



MODULE 5 – APPRECIATION OF AN ENVIRONMENTAL IMPACT ASSESSMENT – EIA

Objectives

- You get acquainted with the format of an EIA report
- You learn how to assess the quality of such a document

Some background information

- The study is for a road section between the Kyrgyz town Sary Tash and the Tajik border, to be financed by the Asian Development Bank (ADB). In the context of donor cooperation, the EC finances the impact assessment for this project.
- The project is not about new road construction but about the conversion of an existing earth road into an improved gravel/asphaltic concrete road.
- Because expected impacts are not very significant, a “light” EIA procedure (called “initial environmental examination”) is applied here, in conformity with ADB procedures.

Instructions

- Quickly go through the documents (extracts from the EIA report), starting by getting acquainted with the structure of contents. Have a closer look at pp. 21-22 (categorisation of project and methodology), p. 119 (conclusions), pp. 101-109 (environmental management and monitoring plans).
- In the attached evaluation grid (see overleaf), use the questions related to the evaluation criterion assigned to your group (ease of reading and understanding, comprehensiveness of the study, precision and credibility, or relevance and pragmatism of recommendations) to appreciate the quality of the study (based on available extracts and within the time limits of the exercise). Note the main strengths and weaknesses. **Don't attempt to answer each question individually!** (Questions are just there to guide your overall thinking.)
- Get prepared to share your conclusions with others in plenary session, in a synthetic manner (2-3 main strengths and weaknesses).

Documents to be used

- Road section Sary Tash – Karamyk road, Kyrgyzstan: extracts from the EIA report (2007)
- Evaluation grid for an EIA (see next pages)

Evaluation grid for an EIA

1. Ease of reading and understanding
<ul style="list-style-type: none"> - Is the structure of the report coherent? - Does it include a non-technical summary that reflects the contents of the report? - Is the report clear and easy to read? - Does the report avoid superfluous details? - Is it easy to get an idea of the project proposal? - Is it easy to get an idea of the main impacts of project implementation? - Is it easy to understand the main recommendations? - Is it easy to understand the merit of the selected alternative over the other considered alternatives (if any), based on the results of the environmental analysis? - Is it clear how the recommendations will be operationalised?
2. Comprehensiveness of the study
<ul style="list-style-type: none"> - Does the report cover all aspects included in the <i>Guidelines'</i> Terms of Reference? (see Annex 8) - Is a description given of the proposed project and of the alternatives being considered? Are the presented alternatives (if any) feasible and relevant to achieve the purpose of the project? - Was a scoping study undertaken? Does it identify the key stakeholders and their concerns, key elements of the institutional and legal/regulatory framework (as relevant to the EIA), the key environmental aspects and project components to be addressed in the EIA study, and the impact assessment tools and methods to be used? - Does the report include associated developments as part of the project (e.g. transmission lines for a power plant; access roads for a construction site)? - Does it address (if relevant) the construction, operation and decommissioning phases (infrastructure projects)? - Have (comprehensible and relevant) diagrams, tables, maps and pictures been included in the report? - Is the present situation (environmental baseline) described in a sufficiently extensive manner and addressing the key environmental variables? Does the environmental baseline give a clear indication of the state of the environment, and the key pressures and trends? - Is a scenario presented which describes the expected state of the environment under the assumption that the project is not implemented ("zero alternative")? - Are the geographical units that have been defined in the EIA sufficiently large to permit the assessment of all significant impacts (e.g. catchment areas)? - Does the report take into account, in a balanced manner, the various variables likely to be affected by the project, including social aspects? - Does it address indirect impacts? - Does it include information on the stakeholder engagement methodology, and the records of the stakeholder consultations?
3. Precision and credibility
<ul style="list-style-type: none"> - Has the methodology proposed in the scoping study effectively been applied? - Does the report describe the methods that have been used to identify and evaluate impacts? - Are these methods adequate with regard to the project components being assessed and the environmental variables being considered?

- Are the environmental impacts of the considered alternatives clearly and objectively compared with impacts of the zero alternative?
- Is the report free of contradictions and inconsistencies?
- Does the information appear to be objective and neutral (e.g. absence of gratuitous statements)?
- Does the report give a clear indication of uncertainties, limits of the study, hypotheses, value judgements, sources of information?
- Are indirect impacts considered, as well as the interactions between different environmental components?
- Does the report include a reasonable degree of precision and quantification?
- If some impacts are assessed qualitatively, are the results clearly explained and justified?
- Are the potential impacts characterised (e.g. positive/negative; direct/indirect; cumulative; synergistic; short-, medium- or long-term; permanent/temporary; mitigable/non-mitigable; significance; magnitude)?
- Does the report take into account the concerns and opinions of stakeholders?
- Does it take into account the external influences to the project?

4. Relevance and pragmatism of recommendations

- Does the report include clear conclusions, notably regarding the choice of a project alternative (if several were considered) and the appropriateness of proceeding with the envisaged project?
- Do the recommendations (mitigation measures) adequately address the impacts identified (mitigating negative impacts and optimising positive ones)? Are the mitigation measures proportionate to the identified impacts?
- Are the mitigation measures operational and realistic?
- Does the report describe the residual impacts and the environmental impacts possibly created by the implementation of the mitigation measures?
- Are the residual impacts acceptable?
- Does the report include a well structured Environmental Management Plan (including designation of responsibilities, environmental clauses to include in the tendering or contractual documents, estimation of costs and indicators)?
- Are there clear recommendations regarding the follow-up of the implementation of proposed mitigation measures (including the role of the Delegation and of national partners)?
- Have the proposed mitigation measures been costed?
- Have the proposed mitigation measures been prioritised?

The European Union's Tacis Programme

Pre-Feasibility & Feasibility Studies for Road Sections of the Termez - Dushanbe - Sary Tash Road

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Sary Tash – Tajik Border Section
Feasibility Study

Annex 14
Environmental Impact Assessment Report



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CURRENCY EQUIVALENTS

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KGS1.00	=	\$0.0263

ABBREVIATIONS

AC	–	Asphaltic concrete
ADB	–	Asian Development Bank
AIDS	–	Acquired Immune Deficiency Syndrome
AO	–	Aiyl Okmot (local (village or a group of villages) administration)
BOD	–	Biochemical oxygen demand
CAR	–	Central Asian Region
CDF	–	Comprehensive Development Framework
CAREC	–	Central Asia Region Economic Cooperation
CEA	–	Country Environmental Analysis
CO	–	Carbon monoxide
COD	–	Chemical oxygen demand
CSP	–	Country Strategy Program
DEE	–	Department of Ecological Expertise (under the SAEP&FM)
DRW	–	Department of Water Resources under the Ministry of Agriculture, Water Resources and Processing Industry
EARP	–	Environmental Assessment and Review Procedures
EIA	–	Environmental impact assessment
EBRD	–	European Bank of Reconstruction and Development
EMP	–	Environmental Management Plan
GDP	–	Gross domestic product
GEF	–	Global Environmental Facility
HIV	–	Human Immuno-deficiency Virus
IEE	–	Initial Environmental Examination
IUCN	–	International Union on Conservation of Nature
KR	–	Kyrgyz Republic
M&E	–	Monitoring and evaluation
MOTC	–	Ministry of Transport and Communication
ME	–	Ministry of Emergencies
NGO	–	Non-governmental organizations

NEAP	– National Environmental Action Plan
NSPA	– National Strategy of Poverty Alleviation
NPV	– Net present value
NOx	– Nitrogen oxides
PIU	– Project Implementation Unit (under MOTC)
PPTA	– Project Preparation Technical Assistance
PRC	– People's Republic of China
PSA	– Poverty and Social Assessment
SAEP&FM	– State Agency for Environment Protection and Forestry Management
SIEE	– Summary Initial Environmental Examination
SOx	– Sulfur oxides
SRII	– Scientific Research Institute for Irrigation
SEE	– State Environmental Expertise
SER	– State Environmental Review
ToR	– Terms of Reference
TASIC	– Technical Assistance for the Commonwealth of Independent States
TPM	– Total particulate matter (airborne)
TSS	– Total suspended solids (waterborne)
UNDP	– United Nations Development Program
UNEP	– United Nations Environmental Program

WEIGHTS AND MEASURES

kg	– Kilogram
mm	– Millimeter
m, m ² , m ³	– Meter, square meters, cubic meters
km, km ²	– Kilometer, square kilometer
ha	– Hectare
dB(A)	– Noise measurements taken with an instrument set on the A weighting scale
mg/l	– Milligrams per liter
MPN/100ml	– Bacterial unit as most probable number per 100 milliliter

ANNEX 14

ENVIRONMENTAL IMPACT ASSESSMENT

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INTRODUCTION

The Governments of Kyrgyz Republic and Tajikistan are undertaking a number of road upgrading and rehabilitation projects to improve national and regional road transport networks and facilitate socio-economic development. The Asian Development Bank (ADB) is providing assistance by funding a number of such projects in both countries and is currently funding the Project Preparation Technical Assistance (PPTA) for the Maintenance of Regional Road Corridors Project (the project). In particular, ADB has been assisting in rehabilitation of the Dushanbe–Kyrgyz Republic border road in Tajikistan with two loans. ADB is also helping rehabilitate part of the southern road corridor in the Kyrgyz Republic between Osh and Irkeshtam at the border with the People's Republic of China (PRC). ADB is now considering a third loan for Tajikistan to complete the rehabilitation of the Dushanbe–Kyrgyz Republic border road and a loan for the Kyrgyz Republic to improve maintenance of regional roads.

1. DESCRIPTION OF THE PROJECT

The priority of the Government of the Kyrgyz Republic (the Government) is to rehabilitate the remaining section of the road from Irkeshtam to the Tajikistan border via Sary-Tash (approximately 215 km of which the first 19 km has already been upgraded), and the Tajikistan Government's priority is to complete the missing link of the Dushanbe–Kyrgyz Republic border road. Based on these priorities, ADB proposed to combine two loans planned for the Kyrgyz Republic and Tajikistan in 2007 into one regional road improvement project to cover the section of the road between Irkeshtam and Dushanbe via Sary-Tash, with the total length of 324 km. Because ADB's planned loan amounts to complete the entire corridor are limited and current traffic levels do not justify full rehabilitation, ADB proposes to consider full rehabilitation of critical sections only and partial rehabilitation for remaining sections. The project includes the following components:

- Improvement of 142 km of the remaining sections of the regional road between Sary Tash in the Kyrgyz Republic to Dushanbe in Tajikistan;
- Improvement of border infrastructure and facilities at the border crossing of Karamyk between Tajikistan and the Kyrgyz Republic;
- Assistance to develop a cross-border agreement among the Kyrgyz Republic, Tajikistan on the Irkeshtam–Sary-Tash–Dushanbe regional road corridor;
- Capacity building for enforcement of vehicle axle load controls; and
- Assistance to develop a road maintenance action plan.

In the Kyrgyz Republic, the executing agency (EA) is the Kyrgyz Republic's Ministry of Transport and Communications (MOTC) through its Project Implementation Unit (PIU). This initial environmental examination (IEE) covers the section between the Kyrgyz Republic – Tajikistan border (Karamyk) and Sary-Tash. The section of the road between

the border and Dushanbe is covered under a separate project - Dushanbe-Kyrgyz Border Road Rehabilitation - including Phase II, which involves the rehabilitation of a section of 77 km of the national road and upgrading of some 100 km of selected rural access roads to link the main road.

The road section which is the subject of this IEE is referred to as the Sary-Tash – Karamyk Road (ST-KM).

2. LEGAL AND ADMINISTRATIVE FRAMEWORK

The interventions of the ST-KM Road Rehabilitation Project will be designed, built and operated in conformity with the following legislative and regulatory requirements, and lender policies and guidelines:

- National legislation
- International conventions in force in Kyrgyzstan
- ADB policies, standards and guidelines

This section of the EA discusses the relevance of these to the Project. The national environmental legislative and policy framework is initially described. This includes specific aspects of policy and legislation dealing with environmental impact assessment. This is followed by a summary of environmental legislation, international agreements and conventions to which Kyrgyzstan is a signatory (or which are under consideration), and regional co-operation in the form of transboundary agreements to deal with natural disasters. The chapter closes with international finance institution (ADB) screening and safeguarding policies that are pertinent to the Project.

2.1. LEGAL FRAMEWORK

2.1.1. National Environmental Policy

The immediate objectives of environmental policy were set out in the National Environmental Action Plan (NEAP) for the Kyrgyz Republic which was adopted in 1995 for the period 1995-1997. It provides a guiding policy for dealing with key environmental problems facing the country:

- Inefficient water resource management
- Land degradation, mainly due to overgrazing
- Overexploitation of fragile forest resources
- Threat of irreversible loss of biodiversity
- Inefficient mining and refining practices.

According to the NEAP, Kyrgyzstan's overriding objectives are to ensure sustained economic growth and to reduce poverty. Environmental protection is viewed as both a tool and a condition for achieving the broad goals.

