Initial Environmental Examination

Project Number: 48424-002
October 2015

KAZ: CAREC Corridors 1 and 6 Connector Road (Aktobe–Makat) Improvement Road

Prepared by the Ministry of Investments and Development, Republic of Kazakhstan for the Asian Development Bank.

«ҚАЗАҚСТАН РЕСПУБЛИКАСЫ ИНВЕСТИЦИЯЛАР ЖӘНЕ ДАМУ МИНИСТРЛІГІНІҢ АВТОМОБИЛЬ ЖОЛДАРЫ КОМИТЕТІ» РЕСПУБЛИКАЛЫҚ МЕМЛЕКЕТТІК МЕКЕМЕСІ

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Asian Development Bank

Regarding publication of RAP and IEE at the website

Herewith Committee for Roads of the Ministry for Investment and Development of the Republic of Kazakhstan sends the documents agreed with the Bank and approved by the Committee – “Land acquisition and resettlement Framework” and “Initial Environmental Examination” on project “Aktobe – Makat” for publication at ADB website.

Appendixes: *RAP and IEE.*

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№ 23-23-09/2814
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Азиатский Банк Развития

Касательно размещения на сайте ППЗП и ПЭО

Комитет автомобильных дорог Министерства по инвестициям и развитию Республики Казахстан направляет согласованные с Банком утвержденные Комитетом документы – «План выкупа земель и переселения» и «Предварительная оценка воздействия на окружающую среду» по проекту «Актобе-Макат» для размещения на сайте АБР.

Приложение: *ППЗП и ПЭО.*

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Table of Contents

List of Figures

List of Tables

List Of Appendices

Abbreviations and Acronyms

ADB	Asian Development Bank
AUA	Atyrau – Uralsk – Aktobe Road
Akimat	Town Mayor Office
BAP	Borrow Pit Action Plan
CAREC	Central Asia Regional Economic Cooperation Program
CL	Center Line (of carriageway)
CFW	Committee for Forestry and Wildlife
CoR	Roads Committee of the Ministry of Investments & Development
CO	Carbon monoxide
CO2	Carbon Dioxide
CWR	Committee for Water Resources
dBA	decibel
DOE	Department of Environment (Oblast level)
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EBRD	European Bank for Reconstruction and Development
EC	Environmental Code
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EO	Environment Officer
ERP	Emergency Response Plan
ES	Executive Summary
FS	Feasibility Study
GoK	Government of Kazakhstan
GLOF	Glacial Lake Outburst Floods
GOST	Technical Standard
GRC	Grievance Redress Committees
GRM	Grievance Redress Mechanism
Ha	Hectare
HC	Hydrocarbons
HSP	Health and Safety Plan
IBA	Important Bird Area
IFI	International Financing Institution
IEE	Initial Environmental Examination
IsDB	Islamic Development Bank
IUCN	International Union for the Conservation of Nature
JICA	Japan International Cooperation Agency
km	Kilometer
Km^2	Square kilometer
KAZ-Atyrau	KazAvtoZhol Atyrau
KAZ-Aktobe	KazAvtoZhol Aktobe
LARP	Land Acquisition and Resettlement Plan
M	Meter
M^2	Square meter
M^3	Cubic Meter
MAC	Maximum Allowable Concentrations
MPE	Maximum Permissible Emission
MPD	Maximum Permissible Discharges
MFF	Multi-tranche Financing Facility
MoA	Ministry of Agriculture
MoE	Ministry of Energy
MoHSD	Ministry of Health and Social Development

MID	Ministry of Investments & Development
NGO	Non-Governmental Organization
NOx	Nitrogen oxides
Oblast	Province
Okrug	District
OM	Operational Manual (of ADB)
OVOS	Kazakh EIA
PAH	Polycyclic aromatic hydrocarbons
Pb	Lead
PC	Public Consultation
PCR	Physical and Cultural Resources
PEIA	Preliminary Environmental Assessment
PM	Particulate matter
PMU	Project Managing Unit
PPE	Personal Protective Clothing
PPTA	Project Preparatory Technical Assistance (Concept Paper)
Rayon	District
RoW	Right of Way
SanPiN	Sanitary Regulations and Standards
SES	Sanitary and Epidemiological Services of MoHSD
SNiP	Construction Standards
STD	Sexually transmitted diseases (such as HIV/AIDS)
SSEMP	Site Specific Management Plan
SO2	Sulphur Dioxide
TEPO	Territorial Environmental Protection Offices
ToR	Terms of Reference
TSP	Total Suspended Particulates
USAID	United States Agency for International Development
USD	United States Dollar
WB	World Bank
WE-WC	Western Europe - Western China
WHO	World Health Organization
WKTC	Western Kazakhstan Transport Corridor
WMP	Waste Management Plan
°C	Degrees Celsius

Currency Exchange Rates as of 05 October 2015:
1 US$ = 271 KZT (Kazakhstan Tenge)
($ refers in this report to US-Dollars)

Executive Summary

1. Introduction

1. This initial environmental examination (IEE) is part of the process of compliance with the ADB guidelines in relation to the CAREC Corridors 1 & 6 Connector Road (Aktobe-Makat) Improvement Project.

2. The IEE provides a road map to the environmental measures needed to prevent and/or mitigate negative environmental effects associated with the development project. The IEE provides a detailed description of the direct and indirect environmental effects associated with the proposed subproject during key periods of work. The IEE:

- Describes the extent, duration and severity of the impacts;
- Analyzes all potential impacts, both positive and negative;
- Formulates the mitigation actions and presents it all in the form of an Environmental Management Plan (EMP).

3. Based on the existing ADB Environmental Safeguards Policy (2009), this Project falls under ADB's project **Category B**.

2. Description of the Project

4. The existing Aktobe-Makat road is a two-lane, category III/IV republican road constructed about 30 years ago and connects the oil and mineral-rich provinces of Aktobe and Atyrau, where approximately 1.7 million people live. It is part of the Trans-Caspian sea Transit Corridor (Baku-Astrakhan-Atyrau-Aktobe-Aktau-Turkmen border) which connects Kazakhstan with Azerbaijan and Europe in the West, with Russia in the North, and with Turkmenistan in the South. It also connects the Central Asia Regional Economic Cooperation (CAREC) Corridors 1b and 6b at Aktobe and Makat respectively, providing further access to China and South East Asia. As a result of neglected and improper maintenance, the deteriorated road pavement as well as bridges and culverts are barely able to cope with the rapidly rising and heavy traffic loads generated by the oil wells and refineries in the region. Road safety hazards are a direct result of these conditions.

5. 473 km of the national highway A-27 between Aktobe and Makat will be rehabilitated in seven sub-sections, four of which will be funded by the ADB under this Project (299 km) with the remaining three sections funded by the Government of the Republic of Kazakhstan (GoK) and the Islamic Development Bank (IsDB) as follows:

Sub-section	Oblast	Chainage (km)	Funding Agency
1	Aktobe	11-160	IsDB
2	**Aktobe**	**160-220**	**ADB**
3	Aktobe	220-236	GoK
4	**Aktobe**	**236-330**	**ADB**
5	**Atyrau**	**330-458**	**ADB**
6	Atyrau	458-468	GoK
7	**Atyrau**	**487-504**	**ADB**

*Between km 468 and 487 rehabilitation works have been ongoing since 2009. This 19km portion of the road (Category III) will not form part of the Project

6. The IEE herewith focuses on the four sub-sections funded by the ADB. Separate environmental assessments have been prepared by the GoK for their portion of the Project

(Sub-sections 3 & 6). Likewise, IsDB are preparing an environmental assessment for Sub-section 1.

Figure ES-1: Project Location

Source: http://www.nationsonline.org/oneworld/map/kazakhstan-administrative-map.htm

7. Basic elements of the road design include:

- The reconstruction of the road will follow the existing road alignment, with the exception of realignments at Bayganin [1] (necessary to accommodate a bridge over the adjacent railway) and Shubarkaduk (8km bypass north of the town).
- The road will have a carriageway width of 7.5 m (2 x 3.75 m lanes) with two 3 m shoulders.
- Design speeds of 120 km/h will be adopted for flat and undulated terrain and 60 km/h for urban areas.
- Bridges and culverts will be reconstructed or rehabilitated.
- Traffic safety features such as lighting, pedestrian crossings, road signs, road marking will also be incorporated.

3. Existing Conditions

8. Climate and Air Quality - The Aktobe section of the project area is located in dry and desertified steppe. Temperatures vary widely during the year from highs of 46°C in July to minus 48°C in January. Precipitation ranges between 150-350 mm and mainly falls in the summer. The Atyrau section of the Project area locates in the desert and semi desert zone characterized by hot summers and cold winters. The mean annual temperature in the Atyrau region is 8.9°C. Precipitation is low throughout the year and averages 77 mm during

[1] Bayganin is also known as Karaurakeldy, but will be referred to as Bayganin in this report.

November-March and 113 mm during April-October. There are no stationary sources of air pollution within Project Corridor. However due to the poor condition of the Project Road high levels of dust are created by the movement of cars and trucks along the road. This can be a particular nuisance in the villages through which the road passes.

9. Topography & Soils - The entire road lies in gentle terrain represented by undulating flatlands with elevation between 200-260 meters. Soils mainly consist of light brown dry steppe soil types in Aktobe. Salt crusts often appear at the soil surfaces. In Atyrau soils are largely represented by semi-desert brown soils covered with with semi-desert vegetation.

10. Hydrology – All four rivers in the Aktobe section have continuous river flow all year round. These rivers are expected to be sources for technical water during construction works. In Atyrau the road crosses two rivers, Sagiz and Nogaity. Groundwater tables are mostly deep, and quality is poor due to salt intrusion.

11. Flora - The project area contains vegetation typical for desert and dry steppe areas like feather grass, sheep fescue and Artemisia. No special status flora was noted within the Project corridor.

12. Fauna - Wildlife along the Aktobe portion of the road is typical for a steppe-desert ecosystem. Among mammals, the most common species are rodents such as ground squirrels, hamsters, voles, rabbits, and jerboa. In the past, when Saiga Antelope (classified by the IUCN as critically endangered) was abundant in the steppe, its Ustyurt population stretched up to the Aktobe region and there were migratory corridors in the Aktobe section of the Project. However, according to the Aktobe Oblast Territorial Inspection for Forestry and Wildlife there was a significant decline of the Saiga population in the 1990s, and the government annual census has not registered Saiga in the Project area since. In addition, recent studies of Saiga Antelope in Kazakhstan by USAID and Flora and Fauna International did not indicate the presence of the animal within the Project Area. An important bird area (IBA) has been identified a few kilometers north west of Sagiz in Atyrau Oblast. In June 2006, 62 bird species were observed in the area and five of those species are included in the Red Data Book of Kazakhstan – Steppe Eagle, Demoiselle Crane, Little Bustard, Pallas's Sandgrouse and Black-bellied Sandgrouse.

13. Protected Areas - No protected areas are present within the vicinity of the Project road. Some poorly managed woodlands (KAZAK managed) were observed between km 160 and km 180, although these were located outside of the RoW and are unlikely to be impacted.

14. Noise – Current noise levels are low in the Project corridor due to limited traffic movement, and scarcity of industry or urban areas.

15. Socio-economic Conditions - Aktobe oblast has a unique mineral resource base, however, none are located within the immediate Project corridor. Atyrau region is the oldest oil and gas-producing region of Kazakhstan with 62 out of 250 oil fields located in the Atyrau region. Oil fields were noted within the vicinity of the Project road at km 374, but not within the right of way (RoW). Agricultural land-uses are limited in the entire road corridor due to the harsh environmental conditions and the general lack of suitable water for irrigation. Agricultural cropland is nowhere recorded or visible along the entire road. The prevailing land-use in the Project area is cattle grazing (mostly horse and sheep grazing).

16. Aktobe oblast is the second largest oblast in Kazakhstan (after Karaganda oblast) occupying 300,600 km^2, or 11% of the country's territory. Total population of the Aktobe oblast was estimated at 822,522 (January 1, 2015). Atyrau oblast occupies an area of

118,631 km^2. Total population of the Atyrau oblast was estimated at 581,473 (January 1, 2015). Several schools and health clinics were noted in villages within the Project corridor, none of which were within 50 meters of the Project Road. According to the 2009 Census, 70% of the population is Muslim, 26% Christian, 0.1% Buddhists, 0.2% others (mostly Jews), and 3% Irreligious. No physical or cultural resources of note were identified in the Project corridor with the exception of several cemeteries, one of which was located almost adjacent to the Project road at km 374.

4. Alternatives

17. Several alternatives have been assessed as part of the EIA, including:

1. "No Project" Alternative - This alternative has been ruled out on the basis that good road connectivity is the key to economic development and reduction of poverty. A "No-Project" alternative would therefore be regarded as counter-productive to such goals.
2. Alternative Transport Modes - The road corridor runs parallel to an existing rail line for much of its extent. The rail line connects Aktau and Atyrau with Aktobe and other areas of Kazakhstan. This railway, although mostly single track, is capable of handling large freight and passenger trains, and is being further upgraded. However, the railway is considered necessary as part of a mix of transport modes, with rail promoted as the preferred mode for longer distance, containerized and bulk commodities, as this represents the most environmental and efficient mode of transport. On the other hand, the Project road is promoted for the local and regional movement of people and goods. Accordingly, the railway is not considered an alternative to the Project but as an additional component of the country wide transport network.
3. Alternative Alignments – Two potential changes in the existing alignment have been proposed as part of the project design. The first relates to a change in alignment close to the village of Bayganin to accommodate a bridge crossing of the existing railway line. The second relates to an 8 km bypass north of the town of Shubarkaduk Town. No significant environmental impacts are anticipated from these changes in alignment. However, land acquisition and resettlement will be required to accommodate the changes. A Land Acquisition and Resettlement Plan (LARP) has been prepared for the Project and addresses these specific alignment issues.
4. Alternative Route - Current estimates assume that a maximum of 260 vehicles per day[2] are using the Atyrau – Uralsk – Aktobe (AUA) roads as an alternative to the Project road primarily due to the current poor condition of the Project road. Accordingly, the AUA road could be considered an alternative option to the rehabilitation of the Project road. However, two main issues exist with this alternative, firstly travel time and cost. Using the AUA road would take more than double the time of a rehabilitated Project road and also incur more vehicle related costs, such as fuel and, over time, maintenance costs. Secondly, the AUA alternative would result in similar negative impacts for the Project road and the population it serves as those associated with the 'no action' alternative. Accordingly this alternative, although currently considered a viable alternative to the Project road in its current condition, would not be a viable alternative to the rehabilitated Project road.

5. Impact Identification

18. In general, the ecological conditions along the alignment give little reason for concerns of becoming potentially damaged by the foreseen Project activities. The terrain

[2] Initial Project Preparatory Report of Traffic Data for "Reconstruction of Road "Aktobe-Atyrau-border of the Russian Federation (to Astrakhan)" "Aktobe-Makat" road section, 160 - 468 km June, 2015

adjacent to the road alignment is semi-desert, desert and steppe, often with only sparse vegetation due to the high salt content of the soil and absence of sufficient rainfall. In addition, items of significant archaeological and historical importance do not appear within the RoW (with the exception of the aforementioned cemetery). Accordingly, the IEE established that there were no significant environmental issues that could not be either prevented or adequately mitigated to levels acceptable Kazakh and international standards. A complete EMP has been prepared with tables listing mitigative measures and monitoring actions to be undertaken during the feasibility / design, construction and operating period of the project.

19. The following provides a summary of the potential impacts associated with the Aktobe - Makat Road:

Feasibility / Design Phase

- Erosion – Inadequate design of road structures, such as drainage, could lead to increased soil erosion within the Project Area. This may lead to degradation of productive lands and potential damage to the road itself. However, due to the relatively flat topography of the project corridor and the lack of agricultural land, this impact is likely to be limited.
- Resettlement – Two changes in the road alignment will occur, at Karauylkeldy and Shubarkaduk. As noted above, no significant environmental impacts are anticipated from these changes in alignment. However, land acquisition and resettlement will be required to accommodate the changes.
- Livestock – Pastureland is a main land use in the Project area. Herds of livestock are often noted crossing the road. Suitable passages need to be provided to limit accidents involving vehicles and livestock.
- Health and Safety – Increased traffic often leads to increased numbers of accidents. Accordingly, designs need to ensure the road incorporates safety measures to reduce accidents.

Construction Phase

- Siting of facilities – Improper siting of construction camps, borrow pits, quarries, temporary storage sites, etc, could have negative impacts to:
    - Water quality (surface and ground water pollution);
    - Soils (contamination from spills and leaks); and
    - Local residents (in terms of social issues such as increased noise levels, traffic accidents, spread of STD's, etc).
- Dust and Emissions – Movement and operation of construction vehicles and machinery will result in short term, elevated concentrations of dust and emissions. Due to the sparsely populated nature of the Project road, the impact to human health from poor air quality is likely to be low, except for sections passing adjacent to the villages and towns located in the Project corridor where impacts can be of greater significance if mitigation measures are not enforced.
- Water Quality – Poor storage of liquid waste / hazardous liquids could lead to spills and leaks which will have negative impacts to both surface and groundwater quality.
- Water Use – A significant quantity of technical and potable water is required for the construction phase of the road. Un-controlled exploitation of water resources could impact upon existing water users by depleting their supplies.
- Fauna (Birds) – The IBA is located more than 2 km north west of the Project road with no direct access road. This habitat (the presence of which was only revealed by an internet search and not by the CWF of Atyrau and Aktobe, which would lead one to believe this site is not particularly well known or advertised) is therefore unlikely to be significantly impacted directly by Project activities during both the construction and operational

phases of the Project. However, it is possible that poaching of rare and endangered bird species could occur by construction workers of facilities are sited too close to the IBA.

- Fauna (Saiga Antelope) - Consultations with the Aktobe Oblast Territorial Inspection for Wildlife and Forestry and review of recent literature on the subject indicated that Saiga Antelope are not present within the Project area. The Territorial Inspection did suggest that Saiga could potentially migrate to through the Project corridor in the future if there numbers increase. If they do return, it is likely to be in relatively small numbers at first, and they are unlikely to be impacted by construction works which are scheduled to commence within the next 12 months. However, in the longer term, any increased numbers of migrating Saiga in the operational period of the project could result in increased mortality as the antelope attempt to cross an increasingly busy road.
- Infrastructure – Working within villages in the Project corridor may necessitate the removal (temporarily) of utilities, including electricity, water supply and gas supply. This can create social tensions if potential disruptions are not discussed with locals and alternative measures are not provided.
- Physical and Cultural Resources – No physical and cultural resources were noted in the Project corridor with the exception of one graveyard within 20 meters of the Project road. It is, however, possible that chance finds could occur.
- Noise – Operation of construction vehicles and machinery can lead to elevated levels of noise within residential areas.
- Waste – Camps and worksites will generate a large volume of inert and to a lesser extent, hazardous waste. Poor storage and disposal methods can lead to pollution incidents. The project will also involve the removal of substantial amounts of bituminous surfacing. Whilst it may be possible to recycle a proportion of this material, it is likely that substantial amounts of material, including bituminous waste, will need to be dumped, probably close to the existing road.
- Health and Safety – The potential exists for health and safety impacts (e.g. traffic accidents) to villagers and school children living and working within the construction areas. In addition, due to the nature and scale of the Project, the possibility of accidents involving construction workers is high if they do not receive adequate training or have appropriate equipment for their jobs.

20. It should be noted that the project will result in a number of positive environmental impacts including (i) improvement of air quality by reducing dust development and vehicular emissions, (ii) reducing journey times to facilities such as schools and hospitals, and (iii) decreasing road safety risks by substantially improving the road conditions.

6. Mitigation Actions

21. The summary mitigation measures for the potential impacts identified above for the Aktobe - Makat Road includes:

Feasibility / Design Phase

- Re-alignment Related Resettlement – A Land Acquisition and Resettlement Plan (LARP) will be prepared by the Ministry of Investment and Developments (MID) through their Committee of Roads (CoR) according to ADB requirements on resettlement.
- Erosion – Recommendations are made within the IEE to mitigate potential erosion impacts through suitable design of drainage structures and embankments.
- Livestock – Consultations with village representatives have identified the required locations for livestock underpasses within the Project corridor.
- Health and Safety – Prior to construction a traffic management plan will be prepared by the Contractor which shall describe procedures such to limit the potential for accidents during the project. The Project road design will also include safety measures for the operational period of the project such as safety barriers, warning signs, etc.

Construction Phase

- Siting of facilities – The Contractor shall be responsible for ensuring that all of his construction facilities are sited according to the requirements of the EMP, that means ensuring that they are sited away from sensitive sites (including the IBA close to Sagiz) and that they do not pollute water courses or soils. The Engineer shall be responsible for reviewing and approving all of the Contractors proposed facility locations.
- Dust and Emissions – More than 90% of the Project road is located in uninhabited desert and steppe. As such impacts from dust and emissions will be limited to the few settlements dotted along the Project corridor. Proper control, siting and maintenance of equipment shall mitigate emissions impacts to these areas. Spraying of roads with water during dry periods and covering of friable materials will also help prevent dust impacts within urban areas.
- Water Quality – Proper siting and management of facilities as per the recommendations of the IEE will prevent impacts to water quality. Accidental spills could occur and provisions are recommended in the EMP to manage such accidents.
- Water Use – Potential water resources have been identified for construction phase. The Contractor shall ensure that prior to the commencement of construction that all licenses, permits and agreements are in place for the extraction of water from the identified sources or any other newly identified sources.
- Infrastructure – The Contractor shall ensure that the temporary removal or relocation of utilities is coordinated with the relevant utility and the local community. Coordination with local communities on such issues will be through monthly community meetings between the Contractor, the Engineer and members of the public.
- Physical and Cultural Resources – Prior to the commencement of works the Contractor shall place temporary fencing around the cemetery at km 374 to ensure that construction activities do not impact upon this area. The EMP provides a procedure for chance finds.
- Noise – Noise impacts will be limited to the periods of work in settlements and also within construction camps (e.g. around rock crushing plant). Noise levels from construction equipment and vehicles can be reduced by introducing activity time constraints, ensuring proper siting and maintenance of equipment and provision of personal protective equipment (PPE).
- Waste and Spoil – Waste disposal activities shall be coordinated with territorial environmental protection offices (TEPOs) to ensure that all construction waste is disposed of at suitable locations, this will include consultations between TEPOs, the Engineer and Contractor to ensure adequate disposal of any spoil material. Regarding Asphalt, the Project Designers should assess the feasibility of recycling the waste asphalt for other projects in the region and make recommendations to the Contractor accordingly.
- Health and Safety – Health and safety plans, training and HIV/AIDS awareness programs will be provided by the Contractor. In addition he shall prepare traffic management plans to reduce potential impacts to villagers during construction periods.

Operational Phase

- Fauna – Despite the fact that no Saiga Antelope have been recorded in the Project area, the Aktobe Oblast Territorial Inspection for Forestry & Wildlife indicated that is a possibility, however remote, that Saiga could return to the Project area during the operational period of the Project. The potential migration routes of the Saiga within the Project corridor are not known and studies would have to be undertaken by Saiga specialists to estimate any potential routes that they may take in the future. It is understood that Saiga would not use underpasses and would therefore not be able to utilize the planned cattle underpasses (which anyway, are located within the close proximity of urban settlements which would most likely be avoided by the Saiga). That

would leave two potential mitigation options which have both been identified by recent studies on the subject:

1. Overpasses – Overpasses are effective, but costly. For example a total of 2 overpasses costing $2.5 million each were built along a 21 kilometer section of a highway corridor in Wyoming. Pronghorn antelope were quick to utilize the overpasses but were reluctant to use underpasses that were also built at part of the project.
2. Crossing at Grade - Observations of Saiga crossing a road and railway several decades ago in the Betpak-Dala region of Kazakhstan suggest that Saiga are wary of these corridors and gather for periods of up to several days before finally crossing en masse. According to recent studies long segments of road which have tall embankments may prevent Saiga from continuing their migration unless they are motivated enough to continue alongside until the embankment is low enough to cross. Accordingly, crossing at grade (resembling a vehicle crossing at grade) is considered a potential option for the future. However, it should be noted that the Aktobe – Atyrau – Aktau railway is located to the south of the Project road in Aktobe. This means that Saiga antelope migrating from the south still have to cross the railway before they get to the road. The railway embankment is more than two meters high along much of its extent, this severely limits the migration route of the Saiga even before it can reach the Project road.

Given that Saiga are no longer migrating within the Project corridor and the fact that the existing railway is a considerable barrier to their migration northwards prior to reaching the Project road it is considered unlikely that Saiga would return to the Project area in the short term. Although outside the scope of this Project, monitoring of the longer term situation should be undertaken by the Aktobe Oblast Territorial Inspection for Forestry and Wildlife to assess if this situation changes and where the new mitigation routes are. If the situation does change and Saiga start migrating further north over the railway and towards the road the responsible government agency in coordination with the Aktobe Oblast Territorial Inspection should consider establishing at grade crossings at locations identified by the Territorial Inspection.

7. Monitoring Actions

22. To ensure that all of the above mitigation actions are completed according to the requirements of the EMP, monitoring shall be undertaken of Project works by the Engineer and by independent monitoring specialists. Specifically both observational monitoring and instrumental monitoring shall be undertaken on the Aktobe - Makat Road as follows:

- Instrumental Monitoring – This shall be completed by independent specialists and will include air quality monitoring during the pre-construction and construction phases and noise monitoring during the construction phase. Schedules, parameters, locations are indicated by the Project EMP and shall be adopted by the Contractors SSEMP.
- Observational Monitoring – The Contractors actions shall be continually monitored by the Engineer throughout the Projects Construction phase. This will be achieved through weekly inspections of the Contractors environmental performance by national and international environmental specialists engaged by the Engineer throughout the construction period. The Engineer shall have the right to suspend works or payments if the Contractor is in violation of any of his obligations under the EMP and this IEE.

8. Consultations

23. Stakeholder consultations were undertaken in April, 2015 (Atyrau), August, 2015 (Aktobe) and again in Atyrau in September 2015 (to account for the change in funding of Sub-section 6 from GoK to ADB). The consultations with villagers, local officials and

government representatives in both Atyrau and Aktobe Oblasts did not reveal any environmental impacts that could not be mitigated by this IEE. In addition, consultations with the TEPOs at Atyrau and Aktobe did not reveal any specific environmental issues that would result from Project works.

9. Implementation

24. The EMP, its mitigation and monitoring programs, contained herewith shall be included within the Project Bidding documents for project works. The Bid documents state that the Contractor shall be responsible for the implementation of the requirements of the EMP through his own Site Specific Environmental Management Plan which will adopt all of the conditions of the EMP and add site specific elements that are not currently known, such as the Contractors final list of borrow pit locations. This ensures that all potential bidders are aware of the environmental requirements of the Project and its associated environmental costs.

25. The EMP and all its requirements will then be added to the Contractors Contract, thereby making implementation of the EMP a legal requirement according to the Contract. He shall then prepare his SSEMP which will be approved and monitored by the Engineer. Should the Engineer note any non-conformance with the SSEMP the Contractor can be held liable for breach of the contractual obligations of the EMP. To ensure compliance with the SSEMP the Contractor should employ a national environmental specialist to monitor and report Project activities throughout the Project Construction phase.

A. Introduction

A.1 Purpose of the report

26. This initial environmental examination (IEE) is part of the process of compliance with the ADB's Safeguard Policy Statement in relation to the CAREC Corridors 1 & 6 Connector Road (Aktobe-Makat) Improvement Project.

27. The IEE provides a road map to the environmental measures needed to prevent and/or mitigate negative environmental effects associated with the development project. The IEE also provides a detailed description of the direct and indirect environmental effects associated with the proposed subproject during key periods of work.

28. More specifically, the IEE:

- Describes the extent, duration and severity of the impacts;
- Analyzes all significant impacts;
- Formulates the mitigation actions and presents it all in the form of an Environmental Management Plan (EMP).

A.2 Identification of the Project and Project Proponent

29. The proponent for this Project is the Government of Kazakhstan (GoK) acting through its Ministry of Investments and Development (MID). The Implementing Agency (IA) is the and its Committee of Roads (CoR) who are supported regionally by the roads agencies KazAvtoZhol Atyrau (KAZ-Atyrau) and KazAvtoZhol Aktobe (KAZ-Aktobe).

30. The MID has developed the Project within the framework of the Central Asia Regional Economic Cooperation (CAREC) Investment Program.

A.3 The Nature, Size, Location and Importance of the Project

31. The Project activities funded by the ADB will comprise upgrading of 299 km of four sub-sections of the national highway A-27 between Aktobe and Makat (see **Figure ES-1**). Located within a steppe-desert environment, the project will be confined within the right-of-way with the exception of approximately 14km of bypasses around the town of Shubarkaduk and a realignment to incorporate a rail crossing at Bayganin. The proposed Project will enhance regional cooperation and inclusive economic growth in Kazakhstan, particularly in the Atyrau and Aktobe provinces and will improve quality and efficiency of road transport service.

A.4 IEE Boundaries

32. For purposes of establishing the environmental conditions, the overview of regional data is followed by the description at the project level if data is available. This IEE covers the entire length of the Project Road funded by the ADB (299 km). For purposes of this impact assessment, an envelope of 200 meters wide on each side of the project road over its entire length is identified as the primary impact area ("Project Area" or "Project Corridor"). This distance takes into account the common impacts associated with road works such as noise, dust and emissions. However, the project impact area maybe widened depending on conditions on the ground and with regard to specific construction sites outside of the right of way (RoW – the Project road RoW is 50 meters), e.g. borrow pits and quarries. The road sections where sensitive receptors are present, such as schools, hospitals or other places

where people congregate are given particular attention so that ample mitigation is formulated. For road sections that cross rivers, the impact assessment is expanded to cover the identified continuous extent of any ecologically important habitats / features along the Project Corridor. **Table A-1** indicates the assessment boundaries adopted for the IEE.

Table A-1: Assessment Boundaries adopted for this IEE

Terrestrial Environment	Aquatic Environment	Air Shed	Acoustic Environment
200 m on either side of the road.	50 m upstream and 100m downstream of any project road crossing a river	200 m from center line of road [and rising 100 m from the road centerline]	200 m from center line of road and extended on sensitive areas such as settlements.

In addition to the above, in accordance with the concept of an associated facility (SPS. Appendix 1, para 6) it is necessary to mention that sections funded by IsDB and GoK are associated facilities to this project. Their assessment is covered in Section E.10 of this report.

A.5 Methodology Applied

33. The methodology is based on the ADB, Safeguard Policy Statement (2009) and the joint experience of the International and National environmental consultants involved in the IEE. Background data and information was obtained from published and unpublished sources, e.g., on: climate, topography, geology and soils, natural resources, flora and fauna, agriculture, and socio-economic data. Several site inspections were conducted jointly by the International Environmental Specialist and National Counterpart during July and August, 2015. The existing road was driven and areas of potential environmental significance assessed carefully. Discussions were held with a number of stakeholders in order to determine their perceptions of the level of impact from road works (see **Section F**). Data and information obtained have been included where appropriate in the IEE Report.

A.6 Constraints and Limitations

34. Given the available time and resources very little constraints or limitations are applicable to this report. The Project is classified as a Category B project [3] and as such, at this stage of the Project, no instrumental monitoring of items such as air quality and water quality was deemed necessary. Two field trips were undertaken with an International and National Environmental Specialist and multiple consultations were held with stakeholders.

A.7 Structure of the Report

35. The report is organized to comply with ADB Safeguard Policies (2009) as follows:

- **Section A: Introduction –** The section in hand provides the introductory information for the Project.
- **Section B: Legal, Policy and Administrative Framework -** This section presents an overview of the policy/legislative framework as well as the environmental assessment guidelines of Kazakhstan that apply to the proposed project. The section also identifies relevant Asian Development Bank Safeguard Policies that will apply.

[3] See Section C.2 for explanation of category.

- **Section C: Description of the Project –** Section C describes the Category of the Project and the need for the Project. A detailed scope of works is also provided indicating the type of engineering works required. The final portion of this section discusses Project alternatives.
- **Section D: Description of the Environment –** This section of the report discusses the regional and local environmental baseline conditions. This section is divided into subsections relating to physical environment, ecological environment, economic conditions and socio-cultural characteristics.
- **Section E: Screening of Potential Environmental Impacts and Mitigation Measures –** Section E outlines the potential environmental impacts and proposes mitigation measures to manage the impacts.
- **Section F: Environmental Management Plan & Institutional Requirements –** This section provides the EMP for the design, construction and operational phases of the Project.
- **Section G: Public Consultation, Information Disclosure & Grievance Mechanism –** Section G provides a summary of all of the stakeholder consultation activities undertaken. A grievance mechanism for project affected persons is also provided along with information regarding the disclosure process.
- **Section H: Conclusions and Recommendations –** The final section of the report provides the report conclusions and any necessary recommendations.

B. Legal, Policy and Administrative Framework

B.1 General

36. This section of the IEE presents an overview of the policy/legislative framework as well as the environmental assessment guidelines of Kazakhstan that apply to the proposed project. The section also identifies relevant Asian Development Bank Safeguard Policies that will apply. The project will be required to comply with all relevant national and international environmental and social policies / guidelines.

B.2 Country Policies and Administrative Framework

B.2.1. Overall legal framework

37. Environmental protection is administered in Kazakhstan by the Ministry of Energy of the GoK. This Ministry has been formed during reorganization of the GoK in August 2014. The ministry has taken functions and responsibilities of liquidated Ministry of Oil and Gas of the GoK, Ministry of Industry and New Technologies and the Ministry of Environmental Protection and Water Resources.

38. The overarching legislative framework that establishes the legal framework for environmental protection in Kazakhstan is the Kazakhstan Environmental Code (also translated as the Ecological Code), Law Number 212-III, adopted 9 January 2007 with latest amendments and additions dd June 15, 2015 (referred to hereafter as the 2007 EC)[4]. Three main laws (the *Law on Environmental Protection*, the *Law on Ecological Expertise* and the *Law on Air Protection*) were abrogated subsequent to their integration into the Environmental Code. Moreover, some 80 normative legal acts were abrogated after the adoption of the Environmental Code.

B.2.2. Environmental Impact Assessment

39. According to Article 36 of the Environmental Code development of OVOS (or EIA) is mandatory for all types of activities and projects that can have a direct or indirect impact on the environment or health of the people. The permitting system is a component of the Environmental Code.

40. The Ordinance №204-п of the Ministry of Environmental Protection of GoK (June 28, 2007 with amendments and additions 24 September 2013) on “Approval of the instruction on conducting environmental impact assessment of planned economic activity when developing pre-planning, planning, initial project and project documentation” establishes the basis for EIA and represents the main guiding document on the EIA process in Kazakhstan.

41. The EIA consists of four (4) stages:

(i) ***Review of environmental conditions***: It includes general characteristics of natural and socio-economic environment of the area of planned activity, analysis of main trends of practical use of the territory and defining of principal positions of EIA. This stage of the EIA is based on the conceptual design, available materials, other special literature, project description etc. The purpose of this stage is to evaluate the environmental conditions, identify key environmental issues, choose the best option available for siting of the development, and to define scope of work for the second stage

[4] Source: http://online.zakon.kz/Document/?doc_id=30085593#pos=1;11

(ii) ***Preliminary environmental assessment (PEIA or predOVOS)***: it is essentially a scoping-level desk study prepared in parallel with an engineering feasibility study;
(iii) **EIA:** it is a comprehensive assessment of positive and negative environmental impacts along with a detailed mitigation & monitoring plan; and
(iv) **Section "Environment Protection"**. It is required only if certain technical solutions in the feasibility study undergo substantial revisions after the EIA has been completed and approved. [5] In this case, the Section "Environment Protection" represents an updated EIA of the second stage with a detailed assessment of additional technical solutions.

42. A "Notification of environmental consequences" is prepared by the project proponent as an annex to the EIA and is submitted for the ecological expertise along with other project documentation. The notification is mandatory at all stages of EIA.

43. Other legislation addressing specific environmental issues has also been enacted. The Forest Code regulates the use, protection and conservation of forests as well as forest restoration. Specific issues related to the protection and conservation of forests, are regulated in by-laws. The Water Code passed in July 2003 contains main directives on environmental protection, preservation and use of water resources on the territory of Kazakhstan. The last changes were integrated in February 12, 2009. The main state document regulating land use and protection is the Land Code of the Republic of Kazakhstan that was adopted in June 20, 2003 (№-442-II) with changes and amendments as of July 4, 2013.

B.2.2. Administrative Framework

44. The central executive body for environmental protection in the Kazakhstan Administrative Framework is the Ministry of Energy (MoE). MoE's responsibilities include developing and pursuing national environmental policy, enforcing laws, and administering State supervision and State ecological expertise. MoE oversees the country's compliance with ratified international environmental conventions and inter- State environmental agreements. It also controls emissions and discharges of pollutants, issues permits of certain categories (discussed below) and determines the maximum volumes and composition of pollutants.

45. At the local level, the MoE has territorial environmental protection offices (TEPOs). Their role is mostly related to inspection of local sites, but they also play an advisory role regarding enterprises and perform State ecological expertise on subjects of local importance. Akimats (the executive branch of local government) and maslikhats (representative local authorities) are entitled to perform State supervision and can approve certain provisions and tariffs for use of natural resources. They also determine, within certain limits, the pollution charges paid by enterprises. They allocate natural resources, including mountain and woodland pastures and grasslands, and establish and administer local specially protected areas, and also issue nature resource-use regulations within their competencies.

46. The other State bodies within the Kazakhstan Administrative Framework with relevant environmental responsibilities are as follows:

- The Committee on Forestry and Wildlife (CFW) within the Ministry of Agriculture (MoA) manages woodlands and specially protected natural areas: nine national natural

[5] Point 27 of the Ordinance №204-п dated 28 June 2007

reserves and six national natural parks in the 14 oblasts. At the local level, territorial offices of the Committee manage forestry and bio-resources, and 138 governmental Forest Conservation Agencies (accountable to the Committee) are responsible for forest protection and conservation.

- The Committee on Water Resources (CWR) under MoA administers the State reporting system regarding the protection and efficient use of water resources. Its responsibility covers: water intake from natural watercourses and groundwater; fresh water consumption; water use for production; water use for agriculture; conservation of fresh water and the recycling of water supply; and sewage discharges into natural water bodies and under ground. Water resources are managed by the river basin organizations according to hydrographic or river basin principles.

- The Emergency Management Committee of the Ministry of Internal Affairs is responsible for environmental disaster management and prevention (e.g., fires, flooding, mudslides, industrial accidents, etc.).

B.3 Air, Water, Land and Noise Quality Standards

B.3.1. Air Quality Legislation and Standards

47. The Environmental Code defines the basic terms and principles of State control of air and soil conditions. In addition Sanitary Regulations and Standards (referred to as "SanPiN") exist with the aim of protection of human health.

48. Ambient air and soil quality standards are established by the last published SanPiN called “Sanitary and Epidemiological Requirements for Atmospheric Air in Urban and Rural Areas, Soils and Their Protection, Maintenance of the Territories of Urban and Rural Settlements, Working Conditions with Sources of Physical Impacts Affecting People". It was introduced in January 25, 2012.

49. The standards for air quality establish the permissible limit of the content of harmful substances both in industrial areas and residential areas. The main terms and definitions related with the atmospheric air contamination, monitoring programs, behavior of pollutants in the atmospheric air determined by the GOST 17.2.1.03-84; Environmental Protection, Atmospheric Air Terms and Definitions for Contamination Control.

Table B-1: Air quality standards in Kazakhstan [6]

Substance	Maximum Allowable Concentration, mg/m^3		Hazard Class
	One Time Maximum	Daily Average	
Inorganic dust	0.3	0.1	3
Nitrogen Dioxide	0.2	0.04	2
Sulphur Dioxide	-	0.125	3
Carbon Monoxide	5.0	3	4

50. The regulatory document containing information on harmful substances in the atmospheric air is the “Sanitary and Epidemiological requirements for the Atmospheric Air Quality” approved by the Order of the Ministry of Health of the GoK (№629, 18.08.2014)

[6] Source: “Sanitary and Epidemiological Requirements for Atmospheric Air in Urban and Rural Areas, Soils and Their Protection, Maintenance of the Territories of Urban and Rural Settlements, Working Conditions with Sources of Physical Impacts Affecting People", January 25, 2012.

51.The emission of hazardous substances (pollutants) in the atmospheric air by the stationary source is allowed only on the basis of a special permit issued by the authorized state body in charge of atmospheric air protection or its territorial subdivisions. The fee is based on the total annual emissions of the polluter without disaggregating data by emission sources. The issuing of air pollution permits for stationary and mobile sources of emissions (ground and air transport) is stipulated in the Environmental and Tax Codes of the Republic of Kazakhstan .

52. All motor vehicles of any type (including buses and trucks) are required to pass an annual roadworthy test which includes emission testing which must be in accordance with the regulations referred to below.

Table B-2. Air quality legislation

Instruction on Agreement and Approval of the Design of the Maximum Permissible Emission (MPE) and Maximum Permissible Discharges (MPD)	The Order of the Ministry for Environmental Protection of the GoK No.61n dd24.01.2004
Collected Book of Methods for Calculation of the Atmospheric Air Pollution by Different Types of Production	The Order of the Ministry of Ecology and Bio resources 01.12.96. *Included in the list of the current regulatory legal acts in the field of the environmental protection, the Order of the Ministry for Environmental Protection No 324-n dd October 27, 2006*
The Inventory rules for Emissions of the Hazardous substances (pollutants), harmful Physical Effects on the Atmospheric Air and Their Sources	The Order of the Ministry for Environmental Protection of the GoK No.217-n dd. August 4,2005
The procedure of Calculation of the Hazardous Substances Concentrations Containing in the Atmospheric Discharges of Industrial Enterprises. Guiding normative document 211.2.01.01-97	The Order of the Ministry of Ecology and Bioresources, 01.08.1997. *Included in the List of the current regulatory legal acts in the field of the environmental protection, the Order of the Ministry for Environmental Protection No 324-n, October 27, 2006*
The procedure of Calculation of the Hazardous Substances Concentrations Containing in the Atmospheric Discharges of the Enterprises	Approved by the Order of Minister of Environmental Protection No.100-n, April 18,2008
Recommendations on Execution and Content of the Design Standards of the Maximum Permissible Emissions (MPE) in the Atmospheric Air made by the Enterprises of the Republic of Kazakhstan. Guiding normative document 211.02.02-97	The Orders of the Minister of Ecology and Bio resources dd August 1, 1997 and Order of the Ministry of Natural Resources and Environmental Protection of the GoK No. 156, 06.07.2001 *Included the List of the current regulatory legal acts in the field of the environmental protection, the Order of the Ministry for Environmental Protection No.324-n dd October 27, 2006*
Instruction on Standardization of the Air Pollutants Emissions in the Republic of Kazakhstan	The Order of the Ministry of Natural Resources and Environmental Protection of the GoK No.516-n, 21.12.0 *Included the List of the current regulatory legal acts in the field of the environmental*

	protection, the Order of the Ministry for Environmental Protection No.324-n dd October 27, 2006
Calculation of Motor Vehicles Emissions Guiding normative document 211.2.02.07-2004	The Order of the Ministry for Environmental Protection of the GoK No.324-n, October 27, 2006 *Included in the List of current regulatory legal acts in the field of the environmental protection, the Order of the Ministry for Environmental Protection No.324-n, October 27, 2006*
Calculation of Specific Emissions of Atmospheric Pollutants and Associated Damages based on Type of Used Fuel in the Republic of Kazakhstan Guiding Normative Document 211.3.02.01-97	The Order of the Ministry for Ecology and Bioresources 09.07.1997. *Included in the List of current regulatory legal acts in the field of environmental protection, the Order of the Ministry for Environmental Protection No.324-n, October 27, 2006*
Calculation of Contaminants in the Exhaust Emissions from Transport enterprises	Approved by the Order of the Minister of Environmental Protection No.100-n, April 18, 2008
Rules of Government Accounting of Sources of Greenhouse Gases Emissions into the Atmosphere and Consumption of Ozone-destroying Substances	The Governmental Decree No 124, February 8, 2008
Rules for Limiting, Stopping or Decreasing Greenhouse Gases Emissions into Atmosphere	The Governmental Decree No.128, February 11,2008

B.3.2. Water Quality Legislation and Standards

53. The main legislative act in the area of water resources protection and use is the Water Code of the Republic of Kazakhstan №481, 09.07.2003. According to the definition provided in this document, protection of water bodies is an activity aimed at conservation, rehabilitation and reproduction of water bodies as well as prevention of water from detrimental effect.

