The existing Kyzyl Tu 1 – Kyzyl Tu 2 road will pass underneath BAKAD. Therefore, no limitations to transport connection are expected.	Not assessed	Not required	Not assessed
Division (fragmentation) of agricultural lands Irrigated agricultural lands located south of the proposed BAKAD route will be crossed by the highway in the East-West direction at KP490+00 and KP500+00. The Project provides for construction of culverts with the diametre of less than 1 m (4 culverts) and 2 m (1 culvert) to preserve the integrity of the irrigation system. The nearest dry season cattle underpasses will be constructed at crossings of the rivers Kartabulak (KP485+72) and Almerek (KP529+38). The distance from the proposed cattle underpasses to the furthest agricultural land plots may amount to 2.5 km, which is not expected to limit cattle drives. However, the height of the underpass is to be no less than 3.5 m to ensure a free passage of agricultural machinery.	Major	• Design of Section 4 should provide for construction of passage ways alonf BAKAD for agricultural machinery in accordance with the needs of agricultural enterprises	Negligeble

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Zhana Kuat residential district and Zhalyn gardening partnership			
As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to fields for machinery is considered permanent, local in extent and large in scale due to loss of access to agricultural lands. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.			
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Panfilovsky Rural Okrug

Table 7.6-13 Assessment of Impacts on Kyzyl Tu 4 (52+800 km – 53+000 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kyzyl Tu 4 (Kyzyl Tu 1, Kyzyl Tu 2, Kyzyl Tu 3)			
CONSTRUCTION			
Cohesion of settlements, nuisance BAKAD construction work could cause nuisance for Kyzyl Tu 4 community, as the local roads connecting different parts of settlement will be crossed by BAKAD. Nuisance will be related to physical presence of workers and	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the	Moderate

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kyzyl Tu 4 (Kyzyl Tu 1, Kyzyl Tu 2, Kyzyl Tu 3)			
equipment, limitation for pedestrians and traffic movement, which could cause traffic jams and overdrives. As the duration of the construction works of Section 4 will last for 23 months, will be continuous, local in extent and will cause moderate nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance.		construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Provision of the construction schedule, schedule of restrictions and detour schemes for local road, developed in cooperation with local authorities; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required.	
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate
OPERATION			
Cohesion of settlements The proposed BAKAD route will pass between Kyzyl Tu 1 and Kyzyl Tu 2. Residential development in Kyzyl Tu 1 expands in the eastwardly direction towards Panfilovo. At KP 540 +00, BAKADE will pass in the immediate vicinity to residential quarters of this settlement. There are located 5-6 houses at KP 540 +00, which will be divided from general residential area. As the BAKAD will separate these houses from main residential area and infrastructure permanently, the scale of the impact is considered large, the Impact Magnitude is therefore considered *Large.*	Major	• Provide connections to all necessary infrastructure for residents of separated houses; • Provide and access road (passage way along the BAKAD route to the nearest viaduct) for separated houses;	Minor

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kyzyl Tu 4 (Kyzyl Tu 1, Kyzyl Tu 2, Kyzyl Tu 3)			
Receptors responsivity is considered *Medium* to *High* depending on the vulnerability of particular households.			
Walking accessibility of and vehicle access to residential areas The Project provides for construction of a viaduct at KP527+59 where BAKAD will cross the road connecting Kyzyl Tu 1 and Kyzyl Tu 2. This road connects Panfilovo, Kyzyl Tu 1 and allotments of Nurly Dala gardening partnership with Kyzyl Tu 2, Kyzyl Tu 3 and Kyrly Shy residential district. It also connects the Ile Route with the Kuldzha Route in the North-South direction. The Project Area of Influence within Panfilovsky Rural Okrug will encompass two cemeteries located west and north of the limits of Kyzyl Tu 1. These cemeteries adjoin the proposed BAKAD route at KP520+90 and KP530 +70. The access to these cemeteries is not expected to be limited provided the proposed viaduct is in place. Medical services are provided for the communities of Kyzyl Tu 1 and Nurly Dala gardening partnership in Kyzyl Tu 4. Children of these two communities are brought by their parents also to Kyzyl Tu 4. The project includes the construction of an overpass that connect Kyzyltu-1, Nurly Dala with Kyzyl Tu-2. Therefore no impact is expected in this case.	Not assessed	Not required	Not assessed
Division (fragmentation) of agricultural lands Kyzyl Tu 1 and land plots of Nurly Dala gardening partnership are surrounded by predominantly irrigated agricultural lands. TOO Baiserke Agro is a large agricultural enterprise, which lands will be divided by BAKAD in the East-West direction at KP 490+00 and KP500+00. The Project provides for construction of culverts with the diametre of less than 1 m (4 culverts) and 2 m (1 culvert) to preserve the integrity of the irrigation system. The nearest dry season cattle underpasses will be constructed at crossings of the rivers Kartabulak (KP485+72) and Almerek (KP529+38). The distance from the proposed cattle underpasses to the furthest agricultural land plots may	Major	• Design of Section 4 should provide for construction of passage ways along BAKAD for agricultural machinery in accordance with the needs of agricultural enterprises.	Negligible

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kyzyl Tu 4 (Kyzyl Tu 1, Kyzyl Tu 2, Kyzyl Tu 3)			
amount to 2.5 km, which is not expected to limit cattle drives. However, the height of the underpass is to be no less than 3.5 m to ensure a free passage of agricultural machinery. As the BAKAD operation doesn't have any time limitation, the impact related to loss of access to fields for machinery is considered permanent, local in extent and large in scale due to loss of access to agricultural lands. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.			
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Table 7.6-14 Assessment of Impacts on Panfilovo (54+900 km – 55+100 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Panfilovo			
CONSTRUCTION			
Cohesion of settlements, nuisance Interchange construction work could cause nuisance for Panfilovo community, as the Kuldjinsky Route road is the main access road, which is used by local people to reach Almaty. Nuisance will be related to physical presence of workers and equipment, limitation for pedestrians and traffic movement, which could cause traffic jams, and transportation of construction materials. As the duration of the construction works of Section 4 will last for 23 months, will be continuous, local in extent and will cause moderate nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Provision of the construction schedule, schedule of restrictions and detour schemes for Kuldjinsky Route, developed in cooperation with local authorities; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required.	Moderate
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate
OPERATION			
Cohesion of settlements	Not assessed	Not required	Not assessed

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Panfilovo			
BAKAD route will pass Panfilovo settlement from the south and won't lead to deterioration of the cohesion in community.			
Walking accessibility of and vehicle access to residential areas Panfilovo is connected with Kyzyl Tu 1 and Kyzyl Tu 2 by a municipal road of Category III (AL91), which terminates at the Ili Route. Transport connection is not expected to be impaired as major social infrastructure facilities are located in Panfilovo. The cemetery of Panfilovo is located 200 m off the proposed BAKAD route section 550+00 and is accessible from Panfilovo via local dirt roads. Therefore no impact is expected.	Not assessed	Not required	Not assessed
Division (fragmentation) of agricultural lands BAKADBAKAD crosses agricultural fields and divide them into several parts. The Project provides for construction of a two cattle underpasses near the intersection between BAKAD and Kuldginsky Route (Alamty-Evgenievka-Shelec-Khorgos road). The height of the underpasses is to be 2.5 m and is not ensured a free passage of agricultural machinery, which will be causeed deterioration of access to fragmented lands and overdrives. As the BAKAD operation is not had any time limitation, the impact related to deterioration of access to fields is considered permanent, local in extent and medium in scale. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.	Major	Passage ways along BAKAD to remoted fields should be built to ensure a free passage of agricultural machinery	Negligible
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Table 7.6-15 Assessment of Impacts on Taldybulak (64+900 km – 65+300 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Taldybulak			
CONSTRUCTION			
Cohesion of settlements, nuisance All social infrastructure facilities are located in the northern part of Taldybulak. Therefore, residents living in the southern part of the settlement have to cross Talgar Route to reach infrastructure facilities. Talgar Route is intensively used BAKAD with traffic jams at peak time. Due to perpetual heavy traffic on the Talgar Route, residents of Taldybulak reach Talgar, the administrative centre of the District, via the KV44 Almaty-Belbulak-Talgar road. The KV44 road terminates at the Talgar Route with an unsignalised intersection. Interchange construction work could cause nuisance for Taldybulak community, as the Talgarsky Route road is the main access road, which is used by local people to reach both Almaty and Talgar. Nuisance will be related to physical presence of workers and equipment, limitation for pedestrians and traffic movement, which could cause traffic jams. As the duration of the construction works of Section 9 will last for 18 months, will be continuous, local in extent and will cause major nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility and nuisance	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Provision of the construction schedule, schedule of restrictions and detour schemes for Talgar Route, developed in cooperation with local authorities; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required. • Provision of signalling facilities at the intersection where the KV44 road terminates at the Talgar Route.	Moderate