More recently, the following priority environmental objectives have been identified for action:

- Reducing urban air pollution
- Using water resources more efficiently and economically

- Improving wastewater treatment
- Protecting arable lands against degradation
- Establishing a system of sustainable use of plant resources, including forests
- Updating the Red Data Books
- Expanding the system of specially protected areas and of biosphere reserves
- Rehabilitating and making safe radioactive dump sites
- Controlling the production, treatment, transport and disposal of toxic wastes
- Registering harmful substances
- Improving the environmental monitoring system.

The major direction of environmental policy in Kyrgyzstan is aimed at providing environmental safety of the country through adoption of a system of principles and priorities which define external and internal policy, and legal and economic mechanisms, aimed at nature protection and conservation.

In moving towards achieving this goal, Kyrgyzstan has adopted a number of strategic policy documents. They are the following: the Concept of Ecological Safety (1997), the National Strategy for Sustainable Human Development (1997), the Comprehensive Development Framework for the Kyrgyz Republic to 2010 (CDF), and the National Strategy for Poverty Alleviation (NSPA) to 2005.

In addition, as a country with highland ecosystems increasingly vulnerable towards anthropogenic impacts, the Kyrgyz Republic initiated the year 2002 as International Mountain Year within the United Nations. As a result, the Global Mountain Summit was held in Bishkek, the capital of Kyrgyzstan, in 2002.

2.1.2. National Environmental Legislation

National environmental legislation applicable to the Project is comprised of the following sources of law listed hierarchically in accordance with the Constitution and other laws of Kyrgyzstan:

- Constitution of Kyrgyzstan
- Laws, international treaties and Presidential Decrees
- Governmental regulations
- Ministerial orders and decrees
- Regulations and regulatory decisions of the local administrations (local keneshes).

The Constitution and the main environmental laws and regulations that are relevant to the Project are reviewed below.

Constitution of Kyrgyzstan

The Constitution was adopted on 5 May 1993 by the Supreme Council (then the highest legislative body in Kyrgyzstan) and has since been amended several times. The Constitution has the highest legal authority.

The Constitution of Kyrgyzstan directly addresses environmental issues and sets out the legal framework that guarantees a public consultation process with respect to environmental matters. Basic rules on environmental protection and natural resource use are established by the Constitution. Clause 4 provides that land, its subsoil, air, waters, forest plant life and wildlife, and also other natural resources, are used as a basis for the life and activities of the Kyrgyz people and are afforded special protection by the State. It also establishes that land can be in public, communal or private ownership.

The Constitution establishes the fundamental right of individuals to a favorable and healthy environment and to compensation for damage caused to health and property from the use of natural resources. The right is balanced by the obligation on each citizen to use the environment, natural resources and historical monuments with care. The Constitution does not grant individuals the right to environmental information; although this is covered in the 1999 Law on Environmental Protection and other specialized legislation (see below).

Environmental Legislation

Environmental laws, standards and regulations in the Kyrgyz Republic were mostly inherited from the former Soviet Union. Since independence in 1991, extensive legislative reform has provided a more appropriate market-oriented legal framework for environmental protection. In the process the environmental legislation of Kyrgyzstan has been largely revised.

A brief summary of the main statutes is set out below.

General Environmental Legislation

Law on Environmental Protection 1999. The 1999 Law on Environmental Protection was signed by the President of Kyrgyz Republic on 16 June 1999 and supersedes the 1991 Law. This law declares a national policy and regulates legal relationships in the field of the environmental protection and nature management.

Law on Mountain Territories 2002 (amendment #194 of August 10, 2003). The goal of the present law is establishment of socio-economic and legislative basis for sustainable development of mountain territories of Kyrgyz Republic, conservation and rational use of natural resources, historical, cultural and architectural heritage. The law provides a ground for regulation of human activities in mountain territories.

Emergency Situations

Law on Protection of Population and Territories from Natural and Technogenic (Man-made) Emergency Situations 2000. The goals of the present law include 1) prevention of triggering and development of emergency situations; 2) decreasing damages and losses from emergency situations; 3) mitigation of emergency situations.

Emergency situation implies “a situation formed on a certain territory as a result of dangerous natural or technogenic phenomenon, accident, catastrophe or natural disaster which can result in fatalities, health injuries, adverse environmental impacts, economic losses and violation of vital activity of human beings.”

Environmental Assessment

Law on Ecological Expertise (State Environmental Review) 1999. The 1999 Law on Ecological Expertise was signed on 16 June 1999 with the purpose of regulating legal relationships relating to environmental review (ecological expertise) and the prevention of negative environmental consequences arising from economic activities. The term "ecological expertise" is defined as "the identification of environmental risks and hazards posed by a proposed activity which, directly or indirectly, will have an impact on the condition of the environment and natural resources." The procedure to assess environmental impacts of the proposed activity is known as OVOS (Otsenka Vozdeistviya na Okruzhayutchuyu Sredu).

Air Quality

Law on Atmosphere Protection 1999 (amendment of June 24, 2003). The Law on Atmosphere Protection was signed into law together with a series of other important environmental laws on June 12, 1999 replacing the Law on Atmosphere Protection of 1981. The new law seeks to regulate legal relationships in the field of atmosphere protection. This law lays down two types of air quality standards (Section II): Maximum Admissible Concentrations (MAC) for pollutants, microorganisms and other biological substances in the atmosphere; and Maximum Admissible Levels (MAL) for acoustic, electromagnetic, ionizing and other physical impacts on the atmosphere. Section IV of the law sets forth requirements for pollutant emissions from stationary sources and Section V from mobile ones. Monitoring and inspection policy for the atmosphere is set out in Section IX.

Biological Resources

Law on Biosphere Territories 1999. This law lays down legal rules for establishment and operation of biosphere territories. Biosphere territories are water or/and ground-based ecological systems providing a stable balance of biodiversity, economic development and protection of cultural values. Biosphere territories have the status of specially protected areas at the national level.

Law on Specially Protected Natural Territories 1994. Specially protected natural territories are regulated pursuant to the Law of 28 May 1994, #1562. According to the Law, there are six categories of protected areas: State Nature Reserves (zapovedniki) - conservation is the primary objective, economic activities are prohibited; State National Parks (prirodnye natsionalnie parki) - conservation and recreation are the primary objectives, with different management zones defined; State Specialized Reserves (zakazniki) - conservation of certain species or habitats is the primary objective, divided

into five sub-categories (complex, zoological, botanical, forest and hydrogeological zakazniki). These areas are of national or local importance, established for 10 or more years or for 5 years maximum, respectively; Objects of Natural Heritage - both state and private property - a list is approved by the Government; botanical and zoological gardens and dendrological parks; Natural Areas for Health Promotion - a list of areas of mineral waters, therapeutic mud, valuable landscapes is approved by the Government.

Forest Code 1999. The Code establishes legal rules for efficient use, protection, conservation and reproduction of forests, and building their ecological and resource capacities. All forests and lands privately, publicly and communally owned and granted to the needs of forestry constitute the Forest Fund of the Kyrgyz Republic. Land covered by forest, as well as not covered by forest but assigned for forestry, is recognized as forest fund land. This includes forests, plantations, nursery forests, felling areas and clearings as well as non-forest land cleared during construction of roads, pipelines, transmission lines, etc.

Law on Animal Kingdom 1999. The animal kingdom is legally the property of the Kyrgyz Republic; it is an essential element of nature and an important regulating and stabilizing component of the biosphere; the law requires that it be protected and efficiently used to meet the material and spiritual requirements of the Kyrgyz people. The present law establishes regulations for protection, use and reproduction of animal species e.g. while designing and constructing airports, railways, highways, canals, dams, etc., and measures should be taken to preserve migration routes and habitats of animals including breeding and overwintering sites.

Law on Protection and Usage of Plant World 2001 (amendment # 114 of June 24, 2003). This law establishes legal relationships to provide effective protection, rational use and reproduction of plant resources.

Water Quality

Law on Water 1994. The major goal of water legislation of Kyrgyz Republic is regulation of relationships in the field of usage and protection of water resources, prevention of environmentally harmful impacts on water sites and water facilities and improving their condition, strengthening relationships in the sphere of water relationships.

Law on Drinking Water 1999. This law regulates among other aspects the supply and quality of drinking water.

Waste and Radiation

Law on Radiation Security of Population 1999. The Law defines legal relationships in the field of radiation security of people and environmental protection from the adverse effects of ionizing radiation. Four basic principles of radiation security are recognized: 1) Rating: individual radiation doses from all the sources of ionizing radiation should not exceed permissible levels; 2) Basing: prohibition of all activities on usage of ionizing radiation sources when benefits do not exceed harm from such an activity; 3)

Optimization: when using ionizing radiation sources, doses and number of people exposed to radiation should be kept as low as possible; 4) Openness: people should have free access to information about ionizing radiation in their neighborhood and about accidents with radioactive materials. Sections II and III regulate issues of state control over radiation security and authority of state structures in the field of radiation security. Section V stipulates the rights of people and legal entities on information in the field of radiation security.

Law on Tailings Ponds and Dumps 2001. The Law aims to provide safety for the environment and present and future generations from tailings ponds and waste dumps. Section III of the law stipulates a state inventory of all tailings ponds and waste dumps located in the territory of Kyrgyzstan. At present in Kyrgyzstan there are over 50 tailings ponds containing more than 100 million cubic meters of radioactive and toxic wastes.

Law on Wastes of Production and Consumption 2001. This Law regulates legal relationships arising as a result of the formation, collection, storage, usage, neutralization, transportation and burial of wastes of production and consumption. Radioactive wastes, air and water pollution are the subject of other laws.

Historical and Cultural Values

Law on Protection of Historic and Cultural Heritage 1999. Cultural resources in Kyrgyzstan are regulated pursuant to the Law on Protection of Historic and Cultural Heritage (26 July 1999, # 91) administered by the Ministry of Education, Science and Culture. Historic and cultural monuments are subject to state registration. There is a list of monuments of international, national and local significance. A document entitled Concept of Development and Preservation of Culture and Art (Madaniyat), 1997-2000, indicated that there are approximately 5,000 historical monuments in Kyrgyzstan. Of these, approximately 1,300 are registered and 800 are under the protection of the state.

State Environmental Expertise

State Environmental Expertise (SEE) or State Environmental Review (SER) represents an expert examination of materials submitted to an authorized body to implement a project. The purpose of SEE is to appraise environmental impacts of the intended project. The outcome of the SER is expressed in a negative or positive resolution on the project.

Section IV (Environmental Requirements for Economic and Other Activities) of the 1999 Law on Environmental Protection and the 1999 Law on Environmental Expertise (State Environmental Review) states that funding or implementation of a project that may have a potentially adverse impact on the environment is prohibited, unless approval is obtained from a state environmental expert commission.

The environmental review is carried out in accordance with a procedure approved by an authorized state body on environmental expertise.

The 1997 Instruction on a Procedure of State Environmental Expertise for Pre-Project, Project and other Materials in Kyrgyz Republic provides requirements for what information is to be submitted to the State Environmental Expertise and the organization of the environmental expertise bodies.

An extensive list of documents is required to be subjected to SER. This includes all types of planned and pre-project documentation, drafts of environmental and other programs, concepts, sectoral development plans, city and area development plans, feasibility studies and projects for reconstruction, development, re-equipment, decommissioning, drafts of international treaties, contracts, and agreements related to usage of mineral resources etc.

In order to carry out state environmental review the project proponent should provide the following documentation:

- Materials covering the environmental assessment of economic activities
- Approvals from corresponding state bodies and local administrations
- Statement of public environmental review (if carried out).
- State environmental review of a project is a responsibility of an expert commission created by an authorized body on Environmental Expertise.

The expert commission involves specialists from the authorized body and part-time experts, including those from environment protection organizations, with the exception of the project proponent or developer.

The duration of the SER is defined by the complexity of the project but should not exceed three months after submission of the necessary documentation and payment of fees.

Public Participation

The 2001 Law on Accession of the Kyrgyz Republic to UNECE Convention on Access to Information, Public Participation and Access to Justice on Environmental Matters (the Aarhus Convention and 1999 Laws on Environment Protection and Environmental Expertise) provide the legislative framework for public participation in environmental decision-making.

Public environmental expertise is organized and conducted by an initiative of citizens, local administrations and public associations, registered according to a procedure established by Kyrgyz legislation. Public environmental expertise may be organized independently from the state environmental expertise.

Initiators of the public ecological environmental have to notify in advance in writing to local administrations and local councils about the performance of the public environmental expertise.

A statement of public environmental expertise is directed to the body conducting state environmental expertise, and also the body making a decision about execution of the project under assessment.

A statement of public environmental expertise is recommended. It can be published in the mass media and passed to local state administrations and local councils, project initiators, designers and other stakeholders.