54. According to Article 112, water bodies shall be protected from: (i) natural and industrial pollution of hazardous chemical and toxic substances and their compounds, as well as thermal, bacterial, radiation and other types of pollution; (ii) infestation and pollution with hard, non-soluble subjects, industrial, household and other types of wastes; (iii) fecal pollution.

55. Water bodies shall be protected to prevent: (i) disturbance of the environmental stability of the natural systems; (ii) causing harm to the lives and health of population; (iii) reduction of fishery resources and other water fauna; (iv) deterioration of the water supply conditions; (v) weakening of the natural self-reproduction and cleansing functions of the water bodies; (vi) other unfavorable conditions that negatively affect physical, chemical and biological qualities of water bodies.

56. Protection of water bodies is carried out through (i) taking into consideration competing or conflicting demands related to the protection of water bodies to all water users who use water for any purpose; (ii) improving and applying water protective activities/

measures with the help of new equipment and environmentally and epidemiologically safe technologies; (iii) establishment of water conservation zones and sanitary protection zones for protection of public (drinking) water supply sources; (iv) execution of public (state) and other forms of control over the use and protection of the water bodies; (v) applying sanctions for non-observance of the water protection requirements.

57. Central and local executive authorities of Oblasts, cities of republican importance, and the capital undertake measures in compliance with relevant legislation and principles of sustainable development to conserve water resources as well as prevent, mitigate and eliminate water pollution.

58. Physical and legal entities that discharge effluents to water bodies are obliged to develop and implement managerial, technological, forestry, ameliorative, land treatment, hydro technical, sanitary-epidemiological and other activities to ensure protection of water bodies from pollution and depletion of water resources.

59. Article 116 of the Law regulates issues related to water protection zones. In particular, the Article mandates the establishment and demarcation of water protection zones and belts to maintain water bodies and water facilities in the state required by hygiene & sanitary and ecological norms, to prevent contamination and depletion of surface waters, to preserve flora and fauna.

60. When developing a project that may have a negative impact on water resources, the project design should be agreed with a local executive entity in charge of water resources use, which is a River Basin Organization of the Water Resources Committee of the Ministry of Agriculture of RK. The Water Code, initially adopted on March 31, 1993 and then substantially revised and passed in July 2003, is the main guiding document in the Republic of Kazakhstan on water resources conservation and protection. In addition, the Government approved a State Program on Water Resources Management for 2014-2020 that—among other things—addresses issues related to the access and quality of drinking water, and needs of ecosystems.

61. Following adoption of the Water Code, the GoK has adopted by-laws that specify procedures for issuing special use permits and recall of such permits; for using water in case of fire fighting needs; for classifying water ways as navigable routes; and for using reservoirs for air transport needs. The Government of RK approved a list of reservoirs (including underground waters) of health significance and reservoirs of special state significance or special scientific value. Granting the access to the listed water bodies is either restricted or entirely prohibited.

62. As in case with the air quality standards, various indices were used for comparative testing of water contamination. The most widely used index is the integrated hydro-chemical water impurity index (WII). The basic document regulating the quality of surface waters and hazardous substances is the sanitary and epidemiological norms and regulations for the Surface water protection against pollution №3, 02.03.2004 approved by the Order of the Ministry of Health of the GoK № 506, 28.06.2004.

63. The legislative and regulatory and procedural documents in the field of the water environment protection are listed below:

Table B-3: Water quality legislation

Recommendations on Execution and Content of Design Standards of the Maximum Permissible Discharge (MPD) in	The Order of the Ministry of Ecology and Bioresources of the GoK, 1992. *Included in the List of the current regulatory*

Water Bodies for Enterprises in the Republic of Kazakhstan.	*legal acts in the field of the environmental protection, the Order of the Ministry for Environmental Protection #324-n, October 27, 2006*
Instruction on Discharge of Contaminants into Water Bodies of the Republic of Kazakhstan Guiding normative document 211.2.03.01-97	The Order of the Ministry of Natural Resources and Environmental Protection of the GoK#516-n, 21.12.00. *Included in the List of the current regulatory legal acts in the field of the environmental protection, the Order of the Ministry for Environmental Protection #324-n, October 27, 2006*
Calculation Procedure for Standards of Water Pollutants Discharges into Water Bodies, Disposal Fields and Land	Approved by the Order of the Minister of Environmental Protection #100-n, April 18, 2008
Procedure for Establishment of a Maximum Permissible Discharge (MPD) of Pollutants to Disposal Fields and Natural Land Depressions. Guiding normative document 211.3.03.03-2000	The Ministry of Environmental Protection of the GoK #156-n, 06.07.2001 *Included in the List of the current regulatory legal acts in the field of the environmental protection, the Order of the Ministry for Environmental Protection #324-n, October 27, 2006*
Recommendations on Control & Oversight of Operation of Treatment Facilities and Discharge of Wastewaters.	The Order of the Ministry of Ecology and Bioresources of the GoK, 21.05.94. *Included in the List of the current regulatory legal acts in the field of the environmental protection, the Order of the Ministry for Environmental Protection #324-n, October 27, 2006*
Rules of Surface Waters Protection in the GoK Guiding normative document 01.01.03-94	The Order of the Ministry of Ecology and Bioresources of the GoK, 27.06.94. *Included in the List of the current regulatory legal acts in the field of the environmental protection, the Order of the Ministry for Environmental Protection #324-n, October 27, 2006*
Guidelines on Application of the Rules of Surface Waters Protection in the GoK	The Order of the Ministry of Ecology and Bioresources of the GoK, 12.02.97. *Included in the List of the current regulatory legal acts in the field of the environmental protection, the Order of the Ministry for Environmental Protection*
Procedural Requirements for Application of Norms and Standards of Water Resources Use in Various Climatic Zones of the Republic of Kazakhstan during Ecological Zoning.	Approved by the Order of the Minister of Ecology and Bioresources of the GoK, 1997. *Included in the List of the current regulatory legal acts in the field of the environmental protection, the Order of the Ministry for Environmental Protection*

B.3.3. Land Quality Legislation and Standards

64. New sanitary rules were introduced in Kazakhstan following long-term scientific studies. As such, SanPiN (Sanitary Rules and Norms) 2.1.7.1287-03 Sanitary and Epidemiological Requirements for Quality of Soil and Subsoil establishes standards for soils quality in inhabited localities and agricultural lands, and control the observance of the sanitary-hygienic standards during engineering, construction, renewal (technical upgrading and operation of facilities for different purposes that may cause the adverse impact on soil).

65. The main terms related to the chemical contamination of soils are defined by the GOST 27593-88. The basic regulatory documents for control of the soil pollution content is "Standards of the Maximum Allowable Concentrations of the Hazardous Substances, Harmful Microorganisms and Other Biological Materials Being the Soil Pollutants" approved by the Order of the Ministry of Health of the GoK #99, 30.01.2004 and the Order of the Ministry of Environmental Protection of the GoK №21П, 27.01.2004.

66.The maximum allowable concentration (MAC) or allowable permissible concentration (APC) of chemical substances in soil refer to principal criteria for the sanitary assessment of soil contamination by chemical agents.

67. This requirement applies to all land uses and does not differentiate between various land uses. The verification of the MAC of the chemical substances in the soil is based on 4 main nuisance values identified. The Maximum Allowable Concentration for the soil valid in Kazakhstan are shown in the **Table B-4** below.

Table B-4: Soil quality standards in Kazakhstan[7]

Substance	Maximum Allowable Concentration, mg/kg	Limiting Rate
Manganese (gross form)*	1500	According to the General Sanitary Norms
Cupric (flexible form)*	3.0	According to the General Sanitary Norms
Lead (gross form)	32.0	Translocational
Zink (gross form)*	23.0	Translocational
Arsenic (gross form)	2.0	According to the General Sanitary Norms
* Due to the absence of these substances in new SanPiN data was taken from the previous document «Standards of the Maximum Allowable Concentrations of the Hazardous Substances, Harmful Microorganisms and Other Biological Materials Being the Soil Pollutants» approved by the Order of the Ministry of Health of the GoK №99, 30.01.2004 and Order of the Ministry for Environmental Protection of the GoK №21П, 27.01.2004.		

B.3.4. Noise Standards

68. The sanitary rule regulating on noise level within settling areas is SanPiN of GoK № 3.01.035-97 «Maximum Allowable Noise Levels in Residential and Public Buildings and in Residential Areas». In addition to establishing acceptable standards, noise levels are generally regulated with respect to sound levels at specific places referred to as "sensitive receptors" such as schools, hospitals or, in the absence of such facilities, at residential buildings or a given distance from the source of the noise.

[7] Source: "Sanitary and Epidemiological Requirements for Atmospheric Air in Urban and Rural Areas, Soils and Their Protection, Maintenance of the Territories of Urban and Rural Settlements, Working Conditions with Sources of Physical Impacts Affecting People", dated January 25, 2012.

69. The level of the road traffic noise is determined according to the norms of the SNiP (construction norms and rules) 11-12-77 «Noise Protection». The limit of noise exposure generated by the motor vehicles in the distance of two meters from the buildings facing to the noise sources in compliance with the SNiP 11-12-77 is 70 dBA.

70. The maximum allowable noise level is assumed for areas neighboring on the residential houses, rest areas of the micro-districts and residential groupings, school areas, playgrounds of the preschool after adjustment as follows:

- For noise made by the motor vehicles - 10 dBA
- For existing residential construction - 5 dBA
- For daylight time from 7 hour till 23 hour - 10 dBA

B.4 Asian Development Bank Safeguard Policies 2009

71. The ADB has three safeguard policies that seek to avoid, minimize or mitigate adverse environmental impacts and social costs to third parties, or vulnerable groups as a result of development projects[8].

Safeguard Requirements 1: Environment.

72. The objectives are to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process. Environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts. Eleven 'Policy Principles' have been adopted as part of the SPS, including:

> 1. Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks. (*The Project was initially screened by the ADB and classified as a Category B project*)
> 2. Conduct an environmental assessment for each proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential transboundary and global impacts, including climate change. Use strategic environmental assessment where appropriate. (*The IEE herewith provides the environmental assessment for the Project, including an assessment of climate change. Transboundary impacts are not applicable*).
> 3. Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative. (*Alternatives have been considered, including the 'no project' alternative in* ***Section C.7 – Alternatives***)
> 4. Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an environmental management plan (EMP) that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity

[8] ADB. 2009. Safeguard Policy Statement, Manila

development and training measures, implementation schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle. (*An EMP has been prepared for the Project and is outlined in detail in* ***Section F - Environmental Management Plans and Institutional Requirements****).*

5. Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a grievance redress mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance. *(Consultations were held in Akimats in Aktobe and Atyrau to discuss environmental issues, the findings of the consultations (and a description of the Project grievance redress mechanism) are presented in* ***Section G - Public Consultation, Information Disclosure & Grievance Mechanism****)*

6. Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders. (*This IEE and its EMP have been disclosed on the ADB web-site*)

7. Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports. (The IEE and its EMP outline a plan to monitor the implementation of the EMP and the institutional responsibilities for monitoring and reporting throughout the Project lifecycle: **Section F.2 - EMP Institutional Responsibilities**)

8. Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the over all benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources. (*No critical habitats have been identified that would be significantly impacted by the Project*)

9. Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase-outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides. *(The IEE and its EMP outline specific mitigation and management measures to prevent and control pollution:* ***Section F -***

Environmental Management Plans and Institutional Requirements. *No pesticides will be used during the lifecycle of the Project**)***

10. Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities. *(The IEE and its EMP outline the requirement for specific health and safety plans and emergency response plans :* ***Section F - Environmental Management Plans and Institutional Requirements.)***

11. Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation. *(With the exception of one cemetery, no physical and cultural resources have been identified that would be significantly impacted by the Project. A chance find procedure is provided in* ***Section E.9.4 – Physical and Cultural Resources****)*

Safeguard Requirements 2: Involuntary Resettlement.

73. The objectives are to avoid involuntary resettlement wherever possible; to minimize involuntary resettlement by exploring project and design alternatives; to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-project levels; and to improve the standards of living of the displaced poor and other vulnerable groups. The safeguard requirements underscores the requirements for undertaking the social impact assessment and resettlement planning process, preparing social impact assessment reports and resettlement planning documents, exploring negotiated land acquisition, disclosing information and engaging in consultations, establishing a grievance mechanism, and resettlement monitoring and reporting.

74. The involuntary resettlement requirements apply to full or partial, permanent or temporary physical displacement (relocation, loss of residential land, or loss of shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) resulting from (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas. Resettlement is considered involuntary when displaced individuals or communities do not have the right to refuse land acquisition that results in displacement. A land acquisition and resettlement plan (LARP) has been prepared for the Project to ensure compliance with the safeguard on Involuntary Resettlement.

Safeguard Requirements 3: Indigenous Peoples.

75. The objective is to design and implement projects in a way that fosters full respect for Indigenous Peoples' identity, dignity, human rights, livelihood systems, and cultural uniqueness as defined by the Indigenous Peoples themselves so that they (i) receive culturally appropriate social and economic benefits, (ii) do not suffer adverse impacts as a result of projects, and (iii) can participate actively in projects that affect them.

76. For operational purposes, the term Indigenous Peoples is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:

1. self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;

2. collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;
3. customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
4. a distinct language, often different from the official language of the country or region.

77. In considering these characteristics, national legislation, customary law, and any international conventions to which the country is a party will be taken into account.

78. Guidelines provide a rational approach for determining environmental category of the Project, the need for public consultation and disclosure, environmental management planning, and resolving involuntary resettlement, indigenous people and gender issues.

79. Activities carried out under the project needs to conform to current laws in Tajikistan and sound social and environmental principles. In general, the project activities will not trigger serious impacts on physical and human environment.

C Description of the Project

C.1 Type of project

80. The Project is a road rehabilitation project involving 473 km of national highway A-27 between Aktobe and Makat (**Figure C-1**) rehabilitated in seven sub-sections, four of which will be funded by the ADB under this specific Project (299 km ADB funded). The project will be confined within the right-of-way with the exception of two proposed changes in alignment at Shubarkaduk and Bayganin (totaling around 14km). The seven sub-sections are funded by the ADB, the Government of the Republic of Kazakhstan (GoK) and the Islamic Development Bank (IsDB) as follows:

- Sub-Section 1 (Aktobe Oblast, km 11 - 160) - Funded by the IsDB.
- **Sub-Section 2 (Aktobe Oblast, km 160 - 220) - Funded by the ADB.**
- Sub-Section 3 (Aktobe Oblast, km 220 - 236) - Funded by the GoK.
- **Sub-Section 4 (Aktobe Oblast, km 236 - 330) - Funded by the ADB.**
- **Sub-Section 5 (Atyrau Oblast, km 330 - 458) - Funded by the ADB.**
- Sub-Section 6 (Atyrau Oblast, km 458 - 468) - Funded by the GoK.
- **Sub-section 7 (Atyrau Oblast, km 487-504) – Funded by the ADB.**

81. The IEE herewith focuses only on the four sub-sections funded by the ADB. Separate environmental assessments have been prepared by the GoK for their portion of the Project (Sub-section 3 & 6). Likewise, IsDB are preparing an environmental assessment for Sub-section 1.

C.2 Category of Project

82. Based on the existing ADB Environmental Safeguards Policy (2009), this Project falls under ADB's project **Category B**. This category is defined as:

"*Projects with potential to cause less significant fewer environmental impacts than Category A, yet still require a prescribed level of environmental management to protect the environment. For these projects an initial environmental examination (IEE) could be considered as final environmental assessment report if the stated document determines that an environmental impact assessment (EIA) is not required for the project under examination*".

C.3 Need for the Project

C.3.1 General

83. Roads promote connectivity and mobility, which is a precondition for growth and development particularly for Kazakhstan the world's largest landlocked country with the population density among the lowest (at less than 6 people per square kilometer) while having the largest and strongest performing economy in Central Asia. The proposed Project will reconstruct about 299 kilometer (km) of Aktobe - Makat road section, a key part of the Western Kazakhstan Transport Corridor (WKTC). This will enhance regional in particular western Kazakhstan road connectivity and mobility, improve quality and efficiency of road transport service, and promote inclusive economic growth in the western part of the country.

84. With a land area (about 2.7million km^2) larger than Western Europe, an estimated 17.4 million population (as of 2014) and abundant natural resources unevenly spatially distributed, the provision of adequate road transport infrastructure across the country is critical. Strategically, Kazakhstan has huge potential to link the fast growing markets of China and East Asia with Russia and Western Europe by road and rail, and through ports on the land-locked Caspian Sea. For instance, the total volume of goods in transit through Kazakhstan in 2012 amounted to 17.8 million tons, income from which amounted to more than $1 billion. Long travel distances result in significant travel times and costs for accessing markets within the region and beyond. A World Bank study estimated that transport costs account for 8 - 11 % of the final cost of goods about double the cost in most industrialized countries. As such, the development of transport infrastructure coupled with sector efficiency improvement will perform a catalytic role for sustaining the social and economic development of the country.

85. Reckoning that the successful integration of Kazakhstan into the world economy relies on, among other investments, a well-developed transport system in the country, the government has, since 2007, been reconstructing and/or upgrading the 2,787 km Kazakhstan section of the Western Europe - Western China (WE-WC) international transit corridor (also known as the CAREC corridors 1b and 6b) to turn it into a truly international trunk corridor. The entire project is estimated to cost $6.5 billion and is mainly co-financed by development partners including ADB, the European Bank for Reconstruction and Development (EBRD), the IsDB, the Japan International Cooperation Agency (JICA) and the World Bank.

86. With the reconstruction of WE-WC Corridor near completion, additional national transport corridors of strategic importance and regional impact, known broadly as the Centre South (Astana / Almaty), Centre East (Astana / Ust'-Kamenogorsk) and Centre West (Astana / Aktau) corridors, are being developed by the government and development partners. These corridors are estimated to cost $6.6 billion and planned for implementation during 2016-2020.

C.3.2 Project Road

87. The Aktobe - Makat road is a two-lane republican road constructed in the 1970s & 1980s. It has a length of 473 km, largely category III/IV roads, and passes main districts in the oil and mineral-rich provinces of Aktobe and Atyrau whose population totals about 1.7 million. As a result of inadequate maintenance and lack of rehabilitation and/or reconstruction work over the years, the road pavement has lost its structure and bridges and culverts can barely withstand the fast rising traffic that serves the oil production and refinery factories in the region. As the main transport artery of the region and connecting to rest of the country, the poor road condition has likewise caused negative social effects as the rural population feel somewhat disconnected and abandoned by the cities and district centers. Road connectivity has become a key development issue particularly for the western part of the country.

88. The reconstruction of Aktobe - Makat road will be part of an overall network upgrade program that will also enhance existing links between Astana and the Caspian Sea port town of Aktau. Taking into account the standards and costs, the 473 km section will be a two lane corridor (upgraded to Category II).

89. Besides benefits accrued to regional trade and transit traffic, improvements to this road will also improve access to markets and social services for local communities and stimulate development of non-oil sector industries that in return create more job opportunities and improve the regions living standards. The road sector in Kazakhstan has

made impressive strides in institutional and capacity development with assistance from development partners.

90. As the Ministry of Investments and Development (MID) and its Committee of Roads (CoR) embark upon the next stage of nationwide road network upgrading, continued institutional and capacity development, i.e., follow-on implementation of functions under development and scaling-up what has been functioning well, will be needed for further improvements in transport efficiency and quality of service. The core problem of an inefficient road transport system, attributable to unbalanced road connectivity and deteriorated roads coupled with substandard services, is that it increases transport costs and constrains the country s integration into the global economy. This ultimately hampers sustainable social and economic development. Recent reports have indicated that in some of the road sections traffic growth is actually negative due to the deteriorating road condition and the reluctance of people to use the road.

91. Traffic counts undertaken in 2015 indicate that road traffic on the rehabilitated road will increase by an average of 4% annually between 2015 and 2035. **Table C.1** illustrates the traffic forecasts.

Table C.1: Traffic Forecasts, Vehicles Per day (VPD), 2015 – 2035.

Chainage (km)	VPD 2015	2035
100 – 160	1445	3166
160 – 220	438	960
220 – 275	227	497
275 – 330	92	202
330 – 360	124	272
360 – 400	239	524
400 - 468	334	754
487 - 504	1493	4291

92. These figures show that the highest flow is from Aktobe City to Kandagash town, then gradually reduced to Shubarkaduk town and so on until the village Nogaity. This was due to the population in the settlements that the most of the population lives in Aktobe and the least in Nogaity. The same is true for the Nogaity to the city of Atyrau, the traffic flow closer to Atyrau reaches at its maximum.

93. Currently the road condition is very poor and accordingly vehicle speed is limited to 15 – 25 km / hour. Average journey times are summarized below.
Km160–248 – 3.5 hours
Km248–330 – 6 hours
Km330–338 – 1 hour
Km338–378 – 1.5 hours
Km378–468 – 4 hours
Total – 15.5

94. Most of the accidents recorded on the road result from vehicle roll-overs due to high speed in the Aktobe section of the Project road, these have caused a high number of deaths compared to the number of accidents. In Atyrau section, the number of accidents is low, as the number of vehicles and vehicle speeds are lesser due to the poor condition of road. Historical accident data is provided by **Appendix G.**

95. Under the project, ADB will finance improved road connectivity in Aktobe and Atyrau provinces and help improve road safety and maintenance. The project is consistent with the ADB Country Partnership Strategy for Kazakhstan, 2012 2016 and fits with ADBs Midterm

Review of Strategy 2020. It supports the CAREC Transport and Trade Facilitation Strategy 2020 and is included in the Country Operations Business Plan for Kazakhstan, 2015 -2017.

C.4 Locations & Size of Operations

C.4.1 Project Locations

96. The Aktobe - Makat Road begins in Aktobe, the capital of Aktobe Oblast. The road broadly follows a south-west route until it reaches Makat which is located approximately 120 kilometers north east of Atyrau in Atyrau Oblast. The road traverses three distinct vegetation types, steppe, semi desert and desert environment. The road is relatively flat and passes through seven villages and towns, none of which have properties within the existing RoW.

97. **Figure ES-1** provides a location map of the road within the context of Kazakhstan. **Figure C-1** provides a map of the road within Aktobe and Atyrau Oblasts. **Appendix A** provides an overview of the environmental setting of the road, **Appendix B** provides detailed mapping of the road with chainages and **Appendix C** provides satellite mapping of the road corridor with specific environmental features indicated.

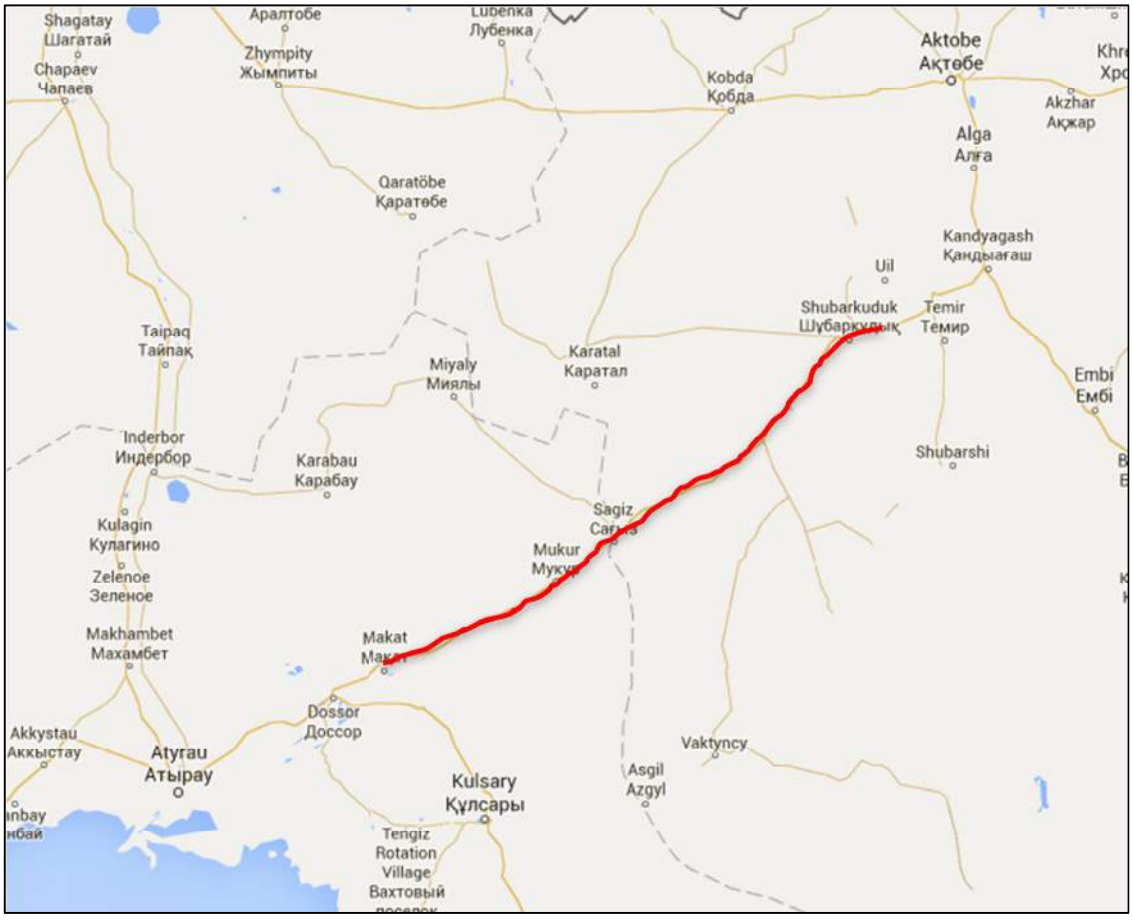


Figure C-1: Aktobe – Makat Road (Including ADB and GoK Sections)

C.5 Scope of Works

C.5.1 Project Phases

98. The Project is being undertaken in several phases as follows:

1. **Feasibility / Design Phase** - A team of individual international consultants and national consultants (Gazdorproject (Aktobe sections) & Kostnaidorproject (Atyrau sections)) are preparing a feasibility study (including this IEE) and design for the Project Road, as well as the Bidding Documents. The IEE EMP will be provided to the prospective Contractors with the Bidding Documents but are not Contract Documents. They are provided to the prospective Contractors only for initial information and understanding of the context of the project.
2. **Construction Phase** – During this phase the following activities will be undertaken:
   - **Land Acquisition -** Under the terms of the Grant of the Asian Development Bank (ADB), before the commencement of the construction works at any part of the site, the *Employer* must prepare the Land Acquisition and Resettlement Plan (the LARP), obtain the approval of ADB and then implement the plan and acquire the land.
   - **Site Specific Environmental Management Plan (SSEMP)** - Ensure that the Site Specific EMP is submitted to the Engineer for review at least 10 days before taking possession of any work site. No access to the site will be allowed until the SSEMP is reviewed by the Engineer and approved by the Project Management Consultant.
   - **Site Clearing Works -** The Works include the following site clearing works within or adjacent to the RoW of the Project Road, in accordance with the Drawings or instructions of the Engineer:
     - Clearing and grubbing.
     - Removal and disposal of traffic signs, sign posts and their foundations.
     - Demolition, removal and disposal of existing bridges including foundations, abutments, piers, retaining walls, riverbank and waterway protection works.
     - Demolition, removal and disposal of existing culverts, inlet and outlet structures, headwalls, concrete drains, channel lining, and erosion protection works.
     - Removal of and any other natural or artificial objects within the RoW.
     - Removal and disposal of all vegetation and debris within the designated limits of the Right-of-Way.
   - **Relocation of Existing Services -** The Works include the relocation of all services affecting the construction of the Project Road within the Right-of-Way. The services include the following
     - water mains
     - overhead electric supply lines
     - gas pipelines
     - underground telephone cables
     - sewer mains
   - **Construction Activities** – The main construction phase aspects are described in detail below.
3. **Operational Phase** – Commences from the date of Taking Over of the Works by the Employer.

C.5.2 Major Components and Design Characteristics

Road Standards and Typical Profiles

99. The Project Road will be rehabilitated to a Category II road. **Table C-1** provide an overview of the Geometric Standards for Category II roads (according to SNiP 2.05.02-85)

Table C-1: Geometric Design Standards for Category II Roads

Description	Design Standard			
Road Category	II			
Rural Design Speed (km/h)	120			
Urban Design Speed (km/h)	60			
Cross-sectional Elements (m)	No. of Lanes	Lane Width (m)	Carriageway Width (m)	Shoulder Width (m)
	2	3,75	9,0	3,0
Cross Slope, %	Roadway		Shoulder	
	60		40	
Maximum Superelevation %	4			
Minimum Radius in Plan (m)	General		Mountain	
	800		600	
Minimum Sight Distance	Stopping		Passing	
	250		450	

100. **Appendix F** illustrates typical cross sections of a Category II road.

Bridges

101. Ten bridges will be constructed or widened during the project works. **Table C-2** below provides summary details of the bridges and their locations.

Table C-2: Bridges

Bridge No.	Location (km)	Nearest settlement	Watercourse type/ Name	Bridge length (m)	Number of spans
Aktobe Oblast					
1	160+700	Shubarkaduk	Zhaksymai river	39,00	2
2	181+600	Shubarkaduk	Shiili river	71,00	4
3	204+685	Shubarkaduk	Kenzhaly river	64,67	3
4	246+800	Bayganin	Karaulkeldy river	39,00	2
5	288+000	Zharly	Zharly river	39,00	2
6	320+800	Nogaity	Nogaity river	42,40	2
Atyrau Oblast					
7	338+511	Sagiz	Nogaity river	63,60	3
8	342+970	Sagiz	Sagiz River	105,70	5
9	378+145	Mukur	Mukur River	36,60	3
10	430+175	Zhamansor	Sagiz River	84,65	4
TOTAL				**585,62**	

102. The construction of new and widening of the existing bridges includes but is not limited to the following parts of the structures and associated works:

- Foundations.
- Substructure including bridge bearings.
- Superstructure, including construction of expansion and deformation joints and footpaths.
- Deck pavement including hydro isolation, drainage, hand railing, and conduits for services.
- Approach slabs.
- Slope treatments in front and around the abutments.
- Construction and maintenance of traffic detours.
- Scour and erosion protection of the waterway areas and river bank protection upstream and downstream of the bridge crossing, and removal of old foundations and substructure from the waterways.
- All necessary and incidental items required for a complete bridge.
- All new and widened bridges will be designed for the life expectancy of 75 years.
- The bridge rehabilitation and strengthening works will be designed for the life expectancy of 50 years.

Culverts

102. Project works include the design and construction of cross drainage structures (culverts), including inlet and outlet structures and associated works in accordance with the Specification. The scope of the cross drainage works includes:

- Complete replacement of existing culverts which are old, structurally deficient or undersized;
- Extension of existing culverts which are of adequate design and in good condition;
- Construction of new culverts at locations where no cross drainage structure existed before;
- Cleaning of existing culverts which are partially or completely silted;
- Miscellaneous repair of the existing culvert joints, headwalls, wing walls, and scour and erosion protection works; and
- Construction of new scour protection and channel lining works.

103. Approximately 122 culverts will be rehabilitated or constructed as part of the Project (80 in Aktobe Oblast and 42 in Atyrau)

Other Drainage Structures

104. Surface runoff from the carriageway and all other pavements, and any cut and embankment slopes must be discharged through longitudinal drains designed for adequate cross section, bed slopes, invert levels and the outfalls. The Works include construction of the drainage system components in urban and rural areas according to the types, dimensions, classes and material requirements for this work shown on the typical cross section drawings (**Appendix F**).

Animal Underpasses

105. Animal underpasses will be constructed at various locations along the Project road in order to accommodate the movement of cattle. According to KAZ-Aktobe and KAZ-Atyrau most villages along the route will be provided with at least one underpass, possibly two. The underpasses will take the form of a box culvert approximately 2 meters in height by 2.5 meters in width. The exact locations of the underpasses have yet to be determined and will

be finalized during consultations between the KAZ-Aktobe, KAZ-Atyrau and village representatives.

Earthworks

106. The Works include the following types of earthworks necessary for the construction of the Project Road and all associated works:

1. Removal of topsoil.
2. Construction of embankments.
3. Construction of subgrade.
4. Excavation and removal of the existing pavement materials and the existing road embankment.
5. Removal and replacement of unsuitable materials.
6. Structural excavation.
7. Excavation for the construction of side drainage and cross-drainage works.
8. Excavation for the removal and relocation of the existing utilities.
9. All backfilling necessary for the construction of bridges, retaining walls or other earth retaining structures, cross drainage structures and associated works, side drains and erosion protection work.
10. Preparation of beddings and filters for all structural, cross drainage, side drains or pavement works.
11. Excavation, filling or backfilling necessary for the execution of any other incidental works.

107. **Table C-3** indicates the approximate earthworks and pavement quantities for the Project Road for the sections in Aktobe Oblast. [9]

Table C-3: Earthworks (Aktobe Oblast only)

Description	Unit	Quantity
Clearing and grubbing of trees diameter less than 24cm	no.	160
Clearing and grubbing of trees diameter more than 32cm	no.	20
Stripping of topsoil	M^3	565,000
Road bed excavation and excavation in cut	M^3	160,000
Excavation in rock	M^3	40,000
Embankment Construction for roads and associated works up to bridge pay lines	M^3	4,800,000
Subgrade Preparation	M^3	6,900,000
Preparation of the underlying granular pavement layer	M^3	510,000
Dismantling of existing concrete structures, loading on trucks and haulage of up to 3km	M^3	1,080
Removal and transportation of existing bituminous pavement	M^3	700,000
Structural excavation for culverts, headwalls, wingwalls and retaining walls	M^3	3,700
Structural Excavation in rock for retaining walls	M^3	1,600
Granular backfill behind retaining walls	M^3	2,800
Granular backfill to culverts, headwalls, wingwalls and bedding for culverts	M^3	3,200

Removal of Asphalt

[9] To date no earthworks data have been provided for the portions of road in Atyrau Oblast.

108. The Contractor shall remove the existing bituminous pavement layers and stockpile this material at locations that will be specified by KAZ-Atyrau / KAZ-Aktobe and instructed by the Engineer. The asphalt will be re-used, where practical, for access roads and temporary roads, after which it will be re-used for shoulder material.

C.5.3 Source of Materials

Quarries & Borrow Pits

109. The exploitation of borrow pits and quarries will be conducted by licensed companies or the Contractor will obtain its own licenses. The exact locations of quarry and borrow sites will be determined by the Contractor and specified within the SSEMP. The Project will not implement any exploration activities from illegal sources. **Table C-4** indicates the potentially available sources.

Table C-4: Potential Quarry & Borrow Sites

#	Location / Name	Material
1	Nikeltau train station - Mamyt's crushed stone quarry	crushed stone
2	Mugalzhar train station - crushed stone quarry	crushed stone
3	Aktobe - sand-gravel mix quarry	sand-gravel mix
4	Quarry № 1 (km 439+150)	Loam
5	Quarry № 2 (km 420+750)	Loam
6	Quarry № 3 (km 407+300)	Sandy Loam
7	Quarry № 4 (km 367+400)	Sandy Loam
8	Quarry №5 (km 362+950)	Sandy Loam
9	Quarry №6 (km 347+800)	Loam,Sand

Asphalt Plants

110. The Contractor will be responsible for ensuring the asphalt facilities comply with the EMP and that all necessary permits to operate are obtained from the local authorities. As an indicator asphalt plants will be located at the following locations: km 181 (Shubarkaduk), km 240 (Bayganin) & km 280 (Zharly) in Aktobe Oblast and Sagiz, Mukur and Makat in Atyrau Oblast.

Technical and Potable Water

111. According to KAZ-Aktobe approximately 1,650 m^3 of technical water will be needed per day during the construction phase for the Aktobe Oblast sections and around 30 m^3 of potable water per day. Potential locations for the technical water include the rivers Temir, Shiili, Kenzhaliyev, Zharly and Nogayty (Aktobe Oblast) no surface water will be extracted from rivers in Atyrau Oblast. Potential sources of potabal water will be groundwater from Shubarkuduk and Karauylkeldy (Aktau Oblast) and Sagiz, Mukur and Makat (Atyrau Oblast). The final locations of the extraction points (for both technical and potable water) will require the approval of the Engineer, KAZ-Atyrau / KAZ-Aktobe, TEPOs and the Committee on Water Resources prior to the start of extraction to ensure that over extraction of water resources does not happen. Potable water will also need to be tested regularly throughout the construction period to ensure it meets the drinking water standards of GoK.

C.5.4 Temporary Storage Areas

Construction Camps

112. Camp sites will be selected keeping in view the availability of an adequate area for establishing camp sites, including parking areas for machinery, stores and workshops, access to communication and local markets, and an appropriate distance from sensitive areas in the vicinity. Construction camps will be required for all Project Lots. The final locations of the camps will be selected by the Contractor after the approval from the KAZ-Aktobe, KAZ-Atyrau and the Engineer.

113. The area requirement for construction camps will depend upon the workforce deployed and the type and quantity of machinery mobilized. For example, the camps may include asphalt plants, rock crushing and concrete batching. In view of the area required, it will not be possible to locate camp sites within the RoW and the contractors will have to acquire land on lease from private landowners. The construction camp will also have facilities for site offices, workshop and storage yard, and other related facilities including fuel storage.

114. The Contractor will provide the following basic facilities in the construction camps:
- Safe and reliable water supply.
- Hygienic sanitary facilities and sewerage system.
- Treatment facilities for sewerage of toilet and domestic wastes
- Storm water drainage facilities.
- Sick bay and first aid facilities.

115. Detailed criteria for siting of construction camps and establishment of facilities are given in the EMP – **Section F**.

Storage Areas

116. Temporary storage areas will be required for certain activities, such as the storage of sand and gravels and construction equipment. These storage areas may range in size from anything between 50 m^2 to more than a hectare. The precise locations of these temporary facilities is not known at this stage, as such mitigation measures shall be prepared to ensure that these areas are sited in approved locations.

C.5.5 Road Safety

117. The scope of the Permanent Works includes the planning, manufacturing and installation of traffic signs and application of pavement markings along the entire length and for all features of the Project Road. The following types of traffic signs will be installed along the Project Road:
1. Warning Signs
2. Regulatory Signs
3. Signs for all off-ramp/adjacent roads
4. Information and Direction Signs

118. In addition, the Works include the construction/manufacturing and installation of different types of safety barriers steel guardrail, kilometer posts and guideposts in accordance with MID requirements.

119. The main road safety benefits the project will deliver are the following:
- Reduced risk of vehicles leaving their lane to avoid potholes and surface deformations;
- Improved sight distances;
- Better separation between pedestrians and vehicles; and

- Better night driving conditions due to wider carriageway and improved pavement centerline markings.

120. Some of these advantages could be partially offset by the higher speeds which will be possible after the road improvements.

C.5.6 Snow Barriers

121. Snow barriers will be constructed at locations along the road to prevent snow drift from engulfing the road during the operational period of the Project. The snow barriers will be will be located in rural areas approximately 70-80 meters from the road side. The barriers will be 5 meters high and constructed according to SNiP 3.03-09-2006, point 10.23. The barriers will be staggered to allow the movement of cattle and wildlife through them at various intervals.

C.6 Contracting and Institutional Issues

Contracting Procedures

122. Contracting Procedures are an essential aspect of the Project Design. The Project shall incorporate procedures which include important safeguards, most notably the Site Specific Environmental Management Plan (SSEMP), the purpose of which is to make explicit the Contractor's documented and detailed understanding of the requirements of the EMP and to make their implementation both site-specific (e.g., where water quality monitoring will be conducted pursuant to the requirements of the Contract) and time-specific. It is important to note that, to be meaningful, the recommendations of the EMP must go beyond recommendations and become legally enforceable and incorporated in the bid and contract documents.

Monitoring and Supervision

123. Supervision and monitoring are an equally important part of Project design. Supervision and monitoring provisions will be primarily the responsibility of the following:

- Engineer. The Engineer will be tasked with specific responsibility to ensure safeguard compliance of civil works - with particular emphasis on the monitoring of implementation of SSEMP and related aspects of the Project.
- Contractor's Environmental Specialist. The preparation of the SSEMP will require a licensed person. The Contractor will be required to retain expertise to do this work and must keep that person/firm to oversee the operation throughout the contract period.

124. Recommendations in regard to this aspect of the Project will be put forward in **Section F: Environmental Management Plan** and **Section G: Conclusions and Recommendations.**

C.7 Alternatives

C.7.1 The No Action Alternative

125. The “No Action” Alternative in this instance is defined as a decision not to undertake the proposed construction of the Project Road. The “No Action” Alternative would result in the continued deterioration of the road, bridges and drainage structures along the Right of Way (RoW), thereby severely impeding the economic recovery of the Project Area and the Atyrau and Aktobe Oblasts. All positive benefits would be foregone. The relatively minor,

less than significant environmental impacts (such as noise and short-term air quality impacts due to maintenance activities) and inconveniences (such as traffic diversions) would be avoided in the short-run. In the long-run, however, the steadily declining state of the roadway would severely hamper economic development in the area. In light of these considerations, the "No Action" Alternative is deemed to be neither prudent not in the best interest of Kazakhstan or those with an interest in, and attempting to assist restoration of, Kazakhstan's well being.

C.7.2 Alignment Alternatives

126. Two potential changes in the existing alignment have been proposed as part of the project design. The first relates to an 8 km bypass north of the town of Shubarkaduk Town (see **Figure C-2**). The re-alignment bypassing Shubarkaduk has been proposed with two aspects in mind. Firstly pedestrian safety; it has been recognized that traffic / pedestrian accidents will be lower if the Project road bypasses the town instead of running through it. Secondly, SNiP 3.03-09-2006, point 4.1.10 mandates that roads of categories I-III bypass settlements, where possible and that a distance between the road and border of the settlement should not be less than 200 meters. The SNiP also specifies that the planned bypass should take into account a perspective development plan of the area (During PC consultations in Shubarkaduk, Deputy Akim confirmed that the proposed bypass is in line with a master plan of the village). Given both of these aspects, the road designers (Gazdorproject) and CoR have determined that the bypass is warranted. It should be noted that rehabilitation of the existing pavement within the town will also be undertake, but this will involve only replacement of the asphalt surface. The second change in alignment is located close to the village of Bayganin to accommodate an elevated crossing of the existing railway line to the north east of the village (see **Figure C-3**). The elevated crossing will be constructed according to the requirements of SNiP 3.03-09-2006, point 6.5 which provides instructions on the construction of rail crossings for Category II roads.