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Taldybulak			
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered.	Minor to Moderate
OPERATION			
Cohesion of settlements Residential development in Taldybulak expands southwards. Therefore, the settlement is divided by the Talgar Route into two parts. The larger part of the settlement is located north of the Talgar Route. BAKAD passes to the west of Taldybulak. The cohesion of Taldybulak will not be broken by BAKAD.	Not assessed	Not required	Not assessed
Walking accessibility of and vehicle access to residential areas Construction of the interchange within a densely populated residential area will impair the connectivity of residential communities west and east of the proposed interchange. No confirmation on the proposed interchange configuration and possibilities for pedestrians to pass along the Talgar Route (under the interchange) and cross it (within the interchange construction area) was available at the time of preparation of the Report. As the interchange operation doesn't have any time limitation the impact is considered permanent, local in extent and will cause large nuisance for local residents if pedestrian safety are not managed properly. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to changes in walking accessibility. Particularly vulnerable	Major	• Engagement with local authorities responsible for construction of a perestrian facilities on the issue of road safety, ensuring pedestrian facilities to be constructed and development of additional measures if required.	Negligible

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Taldybulak			
groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility.			
Intersection with infrastructure facilities, supply pipelines The settlement's irrigation system is based on irrigation canals. The Gorokhov and Tursuk Maly irrigation canals are located west and east of the settlement respectively. In the north, Taldybulak is crossed by the P2 irrigation canal passing in the East-West direction. Irrigation of small private land plots is largely based on the system of small aqueducts (aryks). Water supply from the system of irrigation canals is the main source of irrigation of private households. Project provides for transferring of state and municipal irrigation systems, however, small aqueducts (aryks) made by local people and unregistered by local authorities, doesn't included in Project. Interruption of small aqueducts (aryks) system will cause losses of crop income for local households relying on agriculture and gardening. As the BAKAD operation is not had any time limitation the impact is considered permanent, local in extent and will cause medium income losses for local households if they won't have the source of water for irrigation. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to changes in walking accessibility. Particularly vulnerable groups of households are people of low and instable income. Responsivity of these receptors is considered *High* due to their vulnerability to impacts related to loss of income.	Major	In order to ensure continuous water supply, the pipe culvert estimated in the Project shlould ensure continuous water supply within the area of the interchange at KP65, KP66 and preservation of the existing system of small aqueducts used for irrigation of small private land plots. Any loss of income caused by the severance of the aqueducts by the Project should be compensated in compliance with lender requirements. Livelihoods should be restored to pre-project levels or better.	Negligible

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Taldybulak			
Division (fragmentation) of agricultural lands BAKAD crosses agricultural fields and divide them into several parts. The Project provides for construction of several viaducts (at km 57+930, km 59+057 and km 63+375). These viaduct will provide an access routes for agricultural machinery, however, not all remoted fields will have access to them. The project will be revised and additional box type passage will be estimated near KM 63+00. As the BAKAD operation is not had any time limitation, the impact related to loss of access to fields is considered permanent, local in extent and large in scale due to loss of access to agricultural lands. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to loss or deterioration of access.	Major	• Design of Section 9 should provide for construction of passage ways along BAKAD for agricultural machinery in line with needs of agricultural enterprises	Negligible
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

Table 7.6-16 Assessment of Impacts on Kyzyl-Kairat (65+300 km – 65+800 km)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kyzyl-Kairat			
CONSTRUCTION			
Cohesion of settlements, nuisance Interchange construction work could cause nuisance for Kyzyl-Kairat community, as the Talgarsky Route road is the main access road, which is used by local people to reach both Almaty and Talgar. Nuisance will be related to physical presence of workers and equipment, limitation for pedestrians and traffic movement, which could cause traffic jams. As the duration of the construction works of Section 9 will last for 18 months, will be continuous, local in extent and will cause major nuisance for local residents, the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to temporary impact. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with construction of interchange.	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Provision of the construction schedule, schedule of restrictions and detour schemes for Talgar Route, developed in cooperation with local authorities; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required. • A signalized passage way and safe pedestrian crossings between the northern and southern part of the settlement are to be in place to ensure a free access for the community and emergency medical services.	Moderate
Noise, dust Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent and will cause large	Major	• Installation of the noise barrier before the start of the construction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction	Minor to Moderate

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kyzyl-Kairat			
nuisance for local residents, therefore the Impact Magnitude is considered *Large*. Responsivity of receptors is considered *High* as the human health and safety are of the highest priority.		works, in case of that temporary Noise Screen construction shall be considered.	
OPERATION			
Cohesion of settlements The western part of Kyzyl-Kairat is located less than 100 m away from the proposed BAKAD interchange at KP65, KP66. The fragmentation of Kyzyl-Kayrat is not expected.	Not assessed	Not required	Not assessed
Walking accessibility of and vehicle access to residential areas Construction of the interchange within a densely populated residential area will impair the connectivity of residential communities west and east of the proposed interchange. No confirmation on the proposed interchange configuration and possibilities for pedestrians to pass along the Talgar Route (under the interchange) and cross it (within the interchange construction area) was available at the time of preparation of the Report. As the interchange operation doesn't have any time limitation the impact is considered permanent, local in extent and will cause large nuisance for local residents if pedestrian safety are not managed properly. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to changes in walking accessibility. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High* due to their vulnerability to impacts, associated with interruption of walking accessibility.	Major	• Engagement with local authorities responsible for construction of a perestrian facilities on the issue of road safety, ensuring pedestrian facilities to be constructed and development of additional measures if required.	Negligible

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kyzyl-Kairat			
Intersection with infrastructure facilities, supply pipelines The settlement's irrigation system is based on irrigation canals. The Tursuk Maly irrigation canals are located west of the settlement. Irrigation of small private land plots is largely based on the system of small aqueducts (aryks).Water supply from the system of irrigation canals is the main source of irrigation of private households. Project provides for transferring of state and municipal irrigation systems, however, small aqueducts (aryks) made by local people and unregistered by local authorities, doesn't included in Project. Interruption of small aqueducts (aryks) system will cause losses of crop income for local households relying on agriculture and gardening. As the BAKAD operation doesn't have any time limitation the impact is considered permanent, local in extent and will cause medium income losses for local households if they won't have the source of water for irrigation. The Impact Magnitude therefore is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to changes in walking accessibility. Particularly vulnerable groups of households are people of low and instable income. Responsivity of these receptors is considered *High* due to their vulnerability to impacts related to loss of income.	Major	In order to ensure continuous water supply, the pipe culvert estimated by the Project should provide for preservation of the existing system of small aqueducts used for irrigation of small private land plots	Negligible
Division (fragmentation) of agricultural lands No impact is expected	Not assessed	Not required	Not assessed
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

7.6.5 *Zhambylsky District*

Kargalinsky Rural Okrug

Table 7.6-17 Assessment of Impacts on Kargaly (Fabrichny Quarry)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Kargaly			
CONSTRUCTION			
Nuisance A proposed quarry north of Kargaly near the existing quarry for extraction of sand and gravel materials will not produce any significant community impacts due to its remoteness from the nearest settlements. No impact related to traffic safety is expected as transportation route will pass north from the quarry and won't effect Kargaly.	Not assessed	Not required	Not assessed
Noise, dust To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

7.6.6 *Enbekshikazakhsky District*

Boleksky Rural Okrug

Table 7.6-18 Assessment of Impacts on Issyk gardening partnership (Issyk quarry)