International Agreements and Conventions

Kyrgyzstan's priorities in international co-operation are related to the country's most urgent environmental problems:

- Ensuring the safe rehabilitation of nuclear tailings
- Strengthening the pollution monitoring and control system
- Combating desertification and land degradation
- Improving water resource allocation between neighbors

Since independence in 1991, the Kyrgyz Republic has demonstrated a commitment to widening its international co-operation in environmental protection, the sustainable use of natural resources and resolution of transboundary issues, notably water sharing (see below).

The international agreements and conventions of relevance to the Project to which Kyrgyzstan is party (or to which active discussions are taking place) are listed in Table 1. The Kyrgyz Republic has signed 11 international conventions in the environmental field.

Table 1: International Agreements and Conventions of Relevance to the Project

Convention/Treaty/Protocol	Status in Kyrgyzstan
Basel Treaty on Transboundary Movements of Hazardous Wastes and Their Disposal	Ratified: 18/1/96 (according to the UN Environment Program the Kyrgyz Republic acceded to the Protocol on 13/8/96)
UN (Rio) Treaty on Biological Diversity	Ratified: 26/7/96 (according to the Secretariat the Kyrgyz Republic acceded on 6/8/96)
Convention on Navigable Waterways of International Concern	According to the UN official documents, the Kyrgyz Republic was not among the voters for/against the Convention, neither was it among abstainers or others attending voting in the UN General Assembly on 21/5/9
United Nations Treaty to Combat Desertification	Acceded to the Treaty on 21/7/99 (according to the Secretariat the Kyrgyz Republic ratified the Treaty on 19/12/97 and acceded to it on 19/9/97).
UN Framework Convention on Climate Change	Acceded on 14/1/00 (on 25/5/00 according to the Secretariat)
The Kyoto Protocol – UN framework convention on climate change	Law on ratification #9 of 15 January 2003

Convention/Treaty/Protocol	Status in Kyrgyzstan
Convention on Wetlands of International Importance Especially as Wildfowl Habitat (Ramsar)	Currently is at the review stage. The list of water and wetland resources of international significance includes inter alia Issyk-Kul lake.
UN Rotterdam Convention of the Procedure of Preliminary Justified Agreement regarding Chemical Substances and Pesticides International Trade	Signed on 11/8/99; ratified and the law was signed on 15/1/00 and published on 26/1/00; according to the Secretariat on 25/5/00.
Vienna Convention on the Protection of the Ozone Layer	Acceded on 15/1/00; on 31/5/00 according to the Secretariat.
Montreal Protocol on Substances That Deplete the Ozone Layer (and its London and Copenhagen amendments)	Acceded on 15/1/00; on 31/5/00 according to the Secretariat.
Paris Convention on the Protection of the World Cultural and Natural Heritage	Acceded on 10/6/95; on 3/7/95 according to the Secretariat.
Geneva Convention on Long-Range Transboundary Air Pollution	Acceded on 14/1/00; on 25/5/00 according to the Secretariat.
Protocol of the 1979 Convention of Long-Range Transboundary Air Pollution	Acceded on 14/1/00
Convention on Transboundary Environmental Impact Assessment	Acceded on 14/1/00
The Aarhus Convention on Access to Information and Public Participation in Decision-Making and Access to Justice in Environmental Matters	Acceded on 14/1/00
The Stockholm Convention on Persistent Organic Pollutants	Acceded on 16/5/02

2.1.3. Regional Cooperation

In addition to international Conventions/Treaties ratified by the Kyrgyz Republic there are many international agreements in the Central Asian region regarding co-operation in management and conservation of natural resources as well as dealing with transboundary matters concerning natural disasters, including uranium mine tailings and international waters. Those most relevant to the Project are as follows:

- Agreement between the Government of the Kyrgyz Republic, the Government of the Republic of Kazakhstan and the Government of the Republic of Uzbekistan on the use of water and energy resources of the Syr Darya river basin (signed in Bishkek, March 17, 1998). This includes reference to collaboration to reduce the adverse effects of spring flood waters, mudflows and other natural hazards.
- Agreement between the Government of the Kyrgyz Republic, the Government of the Republic of Kazakhstan and the Government of the Republic of Uzbekistan on the environmental protection and rational management and conservation of nature (signed in Bishkek on March 17, 1998)

Kyrgyzstan is also a Member of the CIS Interstate Council Agreement on Emergencies of a Natural or Technogenic Character, the goals of which include facilitating transboundary co-operation in prevention of and response to emergencies through co-ordination of policy and participating jointly in technical international programs. These include, for example, co-operation and interaction in earthquake research and seismic risk prediction.

In addition to intergovernmental, bilateral and mutual agreements with neighboring CIS members (Kazakhstan, Tajikistan and Uzbekistan), there continues to be a high level of co-operation with international funding agencies, western governments and other donors/aid agencies on projects to support natural disaster preparedness and sustainable development. These include the World Bank, Tacis, UNDP, UNEP, ADB, GEF, EBRD and the governments of Finland, Germany, Japan and Switzerland, as well as other organizations.

2.2. ADMINISTRATIVE FRAMEWORK

The Kyrgyz Republic is a centralized country divided into seven oblasts (regions) plus the metropolitan region of Bishkek, the capital. Each oblast consists of several rayons (districts) and towns directly subordinated to the oblast. In each of the oblasts there are regional councils, but the main executive authority is represented by the head of the oblast administration, who is appointed by central government.

The 75 member Zhogorku Kenesh (Supreme Council) represents the legislative power and comprises of one chamber.

The directly elected President of the Republic is Head of State and Commander-in Chief of the Armed Forces. He appoints and dismisses the Prime Minister (subject to approval by the legislature), appoints the other members of the Government as well as heads of administrative offices and other leading state posts and plays a crucial role in the legislative process.

The President is entitled to pass regulatory decrees, which have the same force as laws and apply nationwide. International treaties signed by the President and ratified by Parliament are part of the country's legislation. They do not have precedence over national laws. Governmental regulations are meant to implement laws (including international treaties) and presidential decrees. Ministries and agencies adopt orders and decrees in accordance with their mandates. The President can suspend or cancel governmental and ministerial regulations.

In the context of environmental policy, the President has specific authority on establishing rules of natural resources use, defining and announcing environmental emergencies and environmental disaster zones as well as procedures for collection and use of environmental protection funds.

The executive arm of central government is headed by the Prime Minister and the First Vice Prime Minister. Three additional Vice Prime Ministers are responsible for Industrial, Social and Agricultural (including Environmental) Policies and the supervision of the respective ministries and national agencies.

Environmental Institutions

At the highest level of government, the Jogorku Kenesh (Parliament) - through the Commission on Agriculture and Environment - is responsible for:

- Defining the overall framework for nature protection policy
- Developing and approving laws and regulations
- Approving government proposals on resource charges and taxes.

A number of environmental responsibilities are delegated to the President's office. The President has the authority to:

- Establish specific rules and decide on the use of natural resources
- Define and announce the boundaries and the status of environmental emergencies and environmental disaster zones
- Approve procedures for the collection and use of environmental protection funds.

The President is also responsible for signing all laws adopted by the Jogorku Kenesh and for conducting international negotiations, as well as signing international conventions and treaties and submitting them for ratification by Parliament.

Institutions with a responsibility in environmental matters are discussed below.

The key government institution responsible for the establishment and implementation of environmental policy and management in Kyrgyzstan is the State Agency on Environmental Protection and Forestry Management (SAEP&FM).

According to legal provisions, the SAEP&FM is a governmental body in the field of ecology and industrial safety. Its major aims and purposes are to:

- Exercise State control over environment protection, development and implementation of a common policy in the field of environment protection and nature management;
- Control and license in the field of industrial safety, economic activities and mining.

SAEP&FM has a central office in Bishkek and seven local branches (one in each of the oblasts, i.e. Jalal-Abad, Issyk-Kul, Naryn, Osh, Talas, Chui, Batken and one in the city of Bishkek).

Other Government Bodies with Environmental Responsibilities

Other government institutions with a responsibility in environmental matters are briefly discussed below.

The Ministry of Emergencies is responsible for the monitoring and predicting occurrences of the hazardous natural and technogenic disasters and phenomena and timely protecting the local population from the named hazards, especially in the mountain areas.

The Central Directorate for Hydrometeorology ("Hydromet") falls under the Ministry of Emergencies (ME). Besides providing meteorological services, it also is monitoring chemical and radioactive pollution of air, water and soil as well as conditions of snow avalanches in mountains.

The National Statistics Committee collects all environmental monitoring data obtained from Hydromet.

The Ministry of Health controls the standards for health protection, the concentrations of toxic substances in air, water and food and protection of the public against adverse effects of toxins and hazardous substances in the air, soil and water as well as from waste handling and storage.

The State Sanitary-Epidemiological Department (under the Ministry of Health) was founded by Government Ordinance No. 229 of 29 May 1997. Its main remit is to implement sanitary, hygiene and anti-epidemic measures aimed at preventing and eliminating environmental contamination, improving working conditions, welfare and recreation of the population, preventing morbidity and reducing mortality and morbidity rates.

The State Agency for Geology and Mineral Resources under the Government is responsible for implementing the Government's mineral sector policies. Its key functions include conducting national geological surveys, administering the minerals sector (licensing and exploration) and protecting the national mineral resources. In this context it has a program for surveying levels of polluting substances in soil and groundwater.

Department of Water Resources (DWR - part of the Ministry of Agriculture and Water Resources). It regulates the use of the country's water resources and is in charge of design, construction and operation of the all off-farm irrigation infrastructure. The Division of Irrigation (DOI) within DWR is responsible for all aspects of impounding and distribution of irrigation water and its delivery to farm levels. It also takes part in regular negotiations with its counterpart organizations in neighboring countries within the context of the Water Sharing Agreement. DWR also includes the Scientific Research Institute for Irrigation (SRIII).

Local administrations for environmental protection and management - these are under the responsibility of the seven oblasts and central office of SAEP&FM. Although they are subdivisions of the SAEP&FM and report to the Director, the local Committees are also accountable to local Governors.

2.2.1. Requirements for Environmental Assessment – Kyrgyz Republic

Environment policy of the Kyrgyz Republic is anchored in the 1995 National Environment Action Plan (NEAP) which effectively shaped the evolution of the country's environmental laws and regulations. The two most significant pieces of legislation being the Law on Environmental Protection (No. 53 of June 16 1999) and Law on Ecological Expert's Review (No. 54 of June 16 1999).

The Law on Environmental Protection requires that in the process of designing, placing, construction, re-construction, putting into operation facilities, and other activities having a direct or indirect impact on environment, the actions for protection, use and restoration of the environment and natural resources shall be identified and undertaken "according to ecological norms". The Law also requires that an Environmental Impact Assessment (EIA) be prepared for a planned activity (Clause 17).

The Law on Ecological Expert's Review states that EIA means the identification, analyses, assessment, and taking into consideration possible impacts of development activities (Clause 1). Clause 10 defines the activities that require EIA and the process for the project proponent to undertake the EIA.

The activities that require EIA include:

- Concepts, programs and plans for sectoral or territorial socio-economic development;
- Plans for the integrated use and/or protection of natural resources;
- Master plans for cities and settlements as well as other town-building; and
- Any new construction, reconstruction, expansion or re-equipment of operating economic entities or other entities which are likely to have impacts on the environment.

According to the Temporary Instruction for Procedure for Performance of Environmental Impact Assessment of Planned Economic and Other Activities (Instruction 1) the documentation prepared must reflect the full extent of the project and meet the specified requirements for EIA, while to ensure consistency of EIA reports, the Instruction on Procedure for Performance of Environmental Impact Assessment of Planned Activity should be fully consulted (Instruction 2). (Instruction 1 - as approved by the Minister of Environmental Protection of the Kyrgyz Republic (June 27, 1997) and Instruction 2 - No. 386 as registered by the Ministry of Justice (July 04 1997):

- Description of the project or planned activity;
- Possible alternatives for the project or planned activity;
- Description of the existing environment;
- Types and degree of impact on environment and population;
- Forecast any possible changes in environmental quality;
- Description of socio-economic and ecological consequences; and
- Actions to prevent environmental damage or mitigate the level of ecological risk.

Once prepared the EIA is reviewed by the authorized government body on environmental protection¹ as per the Instruction on Procedure for Performance of State Ecological Expert Review of Materials and Documents² which describes what must be submitted for state review of an EIA. It should be noted that Instruction 2 is developed in accordance with regulations of the International Convention on Environmental Impact Assessment in a Trans-boundary Context and also defines:

- Scope of the EIA application;
- Organization and procedure for the EIA performance;
- Responsibilities and liability of EIA participants;
- Registration of the EIA results; and
- Procedure for public hearing.

The final EIA shall be the statement on ecological consequences of a project or planned activity and contain guarantees for adoption of the actions to ensure protection of the environment and ecological safety throughout the implementation of the project or planned activity.

Consultation with the State Agency for Environmental Protection and Forestry (SAEP&FM) has confirmed that an IEE will be acceptable as the level of assessment for this project. Upon MOTC's review of the IEE it will be submitted by the PIU to the SAEP&FM for clearance.