Figure C-2: Proposed Re-alignment, Shubarkaduk (km 172 – 180)

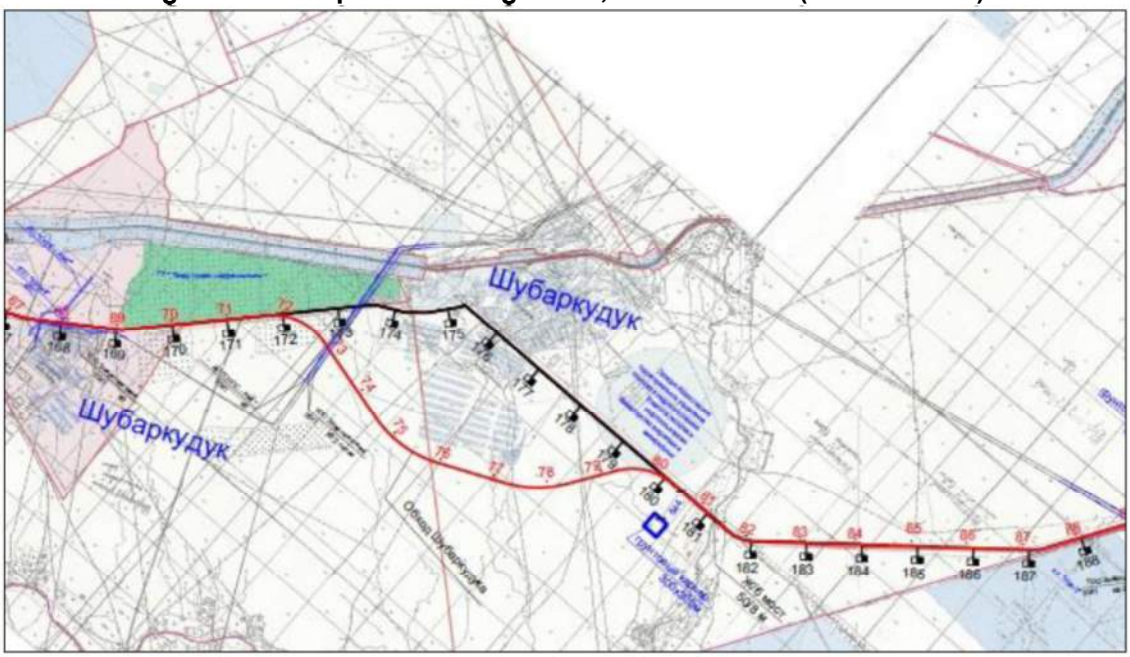
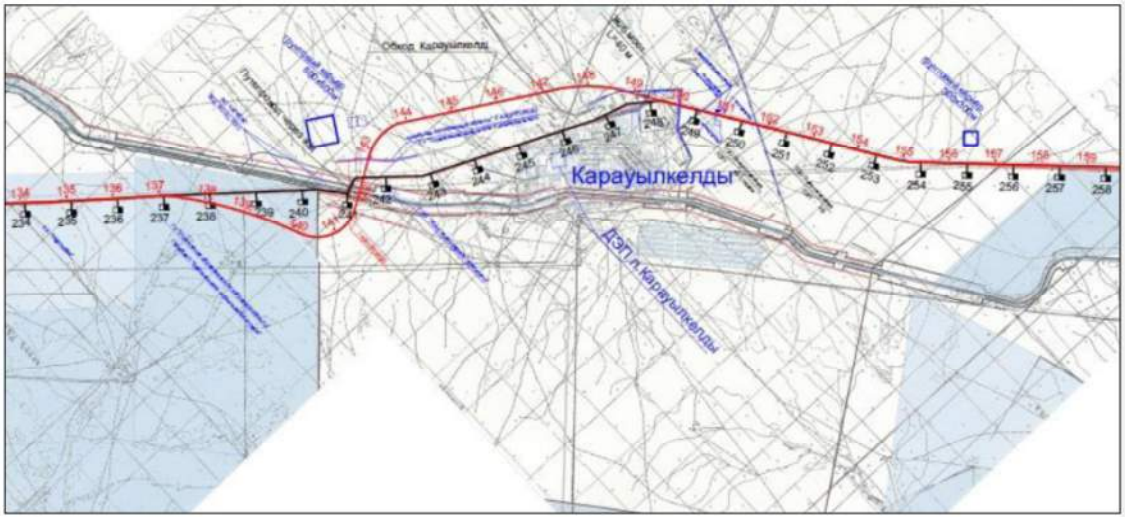


Figure C-3: Proposed Re-alignment, Bayganin (km 241 – 248)



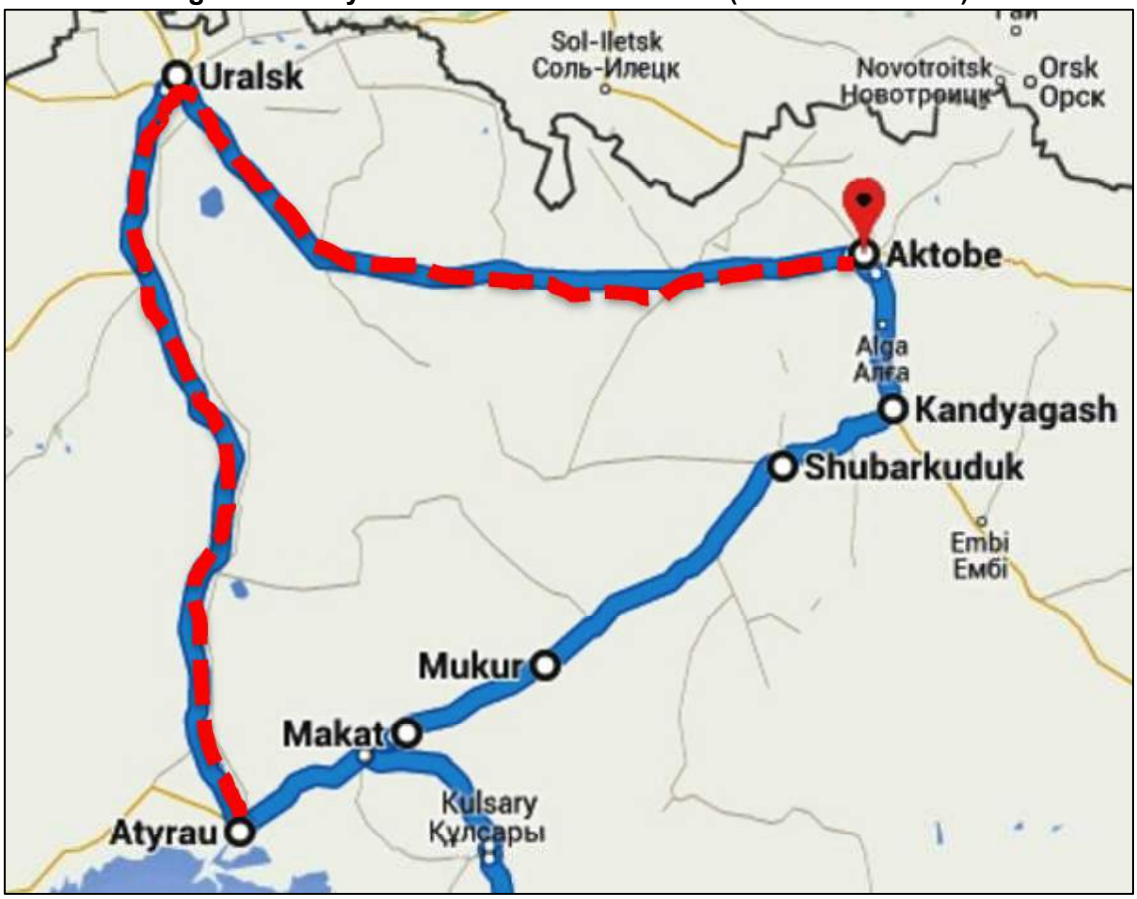
127. No significant environmental impacts are anticipated from these changes in alignment. However, land acquisition and resettlement will be required to accommodate the changes. A Land Acquisitions and Resettlement Plan (LARP) has been prepared for the Project and addresses these specific alignment issues.

C.7.3 Alternative Road Corridor

128. Current estimates assume that a maximum of 260 vehicles per day [10] are using the Atyrau – Uralsk – Aktobe (AUA) route as an alternative to the Project road primarily due to its poor condition. Accordingly, the AUA road could be considered an alternative option to the rehabilitation of the Project road. However, two main issues exist with this alternative, firstly travel time and cost. Using the AUA road would take more than double the time of a rehabilitated Project road and also incur more vehicle related costs, such as fuel and, over time, maintenance costs. Secondly, the AUA alternative would result in similar negative impacts for the Project road and the population it serves as those associated with the 'no action' alternative. Accordingly this alternative, although currently viable given the poor standard of the existing Project road, would not be a viable alternative to a rehabilitated Project road.

[10] Initial Project Preparatory Report on Traffic Data "Reconstruction of Road "Aktobe-Atyrau-border of the Russian Federation (to Astrakhan)" "Aktobe-Makat" road section, 160 - 468 km June, 2015

Figure C-4: Atyrau – Uralsk – Aktobe Road (Red Dashed Line)



C.7.4 Alternative Transport Modes

129. The road corridor runs alongside an existing rail line, which connects Aktau and Atyrau with Aktobe and other areas of Kazakhstan. This railway, although mostly single track, is capable of handling large freight and passenger trains, and is being further upgraded. However, the railway is considered necessary as part of a mix of transport modes, with rail promoted as the preferred mode for longer distance, containerized and bulk commodities, as this represents the most environmental and efficient mode of transport. On the other hand, the Project road is promoted for the local and regional movement of people and goods. Accordingly, the railway is not considered an alternative to the Project but as an additional component of the country wide transport network.

C.8 Proposed schedule for implementation & Cost

Project Duration	33 months - construction + 24 months - warranty period
Start Date	2nd quarter 2016
End Date	Construction - 1st quarter 2019 +1 st quarter 2021 the warranty period
Works Procurement	October 2015
Cost	401.9 million. USD.

D. Description of the Environment

130. This section of the report discusses the existing environmental and social conditions within the Project corridor of the Project under the following headings:

- Physical Resources (air quality, hydrology, topography, etc);
- Ecological Resources (flora, fauna, protected areas);
- Economic Resources (infrastructure, land use, etc);
- Social and Cultural Resources (health, education, noise, cultural resources, etc).

D.1 Physical Resources

D.1.1 Air quality & Climate

Air Quality

131. Due to the fact that the road alignment runs almost completely through uninhabited desert and steppe terrain, traffic or construction-related impacts affecting air quality are of little concern except in the villages through which the road passes. However, in general, most houses and buildings within the settlements are set back out of the RoW by some distance and in general the pavement conditions in these areas is better than in the rural sections of the road thereby reducing dust impacts from passing vehicles.

Climate

Aktobe region (160-330 km):

132. The Aktobe section of the project area is located in a dry and desertified steppe environment. The meteorological conditions of this section are characterized by a pronounced continental climate pattern with cold winters and hot summers and high daily, monthly and annual temperature fluctuations. The mean annual temperature in the Aktobe region is +3.6°C. Absolute maximum value of air temperature of +46°C may occur in July, while absolute minimum temperature may reach -48°C in January. Frost-free season lasts for about 7 months with ground frosts being typical in early autumn and spring.

Table D-1: Mean Monthly and Annual Temperatures In Aktobe (^{0}C)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
-15.6	-14.9	-8.2	+4.7	+14.6	+19.8	+22.3	+20.3	+12.3	+4.4	- 4.8	-12.1	+3.6

Source: Gazdorproject draft IEE, 2015

133. The amount of precipitation usually ranges between 150-350 mm (170 mm during warm season and 145 mm during cold season) annually indicating the region's deficit in precipitations and their variability by season. Precipitation mostly falls during summer. Strong winds exacerbate humidity deficit in the region. The number of days with strong winds of 15 m/sec and above ranges from 32 to 105 days a year. The registered average wind speed is about 4-5 m/sec. The main wind direction in winter is south-east and in summer is north-west. **Appendix H** provides wind roses for Aktobe and Atyrau.

Atyrau region (330-504 km):

134. The Atyrau's section of the Project area is located in the desert zone with arid and semi- climate characterized by hot summers and cold winters. The mean annual temperature in the Atyrau region is +8.9°C. Summers are characterized by temperatures averaging 32.1°C and lack of precipitation, resembling continental hot-summer Mediterranean climates and sub-arctic winters with little snow but chilling temperatures.

Absolute maximum value of air temperature of +43°C may occur in June-July, while absolute minimum temperature reaching -38°C in January.

Table D-2: Mean Monthly and Annual Temperature in Atyrau (^{0}C)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr.
-9.8	-8.8	-1.8	+9.4	+17.9	+23.3	+25.6	+23.7	+16.7	+8.3	-0.1	-5.7	8.9

Source: Kostainaidorproekt IEE, 2015

135. Precipitation is low throughout the year and averages 77 mm during November-March and 113 mm during April-October. Snow is common, though light, in winter. The average wind speed during cold season with air temperature of 8^0C and below is 5.8 m/sec, and in warm season is 4.7 m/sec. The main wind direction in December-February is from east and in June-August is south-west and north-west. The insignificant amount of precipitation in the entire Project Area results in extreme dryness during the summer months. On the other hand, the long duration of warm period is favorable for carrying out civil works during most time of the year.

Climate Change

136. According to the World Bank climate change projections suggest an increase of the average expected mean annual temperature of 1.4°C by 2030, 2.7°C by 2050, and 4.6°C by 2085 in Kazakhstan. By mid-century, winter and spring precipitation is projected to increase by 9 % and 5 %, respectively which could lead to increased agricultural potential. The frequency of forest and steppe fires is expected to increase due to global warming. These fires could damage considerable areas of agricultural lands and also would have an indirect impact on population health by raising smoke concentrations in the air. Climate change is projected to significantly influence Kazakhstan's water resources, exacerbating existing water shortages and placing greater pressures on agricultural activity. However, any increased glacial melt is unlikely to lead to hydrological impacts to the Project due to its distance from the mountains. In terms of climate change impact, more extreme temperatures will add to road deterioration, which has already happened in Kazakhstan, where truck travel has to be limited on hot summer days when the asphalt softens. [11] There is a lack of reliable data, information and analysis on the impacts of climate change on the Caspian Basin, [12]particularly its impact on water level fluctuations and related social, environmental and economic consequences. It is possible that any rise in the sea level of the Caspian could make the area up to Makat vulnerable to flooding (from Atyrau to Makat the elevation is between -27 to -22 masl – with the Caspian Sea level around -29 masl. After Makat the road elevation rises rapidly to more than 50 meters above masl). However, currently there is no credible scientific data to make any certain assumption that increases in sea level of 2-7 meters could occur within the next 50 years.

D.1.2 Topography

Aktobe section (160-330 km):

137. The oblast is located in the northwestern part of the Republic of Kazakhstan and borders with Western Kazakhstan, Atyrau and Mangystau oblasts in the west; Kostanay, Karaganda and Kyzylorda oblasts in the east; Orenburg oblast of the Russian Federation in the north and Karakalpakstan autonomous region of Uzbekistan in the south. The Aktobe

[11] Kazakhstan – Overview of Climate Change Activities. October, 2013, World Bank.
[12] Caspian Sea State of the Environment, Report by the interim Secretariat of the Framework Convention for the Protection of the Marine Environment of the Caspian Sea and the Project Coordination Management Unit of the "CaspEco" project, 2011

section of the Project Area lies in the moderately dry and desertified steppe zone with prominent denudations and largely unchanging landscape features. Geomorphologic characteristics of the territory include gentle terrain represented by undulating flatlands and wavy hills with elevation of 230-260 meters, and river terraces with gently undulating and flat surfaces of river valleys that include flood-plain and above flood-plain terraces with elevations of 200-240 meters.

Atyrau section (330-504 km):

138. Atyrau region is located in southwestern Kazakhstan within the vast Caspian lowland section of the desert ecosystem represented by undulating flat lands. The mainly sandy terrain is interspersed with salt marshes. The Atyrau section of the road starts within the structural denudation plain of western Kazakhstan (330-370 km) represented by undulating plains. Pre-Caspian lowlands and some areas of the structural denudation plain occupy the road section of 370-418 km. The road section between 418-468 km is located in the lake and coastal plain of the Pre-Caspian lowlands characterized by a rather flat landscape. Parallel almost longitudinal sand ridges, the so-called Baer knolls, of up to 5 km length and 15-25 m height occupy most of the Dossor-Kokchagylskiy lowland area and represent a peculiar topographic feature of this section of the road. **Figure D-1** indicates the topography of the Project area. As can be seen, Makat is located below sea level, at around -25 meters.

Figure D-1: Topography of Kazakhstan

D.1.3 Soils

Aktobe section (160-330 km):

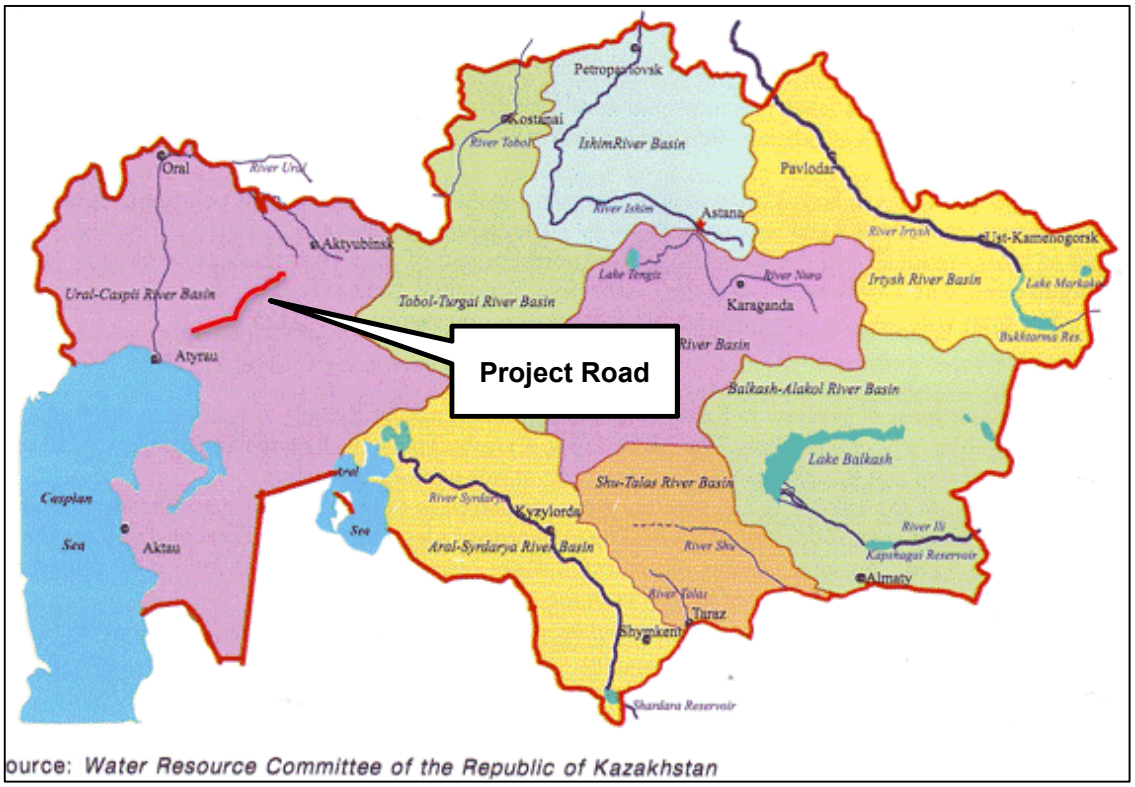
139. In geological terms, the surface soils mainly consist of light brown dry steppe soil types that mostly occupy carbonate rich sandy loam and clay. Top-soils of about 20 cm are generally poor in humus, up to 2 %. Salt crusts often appear at the soil surfaces. In the entire road corridor there are deposits of quaternary age. Among the quaternary deposits there are a variety of alluvial deposits of sandy loam and clay.

Atyrau section (330-504 km):

140. The surface soils are largely represented by semi-desert brown soils covered with with semi-desert vegetation. Most of the project area is occupied by solonetz[13] and sand. A map of soils in the Project area is provided by **Appendix I**. In the region around Makat salt pans are visible close to the Project road. The salt pans were dry during the site visits in June and September. None of these salt pans are known to be important habitat for special status birds, or any other species of flora and fauna.

D.1.4 Hydrology

141. General - Kazakhstan is divided into eight river basins (see **Figure D-2**). The Project road is located within the Ural-Caspian river basin which occupies an area of 415,000 km^2 and includes the catchment area of the Ural River (236,000 km^2), the Volga-Ural inter-fluvial area (107,000 km^2) and the Ural-Emba inter-fluvial area (72,000 km^2).[14] Groundwater tables in both Atyrau and Aktobe are mostly deep, and quality is poor due to salt intrusion. However, given enough depth, good quality water can be found in abundance for technical and potable supplies.



ource: *Water Resource Committee of the Republic of Kazakhstan*

[13] "Solonetz" is one of the 30 soil groups in the classification system of FAO. Solonetz soils are defined by an accumulation of sodium salts and readily displaceable sodium ions bound to soil particles in a layer below the surface horizon (uppermost layer). This subsurface layer also contains a significant amount of accumulated clay. Solonetz soils are related to the sodium-accumulating aridisols and mollisols of the U.S. Soil Taxonomy.

[14] http://www.cawater-info.net/bk/water_land_resources_use/english/index.html

Figure D-2: Main River Basins of Kazakhstan

Aktobe section (160-330 km):

142. The river network of the area includes the following rivers with road intersection points:

#	Km	River
1	160+700	Zhaksymai river
2	181+600	Shiili river
3	204+685	Kenzhaly river
4	246+800	Karaulkeldy river
5	288+000	Zharly river
6	320+800	Nogaity river

143. All rivers in the Aktobe section have continuous river flow all year round. According Gazdorproject assessment, the above listed rivers are expected to be sources for technical needs during construction works. Drinking water can be obtained at Shubarkaduk and Bayganin settlements on a contractual basis.

Atyrau Section (330-504 km):

144. In the road section of 330-370 km, rivers Sagiz and Nogaity (near Sagiz village) intersect the road. The Mukur River crosses the road section at km 378, west of the Mukur village. The creek is usually snow and rain fed and during the summer season the river is dry up. The Sagiz River again passes under the Project road at km 430.

#	Km	River
1	338+511	Nogaity river
2	342+970	Sagiz River
3	378+145	Mukur River
4	430+175	Sagiz River

145. Technical water needs in this section are to be covered by Sagiz river (330-370 km) and water supply systems of Zhumansor, Mukur & Makat (370-504). Drinking water will be obtained at Sagiz water station, Zhumansor, Mukur & Makat. The quality of drinking water in both Aktobe and Atyrau conforms to Sanitary-epidemiological requirements to water sources (№ 554, 28 July 2010).

D.1.5 Geology & Seismicity

146. Geologically, most of the Project area has been formed mainly by marine sediments, the formation of which began already with the Thetys Ocean during the Mesozoic era. During the Quaternary, the Caspian Sea had high water levels, flooding vast parts of Atyrau and Aktobe regions.

147. Geomorphologically, the project area is an undulating plain with alternating flat ridges and flat plains. The vast areas with completely flat fields associated with the broad backed summits of the plain rises. The swell-like ridges and some hills up to 10 m stand out against their background. Extensive dry hollows often with steep slopes, dry beds of ancient and modern water streams are widespread in the project area. Geological elements of the project area include the sandy loam of greyish, brown color and of solid consistence.

148. The examination of seismic zoning of both the Aktobe and Atyrau sections of the road specified in the IEE of Kostnaidorproject and draft IEE of Gazdorproject defines the entire area as "non-seismic". A map indicating the low seismic hazard classification of the Project area is provided by **Appendix J**.

Figure D-3: Sagiz River (km 430)

D.2 Ecological Resources

D.2.1 Flora

149. More than 6,000 species of vascular plants are found in Kazakhstan, along with 5,000 species of fungi, 485 species of lichens, 2,000 species of algae, and 500 species of bryophytes. Among the vascular plants, 14 percent are endemic to Kazakhstan. The steppes in which Aktobe is located forms a broad band across northern Kazakhstan. Steppe ecosystems host more than 20 major plant formations. However, most steppes are either heavily ploughed or grazed. The dominant vegetation within the steppe consists of grasses, notably the various species of feather grasses, but also including fescues and wild oats. Numerous herbaceous species are also present. Characteristic shrubs include Spiraea, Caragana, and wild cherry.

150. Steppe habitats are favoured by rodents such as ground squirrels, hamsters, Voles, lemmings and marmots. The only ungulate common in the southern steppes is the Saiga antelope which was at the verge of extinction in the early 20th century but has since recovered, although there is evidence of a recent decline. Wolves, foxes and steppe ferret are typical carnivores in this ecosystem. Steppes also support a characteristic and threatened bird fauna, including bustards, demoiselle crane, sociable plover and black and white-winged larks.

Figure D-4: Typical Steppe Roadside Vegetation

151. Semi-desert ecosystems (Atyrau) are characterized by shrub (notably wormwood and shrub/grass communities. Further south, true deserts are characterized by the typical communities of Artemisia, adapted to different soil types. Rocky and clay deserts give way to more sandy deserts in the

extreme south. Saxaul woodlands are characteristic of sandy deserts, with endemic sand acacias also playing an important ecological role.[15]

D.2.2 Fauna

152. General - The fauna of Kazakhstan includes 178 species of mammals, 489 species of birds and 117 species of fish. An estimated 6,000 species of vascular plants are found in Kazakhstan. This high biodiversity results from the combination of faunas and floras of different bio-geographical origins. The diverse and threatened large mammal fauna includes Saiga antelope, wild sheep and goats, and their predators, including wolf and snow leopard. Populations of vulnerable species — such as Saiga, Caspian seal, Caspian sturgeon, and migratory birds — undertake large-scale annual movements that increase their exposure to risks from anthropogenic and climatic factors.

Aktobe section (160-330 km):

153. According to the zoological and geographical classification of the road section in the Aktobe region it belongs to the Central Asian sub-region, Kazakhstan-Mongolia province, Kazakhstan okrug and forest steppe area (Atlas of the Kazakh SSR).

154. Wildlife along this road corridor is typical for a steppe-desert ecosystem. Among mammals, the most common species are rodents such as ground squirrels, hamsters, voles, rabbits, and jerboa.

155. The project area contains various terrestrial vertebrate species including 4 types of amphibians, 10 types of reptiles, about 290 types of bird species including steppe eagle (Red book species), little bustards (the majority observed during migrations), and 62 types of mammal species (e.g. wild boar, hare, corsac fox, fox, polecat—game species). Among bird species, 16 species refer to rare or endangered species listed in the Red Book of Kazakhstan. During migration, the number of bird species increases.

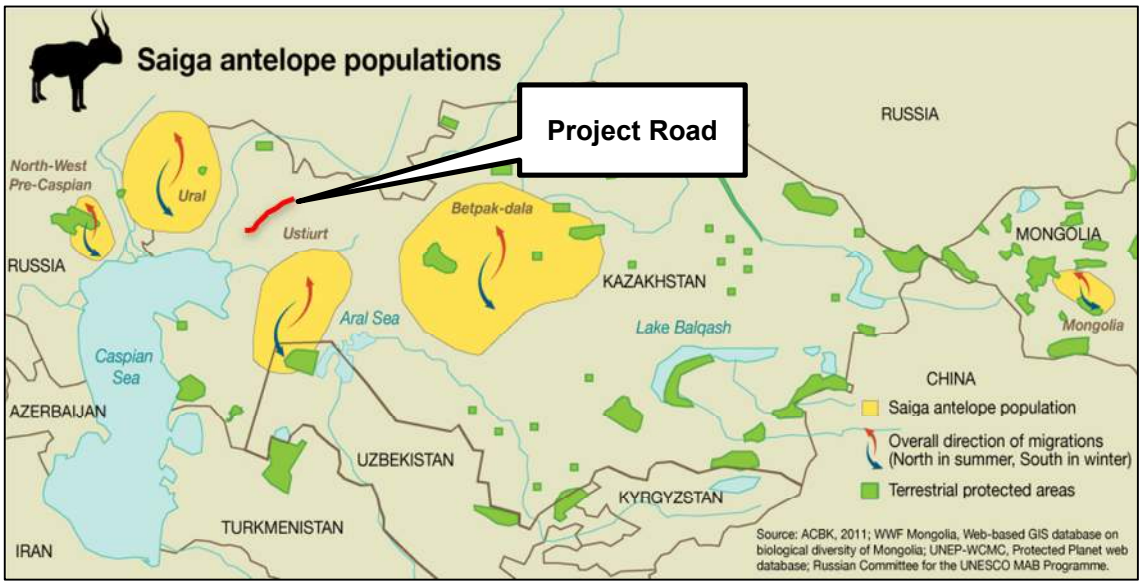
156. Historical migratory corridors exist in the Aktobe section (between Nogaity and Sagiz) when Ustyurt population of Saiga Antelope (classified by the IUCN as a critically endangered species) was abundant in the steppe. All Saiga populations (Ustyurt, Ural and Betpak-Dala) within Kazakhstan are believed to undertake long distance movements along a north - south axis within large, loosely defined ranges (see **Figure D-5**). According to a recent study; since the mid 1990's the population has dropped substantially mainly due to unsustainable hunting for their horns and meat (Olsson, 2010). According to the two latest Saiga census by the CFW 1,700 species were registered in 2014 (published data of CFW) and only 1,270 species in 2015 (not yet published data). In 2011, the number of Saiga in the northern parts of Aktobe region totaled 109 species but the Aktobe Territorial Inspection for Forestry and Wildlife reports that no single animal in was registered in recent years.

157. The main winter range for the Ustyurt Saiga is in the region of the 200,000 km^2 Ustyurt Plateau that lies in Uzbekistan. The Ustyurt Saiga population migrates to the northern extent of their range during the warmer growing season and south during the colder winter. Ongoing research tracking the movements of Saiga antelope from the Ustyurt plateau support the existence of a north south long distance movement pattern. However studies funded by USAID and Flora and Fauna International in 2010 [16] indicate that Ustyurt Saiga are not found within the Project corridor – and this was confirmed by the Aktobe Territorial Inspection for Forestry and Wildlife. However, this does not preclude the chance

[15] Biodiversity Assessment of Kazakhstan. USAID, 2001.
[16] Guidelines and Recommendations to Mitigate Barrier Effects of Border Fencing and Railroad Corridors on Saiga Antelope in Kazakhstan. Olsson, 2010.

that Saiga could return to the Project Area. **Figure D-5** illustrates the approximate range of the Ustyurt (A) and Betpak-Dala (B) Saiga populations in Kazakhstan and the proximity of this range to the Project road.

Figure D-5: Approximate range of the Ustyurt, Ural and Betpak-Dala Saiga populations in Kazakhstan.



Atyrau section (330-504 km):

158. The Atyrau oblast is home to 39 mammal species. A diverse rodent community includes more than ten species of jerboas, with several endemic genera, and the unique selevinia in its own family. Larger mammals include the wild ass and the goitered gazelle. Predator species like wolves, wild boars, corsacs, wild cats, weasels can be found in the Atyrau oblast. The reptile fauna is also very diverse.[17]

159. According to the Kostnaidorproject IEE (2015), no wildlife migratory ways, habitats, spawning or breeding grounds of rare or Red listed species were found in this section of the road. Habitats of the Red Book goitered gazelle and endangered Saiga are locate south of the project area in the Ustyurt plateau. The majority of these species can be found in the Ustyurt State Reserve in the Mangistau Oblast. However, an important bird area (IBA) was identified close to Sagiz (see **Figure D-6** for location).

160. The IBA is located in slightly undulating desert/semi-desert plain, with “white” wormwood, in some places mixed with Graminea including Stipa sp, on the right bank of the Sagiz river, approximately 9-29 km to the west-north-west of Sagiz railway station and more than 2 km north west of the Project Road. The average width of the area is 5 km. The soils are hard, sandy and salty, with patches of almost white clay. Along the river, which is 25-30 m wide, there are Tamarix thickets, in some places at least 100-150 m wide. There are precipitous banks suitable for the breeding of sand martins and other hole-nesters. 'Real' tree vegetation is absent. In June 2006, 62 bird species were observed in the area during 4 days and about 70 bird species are estimated to breed. Five species are included in the Red Data Book of Kazakhstan – Steppe Eagle, Demoiselle Crane, Little Bustard, Pallas’s

[17] Biodiversity Assessment of Kazakhstan. USAID, 2001.

Sandgrouse and Black-bellied Sandgrouse. **Table D-3** provides the details of IBA triggered species in this location.

Figure D-6: Important Bird Area[18]

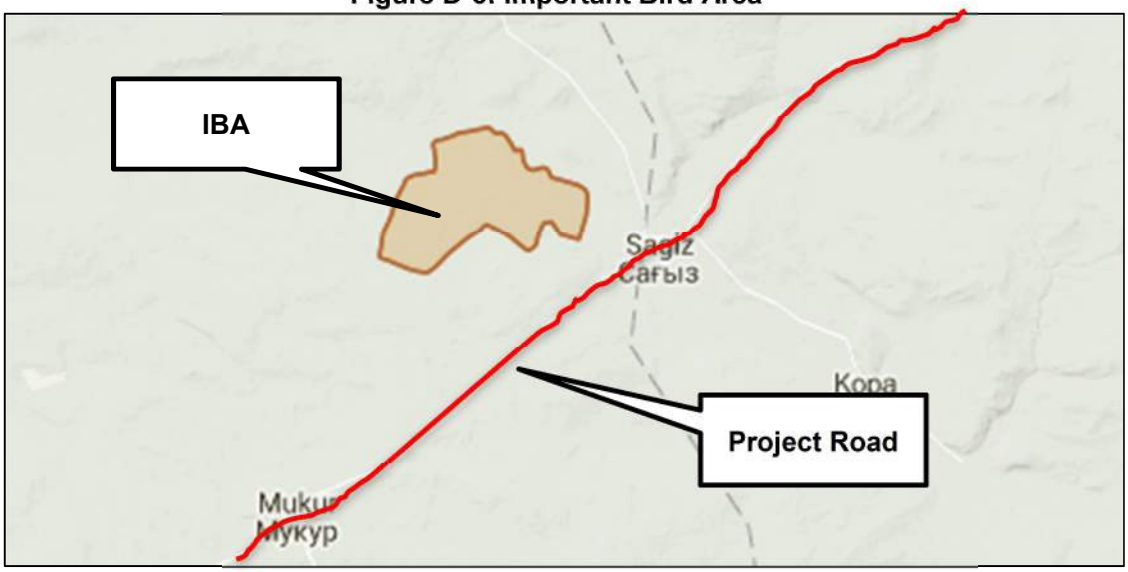


Table D-3: Populations of IBA Triggered Species[19]

Species	Season	Period	Population estimate	Quality of estimate	IBA Criteria	IUCN Category
Lesser Kestrel *Falco naumanni*	breeding	2006	10 breeding pairs	good	A1	Least Concern
Pallid Harrier *Circus macrourus*	breeding	2006	2-3 breeding pairs	good	A3	Near Threatened
Steppe Eagle *Aquila nipalensis*	breeding	2006	5-7 breeding pairs	good	A3	Least Concern
Little Bustard *Tetrax tetrax*	breeding	2006	5 breeding pairs	good	A3	Near Threatened
Demoiselle Crane *Anthropoides virgo*	breeding	2006	5 breeding pairs	good	A3	Least Concern
Caspian Plover *Charadrius asiaticus*	breeding	2006	< 50 individuals	medium	A3	Least Concern
Black-winged Pratincole *Glareola nordmanni*	breeding	2006	100 breeding pairs	good	A1, A3	Near Threatened
Pallas's Sandgrouse *Syrrhaptes paradoxus*	breeding	2006	5-10 breeding pairs	good	A3	Least Concern
Black Lark *Melanocorypha yeltoniensis*	breeding	2006	500 individuals	good	A3	Least Concern
Red-headed Bunting *Emberiza bruniceps*	breeding	2006	40-50 breeding pairs	good	A3	Least Concern

D.2.3 Forests & Protected Areas

Aktobe section (160-330 km):

[18] http://www.birdlife.org/datazone/sitefactsheet.php?id=23415
[19] http://www.birdlife.org/datazone/sitefactsheet.php?id=23415

161. Seven state forest enterprises present in the region overseeing the forest fund area of about 200,000 hectares (ha), of which 42.7 ha are covered with forest. Most of the oblast forest is located in the forest-steppe zone in the northern parts of the region. No forest fund areas are found along the road alignment. Some trees managed by the KAZAK were observed within the road RoW but they will not be impacted during construction works. There are no protected areas in the close proximity of the project area. The Irgiz-Turgai State Reserve in the Aktobe region is located far away from the project area and it will not impacted during construction works.

Atyrau section (330-504 km):

162. No forests were observed in this section. Some desert bush type vegetation can be found within the road RoW, none of which is protected, or has any special status.

Figure D-7: Protected Areas of Kazakhstan

D.3 Economic Development

D.3.1 Industries & Agriculture

Aktobe section (160-330 km):

163. Aktobe oblast has a unique mineral resource base. The main types of minerals are chrome, oil, petroleum flare gas, brown coal, nickel, marble, copper ore, chromite, phosphate rock, sand and gravel, brick clay, gypsum, limestone to lime. Aktobe oblast occupies the leading place in the world in terms of chromium (Chromtau District, South Kempirsay ore district) and is the only region in the Republic of Kazakhstan, where he covers the development of nickel deposits (Kempirsay group, the main industrial

components in ore, nickel and associated cobalt). Around 10% of proven and probable reserves of 30% of hydrocarbons in Kazakhstan are concentrated in Aktobe oblast, mainly in Mugalzhar district, Temir and Baygany areas. The largest deposits include Zhanazhol and Kenkiyak. There are reserves of brown coal, providing most of the domestic demand for raw materials and energy in the Kargaly area. The region has been explored more than a hundred fields of common minerals, most of which are located in Chromtau (24%) and Mugalzhar (18%) regions, as well as in Aktobe (21%). No mineral resources or industry of note was observed within the Project area.

Atyrau section (330-504 km):

164. Atyrau region is the oldest oil and gas-producing region of Kazakhstan. Currently over 250 oil and gas fields are operational in Kazakhstan, 62 of them located in the Atyrau region. One of the largest oil fields in the region is Tengiz, which has reserves from 750 million to 1.125 billion tons of oil. Atyrau Oil Refinery is the country's third largest refinery after Shymkent and Pavlodar. It has a capacity of 16,600 m³/day. Mining is also well developed in the Atyrau region, which can boast vast reserves of boron, gypsum, chalk and salt. Mechanical engineering of the region specializes on equipment for the oil and gas industry and shipyards. Another industry that plays significant role in the regional economy is fishing. Products of Atyraubalyk Fish Cannery were awarded at prestigious exhibitions. An active oil field was observed at km 380, close to Mukur.

D.3.2 Infrastructure and Transportation facilities

165. Within the Project corridor medium voltage transmission lines (approximately km 390) were noted and gas pipelines. Low voltage transmission lines and gas pipelines were also present within the settlements through which the Project road passes. The Project corridor also broadly follows the railway line connecting Aktau, Atyrau and Aktobe. The Project road crosses the railway at the northern edge of Bayganin village and as such a re-alignment of the road is proposed in this section to include an overpass of the railway (see **Section C.7.2 – Alternatives**, for more details).

D.3.3 Land use

166. Agricultural land-uses are limited in the entire road corridor due to the harsh environmental conditions and the general lack of suitable water for irrigation. Agricultural cropland is nowhere recorded or visible along the entire road. The prevailing non-industrial land-use in the project area is cattle grazing (mostly horse and sheep grazing) because of the vastness of desert and steppe terrain. Quality and availability of pasture land and fodder plants varies along the road alignment—becoming more abundant in the dry steppe area of the Aktobe region.

Table D-4: Total Agricultural Output in the Project Area, 2014

Project Area	Livestock breeding, head				Crop/vegetable production, tons			
	cows	sheep/goats	horses	camels	grain & legume	vegetables	melons &squash	potatoes
Aktobe Section (160-330 km)								
Temirskiy rayon	41,667	130,307	6,444	286	310.6	1,113.8	515	903.2
Bayganin rayon	32,247	116,085	7,293	3,288	-	352.4	68.3	172.5
Atyrau Section (330-468 km)								
Kzylkoginskiy rayon	25,841	113,402	7,674	1,386	-	87.4	56	81.9

Source: Aktobe and Atyrau Oblast Departments of Statistics, 2014

D.4 Social and Cultural Resources

D.4.1 Population and communities

Aktobe section (160-330 km):

167. Aktobe oblast is the second largest oblast in Kazakhstan (after Karaganda oblast) occupying 300,600 km^2, or 11% of the country's territory. The Aktobe oblast includes the city of Aktobe, 12 rayons, 4 small towns, 140 rural okrugs and 419 rural settlements. Total population of the Aktobe oblast as of January 1, 2015 was estimated at 822,522 residents with 62% (or 510,568) living in urban areas and 38% (or 311,944) in rural areas[20]. The project area covers two rayons: Bayganin (22,910 people) and Temir (37,486 people) rayons with rayon centers in Bayganin village and Shubarkaduk village respectively.

Atyrau section (330-504 km):

168. Atyrau oblast occupies an area of 118,631 km^2. The Atyrau oblast includes to urban areas (Atyrau, oblast capital; Kulsary – rayon centre), 65 rural okrugs, 174 rural settlements in 7 rayons. Total population of the Atyrau oblast as of January 1, 2015 was estimated at 581,473 residents with 47% (or 274,368) living in urban areas and 53% (or 307,105) in rural areas. The project area runs through the Kzyl-Kuginsky rayon with Miyaly village as its rayon center. The rayon area covers 24,900 km^2 and it mostly a plain area.

D.4.2 Health & Education facilities

169. Education is universal in Kazakhstan and mandatory through to the secondary level, and the adult literacy rate is 99.5%.[21] The school system is well developed and diversified in both target regions, ranging from pre-schools/kindergarten and primary schools to secondary school types. Higher education facilities include universities (7 in Aktobe region, 8 in Atyrau region) and colleges (37 in Aktobe region, 24 in Atyrau region). The majority of all higher education opportunities are concentrated in Aktobe and Atyrau. Several schools were noted in some of the settlements through which the Project road passes (Bayganin Technical College & Sagiz Agricultural and Technical State college), but none were noted within 50 meters of the RoW. A hospital was noted approximately 100 meters from the roadside in Shubarkaduk.

D.4.3 Socio-economic conditions

Economy

Aktobe section (160-330 km):

170. In terms of the economically active population, the statistical data show that the majority of people in Aktobe oblast are employed in the industrial sector, mainly oil and mining (73%), public sector and general service (retail) sector. The self-employed proportion of the population account for about 27%. In the Atyrau region, of the total population about 32% are employed by organizations/enterprises/business, of which large and SMEs employ about 75% of available labor force in the region. Unemployment rate is about 5% in both regions.

[20] Committee on Statistics of the Ministry of National Economy (2015); www.stat.gov.kz
[21] http://www.collegeatlas.org/kazakhstan-colleges-universities.html

171. Within the Project area main the main sources of employment include the oil & gas industries (Bayganin & Temirskiy rayons contribute about 38% of total oblast production in this sector, contribution of the Kzylkoginskiy rayon accounts for over 90%), cattle breeding, retail business (mostly small shop-keeping) and the public sector (rayon and village akimat administrations). The registered unemployment rate in the project rayons as of July 2015 is rather lower, about 0.2%.