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Issyk gardening partnership			
CONSTRUCTION			
Community cohesion, nuisance Issyk gardening partnership is the nearest residential area located north-west of the quarry for extraction of sand and gravel materials. This gardening partnership of about 1,200 allotments is home to about 200 permanently resident families with about 100 schoolchildren attending school in Bolek. Children are daily transported by three school busses. The gardening partnership is provided with a public transport stop near the intersection close to the bridge. The outermost allotments of the gardening partnership are located about 100 m away from the quarry boundary. The distance from the outermost allotments of Issyk and Parushino gardening partnerships to the road passing along the Great Almaty Canal is less than 100 m and less than 30 m respectively. The quarry will adjoin gardening partnership from the southeast. Major public concerns are associated with eventual transportation of materials via local roads along the Great	Major	• Installation of the noise barrier along the quarry boundary facing residential areas to minimize noise and visual impacts before the start of the extraction works, if the noise exceeds the permissible sound level defined under the laws and regulations of the Republic of Kazakhstan during the construction works, in case of that temporary Noise Screen construction shall be considered; • Installation of fencing around the construction sites, which will limit movements of equipment and workers; • Disclosure of the construction schedule, transportation routes to local residents; • Installation of additional road safety signs (if applicable and agreed with local authorities); • Engagement with local authorities on the issue of road safety and traffic movement during construction and development of additional measures if required. • Stabilisation of the pit walls to minimize underflooding of the outermost houses of Issyk gardening partnership	Minor

Impact Description	Impact Significance	Recommended Mitigation Measures	Residual Impact Significance
Issyk gardening partnership			
Almaty Canal over the bridge crossing the Issyk River, which may result in increased traffic accidents involving pedestrians and among them children. Surfacing of local roads and bridges may become damaged. Extraction of construction materials, physical presence of workers and equipment could cause medium to large nuisance (depending on the distance between households and the quarry) for local resident during construction of eastern part of BAKAD. Therefore the impact is considered *Large*. Responsivity of receptors is considered *Medium* due to limited ability for adaptation to changes in everyday lifestyle and safety conditions. Particularly vulnerable groups of residents are people of low-mobility, elderly and children. Responsivity of these receptors is considered *High*.			
Noise, dust Operation of the quarry and large-scale transportation of materials from the quarries may potentially result in dust pollution during the dry season and noise pollution of the nearest households. To be further assessed. Will be presented within the next revision of the ESIA	Not assessed	To be further developed based on the results of the assessment	Not assessed

7.7 DISPLACEMENT OF EXISTING LAND, USE, PROPERTY AND PEOPLE

7.7.1 Introduction

The sections below summarise the findings of land acquisition process. Reference is frequently made to further information on expropriation in the Land Acquisition and Resettlement Framework (LARF), which is presented separately as LARF of the ESIA package.

Please note that at the time of this draft ESIA the schemes and explications of the expropriated lands were not provided to Consortium BAKAD yet by the Transport Committee within the Ministry of Innovation and Development (TC); the TC considers the plot-specific information to be confidential. At the time of the report the responses on data requests formed by ERM and sent by the Consortium have been received from Talgar and Ily districts, the respond from Karasay district is still missing. In order to assess the degree of bisected and fragmentated landplots, the following information is required:

- The configuration of the land plot before the expropriation;
- The configuration of the land plot(s) after the expropriation.

Both are unavailable to the time of reporting.

In order to assess the abovementioned impact ERM used to the extent possible the up-to-date public cadastre maps[1]. However the method has the following limitations:

- The available cadastre map includes only parts of the BAKAD RoW;
- Not all the landplots shown on the cadastre map are evidently can be identified as bisected and/or fragmented.

Therefore at large extent the assessment provided below based on the report "Preliminary Analysis of the Process of Acquisition of Land Plots" on the basis of analysis prepared by Kocks Consult HmbG, and experts: Yelena Oplanic, Branko Radovanovic, Yerlan Abdugaliyev (hereinafter jointly referred to as the "Experts") by the order of International Finance Corporation (IFC) in 2013 and updated as of 2016.

The construction corridor varies between 42 m and 78 m, where the land withdrawn (both permanent and temporary) has taken place. The size of the corridor has been selected to accommodate for potential smaller changes in the BAKAD routing during final design.

The location of access roads, some of the quarries and some of the construction grounds (additional plots along the route that will be used for the temporal storage of soils and construction materials) was not known at the

[1] http://www.aisgzk.kz/aisgzk/ru/content/maps/

time of writing and, therefore, the scope of this assessment does not cover these in detail.

The RoW has been defined as the area directly affected by the land acquisition process. After land acquisition there are unused, besected and fragmented lands, which also form the area of direct influence of the land acquisition impact. In terms of assessment of future developments, the area of influence is wider and encompasses a corridor of 2000 m (being 100 m on each side of the BAKAD centreline).

7.7.2 *Summary of Baseline Findings and Sensitive Receptors*

Outcomes of Socio-economic Baseline Survey

Please note that this section provides an analysis of land owned by private owners. Since the state administration carried out the purchase of land for the BAKAD, the state lands were allocated without compensation. The permitted users have lost their rights to use the land upon the land lease agreements expired. It is possible that some of such agreements were terminated prior the expiration date, however such information was not made available.

The land use can be classified as agricultural areas. In agricultural areas, there are non-irrigated complex cultivation, irrigated complex cultivation and land principally occupied by agriculture with hayfields, non cultivated lands (out of crops) and grazing lands. There are no forest ecosystems and water bodies.

The key findings of the land use capability analyses are summarized below:

- state lands are represented by 14.5% of the total area of all allocated lands;
- 85% of lands are agricultural;
- about 56% of the agricultural lands are irrigated, the minority (44%) are not.
- less than 0.5%of lands occupied by commercial activities and private housing.

7.7.3 *Overview of Land Acquisition Process*

Land acquisition process followed from the legal perspective included the following steps:

Timeframe	Land acquisition activities
2006 - 2007	• Committee of roads of the Ministry of Investment and Development of the Republic of Kazakhstan (hereinafter the Committee of roads) agreed on the regional level budget application for the purchase of land and real estate[1].
2007	• Cut-off date was set and the initial notifications to potential affected people were sent. Registration of the new private land was prohibited. • Budget for land acquisition was approved by the Akimat of Almaty and Maslihat of Almaty and was included in RoK National Budget. Ministry of Transport and Communication sent a written request to the administration of the Almaty city to approve the acquisition of land plots and the real estate for the state needs. • Akimat of Almaty Oblast approved the MTC request. The Department on Land Relations of the Akimat of Almaty prepared the draft of the Land Acquisition Act of the Akimat of Almaty oblast, with attached lists of land plots and the real estate. • The Land Acquisition Act of the RoK Government was issued upon obtaining the necessary documentation and receiving positive conclusions for the approval for land acquisition in accordance with the designated use stated by the MTC from the Center of Land Cadaster. • The Land Acquisition Act by the Almaty oblast Akimat on acquisition of the land plots and the real estate for state needs, with attached lists of land plots and the real estate (The Act of the Almaty oblast local administration dated August 16, 2007 № 163). • Notification of the owners. • The primary acquisition of land for the state needs was conducted in November-December 2007. During 2007, forty one (41) land plots were acquired. Local and regional authorities were responsible for their acquisition • The process of acquisition of land was suspended in connection with a corruption scandal involving inflated prices upon redemption.End of 2007 the process on BAKAD put on stand by.
2008 – 2010	• The resettllment process was frozen.
2011 - 2012	• Amendments to the Land code and the Law on State property concerning the calculation of compensation were adopted in March 2011. • The resolutions/Land Acquisition Acts have not been registered in the Ministry of Justice that is required by the national legislation. • Notification of the owners. • A specialized enterprise performed (under contract and power of attorney of the Akimat) the assessment of the property value and land plots by the appraising companies. Only Akimat can do the verification of work of the appraisal companies.