2.2.2. Requirements for Environmental Assessment – ADB

The ADB's environment policy was approved in 2002 and is supported by a set of procedural guidelines and various sections of the Operations Manual (OM).³ All ADB investments are subject to categorization to determine the level of environmental assessment required. According to OM 20 – Environmental Categorization the ADB classifies projects as one of four categories based on generic locational characteristics and magnitude of impacts of projects:

- Category A – projects with likely significant adverse impacts that are located in or near sensitive environments; cultural heritage sites; densely populated areas; regions subject to heavy development or create conflicts with natural resource allocation; and lands or waters containing valuable resources. These projects

¹ Previously the mandate of the Ministry of Environment and Emergency Situations (MEES) following Government restructuring this role has been taken over by Government of Kyrgyz Republic's State Agency on Environment Protection and Forestry Management – Department of Ecological Expertise.

² As registered by the Ministry of Justice (No. 407, October 15 1997).

³ ADB; Environment Policy of the Asian Development Bank (November 2002, Manila), Environmental Assessment Guidelines (2003, Manila), OM Section 20 – Environmental Categorization, and OM Section F1/BP and OM Section F1/OP – Environmental Considerations in ADB Operations (September 2006, Manila).

require an EIA and a summary EIA (SEIA) addressing the significant environmental impacts;

- Category B – projects that will have impacts on environmentally important areas or people that are less adverse than Category A and mitigation measures can be designed more easily than for Category A projects. Category B projects deemed 'sensitive' are subject to the same disclosure requirements as Category A projects. Category B projects require an IEE and SIEE to determine whether or not significant environmental impacts warranting an EIA are likely;
- Category C – projects that are likely to have minimal or no adverse environmental impacts. Category C projects do not require an EIA or IEE but need to be reviewed for identification of mitigation measures that can be incorporated directly into project design or could be subject to an environmental management plan; and
- Category FI – these are projects that involve a line of credit through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all subprojects will result in insignificant impacts.

It should be noted that if a project with many components or subprojects has one component that is categorized as A, the entire project becomes a Category A project and an EIA must be prepared, full disclosure of which is required at least 120 days before ADB Board consideration. If a subproject results in significant resettlement, this will mean the project is treated as a 'Category B Sensitive' project and is also subject to similar disclosure requirements.

The IEE and summary initial environmental examination (SIEE) of Category B projects are reviewed by ADB's Regional Department Sector and Environment and Social Safeguards Divisions as well as by the executing agency and authorized government agency for environment (which in this case is State Agency on Environment Protection and Forestry). Following final review, the executing agency officially submits the IEE and SIEE to ADB for submission to the Board and the public. SIEEs are required to be circulated widely, through the depository system on ADB's website, through which IEEs can also be made available on request.

Recommended Categorization of the Project

ADB's system of environmental categorization is determined according to the likelihood and magnitude of risk associated with a project when implemented without mitigation. The overall risks associated with the Sary Tash – Karamyk Road project are considered low because the project does not include any new road construction, rather it is focused on maintenance and rehabilitation works such as shaping of the formation including shoulders and drains, repairing cracks and potholes, sealing and overlaying, and cleaning or replacing culverts, indeed, environmental improvements are expected as a result of the project (improved drainage).

The assessment process determined that the project falls under Category B. The Sary Tash – Karamyk Road already exists and there will be no widening under this project. The rehabilitation works will be limited, but are anticipated to create a range of potentially adverse, but not significant, environmental impacts if implemented without mitigation. The road does not traverse any protected or ecologically sensitive areas or densely populated areas. Therefore, the recommendation is that the project can have an overall environmental categorization of Category B.

Purpose and Methodology of IEE

To meet the requirements of the ADB's Environmental Assessment Guidelines an IEE has been prepared for the specific rehabilitation and maintenance works proposed for the Sary Tash – Karamyk Road. The purpose of the IEE is to assess the potential impacts of the road rehabilitation and maintenance activities on the surrounding biophysical, ecological, and social environment and to develop procedures to ensure that future activities take account of environmental considerations.

The project will involve upgrading works and maintenance and the typical impacts of the works have been identified, as have environmental mitigation and monitoring measures. The research for, and preparation of the IEE was undertaken over the period between June and August 2007. It was supervised by a local senior specialist working closely with a counterpart seconded from the SAEP&FM's Department of Ecological Expertise (DEE).

In the framework of the PPTA, a survey of beneficiaries and communities and social impact field work was conducted by the ADB international and local consultants. The data received by them were used for the development of the current report. The data have been presented as the project's Poverty and Social Assessment (PSA). Some of that work, where relevant, has been incorporated into this IEE. These results were supplemented by the meetings and interviews with local communities conducted by the environmental consultant responsible for the preparation of the current report.

The following methodology was employed for this IEE:

- Existing baseline data (including all available environmental legislation and guidelines) and relevant reports from previous similar projects were collected, reviewed, and analyzed;
- Discussions were held with local experts from the DEE and MOTC, Forestry Management Department, Osh Oblast Department under SAEP&FM, Hydromet and Department of Emergencies and Tailings Management (both under the Ministry of Emergencies);
- Informal interviews and participatory (focus group meetings) discussions were held with people living and working along the road and a socio-economic survey was undertaken;

- Engineering data, designs, field notes and photographs produced for the studies were reviewed and discussed to identify the various environmental issues involved;
- Field trips were undertaken to examine existing environmental conditions and understand the type and magnitude of expected impacts;
- The possible environmental impacts and mitigation measures for each step of the planning, design, construction and operation processes were assessed; and
- A management plan and monitoring program has been prepared.

4. ENVIRONMENTAL IMPACTS & MITIGATION

4.1. SCREENING OF IMPACTS

This chapter was prepared on the basis of the relevant materials and data provided in the ADB consultants report on the ST-KM Road Rehabilitation Project. After the consultations held with the mentioned ADB consultants it became clear that the scope of the proposed activities and measures had not any significant difference and hence the current chapter can be identical to the one that would be provided by the EU consultant. Possible minor additions will be included into the proposed mitigation measures and EMMP.

Each environmental factor, which could be affected by implementation of the project, has been addressed, and the scope and importance of each potential environmental impact has been assessed. The following definitions of significance of impact have been used in the environmental impact screening¹⁶:

- No impact - a potential impact is assessed as having no impact if the project activity is physically removed in space or time from the environmental component, or if the impact is so small as to be un-measurable (i.e. negligible). No mitigation measures are required for project activities;
- Minor impact (positive or negative) - if an impact occurs but does not meet the criteria for a major impact it is considered minor. For minor negative impacts, appropriate mitigation measures have been identified;
- Major impact (positive or negative) - an impact is major if the project has the potential to affect an environmental component. The following criteria are used to determine whether an impact is major; (i) spatial scale of the impact (site, local, regional, or national/ international); (ii) time horizon of the impact (short, medium, or long term); (iii) magnitude of the change in the environmental component brought about by the project activities (small, moderate, large); (iv) importance to local human populations; (v) compliance with international, national, provincial, or district environmental protection laws, standards, and regulations; and (vi) compliance with guidelines, policies, and regulations of Kyrgyz Republic and ADB. Where potential major negative impacts are identified, mitigation measures are developed to reduce them to acceptable levels. Where this is not possible, major negative impacts can act as a trigger for further detailed environmental impact assessment; and
- Unknown impact - the potential impact of the project will be assessed as being unknown if the magnitude of the effect can not be predicted for any of the following reasons; (i) the nature and location of the project activity is uncertain; (ii) the occurrence of the environmental component within the study area is uncertain; (iii) the time scale of the effect is unknown; or (iv) the spatial scale over which the effect may occur is unknown. Where possible mitigation measures are identified for impacts categorized as 'unknown impacts'.

¹⁶ ADB; Environmental Impact Assessment for Developing Countries (Manila, 1997)

Mitigation measures have been developed according to the following hierarchy:

- The first priority is to make changes to the subproject design or location during the pre-construction phase to avoid the potential impact;
- The second priority is to make changes to the subproject design or location, or to implement other measures to minimize the scale or magnitude of the impact, or confine it to less sensitive areas;
- The third priority is to implement measures to mitigate any residual impacts to an acceptable level of impact; and
- The fourth and final priority is to compensate any residual impacts through 'in kind' compensation or monetary compensation.

4.2. IMPACTS OF ROAD REHABILITATION AND MAINTENANCE ACTIVITIES

4.2.1. Type of Impacts Assessed

There are several types of impacts to be considered. They can include direct and indirect impact during the construction and operation, long- and short-term, immediate and farther impacts. Analysis demonstrated that In the Project zone the direct impact will be rather limited and concentrated within the existing right-of-way.

Short-term impacts, like the noise and fumes produced by the operating heavy equipment and machinery occur during the road construction usually don't have any long-lasting effects. As the project is limited to small-scale rehabilitation works and maintenance of an existing road, there is a small possibility for long-term environmental impacts.

The environmental screening for the project identifies the range of potential environmental impacts that could occur from the rehabilitation and maintenance activities proposed. Where the environmental impact is deemed to be major (or significant) mitigation measures are provided, generally to be incorporated into the project design documents.

Impacts created during construction activities are dependent on a number of factors including the temporary use of land and its rehabilitation post-construction, 'best practices' being employed during construction activities, coordination and cooperation with local authorities in terms of impact management, and strict enforcement of environmental conditions included in project bid documents and specifications and adherence to a comprehensive environmental management plan (EMP).

4.2.2. Construction Impacts on the Physical Environment

(a) Air Quality and Risk of Climate Change

As the ambient air quality within the vicinity of the road is generally poor due to suspended particulate matter (dust) generated by vehicles moving on the gravel and earth roads or coal particles dispersed during its transportation (along the Sary-Mogol – Sary-Tash section).

During construction and ongoing maintenance of the road the planned works will not have any significant impact on local air quality through emission of exhaust from vehicles and asphalt, aggregate and concrete plant, as well as through dust generation from vehicles transporting materials and from exposed stock-piles of material. So according to the proposed above gradation, the expected impact can be considered as minor. The further improvement of the road will result in decrease of dust rising level.

The project's monitoring plan requires that baseline conditions be recorded prior to the reconstruction works in order that air quality can be monitored both during and post rehabilitation works. The national standards to be observed for monitoring, as shown in the table below, follow Soviet standards: GOST 17.2.3.01-86. Rules for Air Quality Control in Settlements (1986) and RD 52.04.186-89 Manual on Atmospheric Pollution Control (1989).

Table 18: Ambient Air Quality Standards in Kyrgyzstan

Pollutant	Maximum Permissible (mg/m3)	Average Daily Concentration (mg/m3)
Particulate Material:		
With silica content > 70%	0.15	0.05
70 - 20% (cement, coal, clay, etc.)	0.3	0.1
< 20% (dolomite, etc.)	0.5	0.15
Cement dust (Calcium oxide > 60% and silica >20%)	0.5	0.05
Sulfur Dioxide SO ₂	0.5	0.05
Carbon monoxide	5	3
Nitrogen Dioxide NO ₂	0.085	0.04
Nitrogen Oxide NO	0.40	0.06
Lead (Pb) and compounds (except tetra ethyl)	-	0.0003
Lead sulphurous (in terms of Pb)	-	0.0017

Source: Central Department on Hydrometeorology, SAEP&FM KR

Impacts on air quality will be mitigated by:

- Adherence to Kyrgyz Government's pollution control guidelines and standards;
- Construction equipment being maintained to a good standard and fitted with pollution control devices. The equipment (including the pollution control devices)

will be checked at regular intervals to ensure they are maintained in working order and the checks will be recorded by the contractor as part of environmental monitoring;

- Prohibition of the use of equipment and machinery that causes excessive pollution (i.e. visible smoke) at project work sites;
- Discouraging of the idling of engines;
- Ensuring that all vehicles transporting potentially dust-producing material are not overloaded, are provided with adequate tail-boards and side-boards, and are adequately covered with a tarpaulin (covering the entire load and secured at the sides and tail of the vehicle) during transportation;
- Not permitting the operation of hot-mix, asphalt, aggregate or concrete plant in close proximity of populated settlements nor within 500m of sensitive uses (such as schools, and hospitals);
- During periods of high wind any dust generating activities will not be permitted within 200m of populated settlements located in the direction of prevailing wind;
- Preparation of a dust suppression program, submitted to the PIU prior to commencement of the works. The plan (which can be included in the EMP) will detail the action to be taken to minimize dust generation (e.g. spraying the road 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;
- Regular watering/spraying of the project road, especially in the vicinity of the four settlements, and any roads being used for haulage of materials during the dry season;
- Material stockpiles being located in sheltered areas and be covered with tarpaulin or other suitable covering to prevent material of becoming a factor of air pollution through additional dusting ;
- Prohibition of the open burning of waste or materials;
- Periodic air quality monitoring.