Table D-5: Small & Medium-Size Enterprises in the Project Area, 2015

Project Area	Total no of registered SMEs	Including			Total no of operational SMEs	Including		
		Legal entitie	Individual entrepreneur	Agr. farm		Legal entitie	Individual entrepreneur	Agricultural farms
Aktobe section (160-330 km)								
Temirskiy rayon	1 648	65	1 298	285	1 613	51	1 277	285
Bayganin rayon	*1 222*	31	920	271	1 168	20	880	268
Atyrau section (330-468 km)								
Kzylkoginskiy rayon	1 136	62	917	157	1 116	57	903	156

Source: Social and Economic Development of Atyrau Oblast. Atyrau Oblast Department of Statistics (July 2015). Social and Economic Development of Aktobe Oblast. Aktobe Oblast Department of Statistics (July 2015).

Ethnic Groups

Aktobe section (160-330 km):

172. Of total population, Kazakhs represent 80%, Russians - 12.5% and other ethnic groups include Ukrainians, Tatars, Germans, Koreans, Chechens, Belorussians, Azeri, Uzbeks, and other minorities.

Atyrau section (330-504 km):

173. Of total population, Kazakhs represent 92%, Russians – 6%, other ethnic groups include Koreans, Tatars, Ukrainians, Germans, Uzbeks, Azeri, Armenians, and other minorities.

Languages

174. Kazakhstan is officially a bilingual country: Kazakh language spoken natively by 64.4% of the population has the status of "state" language, whereas Russian, which is spoken by most Kazakhstanis, is declared an "official" language, and is used routinely in business, government, and inter-ethnic communication. Other minority languages spoken in Kazakhstan include Uzbek, Ukrainian, Uyghur, Kyrgyz, and Tatar.[22]

Religion

175. According to its Constitution, Kazakhstan is a secular state. Religious freedoms are guaranteed by Article 39 of Kazakhstan's Constitution. Article 39 states: "Human rights and freedoms shall not be restricted in any way". According to the 2009 Census, 70% of the population is Muslim, 26% Christian, 0.1% Buddhists, 0.2% others (mostly Jews, and 3% Irreligious.[23]

[22] http://www.inform.kz/eng/article/2741711
[23] Results of the national population census of 2009. Agency of Statistics of the Republic of Kazakhstan. 2010. Retrieved from stat.gov.kz on July 20, 2015.

D.4.4 Physical and Cultural Resources

Aktobe section (160-330 km):

176. No items of physical or cultural heritage were noted within the RoW of this section of the Project Road.

Atyrau section (330-504 km):

177. According to the Archaeological Expertise published in the PEIA of the Kostnaidorproject (2015) no archaeological/historical assets were located along the road alignment. However, a cemetery was noted within 20 meters of the road at km 374 (see **figure D-8**)

Figure D-8: Graveyard, km 374

D.4.5 Noise & Vibration

178. Noise is often explained as sound that is unwanted by the listener. Sound is a wave motion carried by air particles between the source and the receiver, usually the ear. Sound, pressure and noise are measured in units of decibel (dB) using a logarithmic scale. If a sound is increased by 10 dB, it is perceived as a doubling in loudness. Changes in a sound by 3 dB(A) is barely perceptible to the human ear. Noise standards in Kazakhstan are described in **Section B.3.3** above. Given the current low-moderate level of road traffic and general lack of industrial activity within the Project Corridor, noise is not considered to be a key environmental issue in the Project area at present. No sensitive receptors were identified within 50 meters of the Project road.

E. Screening of Potential Environmental Impacts and Mitigation Measures

E.1 Introduction

179. This section of the IEE details the Projects potential impacts and proposes mitigation measures to limit any negative impacts identified. The first items discuss the types and phases of the impacts. The report then presents the impacts and mitigation in detail for the three portions of the Project in the subsections as follows:

- Physical Resources
  - Air quality & Climate Change
  - Topography
  - Soils
  - Hydrology
  - Geology & Sesmicity
- Ecological Resources
  - Flora
  - Fauna
  - Forests & Protected areas
- Economic Development
  - Industries
  - Infrastructure & Transportation Facilities
  - Land use
  - Waste Management
- Social and Cultural Resources
  - Population and communities
  - Health & Education
  - Socio-economic conditions
  - Physical and Cultural Resources
  - Noise

E.2 Impact Phases

180. This impact assessment and mitigating measures cover the entire cycle of the project activities, from pre-construction to construction and operation and maintenance. The coverage of each of this sub-project phases is defined as follows:

- Feasibility / Design Phase, or the Pre-construction Phase
- Construction Phase
- Operation Phase

E.3 Types of Impacts

181. The types of impacts that may arise during Project works can be classified as follows:

- Direct Impacts - i.e., those directly due to the Project itself such as the impacts to air quality resulting from construction activities, equipment and vehicles. Direct impacts also include the impact of construction expenditures in the local economy.
- Indirect Impacts - i.e., those resulting from activities prompted by the Project, but not directly attributable to it. The use of rock and other construction materials, for example, has an indirect impact of increasing the demand for these materials.
- Cumulative Impacts - i.e., impacts in conjunction with other activities. A single road improvement may not exert a significant environmental impact, but if several roads are

developed in the same area developing a road network the cumulative or additive effect could be more significant.

182. Impacts in all three categories may be either:

- Short-term – i.e., impacts which occur during construction and affect land use, air quality and other factors. Many of these impacts, however, will be short-lived and without long-lasting effects. Even the effects of some relatively significant impacts such as borrow pits, for example, may be eventually erased if appropriate mitigation actions are taken. Many potential short-term negative impacts can be avoided or otherwise mitigated through proper engineering designs and by requiring Contractors to apply environmentally appropriate construction methods. Or;
- Long-term – i.e., construction impacts that could, for example, affect regional hydrology and flooding if poor design practices are used.

183. Both short-term and long-term impacts may be either beneficial or adverse. Short-term positive impacts will include, for example, the generation of employment opportunities during construction period. Long-term benefits will include enhanced development opportunities, improved transport services, easier access to commercial and service facilities; faster communications and commodity transport; improved access to markets and growth centers and increased services and commercial facilities.

E.4 Mitigation Aspects

184. Mitigation is recommended through strategic avoidance combined with construction and monitoring. Bid and contract documents are recommended to specify that a Site Specific EMP (SSEMP) shall be required for both road Projects. The Contractor shall ensure that the SSEMP is submitted to the Engineer for review at least 10 days before taking possession of any work site. No access to the site will be allowed until the SSEMP is reviewed and approved by the Engineer (and potentially the Project Management Consultant).

E.5 Summary of Impacts

185. **Table E-1** provides a summary of the potential Project impacts that are discussed in detail under **Sections E-6** to **E-8**.

Table E-1: Summary Impact Table

	Physical Characteristic						**Biological Characteristic**			**Socio-economic Characteristic**									
	Geology	Topography	Soils	Climate and Air Quality	Hydrology	Natural Hazards	Flora	Fauna	Protected Areas	Infrastructure	Land Use	Waste Management	Population	Community Structure	Socio-economic	Public Health & Safety	Educational Facilities	Cultural Heritage	Noise
Alignment Changes			D/L				D/S			D/S	D/L					D/L		D/S	D/L
Animal Crossings			D/S					D/L				D/S							D/S
Land Acquisition											D/L				D\L				
Borrow Pits	D/L	D/L	D/L	D/L			D/L									D/L			D/L
Asphalt Plants			D/L	D/L	D/S		D/S					D/L				D/L			D/L
Construction Camp			D/L	D/L	D/S		D/S					D/L			D/L	D/L			D/L
Storage Areas			D/L	D/L	D/S		D/S					D/L				D/L			D/L
Haul Routes			D/L	D/L						D/L						D/L	D/L		D/L
Site Clearance			D/L		D/L		D/L	D/L			D/L	D/S							D/S
Pavement construction		D/S	D/S	D/S	D/S		D/S			D/S		D/S				D/S	D/S		D/S
Bridge construction			D/S	D/S	D/L		D/L	D/L				D/S				D/S			D/S
Culverts			D/S	D/S	D/L			D/S				D/S				D/S			D/S
Earthworks	D/L	D/L	D/S	D/S	D/S		D/S	D/S		D/S	D/S	D/S				D/S			D/S
Removal of Vegetation			D/L		D/L		D/L	D/L			D/L				D/S				
Relocation of Services										D/L	D/L		D/L	D/L	D/L				
Increased traffic				D/L											D/L	D/L	D/L		D/L

D = Direct Impact	S = Short-term Impact	L= Long term Impact		Potential Positive Impact		Potential Low/Medium Impact		Potential High Impact

E.6 Physical Resources

E.6.1 Air quality & Climate Change

Potential Impacts

186. The potential impacts of the Project to air quality and climate change are described as follows:

Construction Phase

187. During construction of the road, air quality is likely to be degraded by a range of operational activities including:

- Exhaust emissions from the operation of construction machinery and the combustion of fuel for furnaces and boilers (e.g. Nitrogen Oxides (NOx), Sulphur Oxides (Sox) and Carbon Monoxide (CO));
- Open burning of waste materials; and
- Dust (Particulate Matter (PM)) generated from quarries, borrow pits, haul roads, unpaved roads, exposed soils and material stock-piles.

188. Dust is the major air quality problem from construction sites. Dust is a problem for a variety of reasons, as outlined below:

- Inconvenience to local people. For example, people may have to re-wash laundry that has been put outdoors to dry, and wash windows, curtains and vehicles. Dust can contaminate meat hanging up in open-air butchers and other food that is exposed to it in homes, shops and open-air restaurants, giving food a gritty texture.
- Health and safety problems. Dust may affect health by irritating eyes and worsening the health of people with asthma. Dust can reduce visibility for drivers on roads. It can also be blown for long distances by the wind.
- Crop damage. Even low concentrations of dust can affect plant and fruit growth as far away as one kilometer from a construction site. Plant growth is particularly susceptible to dusts that are highly alkaline, for example limestone and cement dust. Dust deposited during light rainfall can cause the soil surface to form a crust increasing run-off.
- Impact on ecology. Dust blowing onto watercourses may damage ecology by increasing sedimentation, reducing sunlight and suffocating fish. It may also affect plant growth and change the species of plants growing in an area. Dust may also damage trees and other vegetation planted as part of the construction contract.
- Damage to plant and equipment. Within the construction site, dust can cause mechanical or electrical problems in sensitive equipment such as computers. It can also increase abrasion of moving parts in equipment and clogging of air filters.

189. However, the road rehabilitation works associated with the Project are generally intermittent and not permanent in a specific site, the works move along the Project road as work progresses and as such air quality impacts will be short term in specific locations. In addition, more than 95 % of the Project road is located in uninhabited rural areas with little or no agricultural land, thereby limiting the impacts of air pollution during the construction phase. Fugitive emissions will be emitted on a longer-term basis from

stationary sources such as quarries, borrow pits and asphalt plants. These sites can however be selected and be placed in an area where it can cause the least impact on human and ecologic receptors.

Operational Phase

190. According to the MID, traffic is anticipated to increase at around 4% per annum once the Project becomes operational. The main source of air pollution during the operational phase will be vehicles moving on the highway. The main pollutants are:

- Carbon monoxide (CO),
- Nitrogen oxides (NOx),
- Hydrocarbons (HC),
- Sulphur dioxide (SO_2),
- Lead (Pb),
- Carbon dioxide (CO_2),
- Polycyclic aromatic hydrocarbons (PAH),
- Particulate matter (PM) and
- Trace metals.

191. Some of these compounds can damage health and/or the environment. The concentration of pollutants generated by vehicles depends on factors such as the number, type and speed of vehicles. The effect of air pollution on local people depends on the distance between them and the road, wind direction, topography and other factors. The main direct effects are in the area closest to the road as the rapid dispersion and dilution of exhaust gases quickly reduces their concentrations to levels at which risks are minimal. However, given the relatively low population levels within Project corridor, it is unlikely that increased traffic volumes will have significant impacts to residents health in terms of NOx, CO and PAH pollution. In addition, once completed, current high levels of PM in areas where the road condition is poor will be substantially reduced. Improved vehicle performance on a new better road surface will also serve to alleviate potential air pollution levels to a modest degree.

192. Even though traffic will increase on the Project road, vehicle emissions are unlikely to contribute in any significant way to regional or global greenhouse gas levels. A Climate Change Risk Assessment has been prepared for the Project and indicates the following potential issues and risks:

1. Change in Temperature:
    a. Potential deterioration of pavement integrity, such as softening, traffic-related rutting, and migration of liquid asphalt due to increase in temperature (potentially by 4.6 degrees Celsius by 2085).
    b. Potential corrosion of steel reinforcements in concrete structures due to increase in surface salt levels in some locations resulting from increased evaporation due to increased temperatures.
    c. Potential for reduced pavement deterioration from less exposure to freezing, snow, and ice. Warmer winters could result in reductions in snow and ice removal costs, extend the construction season and improve the mobility/safety of passenger and freight.
2. Change in precipitation levels:
    a. Damage to roads and drainage systems due to flooding - more frequent as well as intense and heavy precipitation events can cause immediate

damages, undermine road structural integrity, affect the maintenance of roads, bridges and drainage systems.

b. Increases in heavy precipitation events/floods will also cause more weather-related accidents due to vehicle and road damages and poor visibility, delays, and traffic disruptions. However, embankments heights are being reduced to limit fatalities and serious injuries caused when vehicles roll off the road.
c. Increase in scouring of roads, bridges, and support structures.
d. Damage to infrastructure due to increased susceptibility to wildfires.

3. Sea level rise
    a. There is a lack of reliable data, information and analysis on the impacts of climate change on the Caspian Basin, particularly its impact on water level fluctuations and related social, environmental and economic consequences. It is possible that any rise in the sea level of the Caspian could make the area up to Makat vulnerable to flooding (from Atyrau to Makat the elevation is between -27 to -22 masl – with the Caspian Sea level around -29 masl. After Makat the road elevation rises rapidly to more than 50 meters above masl). However, currently there is no credible scientific data to make any certain assumption that increases in sea level of 2-7 meters could occur within the next 50 years.

Mitigation Actions

Pre-construction Phase

193. To adequately manage air quality impacts, the Contractor shall be responsible for the preparation of an Air Quality Plan, submitted to the Engineer as part of the SSEMP. The plan will detail the action to be taken to minimize dust generation (e.g. spraying un-surfaced roads with water, covering stock-piles, and blasting with use of small charges etc) and will identify the type, age and standard of equipment to be used and will also provide details of the air quality monitoring program for baseline and routine monitoring. The Plan shall also include contingencies for the accidental release of toxic air pollutants (or shall make reference to the Emergency Response Plan). More specifically, the plan will include the following provisions:

- *Exhaust emissions* - No furnaces, boilers or other similar plant or equipment using any fuel that may produce air pollutants will be installed without prior written consent of the Engineer. Construction equipment shall be maintained to a good standard and fitted with pollution control devices regularly monitored by the Contractor and Engineer.
- *Open burning of waste materials* - No burning of debris or other materials will occur on the Site without permission of the Engineer.
- *Dust generated from haul roads, unpaved roads, material stock piles, etc* - The Contractor shall ensure and that material stockpiles shall be located in sheltered areas and be covered with tarpaulins or other such suitable covering to prevent material becoming airborne. All trucks used for transporting materials to and from the site will be covered with canvas tarpaulins, or other acceptable type cover (which shall be properly secured) to prevent debris and/or materials from falling from or being blown off the vehicle(s). Hard surfaces will be required in construction areas with regular movements of vehicles. Effective use of water sprays will be implemented (e.g., all roads within the construction areas of the Site shall be sprayed

at least twice each day during days of no rainfall, and more if necessary to control dust to the satisfaction of the Engineer).

- *Construction Camp* – The Contractor shall ensure that all dust creating activities, such as rock crushing, concrete batching, etc should be sited downwind of any urban area and also downwind of site offices and accommodation at the Contractors camp.

194. In addition to the above plan, the following assessments associated with potential climate changes should be undertaken by the designers during the design stage of the Project:

- *Deterioration of pavement integrity* – Assessment should be undertaken to determine if a potential change in temperature of 5°C will require adaption of pavement design (e.g. change in the asphalt binder or in mineral aggregate).
- *Corrosion of steel reinforcements in concrete structures* – Assess if the use of Advanced concrete materials and structures will help improve the durability of concrete infrastructure and their adaptation to climate change
- *Damage to roads and drainage systems due to flooding* – Assessment of 1/50 year flood return period for all bridges and roads embankment and recommend measures to mitigate the flood risks of all planned project roads. Increase capacity of side and cross drains to accommodate more intense floods.
- *Increase in scouring of roads, bridges, and support structures* – Assess designs of piers, abutments and embankments to determine if protection methods (e.g. rip-rap) are required to cope with additional water volumes and increased flow intensity.
- *Sea level rise* – No action required due to the uncertainty of this event.

Construction Phase

194. Locations for quarry sites, borrow pits and asphalt plants shall require approval from the Engineer and TEPOs during the Construction phase. Efforts should be made to ensure that these facilities are as near to the Project road as practical to avoid unnecessary journeys and potential dust issues from vehicle movements during construction works. In addition, no quarry or asphalt plant shall be located within one kilometer of any urban area or sensitive receptor. The locations of these facilities shall be indicated within the Contractors SSEMP. Baseline air quality monitoring shall also be undertaken by the Contractor as described below under recommended monitoring.

Operational Phase

195. Warning systems should be put in place to ensure the affected road section is closed during extreme wildfire events.

Instrumental Monitoring

196. Regular monitoring of air pollution against Kazakh standards (and international, e.g World Health Organization (WHO), for any parameters not covered by local regulations) shall be carried out throughout the construction period. The party responsible for monitoring will be the Contractor, who will be obliged to report to the Engineer as well as TEPOs. The following air quality monitoring actions are required:

Construction Phase

196. Baseline Air Quality Survey – Air quality monitoring shall be carried out to determine the baseline levels of the air quality at specified monitoring stations as indicated by the EMP. Baseline monitoring is required to be carried out prior to the start of construction by the Contractor for a one-week period with measurements to be taken at each monitoring station according to the frequency schedule specified in the EMP.

197. Routine Air Quality Monitoring – Air quality shall be monitored for the Project once per quarter during the course of the Works. Monitoring results shall be submitted to the Engineer two working days from the completion of the monitoring period for analysis and review. Actions taken in response to the monitoring results shall also be required. Additional monitoring shall be undertaken as deemed warranted by the Engineer.

E.6.2 Topography

Potential Impacts

Pre-construction Phase

198. The Project location in this instance has been determined by the existing RoW to be rehabilitated. No significant alteration in realignment is included in the Project with the exception of the 14 km of alignment changes described in **Section C.7.2 - Alternatives**. However, given that both of these sections are located on relatively flat areas no impacts to topography are anticipated.

Construction Phase

199. Potential impacts to area topography are most likely to occur in this phase due to quarry operations. Crushed rock material will be needed for construction purposes. Operation of quarries can have significant environmental problems if not managed correctly, more specifically uncontrolled excavation of rock material can leave unsightly scars on mountain sides and can also potentially make slopes unstable.

Mitigation Actions

Construction Phase

200. It is most likely that quarried material will be procured from existing, licensed quarries. If this is the case, the Contractor must provide copies of agreements with the quarry operator for the procurement of aggregates and the quarries operational license to the Engineer prior to the commencement of construction. However, the Contractor may decide to open and operate his own quarry. In this instance potential adverse impacts to topography in the Project Area resulting from quarry operations shall be avoided or otherwise mitigated by ensuring the Contractor complies with the following:

- Quarry sites must obtain the required permits prior to commencement of works, this shall include approval from the TEPO and the Engineer (and OVOs if required). Efforts should be made to ensure that quarries selected are as near to the site as practical to avoid unnecessary journeys. However, no quarry shall be located within one kilometer of any urban area or sensitive receptor. The locations of the quarries shall be indicated within the Contractors SSEMP. In addition, Contractors should

ensure that quarries and crusher plants are located at least one kilometer from urban areas to prevent noise and dust impacts and where possible located on government owned lands.

E.6.3 Soils

Potential Impacts

Construction Phase

201. The decision to restrict the Project road to within the existing RoW and carriageway (with the exception of the afore mentioned re-alignments), will keep soils related construction impacts to a minimum. Potential impacts to this component may however include:

- Borrow Pits – Opening and operating of borrow pits can result in multiple environmental and social impacts, including degradation of production soils, flora and habitat, impacts to air quality, elevated noise levels, etc. The Designers have already identified existing and potential borrow pits (see **Table C-4**, **Section C.5.3 – Source of Construction Materials**). However, the Contractor shall make the final decisions on the borrow pits that he wished to use. The existing borrow pits identified by **Table C-4** have already received approval from the Rayon Akimats and all other responsible institutions including environmental approvals. They are available for use by any contractor depending on the contractor's precise requirements. The contractor will not own or have an interest in the ownership of these borrow pits, the contractor merely enters into a contract with the owner/operator of the borrow pit to buy specified amounts to an agreed specification.
- Contamination Due to Spills or Hazardous Materials - Potential soil contamination is a possibility resulting from poorly managed fuels, oils and other hazardous liquids used during the project works.
- Erosion – It is possible, that without adequate protection measures soil erosion could occur on road embankments and bridge embankments. It is also possible, that stockpiles of soil located close to close to surface waters could infiltrate the water courses during heavy rainfall and cause siltation of the rivers. However, given limited precipitation levels in the Project area, this last point is unlikely to be a significant.

Operational Phase

- Induced Changes - Induced changes in the Project Area leading to industrial and commercial development are conceivable. However, due to the limited agricultural activity in the project area any impacts to productive soils due to induced growth will be minimal.

Mitigation Actions

Construction Phase

202. Mitigation related to the potential soil-related impacts is recommended as follows:

- Borrow Pits. For existing borrow pits a due diligence review will be carried out by the Engineer to confirm that those sites identified for use by the Contractor are indeed operating or operable in an appropriate manner. This will include review of the borrow pits operational license. The license should clearly show the validity of the operational period of the borrow pit. A copy of the agreement between the operator and the Contractor should also be provided to the Engineer. If the Contractor intends to open any new borrow pits not listed in **Table C-4** they will require approval from a range of local government institutions including an inter-regional committee of the Oblast. An EIA will need to be prepared by consultants for the owner/operator (the Contractor). In addition, for any new borrow pit to be operated by the Contractor, the Contractor will be responsible for the preparation of a Borrow Pit Action Plan (BAP). The BAP will be submitted to the Engineer prior to the start of construction. The plan will identify the locations of all proposed borrow pits which will also be approved by both the Engineer and representatives of the TEPOs. The plan shall ensure that:
  - Pit restoration will follow the completion of works in full compliance all applicable standards and specifications.
  - Arrangements for opening and using material borrow pits will contain enforceable provisions.
  - The excavation and restoration of the borrow areas and their surroundings, in an environmentally sound manner to the satisfaction of the Engineer will be required before final acceptance and payment under the terms of contracts.
  - Additional borrow pits will not be opened without the restoration of those areas no longer in use.

  The total approval process for a new borrow pit through the Oblast and Rayon can be lengthy, as such the Contractor is recommended to use existing borrow pits with the existing approvals rather than try to use new sites for the extraction of material.
- Erosion - During construction, the Contractor will be responsible for ensuing material that is less susceptible to erosion will be selected for placement around bridges and culverts. In addition he shall ensure re-vegetation of exposed areas including; (i) selection of fast growing and grazing resistant species of local grasses and shrubs; (ii) immediate re-vegetation of all slopes and embankments; (iii) placement of fiber mats to encourage vegetation growth. The Engineer and the Contractor will both be responsible for ensuing that embankments are monitored during continuously during construction for signs of erosion.
- Conversion of Agricultural Soils Due to Indirect/Induced Impacts. Although the EMP contains provisions controlling direct impacts of land takings for both the road and ancillary functions (asphalt plants, construction camps, etc.), control of the induced impacts is largely beyond the scope of the Project.
- Contamination Due to Spills or Hazardous Materials. The Contractor, with oversight from the Engineer, shall ensure that:
  - All fuel and chemical storage (if any) shall be sited on an impervious base within a bund and secured by fencing. The storage area shall be located away from any watercourse or wetlands. The base and bund walls shall be impermeable and of sufficient capacity to contain 110 percent of the volume of tanks.
  - The construction camp maintenance yard shall be constructed on impervious hardstanding with adequate drainage to collect spills, there shall be no vehicle maintenance activities on open ground.
  - Filling and refueling shall be strictly controlled and subject to formal procedures. Drip pans shall be placed under all filling and fueling areas. Waste oils shall be stored and disposed of by a licensed contractor.

  - All valves and trigger guns shall be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use.
  - The contents of any tank or drum shall be clearly marked. Measures shall be taken to ensure that no contaminated discharges enter any soils.
  - No bitumen drums or containers, full or used, shall be stored on open ground. They shall only be stored on impervious hardstanding.
  - Areas using bitumen shall be constructed on impervious hardstanding to prevent seepage of oils into the soils.
- In addition to the above, the Contractor will be responsible for preparation of an Emergency Response Plan (ERP) which will cover containment of hazardous materials, oil spills, and work-site accidents. The plan will detail the process for handling, and subsequently reporting, emergencies, and specify the organizational structure (including responsibilities of nominated personnel). The plan will be submitted to the Engineer for approval. Implementation of the plan will be monitored by the Engineer. Any emergencies, and how they were handled, will be reported in monthly progress reports by the Contractor to the Engineer. The Engineer will also provide periodic monitoring of the Contractors works throughout construction to ensure the ERP is implemented effectively. An outline of the Engineers responsibilities are provided in the EMP.

E.6.4 Hydrology – Surface Water

Potential Impacts

Construction Phase

- Construction Camps – Improper siting and design of construction camps can have negative impacts to hydrology through improper disposal of liquid waste and spills of hazardous liquids. Poor management of sanitary waste and accidental spills of hazardous liquids from construction camps can also have negative impacts on ground and surface water.
- Bridge Construction - Bridge construction activities may increase silt load in the river during construction at bridge sites and may result in accidental spillage of concrete and liquid waste into the river. This may impact upon the ecology of rivers including fish species.

Mitigation Actions

Construction Phase

203. Potential adverse impacts in the Project Area will be avoided or otherwise mitigated by ensuring the Contractor complies with the following:

- Construction Camps – The Contractor shall be responsible for the preparation of a Construction Camp Site Plan which will form part of the SSEMP. The Plan shall indicate the system proposed and the locations of related facilities in the site, including latrines, holding areas, etc. The Contractor shall ensure the following conditions are met within the Plan:
  1. Rain-water run-off arising on the site shall be collected, removed from the site via a suitable and properly designed temporary drainage system and disposed of at

a location and in a manner that will cause neither pollution nor nuisance. The drainage system should be fitted with oil and grease interceptors.

2. There shall be no direct discharge of sanitary or wash water to surface water. Septic tanks shall be provided at construction camps for sewage water. Licensed contractors will be required to collect and disposal of liquid waste from the septic tanks on regular basis.
3. Disposal of materials such as, but not limited to, lubricating oil and onto the ground or water bodies shall be prohibited.
4. Liquid material storage containment areas shall not drain directly to surface water.
5. Lubricating and fuel oil spills shall be cleaned up immediately and spill clean-up shall be materials be maintained at the storage area.
6. Construction and work sites will be equipped with sanitary latrines that do not pollute surface waters and are connected to septic tanks, or waste water treatment facilities.
7. Discharge of sediment-laden construction water directly into surface watercourses will be forbidden. Sediment laden construction water will be discharged into settling lagoons or tanks prior to final discharge.
8. Washing out concrete trucks at construction sites shall be prohibited unless specific concrete washout areas are provided for this purpose at the construction site (e.g. a bridge site). The washouts should be impermeable and emptied when 75% full.
9. Spill clean up equipment will be maintained on site (including at the site maintenance yard and vehicle fueling areas). The following conditions to avoid adverse impacts due to improper fuel and chemical storage:
   - Fueling operations shall occur only within containment areas.
   - All fuel and chemical storage (if any) shall be sited on an impervious base within a bund and secured by fencing. The storage area shall be located away from any watercourse or wetlands. The base and bund walls shall be impermeable and of sufficient capacity to contain 110 percent of the volume of tanks.
   - Filling and refueling shall be strictly controlled and subject to formal procedures and will take place within areas surrounded by bunds to contain spills / leaks of potentially contaminating liquids.
   - All valves and trigger guns shall be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use.
   - The contents of any tank or drum shall be clearly marked. Measures shall be taken to ensure that no contaminated discharges enter any drain or watercourses.
   - Disposal of lubricating oil and other potentially hazardous liquids onto the ground or water bodies will be prohibited.
   - Should any accidental spills occur immediate clean up will be undertaken and all cleanup materials stored in a secure area for disposal to a site authorized to dispose of hazardous waste.

204. Site plans shall be devised to ensure that, insofar as possible, all temporary construction facilities are locate at least 50 meters away from a water course, stream, or canal. If determined warranted by the Engineer, the Contractor shall provide a wash pit or a wheel washing and/or vehicle cleaning facility at the exits from the sites. If so requested, the Contractor shall ensure that all vehicle are properly cleaned (bodies and tires are free of sand and mud) prior to leaving the site

areas. The Contractor shall provide necessary cleaning facilities on site and ensure that no water or debris from such cleaning operations is deposited off-site. The Engineer shall undertake regular monitoring of the construction camps on both roads and the storage areas to ensure compliance with the SSEMP and the Construction Camp Site Plan.

- Bridge Construction - The Contractor shall consult with the TEPOs to establish the fish spawning period in relation to the bridge construction works. The Contractor shall ensure that all works are undertaken in periods least likely to affect the fish spawning period. In addition, concerning bridge construction works, the Contractor shall:
  1. Divert the water flow near the bridge piers.
  2. Coffer dams, silt fences, sediment barriers or other devices will be provided to prevent migration of silt during construction within streams.
  3. Dewatering and cleaning of cofferdams will be performed to prevent siltation by pumping from cofferdams to a settling basin or a containment unit.
  4. Carry out bridge construction works without interrupting the traffic on the Project Road.
  5. Ensure no waste materials are dumped in the river, including re-enforced concrete debris.

E.6.5 Hydrology – Groundwater

Potential Impacts

Construction Phase

205. Project works have the potential to impact subsurface hydrology in a variety of ways. The most significant being groundwater pollution form construction works (including impacts resulting from construction camps) and extraction of limited groundwater resources for construction activities. In adition, uncontrolled extraction of groundwater for construction use and for potable water supplies via boreholes can have negative environmental and social consequences.

Mitigation Actions

206. The mitigation measures outlined in **Section E.5.4**, Hydrology – Surface water, should prevent impacts to groundwater as well as surface water. For example, the conditions relating to accidental spills will also prevent impacts to groundwater (and also to soils). Regarding extraction of groundwater; it is unlikely that groundwater will be required for construction activities with the exception of use as potable drinking water at the construction camps (and perhaps for activities such as use in laboratories). If boreholes are constructed at construction camps it is likely that the water will also be used for other activities such as water for washing, cooking, cleaning of the site and vehicles. This may result in a significant consumption over the construction period. As such, the Contractor is required to obtain all necessary permits for the drilling and operating of a borehole during the construction period. The Engineer will ensure that all appropriate permits are in place before excavation of boreholes can begin.

E.6.6 Geology & Seismicity

Potential Impacts

207. Rock materials will be obtained from quarries and hauled by road to the sites as needed. Existing sources, if in active operation, are expected to be used in most cases although Contractors may elect to use other supply options provided they are cost competitive and provide rock meeting established quality standards. Issues relating to quarried materials are discussed above under **E.6.2 - Topography**. The Project corridor is not located within a seismically active area.

Mitigation Actions

208. Actions to ensure the use of proper sources of rock have been noted above to the degree warranted by the nature of the Project. Other than the actions as noted and adherence to good engineering practice, no mitigation actions related geological characteristics are warranted.

E.7 Ecological Resources

E.7.1 Flora

Potential Impacts

209. Minor impacts upon habitats and flora in the project area are expected as a result of the road works. Rehabilitation work will cause minor degradation of local ecology through the clearance of areas of vegetation – mostly ground cover - at work sites and ancillary sites. However, no trees will need to be cut as part of the Project and no special status flora have been identified within the vicinity of the Project Road that maybe adversely affected. In addition, construction of the road will allow areas adjacent to the road that are currently used as alternative roadways (due to the existing deteriorated pavement) to return to their original natural condition (See **Appendix A – Environmental Setting**).

210. During site visits in August, 2015 a number of natural steppe fires were notes. Fires are one of the natural processes that help to maintain healthy and diverse grassland vegetation. A steep embankment can stop the spread of fire. If fires become less frequent, larger, hotter and more dangerous fires will occur. Changes in vegetation composition can occur if fire suppression happens over long periods of time. A natural fire regime will result in a mosaic of burned and unburned vegetation patches which facilitates the growth of more nutritious plants and helps maintain the presence of fire dependent species.

Mitigation Actions

211. Review of the typical road cross sections indicates that road embankments will not be steep, and in fact will have a lower gradient than at present for safety purposes (due to the fact that the road is long, flat and straight many accidents occur when drivers fall asleep at the wheel and the vehicles roll off the road and down the embankments. KAZ-Aktobe and KAZ-Atyrau have specified that the embankment gradient should be lower so that accidents are less likely to result in vehicle rolls.). As such, no steep embankments are planned that would prevent the natural steppe fires and no mitigation actions are required.

E.7.2 Fauna

Potential Impacts

212. Consideration has been given to potential direct impact to wildlife in the Project corridor due to:

- Habitat Loss - Improvements will occur within the existing RoW with little loss of habitat. Borrow pits and quarries used will either be operational or require the approval of the Engineer and TEPOs, and as such impacts to habitat will have either been mitigated or will require mitigation as part of any approval process. An IBA has been identified within the vicinity of Sagiz village. However, the IBA is located more than 2 km north west of the Project road and this habitat is therefore unlikely to be impacted directly by Project activities during both the construction and operational phases of the Project. Consultations with the Committee for Wildlife and Forestry in Aktobe and review of recent literature indicates that this area is no longer a habitat for Saiga Antelope.
- Habitat Fragmentation - Habitat fragmentation occurs when a road cuts through an ecosystem, fragmenting an area into weaker ecological sub-units, thus making the whole more vulnerable to invasion and degradation. In this instance, the fact that; a) proposed construction actions will occur within areas already devoted to transport, b) all improvement activities will be contained within the existing RoWs (with the exception of two re-alignments in urban areas), and c) that this area is no longer an important habitat for Saiga antelope, minimizes any potential for further habitat fragmentation.
- Accidents Involving Cattle. Increased traffic movements during the operational phase of the Project may result in increased traffic accidents with cattle.
- Rare and Endangered Species – Consultations with the Committee for Wildlife and Forestry in Aktobe and review of recent literature on the subject indicated that Saiga Antelope are not present within the Project area. The CWF did suggest that Saiga could potentially migrate to through the Project corridor in the future if there numbers increase. If they do return, it is likely to be in relatively small numbers at first, and they are unlikely to be impacted by construction works which are scheduled to commence within the next 12 months. However, in the longer term, any increased numbers of migrating Saiga in the operational period of the project could result in increased mortality as the antelope attempt to cross an increasingly busy road. In addition, it is possible that poaching of rare and endangered birds from the IBA by construction workers could occur during the construction phase if construction camps are located within close proximity of the IBA. No other rare and endangered species such as the steppe tortoise (Agrionemys horsfieldii) has been identified.

213. Consideration has also been given to potential indirect wildlife impacts under the following headings:

- Accessibility. Traffic volumes will increase quite rapidly in this relatively quite portion of the Project road once the Project becomes operational. This means than more people will have indirect access to the IBA which could potentially lead to poaching of rare and endangered species. However, the presence of the IBA was only revealed by an internet search and not by the CWF of Atyrau and Aktobe, which would lead one to believe this site is not particularly well known or advertised. As such it is considered unlikely that construction of the road would lead to poachers

accessing the IBA which is more than 2 km away from the Project road with no direct road access.

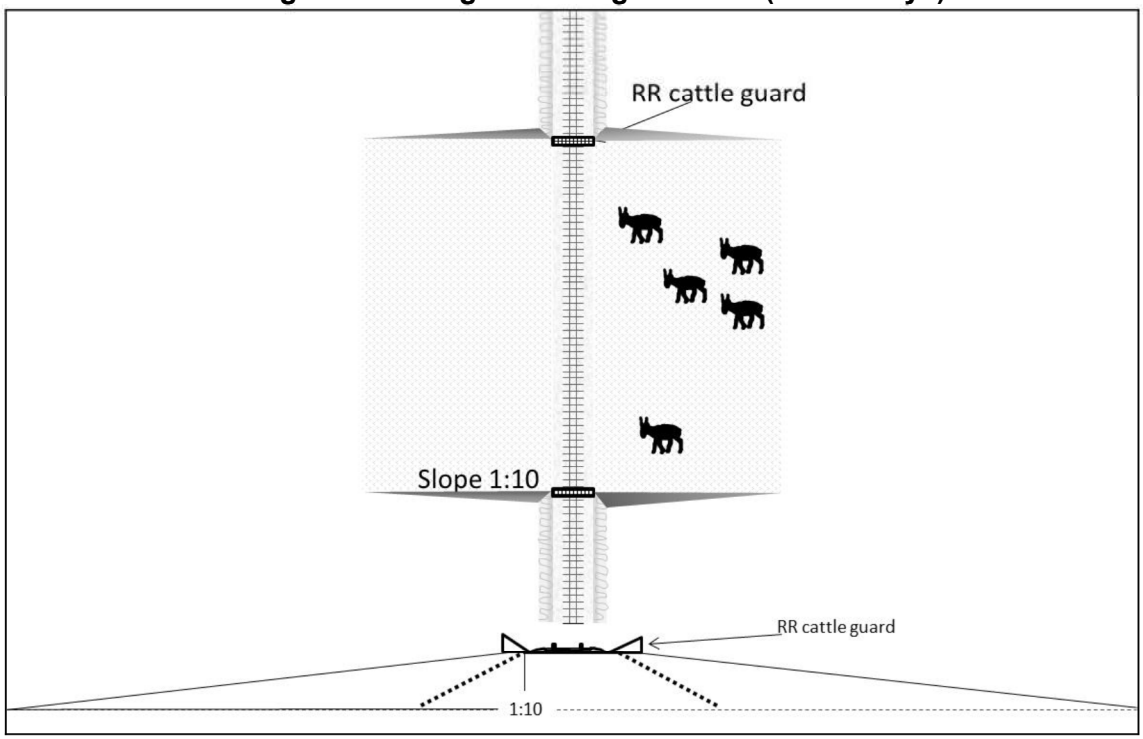
- Ecological Disequilibrium. Opening of a transport corridor sometimes results in the introduction of a new plant and animal species along the roadway upsetting the dynamic balance that exists in the ecosystem and altering predator-prey relationships. In this instance, the fact that the corridor is devoted to transport or otherwise altered by man minimizes any potential for ecological disequilibrium.

Mitigation Actions

- Accidents Involving Cattle. Cattle underpasses have been recommended at the settlements within the Project corridor. The EMP specifies the locations requested by local officials and residents during the consultation process.
- Rare and Endangered Species – Despite the fact that no Saiga Antelope have been recorded in the Project area. The CWF in Aktobe indicated that is a possibility, however remote, that Saiga could return to the Project area during the operational period of the Project. The potential migration routes of the Saiga within the Project corridor are not known and studies would have to be undertaken by Saiga specialists to estimate any potential routes that they may take in the future. It is understood that Saiga would not use underpasses and would therefore not be able to utilize the planned cattle underpasses (which anyway, are located within the close proximity of urban settlements which would most likely be avoided by the Saiga). That would leave two potential mitigation options which have both been identified by recent studies on the subject:
    3. Overpasses – Overpasses are effective, but costly. For example a total of 2 overpasses costing $2.5 million each were built along a 21 kilometer section of a highway corridor in Wyoming. Pronghorn antelope were quick to utilize the overpasses but were reluctant to use underpasses that were also built at part of the project.
    4. Crossing at Grade - Observations of Saiga crossing a road and railway several decades ago in the Betpak-Dala region of Kazakhstan suggest that Saiga are wary of these corridors and gather for periods of up to several days before finally crossing en masse. According to recent studies long segments of road which have tall embankments may prevent Saiga from continuing their migration unless they are motivated enough to continue alongside until the embankment is low enough to cross. Accordingly, crossing at grade (resembling a vehicle crossing at grade) is considered a potential option for the future. The expected dimensions of an at grade crossing are 50 meters in width and a 1:10 slope ratio (see **Figure E-1**). However, it should be noted that the Aktobe – Atyrau – Aktau railway is located to the south of the Project road in Aktobe. This means that Saiga antelope migrating from the south still have to cross the railway before they get to the road. The railway embankment is more than two meters high along much of its extent, this severely limits the migration route of the Saiga even before it can reach the Project road.
- Given that Saiga are no longer migrating within the Project corridor and the fact that the existing railway is a considerable barrier to their migration northwards prior to reaching the Project road it is considered unlikely that Saiga would return to the Project area in the short term. However, monitoring of the longer term situation should be undertaken by the CFW to assess if this situation changes and where the

new mitigation routes are. If the situation does change and Saiga start migrating further north over the railway and towards the road the CoR, in coordination with CFW should consider establishing at grade crossings (as depicted in **Figure E-1**) at locations identified by the CFW.

Figure E-1: Saiga Crossing at Grade (for railways)



- To prevent poaching of rare and endangered birds from the IBA by construction workers it is recommended that no construction camp, or construction facilities, such as asphalt plants, etc, are located within five kilometers of the IBA.
- Habitat Loss – As long as the mitigation relating to siting of construction camps and facilities is applied, it is unlikely that impacts to the IBA habitat will occur especially given the lack of direct access to this area.

E.7.3 Forests and Protected areas

Potential Impacts

214. No protected areas are within the vicinity of the Project area.

Mitigation Actions

215. None required.

E.8 Economic Development

E.8.1 Industries

Potential Impacts

216. Limited industrial activity is present within the project areas apart from some oil drilling close to Mukur. Significant negative impacts to industrial activities are therefore not anticipated. However, rehabilitation of the road has the potential to increase economic activity in the region and thus stimulate industrial activity within the valley.

Mitigation Actions

217. No mitigation required.

E.8.2 Infrastructure & Transportation Facilities

Potential Impacts

Infrastructure

218. Construction activities will include the demolition or rehabilitation of existing drainage structures and construction of new drainage structures along the alignment. Design errors could lead to portions of the drainage network operating below the required standard and lead to erosion of embankments, road washout, flooding, (due to inadequate flow of water through culverts) and dangerous driving conditions.

Transportation

219. The main impacts resulting from Project works will be road diversions and some temporary blocking of access routes. Road closure may occur for periods between one and two hours and as such is not a significant issue as long as the local population are given notice of the delays. Blocking of access routes will be temporary while structures, such as side drains and culverts, are constructed. Notwithstanding the above, the potential beneficial impacts to transport are significant. The road, when complete, will offer reduced travel times, smoother ride (resulting in less vehicle maintenance and less damage to perishable goods) and safer driving conditions.

Utilities

220. Medium and low voltage power lines and gas pipes are located within the Project corridor. Although unlikely, it is possible that transmission lines and gas pipes close road maybe impacted during construction.

Mitigation Actions

Infrastructure

221. Detailed designs will ensure that all drainage structures for both Project roads are sized and located correctly. During the construction phase the Engineer will ensure that the Contractor follows the design documents with respect to the required infrastructure facilities.