[1] On August 6, 2014 during the reorganization of the Government of Kazakhstan the Ministry of transport and communications was abolished, the functions of the Ministry were transferred to the new Committee of roads within the Ministry of investment and development of the Republic of Kazakhstan

Timeframe	Land acquisition activities
	• The evaluation committee established in three districts. The condition of works with the owner or the users of the landplots concerning land acquisition and issues of the payment of the compensation prior to referring to the court
2013	• The first public consultations during the six years of BAKAD history were held on May, 3 and 4, 2013. The familiarization of the owners/land users with the results of the appraisal report of their land plots and other properties. • If case of the agreement, the contracts on the purchase of the property for the state needs were signed. • If not agreed the preparation of the documents and materials for starting lawsuits against the forcible alienation of the concerned land plots. • The implementation of the court decision by the executive authorities.
2014 - 2018	• Implementation of the court decision by the executives, completion of acquisition process.

7.7.4 *Overview of Land Acquired for the Project*

The total area of land acquired for construction of the BAKAD as discussed in "Preliminary Analysis of the Process of Acquisition of Land Plots" is about 614 hectares, which is 6.1% of the total area of affected land plots. The remaining parts of the divided land plots (93.9%) are outside the right-of-way and remain in the possession of the landowners.

The total area of the acquired land is 614 hectares including:

- 513 hectares is privately owned and
- 101 hectares is state-owned.

The table below (*Table 7.7-1*) provides information on the distribution of land plots by the so called intended purpose (use approved by the authorities who allocated this land).

Table 7.7-1 ***Distribution of plots (private and state-owned) by the intended land use purpose***

District	Agricultural land		Houses and dwellings		Business land		Other categories	
	ha	Wasteland (ha)	ha	Wasteland (ha)	ha	Wasteland (ha)	ha	Wasteland (ha)
Karasaysky	**243**	1.89	**16,00**	0.49	**43**	0.69	**3**	0.00
Iliysky	**126**	0.01	**4**	0.12	**19**	0.00	**22**	0.00
Talgarsky	**134**	1.55	**2,5**	0.00	**1,33**	0.03	**0**	0.00
In total, ha	**503**	3.45	**23**	0.61	**64**	0.72	**25**	0.00

The acquired area is presented by 784 land plots within the territory of the tree districts of Almaty region- Talgarsky, Ilijsky, Karasaisky districts.

As of 2016 the total land number of land plots subject to acquisition for construction of BAKAD is 722[1]:

- 339 in Karasaisky district;
- 186 - in Talgarsky districts,
- 197 - in Ilijsky district.

At the time of the development of the report, the actual data on the number of land plots has not been provided to the experts. The area represented by state-owned land plots do not require acquisition.

Based on the statistic data from Annexes from "Preliminary Analysis of the Process of Acquisition of Land Plots", the total land number of all allocated land plots for construction from 2007 to 2016 of BAKAD is 769:

- 356 in Karasaisky district;
- 190 - in Talgarsky districts,
- 223 - in Ilijsky district.

Table 7.7-2 ***Distribution of land plots according to the form of ownership (total statistic data with landplots acqised in 2007)***

District	Agricultural land, ha	Houses and dwellings	Business land	Other categories
Karasaisky	191.91	16	17.94	3
Ilijsky	129.73	4.11	0.22	22
Talgarsky	143.1	2.51	1.33	0
Total,ha	**464.74**	**22.62**	**19.49**	**25**

The Project will have the most significant impact on the private owners who use land for agricultural purposes, commercial activities and housing.

The share of agricultural land from the total area of acquires land is 87%, other 3,6% of land is used for commercial purposes, and 4,2% of land for housing and the same for other purposes.

7.7.5 Summary of Impacts Related to Land Acquisition

The following types of impacts were identified as potential consequences of the Project:

- **Physical Displacement of agricultural producers whose land plots were allocated entirely**

[1] Based on the data provided in the Preliminary Analysis of the Process of Acquisition of Land Plots, 2016, developed by group of experts by the order of International Finance Corporation (IFC)

BAKAD construction provides for acquisition of agricultural land plots. The land plots which was allocated entirely was both in use for planting, gardening as well as unused at the time of this report.

Landowners who have not received compensation due to the difficulties of substantiation of property rights, and disagreement with amount of compensation should apply to the district akimats and the Transport Committee in accordance with the legislation of the Republic of Kazakhstan.

- **Physical Displacement of agricultural producers whose land plots were intersected by BAKAD on the edges**

BAKAD construction provides for acquisition of part of agricultural land on the edges of a land plot. Allocated lands were both in use for planting, gardening as well as unused at the time of this report.

Landowners who have not received compensation due to the difficulties of substantiation of property rights, and disagreement with amount of compensation should apply to the district akimats and the Transport Committee in accordance with the legislation of the Republic of Kazakhstan.

Some land users will lose access to the land plot as a result of BAKAD construction.

- **Physical Displacement of agricultural producers whose land plots were intersected into the several parts (fragmentation of land)**

Landowners who have not received compensation due to the difficulties of substantiation of property rights, and disagreement with amount of compensation should apply to the district akimats and the Transport Committee in accordance with the legislation of the Republic of Kazakhstan.

BAKAD construction provides for acquisition of part of agricultural land which will lead to fragmentation of a land plot. This could lead to deterioration of even loss of access to separated land plots and, therefore, loss of income.

- **Physical Displacement: effects on livelihood from business activities**

There are three options for effects on livelihood from business owners:

1. The building is located in the right of way and at ESIA study the business activity is already relocated.
2. The building is located in the right of way and at ESIA study the business activity is not relocated.
3. The part of the land plot is allocated.

- **Physical Displacement: effects on livelihood from individual housing owners**

There are three options of effects on livelihood from individual housing owners:

1. The house is located in the right of way and at the time of Report the physical displacement is over. The householder resettled to the new location.
2. The house is located in the right of way and at the time of Report development the householder is still living there.
3. The part of land plot is located in the right of way. The house owner will keep same live location.

- **Effects on livelihood from livestock activities**

The Project implementation will cause the fragmentation of certain pastures. In worse cases there will be the loss of pasturelands available for public use. The Project implementation will cause the access limitation to several of them especially where underpasses for livestock will be far from pastures.

- **Future urban development potential**

The Master Plan of Almaty provide for the expansion of the city to the BAKAD border by reducing the area of agricultural lands. In connection with the transferring of agricultural value category to the land of settlements value category there will be loss of soil fertility, that it will not be taken in account.

Suburban agricultural lands provide the most share of food for Almaty mega-city.

Extensive evaluation of the loss of fertility of agricultural lands, economic losses of crops and decreasing of Almaty food safety is not conducted.

The completed land acquisition and resettlement impact assessment has not be undertaken yet whereas it is necessary to provide of Land Acquisition and Resettlement Risk Assessment. After the results of the Land Acquisition and Resettlement Risk Assessment, the detailed LARF, RAP with mitigation measures should be developed.

7.8 ARCHAEOLOGY AND CULTURAL HERITAGE

7.8.1 Introduction

This chapter addresses cultural heritage impacts of the Project including potential impacts to terrestrial sites and to aboveground historic structures such as cemeteries and buildings. The most significant potential for impacts

on archaeological sites will be from direct physical impacts during the construction of the Project.

The full assessment of the impacts on archaeology and cultural heritage is presented in *Appendix 3.5* of *Volume III* of this ESIA Report.

7.8.2 *Summary of Baseline Findings and Sensitive Receptors*

The baseline study has identified a total of 36 Cultural Heritage assets along the route of the scheme as listed below:

- 25 Cultural Heritage assets belong to the objects of historical and cultural heritage of the Republic of Kazakhstan (archaeological monuments from the early iron age to modern times);
- 1 Cultural Heritage asset is discovered and listed in the archeological and cultural catalogue of RK
- 1 asset refers to the sacred object "Sacred well spring Almerek";
- 9 modern cemeteries.
- The greater part of the terrestrial works for identifying the archaeological and immovable cultural heritage assets were within the 500 m corridor spanning the highway route (250 m each side of the road).

The full list of cultural heritage assets is provided in the table below(Table 7.8-1) and location is presented in the *Figure 7.8-1*.