As noted in the following sections, potential impacts on water flow and flooding can be adequately mitigated through design measures. The project is localized and will upgrade and improve an already existing road and therefore will not create any impacts on rainfall, unexpected snow-melt or groundwater depletion, which in turn could affect risk of, or induce, climate change.

(b) Impacts from Quarry Sites and Borrow Pits

Quarry sites will be identified during detailed design. In order to reduce impacts associated with quarry activities and borrow pits, contract documents will specify only licensed quarrying operations are to be used for material sources. If licensed quarries

are not available the contractors will be responsible for setting up dedicated crusher plants at quarry sites approved by PIU and SAEP&FM. Further, for all borrow sites, contractors will ensure that they acquire appropriate environmental permits from SAEP&FM before sourcing the material.

The contractor will be required to prepare a plan to identify the sources of material and of spoil that will be used for the embankments. The plan will be submitted to PIU, which will ensure that the plan is implemented. The materials and spoil plan should show the location of any borrow pits to be used and the measures to be taken to rehabilitate these pits upon finalization of the project. PIU will approve and monitor implementation of the plan.

To mitigate the impacts from quarry sites and borrow pits, it is recommended that in addition to the preparation of the materials and spoil plan, that bid and contract document specify that (i) borrow areas will be located outside the right-of-way; (ii) pit restoration will follow the completion of works in full compliance all applicable standards and specifications; (iii) arrangements for opening and using material borrow pits will contain enforceable provisions; (iv) the excavation and restoration of the borrow areas and their surroundings, in an environmentally sound manner to the satisfaction of the project supervision consultant (PSC) will be required before final acceptance and payment under the terms of contracts; (v) topsoil from borrow pit areas will be properly saved in the places where they will not be impacted by rains and winding. They will be provided with appropriate cover of cohesive vegetation or covered by tarpaulins and reused in re-vegetating the pits to the satisfaction of the PSC; and (vi) additional borrow pits will not be opened without the restoration of those areas no longer in use.

(c) Soils, Erosion, and Slope Stability

Soil characteristics and topographic conditions have been taken into account in the proposal of works and maintenance activities. There will be no alteration in alignment along the project road and no relocation of the right-of-way is required. The main impacts on soil and slope stability during construction are from (i) loss of agricultural soil or soils of high productive value; (ii) extraction of fill materials from rivers and/or borrow pits; (iii) conversion of the existing land uses such as agriculture and grassland to stockpiles of materials; (iv) soil erosion in areas of mountainous slopes, side slopes, and un-compacted embankments; and (v) soil contamination of from chemicals and/or construction material spillage.

There will be no loss of soil for agricultural production as all rehabilitation activities in lowland areas will be confined to the existing right-of-way and therefore no loss of agricultural land due to road widening or re-alignment will occur.

Earth embankments and material stockpiles will be susceptible to erosion, particularly during the rains and re-suspension of dust during the dry seasons. Certain types of road improvements, e.g. road widening, result in increased runoff and/or increased velocities that could lead to loss of soil. Project activities will be confined to the existing right-of way and no significant increase in the amount of impervious surfaces and/or the quantity or velocity of runoff is anticipated.

Suitable excavated material will be re-used wherever possible, the engineering investigations noted that quality of existing material is highly variable along the road and in many cases re-use for the project will not be possible.

However, this does not preclude its re-use for local roads that require maintenance to a lower standard, and village roads may be upgraded through re-use of the AC pavement reclaimed from the sections of road in the vicinity of Sary-Tash.

The foregoing impacts will be mitigated by:

- All required materials will be sourced in strict accordance with Government guidelines, project provisions, and the EMP;
- Priority will be given to location of material stock-piles, borrow pits and construction camps on unused land and non-agricultural land. All land will be rehabilitated to its original or better condition upon completion of the project works;
- The side slopes of cuttings and embankments will be designed to reflect soil strength and other considerations as included in the project specifications in order to reduce slips or erosion;
- To prevent soil erosion in areas of steep mountainous slopes, rock-fall fences, rip-rap, retaining structures and gabion baskets for river bank protection will be included in the engineering design;
- For embankments greater than 6m, stepped embankments will be used;
- Embankments will be monitored during construction for signs of erosion;
- Material that is less susceptible to erosion will be selected for placement around bridges and culverts;
- Ditches shall be designed for the toe of slopes in cut sections with gutters or drainage chutes designed to carry water down-slope to prevent erosion. Interceptor ditches shall be constructed near the top of slopes, or on benches, in cut slopes. For steep slopes drainage will be designed and constructed to intercept longitudinal flow and carry water away from fill slopes;
- Random and uncontrolled tipping of spoil will not be permitted. Suitable tip sites will be designated (generally wide gently sloping areas located away from streams and rivers) at a maximum average spacing of approximately 1 km;
- Re-vegetation of exposed areas including; (i) selection of fast growing and grazing resistant species; (ii) immediate re-vegetation of all slopes and embankments if not covered with gabion baskets or geotextiles; (iii) placement of fiber mats to encourage vegetation growth; and
- Acquisition of all necessary permits and approvals for location of construction camps, quarry sites and sources of construction materials from SAEP&FM and local government agencies prior to any construction or erection of camps and extraction of material;

It should be noted that the engineering investigations observed erosion of hills and plains in the catchments of the road. The project will contribute to the prevention of further or ongoing erosion in areas where it has been identified.

(d) Water Quality

The project has the potential to create some short-term and minor adverse impacts on water quality including (i) an increase in silt loads at culverts and the seven bridges to be reconstructed; (ii) construction materials such as gravel, sand, and fill being washed out into local streams and rivers during rain; (iii) hydro-carbon leakage and/or spills at storage and mixing plant locations; and, (iv) discharge of waste water and sewage from work camps to local streams and rivers.

There will also be longer term environmental benefits created by the project through upgrading of earth road sections to gravel and/or AC and reduced silt laden run-off from earth roads in the rainy season.

In addition to a number of the items outlined in (c) above employed to mitigate soil erosion and effects on slope stability that will also mitigate adverse effects on water quality, the following measures will be included in the engineering design and EMP:

- Interference with natural water flow in rivers, water courses or streams within or adjacent to work sites, and also prevention of abstraction from, and pollution of, water resources in the project sites will not be permitted;
- Water courses, rivers, streams, lakes, drains, canals and ditches within and adjacent to project works sites will be protected from pollution, silting, flooding or erosion as a result of project activities;
- Streams, rivers and watercourses (including drains) within and adjacent to the work sites will be kept free from debris and any material or waste arising from project works;
- Sediment controls such as silt fences, coffer dams and silt barriers and other devices will be included in the engineering design to prevent both siltation and silt migration during project activities in the vicinity of rivers and streams. Sediment control devices will be cleaned, dewatered and discharged to settling ponds or containment units;
- Discharge of sediment laden construction water or material (including dredged spoil) directly into surface waters will not be permitted. All such construction water will be discharged to settling ponds or tanks prior to final discharge;
- Water used for dust suppression purposes will be discharged to specially constructed settlement tanks allowing for sedimentation of particulates. After settlement the water may be re-used for dust suppression and rinsing of vehicles and equipment;
- Hydro-carbons, petroleum products to be used in bitumen mixes, and other chemicals will be stored in secure and impermeable containers or tanks located

away from surface waters, the storage areas will require a concrete base or other forms of containment that will allow any spills to be contained and immediately cleaned up. Any contaminated soil will be handled according to SAEP&FM standards;

- Spoil and material stock piles will not be located near waterways, rivers or streams;
- All storm drainage will be adequately contoured, sized and lined;
- Discharge zones from drainage structures will be carefully identified and structures will be lined with rip-rap, and down-drains and chutes will be lined with rip-rap, masonry or concrete. Spillage ways will be lined with rip-rap to prevent under-cutting;
- Construction and work camps will be equipped with sanitary latrines that do not pollute surface waters. A waste management plan, covering all liquid and solid waste, will be prepared by the contractor and submitted to the PIU;
- Discharge or deposit any material or waste into any waters except without the approval from the relevant regulatory authorities will not be permitted; and
- All water, waste-water and other liquids used or generated in execution of project works and activities will be collected and disposed in an approved manner in an approved location and will not cause either pollution or nuisance.

(e) Emergency Response Measures

The contractor will be responsible for preparation of an emergency response plan 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 MOTC/PIU for approval. Implementation of the plan will be monitored by PIU and PSC. Any emergencies, and how they were handled, will be reported in monthly progress reports.

4.2.3. Construction Impacts on the Biological Environment

(a) Flora and Fauna

Minor impacts upon habitats and flora of the project areas are expected as a result of the road rehabilitation. Rehabilitation work will directly cause minor degradation of local ecology through the clearance of small areas of vegetation – mostly ground cover - at work sites and ancillary sites.

A short-term impact on ecology along the road is likely due to minor vegetation clearance of road-side vegetation, around the quarry sites, material stockpiling areas and worksites during the construction period.

Habitat fragmentation occurs when a road cuts through an ecosystem, the Sary-Tash – Karamyk Road has existed for some time and if its original construction caused habitat fragmentation, the ecosystems have re-established albeit as smaller units around the road. The project will not cause any further habitat fragmentations.

Plant species present within the right-of-way are either introduced species or ubiquitous native species, which are highly tolerant of agriculture, grazing, compaction, and other disturbances. Construction activities will impact only a narrow band of vegetation adjacent to the existing road. Potential impacts to roadside trees will be avoided by ensuring that roadside activities such as asphalt plants, construction camps and other ancillary features are properly sited.

Therefore, in light of the nature of the project and the types of works envisaged, there will be little, if any, loss of flora or habitat. Rehabilitation activities will take place entirely within the existing right-of-way. Sites for contractor work camps, batch plants, rock crushers, material storage, borrow pits and quarries will all be approved by the project's supervision engineer and will not be permitted in any ecologically important or sensitive areas.

In terms of impacts on fauna, there is the potential for construction workers to poach edible animals and birds of the locality in spite of prohibitions. The contractor will be responsible for providing adequate information to the workers regarding the protection of fauna.

Poaching is regulated by the Law on Animal World (1999) and Regulations on Hunting in Kyrgyz Republic (2003) as well as the Criminal Code, 1997 (Article 276 Illegal Fishing and Article 278 Illegal Hunting). Illegal logging or tree cutting is also regulated by the Criminal Code (Article 279 Illegal Tree and Scrub Cutting) and the Code of Administrative Responsibility No. 198 (Article 127 Illegal Tree Cutting).

No interrupted corridors of wildlife migration have been observed in the project areas. The fact that the road corridor is devoted to transport, and that rehabilitation activities will be contained within the existing right-of-way, minimizes any potential for the interruption of wildlife migration patterns.

No endangered flora or fauna species will be impacted by the project.

Measures to be included in the project to ensure protection of flora and fauna within the project areas include:

- Contract documents and technical specifications will include clauses requiring training and awareness for construction workers in relation to existing laws and regulations regarding poaching and illegal logging, and expressly prohibiting the poaching of fauna and felling of trees, not requiring to be cleared by the project, by construction workers for the term of the project;
- The contractor will be responsible for providing adequate knowledge to construction workers in respect of prohibitions on hunting and/or killing of fauna.

The contractor shall ensure that the construction workers do not poach fauna, and will be responsible for imposing sanctions on any workers who are caught poaching or having poached fauna;

- Construction workers will be informed about general environmental protection and the need to avoid un-necessary felling of trees wherever possible
- In respect of the section of road that passes through the Chong-Alay Forest, the cutting of any trees that are located in the road right-of-way through this section is strictly prohibited;
- Vegetation clearance during construction activities, especially of trees and along the road-side, will be minimized;
- Vegetative cover cleared from the roadside during rehabilitation activities will be kept for landslide and slope protection. Contractors will be responsible for re-vegetation in cleared areas;
- Contractors will be responsible for supplying appropriate and adequate fuel in workers' camps to prevent fuel-wood collection;
- Construction vehicles shall use temporary access and haulage roads to minimize damage to habitats.

(b) Protected Areas

In Osh there is one zapovednik and two national parks. The project road does not pass near any of these areas. The closest the project road passes to any state level protected areas is 15 km (Sary-Mogol State Botanical Reserve located to the north of the project road).

The project road is some 1 and 1.5 km distance from the oblast level specially protected area of Nichke-Suu in Chong-Alay Forest. The access road to Nichke-Suu is a very narrow, partially formed earth track. The rehabilitation of the project road will not impact upon the forest or oblast level protected area of Nichke-Suu, and existing laws and regulations prohibit poaching of fauna or logging which will be strictly enforced during construction, as set out above.

4.2.4. Construction Impacts on the Social Environment

(a) Noise and Vibration

During construction, there will be a temporary adverse impact due to the noise of the construction equipment, especially heavy machinery. Compaction equipment, blasting operations for cuts and excavation for foundations and grading can produce noise and vibration. Construction noise is generally intermittent, attenuates quickly with distance, and depends on the type of operation and location and function of equipment.