Transportation

222. To mitigate the potential impacts the Contractor should:

- Submit a Traffic Management Plan to local traffic authorities prior to mobilization and include the plan as part of his SSEMP;
- Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions;
- Allow for adequate traffic flow around construction areas;
- Provide adequate signalization, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control; and
- Provide temporary access where accessibility is temporarily restricted due to civil works.

223. Should the Contractor use any areas for borrow materials, any access roads should be maintained during the construction phase and rehabilitated at the end of construction by the contractor himself to the satisfaction of the local authorities and in compliance with the contract. Compliance shall be monitored by the Engineer throughout the construction period.

Utilities

224. During construction all power lines and gas pipes in the Project Corridor shall be kept operational, especially during the winter months. Temporary transmission lines may be required while existing poles and lines are moved.

E.8.3 Land use

Potential Impacts

Pre-construction Phase

225. As the road involves reconstruction and rehabilitation of an established road, the Project impact on the land acquisition is reduced to a minimum, with the exception of the two identified re-alignments. The Contractor shall prepare geometric design of the road in such a way that no land acquisition in addition to that included in the LARP is required in consequence of the design. For specific details of land acquisition, refer to the Project LARP.

Construction Phase

226. Potential impacts to land uses outside of the RoW during the construction stage are limited to the creation of Construction Camps and other ancillary facilities such as quarries. Construction workers camps constitute a temporary land use change and raise issues related to activities such as poaching of edible animals and birds of the locality in spite of prohibitions; poor sanitation arrangement and improper methods used for disposal of solid wastes and effluent; and transmission of communicable diseases to the local people by the construction workers due to inappropriate health monitoring facilities. Issues relating to quarries are discussed under the heading of Topography above.

Mitigation Actions

Pre-construction Phase

227. Under the terms of the agreement with the ADB, before the commencement of the construction works at any part of the Project, The Employer must prepare the Land Acquisition and Resettlement Plan (the LARP), obtain the approval of ADB and then implement the plan and acquire the land. The LARP will be processed by the Employer and ADB during the bidding period, and it does not require any action of the Contractor. It will be approved and implemented before the Commencement Date. Under the terms of the agreement with the ADB, the Employer must notify all persons affected by land acquisition, approximately one month before the commencement of works on the acquired land. The notice is required to give these persons sufficient time to remove their belongings and to salvage the material from any structure or to cut and remove any trees from the acquired land.

Construction Phase.

228. Contractors will be required to coordinate all construction camp activities with neighboring land uses. Contracts for the Project activities will also require construction operators to maintain and cleanup campsites and respect the rights of local landowners. If located outside the RoW, written agreements with local landowners for temporary use of the property will be required and sites must be restored to a level acceptable to the owner within a predetermined time period.

E.8.4 Waste Management

Potential Impacts

229. Road construction will inevitably generate solid and liquid waste products potentially including:

- Inert waste – for example, uncontaminated roads and soil, concrete, masonry and bricks, wood and plastics.
- Hazardous waste – acids and alkaline solutions, waste oils and oily sludge, batteries, asbestos, and bitumen.

230. In addition, uncontrolled discharges of sewage and 'grey water' (e.g. from washrooms and canteens) from construction sites and worker's camps may also cause odors and pollute local water resources. As well as being a cause of complaints by the local population, this may lead to contravention of local regulations and fines being imposed on the Contractor.

231. The main construction waste produced will be Asphalt.

Mitigation Actions

232. Where possible, surplus materials will be reused or recycled. Oils, fuels and chemicals (including bitumen, bridge deck waterproofing agents and concrete) are substances which are hazardous to human health. They need to be stored properly in correctly labeled containers, both within the construction camp and also at construction sites (e.g. bridges, culverts, etc). Bitumen, oil and fuel should be stored in tanks with lined bunds to contain spillage. Proper storage and handling of hazardous materials

reduces wastage and reduces the risk of spillage which could cause temporary or long-term contamination of the underlying soil and possibly to pollution of groundwater and/or watercourses; some (e.g. concrete) may have serious impacts on freshwater fauna. As well as being a cause of complaints by the local population, this may lead to contravention of local regulations and fines being imposed on the Contractor. Proper storage and management reduces the risk of vandalism and theft. Disposal of waste materials shall be undertaken by a waste management company contracted by the Contractor. The waste management company must have the required licenses to transport and dispose of both inert and hazardous waste (including medical) before any such waste is removed from the site. The Contractor will keep copies of the waste management company's licenses and provide waste transfer manifests at his camp site for routine inspection by the Engineer. The Contractor will also keep a record of the types and volumes of waste removed from the site on a weekly basis

233. Waste asphalt will be recycled where possible by KAZ-Atyrau / KAZ-Aktobe. Waste concrete and reinforced concrete will also require disposal, however, currently there are no locations available for the disposal of this type of waste. This waste should not however be left in or dumped into any river.

234. The issue of liquid waste is discussed above under item **E.6.4 – Hydrology**.

235. To ensure all of the above conditions are met, the Contractor shall be responsible for the preparation of a Waste Management and Recycling Plan. The Plan shall include items relating to the safe handling and management of:

- Domestic waste
- Food waste
- Inert garbage
- Recycled Waste (including Asphalt)
- Plastic
- Metals
- Wood
- Construction Waste
- Hazardous Waste
- Liquid Waste

236. The Plan shall be approved by the Engineer as part of the SSEMP approval process. Oversight of the implementation of the Plan is the responsibility of the Engineer as outlined in the EMP.

E.9 Social and Cultural Resources

E.9.1 Population and communities

Potential Impacts

237. In as much as the project is rehabilitation of the existing roads only, it does not have the social, economic and community life concerns that are associated with new road construction, this road improvement project is generally aimed at bringing benefits to surrounding communities through lower transport costs and better access to market places, jobs, and services such as health and education. Road construction and

rehabilitation projects can lead to changes in the community or social environment around the road, influencing various aspects of lifestyles, travel patterns, social and economic activities.

Mitigation Actions

238. Road construction works will have short-term negative impacts to the population of the road corridors, such as air quality and noise impacts and potential social impacts resulting from imported labor. However, in general the impacts to population and communities will be overwhelmingly beneficial from all project activities. Imported labor can however, also lead to a spread of sexually transmitted disease which is discussed below under **Item E.9.2**.

E.9.2 Health & Education

Potential Impacts

239. Potential impacts due to the proposed construction can be identified as follows:

- Easier access to health care facilities. Positive health impacts may result due to quicker response time in emergency situations and improved access to health care facilities for those living in remote areas.
- Air quality. Potential air quality issues are discussed above under item **E.6.1 – Air Quality and Climate**.
- Contamination of local water supplies during construction. Potential impacts to local water supplies include the possibility of temporary labor camps and the water supply and wastewater disposal associated with them during the construction period, these issues are discussed above under **Item E.6.4 – Hydrology**.
- Noise levels with health consequences. Potential noise issues are discussed in **Item E.9.5 – Noise and Vibration** below.
- Safety. Construction of the road may result in an increase in the total number of road traffic accidents between vehicles, pedestrians and vehicles and livestock and vehicles.
- Worker Safety. Accidents are common during a project of this size and scale. Accidents can occur if workers are not adequately trained or qualified for the job or if they have incorrect safety equipment and clothing.

Mitigation Actions

240. Construction of the road may result in an increase in the total number of road traffic accidents between vehicles, pedestrians and vehicles and livestock and vehicles. However, given that the traffic volumes are also anticipated to rise once construction is complete, the percentage of those affected by road accidents may actually decrease as a result of traffic safety measures, and improvements to the road condition. Traffic safety issues shall be accounted for during the design phase of the Project, they shall include:

- Safety barriers
- Traffic signs
- Road Crossings
- Speed Bumps
- Speed limits

241. A Health and Safety Plan shall be prepared by the Contractors to manage worker safety. The Plan shall include the following items:

1. Safety Training Program. A Safety Training Program is required and shall consist of:
    a. Initial Safety Induction Course. All workmen shall be required to attend a safety induction course within their first week on Site.
    b. Periodic Safety Training Courses. Period safety course shall be conducted not less than once every six months. All Subcontractor employees will be required to participate in relevant training courses appropriate to the nature, scale and duration of the subcontract works. Training courses for all workmen on the Site and at all levels of supervision and management.
2. Safety Meetings. Regular safety meetings will be conducted on a monthly basis and shall require attendance by the safety representatives of Subcontractors unless otherwise agreed by the Engineer. The Engineer will be notified of all safety meetings in advance. The Engineer may attend in person or by representative at his discretion. The minutes of all safety meetings will be taken and sent to the Engineer within seven (7) days of the meeting.
3. Safety Inspections. The Contractor shall regularly inspect, test and maintain all safety equipment, scaffolds, guardrails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing and guarding equipment. Lights and signs shall be kept clear of obstructions and legible to read. Equipment, which is damaged, dirty, incorrectly positioned or not in working order, shall be repaired or replaced immediately.
4. Safety Equipment and Clothing. Safety equipment and protective clothing are required to be available on the Site at all material times and measures for the effective enforcement of proper utilization and necessary replacement of such equipment and clothing, and all construction plant and equipment used on or around the Site shall be fitted with appropriate safety devices. These shall include but not be limited to:
    a. Effective safety catches for crane hooks and other lifting devices, and
    b. Functioning automatic warning devices and, where applicable, an up-to-date test certificate, for cranes and hoists.

242. In addition, all Project sub-contractors will be supplied with copies of the SSEMP. Provisions will be incorporated into all sub-contracts to ensure the compliance with the SSEMP at all tiers of the sub-contracting. All subcontractors will be required to appoint a safety representative who shall be available on the Site throughout the operational period of the respective sub-contract unless the Engineers approval to the contrary is given in writing. In the event of the Engineer's approval being given, the Engineer, without prejudice to their other duties and responsibilities, shall ensure, as far as is practically possible, that employees of subcontractors of all tiers are conversant with appropriate parts of the SSEMP.

243. It shall be a requirement of the Contract that the Contractor subcontracts with an Approved Service Provider to provide an HIV Awareness Program to the Contractor's Personnel and the Local Community as soon as practicable after the Contractor's Personnel arrive at the Site but in any case within two weeks after the Contractor's Personnel arrive at Site and to repeat the HIV Awareness Program at intervals not exceeding four months.

E.9.3 Socio-economic conditions

Potential Impacts

244. The Project is expected to have significant beneficial impacts to the economy of the project area. The key benefits include:

- Reduction in travel times – Journey times from Atyrau to Aktobe and between villages along the road will reduce.
- Reduction of maintenance costs – maintenance of vehicles due to poor road condition drives up the costs of transport.
- Increased Reconstruction effort in remote areas - improved access to these areas may also allow a more intense level of reconstruction effort in the remote areas including facilities such as schools and clinics.
- Improved access to health and education facilities – Improved road conditions will most likely result in increased traffic on the roads including mini-bus and taxi services, this will enable people to access health care and educational facilities more easily.
- Creation of Jobs - The community along the alignment of sub-project will have opportunities for temporary employment during construction. Albeit, this opportunity is temporary in nature, this will be beneficial.

Mitigation Actions

245. None required.

E.9.4 Physical and Cultural Resources

Potential Impacts

246. One of the issues that must be considered during the construction of the road is the preservation of physical cultural resources (PCR) such as historic and cultural monuments and including structures, memorials, cemeteries and burial sites, and other objects associated with historical events in the life of the community. Several cemeteries are located close to the road, all of them are outside of the right of way, however, one cemetery at km 374 is within 20 meters of the Project road. In addition, given the rich cultural heritage of this region of Kazakhstan it is possible that unexpected discoveries of physical and cultural resources could occur in the construction process.

Mitigation Actions

247. In the event of any chance finds during the construction works procedures shall apply that are governed by Kazakh legislation and guidelines, specifically by paragraph 2 of Article 39 of the “Law on Protection and Use of Historical and Cultural Heritage in the Republic of Kazakhstan” which stipulates: "*In case of detection of objects of historical, scientific, artistic, and other cultural value, physical and legal persons are obliged to suspend the further conduct of the work and inform the authorized body*. "

248. Regarding the cemetery at km 374, temporary fencing should be placed around the cemetery during the pre-construction phase to ensure no encroachment into this area during construction.

E.9.5 Noise & Vibration

Potential Impacts

Construction Phase

249. The various mechanical processes during the construction of roads are a source of intense noise, which can adversely affect humans. The intensity of the ambient noise of road machinery depends on the type of machinery and equipment and the distance from the workplace to sensitive and residential development. Especially problematic is the noise created by the work of bulldozers, vibrators, compressors, excavators, and Diesel Trucks. Typical noise signatures of the different equipment for different construction activities are enumerated below.

Table E-2: Construction Noise Examples

Site Clearing		Excavation and Earth Moving		Structure Construction	
Equipment	Noise Level	Equipment	Noise Level	Equipment	Noise Level
Bulldozer	80	Bulldozer	80	Pneumatic drill	81-98
Front end loader	72-80	Backhoe	72-93	Crane	75-77
Dump Truck	83-94	Dump Truck	83-94	Welding Machine	71-82
Grading and compacting		Jack Hammer	80-93	Concrete Mixer	74-88
Grader	80-93	Landscaping and Clean Up		Concrete Pump	81-84
Roller	73-75	Bulldozer	80	Concrete Vibrator	76
Paving		Excavator	72	Air Compressor	74-87
Paver	86-88	Truck	83-94	Bulldozer	80
Truck	83-94	Paver	86-88	Cement and Dump trucks	83-94
Tamper	74-77				

250. Noise attenuation based on the doubling distance rule shows that residents living next to the road will occasionally be exposed to high noise levels if no mitigation measures are implemented.

251. It should be noted that the project road is sparsely populated, and as such and short term localized construction noise is unlikely to have significant impacts. It is considered most likely that any significant impacts would result from long-term exposure to noise that may result from construction facilities such as rock crushing plants and quarries where operational activities may last for the entire construction period.

Operational Phase

252. Noise originating from the Project road over the next five to ten years cannot be considered a major concern, as traffic volumes are generally low. However, traffic

volumes are anticipated to increase over the following twenty years within the Project Corridor and this will eventually lead to elevated noise levels over a longer duration. For some residents living close to the road, the issue of increased noise and vibration, from cars and trucks, is unavoidable.

Mitigation Actions

253. Cooperation between the Contractor, the TEPOs and the local residents within the Project corridor is essential and it is the responsibility of the Engineer to arrange meetings between these parties and arrange such matters as work schedules (hours of equipment operation, traffic lanes to be kept open, diversion roads, etc.), locations of work camps and material storage areas, and siting of rock crushers and batch plants. In addition, the Contractor shall be responsible for ensuring the use of:

- Source Controls, i.e., requirements that all exhaust systems will be maintained in good working order; properly designed engine enclosures and intake silencers will be employed; and regular equipment maintenance will be undertaken;
- Site Controls, i.e., requirements that stationary equipment will be placed as far from sensitive land uses as practical; selected to minimize objectionable noise impacts; and provided with shielding mechanisms where possible;
- Work near Sensitive Receptors shall be limited to short term activities. No asphalt plants, rock crushing plants or any long term generators of significant noise shall be allowed within 300 meters of sensitive receptors;
- Time and Activity Constraints, i.e., operations will be scheduled to coincide with periods when people would least likely be affected; work hours and work days will be limited to less noise-sensitive times. Hours-of-work will be approved by the site engineer having due regard for possible noise disturbance to the local residents or other activities. Construction activities will be strictly prohibited between 10 PM and 6 AM in the residential areas. When operating close to sensitive areas such as residential, nursery, or medical facilities, the Contractor's hours of working shall be limited to 8 AM to 6 PM;
- According to GOST 12.1.003-83 Section "Noise" standards for noise level have been adopted of 70-80 dBA. Zones with noise level above 80 dBA must be marked with safety signs.
- Community Awareness, i.e., public notification of construction operations will incorporate noise considerations; methods to handle complaints will be specified. Sensitive receptors will be avoided as possible (i.e., aggregate crushers, operators, etc.). Disposal sites and haul routes will be coordinated with the local DEP;

Instrumental Monitoring

254. Monitoring of noise is as follows:

Construction Phase

255. Routine Noise Monitoring – Noise shall be monitored quarterly during the course of construction. Monitoring results shall be submitted to the Engineer two working days of the completion of the monitoring period for analysis and review. Actions taken in response to the monitoring results shall also be required. Additional monitoring shall be undertaken as deemed warranted by the Engineer. The reporting requirements are outlined within the EMP.

E.10 Cumulative Impacts

E.10.1 Cumulative Impacts Identified

256. Cumulative impacts of the Project will be those associated with the portions of the Aktobe – Makat road that are to be constructed by other funding agencies. The main cumulative impacts relate to increased traffic. Traffic levels on ADB portions of the road will not increase without the completion of the other road sub-sections which book-end the ADB sub-sections and also join them in the middle of the road corridor. The main cumulative impacts resulting from the increased traffic will be elevated noise levels during the operational period. Air quality may be compromised slightly in the form of vehicular emissions, but levels of dust will decrease significantly – this will generally lead to improvements in terms of health conditions. Increased traffic in urban area may lead to an increase in accidents between vehicles and pedestrians, however, the safety measures proposed for the project should help to limit such impacts.

F. Environmental Management Plans and Institutional Requirements

F.1 Introduction

257. This section of the report provides the Projects Environmental Management Plan (EMP) and the necessary institutional requirements to implement the Plan. In addition, the approximate costs of the EMP is outlined.

F.2 EMP Institutional Requirements

F.2.1 EMP

258. The EMPs herewith provides the overall Project environmental management framework. It provides summary information of the types of impacts, which are described in detail in the Projects **Initial Environmental Examination**. It also provides detailed information about the required mitigation and monitoring measures, the implementation arrangements and the reporting requirements.

F.2.2 Site Specific EMP

259. The SSEMP is the document that the Contractor(s) for all lots shall prepare outlining how he intends to implement the EMP and ensure that all of the mitigation and monitoring is completed according to the implementation arrangements specified in this EMP. The SSEMP shall contain sections relating to:

- Management of Physical Environment
  - Soils
  - Water
  - Air
- Management of Ecological Environmental
  - Flora
  - Fauna
- Management of Economic Characteristics
  - Infrastructure
  - Transport
  - Land Use
  - Agriculture
- Management of Social and Cultural Resources
  - Communities, Health and Education Facilities
  - Historical and Cultural Areas
  - Noise

260. Each section shall describe the precise location of the required mitigation / monitoring, the persons responsible for the mitigation / monitoring, the schedule and reporting methodology. In addition, the SSEMP shall contain specific Management Plans (as Annexes) relating to the following:

- Borrow Pit Management Plan
- Emergency Response Plan
- Air Quality Management Plan

- Water Quality Management Plan
- Noise Management Plan
- Waste Management Plan
- Dust Suppression Plan
- Construction Camp Site Plan
- Health and Safety Plan
- Traffic Management Plan

261. The SEMP will be submitted to the Engineer for approval at least 10 days before taking possession of any work site. No access to the site will be allowed until the SEMP is approved by the Engineer.

F.2.3 Bid Documents

262. The Bid Documents for the potential Contractor(s) shall contain two sections relating to environmental issues, firstly a basic clause indicating that the Contractor will be responsible for following the requirements of this EMP and that he should prepare his own SSEMP for the Project. Secondly, the EMP shall be repeated in its entirety as an Annex to the Bid Documents so as the bidder is aware of his environmental requirements under the Project and help him put environmental costs to his proposal.

F.2.4 Contract Documents

263. The Contract Documents should follow a broadly similar pattern to the Bid Documents. It is not considered necessary to repeat the mitigation measures verbatim in a list of environmental contract provisions, rather the Contract should specify that the Contractor(s) is responsible for implementation of the EMP via his SSEMP. Again, the EMP should be included as an Annex to the Contract so the Contractor(s) is liable for any non-conformance with the EMP, and thereby this IEE.

F.2.5 Contractor Requirements

264. As stated above, the Contractor(s) will be responsible for the preparation of the SSEMP. The preparation of the SSEMP requires a qualified environmental person as the work will need to be fully compliant with the EMP and will need to be prepared within 30 days of Contract award. The environmental person responsible for the work should ideally be an International Environmental Specialist with expertise of preparing SSEMPs to international best practice standards.

265. During construction the Contractor must retain the expertise of an Environmental Officer (EO) to implement and update the SSEMP and to oversee and report on the operation throughout the contract period. The EO should be full-time member of staff on the Contractors roster and should be on site five days per week.

266. The required qualifications of the EO are as follows:
- Degree in environmental sciences / management
- Fluent in Kazakh, Russian and English
- Experience of at least one construction project of a similar size and scale.

267. The Contractor(s) EO is also responsible for engaging external consultants, such as air quality monitoring, or noise monitoring consultants and will also be responsible for the preparation of weekly environmental checklists and monthly environmental reports that shall be submitted to the Engineer for review.

268. The monthly reports, which will include the weekly environmental checklists, shall contain sections relating to:
1. General Progress of the Project
2. Environmental Incidents; e.g. spills of liquids, blasting issues
3. Progress of any environmental initiatives, e.g. protection of sensitive sites
4. Records of any environmental monitoring, both observational and instrumental
5. Conclusions and Recommendations

269. The Contractor(s) shall also prepare a series of environmental training activities for his staff. These activities will be prepared monthly by the EO and should include training on; Waste management; Health and safety (including HIV/AIDS); and Hazardous liquid spills. In addition, the EO shall provide daily toolbox training at the construction camp and also at construction sites. The EO shall keep a record of all monthly training and toolbox training undertaken.

270. The training programs shall be approved by the Engineer.

F.2.6 Engineer Requirements

271. As noted in the mitigation plans below**,** the Engineer is tasked with specific responsibility to ensure safeguard compliance of civil works – with particular emphasis on the monitoring of implementation of EMP through the Contractors SSEMP and related aspects of the project.

272. The Engineer should retain the use of Environmental Specialist, both national and international, to ensure that the Contractor is compliant with his environmental obligations. Specifically, the Engineer should be responsible for preparing a monthly environmental report outlining the Contractors environmental performance during that period. The national specialist shall be engaged on a part-time basis (two-three days per week) to undertake monitoring of the contractors activities. He will be assisted by the International specialist who will provide intermittent input (spread over two months per year) such as preparing the monthly monitoring report template, preparing a monitoring checklist, reviewing the national specialists monthly reports and providing initial monitoring and reporting training to the National specialist prior to the start of construction activities. The International Specialist will also be responsible for quarterly site visits to prepare the Engineers Quarterly Environmental Reports throughout the construction process. It is also important to note that as the International Specialist is only present intermittently, a portion of his time (one day per month) must be spent working from his home base to review monthly reports and checklists.

F.2.7 KazAvtoZhol Requirements (KAZ-Aktobe & KAZ-Atyrau)

273. Given that the Contractor will have his own full-time EO and that the Engineer will also have his own part-time environmental specialist backed up with an international environmental specialist the value of having further environmental specialists within

KazAvtoZhol appears to be limited. Both KAZ-Aktobe and Kaz-Atyrau should however have an environmental 'focal point' who will coordinate with the Contractor and Engineer to ensure that environmental reports required by this EMP are being delivered on time and who will forward the Contractors and Engineers reports to the CoR and ADB for final review. It is recommended that a study tour is provided to KAZ-Aktobe and KAZ-Atyrau environmental focal points to develop their knowledge and understanding of the environmental, social, health and safety aspects of the Project.

F.3 Environmental Management Plan Feasibility / Design Phase

274. The following table (**Table F-1**) provides the environmental mitigation for the pre-construction phase.

Table F-1: EMP Pre-construction Phase Mitigation

Subject	Potential Impact / Issue	Mitigation Measure	Responsibilities
Air Quality & Climate	Air quality impacts from stationary sources	Locations for quarry sites, borrow pits and asphalt plants shall require approval from the Engineer and TEPOs during the Pre-construction phase. Efforts should be made to ensure that these facilities are as near to the Project road as practical to avoid unnecessary journeys and potential dust issues from vehicle movements during construction works. In addition, no quarry, borrow pit or asphalt plant shall be located within one kilometer of any urban area or sensitive receptor.	• Contractor to select sites • Engineer and TEPOs to approve sites.
	Construction impacts	The Contractor shall be responsible for the preparation of an Air Quality Plan, submitted to the Engineer prior to commencement of the works. The plan will detail the action to be taken to minimize dust generation (e.g. spraying un-surfaced roads with water, covering stock-piles, and blasting with use of small charges etc) and will identify the type, age and standard of equipment to be used. The Plan shall also include contingencies for the accidental release of toxic air pollutants. The Plan shall be completed during the design phase and shall form part of the SSEMP.	• Contractor to prepare AQP • Engineer to review and approve ERP as part of the SSEMP
	Deterioration of pavement integrity	Assessment to determine if a potential change in temperature of 5°C will require adaption of pavement design (e.g. change in the asphalt binder or in mineral aggregate).	• Project designers
	Corrosion of steel reinforcements in concrete structures	Assess if the use of advanced concrete materials and structures will help improve the durability of concrete infrastructure and their adaptation to climate change	• Project designers
	Damage to roads and drainage systems due to flooding	Assessment of 1/50 year flood return period for all bridges and roads embankment and recommend measures to mitigate the flood risks of all planned project roads. Increase capacity of side and cross drains to accommodate more intense floods.	• Project designers
	Increase in scouring of roads, bridges,	Assess designs of piers, abutments and embankments to determine if protection methods (e.g. rip-rap) are required to cope with additional water volumes and increased flow intensity.	• Project designers

	and support structures		
Topography	Existing Quarry Sites	For existing quarries a due diligence review will be carried out by the Engineer to confirm that those sites identified for use by the Contractor are indeed operating or operable in an appropriate manner. This will include review of the borrow pits operational license. The license should clearly show the validity of the operational period of the quarry. A copy of the agreement between the operator and the Contractor should also be provided to the Engineer.	• Contractor to provide copies of agreements / licenses to Engineer. • Engineer to approve quarry.
	New Quarry Sites	Any new quarries must obtain the required permits prior to commencement of works at these sites, this shall include approval from the TEPOs and the Engineer. Efforts should be made to ensure that quarries selected are as near to the site as practical to avoid unnecessary journeys. However, no quarry shall be located within one kilometer of any urban area or sensitive receptor. The locations of the quarries shall be indicated within the Contractors SSEMP. In addition, Contractors should ensure that quarries and crusher plants are located at least one kilometer from urban areas to prevent noise and dust impacts and where possible located on government owned lands.	• Contractor to select quarry sites and apply for approval from TEPOs and any other regulatory agencies. • Engineer to review quarry locations, licenses and approvals from TEPOs.
Soils / Hydrology	Existing Borrow Pits	For existing borrow pits a due diligence review will be carried out by the Engineer to confirm that those sites identified for use by the Contractor are indeed operating or operable in an appropriate manner. This will include review of the borrow pits operational license. The license should clearly show the validity of the operational period of the borrow pit. A copy of the agreement between the operator and the Contractor should also be provided to the Engineer.	• Contractor to provide copies of agreements / licenses to Engineer. • Engineer to approve borrow pit.
	New Borrow Pits	If new borrow pits are to be opened the Contractor shall obtain all necessary permits from the regulatory authorities and prepare a Borrow Pit Action Plan (BAP) that should be submitted as part of the SSEMP to the Engineer prior to the start of construction. The BAP will identify the locations of all proposed borrow pits. The locations of the borrow pits shall be approved by both the Engineer and the TEPOs. No borrow pit shall be located within five hundred meters of any protected area. The locations of the borrow pits shall be indicated within the Contractors SSEMP.	• Contractor to select borrow sites and apply for approval from TEPOs and any other regulatory agencies. • Engineer to review borrow locations, licenses and approvals from TEPOs.

	Selection of Asphalt Plant Location	No new asphalt plant shall be located within one kilometer of any urban area, protected area or sensitive receptor. The locations of the asphalt plants shall be indicated within the Contractors SSEMP. Asphalt plant locations shall be approved by the Engineer and the TEPO.	• Contractor to select sites and apply for approval from DEPs and any other regulatory agencies. • Engineer to review locations, licenses and approvals from TEPO.
	Selection of Construction Camp Site	The Contractor shall be responsible for the preparation of a Construction Camp Site Plan which will form part of the SSEMP. The Plan shall indicate the system proposed and the locations of related facilities in the site, including latrines, holding areas, etc. The Contractor shall ensure the following conditions are met within the Plan: • Rain-water run-off arising on the site shall be collected, removed from the site via a suitable and properly designed temporary drainage system and disposed of at a location and in a manner that will cause neither pollution nor nuisance. The drainage system should be fitted with oil and grease interceptors. • There shall be no direct discharge of sanitary or wash water to surface water. Septic tanks shall be provided at construction camps for sewage water. Licensed contractors will be required to collect and disposal of liquid waste from the septic tanks on regular basis. • Disposal of materials such as, but not limited to, lubricating oil and onto the ground or water bodies shall be prohibited. • Liquid material storage containment areas shall not drain directly to surface water. • Lubricating and fuel oil spills shall be cleaned up immediately and spill clean-up shall be materials be maintained at the storage area. • Construction and work sites will be equipped with sanitary latrines that do not pollute surface waters and are connected to septic tanks, or waste water treatment facilities. • Discharge of sediment-laden construction water directly into surface watercourses will be forbidden. Sediment laden construction water will be discharged into settling lagoons or tanks prior to final discharge. • Washing out concrete trucks at construction sites shall be prohibited unless specific concrete washout areas are provided for this purpose at the construction site (e.g. a bridge site). The washouts should be impermeable and emptied when 75% full. • Spill clean up equipment will be maintained on site. The following conditions to avoid adverse impacts due to improper fuel and chemical	• Engineer to review & approve Site Plan

		storage: o Fueling operations shall occur only within containment areas. o All fuel and chemical storage (if any) shall be sited on an impervious base within a bund and secured by fencing. The storage area shall be located away from any watercourse or wetlands. The base and bund walls shall be impermeable and of sufficient capacity to contain 110 percent of the volume of tanks. o Filling and refueling shall be strictly controlled and subject to formal procedures and will take place within areas surrounded by bunds to contain spills / leaks of potentially contaminating liquids. o All valves and trigger guns shall be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use. o The contents of any tank or drum shall be clearly marked. Measures shall be taken to ensure that no contaminated discharges enter any drain or watercourses. o Disposal of lubricating oil and other potentially hazardous liquids onto the ground or water bodies will be prohibited. o Should any accidental spills occur immediate clean up will be undertaken and all cleanup materials stored in a secure area for disposal to a site authorized to dispose of hazardous waste. Site plans shall be devised to ensure that, insofar as possible, all temporary construction facilities are locate at least 50 meters away from a water course, stream, or canal. If determined warranted by the Engineer, the Contractor shall provide a wash pit or a wheel washing and/or vehicle cleaning facility at the exits from the sites. If so requested, the Contractor shall ensure that all vehicle are properly cleaned (bodies and tires are free of sand and mud) prior to leaving the site areas. The Contractor shall provide necessary cleaning facilities on site and ensure that no water or debris from such cleaning operations is deposited off-site.	
	Drilling of Boreholes	The Contractor shall ensure that all required permits have been gathered prior to the excavation of any borehole.	• Contractor to gather permits • Engineer to review permits prior to borehole excavation.
	Bridge Construction	All new bridges shall be designed for the life expectancy of 75 years. The bridge rehabilitation and strengthening works shall be designed for the life expectancy of 50 years. The design loading and design of all structural components must conform to the bridge design standards provided in the	• Project Designer

		Employer's Special Requirements. Finally, the bridge design and layout must be aesthetically pleasing and in harmony with the existing environment.	
	Contamination of Soils	The Contractor will be responsible for preparation of an Emergency Response Plan (ERP), which will cover containment of hazardous materials, oil spills, and work-site accidents. The plan will detail the process for handling, and subsequently reporting, emergencies, and specify the organizational structure (including responsibilities of nominated personnel). The plan will be submitted to the Engineer for approval as part of the SSEMP.	• Contractor to prepare ERP • Engineer to review and approve ERP as part of the SSEMP
	Soil Erosion	To reduce the impacts of erosion, the Project designs shall ensure that side slopes of embankments will be designed to reflect soil strength and other considerations as included in the project specifications in order to reduce slips or erosion.	• Project Designer
Land Use	Loss of Property and Land	The MID must prepare the Land Acquisition and Resettlement Plan (the LARP), obtain the approval of ADB and then implement the plan and acquire the land prior to the start of Pre-construction activities.	• MID to complete LARP • ADB to approve LARP
Waste and Spoil	Waste Management	The Contractor shall be responsible for preparing a Waste Management Plan to manage all excess spoil and waste material. The Plan, which forms part of the SSEMP, shall include items relating to the safe handling and management of: • Domestic waste • Food waste • Inert garbage • Recycled Waste • Plastic • Metals • Wood • Construction Waste • Hazardous Waste • Liquid Waste The Plan will also include provisions to manage all excess spoil material. The Plan should indicate where the spoil will occur and methods and locations for disposal. The plan should also provide a system to record and monitor waste removal from the site (transfer notes, waste volumes, collection dates, etc)	• Contractor to prepare WMP • Engineer to review and approve WMP as part of the SSEMP
Health and safety	Worker Health and Safety	A Health and Safety Plan shall be prepared by the Contractor, as part of the SSEMP, to manage worker safety. The plan shall include an item relating to	• Contractor to prepare HSP • Engineer to review and

		accidental release of toxic fumes.	approve HSP as part of the SSEMP
	Safety	The Contractor shall ensure that traffic safety issues shall be accounted for during the design phase of the Project, they including incorporation of: • Safety barriers • Traffic signs • Road Crossings • Speed Bumps Speed limits	• Engineer to review and approve design documents.
Physical and Cultural Resources		The Contractor shall place temporary fencing around the cemetery at km 374.	• Contractor to construct fencing. • Engineer to approve fencing.
EMP Requirement	Preparation of SSEMP	The Contractor shall prepare a SSEMP to meet the requirements of this EMP. Specifically the SSEMP shall contain sections relating to: • Management of Physical Environment – Soils – Water – Air • Management of Ecological Environmental – Flora – Fauna – Protected Areas • Management of Economic Characteristics – Infrastructure – Transport – Land Use – Agriculture • Management of Social and Cultural Resources – Communities, Health and Education Facilities – Historical and Cultural Areas – Noise In addition, the SSEMP shall contain specific Management Plans as Annexes relating to the following: • Borrow Pit Management Plan • Air Quality Management Plan • Water Quality Management Plan • Noise Management Plan	• Contractor to prepare SSEMP • Engineer to review and approve SSEMP

		• Waste Management Plan • Emergency Response Plan • Dust Suppression Plan • Site Plan • Health and Safety Plan Each section shall describe the precise location of the required mitigation / monitoring, the persons responsible for the mitigation / monitoring, the schedule and reporting methodology. The SSEMP must be submitted within 30 days of the contract award and construction cannot commence until the SSEMPs are approved by KAZ-Atyrau / KAZ-Aktobe and the Engineer.	
	Incorporation of Items into Bid Documents	The Contractor shall be responsible for ensuring compliance with this EMP. A specific environmental section shall be included within the main Bid Documents indicating that the Contractor shall be responsible for conforming with the requirements of the EMP. As such this EMP shall be included as an annex to the Contract Bid Documents.	• CoR to ensure EMP is included within Bid Documents

F.4 Environmental Management Plan Construction Phase

275. The following table (**Figure F-2**) provides the environmental mitigation for the Construction Phase.

Table F-2: EMP Construction Phase Mitigation

Subject	Potential Impact / Issue	Mitigation Measure	Responsibilities
Air Quality	Open burning of waste materials	The Contractor shall ensure no burning of debris or other materials will occur on the Site without permission of the Engineer.	• Contractor to implement mitigation. • Engineer to routinely monitor Contractors activities.
	Fuel Emissions	Contractor shall ensure that no furnaces, boilers or other similar plant or equipment using any fuel that may produce air pollutants will be installed without prior written consent of the Engineer.	• Contractor to implement mitigation. • Engineer to routinely monitor Contractors activities.

	Exhaust emissions from the operation of construction machinery	The Contractor shall ensure construction equipment shall be maintained to a good standard and fitted with pollution control devices. The equipment (including the pollution control devices) will be checked at regular intervals by the Engineer to ensure they are maintained in working order and the checks will be recorded by the Contractor & Engineer as part of environmental monitoring. In addition, the Contractor shall: • Discouraging of the idling of engines; • Prohibit of the use of equipment and machinery that causes excessive pollution (i.e. visible smoke) at project work sites; • Ensure material stockpiles being located in sheltered areas and be covered with tarpaulins or other such suitable covering to prevent material becoming airborne.	• Contractor to implement mitigation. • Engineer to routinely monitor Contractors activities.
	Fugitive emissions from quarries and asphalt plants.	The Contractor shall ensure that conveyor belts at ancillary facilities (e.g. quarries) shall be fitted with wind-boards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize dust emission. All conveyors carrying materials that have the potential to create dust shall be totally enclosed and fitted with belt cleaners.	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.
	Dust generated from haul roads, unpaved roads, exposed soils and material stock piles.	The Contractor shall ensure that the following dust suppression measures shall be instituted: • All trucks used for transporting materials to and from the site will be covered with canvas tarpaulins, or other acceptable type cover (which shall be properly secured) to prevent debris and/or materials from falling from or being blown off the vehicle(s); • Areas of reclamation shall be completed, including final compaction, as quickly as possible consistent with good practice to limit the creation of wind blown dust. • Hard surfaces will be required in areas with regular movements of vehicles; and • Effective use of water sprays will be implemented (e.g., all roads within the construction areas of the Site shall be sprayed at least twice each day, and more if necessary to control dust to the satisfaction of the Engineer).	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.
Soils	Erosion	The Contractor will be responsible for ensuing: • Material that is less susceptible to erosion will be selected for placement around bridges and culverts. • Re-vegetation of exposed areas including; (i) selection of fast growing and grazing resistant species of local flora; (ii) immediate re-vegetation of all slopes and embankments if not covered with gabion baskets; (iii) placement of fiber mats to encourage vegetation growth.	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.

	Contamination Due to Spills or Hazardous Materials	The Contractor shall ensure that: • All fuel and chemical storage (if any) shall be sited on an impervious base within a bund and secured by fencing. The storage area shall be located away from any watercourse or wetlands. The base and bund walls shall be impermeable and of sufficient capacity to contain 110 percent of the volume of tanks. • The construction camp maintenance yard shall be constructed on impervious hardstanding with adequate drainage to collect spills, there shall be no vehicle maintenance activities on open ground. • Filling and refueling shall be strictly controlled and subject to formal procedures. Drip pans shall be placed under all filling and fueling areas. Waste oils shall be stored and disposed of by a licensed contractor. • All valves and trigger guns shall be resistant to unauthorized interference and vandalism and be turned off and securely locked when not in use. • The contents of any tank or drum shall be clearly marked. Measures shall be taken to ensure that no contaminated discharges enter any soils. • No bitumen drums or containers, full or used, shall be stored on open ground. They shall only be stored on impervious hardstanding. • Areas using bitumen shall be constructed on impervious hardstanding to prevent seepage of oils into the soils.	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.
Hydrology	Drainage and Flooding	The Contractor shall ensure the following conditions are met: • During the construction phase the Contractor is required to construct, maintain, remove and reinstate as necessary temporary drainage works and take all other precautions necessary for the avoidance of damage by flooding and silt washed down from the Works.	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.
	Water Supply	The Contractor shall ensure that during construction only legally permitted water resources are used for technical water supply. He shall also ensure that potable water for construction camps and workers meets the necessary water quality standards.	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.

	Bridge Construction	The Contractor shall consult with the local TEPOs and Oblast Territorial Fishery Inspections to establish the fish spawning period in relation to the bridge construction works. The Contractor shall ensure that all works are undertaken in periods least likely to affect the fish spawning period. In addition, concerning bridge construction works, the Contractor shall: • Divert the water flow near the bridge piers. • Coffer dams, silt fences, sediment barriers or other devices will be provided to prevent migration of silt during construction within streams. • Dewatering and cleaning of cofferdams will be performed to prevent siltation by pumping from cofferdams to a settling basin or a containment unit.	• Contractor to implement mitigation. • Contractor to consult with TEPO. • Engineer to routinely monitor Contractors activities.
	Borrow Pits.	The Contractor shall ensure that: • Pit restoration will follow the completion of works in full compliance all applicable standards and specifications. • Arrangements for opening and using material borrow pits will contain enforceable provisions. • The excavation and restoration of the borrow areas and their surroundings, in an environmentally sound manner to the satisfaction of the Engineer will be required before final acceptance and payment under the terms of contracts. • Additional borrow pits will not be opened without the restoration of those areas no longer in use.	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.
Flora and Fauna	Loss of flora	The Contractor shall ensure that all animal underpasses are constructed to the correct size and locations. Tentative locations for the cattle underpasses include: • Shubarkaduk • Zharly • Bayganin • Nogaity • Sagiz • Mukur	• Contractor to implement mitigation • Engineer to approve final locations.
	Impacts to IBA	No construction camp, or construction facility, such as an asphalt plant, shall be constructed within 5 km of the IBA at Sagiz.	• Contractor to implement mitigation • Engineer to approve final locations.
Land Use	Construction Camps and other	The Contractor will be required to coordinate all construction camp activities with neighboring land uses. The Contractor shall also be responsible to maintain and cleanup campsites and respect the rights of local landowners. If	• Contractor to implement mitigation • Engineer to routinely

	ancillary facilities	located outside the RoW, written agreements with local landowners for temporary use of the property will be required and sites must be restored to a level acceptable to the owner within a predetermined time period.	monitor Contractors activities.
Transport and Infrastructure	Road closures, diversions and blocking of access routes	The Contractor shall ensure that: • He shall be responsible for provision of all road diversion signs and ensure that diversion roads do not impact negatively upon private lands. • Any diversions shall be agreed upon by the Engineer. • The Contractor shall be responsible for ensuring that all access routes are kept open during Project works for at least 50% of the day during construction works and 100% of the time after construction works are completed for the day.	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.
	Electrical Systems and Gas pipes	During construction the Contractor shall ensure that all power lines and gas pipes be kept operational, this may include the provision of temporary transmission lines while existing poles and lines are moved.	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.
Waste and Spoil	Spoil	Under no circumstances shall the Contractor dump excess materials on private lands without permission of the owner and approval from the Engineer. In addition, excess spoil shall not be dumped or pushed into any river at any location.	• Contractor to implement mitigation. • Engineer to routinely monitor Contractors activities.
	Inert Solid & Liquid waste	The contractor shall be responsible for the following: • Provide refuse containers at each worksite; • Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary storage of all wastes before transportation and final disposal; • Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process, and • Collect and transport non-hazardous wastes to all approved disposal sites. The sites for waste disposal shall be agreed with the local municipal authorities and TEPO. A specialized company may be contracted, if available to ensure collection of domestic and general waste from camps and temporary storage areas and transportation to landfills approved and licensed by the TEPO.	• Contractor to implement mitigation. • TEPO to approve any waste disposal site. • Engineer to routinely monitor Contractors activities.
	Asphalt	The project designers should assess the feasibility of re-using the existing asphalt for other projects in the local area.	• Project Designers to assess feasibility. • Contractor to implement any recommendations for re-use of asphalt.