Table 7.8-1 List of Cultural Heritage assets revealed during the cultural and historical survey

#	Key characteristics	Value for local and/or national users / stakeholders	Protection and conservation requirements under the national/local laws	Key users/custodians
1	Burial ground of early Iron Age	Site of local significance	Demolition after specialised archaeological survey[1] Execution the national procedure of the exclusion of the surveyed assets from the state list of cultural heritage of local significance.	Culture, Archives and Documentation Administration of Almaty region Archaelogical experts
2	Burial ground of early Iron Age	Site of local significance		
3	Burial ground of early Iron Age	Site of local significance		
4	Burial ground of early Iron Age	Site of local significance		
5	Burial ground of early Iron Age	Site of local significance	Preservation of 50 m protection zone from the boundaries of the objects	Local akimats

[1] Law of the Republic of Kazakhstan of July 2, 1992 No. 1488-XII

"On the protection and use of objects of historical and cultural heritage"

#	Key characteristics	Value for local and/or national users / stakeholders	Protection and conservation requirements under the national/local laws	Key users/custodians
6	Settlement of early Iron Age	Site of local significance	Demolition after specialised archaeological survey[1] Execution the national procedure of the exclusion of the surveyed assets from the state list of cultural heritage of local significance	Culture, Archives and Documentation Administration of Almaty region Archaelogical experts
7	Settlement of Early Modern Period	Site of local significance	Preservation of 50 m protection zone from the boundaries of the objects	Local akimats
8	Settlement of Middle Age	Site of local significance	Demolition after specialised archaeological survey[2] Execution the national procedure of the exclusion of the surveyed assets from the state list of cultural heritage of local significance	Culture, Archives and Documentation Administration of Almaty region Archaelogical experts
9	Burial ground of Early Iron Age	Site of local significance		
10	Burial ground of Early Iron Age	Site of local significance		
11	Burial ground of Early Iron Age	Site of local significance	Observe the protection zones 50 m from the boundaries of the objects	Local akimats
12	Modern cemetary	N/A	Approvement with local authorities for entrance to the cemeteries	Local akimats Relatives of late lamented
13	Burial ground of Early Iron Age	Site of local significance	Demolition after specialised archaeological survey[3] Execution the national procedure of the exclusion of the surveyed assets from the state list of cultural heritage of local significance	Culture, Archives and Documentation Administration of Almaty region Archaelogical experts
14	Burial ground of Early Iron Age	Site of local significance		
15	Settlement of Early Modern Period	Site of local significance		
16	Modern Cemetery to the south of Komsomol settlement		Approvement with local authorities for entrance to the cemeteries	Local akimats Relatives of late lamented

[1] Law of the Republic of Kazakhstan of July 2, 1992 No. 1488-XII

"On the protection and use of objects of historical and cultural heritage"

[2] Law of the Republic of Kazakhstan of July 2, 1992 No. 1488-XII

"On the protection and use of objects of historical and cultural heritage"

[3] Law of the Republic of Kazakhstan of July 2, 1992 No. 1488-XII

"On the protection and use of objects of historical and cultural heritage"

#	Key characteristics	Value for local and/or national users / stakeholders	Protection and conservation requirements under the national/local laws	Key users/custodians
17	Settlement of Early Modern Period	Site of local significance	Demolition after specialised archaelogical survey[1] Execution the national procedure of the exclusion of the surveyed assets from the state list of cultural heritage of local significance	Culture, Archives and Documentation Administration of Almaty region Archaelogical experts
18	Modern Cemetery at the west edge of Otygen Batyr settlement (1)		Approvement with local authorities of entrance to the cemeteries	Local akimats Relatives of late lamented
19	Modern Cemetery at the west edge of Otygen Batyr settlement (2)		Approvement with local authorities of entrance to the cemeteries	Local akimats Relatives of late lamented
20	Settlement of Early Modern Period	Site of local significance	Demolition after specialised archaelogical survey[2] Execution the national procedure of the exclusion of the surveyed assets from the state list of cultural heritage of local significance	Culture, Archives and Documentation Administration of Almaty region Archaelogical experts
21	Modern Cemetery to the north of Almerek settlement		Approvement with local authorities of access to cemeteries	Local akimats Relatives of late lamented
22	Modern moslem Cemetery at the south edge of Kyzyl Tu-2 settlement		Approvement with local authorities of access to cemeteries	Local akimats Relatives of late lamented
23	Cultural historical fund "Almerek"		Approvement with local authorities of protection measures	Private ownership Local akimats
24	Burial ground of Early Iron Age	Site of local significant	Observe the protection zones 50 m from the boundaries of the objects	Local akimats
25	Modern Christian cemetery at the north east edge		Approvement with local authorities of access to the cemeteries	Local akimats Relatives of late lamented

[1] Law of the Republic of Kazakhstan of July 2, 1992 No. 1488-XII

"On the protection and use of objects of historical and cultural heritage"

[2] Law of the Republic of Kazakhstan of July 2, 1992 No. 1488-XII

"On the protection and use of objects of historical and cultural heritage"

#	Key characteristics	Value for local and/or national users / stakeholders	Protection and conservation requirements under the national/local laws	Key users/custodians
	of Almerek settlement			
26	Burial ground of Early Iron Age	Site of local significant	Observe the protection zones 50 m from the boundaries of the objects	Local akimats
27	Modern cemetery		Approvement with local authorities for entrance to the cemeteries	Local akimats Relatives of late lamented people
28	Tuzusay Settlement of Early Iron Age	Site of local significant	Observe the protection zones 50 m from the boundaries of the objects	Local akimats
29	Taldybulak-2 Settlement of Early Iron Age			
30	Burial ground of Early Iron Age	Site of local significance	Demolition after specialised archaelogical survey[1] Execution the national procedure of the exclusion of the surveyed assets from the state list of cultural heritage of local significance	Culture, Archives and Documentation Administration of Almaty region Archaelogical/ experts
31	Settlement of Early Iron Age	Site of local significance		
32	Taldybulak-1 Settlement of Early Iron Age	Site of local significance		
33	Modern moslem cemetery at the east edge of Taldybulak		Approvement with local authorities of access to cemeteries	Local akimats Relatives of late lamented people
34	Burial ground of early Iron Age	Site of local significance	Demolition after specialised archaelogical survey[2] Execution the national procedure of the exclusion of the surveyed assets from the state list of cultural heritage of local significance	Culture, Archives and Documentation Administration of Almaty region Archaelogical/ experts
35	Burial ground of early Iron Age	Site of local significance		
36	"Sacred well spring Almerek"	Site of local significance	Observe the protection zones 50 m from the boundaries of the objects	NGO „Almerek bab kory" Local authorities

Registered Assets within the Project Expropriation Borders

There are several cultural heritage assets in the right of way of BAKAD. They are represented by single burial mounds and burial mounds of the early Iron

[1] Law of the Republic of Kazakhstan of July 2, 1992 No. 1488-XII

"On the protection and use of objects of historical and cultural heritage"

[2] Law of the Republic of Kazakhstan of July 2, 1992 No. 1488-XII

"On the protection and use of objects of historical and cultural heritage"

Age, settlements and estates of the early Iron Age, Middle Ages and Modern times.

The majority of revealed cultural heritage assets (in the form of barrows and burial grounds) in the right of way of BAKAD refers to the period of Saka culture.

Registered Assets outside the Project Expropriation Borders

There are seven registered assets within the 500-metre baseline corridor but outside the expropriation borders. Four of them are classified as the assets of early Iron Age, one refers to the Modern Time and one is registered in archeological and cultural list.

„The sacred well springAlmerek" is also a cultural heritage asset and provides a spiritual and religious values of the affected communities. The well spring is a property of non- governmental fund "Almerek Baba Kory".

Sites Identified by Field Survey

Thirty six (36) cultural heritage assets were identified during the field surveys. Of these, 26 have been identified as archaeological sites, 1 as sacred sites, 9 as a modern cemeteries. Based on the archeological survey all revealed assets were submitted to the State list of historial and cultural sites of local significance, approved by the Culture, Archives and Documentation Administration of Almaty region.

All 19 archaeological assets found in unsafe condition (it means that assets are demolished more than 70% and can not be transferred or saved/restored).