Data provided in Southern Transport Corridor Road Rehabilitation Project IEE noted that potential construction related noise levels of 85-90 decibel (dBA) at 18 m from the source would be reduced to less than 62 dBA at a distance of 600 m from the source. For example, excavation noise levels, assuming bulldozer and dump truck activity only, would yield an equivalent continuous noise level (Leq) of approximately 85 dBA at 18 m. These noise levels would decrease by about three or four dBA with every doubling of distance and would be reduced to approximately 67 dBA at 250 m.

Noise levels will be monitored, as required by the project's IEE monitoring plan, to ensure they meet national standards as shown in the table below. The standards were promulgated as Collection of the Most Important Records on Sanitary and Anti-epidemiological Issues; Volume 2, Part 1 (Information Publishing Centre of Goskomsanepidnadzor, Russian Federation, 1994).

Table 18: Ambient Outdoor Noise Standards in Kyrgyzstan

Activity Category ¹⁷	Leq ¹⁸	Lmax ¹⁹	Description of Activity Category
8	Day = 45	Day = 60	Areas immediately adjacent to hospitals and sanatoriums
	Night = 35	Night = 50	
9	Day = 55	Day = 70	Areas immediately adjacent to dwellings, polyclinics, dispensaries, rest homes, holiday hotels, libraries, schools, etc
	Night = 45	Night = 60	
10	Day = 60	Day = 75	Areas immediately adjacent to hotels and dormitories
	Night = 50	Night = 65	
11	35	50	Recreational areas in hospitals and sanatoriums
12	45	60	Rest areas at the territories of micro-districts and building estates, rest houses, sanatoriums, schools, homes for the aged, etc

Source: Information Publishing Center of Goskomsanepidnadzor (Russian Federation, 1994).

The most sensitive receptor along the project road is the school in Doroot-Korgon. Consideration will be given to installation of a noise barrier if construction (or operation) noise levels exceed the national standards or cause nuisance or interfere with school activities.

Vibration during the construction period will also be a significant consideration, particularly vibratory rolling of the granular pavement layers, or blasting. Some of the existing structures close to the road are of mud-bound construction or otherwise of poor quality, and may be damaged by vibration.

Cooperation between the contractor and the local residents is essential and it is the responsibility of the project supervision consultant to arrange meetings between these parties and arrange such matters as work schedules (hours of equipment operation, traffic lanes to be kept open, etc.), locations of work camps and material storage areas, and siting of rock crushers and batch plants.

Measures to be included in the project to mitigate the effects of noise and vibration include:

¹⁷ Activity Categories 1 to 7 relate to indoor standards. The standards provide for allowable noise levels to be reduced in "green areas" or other designated sensitive areas.

¹⁸ Leq = the sound level equivalent, the Leq represents the level of steady sound which, when averaged over the sampling period, is equivalent in energy to the fluctuating sound level over the same period.

¹⁹ LMax = maximum sound level.

- Requirements in the EMP and contract documents that all exhaust systems be maintained in good working order and that regular equipment maintenance will be undertaken;
- The contractor will prepare a schedule of operations that will be approved by the project supervision consultant. The schedule will establish the days and hours of work for each construction activity and identify the types of equipment to be used;
- Prohibition of any construction activities between 10pm and 6am in settlements or close to sensitive receptors such as hospitals and schools;
- The contractor will consult with the community in respect of construction activities and potential noise and vibration impacts. The consultation process will be facilitated by the project supervision consultant;
- Blasting will only be carried out during the day and according to a pre-established schedule, the adjacent communities will be notified of the blasting times well in advance;
- Use of blasting mats to reduce noise during blasting operations;
- Prior to commencement of construction, the contractor, in conjunction with the project supervision consultant, will undertake a dilapidation survey (including photographs) of all buildings adjacent to the road;
- Trials of the contractors' equipment (especially vibratory rollers) will be carried out adjacent to vulnerable structures, and if cracking or other damage is observed to occur, the contractor will be required to amend their working methods to avoid damage (for example, use of non-vibratory rollers with thinner layers or cement stabilization, or increased asphalt thickness);
- Use of low volume charges will reduce the potential for vibration induced damage to structures; and
- In the event of damage from vibration, owners of structures will be fully compensated.

(b) Impacts on Access and Traffic

The project will cause temporary impacts on local access and traffic in rehabilitation areas during the construction period due to detours and traffic inconveniences, also local roads could be damaged during transportation of borrow materials or by construction equipment.

The contractor will be required to prepare, and implement, a traffic control plan, the plan will be submitted to MOTC/PIU and the relevant local authorities for approval. Implementation of the plan will be monitored by PIU and PSC.

Mitigation of the foregoing impacts will include:

- Contracts will include a clause specifying that care must be taken during the construction period to ensure that disruptions to traffic and road transport are

minimized. The contractor shall ensure that the road remains open to traffic during construction activities;

- The contractor will prepare a traffic control plan, to be approved by the PSC. The plan will include haulage and work site routes, traffic control devices, temporary fencing, barriers and barricades, detours, traffic signs and speed limits, and safe passage of pedestrians;
- Prior to construction activities, the contractor will install all signs, barriers and control devices needed to ensure the safe use of the road by traffic and pedestrians, as required by the traffic control plan;
- Signs, crossing guards and other appropriate safety features will be incorporated at grade level rail and road crossings;
- Local authorities and residents in a working area will be consulted before any detours are established;
- Footpaths and the road will kept free of debris, spoil and other material at all times;
- Disposal sites and haul routes will be identified and coordinated with local officials; and
- Construction vehicles will use temporary roads constructed for that purpose to minimize damage to agricultural land and local access roads. Where local roads are used, they will be reinstated to their original condition after the completion of work.

Issues related to traffic safety are dealt with below.

(c) Health and Safety

The project's construction phase can cause a range of health and safety impacts. The main impacts on health and safety are associated with (i) facilitation of transmission of communicable disease; (ii) contamination of local water supplies; and (iii) traffic safety issues.

The transmission of communicable diseases such as sexually transmitted diseases (STDs) and even Human Immuno-Deficiency Virus and Acquired Immuno-Deficiency Syndrome (HIV/AIDS) is a potential impact posed by construction workers engaging in either commercial sex or sexual relationships with local people. The PSA concluded that the civil works phase of the project can pose risks for both the construction workforce and the communities along the road for the civil works/construction period.

High risk groups in the project area include traders, people from household who travel for marketing or selling, seasonal migrants, poor rural men (who risk passing it on to their spouses or partners), intra-venous drug users (IDUs), and commercial sex workers (CSWs).

Potential impacts to local water supplies include the possibility of temporary construction camps and the water supply and wastewater disposal associated with them. Contract provisions to ensure that these facilities are properly sited will be incorporated in project contract documents.

Road improvement projects can also inadvertently cause adverse impacts on road and traffic safety as a result of higher vehicle speeds due to improved road conditions. The proposed rehabilitation works does not include road realignments or other design improvements that could encourage higher speeds. Additional safety impacts can also be related to risks that are inherent in the across the project area, including ice and snow conditions in the mountain passes, floods, and seismic events.

The PSA noted that the project will create safety benefits as a result of reducing the conflicts between NMT and motorized traffic. Currently both NMT and motorized carts mix with regular traffic, even though they are much slower, swerve in and out of the main traffic stream, and make frequent stops. This situation is exacerbated by the use of the road by road-side sellers, who stand in the road with boxes of fruit, vegetables and tobacco to sell.

The main reason that users of NMT and the motorized carts travel with the main traffic stream, despite it being hazardous, is because the road shoulders are either gravel or earth, in many cases the gravel has disappeared leaving large holes and in other cases the existing shoulders also act as the drain and are often filled with water, making it impossible for use by NMT or pedestrians. Reducing the risk of accidents and improving the safety of pedestrians, NMT users and road-side sellers can be achieved by providing hard (sealed) shoulders in the road design.

Air and noise pollution, which can affect the social as well as physical environment, have already been discussed.

Mitigation measures for the foregoing impacts include:

- Each contractor will recruit an environmental, health, and safety officer (ESO) to address health and safety concerns and liaise with the project supervision consultant and communities;
- Training of all construction workers in basic sanitation and health care issues, general health and safety matters, and on the specific hazards of their work;
- The contractor will provide personal protection equipment, such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection, in accordance with relevant health and safety regulations, for workers;
- Implementation of the STDs/HIV/AIDS awareness and prevention campaign included in the PSA's Social Action Plan (SAP) which includes provision for the contractor to ensure the construction workforce attends 'HIV in the Workplace' seminars provided through UNAIDS;

- Provision of hard, instead of soft shoulders, and road markings and signage to enhance safety and indicate that NMT and pedestrians should use the shoulders, rather than mix in the main stream if traffic;
- The contractor will provide adequate health care facilities including an HIV/AIDS education post and first aid facilities within construction sites;
- Contractors will ensure that no wastewater is discharged to local water bodies and safe and clean drinking water is provided to all workers;
- No site-specific landfills will be established at the construction camps;
- Septic tanks and garbage receptacles will be set up at construction work sites and camps, which will be periodically cleared by the contractors to prevent outbreak of diseases;
- Provision of adequate protection to the general public, including safety barriers and marking of hazardous areas in accordance with relevant safety regulations;
- Provision of safe access across the construction site to people whose settlements and access are temporarily severed by road construction; and
- The contractor will ensure that there is adequate drainage throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form.

(d) Other Social Impacts

Construction camps may place stress on resources and infrastructure of adjacent communities which could lead to antagonism between residents and workers. To prevent such problems, the contractor will provide temporary facilities in the camps such as health care, eating and sleeping areas (including a cook and provision of meals), and prayer areas so that existing facilities and services are not over-burdened by additional people living in the area.

The project has the potential to contribute to local poverty reduction through provision of income generation opportunities such as construction employment and provision of goods and services to workers.

The PSA's SAP contains a number of specific provisions including that contract documents will include provisions for (i) a set aside for jobs for the poor (60 % of the direct unskilled and semi-skilled labor); (ii) explicitly prohibiting the use of foreign unskilled and semi-skilled workers or unskilled and semi-skilled workers from elsewhere in Kyrgyzstan unless there are no local unskilled and semi-skilled workers available; (iii) payment of legal wages to workers; (iv) no use of trafficked or child labor for construction and maintenance activities; (v) inclusion of women as well as poor in local construction force; (vi) no differential wages being paid between men and women for work of equal value; and (vii) use of locally sourced materials used in the rehabilitation to the maximum extent possible;

No additional mitigation measures are required.

4.2.5. Operation Impacts on the Physical Environment

(a) Air Quality

Following the rehabilitation of the road its use will create air pollution such as HC, CO, NO_x, SO₂ and particulate matter. The current volume of traffic (1,219 AADT) and forecasted traffic growth are such that emissions will remain below ambient air quality standards. In spite of low to medium volumes of traffic overall, approximately a quarter of vehicles, particularly buses (three % of traffic) and trucks (22 % of traffic), have been observed to be highly polluting.

Emission standards are authorized under Kyrgyz Republic's Environmental Law and should be enforced to alleviate these sources of pollution. The anticipated levels of traffic and the excessive capacities of the road network (and therefore lack of congestion and concentration of traffic) are unlikely to result in significant adverse impacts to air quality in the project areas either with or without the project.

As noted in the Southern Transport Corridor Road Rehabilitation Project IEE, proposed road rehabilitation activities are unlikely to have any substantial impact on the numbers of vehicles using a road and consequent impact on air quality. Increases in traffic are likely, but as a function of economic recovery and development. No diverted or generated traffic is likely to result of the rehabilitation activities alone.

Economic recovery may lead to increased vehicular travel, and, if so, the rehabilitation will facilitate the flow of the increased traffic - but will not have induced it.

The project has the potential to reduce the volume of dust and particulates released into the atmosphere as a result of gravelling and asphaltting existing earth section of road and poor condition pavements which generate dust within 20 m to 30 m corridors along the road. Reduction in dust emissions will improve air quality, reduce health risks to communities living along the road, reduce damage to the biological environment, and reduce soil erosion through slope stabilization and pavement rehabilitation.

Maintenance of vehicles to maintain an acceptable level of, or to reduce, emissions is beyond the purview of the project.

The conclusion in respect of air quality is that the project road is likely to continue to operate at well under its design capacity and no significant air quality impacts warranting mitigating actions in the operational phase are anticipated.

(b) Soils, Erosion, and Slope Stability

During operation, release of spoil and particulates into water courses in the project area will be reduced as a result of retaining and slope protection structures and gabion

baskets for embankment protection. No mitigation measures are required for the operation phase.

Maintaining and increase in vegetative cover in mountainous areas reduces run-off and landslides and would contribute to the sustainability of farming in mountain areas. Longer term solutions to slope stability problems through prevention of ongoing land degradation are required, but are beyond the purview of the project or this IEE.

(c) Water Quality

Potential impacts on water quality and availability of water for domestic or agricultural use are not expected to occur. This water is not used for drinking and only occasionally for irrigation. Storm drainage will be upgraded.