	Hazardous Waste	Management, handling & storage protocols for hazardous waste will be outlined in the Contractors Waste Management Plan. Disposal locations of hazardous wastes should be agreed with the TEPO. The Contractor shall collect hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at the temporary storage sites and further at the locations approved by TEPO or pass it to the licensed operator having environmental permit on operation of the hazardous wastes.	• Contractor to implement mitigation. • TEPO to approve any waste disposal site. • Engineer to routinely monitor Contractors activities.
Health and Safety	Worker Health & safety	The Contractor shall be responsible for provision of: • Safety Training Program. A Safety Training Program is required and shall consist of an Initial Safety Induction Course. All workmen shall be required to attend a safety induction course within their first week on Site and Periodic Safety Training Courses. • Safety Meetings. Regular safety meetings will be conducted on a monthly basis and shall require attendance by the safety representatives of Subcontractors unless otherwise agreed by the Engineer. • Safety Inspections. The Contractor shall regularly inspect, test and maintain all safety equipment, scaffolds, guardrails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing and guarding equipment. Lights and signs shall be kept clear of obstructions and legible to read. Equipment, which is damaged, dirty, incorrectly positioned or not in working order, shall be repaired or replaced immediately. • Safety Equipment and Clothing. Safety equipment and protective clothing are required to be available on the Site at all material times and measures for the effective enforcement of proper utilization and necessary replacement of such equipment and clothing, and all construction plant and equipment used on or around the Site shall be fitted with appropriate safety devices. • First Aid facilities. A fully equipped first aid base shall be climatically controlled to maintain the temperature of the inside of the building at 20 degrees C. Arrangements for emergency medical services shall be made to the satisfaction of the Engineer. The Contractor shall coordinate with local public health officials and shall reach a documented understanding with regard to the use of hospitals and other community facilities.	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.
	Sub-contractor H&S	All sub-contractors will be supplied with copies of the SSEMP. Provisions will be incorporated into all sub-contracts to ensure the compliance with the SSEMP at all tiers of the sub-contracting. All sub-contractors will be required	• Contractor to implement mitigation • Engineer to routinely

		to appoint a safety representative who shall be available on the Site throughout the operational period of the respective sub-contract unless the Engineers approval to the contrary is given in writing. In the event of the Engineers approval being given, the Engineer, without prejudice to their other duties and responsibilities, shall ensure, as far as is practically possible, that employees of subcontractors of all tiers are conversant with appropriate parts of the SSEMP.	monitor Contractors and sub-contractors activities.
	HIV / AIDS	The Contractor shall subcontract with an Approved Service Provider to provide an HIV Awareness Program to the Contractor's Personnel and the Local Community as soon as practicable after the Contractor's Personnel arrive at the Site but in any case within two weeks after the Contractor's Personnel arrive at Site and to repeat the HIV Awareness Program at intervals not exceeding four months	• Contractor to implement mitigation. • Service Provider to implement training. • Engineer to review program.
Historical and archeological areas	Impacts to Historical and archeological areas	To avoid potential adverse impacts to historic and cultural resources, the Contractor shall: • In the event of any chance finds during the construction works procedures shall apply that are governed by Kazakh legislation and guidelines, specifically by paragraph 2 of Article 39 of the "Law on Protection and Use of Historical and Cultural Heritage in the Republic of Kazakhstan" which stipulates: "*In case of detection of objects of historical, scientific, artistic, and other cultural value, physical and legal persons are obliged to suspend the further conduct of the work and inform the authorized body*. "	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.
Noise	Construction Noise and Vibration	The Contractor shall ensure provision of the following: • Source Controls, i.e., requirements that all exhaust systems will be maintained in good working order; properly designed engine enclosures and intake silencers will be employed; and regular equipment maintenance will be undertaken; • Site Controls, i.e., requirements that stationary equipment will be placed as far from sensitive land uses as practical; selected to minimize objectionable noise impacts; and provided with shielding mechanisms where possible; • Work near Sensitive Receptors shall be limited to short term activities; • Time and Activity Constraints, i.e., operations will be scheduled to coincide with periods when people would least likely be affected; work hours and work days will be limited to less noise-sensitive times. Hours-of-work will be approved by the Engineer having due regard for possible noise disturbance to the local residents or other activities. Construction activities will be strictly prohibited between 10 PM and 6 AM in the	• Contractor to implement mitigation • Engineer to routinely monitor Contractors activities.

		residential areas. When operating close to sensitive areas such as residential, nursery, or medical facilities, the Contractor's hours of working shall be limited to 8 AM to 6 PM; • Community Awareness, i.e., public notification of construction operations will incorporate noise considerations; methods to handle complaints will be specified. Sensitive receptors will be avoided as possible (i.e., aggregate crushers, operators, etc.). Disposal sites and haul routes will be coordinated with local officials.	

F.5 Environmental Management Plan Operational Phase

276. The following table (**Table F-3**) provides the environmental mitigation for the Operational Phase.

Table F-3: EMP Operational Phase Mitigation			
Subject	**Potential Impact / Issue**	**Mitigation Measure**	**Responsibilities**
Air Quality & Climate	Air quality impacts from Vehicle movements	Potential impacts due to the use of the highway are the purview of the TEPOs.	• TEPOs to monitor air emissions during the operational phase of the Project.
	Increase in the intensity of Wildfires	Warning systems shall be put in place to ensure the affected road section is closed during extreme events.	• Responsible Government Agency
Fauna	Saiga Migration	The CFW Aktobe should continue to monitor the movement of Saiga Antelope to assess if they are migration into the Project area. If Saiga are found to be migrating north through the corridor at grade crossings (as illustrated by Figure E-1) should be constructed by the Government Agency responsible for maintenance of roads of republican importance in consultation with the CFW to determine the appropriate locations for the crossings.	• CFW Aktobe to monitor Saiga movements. • Responsible Government Agency to construct crossings if needed.

F.6 Environmental Monitoring Plan Pre-Construction Phase

277. The following table (**Table F-4**) provides the environmental monitoring for the Pre-construction Phase

Table F-4: EMP: Pre-construction Phase Instrumental Monitoring					
Issue	**Mitigation**	**Locations**	**Schedule**	**Responsibilities**	**Reporting**
Air quality	The Contractor shall undertake baseline instrumental monitoring during the Pre-construction phase. Parameters to be monitored to establish a baseline include: • Total Suspended Particulates	The recommended baseline monitoring locations include the villages of: • Zhamansor (km 438)	Air quality baseline monitoring shall be carried out as soon after the date of	The Contractor shall engage a third party monitoring agency to undertake the baseline monitoring. The Agency shall be	The Agency shall provide his results to the Contractor and Engineer prior to the start of

	(TSP) • Sulfur Dioxide (SO_2) • Nitrogen Dioxide (NO_2) • Carbon Monoxide (CO)	• Mukur (km 376) • Sagiz (km 340) • Zharly (km276) • Bayganin (km239) • Shubarkaduk (km178) In addition, the Engineer may also recommend additional monitoring locations during the baseline monitoring. However, as an indicator the number of sampling locations should not exceed ten.	acceptance of the Bid as practicable to determine ambient levels of the air pollutants at the specified monitoring locations which will be identified in the SSEMP.	approved by the TEPO.	Project works.

F.7 Environmental Monitoring Plan Construction Phase

278. The following table (**Exhibit F-5**) provides the environmental monitoring for the Construction Phase

Table F-5: EMP: Construction Phase Instrumental Monitoring					
Issue	**Mitigation**	**Locations**	**Schedule**	**Responsibilities**	**Reporting**
Air Quality	The Contractor shall establish routine Air Quality Monitoring throughout the construction period. The following parameters shall be monitored: (TSP), Sulfur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and Carbon Monoxide (CO). Other parameters maybe warranted as and when requested by the Engineer.	At the locations of the baselines monitoring and at any additional locations to be determined by the Engineer (not to exceed ten per monitoring period).	Monitoring to be undertaken once every three months	The Contractor shall hire an independent monitoring consultant to perform the monitoring activities.	The Independent Specialist shall provide his results to the Contractor and Engineer within a three days of the sampling activity.

Noise	The Contractor shall ensure that routine noise monitoring is undertaken throughout the construction period. Parameters to be monitored to establish a baseline include: Laeq 1h (dBA)	Locations will be determined in consultation with the Engineer and the TEPO but shall include at least the following locations: • Zhamansor (km 438) • Mukur (km 376) • Sagiz (km 340) • Zharly (km276) • Bayganin (km239) • Shubarkaduk (km178)	Quarterly throughout construction.	The Contractor shall hire an independent noise monitoring consultant.	The Independent Specialist shall provide his results to the Contractor and Engineer within a three days of the sampling activity.

F.8. EMP Costs

279. Most costs associated with the environmental recommendations are a normal part of preparing the bid and contract documents and ensuring that proper environmental provisions are incorporated therein. The installation of septic systems at construction camps, for example, is an environmental necessity, but not generally considered an "environmental cost". Bid solicitations will call for the costs of recommended baseline monitoring to be included in the bids. Both baseline and periodic monitoring during construction are normally considered to be a part of good engineering practice and included in the Project Budget. Supervision and monitoring of Contractor activities and reporting thereon are a normal responsibility of the Engineer included in the Project Budget and not a separable cost. Nonetheless, the most overt and explicit environmental mitigation and monitoring activities can be estimated. Those for the Project are summarized below (**Tables F-6 & F-7**)**.** They include estimates for training in regard to the requirements of SSEMP, baseline monitoring of the major environmental parameters and routine periodic monitoring and reporting during the Construction Stage.

Table F-6: EMP Mitigation Costs

Activity / Item	Frequency	Unit Cost / USD	Cost /USD
Pre-construction			
1. Selection of Quarry Sites	Once	Included in Project Budget	0
2. Selection of Borrow Pits	Once	Included in Project Budget	0
3. Selection of Asphalt Plant Location	Once	Included in Project Budget	0
4. Selection of Construction Camp Site	Once	Included in Project Budget	0
5. ERP	Once, forms part of SSEMP	SSEMP Budget	0
6. Soil Erosion protection measures	Once	Included in Project Budget	0
7. Slope Stabilization measures	Once	Included in Project Budget	0
8. Hydrological measures	Once	Included in Project Budget	0
9. Air Quality Plan	Once, forms part of SSEMP	SSEMP Budget	0
10. Waste Management Plan	Once, forms part of SSEMP	SSEMP Budget	0
11. Worker Health and Safety Plan	Once, forms part of SSEMP	SSEMP Budget	0
12. Noise Monitoring Plan	Once, forms part of SSEMP	SSEMP Budget	0
13. Temporary fencing around cemetery.	Once	5,000	5,000
14. Preparation of SSEMP by International Environmental Specialist	Once for Seven Lots	15,000	105,000
15. Climate Change Assessment Team Leader	0.5 months	25,000	12,500

Climate Change Assessment Materials Engineer	0.25 months	25,000	6,250
Climate Change Assessment Hydrologist	0.25 months	25,000	6,250
Construction			
17. Engineers National Environmental Specialist.	33 Months (15 days per month) for Seven Lots	1,000 per month	231,000
18. Engineers International Environmental Specialist.	6 Months for Seven Lots	25,000 per month	1,050,000
19. Contractors Environmental Officer	33 Months for Seven Lots	2,000 per month	462,000
20. Safety Training.	Every month, by Contractors H&S Staff.	Included in Project Construction costs	0
21. Safety Equipment for Workers.	Once.	Included in Project Construction costs	0
22. First aid facilities.	Once.	Included in Project Construction costs	0
23. Refuse containers.	Once. Assume fifty (360 liter) for Seven Lots	90	31,500
24. Waste disposal.	Throughout construction.	Included in Project Construction costs	0
25. Clean up of construction sites.	Once.	Included in Project Construction costs	0
26. Environmental Permits.	Once.	Included in Project Construction costs	0
27. Embankment vegetation.	Throughout construction.	Included in Project Construction costs	0
28. Spill kits.	At each hazardous liquid storage area (assume 10).	Included in Project Construction costs	0
29. Septic tanks.	Once at Two locations for Seven Lots	10,000	140,000
30. Temporary drainage / irrigations measures	Throughout construction.	Included in Project Construction costs	0
31. Impervious hardstanding (for maintenance yards, bitumen storage, etc)	At each Construction camp.	Included in Project Construction costs	0
32. Water spraying	Daily During dry periods for Seven Lots	Water extracted from river. Contractor to purchase water bowser – 25,000	175,000
33. Tarpaulins	Once	Included in Project Construction costs	0
34. HIV/AIDS Training Program	Once every 4 months (6 times) for Seven Lots	1,000	42,000
Total			**2,256,500**

Table F-7: EMP Instrumental Monitoring Costs

Activity / Item	Frequency	Unit Cost	Cost /USD
Baseline Instrumental Monitoring			
1. Air Quality	Once at each specific location prior to construction (7 Sites) for Seven Lots	100	4,900
2.Water Quality	One at each location (3 sites) for Seven Lots	100	2,100
Routine Instrumental Monitoring			
3. Air Quality Monitoring	Every three months at specific sites through construction (maximum ten sites) for Seven Lots	100	56,000
4. Noise Monitoring	Every three months and at other locations specified by the Engineer (maximum ten sites) for Seven Lots	100	84,000
Total			**147,000**

G. Public Consultation, Information Disclosure & Grievance Mechanism

G.1 Public Consultations

280. According to the ADB Safeguard Policy Statement (2009):

"*The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. Meaningful consultation is a process that:*

1. *Begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle;*
2. *Provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people;*
3. *Is undertaken in an atmosphere free of intimidation or coercion;*
4. *Is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and*
5. *Enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.*

Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results are to be documented and reflected in the environmental assessment report."

281. As such, public consultations have been undertaken in Sagiz, Shubarkaduk and Bayganin comprising 149 villagers, government officials and other relevant stakeholders to determine the views of the affected people and other stakeholders.

G.1.1 Public Consultation

282. Public consultations were held during April, August and September, 2015. The consultations were advertised in local papers two weeks prior to the event (see **Appendix E**). The following provides an overview of the consultations (names of all attendees can be found in **Appendix D**):

Table G-1: Atyrau Oblast Public Consultation (April, 2015)
Date: 28 April 2015, 15:00 **Location:** Sagiz village, community center "Shugyla", Kzylkoginskiy rayon **Panel Members:** 1. S. T. Turishev: Akim of Sagyz rural okrug/district 2. N.T. Abishan: Deputy Akim of Sagyz rural okrug/district 3. Zh. G. Sharipov: Director of KAZ-Atyrau. 4. M.S. Kamzaev: Head of Road Maintenance Safety Unit, KAZ-Atyrau. 5. S.S. Kurzhumanova: Head of Quality Control Unit, KAZ-Atyrau. 6. S.S. Muldashev: Head of State Republican Enterprise "Kazakhavtodor"

7. M.P. Baksaraev: Team leader of the project design team of the Kostnaidorproject Ltd.
8. S. G. Ermolenko: Coordination & Reconciliation Specialist, Kostnaidorproject Ltd.
9. S.S. Makhambet: Head of State Enterprise "Department of Housing & Utilities, Passenger Transportation and Roads" of Kzylgoginskiy rayon of Atyrau oblast

List of Participants:
31 Participants

#	Question / Comment	Answer
1	Mr. S.S. Makhambet, Head of State Enterprise "Department of Housing & Utilities, Passenger Transportation and Roads" of Kzylgoginskiy rayon of Atyrau oblast. What kind of cattle crossings does the project design include? Underpasses or ground crossings?	Mr. M. P. Baksarayev, Team leader of the project design team of the Kostnaidorproject. To prevent the cattle from going over the road, the design document plans underpasses.
2	Ms. G.Z. Zhambassinova, Director of the community center "Shygula" of Kzylkoginskiy rayon. Where do you expect to take water for technical needs during construction?	Mr. M. P. Baksarayev, Team leader of the project design team of the Kostnaidorproject. During construction, water for technical needs is to be taken from local ground water sources (such as lakes and rivers)
3	Mr. D. Akhmedov, local resident. Do you plan to start construction this year?	Mr. Zh. G. Sharipov, Director of KAZ-Atyrau. This year we plan to start the construction of the road section 458-468 km (10 km)
4	Mr. Kh. Omarov, local resident. Does the project design include a bypass around Sagiz?	Mr. Zh. G. Sharipov, Director of KAZ-Atyrau. No bypass is planned in Sagiz.
5	Mr. D. Mashrikov, local resident. Does the project design includes reconstruction of the road "Makat-Dosor"?	Mr. Zh. G. Sharipov, Director of KAZ-Atyrau. The road "Makat-Dosor" is outside the road section to be reconstructed.
#	**Other Requests from Local Villagers**	
1	To avoid using water for technical needs from local sources in spring when local rivers flow full and leave it for cattle	
2	To retain the existing access roads to rural settlements, farms, businesses located along the road.	

Table G-2: Atyrau Oblast Public Consultation (September, 2015)

Date: 29 September 2015, 11.00
Location: Makat

Panel Members:
1. Musepov Zh. A., Deputy akim of Makat rayon
2. Mr Nick Skinner, Environmental Specialist, ADB

3. Natalya Panchenko, Environmental Specialist, ADB
4. Zh. G. Sharipov: Director of KAZ-Atyrau.

List of Participants:
19 Participants (see Appendix D for list)

#	Question / Comment	Answer
1	Will the road connect Shurbakuduk village in Aktobe oblast?	Yes, it will.
2	When will the reconstruction start?	In the second half of 2016
3	Before the reconstruction starts, do you expect any maintenance repairs to be performed? The road is in such a bad condition, people can hardly use it.	Partially, it depends on available financing.
4	For how long is the project and when will it be completed?	By 2019
5	Will it be possible to substitute some construction materials in the project for others (e.g. chalkstone) during reconstruction?	No, All works will be completed according the approved project.
6	Will the project include road lighting at cross sections for access roads and cross-overs?	Yes, for sure

Table G-3: Aktobe Oblast Public Consultation

Date: 20 August 2015, 15:00
Location: Shubarkuduk village, Rayon akimat building

Panel Members:
1. Deputy Akim of Temirkiy rayon of Aktobe Oblast: B. O. Izbasov
2. JSC "National Company "KazAvtoZhol" (KAZ-Aktobe): R.S. Tazhbanov
3. ADB: N.V. Panchenko
4. Aktobe Oblast Territorial Inspection for Forestry & Wildlife: R. A. Kenzhibaev
5. Gazdorproject, Ltd.: A. K. Tumanchaev & Zh. M. Tanaliev

List of Participants:
83 Participants (see Appendix D for list)

#	Question / Comment	Answer
1	Mr. B.D. Dandybaev, head of Kaztelekom company of Temirskiy rayon, Aktobe oblast - What materials will be used for snow retention barriers according to the project design documentation?	Snow retention barriers will be made of reinforced concrete.

2	Mr. B.D. Dandybaev, head of Kaztelekom company of Temirskiy rayon, Aktobe oblast - Why the project design includes snow barriers made of reinforced concrete and not planting tree protection belts?	The project commissioner (Aktobe KazAvtozhol) included the use of snow barriers made of reinforced concrete already in the Terms of Reference stemming from the overall effectiveness of similar barriers in other road projects.
3	Mr. A. N. Kalmaganbetov, akim of Shubarkuduk village - Does the project include a repair of the existing road of republican importance that goes through Shubarkuduk, which are not to be reconstructed?	This section of the road will be used as a diversion road for transit transport during construction. Upon completion of the bypass construction, this road will be fully repaired.
4	Mr. B.D. Dandybaev, head of Kaztelekom company of Temirskiy rayon, Aktobe oblast - What kind of road lighting will be used? Solar or standard?	This question is still at the design stage. Final decision will be made at a later stage during a detailed design of this section of the project document.
5	Mr. B.D. Dandybaev, head of Kaztelekom company of Temirskiy rayon, Aktobe oblast - According to the project, the project design organization included three (3) cattle underpasses near the Shubarkuduk village. Will be possible to include in the project design some sheds where people can wait for cattle when it is raining, for example?	This question will be considered in the final design and a technical decision will be made based on available technical standards & recommendations.
6	Mr. K.A. Salimgerei, Head of Employment & Social Programs Department of Temirskiy rayon, Aktobe Oblast - What types of specialists will be required during road reconstruction works? And will it be possible to have a list of specialists that will be required for project implementation?	A list of specialists that will be required for road reconstruction include machine operators, engine drivers, road construction workers, cooks and others. A full list of needed specialists based on the detailed documentation will be sent your e-mail address kalizhan-k@mail.ru.

Table G-4: Aktobe Oblast Public Consultation

Date: 20 August 2015, 09:30
Location: Bayganin, Rayon akimat building

Panel Members:

1. Deputy Akim of Bayganin rayon of Aktobe Oblast: A. Zh. Yergaliev
2. JSC “National Company “KazAvtoZhol” (KAZ-Aktobe): R.S. Tazhbanov
3. ADB: N.V. Panchenko
4. Aktobe Oblast Territorial Inspection for Forestry & Wildlife: R. A. Kenzhibaev
5. Gazdorproject, Ltd.: A. K. Tumanchaev & Zh. M. Tanaliev

Participants: 34 Participants (see **Appendix D** for list)		
#	**Question / Comment**	**Answer**
1	Mr. E. A. Kaliev, Akim of Bayganin rural okrug (district), Aktobe oblast - The proposed number of cattle underpasses near Bayganin village is insufficient. We believe that the number of cattle underpasses should be increased near the village. If needed, akimat of rural okrug (district) can accompany the project design organization to the project site and indicate where additional underpasses are needed.	Your request will be considered. The project design organization will conduct additional surveys of the area to identify places for additional underpasses and will send to the akimat of rural district for accord.
2	Mr. Erkyn Seimukhanov, resident of Bayganin village - I have some cattle and agricultural machinery that need to pass through the road near the Kenzhaly river. Will the project design consider road passes for agricultural machinery and are there any cattle passes in that area?	Your business needs and recommendations will be taken into account in the final design of the project. We will try to accommodate your needs for a cattle track as well as for the agricultural machinery.
3	Mr. Baltabai Tleulin, Technical center of main communication network-14 - Did you already obtain specifications of engineering communication lines in the area from TCCN-14?	Yes, specifications have been obtained from all relevant owners of engineering communications.
4	Ms. E. M. Idrissova, Scientific-research institute “Kazmunaigas”, Ltd - What is the construction period?	We can provide this information for all sections of the project since the project is still at the design stage. For example, for the section that already passed through the state expertise the identified construction period is 19 months.
5	Ms. E. M. Idrissova, Scientific-research institute “Kazmunaigas”, Ltd - Will OVOS (EIA) be developed for this project?	Yes, OVOS (EIA) of the project design documentation will be prepared
6	Ms. E. M. Idrissova, Scientific-research institute “Kazmunaigas”, Ltd - Will the road section that goes through the Bayganin village be repaired.	This road section will be used for transit transport during reconstruction works. After completion of works, the whole section will be fully repaired.
7	Senbai Mamai, owner of café “Abulkhair Khan” - My café is located 100 meters away from the existing road. I got a permission from the authorized road body at the time of construction. Will it be removed now?	The project includes no business or residential buildings for removal
8	Mr. Aitugan Tazhimuratov,	Yes, a turnoff is included in the bypass

	Construction department of Bayganin rayon - Are there any turnoffs to the rayon center planned for the bypass?	design.
9	Mr. Aitugan Tazhimuratov, Construction department of Bayganin rayon - Does the project include a temporary road during reconstruction works? Also, will it be sprinkled and repaired during construction?	Yes, the project includes a temporary road and its proper maintenance by the contractor according to safety requirements.
10	Mr. Ruslan Obayev, Chief specialist of Land Department of Bayganin rayon - What are locations of borrow pits?	The project design considers borrow pits near the road. Exact locations will be determined once results of geological studies are available.
	Mr. Ruslan Obayev, Chief specialist of Land Department of Bayganin rayon - Does the project include reclamation measures for borrow pits?	Yes, the project will definitely include reclamation measures for borrow pits.
	Ms. Aksaya Bolekova, Specialist of Entrepreneurship Department of Bayganin rayon - Does the bypass design include areas for construction of service facilities and cafes (chaikhana)?	The project design cannot instruct where any service facilities such as cafes (chaikhana) should be located. The project design only includes the construction of road service facilities of category B in Nogaity village. Location of other service facilities is stipulated by the Law of RK on Automobile Roads and Government decree №845 dd 05.09.1998.
	Mr. Konyspai Baimukhanov, resident of Bayganin village - Does the project design include repair of a bridge over the Karauylkeldy River?	Yes, all existing bridges along the road including this one will be either repaired or reconstructed.
	Mr. Bagdat Balmanov, Specialist of Economy & Budget Planning Department of Bayganin rayon - Does the project include road lighting for the Bayganin bypass?	Yes, road lighting for the bypass is part of the project design.

G.2 Planned Information Disclosure

283. It is anticipated that in compliance with ADB's requirements for IEEs (Category B environmental analyses), the document will be provided for disclosure on the ADB website prior to Board consideration of the Project.

284. The Contractor will be contractually obligated to notify and inform the public of construction operations prior to construction works, publish an emergency response plan disclosing his intentions to deal with accidents and emergencies, including environmental/public health emergencies associated with hazardous material spills and

similar events, etc.

G.3 Grievance Mechanism

285. Complaints consideration procedures aim to provide an effective and systematic mechanism for the Project in responding to queries, feedbacks and complaints from affected persons, other key stakeholders and the general public.

G.3.1 Levels and Procedure for Grievance Redress

286. The Grievance Redress Mechanism (GRM) is available to people living or working in the areas impacted by the project activities. Any person impacted by or concerned about the project activities has the right to participate in the GRM, should have the easy access to it, and be encouraged to use it. The proposed GRM does not replace the public mechanisms of complaint and conflict resolution envisaged by the legal system of the RoK, but attempts to minimize use of it to the extent possible.

287. Overall responsibility for timely implementation of GRM lies with the MID through its CoR and KAZ-Aktobe / KAZ-Atyrau supported by the Engineer involved in managing and supervising the civil works, while Contractor undertakes the actual civil works. Relevant oblast, rayon and community Akimats, who are mandated by law to perform grievance redress related tasks, and mediators / non-governmental organizations (NGO), who are involved in facilitating amicable resolution of grievances are also included in GRM.

288. This GRM envisages two levels of grievance resolution for the road sector projects implemented under the supervision of the CoR: Grievance Redress Committees (GRC) at regional (oblast) and central (Astana) levels in accordance with the Guideline on Grievance Redress Mechanism on Environment and Social Safeguards for Road Sector Projects approved by the CoR in August 2014 (GRM Guideline). GRCs are usually composed of members nominated from CoR, Akimats, KAZ-Aktobe / KAZ-Atyrau, Engineer & Contractor. GRCs at regional and central levels are chaired by the Heads responsible for the overall operation of GRM and its efficient and timely implementation, while the Coordinators are responsible for involving the relevant parties and coordinating the works of GRCs at regional/central levels.

GRM: Regional (Oblast) Level

289. At the first stage, the resolution of grievance will be attempted through GRC at regional level through the following steps.

290. *Grievance registration*: complainants or concerned individuals can visit, call or send a letter or e-mail or fax to community Akimat, grievance focal point at either the Contractor, the Engineer or KAZ-Aktobe / KAZ-Atyrau. Receipt of grievances lodged in person, via phone, through a letter or e-mail or fax will be acknowledged. GRC at the regional level also considers the anonymous complaints, in case the complainant refuses to provide contact details or no contact information is available in the grievance received by e-mail / mail / fax. Grievances will be recorded in a standard format, provided in the Annex F.

291. *Grievance processing*: Queries and complaints that are clarified and resolved at the intake point are closed immediately. Cases requiring further assessment and action are considered by the GRC at regional level. The GRC at regional level: (i) holds meetings on bi-monthly basis, however special ad hoc meetings can be arranged, as needed; and (ii) discusses the grievance case within ten working days and recommend its settlement to parties. GRC Coordinator at regional level circulates relevant information among the members of GRC, prepares Minutes of GRC meeting and progress reports, and ensures that actions and decisions are properly documented.

292. *Feedback provision*: Receipt of grievances lodged in person or via phone will be acknowledged immediately. Receipt of grievances received through a letter or e-mail or acknowledged through a letter / e-mail / fax within 3 working days upon receipt by GRC coordinator at regional level. In case the grievance is not related to project activities or impacts generated due to the project implementation and cannot be considered under this GRM Guideline, the feedback will be provided to the complaining party specifying to which entity (community / rayon / oblast level Akimat, as relevant) it has been forwarded.

293. If grievance was resolved at regional level, the complaining party will be informed of the outcome. If grievance was not resolved at the regional level and was passed to the GRC at the central level for consideration and resolution, appropriate information will be provided to the complaining party, including the date when the case was passed to GRC at the central level and the date by which the outcome at the central level is expected.

294. In case of anonymous complaints, the printed response will be posted at the information board of KAZ-Aktobe / KAZ-Atyrau, as well as at the information board of the relevant Akimat, so as the complaining party can approach and review the feedback.

GRM: Central Level

295. Following unsuccessful consideration of grievance by GRC at the regional level, complaint resolution will be attempted at a central level through following steps.

296. *Grievance processing*: If grievance cannot be resolved by the GRC at the regional level, it will be forwarded for consideration by the GRC at the central level, including all relevant documents. The GRC at central level: (i) holds meetings on monthly basis, however special ad hoc meetings can be arranged, as needed; and (ii) discusses the grievance case within twenty working days and recommend its settlement to parties. GRC Coordinator at central level circulates relevant information among the members of GRC, prepares Minutes of GRC meeting and progress reports, and ensures that actions and decisions are properly documented.

297. *Feedback provision*: If the grievance was resolved, the complaining party will be informed on the outcome of grievance resolution. If grievance was not resolved by the GRC at central level, appropriate information will be provided to the complaining party, including details why the case was not resolved, as well as recommendation to seek for resolution through the RoK legal system.

298. For anonymous grievances or in cases when the complainant refused to provide contact details, the information on status of grievance redress and outcomes of

resolution process will be posted on the information boards of KAZ-Aktobe / KAZ-Atyrau and relevant community / rayon / oblast Akimats.

GRM: Legal System

299. If after the intervention and assistance from the GRCs at both regional and central levels, no solution has been reached, and if the grievance redress system fails to satisfy the complaining parties, the case will be referred to the court for resolution in accordance with the GoK legislation.

300. In the meantime, it should also be emphasized that the GRM Guideline does not limit the right of the complaining party to submit the case to the court of law in the first stage of grievance process.

G.3.2 Grievance Focal Points

301. DPs or other concerned individuals may visit, call or send a letter or fax to GRC at the regional level for Aktobe and Atyrau Oblasts.

GRC Contact Details in Aktobe Oblast (Regional Level):

Aktobe regional branch of JSC «NC KazAutoZhol» (KAZAK)
Address: 89 Maresyev str., Aktobe
Phone: 8 (7132) 55-50-15, 54-76-29, 54-98-838
Fax: 8 (7132) 54-65-71
E-mail: a.muhanbetkaliev@kazautozhol.kz

Akimat of Aktobe Oblast
Address: 40 Abylkhayir khan ave., Aktobe
Phone: 8 (7132) 56-77-82
E-mail: info@akto.kz

Akimat of Bayganin Rayon
Address: 36 Konaev str., Karauylkeldy community, Bayganin Rayon
Phone: (8-71345) 2-28-74
E-mail: baiganin@akto.kz

Akimat of Temir Rayon
Address: Zheltoksan str., Shubarkuduk community, Temir Rayon
Phone: (8-71346) 2-24-95
E-mail: temir@akto.kz

GRC Contact Details in Atyrau Oblast (Regional Level):

Atyrau regional branch of JSC «NC KazAutoZhol» (KAZ-Atyrau)
Address: 5 Isatay str., Atyrau
Phone: 8 (7122) 29-06-77, 29-06-75
Fax: 8 (7122) 29-01-49
E-mail: a.dyusenov_atrfil@mail.ru

Akimat of Atyrau Oblast
Address: 77 Ayteke Bi str., Atyrau
Phone: 8 (7122) 354-092
E-mail: atyrau_akimat@global.kz

Akimat of Kyzylkogin Rayon
Address: 4 Abay str., Miyaly community, Kyzylkogin Rayon
Phone: (8-71238) 2-13-37
E-mail: kizilkoga_akimat@mail.ru

302. At the Central GRC the key persons are:

- Head of GRC: Kalymov E. - Heal of Department of Investment Projects Implementation;
- Coordinator of GRC: Akhmetov B. - Leading Specialist of Department of Investment Projects Implementation;
- Coordinator of GRC: Ibrayeva D. - Leading Specialist of Department of Projects Preparation.

GRC Contact Details (Central Level):

Address: 32/1 Kabanbay Batyr ave., Astana, 010000, Kazakhstan
Committee of Roads,
Ministry of Investments and Development of the Republic of Kazakhstan
Tel: +8 (7172) 75-46-41
E-mail: a.karymbaeva@mid.gov.kz

G.3.3 Disclosure of the Grievance Process

303. The complaints resolution process for this LARP was and will continue to be disseminated through information brochures and posted to the community / rayon / oblast Akimats and the EA (or regional level representative of the EA). Grievance redress mechanism will also be presented during the public consultations and informal meetings at Project area during preparation of final LARP, during its implementation and later during civil works. The information of grievance resolution will be summarized in CoR progress reports to be submitted to ADB.

H. Conclusions and Recommendations

H.1 Conclusions

304. The IEE and its consultation process established that there were no significant environmental issues that could not be either totally prevented or adequately mitigated to levels acceptable Kazakhstan and international standards. As such, based on the existing ADB Safeguards Policy (2009), this Project falls under ADB's **Category B**. The total estimate costs of the environmental mitigation and management has been calculated at approximately $2,403,500 ($343,000 per lot), or under 1% of the total project cost of $401,900,000.

H.2 Recommendations

305. The EMP, its mitigation and monitoring programs, contained herewith shall be included within the Bidding documents for project works. The Bid documents should state that the Contractor shall be responsible for the implementation of the requirements of the EMP through his own SSEMP which will adopt all of the conditions of the EMP and add site specific elements that are not currently known, such as the Contractors borrow pit locations. This ensures that all potential bidders are aware of the environmental requirements of the Project and its associated environmental costs.

306. The EMP and all its requirements shall then be added to the Contractors Contract, thereby making implementation of the EMP a legal requirement according to the Contract. He shall then prepare his SSEMP which will be approved and monitored by the Engineer. Should the Engineer note any non-conformance with the SSEMP the Contractor can be held liable for breach of the contractual obligations of the EMP. To ensure compliance with the SSEMP the Contractor should employ a national environmental specialist to monitor and report Project activities throughout the Project Construction phase.

APPENDIX A: ENVIRONMENTAL SETTING

The following section provides a summary of the existing conditions, both illustrative and descriptive, along the route to enable the reader to understand the general environmental setting of the project.

KM+170: Trees managed by KAZAK adjacent to the road, but outside of the RoW. Note that many of the trees are dead or dying.

KM+242: Rail crossing at Bayganin. The road will be re-aligned here to accommodate an overpass.

KM+260: A typical road section, straight and flat.

KM+347: Safety barriers have been placed adjacent to this gulley to prevent drivers crashing into the gulley if they fall asleep at the wheel.

KM+360: The road is the portion furthest to the right of the photo, but due to the poor condition of the road other tracks have been made to bypass these poor sections of road. Accordingly, in this section the road corridor is more than 50 meters wide.

KM+372: Horses and cattle were observed at this section of the road. Animal underpasses will be constructed at locations agreed with by local villagers.

KM+430: This bridge crosses the Sagiz River. The bridge showed signs of aging and the pedestrian pathway appeared to be breaking up. However, due to the remote location of the bridge this pathway would almost certainly never be used.

KM+446: Within portions of the roads side drains permnament ponds of water have been established at a few points (less than five were noted). Several species of birds were noted in these areas. Consultations with the relevant wildlife departments in Aktobe and Atyrau did not identify these areas as being of specific importance from a biodiversity perspective.

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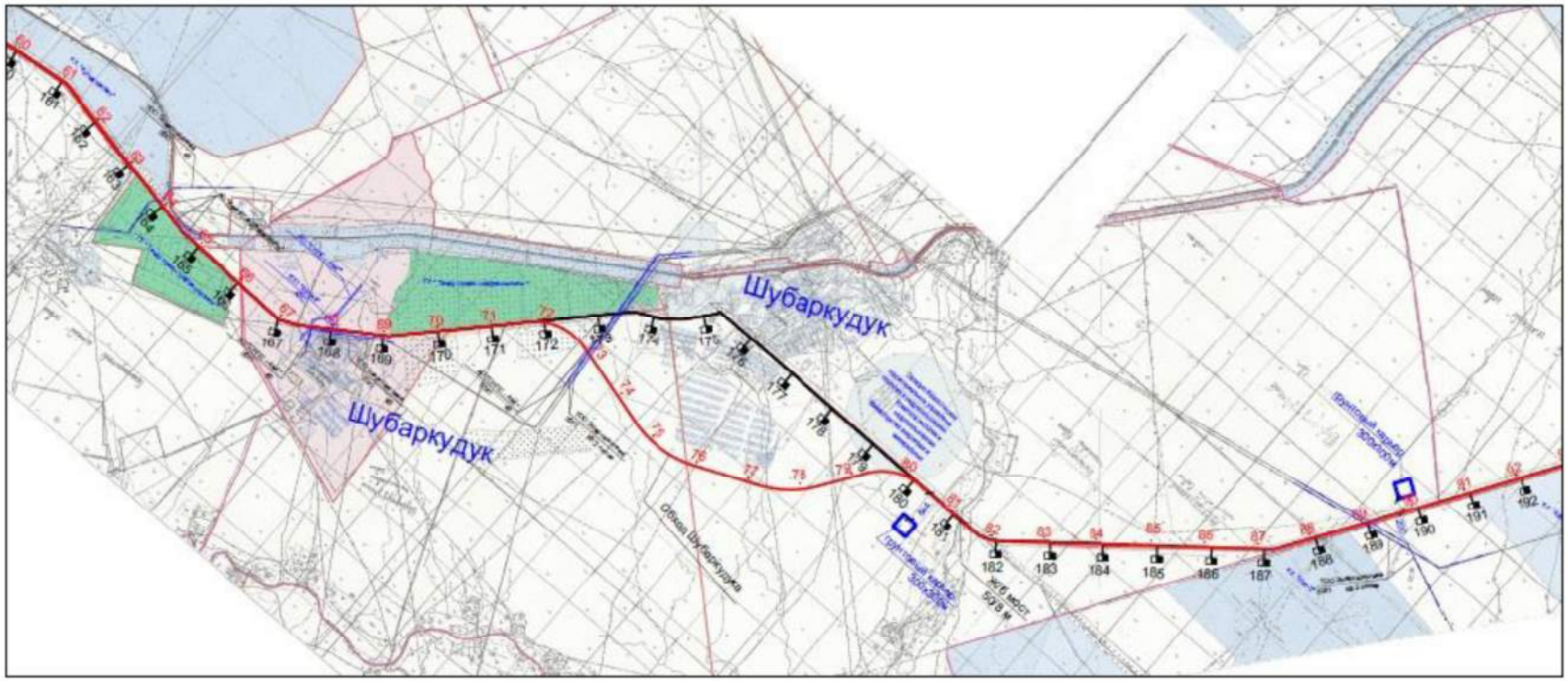
KM+458: Road condition in this area is poor, although portions are asphalted. The road is almost pan flat and traverses desert with little sign of vegetation apart from light grasses. Traffic volume in this section was extremely low, with fewer than two vehicles seen in 30 minutes of driving.

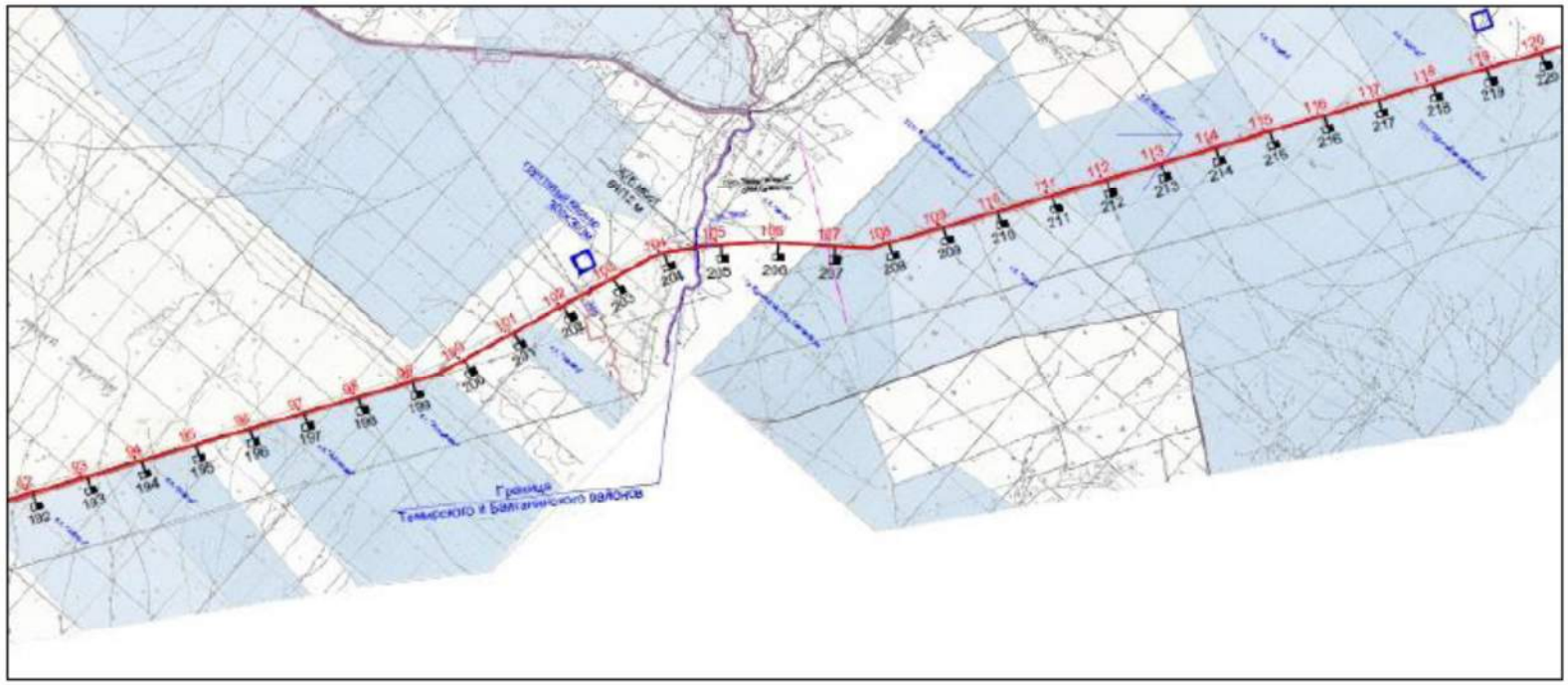
KM + 503: Salt Pan adjacent to the Project Road. No sensitive, or special status flora or fauna have been identified in this area.