Sensitivity of Identified Cultural Heritage Assets

In total the senistivity of 19 cultural heritage assets were categorised as *'High'* . *These are assets №1, 2, 3, 4, 6, 8, 9, 10, 13, 14, 15, 17, 20, 26, 30, 31, 32, 34, 35.*

In total the senistivity of 7 cultural heritage assets were categorised as *'Medium'* Cultural Heritage. *These are assets №5, 7,11, 24, 27, 28, 29, 34.*

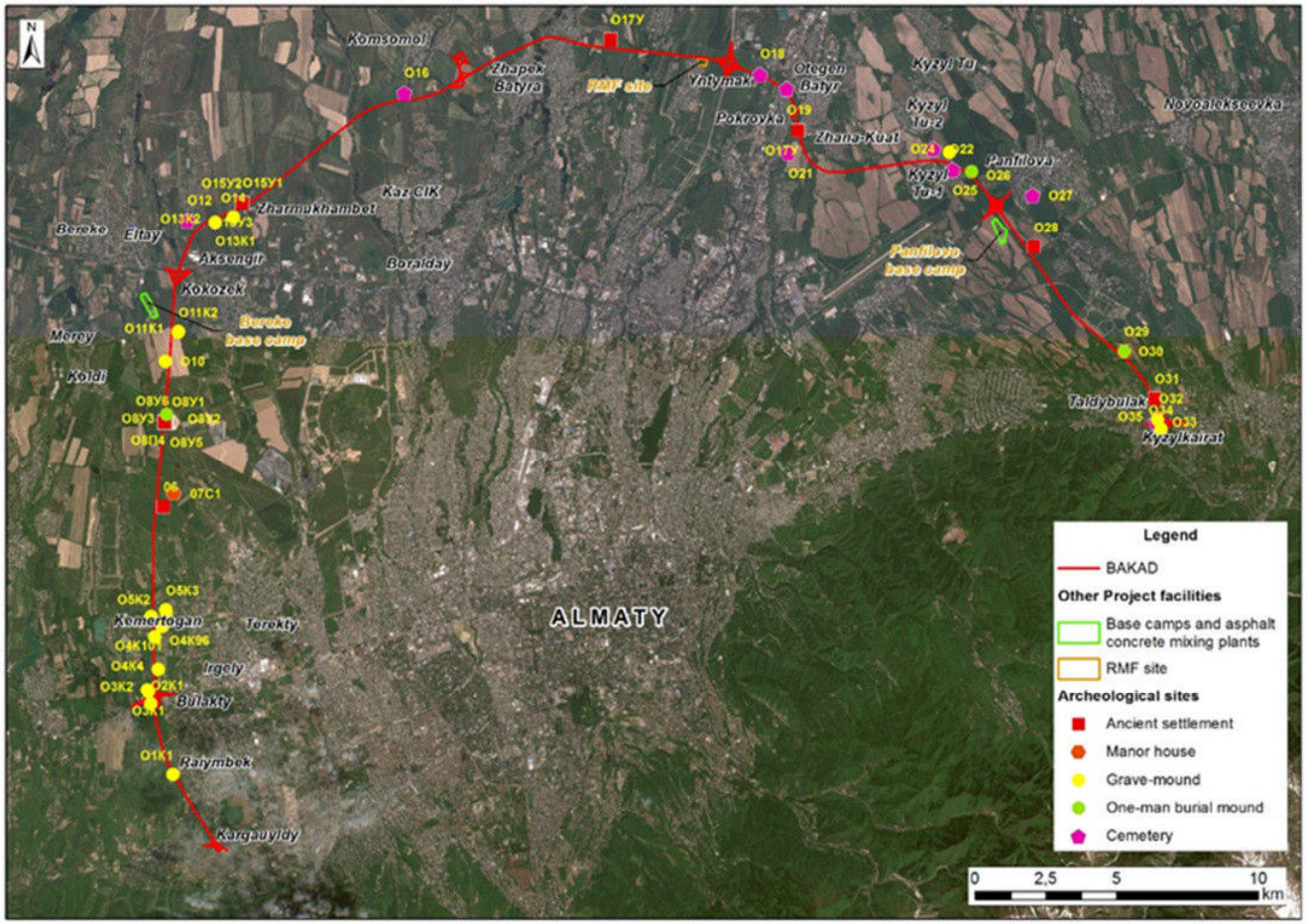


Figure 7.8-1 Location of archaeological and cultural heritage objects according to results of the survey, 2018

The senistivity of the asset called "Sacred well spring Almerek"is categorised as *'High'* .

The senistivity of the remaining 9 identified cemeteries were categorised as *'Medium'*. Cemeteries are located at the edges of follow settlements: Taldybulak, to the north-east of Almerek settlement, Panfilovo, at the south edge of Kyzyl Tu-2, to the north of Almerek settlement, 2 cemeteries at the western edge of Otygen Batyr, Komsomol, at the south-west edge of Isaevo settlement.

7.8.3 Summary of Significant Impacts

Significant impacts are summarised for the construction in *Table 7.8-2* and for operation in *Table 7.8-3.* For the assessment of impacts of minor or negligible significance see *Appendix 3.5* of *Volume III.*

Table 7.8-2 Significant Construction Archaeology and Built Heritage Impacts and Mitigation

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
1	**Complete removal of cultural heritage assets** Critical conditions of cultural heritage assets belong its to the category of reproducible cultural heritage assets. 19 assets are located in the right of way of BAKAD, therefore, it is necessary to carry out salvage excavation of archaeological assets. As the BAKAD operation doesn't have any time limitation, the impact related to loss of cultural heritage assets is considered permanent, local in extent and large in scale due to loss of cultural heritage assets. The Impact Magnitude therefore is considered Large. Responsivity of receptors is considered High due to loss of cultural heritage assets.	**Major** impact on 19 *sites: №1, 2, 3, 4, 6, 8, 9, 10, 13, 14, 15, 17, 20, 26, 30, 31, 32, 34, 35*	No physical intervention is allowed on the identified Cultural Heritage assets prior to a decision taken by the relevant Board.The project needs to enlist a qualified archaeologist or cultural heritage specialist to deliver • induction program to all workers employed by the consortium/contractor/sub-contractors on the Cultural Heritage Management Plan, • conduct regular monitoring over the implementation of chance find procedure and delivery of Cultural Heritage Management Plan. Mitigation measures that should be involved in the Cultural Heritage Management Plan: • Qualified/authoriesed archaeological experts/organization should make request for archaeological investigation of cultural heritage assets in the RoW BAKAD to Culture, Archives and Documentation Administration of Almaty region • Qualified/authoriesed archaeological experts/organization will conduct historical and cultural study and pass the Archaeological Study Report and "Conclusion that cultural sites do not represent a cultural value" to Culture, Archives and Documentation Administration of Almaty region • Based on the Conclusion, Culture, Archives and Documentation Administration of Almaty region provides Letter on the exclusion of the revealed cultural heritage assets (based on the Archaeological Survey Report) from the State list of historial and cultural sites of local significance. • Culture, Archives and Documentation Administration of Almaty region provides Resolution to the Consortium on BAKAD Project construction.	**No impact**
2	**Ensure the observation of the protection zone for cultural heritage assets.**	Major 5, 7, 11, 23, 24,28,29	• In order to ensure the safety of cultural heritage assets during road construction works, it is necessary to observe the protection zones 50 m from the boundaries of the objects.Acoording to the national Law should be conserve to).	**Minor**