During operation negative impacts on water quality could be caused by accidental spills of polluting or hazardous materials should they occur near water courses. The road rehabilitation activities will not induce accidents and therefore there are unlikely to be any additional incidents over and above those that would occur without the project, hence no mitigation measures are proposed.

As noted above for item (b), there will also be longer term environmental benefits for water quality created by the project through upgrading of earth road sections to gravel and some gravel sections to AC and reduced silt laden run-off from sections of earth road in the rainy season. Water quality in the two rivers and other water courses adjacent to the road may show slight improvements after rehabilitation and maintenance due to reduced erosion from improved embankment slopes and stabilization by rip-rap or other material including vegetation to prevent soil erosion.

Proposed improvements to drainage structures will facilitate passage of high flows and reduce scouring and bank erosion in the vicinity of the road, ensuring the integrity of the surface of the road.

The increased runoff due to rehabilitation activities (if any) will be statistically negligible in the project area of the road.

4.2.6. Operation Impacts on the Biological Environment

(a) Flora and Fauna

There will be no impacts on flora during operation of the rehabilitated road.

Based on the assessment of types of existing fauna no instances in which potential impacts might have warranted consideration of design modifications (for example underpasses to provide for wildlife migration patterns) have been identified.

Even if not located in areas of major migration patterns, accidents involving wildlife attempting to cross roads are a potential impact due to the potential for increased speeds and other factors. In this instance, reviews of the available accident data have

not indicated areas in which accidents involving wildlife are common, and therefore significant increases in the numbers of accidents involving wildlife are not anticipated as a result of rehabilitation and ongoing maintenance activities.

(b) Protected Areas

As there are no state level protected areas in the project area, the operation phase activities will not create any impacts on protected areas. The specially protected area within the Chong-Alay Forest is the responsibility of the Forest Management Unit and logging and cutting of trees is not permitted. Consultation with the Forest Management Unit indicate there are no plans to upgrade the existing access track to the area, and therefore there will be no improved access to the area from the project road which could facilitate poaching or logging.

4.2.7. Operation Impacts on the Social Environment

(a) Noise

Under the most optimistic scenario of increased commercial traffic, the ambient noise level after the completion of rehabilitation activities along the road (operational period) will not be of sufficient magnitude to require acoustical mitigation.

As noise is a function of traffic volume, ambient noise levels will not be appreciably increased due to the low forecast traffic. There are a number of sensitive receptors, i.e. houses, schools and public buildings were noted in some locations close to the road (in the settlements).

Maintenance of vehicles to maintain an acceptable level of, or to reduce, noise emissions is beyond the purview of the project.

(b) Access and Traffic

Following rehabilitation of the road, local access as well as the performance of a regional corridor and key transport network will be improved. This will facilitate the flow of traffic, goods, and passengers both internally and between Kyrgyz Republic, Tajikistan, and PRC.

The implementation of the maintenance plan will ensure the sustainability of the various road improvements.

(c) Health and Safety

Traffic safety will be improved following rehabilitation and routine maintenance of the project road. Conflicts between different forms of transport will be reduced by the improvement of shoulders and improved signage will be provided at intersections, bridges, and railroad crossings.

The PSA concluded that in terms of risk of transmission of communicable diseases during operation, roads and highways have the potential to pose a risk as a pathway for disease transmission. The risk increases with the hierarchy of road, its location, and number of villages and towns connected with a larger town or city.

Further, the road is directly connected to international borders with Tajikistan and PRC, and links with other roads that connect to large cities (both Doroot-Korgon – Kyzyl-Kia and Sary-Tash – Osh roads connect with Osh City, and also to the main highway to Bishkek).

With improved access to major markets in Bishkek and Osh, as well as facilitating international trade, truck traffic is likely to increase with the road potentially becoming a major thoroughfare between Tajikistan and PRC. The risk of truck drivers engaging in high risk behavior is increased by hospitality service industries (restaurants, bars, karaoke, beer gardens, truck/bus stops, massage parlors etc) locating along the road and acting as conduits for sex work to communities, traveling businessmen and officials, and truck/bus drivers. This will be mitigated by implementation of the HIV/AIDS awareness and prevention component of the PSA's SAP.

Increase in traffic can cause additional air pollution from dust or exhaust emissions (CO, NOx, SOx, etc.), which will produce a polluting load on the agricultural lands and crops widely located in many places along the RoW, where forage crops are grown by the local population. The heavy metals fall-outs on the crops will cause their further transferring to the domestic cattle and human beings through the trophy chain. This can harm the local population's health in the course of time если количество машин на трассе достигнет определенного уровня. Appropriate measures associated with properly monitored implementing mitigation measures, which presume that, on the one hand, vehicle emissions must be monitored according to national standards. On the other hand, it is important that all the national sanitary and epidemiological safety standards are strictly observed and an appropriate distance between the agricultural fields and the RoW to be kept. This will be supported by the relevant community meetings and explanatory work among the local population along the RoW to be done by the PIU consultants and local administration representatives.

(d) Land Acquisition

The rehabilitation works will be undertaken within the existing right-of-way. There will be no land acquisition or resettlement under the project.

4.2.8. Summary of Impacts

A range of benefits is expected to arise from upgrading and maintaining the road including increased accessibility between internal and international markets, improved opportunities for economic development, and local poverty reduction.

The overall level of negative environmental impacts will be minor. The majority of impacts will be temporary, localized, and readily controlled, that will occur during the civil

works (construction) stage. Examples of such impacts include noise and dust generation, water quality deterioration, disruption to access to properties, and exacerbation of local flooding and drainage concerns. There will be no land acquisition under the project.

Negative operation stage environmental impacts will generally be minor and can be largely avoided through appropriate subproject design and operation and maintenance activities. Examples of such impacts include changes to local flooding, noise generation, and erosion and scouring of areas of cut and fill and waterway crossings.

The risk of spread of HIV/AIDS and trafficking has been identified in the project's PSA as significant and will be addressed through an HIV/AIDS awareness and prevention campaign which includes training on HIV in the workplace to be provided by UNAIDS to the contractors work-force.

4.3. INSTITUTIONAL REQUIREMENTS

The following section presents a discussion of the environmental management activities that will be undertaken as part of overall project implementation. The roles and responsibilities of various organizations in undertaking these activities are then defined and the institutional strengthening activities that will be required to allow those organizations to fulfill their nominated roles and responsibilities are identified.

An environmental monitoring program has been prepared and the cost associated with its implementation has been identified.

4.3.1. Implementation Arrangements for Environmental Activities

Organization Roles and Responsibilities

The overall organizational structure for environmental management for the project is shown in Figure 18.

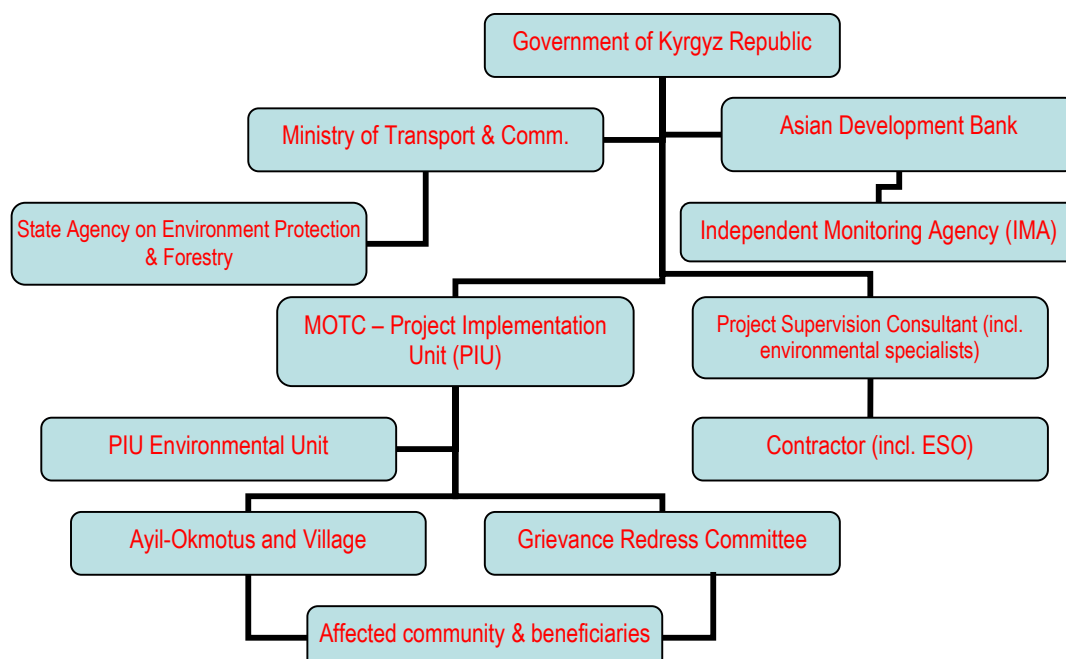


Figure 18 – Organizational Structure for Environmental Management

Currently there are no full-time staff in the PIU assigned to environmental assessment, management or monitoring. The PIU has stated that such tasks will be undertaken on a project by project basis. To this end, it should be noted that the IEE completed for the Southern Corridor Road Rehabilitation Project (Loan 2106-KGZ [SF]) recommended the attachment of a project-funded Environment & Safety Officer (ESO). According to that report, the ESO's responsibilities are recommended to include day-to-day construction supervision to ensure that the environmental and social contract provisions are met and that training for the ESO would be through the provision of two-weeks of training by an international consultant with specific environmental management expertise in the context of road rehabilitation or related projects.²⁰

In the implementation of environmental management and monitoring tasks specific technical assistance will be provided by:

- Environmental specialists that are part of the project supervision consultant's team. The specialists will assist in all aspects of EARP planning and implementation, internal monitoring and evaluation (M&E), and training of PIU and relevant government staff on environmental assessment and ADB's Environment Policy; and
- An independent monitoring agency (IMA) will be hired to (i) conduct periodic monitoring and evaluation, (ii) third party validation of implementation of the IEE

²⁰ The contract specifications and bid documents for Loan 2106-KGZ (SF) require the contractors to recruit an ESO and confirm the appointment to the project supervision consultant in writing.

and EMP activities, and (iii) to ensure that all the identified adverse impacts are being/have been mitigated.

4.3.2. Other Agencies and Institutions

The SAEP&FM was consulted at the outset of the PPTA process and will also be consulted on the categorization of the project. The SAEP&FM will be requested to review the IEE and approve the project as having 'minor environmental importance'. Ongoing consultation with SAEP&FM will be required during the implementation of the project.

The ayil-okmotus and village leaders and organizations will assist in arranging meetings with, facilitating consultation with, and providing information about, affected communities and environmental impacts. An account of the process will be an integral part of the internal monitoring report prepared by PIU.

ADB clearance of this IEE will be provided either by an ADB Environment Specialist at the ADB's Kyrgyz Republic Resident Mission in Bishkek, by a third party organization with environmental assessment capacity chosen by ADB, or will be cleared at ADB Headquarters in Manila, Philippines.

4.3.3. Monitoring

The contractor and MOTC through its PIU, with assistance from the PSC, will be responsible for monitoring during construction. The PIU and PSC will also be responsible for verifying the monitoring undertaken by the contractor through audits and spot-checks.

The outcomes of monitoring will be included in the overall monthly progress reports to be submitted by the contractor to PIU/PSC and by the PSC to MOTC and ADB. These will also be consolidated and submitted to ADB for review on a 6-monthly basis. After project completion, MOTC, again through its PIU will be in charge of the proper operation of the road through an ongoing routine maintenance plan. The ADB will also undertake monitoring as part of the mid-term and post-evaluation assessments.

Responsibilities for the implementation of the monitoring requirements of this IEE are shown in Table 19. Implementation of mitigation measures during the construction stage will be the responsibility of the contractor in compliance with the contract specifications and loan requirements. The environmental specialists of PSC will supervise the monitoring of implementing mitigation measures during the construction stage. The domestic environmental specialist will coordinate with the international environmental specialist for resolving complicated issues that arise in the field and to provide continuously updated information in order to submit reports to PIU and ADB.

After project completion, MOTC will be in charge of the operation and maintenance of the project road. PIU in cooperation with the district/regional administrations will

undertake routine and random monitoring and analyze samples in SAEP&FM's analytical control laboratory in Bishkek as scheduled in the monitoring plan.