APPENDIX B: LOCATION MAPS

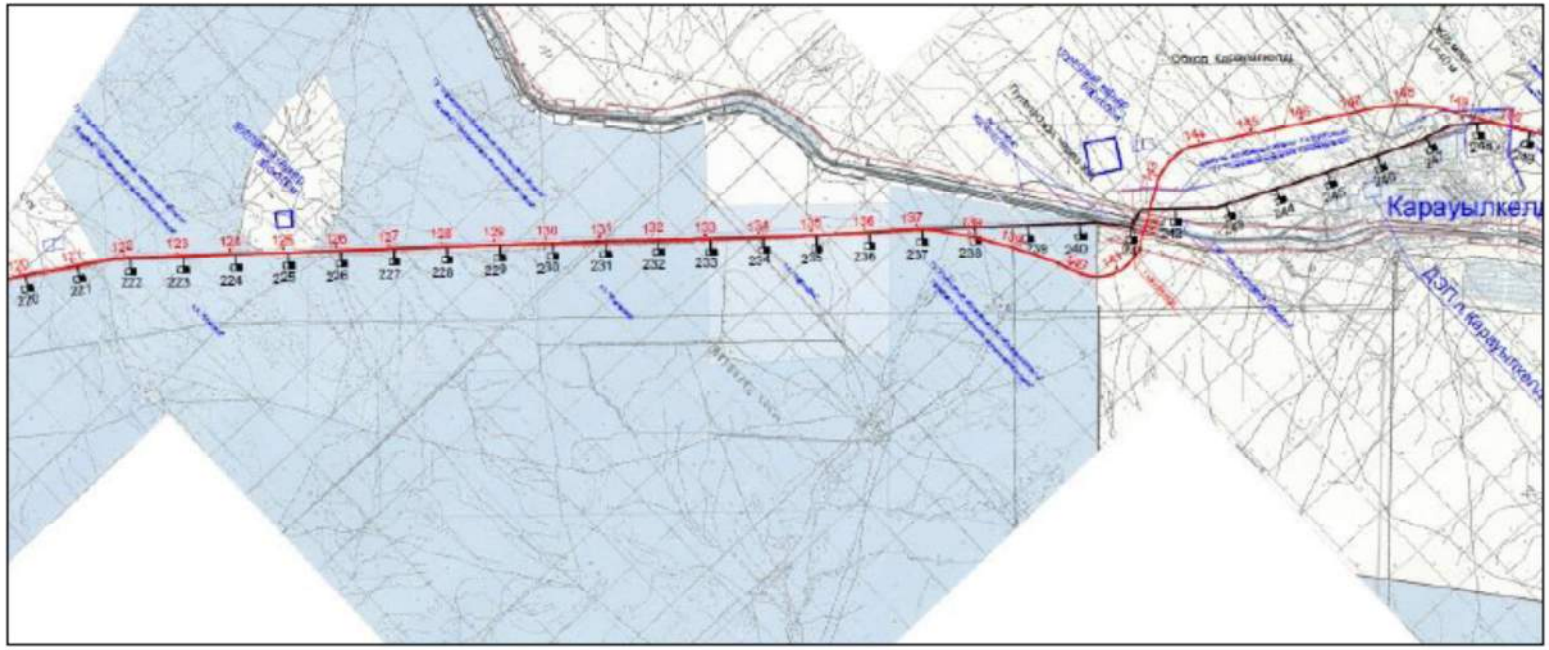
KM 160 - 192



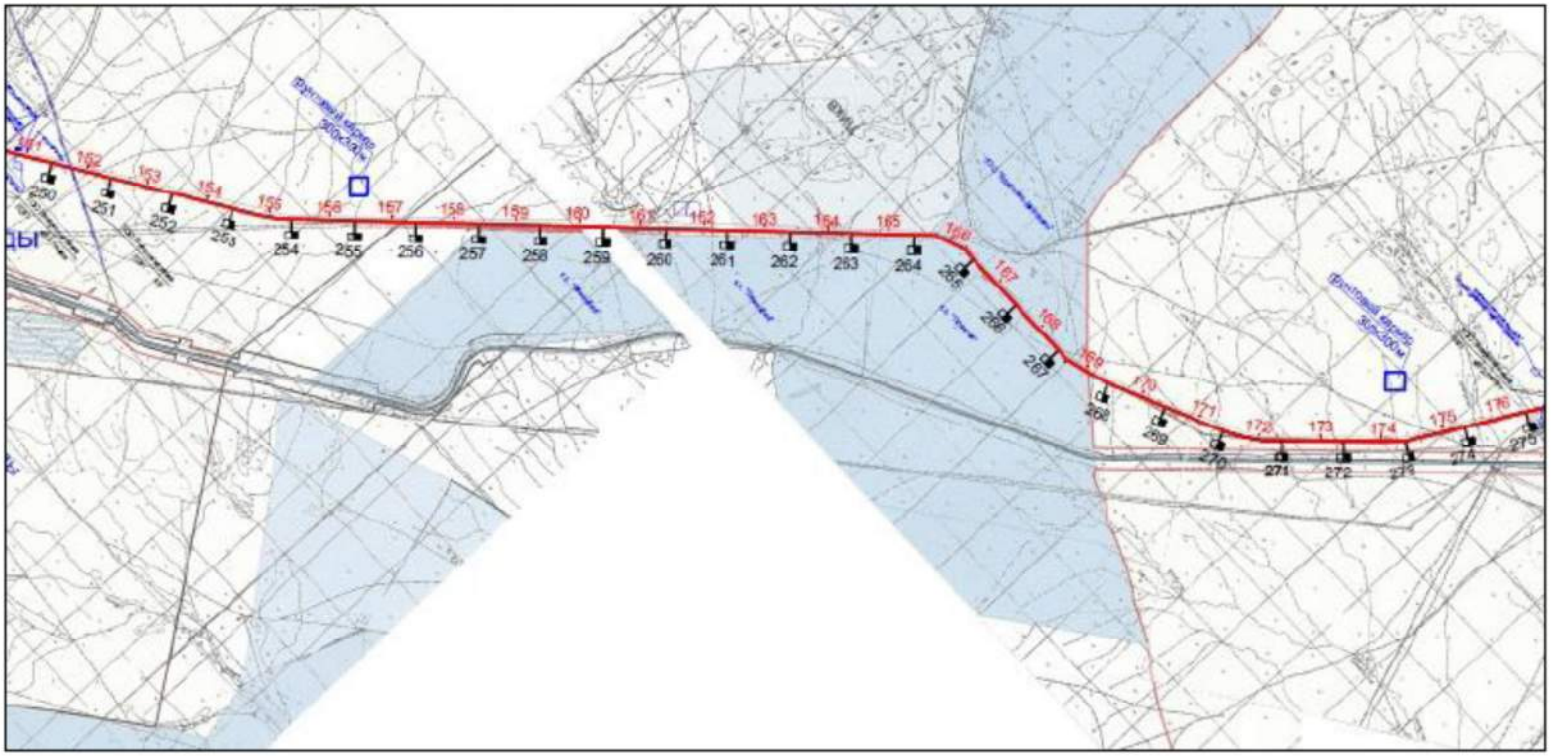
KM 192 - 220



KM 220 - 249



KM 250 - 275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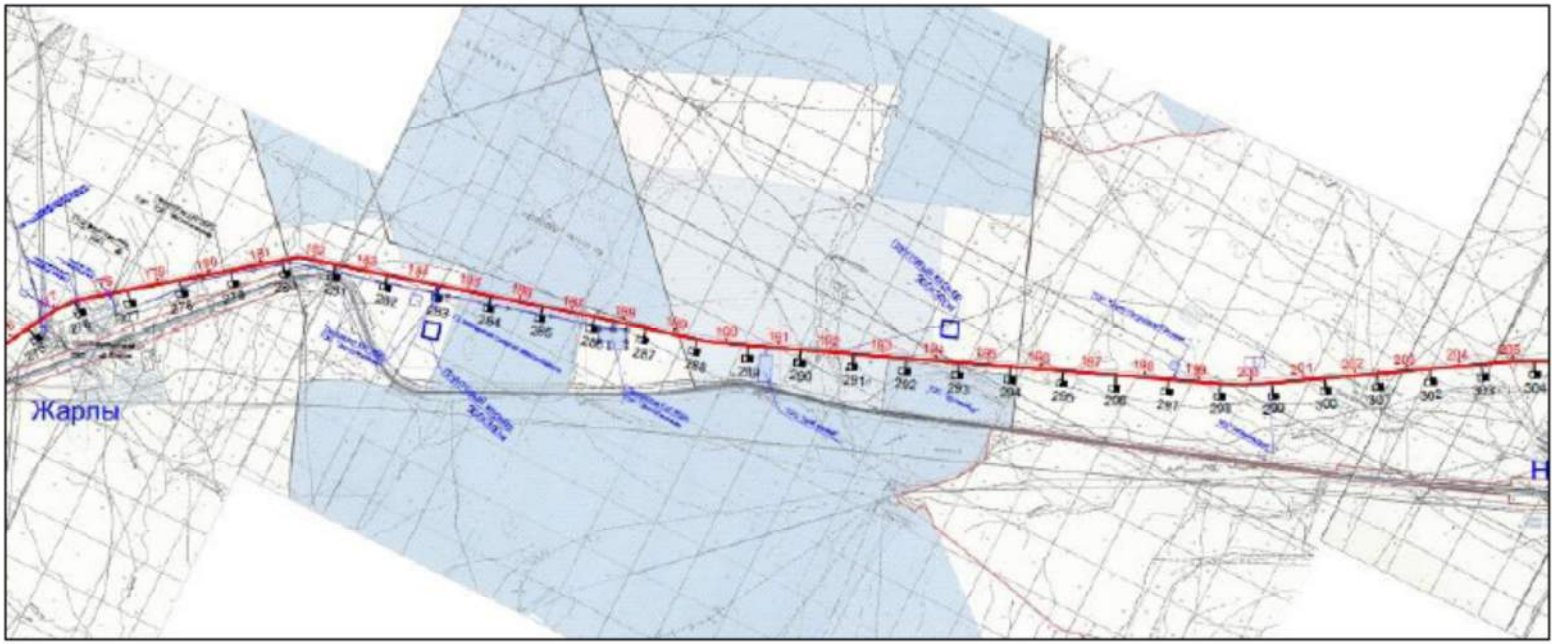
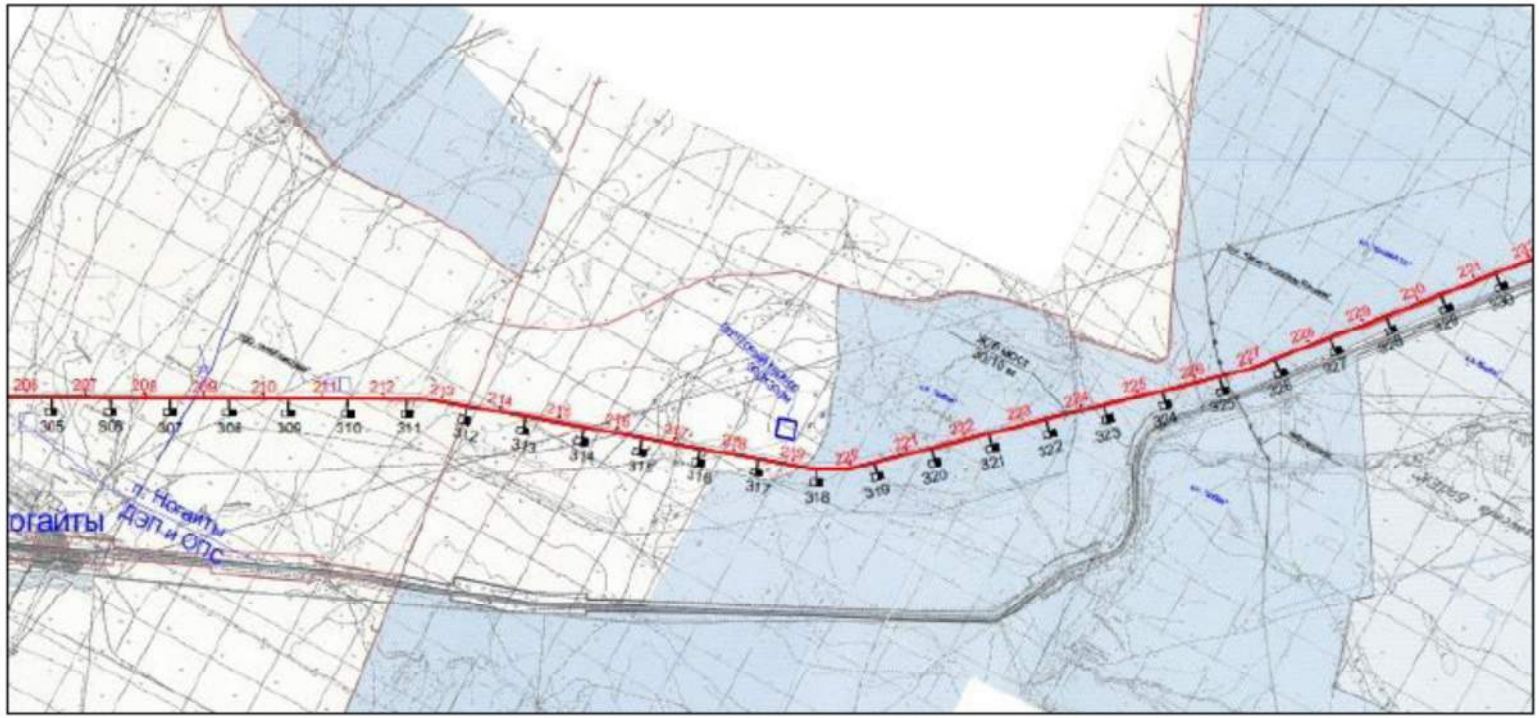
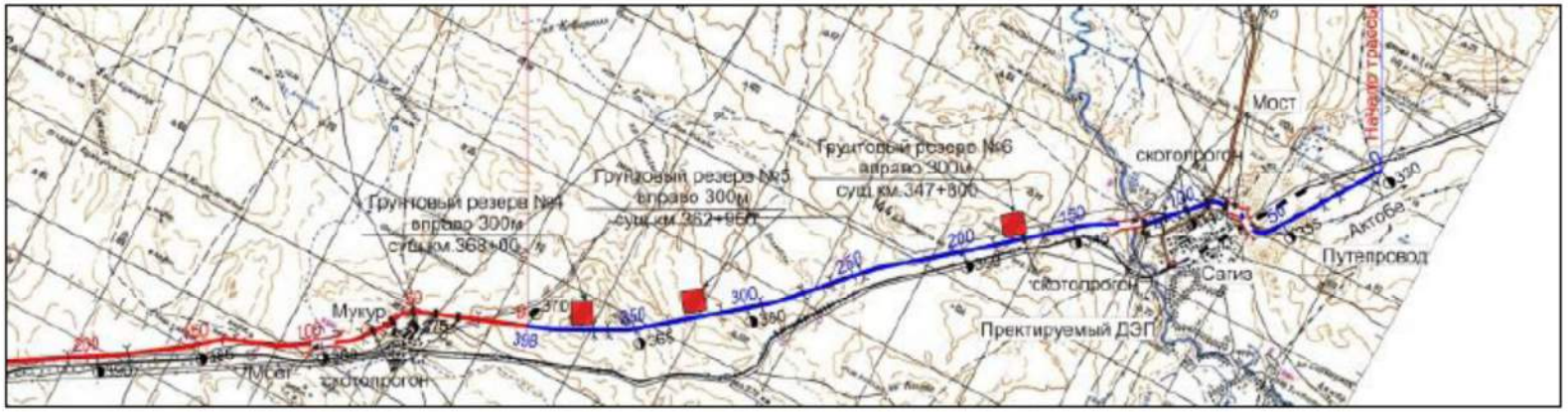
KM 275 - 304



KM 305 - 330



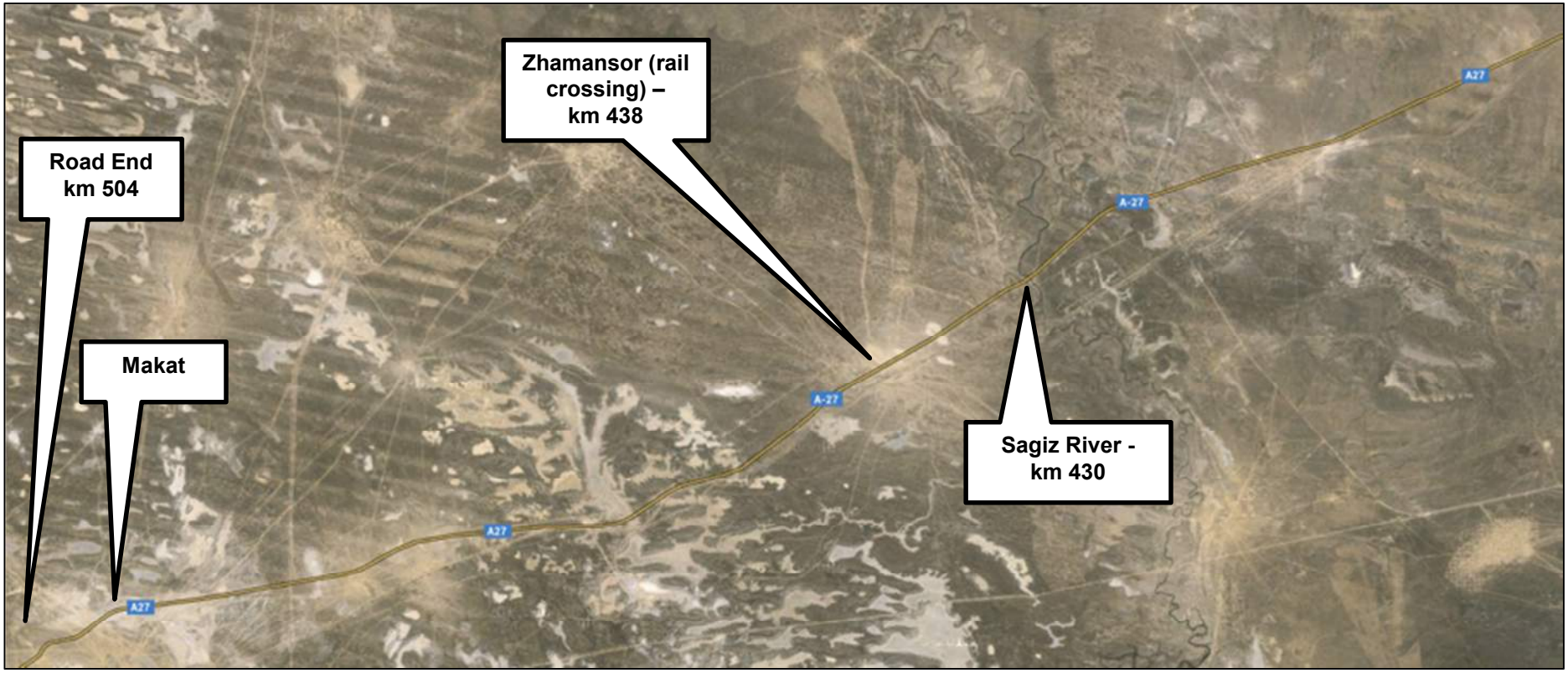
KM 330 - 400

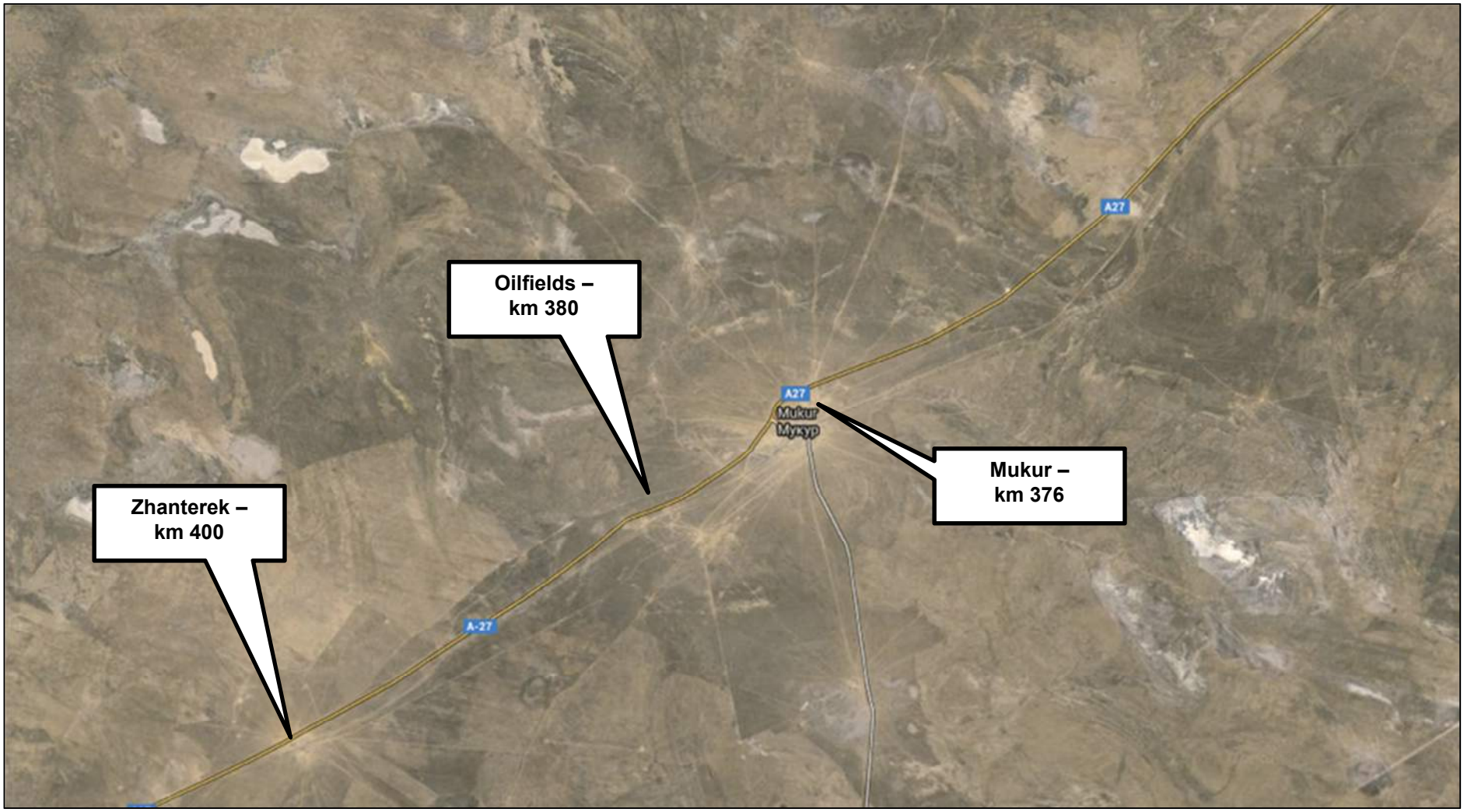

Грунтовый резерв №4
вправо 300м
сущ.км.368+00
Грунтовый резерв №5
вправо 300м
сущ.км.362+000
Грунтовый резерв №6
вправо 300м
сущ.км.347+500
Мукур
скотопрогон
скотопрогон
Мост
Начало трассы
Актобе
Путепровод
Сатиз
Пректируемый ДЭП

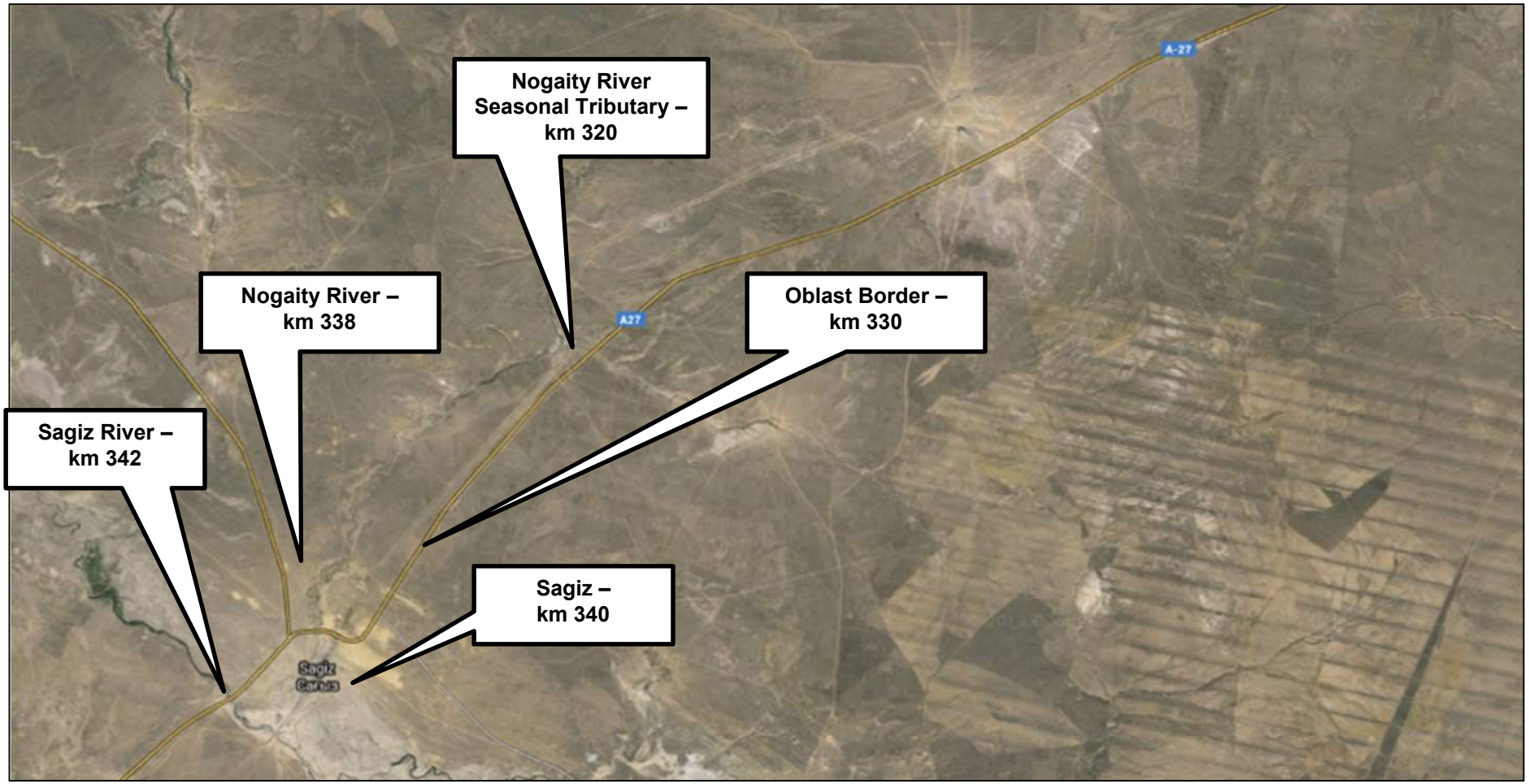
КМ 400 - 468

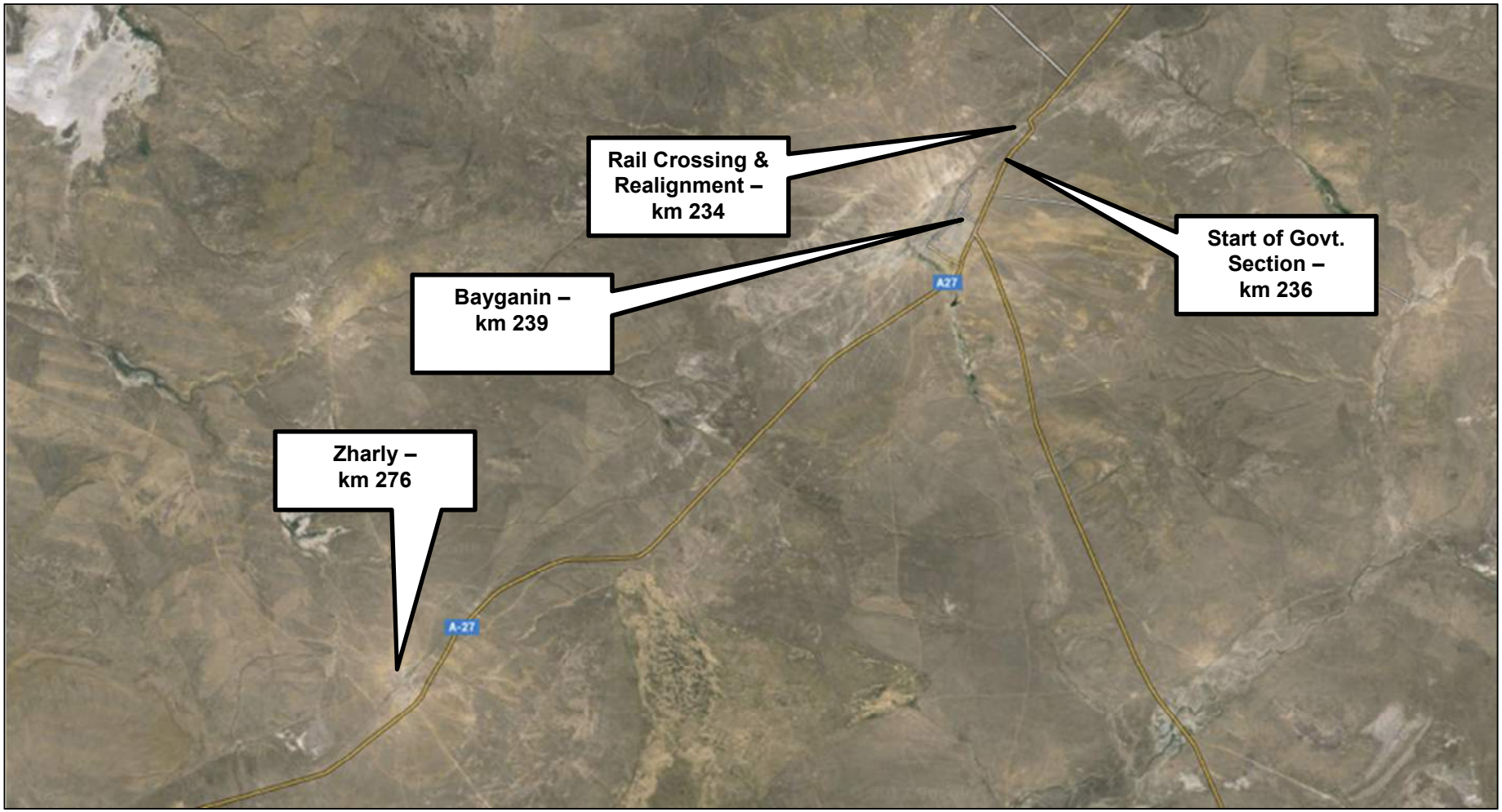

Проектируемый ДЭУ
Атырау
Грунтовый резерв №1
Грунтовый резерв №2
Грунтовый резерв №3
Пересечение с ЖД
Жамансор
Кенбай
Жантерек

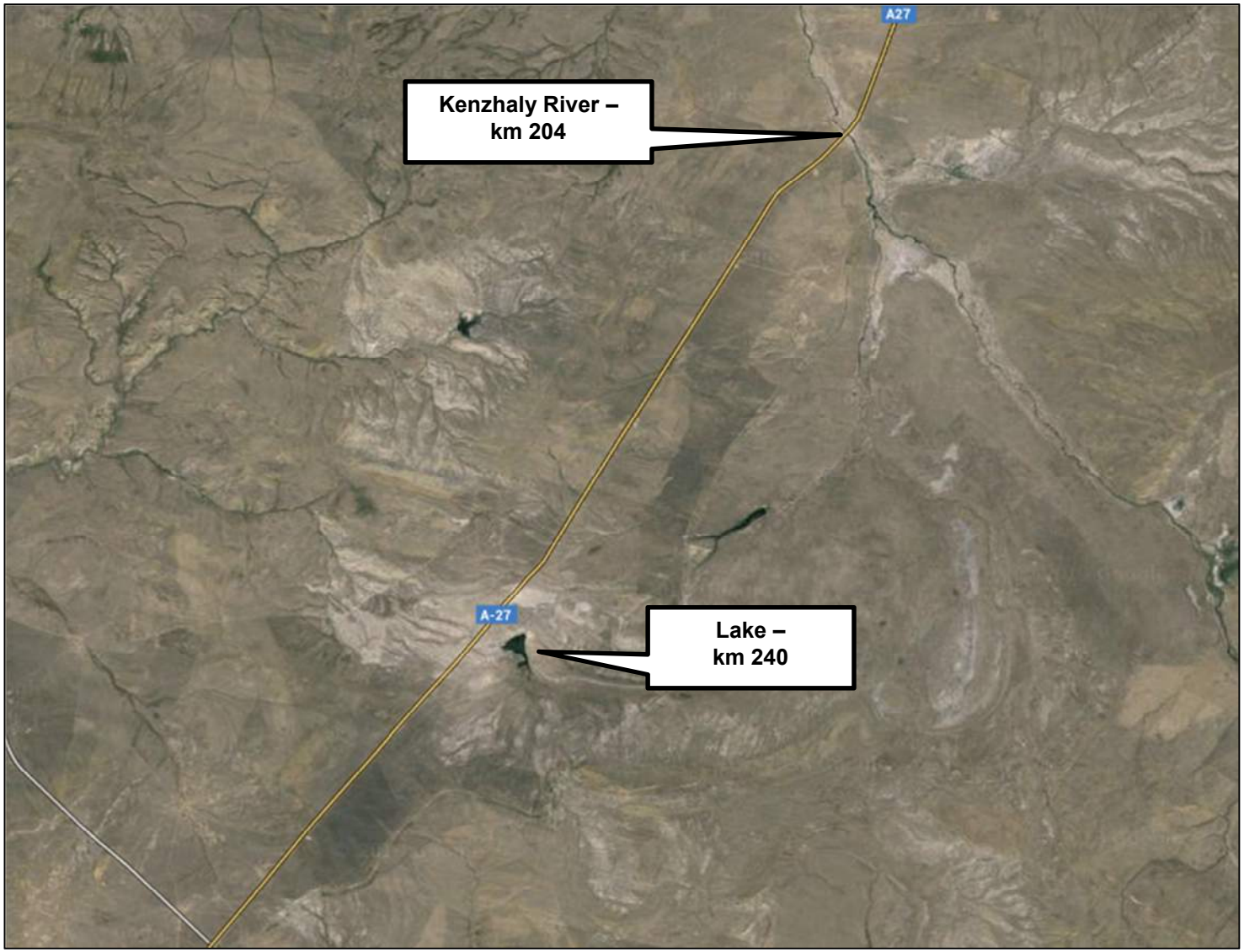
APPENDIX C: SATELITTE IMAGES

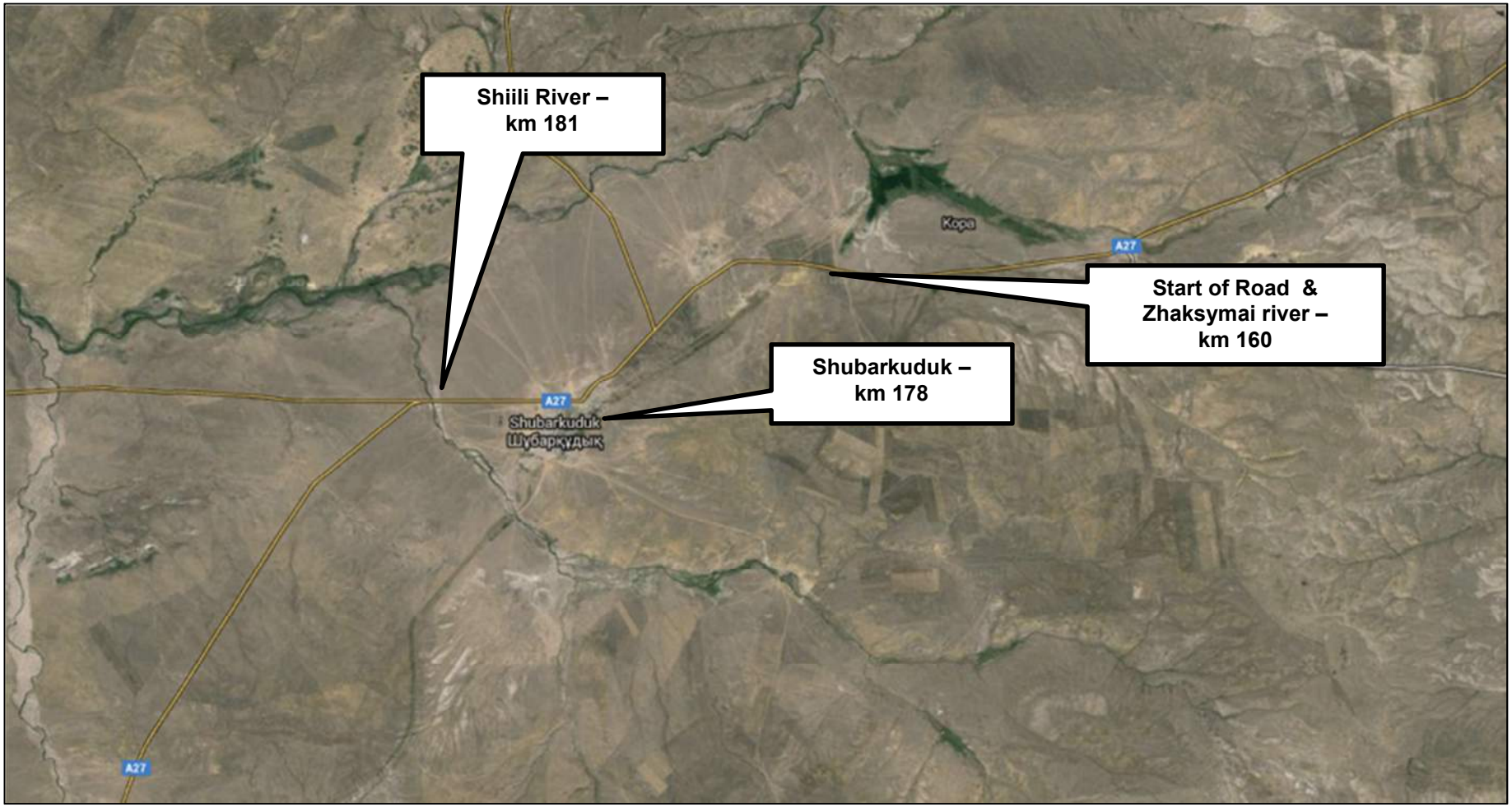



Oilfields –
km 380
Mukur –
km 376
Zhanterek –
km 400
A27
Mukur
Мукур
A-27


Nogaity River Seasonal Tributary – km 320
Nogaity River – km 338
Oblast Border – km 330
Sagiz River – km 342
Sagiz – km 340
A-27
A27
Sagiz


Rail Crossing & Realignment – km 234
Start of Govt. Section – km 236
Bayganin – km 239
Zharly – km 276
A27
A-27


A27
Kenzhaly River –
km 204
A-27
Lake –
km 240


Shiili River –
km 181
Start of Road &
Zhaksymai river –
km 160
Shubarkuduk –
km 178
A27
Shubarkuduk
Шұбаркұдық
Kopa

APPENDIX D: PUBLIC CONSULTATION MINUTES AND ATTENDEES (RUSSIAN AND ENGLISH)

Minutes of
the public consultation meeting on environmental impacts results of the project design document: reconstruction of the Aktobe-Makat Road of Republican Importance "Aktobe-Atyrau-the border of the Russian Federation (to Astrakhan)", section 110-330 km, chaired by Mr. A. Zh. Yergaliev, Deputy akim of Baiganin rayon of Aktobe oblast

Date & time: 20 August 2015, 09:30
Karauylkeldy village
Rayon akimat building

Participants (please refer to the attached list of attendees)

1. A representative of the project design organization "GazDorProject", Ltd, Mr. A. K. Tumanchaev, presented the draft project design for reconstruction of the Aktobe-Makat Road of Republican Importance "Aktobe-Atyrau-the border of the Russian Federation (to Astrakhan)", section 110-330 km, that passes through the Baiganin rayon of Aktobe oblast including the rural settlement of Karauylkeldy by means of a bypass. The GazDorProject representative familiarized the participants with such design decisions as cattle underpasses, bus stops, rest areas, road category, and others.

2. Ms. N.V. Panchenko, ADB consultant, presented the results of IEE indicating that no special status flora or natural habitat that would be signigicantly impacted by the road were identified. No migratory wildlife ways pass through the road, which was confirmed by a specialist from the Territorial Inspection for Forestry & Wildlife. She also familiarized participants with ADB legal requirements for such projects and the grievance redress mechanism that is common for all ADB projects and available for community members during construction.

The following questions were raised during the PC meeting.

1. Mr. E. A. Kaliev, Akim of Karauylkeldy rural okrug (district), Aktobe oblast.

Question: The proposed number of cattle underpasses near Karauylkeldy village is insufficient. We believe that the number of cattle underpasses should be increased near the village. If needed, akimat of rural okrug (district) can accompany the project design organization to the project site and indicate where additional underpasses are needed.

Answer: Your request will be considered. The project design organization will conduct additional surveys of the area to identify places for additional underpasses and will send to the akimat of rural district for accord.

2. Mr. Erkyn Seimukhanov, resident of Karauylkeldy village.

Question: I have some cattle and agricultural machinery that need to pass through the road near the Kenzhaly river. Will the project design consider road passes for agricultural machinery and are there any cattle passes in that area?

Answer: Your business needs and recommendations will be taken into account in the final design of the project. We will try to accommodate your needs for a cattle track as well as for the agricultural machinery.

3. Mr. Baltabai Tleulin, Technical center of main communication network-14.

Question: Did you already obtain specifications of engineering communication lines in the area from TCCN-14?

Answer: Yes, specifications have been obtained from all relevant owners of engineering communications.

4. Ms. E. M. Idrissova, Scientific-research institute “Kazmunaigas”, Ltd.

Question: What is the construction period?

Answer: We can provide this information for all sections of the project since the project is still at the design stage. For example, for the section that already passed through the state expertise the identified construction period is 19 months.

Question: Will OVOS (EIA) be developed for this project?

Answer: Yes, OVOS (EIA) of the project design documentation will be prepared

Question: Will the road section that goes through the Karauylkeldy village be repaired.

Answer: This road section will be used for transit transport during reconstruction works. After completion of works, the whole section will be fully repaired.

5. Mr. Senbai Mamai, owner of café “Abulkhair Khan”

Question: My café is located 100 meters away from the existing road. I got a permission from the authorized road body at the time of construction. Will it be removed now?

Answer: The project includes no business or residential buildings for removal

6. Mr. Aitugan Tazhimuratov, Construction department of Baiganin rayon

Question: Are there any turnoffs to the rayon center planned for the bypass?

Answer: Yes, a turnoff is included in the bypass design.

Question: Does the project include a temporary road during reconstruction works? Also, will it be sprinkled and repaired during construction?

Answer: Yes, the project includes a temporary road and its proper maintenance by the contractor according to safety requirements.

7. Mr. Ruslan Obayev, Chief specialist of Land Department of Baiganin rayon

Question: What are locations of borrow pits?

Answer: The project design considers borrow pits near the road. Exact locations will be determined once results of geological studies are available.

Question: Does the project include reclamation measures for borrow pits?

Answer: Yes, the project will definitely include reclamation measures for borrow pits.

8. Ms. Aksaya Bolekova, Specialist of Entrepreneurship Department of Baiganin rayon.

Question: Does the bypass design include areas for construction of service facilities and cafes (chaikhana)?

Answer: The project design cannot instruct where any service facilities such as cafes (chaikhana) should be located. The project design only includes the construction of road service facilities of category B in Nogaity village. Location of other service facilities is stipulated by the Law of RK on Automobile Roads and Government decree №845 dd 05.09.1998.

9. Mr. Konyspai Baimukhanov, resident of Karauylkeldy village

Question: Does the project design include repair of a bridge over the Karauylkeldy River?

Answer: Yes, all existing bridges along the road including this one will be either repaired or reconstructed.

10. Mr. Bagdat Balmanov, Specialist of Economy & Budget Planning Department of Baiganin rayon

Question: Does the project include road lighting for the Karauylkeldy bypass?

Answer: Yes, road lighting for the bypass is part of the project design.

Upon addressing all questions, the public hearing meeting was closed. Deputy akim and panel members thanked the attendees for their time and active participation.