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
	The are 7 cultural heritage assets are located in the AoI. As the BAKAD operation doesn't have any time limitation, the impact related to loss of cultural heritage assets is considered permanent, local in extent and large in scale due to loss of cultural heritage assets. The Impact Magnitude therefore is considered Large. Responsivity of receptors is considered Low due to loss of cultural heritage assets.		• The protection zone should be marked with a visible sign at the site It it neccessery to disclose information at the Round II Public consultations about location of cultural heritage assets which should be protected. In addition, for ensuring a good control of the works activities for avoiding affecting cultural heritage items or sites, we recommend the following actions: • *Cultural Heritage Management Plan: A clear and detailed Management Plan* should be developed in conjunction with the relevant authorities and implemented for the project. This will detail how the project manages and mitigates the Cultural Heritage as the scheme progresses, detailing a clear agreed framework for mitigation implementation. The plan will detail the roles and responsibilities of individuals responsible for dealing with known sites and unexpected discoveries during and after construction of the scheme, including clear reporting structures and example scenarios. • Consortium should enlist a qualified archaeologist or cultural heritage specialist to deliver induction program to all workers employed by the Consortium/contractor/sub-contractors on the Cultural Heritage Management Plan. • Qualified specialist should conduct regular monitoring over the implementation of chance find procedure and delivery of Cultural Heritage Management Plan.	
3	**Limitation in access to cemeteries located in AoI** There are 9 cemeteries in use are located in three districts in the AoI.This cultural heritage assets are the objects of interest for local residents. As the BAKAD operation doesn't have any time limitation, the impact related to loss or limitation to cemeteris is considered permanent, local in extent and large in scale due to loss or limitation of cemeteris. The Impact Magnitude therefore is considered Large.	**Major** *Assets № 12, 16, 18, 19, 21, 22, 25, 27, 33*	• Provide enagement activities in cooperation with BAKAD and local authorities due to make a decision on protection municipal cemeteries and preservation of the residental access. • Disclose the information to stakeholders during Round II Public Consultation about mitigation measures.	**No impacts**

No.	Impact Description	Impact Assessment	Mitigation Measures	Residual Impact
	Responsivity of receptors is considered Low due to loss or limitation of acess to cemeteries.			

Table 7.8-3 Significant Operation Cultural Heritage Impacts and Mitigation

No.	Impact Description	Impact Assessment	Mitigation /Enhancement Measures	Residual Impact
1	**Promotion of cultural heritage "Sacred well Spring Almerek"** Cultural heritage "Sacred Holy water Almerek" preserved during construction and operation phase activities could be promoted as during operation phase with users could be encouraged to visit these sites during their piligrim's journey.	**Positive** *Asset №36*	• A catalogue of archaeological assets discovered during the project and delivered to the museums will be prepared, promoted and published. • Development of cultural heritage "Sacred Holy water Almerek" should be provide with engagemnet of local authorities, other stakeholder.	The impact will remain **positive**

7.9 ASSESSMENT OF IMPACTS ON VULNERABLE GROUPS

7.9.1 Introduction

This chapter assesses the potential impacts related to Vulnerable Groups of the settlements located in the vicinity of the BAKAD RoW. The following impact were identified for the Project:

- Pre-Construction and Construction:
  - Land acquisition;
  - Community Cohesion, Nuisance;
  - Noise, dust;
  - Walking accessibility of and vehicle access to social infrastructure facilities
- Operation:
  - Cohesion of settlements;
  - Walking accessibility of and vehicle access to residential areas;
  - Division (fragmentation) of agricultural lands;
  - Disturbance: increase of noise levels and pollution with dust and other emissions.

Table 7.9-1 Significant Construction Impacts Related to Vulnerable groups and Mitigation measures

Impact Description	Impact Magnitude	Vulnerability of Receptors	Recommended Mitigation Measures
CONSTRUCTION			
Land acquisition Vulnerable residents in Kyrgauldy are represented by elderly people, people with low income, large families. Vulnerability of these receptors is assessed as *High*.	Major	High	Measures are provided in Section 7.6 Based on the results of the Risk Assessment mitigations measures shall be developed as outlined in LARF (specifically refer to Entitlements Matrix)
Traffic accidents Children and youths are amongst those vulnerable to physical hazards associated with construction traffic, especially in event of unauthorised entry or in proximity to roadways. Vulnerability of these receptors is *High*. Life and Health of children are absolute priority.	Major	High	Measures are provided in Section 7.6
Cohesion of settlements, nuisance Elderly people, people with chronic diseases and children are living in the following settlements within the SAoI – Kyrgauldy, Rayimbek and Gardening Partnerships, Bulakty, Kemertogan, gardening partnerships of Eltaysky RO, Kaztsik, Komsomol, Tole Bi, Zhapek Batyr, Kokkainar and Mukhametzhana Tuimebayeva Zhanadaur, Intymak, Koyankus, Pokrovka nad Otygen Batyr settlements of Talgarsky districts. Vulnerability is *High.* Receptors will have interruption of walking accessibility and nuisance.	Major	High	See the Section 7.6 Based on the results of Social Risk Assessment Consortium it is recommended to develop the Livehood Restoration Action Plan.
Noise, dust Vulnerable groups of residents of all settlements of SAoI. Based on the impact assessment presented in Section 6.7 the duration of impact is defined as short-term, local in extent however will cause large nuisance for local residents during the construction stage, therefore the Impact Magnitude is *Large*.	Major	High	See the Section 7.6 Develop Grievance procedure for dealing with complaints from citizens and representatives of vulnerable groups about noise issues.

Impact Description	Impact Magnitude	Vulnerability of Receptors	Recommended Mitigation Measures
Vulnerability is *High.* Receptors may already have illness.			
Division (fragmentation) of agricultural lands As the BAKAD operation doesn't have any time limitation the impact related to loss of access to these fields is considered permanent, local in extent and large in scale due to overdrive or entire loss of access. The Impact Magnitude therefore is *Large*. Vulnerability of receptors is *High* since the ability for adaptation to loss or deterioration of access is limited.	Major	High	See the Section 7.6 Based on the results of Social Risk Assessment Consortium it is recommended to develop the Livehood Restoration Action Plan.
OPERATION			
Cohesion of settlements Elderly people, people with chronic diseases and children will have limited access to the social infrastructure facilities in the all settlements within the SAoI. Vulnerability of receptors is *High* due to limitation of the access to the social infrastructure facilities.	High	High	See the Section 7.6 Based on the results of Social Risk Assessment Consortium it is recommended to develop the Livehood Restoration Action Plan.
Walking accessibility of and vehicle access to residential areas Receptors of this impact are elderly people, people with chronic diseases and children in the all settlements within the SAoI. Vulnerability of these receptors is *High.*	Major	High	See the Section 7.6
Division (fragmentation) of agricultural lands Impact addressed in LARF.	Impact addressed in LARF.		
Noise, dust People with chronic illness living in the all settlements within the SAoI.	Medium	High	Installation of noise screens along the road route crossing the settlements (please refer to Section 6.7) Develop Grievance procedure for dealing with complaints from citizens and representatives of vulnerable groups about noise issues.

7.10 LABOR AND WORKING CONDITIONS FOR EMPLOYEES

7.10.1 Introduction

The construction of the BAKAD Project associated with a considerable workforce of whom a large proportion are subcontractor employees working with the EPC-Contractor and other construction companies. This section presents a preliminary assessment of potential concerns relating to labor and working conditions which may arise during the construction and operation of the BAKAD project.

Following list have been identified as potential risks and issues for the Project:

- safe and acceptable physical working conditions including construction and operational H&S and training;
- acceptable standards and management of workers accommodation; and
- arrangements for dealing with worker's grievances.

This preliminary assessment is based on a review of good international practice associated with labor and working conditions and comparison with relevant Kazakh Laws and Regulations and then highlighting potential gaps that may need to be addressed by the Project.

7.10.2 General employment rules in Kazakhstan

The fundamental law in labor relations and labor protection issues is the Labor Code of the Republic of Kazakhstan (amended as of July 21, 2018). The Labor Code establishes requirements on labor relations, duration of working time and rest, guarantee and compensation payments, additional bonuses and guarantees for specific categories of workers.