Deputy Akim of Baiganin rayon of Aktobe Oblast	**[Signed]**	**A. Zh. Yergaliev**
JSC "National Company "KazAvtoZhol"	**[Signed]**	**R.S. Tazhbanov**
ADB	**[Signed]**	**N.V. Panchenko**
Aktobe Oblast Territorial Inspection for Forestry & Wildlife	**[Signed]**	**R. A. Kenzhibaev**

GazDorProject, Ltd.	**[Signed]**	**A. K. Tumanchaev**
	[Signed]	**Zh. M. Tanaliev**

Attachment: A signed list of attendees (34 participants total)

Minutes of
the public consultation meeting on environmental impacts results of the project design document: reconstruction of the Aktobe-Makat Road of Republican Importance "Aktobe-Atyrau-the border of the Russian Federation (to Astrakhan)", section 110-330 km, chaired by Mr. B. O. Izbasov, Deputy akim of Temirskiy rayon of Aktobe oblast

Date & time: 20 August 2015, 15.00
Shubarkuduk village
Rayon akimat building

Participants (please refer to the attached list of attendees)

1. A representative of the project design organization "GazDorProject", Ltd, Mr. A. K. Tumanchaev, presented the draft project design for reconstruction of the Aktobe-Makat Road of Republican Importance "Aktobe-Atyrau-the border of the Russian Federation (to Astrakhan)", section 110-330 km, that passes through the Temirskiy rayon of Aktobe oblast and a rural settlement Shubarkuduk by means of a bypass to the south of the settlement following the prospective master plan of Shubarkuduk. The GazDorProject representative familiarized the participants with such design decisions as cattle underpasses, bus stops, rest areas, road category, and others.

2. Ms. N.V. Panchenko, ADB consultant, presented the results of IEE indicating that no special status flora or natural habitat that would be signigicantly impacted by the road were identified. No migratory wildlife ways pass through the road, which was confirmed by a specialist from the Territorial Inspection for Forestry & Wildlife. She also familiarized participants with ADB legal requirements for such projects and the grievance redress mechanism that is common for all ADB projects and available for community members during construction.

The following questions were raised during the PC meeting.

1. Mr. B.D. Dandybaev, head of Kaztelekom company of Temirskiy rayon, Aktobe oblast.

Question: What materials will be used for snow retention barriers according to the project design documentation?

Answer: Snow retention barriers will be made of reinforced concrete.

Question: Why the project design includes snow barriers made of reinforced concrete and not planting tree protection belts?

Answer: The project commissioner (Aktobe KazAvtozhol) included the use of snow barriers made of reinforced concrete already in the Terms of Reference stemming from the overall effectiveness of similar barriers in other road projects.

2. Mr. A. N. Kalmaganbetov, akim of Shubarkuduk village.

Question: Does the project include a repair of the existing road of republican importance that goes through Shubarkuduk, which are not to be reconstructed?

Answer: This section of the road will be used as a diversion road for transit transport during construction. Upon completion of the bypass construction, this road will be fully repaired.

3. Mr. B.D. Dandybaev, head of Kaztelekom company of Temirskiy rayon, Aktobe oblast.

Question: According to the project, the project design organization included three (3) cattle underpasses near the Shubarkuduk village. Will be possible to include in the project design some sheds where people can wait for cattle when it is raining, for example?

Answer: This question will be considered in the final design and a technical decision will be made based on available technical standards & recommendations.

Question: What kind of road lighting will be used? Solar or standard?

Answer: This question is still at the design stage. Final decision will be made at a later stage during a detailed design of this section of the project document.

4. Mr. K.A. Salimgerei, Head of Employment & Social Programs Department of Temirskiy rayon, Aktobe Oblast

Question: What types of specialists will be required during road reconstruction works? And will it be possible to have a list of specialists that will be required for project implementation?

Answer: A list of specialists that will be required for road reconstruction include machine operators, engine drivers, road construction workers, cooks and others. A full list of needed specialists based on the detailed documentation will be sent your e-mail address kalizhan-k@mail.ru.

Upon addressing all questions, the public hearing meeting was closed. Deputy akim and panel members thanked the attendees for their time and active participation.

Deputy Akim of Temirkiy rayon of Aktobe Oblast	**[Signed]**	**B. O. Izbasov**
JSC "National Company "KazAvtoZhol"	**[Signed]**	**R.S. Tazhbanov**
ADB	**[Signed]**	**N.V. Panchenko**
Aktobe Oblast Territorial Inspection for Forestry & Wildlife	**[Signed]**	**R. A. Kenzhibaev**
GazDorProject, Ltd.	**[Signed]**	**A. K. Tumanchaev**

[Signed] **Zh. M. Tanaliev**

Attachment: A signed list of attendees (83 participants total)

Minutes of
the public consultation meeting on environmental impacts results of the project design document: reconstruction of the Aktobe-Makat Road of Republican Importance A-27 "Aktobe-Atyrau-the border of the Russian Federation (to Astrakhan)", section 330-468 km

Place: Sagyz village, community center "Shugyla", Kzylkoginskiy rayon

Date & time: 28 April 2015, 15:00

Participants:

S. T. Turishev – Akim of Sagyz rural okrug/district

N.T. Abishan – Deputy Akim of Sagyz rural okrug/district

Zh. G. Sharipov – Director of JSC "National Company "Kazavtozhol", Atyrau Oblast Representative Office

M.S. Kamzaev – Head of Road Maintenance Safety Unit, JSC "National Company "Kazavtozhol", Atyrau Oblast Representative Office

S.S. Kurzhumanova - Head of Quality Control Unit, JSC "National Company "Kazavtozhol"

S.S. Muldashev – Head of State Republican Enterprise "Kazakhavtodor"

M.P. Baksaraev - Team leader of the project design team of the Kostainaidorproject Ltd.

S. G. Ermolenko – Coordination & Reconciliation Specialist, Kostainaidorproject Ltd.

S.S. Makhambet - Head of State Enterprise "Department of Housing & Utilities, Passenger Transportation and Roads" of Kzylgoginskiy rayon of Atyrau oblast

Also, 31 residents of the Kzylkoginskiy rayon participated in the public consultation meeting.

Participants of the meeting unanimously nominated Mr. Turysh, Akim of Sagyz rural okrug, as the Chairperson of the public consultation meeting and Mr. Abishan, Deputy Akim of Sagyz rural okrug, as the meeting's secretary.

Mr. Turysh, Akim of Sagyz rural okrug, opened the meeting with welcoming words. A presentation of the Director of Kazavtozhol followed. He provided detailed information on the road realignment, proposed technical solutions. Then he presented results of the environmental impact assessment for the subject road section. Measures on mitigation and avoidance of negative environmental impacts were discussed at large.

1. **Presentation of Mr. Zharipov**: He noted that this road "Astana-Aktobe-Atyrau-Astrakhan" is one of the key goals listed in the Message of the State Head "Nurly Zhol – A Road To Future".

A project design documentation is being prepared by the Kostanaidorproject. The subject section located between rural settlements Sagyz and Makat. The design documentation envisages the upgrade of the road's existing category III to category II.

The project design documentation includes dismantlement and replacement of existing culverts, concrete bridges and a rail road crossover.

Vehicle maintenance check structures, food & rest places and vehicle parking areas for drivers and passengers are included in the project design documentation. Resting places will be equipped with benches, shelters, trash containers and toilets. Horizontal markings for parking are envisaged.

For short and long distance passenger transportation, the project design documentation includes bus stops.

In settlements along the road, the design includes pedestrian and cattle crossings.

For road maintenance, the project contains the construction of a Road Maintenance Facility in Makat and Road Operation Enterprise in Sagyz.

After the presentation, the floor was open for clarifying questions and comments.

Question 1: Mr. S.S. Makhambet, Head of State Enterprise "Department of Housing & Utilities, Passenger Transportation and Roads" of Kzylgoginskiy rayon of Atyrau oblast. What kind of cattle crossings does the project design include? Underpasses or ground crossings?

Response: Mr. M. P. Baksarayev, Team leader of the project design team of the Kostainaidorproject. To prevent the cattle from going over the road, the design document plans underpasses.

Question 2: Ms. G.Z. Zhambassinova, Director of the community center "Shygula" of Kzylkoginskiy rayon. Where do you expect to take water for technical needs during construction?

Response: Mr. M. P. Baksarayev, Team leader of the project design team of the Kostainaidorproject. During construction, water for technical needs is to be taken from local ground water sources (such as lakes and rivers)

Question 3: Mr. D. Akhmedov, local resident. Do you plan to start construction this year?

Response: Mr. Zh. G. Sharipov, Director of JSC "National Company "Kazavtozhol". This year we plan to start the construction of the road section 458-468 km (10 km)

Question 4: Mr. Kh. Omarov, local resident. Does the project design include a bypass around Sagyz?

Response: Mr. Zh. G. Sharipov, Director of JSC "National Company "Kazavtozhol". No bypass is planned in Sagyz.

Question 5: Mr. D. Mashrikov, local resident. Does the project design includes reconstruction of the road "Makat-Dosor"?

Response: Mr. Zh. G. Sharipov, Director of JSC "National Company "Kazavtozhol". The road "Makat-Dosor" is outside the road section to be reconstructed.

Requests from local residents:

1. To avoid using water for technical needs from local sources in spring when local rivers flow full and leave it for cattle
2. To retain the existing access roads to rural settlements, farms, businesses located along the road.

Attachment: List of Participants

S. T. Turishev	Akim of Sagyz rural okrug/district
N.T. Abishan	Deputy Akim of Sagyz rural okrug/district
Zh. G. Sharipov	Director of JSC "National Company "Kazavtozhol", Atyrau Oblast Representative Office
M.S. Kamzaev	Head of Road Maintenance Safety Unit, JSC "National Company "Kazavtozhol", Atyrau Oblast Representative Office
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S.S. Muldashev	Head of State Republican Enterprise "Kazakhavtodor"
M.P. Baksaraev	Team leader of the project design team of the "Kostainaidorproject" Ltd.
S. G. Ermolenko	Coordination & Reconciliation Specialist, "Kostainaidorproject" Ltd.
S.S. Makhambet	Head of State Enterprise "Department of Housing & Utilities, Passenger Transportation and Roads" of Kzylgoginskiy rayon of Atyrau oblast

Minutes of
public consultations with participation of Deputy Akim of Makat rayon, Zhaksylyk A. Musepov

Makat village
29.09.2015

Chairman: Musepov Zh. A., Deputy akim of Makat rayon

Paticipants: see the attached list of participants

Agenda items: Reconstruction of the road section "Aktobe-Atyrau-border of Russian Federation (Astrakhan)", km 487-504, ADB financing and: Zh. G. Sharipov, Nick Skinner, Zh. Musepov, S. Kalenov)

1. Mr. Zh. Sharipov, Director of Representative office of JS "NC "KazAvtoZhol" in Atyrau oblast, presented technical information on the upcoming project on reconstruction of the road section Aktobe-Atyrau-to Astrakhan, 487-504 km and the expected source of financing.

2. Mr. Skinner, Environmental specialist, ADB, provided information on ADB requirements for IEE and its purpose. He stressed that IEE as an important prerequisite for obtaining ADB financing.

3. Mr. S. Kalenov, Chair of Veterans' Association in Makat rayon, expressed on the behalf of the Association his gratitude and expressed full support for the upcoming road reconstruction project in the framework of the government program "Nurly Zhol".

Questions/clarifications:

1.**Question**: Will the road connect Shurbakuduk village in Aktobe oblast?
Answer: Yes, it will;

2.**Question**: When will the reconstruction start?
Answer: In the second half of 2016

3. **Question**: Before the reconstruction starts, do you expect any maintenance repairs to be performed? The road is in such a bad condition, people can hardly use it.
Answer: Partially, it depends on available financing;

4.**Question**: For how long is the project and when will it be completed?
Answer: by 2019

5. **Question**: Will it be possible to substitute some construction materials in the project for others (e.g. chalkstone) during reconstruction?
Answer: No, All works will be completed according the approved project.

6.**Question**: Will the project include road lighting at cross sections for access roads and cross-overs?
Answer: Yes, for sure

List of participants is attached.

ПРОТОКОЛ
общественных слушаний по разработке проектно-сметной документации на реконструкцию автомобильной дороги республиканского значения «Актобе – Атырау – граница РФ (на Астрахань)» км 100-330 под председательством заместителя акима Темирского района Избасова Б.О.

20 августа 2015 года
п. Шубаркудук
здание районного акимата

Присутствовали:
(по списку)

Выступили:

1. Представитель проектной организации ТОО «ГазДорПроект» Туманчаев А.К., который собравшихся жителей н.п. Шубаркудук ознакомил с проектом по разработке проектно-сметной документации на реконструкцию автомобильной дороги республиканского значения «Актобе – Атырау – граница РФ (на Астрахань)» км 100-330, который проходит по землям Темирского района и через н.п. Шубаркудук посредством его обхода с южной стороны, согласно плана развития районного центра. Также были озвучены проектные решения, которые предусматривает проект (скотопрогоны, автобусные павильоны, площадки отдыха, категория автомобильный дороги и другие решения).
2. Представитель Азиатского банка развития Панченко Н.В. Ознакомила присутствующих с результатами предварительной оценкой ОВОС. Никаких сред обитания флоры и фауны с особым статусом обнаружено не было. Также пути миграции сайги через автодорогу не проходят, что было подтверждено специалистами территориальной инспекции лесного хозяйства и животного мира. И ознакомила жителей с механизмом разрешения жалоб по экологическом и социальным защитным мерам для проектов в дорожном секторе, которые предусматриваются банком.

По итогам общественного слушания были заданы следующие вопросы:

1. Дандыбаев Б.Д., начальник АО «Казактелеком» Темирского района Актюбинской области.

- Вопрос: Из чего будут строиться снегозадерживающие заборы, которые предусматриваются в проекте?
- Ответ: Заборы для задержания снега в проекте предусматриваются из железобетонных изделий.
- Вопрос: Почему в проекте применяются железобетонные заборы, а не лесонасаждения?
- Ответ: Применение железобетонных стационарных снегозадерживающих заборов в проекте обусловлено техническим заданием на проектирование, выданным Заказчиком проекта. Заказчик в свою очередь их применение включил в задание, на проектирование исходя из эффективной работы аналогичных заборов, которые были установлены на предыдущих проектах.

2. Калмаганбетов А.Н., аким п. Шубаркудук.

- Вопрос: Будет ли предусматриваться ремонт существующей автомобильной дороги республиканского значения, которая проходит через н.п. Шубаркудук и которая не будет реконструирована?
- Ответ: Да, этот участок на период строительства будет использоваться как объездная автодорога для транзитного автотранспорта, после этого будет произведён её капитальный ремонт.

3. Дандыбаев Б.Д., начальник АО «Казактелеком» Темирского района Актюбинской области.

- Вопрос: Согласно проекта, проектировщиком предусматривается три скотопрогона в районе н.п. Шубаркудук. Можно ли предусмотреть для жителей, встречающих КРС навесы для ожидания, где они могут переждать дождь?
- Ответ: Этот вопрос будет рассмотрен и принято по нему в рамках действующих национальных стандартов решение.
- Вопрос: Какое будет освещение, на солнечных батареях или стационарное?
- Ответ: Этот вопрос находится в проекте на стадии разработки. Окончательный решение по нему будет предусмотрено позже в ходе проектирования данного раздела.

4. Салимгерей К.А., руководитель отдела занятости и социальных программ Темирского района Актюбинской области.

- Вопрос: Какие специальности будут востребованы в период строительства автомобильной дороги и можно ли получить списки требуемых специальностей, которые нужны будут при реализации проекта?
- Ответ: В список специальностей, которые будет нужны при строительстве автодороги входят механизаторы, машинисты, дорожные рабочие, повара и другие. Полный список, согласно сметной документации Вам будет предоставлен на электронный адрес kalizhan-k@mail.ru

На этом общественные слушания были завершены, приглашенные и заместитель акима поблагодарил присутствующих.

Заместитель акима Темирского района Актюбинской области — **Избасов Б.О.**

АОФ АО «НК «КазАвтоЖол» — **Тажбанов Р.С.**

Представитель АБР — **Панченко Н.В.**

Актюбинская областная территориальная инспекция лесного хозяйства и животного мира — **Кенжибаев Р.А.**

ТОО «ГазДорПроект» — **Туманчаев А.К.**

Таналиев Ж.М.

Аудан әкімдігінің мәжіліс залында өткізілген жиналысқа қатысушылар

ТІЗІМІ

«20» тамыз 2015 жыл
Сағат: 09-30

п. Шубаркудук

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Аудан әкімдігінің мәжіліс залында өткізілген жиналысқа қатысушылар

ТІЗІМІ

«20» тамыз 2015 жыл
Сағат: 09-30

п. Шубаркудук

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Аудан әкімдігінің мәжілісіне шақырылған жиналысқа қатысушылар

ТІЗІМІ

«20» тамыз 2015 жыл
Сағат: 09-30

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ПРОТОКОЛ
общественных слушаний по разработке проектно-сметной документации на реконструкцию автомобильной дороги республиканского значения «Актобе – Атырау – граница РФ (на Астрахань)» км 100-330 под председательством заместителя акима Темирского района Избасова Б.О.

20 августа 2015 года
п. Шубаркудук
здание районного акимата

Присутствовали:
(по списку)

Выступили:

1. Представитель проектной организации ТОО «ГазДорПроект» Туманчаев А.К., который собравшихся жителей н.п. Шубаркудук ознакомил с проектом по разработке проектно-сметной документации на реконструкцию автомобильной дороги республиканского значения «Актобе – Атырау – граница РФ (на Астрахань)» км 100-330, который проходит по землям Темирского района и через н.п. Шубаркудук посредством его обхода с южной стороны, согласно плана развития районного центра. Также были озвучены проектные решения, которые предусматривает проект (скотопрогоны, автобусные павильоны, площадки отдыха, категория автомобильный дороги и другие решения).
2. Представитель Азиатского банка развития Панченко Н.В. Ознакомила присутствующих с результатами предварительной оценкой ОВОС. Никаких сред обитания флоры и фауны с особым статусом обнаружено не было. Также пути миграции сайги через автодорогу не проходят, что было подтверждено специалистами территориальной инспекции лесного хозяйства и животного мира. И ознакомила жителей с механизмом разрешения жалоб по экологическом и социальным защитным мерам для проектов в дорожном секторе, которые предусматриваются банком.

По итогам общественного слушания были заданы следующие вопросы:

1. Дандыбаев Б.Д., начальник АО «Казактелеком» Темирского района Актюбинской области.

- Вопрос: Из чего будут строиться снегозадерживающие заборы, которые предусматриваются в проекте?
- Ответ: Заборы для задержания снега в проекте предусматриваются из железобетонных изделий.
- Вопрос: Почему в проекте применяются железобетонные заборы, а не лесонасаждения?
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2. Калмаганбетов А.Н., аким п. Шубаркудук.

- Вопрос: Будет ли предусматриваться ремонт существующей автомобильной дороги республиканского значения, которая проходит через н.п. Шубаркудук и которая не будет реконструирована?
- Ответ: Да, этот участок на период строительства будет использоваться как объездная автодорога для транзитного автотранспорта, после этого будет произведён её капитальный ремонт.

3. Дандыбаев Б.Д., начальник АО «Казактелеком» Темирского района Актюбинской области.

- Вопрос: Согласно проекта, проектировщиком предусматривается три скотопрогона в районе н.п. Шубаркудук. Можно ли предусмотреть для жителей, встречающих КРС навесы для ожидания, где они могут переждать дождь?
- Ответ: Этот вопрос будет рассмотрен и принято по нему в рамках действующих национальных стандартов решение.
- Вопрос: Какое будет освещение, на солнечных батареях или стационарное?
- Ответ: Этот вопрос находится в проекте на стадии разработки. Окончательный решение по нему будет предусмотрено позже в ходе проектирования данного раздела.

4. Салимгерей К.А., руководитель отдела занятости и социальных программ Темирского района Актюбинской области.

- Вопрос: Какие специальности будут востребованы в период строительства автомобильной дороги и можно ли получить списки требуемых специальностей, которые нужны будут при реализации проекта?
- Ответ: В список специальностей, которые будет нужны при строительстве автодороги входят механизаторы, машинисты, дорожные рабочие, повара и другие. Полный список, согласно сметной документации Вам будет предоставлен на электронный адрес kalizhan-k@mail.ru

На этом общественные слушания были завершены, приглашенные и заместитель акима поблагодарил присутствующих.

Заместитель акима Темирского района Актюбинской области — **Избасов Б.О.**

АОФ АО «НК «КазАвтоЖол» — **Тажбанов Р.С.**

Представитель АБР — **Панченко Н.В.**

Актюбинская областная территориальная инспекция лесного хозяйства и животного мира — **Кенжибаев Р.А.**

ТОО «ГазДорПроект» — **Туманчаев А.К.**

Таналиев Ж.М.

Аудан әкімдігінің мәжіліс залында өткізілген жиналысқа қатысушылар

ТІЗІМІ

«20» тамыз 2015 жыл
Сағат: 09-30

п. Шубаркудук

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Аудан әкімдігінің мәжіліс залында өткізілген жиналысқа қатысушылар

ТІЗІМІ

«20» тамыз 2015 жыл
Сағат: 09-30

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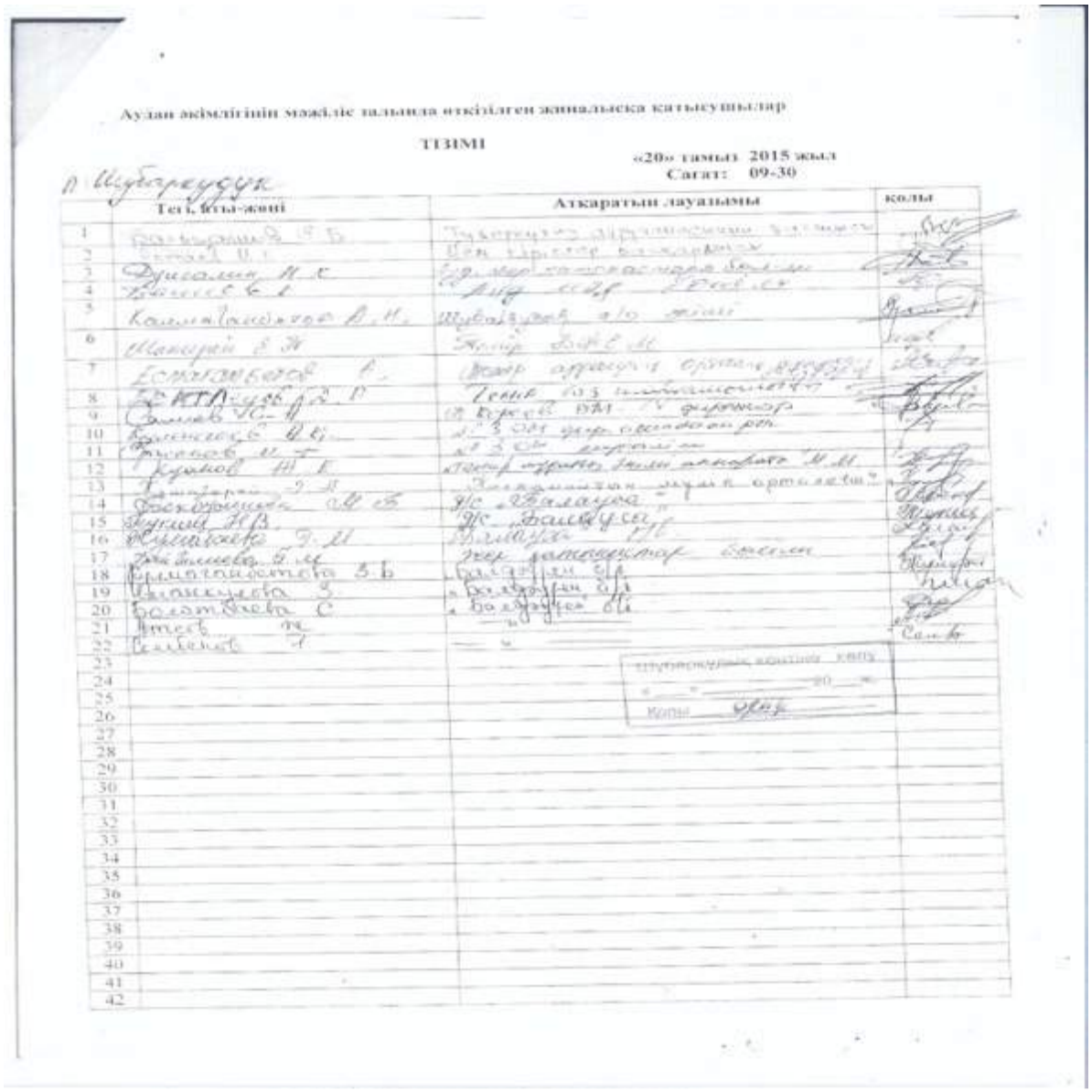

Аудан әкімдігінің мәжіліс залында өткізілген жиналысқа қатысушылар

ТІЗІМІ

«20» тамыз 2015 жыл
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	Тегі, аты-жөні	Атқаратын лауазымы	қолы
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Список участников общественных консультаций г. Макат, 29/09/2015

1) Космагамбетов Аслан Елуганович
2. Саршаев Сахи Хисмулы Саршаев
3) Джанкабылов Халам Таймулы
4) Хасенов Собир Сулейменович
5. Мухамбетжаров Сагын
6 Даулетбаев Дюсенгали
7. Аудандық сәулет және қала құрылыс бөлімінің басшысы З. Акишакова
8. „Доссор кенті әкімі аппараты" - бас маман Тансыбаева Алма Нохатовна
9. Костанбеков Максим Жекенбаевич.
10. Кадыров Абилхаир Бекбаевич - руководитель отдела строительства Макатского района
11. Картабаев Ерлан Сисенгалиевич аудандық жер қатынастары бөлімінің басшысы
12. Елубаев Адайхан зейнеткер
13. Сәреев Болатбек Амандықұлы. Макат кентінің әкімі. Б. Сәреев
14 Наталья Панченко, эксперт-эколог, АБР
15 Nick Shannon, Environmental Specialist, ADB.
16 Нурмағамбет Жаксығали
17 Жумагамбетов Нурлан
18 Курмангалиева Салима нач-к ОКК и ПР АО „НК КазАвтоЖол"
19. Шарипов Жантас Таирович директор АОФ АО „НК „КазАвтоЖол"

APPENDIX F – PUBLIC CONSULTATION ADVERTISEMENTS (AKTOBE)

ЖЕМ-САҒЫЗ

13 тамыз, Бейсенбі 2015 жыл

Байғанин ауданының газеті

№ 34 (7293)

1935 – 80 жыл – 2015

Газет 1935 жылғы шілдеден бастап шығады

zhemsagyzgazeti@mail.ru

Құрметті спортшылар, спорт ардагерлері!

Сіздерді кәсіби мерекелеріңізбен шын жүректен құттықтаймын!

Құрметті спортшылар!

Құрметпен
аудан әкімі: *М. Д. АҚҚАҒАЗОВ*

Құрметті оқырмандар!

ХАБАРЛАНДЫРУ!

«ҚазАвтоЖол» ҰК» АҚ Ақтөбе облыстық филиалы Байғанин ауданында «А - 27 Ақтөбе – Атырау - РФ шекарасы (Астрахань)100 - 330 км көлік жолын қайта жаңарту» тақырыбында қоғамдық тыңдаудың өтуі туралы хабарлайды.

Қоғамдық тыңдау мерзімі: 20. 08. 2015 жылы сағат 15. 00-де аудандық әкімдік ғимаратында.

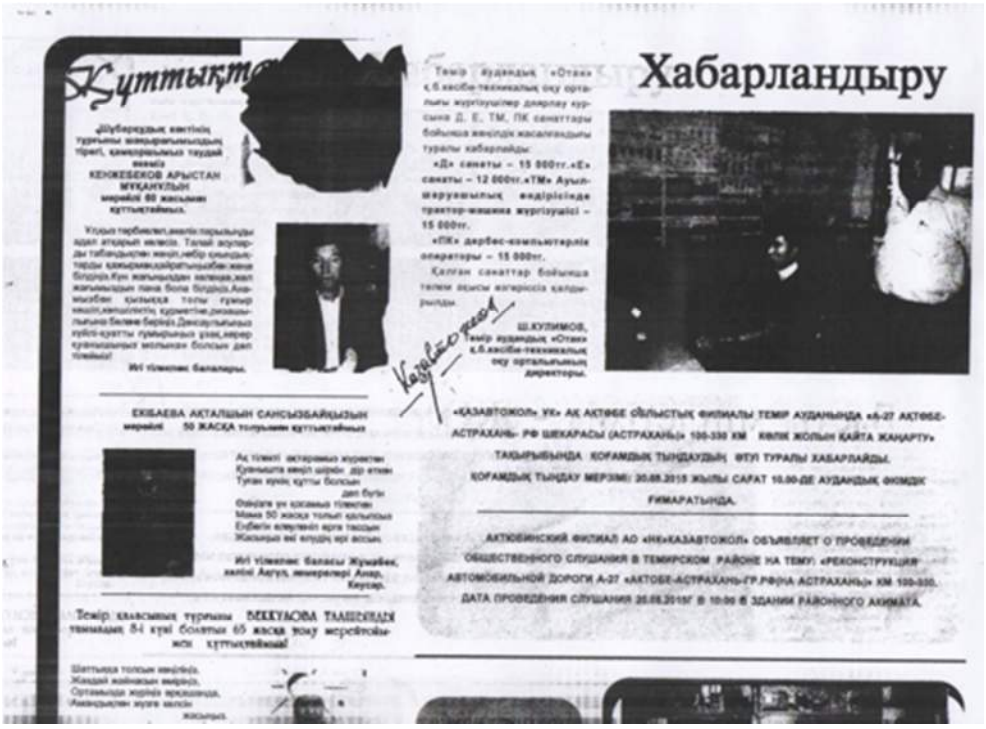
Актюбинский филиал АО«НК«КазАвтоЖол» объявляет о проведении общественного слушания в Байганинском районе на тему: «Реконструкция автомобильной дороги А - 27 «Актобе – Атырау - гр.РФ (на Астрахань)» км 100 - 330.

Дата проведения слушания 20.08.2015г в 15:00 в здании районного Акимата.

Аудандық «Жем – Сағыз» газетінің 2015 жылдың жарты жылдығына жазылуды естеріңізге саламыз!

Қала жазылушылары үшін			2015 жыл	Ауыл жазылушылары үшін	
индексі	6 айға	12 айға	Жазылушылар санаты	6 айға	12 айға
65512	1035,78	2071,58	Жеке тұлғалар	1112,22	2224,44
66512	2185,80	4371,60	Заңды тұлғалар	2262,24	4524,48
67512	694,80	1383,60	Жеңілдікпен жазылатындар	767,64	1535,28

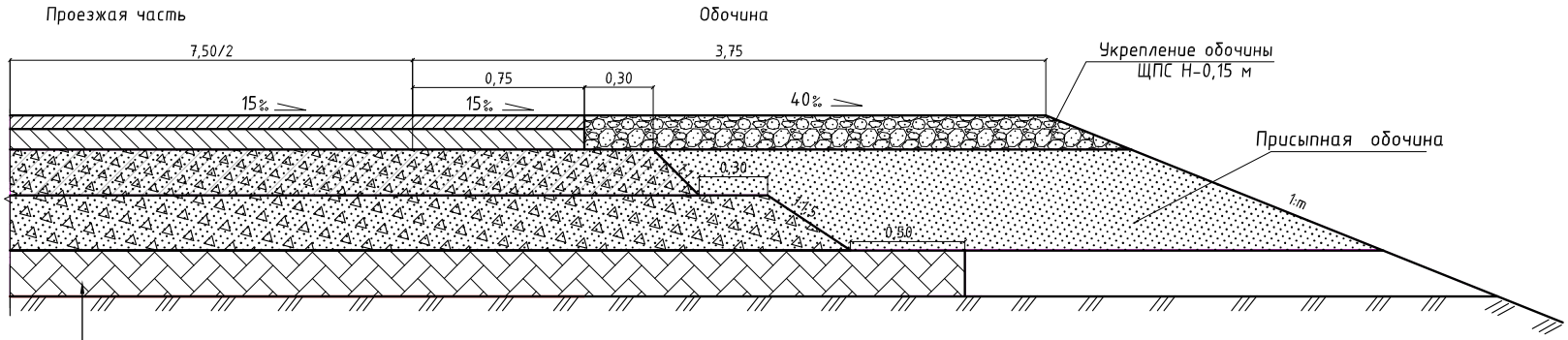
Газетке қоғамдық таратушылар арқылы немесе жергілікті аудандық «Қазпошта» бөлімшелері арқылы жазылуға болады.
Анықтама телефондары: 22 - 4 - 95 (редакция), 22 - 5 - 87 (Қазпошта)
Газеттің индексі 65510.



Құттықтаймыз

Хабарландыру

APPENDIX F: TYPICAL CROSS SECTIONS



Грунт земляного полотна-супесь песчанистая	
Грунт укреплённый неорганическим вяжущим (грунт-72%, ПГС-24%, цемент-4%"Roadzyme"-0.002%)	0.20м
Щебёночно-песчаная смесь	0.24м
Щебёночно-песчаная смесь, укрепленная неорганическим вяжущим (цемент-4%, "Nicoflok"-0,6%)	0,20м
Горячий крупнозернистый пористый асфальтобетон М-I	0,09м
Щебёночно-мастичный асфальтобетон ЩМА-20 с применением добавки Butonal NS198	0,06м

APPENDIX G: TRAFFIC ACCIDENT DATA

Year	Data period	Number of Accidents	Death	Injured
A27 Aktobe - Atyrau, Km 330 - 468, KazAvtoZhol, Atyrau				
2012	12 Months	3	1	7
2013	12 Months	1	0	2
2014	12 months	0	0	0
2015	3 months	0	0	0
A27 Aktobe - Atyrau, Km 160 - 330, KazAvtoZhol, Aktobe				
2006	12 Months	3	6	4
2007	12 Months	1	5	1
2008	12 Months	3	5	4
2009	12 Months	2	5	3
2010	12 Months	3	2	2
2011	12 Months	4	3	1
2012	12 Months	8	5	7
2013	12 Months	7	1	21
2014	12 Months	6	2	13
2015	3 months	1	0	1

APPENDIX H: WIND ROSES

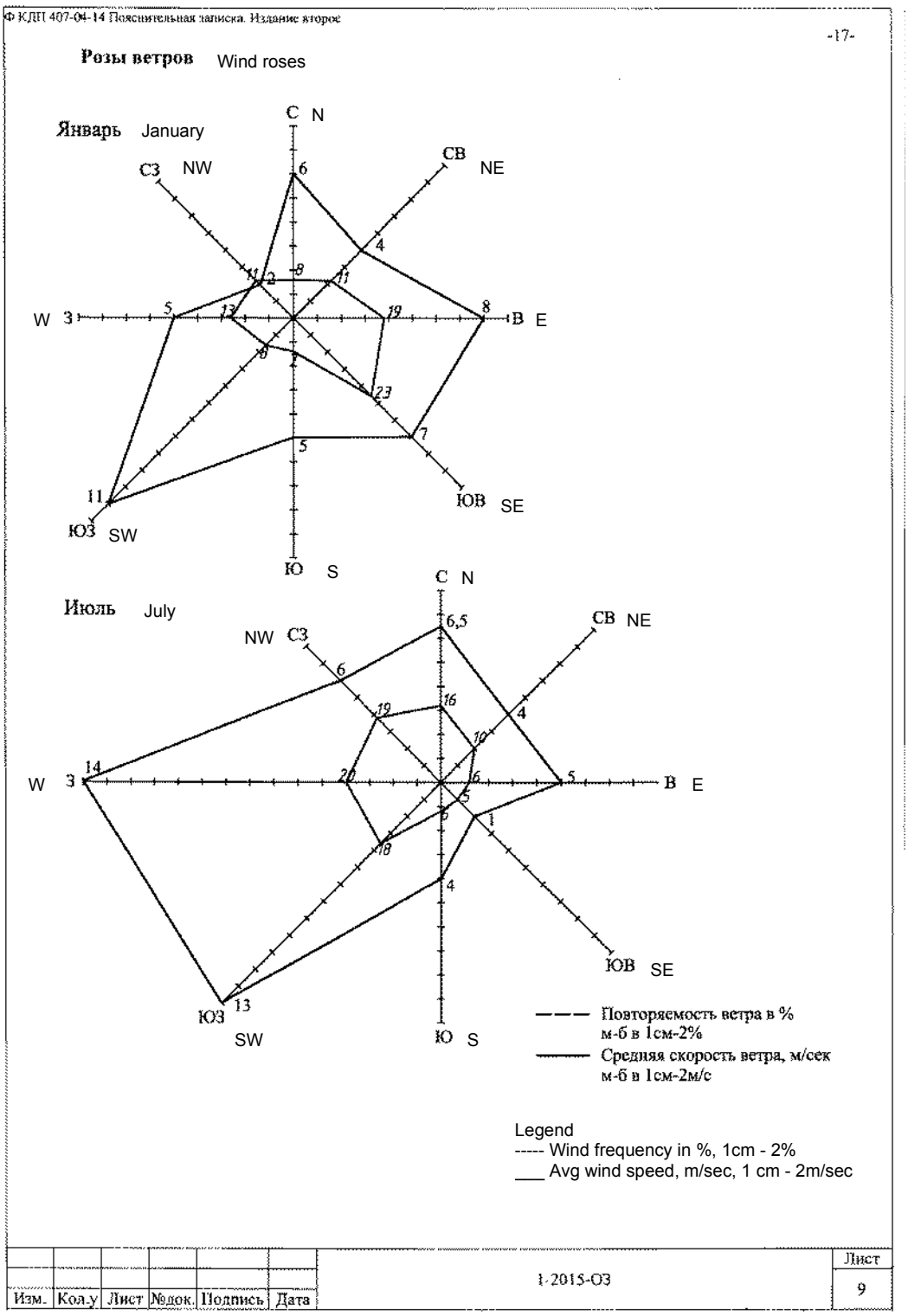


Figure H-1: Aktobe Wind Rose

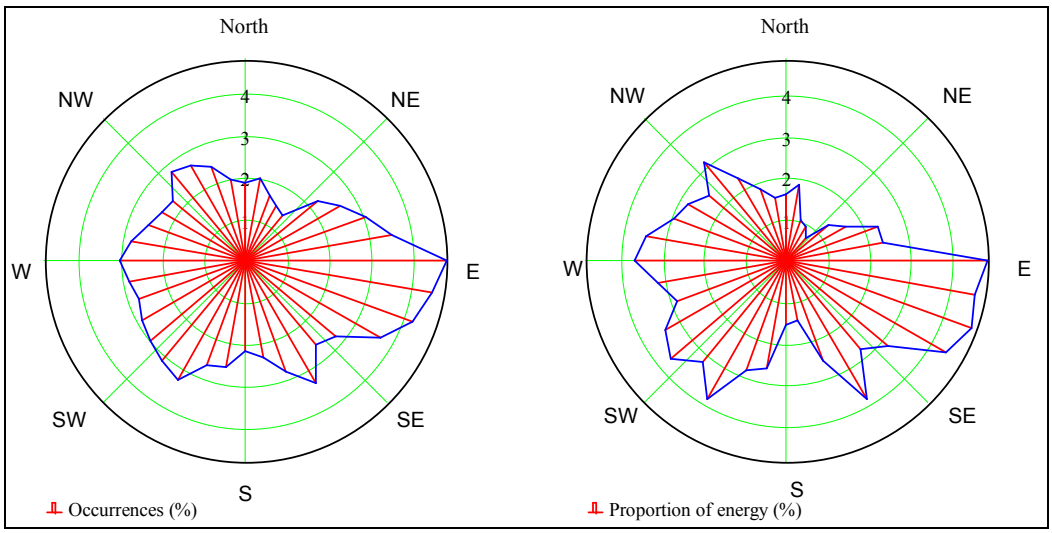
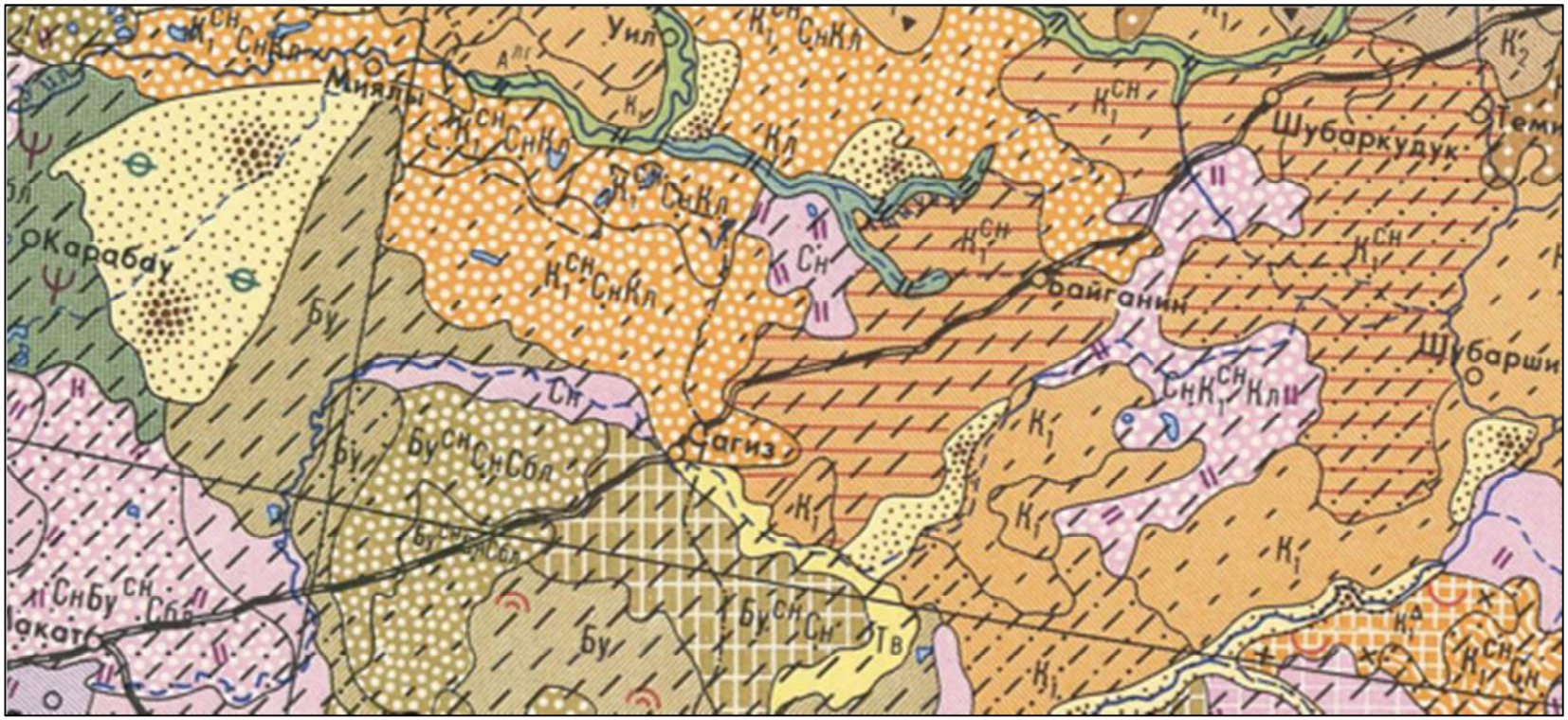


Figure H-2: Atyrau Wind Rose

APPENDIX I: SOIL MAP



Soils in the Project Area (source: European Soil Portal)

APPENDIX J: SEISMIC HAZARD MAP