Below is a summary of the most relevant legal provisions:

- normal duration of working time for a worker should not exceed 40 hours a week;
- limited duration of working time - not longer than 36 hours a week, is established for workers, who are suffering from harmful physical, chemical, biological and other industrial factors within the course of their work;
- overtime work mustn't last for more than two hours a day in general and more than one hour for workers, who are suffering from harmful labor conditions;
- annual main vacation is provided for workers, having duration of 24 days minimum;
- it is prohibited to use women's labor on work sites with unfavourable labor conditions and underground;

- forced labor and discrimination in employment relations are prohibited;
- acceptance for employment is allowed from the age of 16;
- it is prohibited to use labor of people under 18 years on work sites with unfavourable labor conditions, underground and other job that could harm health, safety or morality of this category of workers;
- special clothes, shoes and other personal protection equipment, washing and disinfecting means, milk and other similar food products, medicinal and prophylactic food should be provided for workers free of charge;
- enterprise workers are subject to obligatory insurance against accidents and occupational diseases;
- all employees must undergo preliminary medical examination prior to recruitment and periodical medical examination obligatory for workers who work under harmful and unfavorable conditions;
- companies are obliged to keep records and to investigate the accidents;
- in case a worker lost his working ability completely or partially by the company's fault as a result of industrial accident or occupational disease, the enterprise pays lump-sum allowance and indemnify damage for inflicted health damage.

7.10.3 *BAKAD Employment conditions*

Consortium is legally obliged to comply with the requirements of Kazakh labor laws, which cover the basic principles of international labor standards in the issues of:

- equal treatment of employees;
- avoidance of forced labor;
- ensuring occupational health and safety at the workplaces, etc.

However, at the time of this Report there were significant informational gaps regarding labor and working conditions. Following sections provide analysis of Project against Lender's requirements. Mitigation measures to fulfill gaps is presented in *Section 7.10.4.*

Management of Worker Relationships

There is no information on the Human Resources Policies and Procedures adopted by Consortium at the time of the Report.

Working Conditions and Terms of Employment

There is no information on the working conditions and terms of employment at the time of the Report.

Workers Accommodation

BAKAD employees working at the field will live in an accommodation camps Panfilovo and Bereke. Rooms in the accommodation camps are designed for four persons, size of rooms is 4x4 metres. Toilets and shower cabins are of common use.

General requirements to the living accommodation is described in Alarko Contracting Group Health & Safety Management Plan, developed in November 2015 as a part of Feasibility Study (TEO). These requirements is listed below:

- The accommodation will provide adequate protection against all foreseeable weather conditions; prevent entry to insects or pests.
- The accommodation shall be provided with a finish that can be cleaned easily and shall be maintained in a clean condition.
- The floor shall be concrete if constructed on ground level.
- Purpose built caravans, portal cabins; etc. may be used for accommodation.
- Each sleeping space shall be calculated in accordance to the current legislation.
- There shall be no more than four persons in a room at one time.
- There shall be provided for each occupant a cupboard (locker) for keeping belongings. Hanging of clothes on the wall shall be avoided.
- Mattresses and blankets shall be aired regularly.
- Windows shall, as far as possible, be fixed on opposite sides to provide through ventilation.
- Sufficient natural and artificial lighting shall be provided.
- Sufficient smoking areas shall be set aside.

Panfilovo construction camp

Panfilovo camp is located to south from the Panfilovo settlement between km 56-57 of BAKAD (see *Section 2.3.5*).

Residential area will be located in southern part of the construction camp. There will be a canteen, a mosque, three leisure centers (separated leisure centers for workers, engineers and managers), a gym, a clinic, a barber shop, a laundry, and a market in the Panfilovo camp.

No information about meals organization, medical insurance including insurance against injuries, provision of PPEs, summer and winter safety gear and boots was available at the time of the Report.

At the time of the Report Panfilovo camp was under construction (*Figure 7.10-1*).

Figure 7.10-1 *Pictures from the Panfilovo shift camp under construction (August 2018)*

Bereke shift camp

Bereke camp is located to the west from BAKAD RoW between km 19-20 (see *Section 2.3.5*).

Residential area will be located in southern part of the construction camp. There will be a canteen, a mosque, two leisure centers (separated leisure centers for workers and engineers), a gym, a clinic, a barber shop, a laundry, and a market in the Bereke camp.

No information about meals organization, medical insurance including insurance against injuries, provision of PPEs, summer and winter safety gear and boots was available at the time of the Report.

Workers' Organizations

Due to early phase of the Project implementation there is no workers' organization yet.

Non-discrimination and Equal Opportunity

Labor Code of the Republic of Kazakhstan prohibits sex, race, national, ethnic and social discrimination.

There is no information about hiring procedures at the time of this Report.

Alarko Contracting Group Health & Safety Management Plan, developed in November 2015 as a part of Feasibility Study (TEO) states that there should be no discrimination or stigmatization of workers on the basis of real or perceived HIV status.

Retrenchment

No retrenchment is expected due to Project implementation. The construction will involve workers on a contractual basis with a fixed time of work. The nature of a Project doesn't intend to create significant number of jobs, so no collective large-scaled dismissals is expected.

Grievance Mechanism

The Consortium is establishing the internal Grievance Mechanism at the time of the Report.

Child Labor

The Labor Code of the Republic of Kazakhstan states that acceptance for employment is allowed from the age of 16 and employment people under 18 years for works with unfavourable labor conditions, etc. is prohibited and child labour will not be an issue.

Forced Labor

There is no information on a forced labor, however it is not expected during Project implementation as the Kazakh legislation prohibits forced labor.

Occupational Health and Safety

Alarko Contracting Group Health & Safety Policy was developed for the Project as a part of Feasibility Study (TEO) dated November, 2015. H&S Policy states that Occupational Health & Safety (OHS) as a corporate value and a basic human right and H&S in all fields and activities is the top priority of the Project.

Health & Safety Management Plan was also developed as a part of Feasibility Study (TEO) to identify H&S risks and settle the actions to be taken and the technologies to be used during works, in compliance with the provisions of the national, community and international legislation, so that the negative effects upon the H&S to be avoided and eliminated, or at least, diminished as much as possible.

The Big Almaty Ring Road Project Occupational Health and Safety Risk Assessments are carried out in accordance with Contractor Risk Assessment Procedure and Contract Requirements. All hazards are recorded on Hazard Log & Risk Register Form.

Employees are provided with PPEs to match the environment and conditions they work in. Personnel will undergo regular preliminary and periodic medical examinations.

7.10.4 *Mitigation measures*

There are significant informational gaps within the labor and working condition of the Project.

To comply with Lender's Requirements following mitigation measures were identified.

Management of worker relationships

It is required to adopt and implement human resources policies and procedures, which will set out Consortium approach to managing workers consistent with the Lender's requirements and laws of Kazakhstan.

This documents as well documented information that is clear and understandable, regarding workers' rights under national labor and employment law and any applicable collective agreements should be provided to workers.

Working Conditions and Terms of Employment

The Consortium should provide reasonable working conditions and terms of employment, including wages and benefits; wage deductions; hours of work; overtime arrangements and overtime compensation; breaks; rest days; and leave for illness, etc.

Migrant workers should be treated as other non-migrant workers carrying out similar work.

Workers Accommodation

In addition to requirement for worker accommodation, developed as a part of Feasibility Study in 2015 it is recommended to check accommodation camps against *IFC's and EBRD's Guidelines on workers' accommodation: processes and standards, 2009*. As prescribed in the Guidelines, it is recommended that Consortium conduct regular (at least once per quarter) inspections of camps, followed by inspection reports and corrective actions.

Workers' Organizations

It is required BAKAD employees will be aware of the opportunity to create a union and the Consortium's Management will build no obstacles against it.

Non-discrimination and Equal Opportunity

Labor Code of the Republic of Kazakhstan prohibits sex, race, national, ethnic and social discrimination.

It is required that Consortium will apply the principles of non-discrimination to workers regardless of personal characteristics unrelated to inherent job requirements.

Retrenchment

No additional measures are required.

Grievance Mechanism

Consortium shall provide workers (and their organizations, where they exists) with effective grievance mechanism.

This mechanism should involve an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned, without any retribution. The mechanism should also allow for anonymous complaints to be raised and addressed. The mechanism should not impede access to other judicial or administrative remedies that might be available under the law or through existing arbitration procedures, or substitute for grievance mechanisms provided through collective agreements.

Child Labor

No child labor should be used during Project implementation if it is economically exploitative, or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

Forced Labor

No forced labor should be used during Project implementation.

Occupational Health and Safety

Overall the H&S conditions provided by Consortium are in compliance with both national and international standards and requirement. Numerous measures (Embedded Measures) are already being undertaken by Consortium as part of its Feasibility Study.

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