Table 19: Responsibilities for Environmental Monitoring

Project Stage	Responsible Organization	Responsibilities
Detailed Design	PIU	Incorporation of mitigation measures into engineering design and technical specification. Translation of mitigation measures into clauses in contract documentation.
	PIU and SAEP&FM	Review and approve environmental mitigation and management measures.
Construction	Contractor	Implementation of required environmental measures
	District road maintenance engineer Project supervision consultant	Supervise contractor's implementation of environmental measures on a daily basis. Enforce contractual requirements
	Project supervision consultant; IMA	Audit construction phase through environmental inspections and review monitoring data. Submission of quarterly reports. Provision of awareness/training to workers and technology transfer to the contractor.
	District road maintenance engineer Regional Committee on Environment Protection	Ensure compliance with Government legal requirements during construction. Review complicated issues arises from the project.
Operation	PIU	Provide budget to undertake environmental monitoring for 3 years.
	PIU and project supervision consultant; IMA	Undertake environmental monitoring and prepare bi-annual reports for 3 years.
	PIU and SAEP&FM; IMA	Review monitoring reports

5. ENVIRONMENTAL MANAGEMENT AND MONITORING

5.1. ENVIRONMENTAL MANAGEMENT PLAN

As noted in Section 4 it is the construction phase, including bridge and culvert reconstruction that has the potential to cause the greatest number of adverse impacts. These can be mitigated and/or avoided. Several of the impacts during the construction period cannot be assessed at this moment, because sites for temporary work activities have not been identified and/or information concerning the period and the duration of these activities are not available.

Table 20: Environmental Management Plan

Potential Impact	Mitigation Measure	Responsibility	Cost (US\$)
Construction Stage			
Erosion or sedimentation caused during clearing or earthworks	Install sediment fences and/or sediment traps to collect sediment before it enters waterways	Contractor	TBA once number known
	Minimize size and duration of cleared areas	Contractor	No marginal cost
	Undertake progressive re-vegetation of cleared areas	Contractor	37,750
	Avoid clearing activities during the rainy season where possible	Contractor	No marginal cost
Soil erosion, land slide or rock fall	Undertake progressive re-vegetation of cleared areas	Contractor	Incl. in above
	Embankments in areas of steep slopes to be stepped	Design & Contractor	To be incl. in engineering cost
	Side slopes of cuttings and embankments designed to reflect soil strength etc	Design & Contractor	To be incl. in engineering cost
	Re-use excavated material wherever possible	Contractor	No marginal cost
	Rip-rap, retaining structures, gabion baskets etc to be used wherever necessary for slope and river-bank protection	Design & Contractor	To be incl. in engineering cost
Soil contamination from spillage of oil or other chemical substances	Store chemicals in secure area/compound, with concrete floor and weatherproof roof	Contractor	15,000
	Ensure construction plant are maintained in good condition and any leaks are quickly repaired	Contractor	No marginal cost
Air pollution from dust or exhaust emissions (CO, NOx, SOx, etc)	Implement dust suppression measures including watering of exposed surfaces	Contractor	15,625
	Cover all trucks carrying dispersible materials to or from the site	Contractor	No marginal cost

Potential Impact	Mitigation Measure	Responsibility	Cost (US\$)
	Minimize size and duration of cleared areas	Contractor	No marginal cost
	Ensure all construction vehicles and equipment are well maintained	Contractor	No marginal cost
Interference with existing infrastructure (telecomm. or electricity etc)	Consult with subproject engineering staff to minimize physical impacts on public infrastructure and disruption to services	PIU	No marginal cost
Clearing of vegetated areas	Undertake progressive re-vegetation of cleared areas with fast-growing, native species Avoid the felling of road-side trees wherever possible	Contractor	Incl. in above

Potential Impact	Mitigation Measure	Responsibility	Cost (US\$)
Exploitation of local resources incl. poaching of fauna	Poaching of fauna or felling trees that are not required to be cleared or removed by the project within the project areas will be forbidden Contractor will impose sanctions on any worker poaching fauna or felling trees unnecessary for the project works	Contractor	No marginal cost
Noise emissions from construction equipment	Ensure all construction vehicles and equipment are well maintained	Contractor	No marginal cost
	As far as possible limit noisy construction activities to day time hours in the vicinity of houses and hospitals and to night time hours in the vicinity of schools	Contractor	No marginal cost
	Fresh concrete and asphalt mixing stations must not located nearby residential areas, schools and hospitals	Contractor	No marginal cost
	Inform nearby community of schedule and duration of construction works	Contractor	No marginal cost
	Provide workers with noise abatement equipment (ear-muffs etc)	Contractor	No marginal cost
Changes to road safety / traffic movements, property access	Install signage and lighting in vicinity of works on road	Contractor	No marginal cost
	Install temporary access to affected properties	Contractor	No marginal cost
	Reinstate good quality permanent access to affected properties on completion of construction works	Contractor	No marginal cost
	Notify nearby community of schedule and duration of construction works	Contractor	No marginal cost
	As far as practical, limit construction vehicle movements to main transport routes and avoid movements in peak hours	Contractor	No marginal cost
Waste disposal	Prepare and implement "waste	Contractor	No marginal

Potential Impact	Mitigation Measure	Responsibility	Cost (US\$)
problems from solid waste generated during construction activity or wastes generated in construction camps	management plan"		cost
	Train construction workers in appropriate waste disposal methods	Contractor	No marginal cost
	Remove waste regularly from site for disposal to landfill	Contractor	No marginal cost
	Install waste collection and temporary storage facilities in construction camps	Contractor	No marginal cost
	Wastewater systems from construction camps must not discharge into water bodies which are use for water supplies for domestic and industrial purposes	Contractor	No marginal cost
Disrupts commercial activities on roadside	Install temporary access to affected properties	Contractor	No marginal cost
	Reinstate good quality permanent access to affected properties on completion of construction works	Contractor	No marginal cost
	Notify nearby community of schedule and duration of construction works	Contractor	No marginal cost
Construction workers cause social disruption or sanitation/health conditions	Ensure construction camps maintained in clean/hygienic conditions, implement "waste management plan"	Contractor	No marginal cost
	Train workers on appropriate interactions with local community and institute awareness program about sanitation and communicable diseases. Implement HIV awareness and prevention campaign (incl. HIV in the Workplace training for workers)	Contractor and NGO or UNAIDS	Incl. in costs of Social Action Plan
	Consult with local authorities to plan construction worker housing arrangements	Contractor	No marginal cost

Potential Impact	Mitigation Measure	Responsibility	Cost (US\$)
Visual and landscape impacts	Implement low maintenance landscaping along roadside	Contractor	Incl. in cost of re-vegetation
Employment or livelihood benefits from employment of local people	Maximize the number of local people involved in the construction works	Contractor	No marginal cost
Risks to public or construction worker health or safety	Provide safety equipment to workers and train them in its use	Contractor	No marginal cost
	Secure construction site and restrict access by local community	Contractor	No marginal cost
Generation of excess spoil	Give or sell the excess spoil to farmers or for local community purposes	Contractor	No marginal cost
Water afflux in depressions along the road	Provide proper cleaning to remove silt from the channels and maintain the channeling on the permanent basis in future	MOTC/DEP, MAWPI/DIN-16 & local government	No marginal cost

	Provide better conditions for water drainage in the areas where usually the water afflux occur	Contractor	No marginal cost
Operation Stage			
Changes to road safety	Installation of road safety/speed limit signage where accidents are likely to occur	MOTC & local government	No marginal cost
	Work with local authorities to carry out enforcement of traffic regulations on the road once upgraded		No marginal cost
Environmental damage from accidents involving spills of chemicals or other hazardous substances	Install speed limits and warning signs in areas of difficult driving conditions	PIU/MOTC	No marginal cost
Changes in dust levels or air quality	Vehicle emissions must be monitored according to national standards	PIU/MOTC	No marginal cost
	Implement landscaping along the roadside to reduce dust impacts	PIU/MOTC	No marginal cost
	Work with local authorities to ensure regular cleaning of the road surface	PIU/MOTC	No marginal cost
	Work with local authorities to implement regulations for trucks traveling on the road in relation to wheel washing and covering of dispersible loads	PIU/MOTC	No marginal cost
Erosion or scouring at waterway crossings, or on areas of fill or embankments	Implement stabilization and anti-scouring measures as required at bridges and culverts	PIU	No marginal cost
Creates areas of standing water	Drain and fill areas of standing water	PIU	No marginal cost
Protecting the road of snow drifting	Provide earth fences and/or snow-screens along the road	Contractor	No marginal cost
	Arrange proper protective afforestation/shelterbelts along the road where required	Contractor and SAEP&FM	At the cost of appropriate funding provided by SAEP&FM
	Foresee appropriate construction measures to make the road embankment higher against those with no any snow drifting impact	Design and Contractor	
Causes surface water or groundwater pollution from contaminated road	Undertake regular maintenance and cleaning of road	PIU	No marginal cost
	Work with local authorities to restrict movements of polluting vehicles	PIU & local gov.	No marginal cost

surface runoff	Ensure road drainage systems are well maintained and free of blockages	PIU	No marginal cost
	Vegetation or otherwise stabilize drainage systems	PIU	No marginal cost
Changes to visual amenity & landscape values	Implement low maintenance landscaping along roadside	Contractor	Incl. in cost of re-vegetation

5.2. ENVIRONMENTAL MONITORING PLAN

Environmental monitoring is a very important aspect of environmental management during construction and operation stages of the project to safeguard the environment. During construction, environmental monitoring will ensure the protection of landslide, side slope, and embankment from potential soil erosions, borrow pits restoration, quarry activities, sitting of work sties and material storages, sitting of asphalt plants, community relations, and safety provisions. During operation, air, noise, and surface water quality monitoring of the project road will be an important parameter of the monitoring program.

In response to the environmental impact identified during the study, an environmental monitoring plan has been developed and is presented in Table 21. The contract documents will contain a list of all required mitigation measures (Section 4) and a time frame for the compliance monitoring of these activities. The monitoring will comprise surveillance to check whether the contractor is meeting the provisions of the contract during construction.

The project supervision consultant in cooperation with PIU during project implementation will be required to:

- Develop an environmental auditing protocol for the construction period, and formulate a detailed monitoring and management plan;
- Supervise the environmental monitoring (to be sub-contracted) regularly, and submit quarterly reports: the main parameters to be monitored are outlined in Table 21; and
- Supervise the project road regularly, and submit quarterly reports based on the monitoring data and laboratory analysis report. The main parameters to be monitored by the contractor are outlined in Table 21. The contractor will be responsible for subcontracting data collection of environmental monitoring to a recognized organization.

A lump sum budget is allocated to cover monitoring cost during operation stage of the project. PIU will hire a recognized organization for environmental monitoring and ensure that the road is monitored regularly for the first three years following completion of the rehabilitation works.

The following measures will be taken to provide an environmental compliance monitoring program during project implementation:

- The tender and contract documents will clearly set out the contractor's obligations to undertake the environmental mitigation measures as set out in Section 4 of this IEE and to be appended to contract specifications;
- The recommended environmental mitigation cost should be included as an item in the Bills of Quantities. This will ensure that there is specific environmental mitigation budget and will be implemented as required. During the procurement, contractors will be encouraged to include these costs in their rates and present the mitigation cost as a line item in the Bill of Quantities. There will be an identified extra payment in the contract to ensure measures are costed and carried out; and
- Each contractor will recruit an ESO, who will be responsible for implementing the contractors' environmental responsibilities, and liaising with district administration. The ESO will also be responsible for health and safety aspects of work sites.
- The project's environmental monitoring plan is provided in Table 21. Costs for monitoring during construction have been included, costs for monitoring during operation will depend on the type and regularity of monitoring finally agreed to by MOTC an ADB, the monitoring plan includes a recommendation for this but does not include costs.
-

Table 21: Environmental Monitoring Plan

Parameter	Location	Monitoring	Frequency	Responsibility	Estimated Cost (US\$)
Construction Phase					
Quarries	Road corridor	Visual inspection to ensure fill is only obtained from designated quarries per EMP	Monthly	Contractor; PIU/PSC	Incl. in PSC contract
	Quarry Sites	Visual inspection to ensure quarry rehabilitation is conducted per EMP	Monthly	Contractor; PIU/PSC	Incl. in PSC contract
Material Storage Sites	Road corridor	Visual inspection. Ensure storage sites are using existing concrete hardstands. Ensure vegetation clearance has been minimized.	Monthly	Contractor; PIU/PSC	Incl. in PSC contract
Erosion	Road corridor	Visual inspection of prevention measures per EMP and occurrence of erosion	Monthly	Contractor; PIU/PSC	10,800
Rock fall	Active rock fall sections, steep slopes	Visual Inspection	Monthly	Contractor; PIU/PSC	Incl. in design & PSC

Parameter	Location	Monitoring	Frequency	Responsibility	Estimated Cost (US\$)
					contract
Hydrocarbon and chemical storage	Construction camps	Visual inspection of storage facilities as per EMP and emergency response plan	Monthly	Contractor; PIU/PSC	Incl. in design and PSC contract
Waste Management	Construction camps	Visual inspection that solid waste is disposed per EMP	Monthly	Contractor; PIU/PSC	Incl. in design and PSC contract
Surface Water Quality	Bridge sites	Visual inspection of water management per EMP	Monthly	Contractor; PIU/PSC	19,032
	Directly downstream of pollution event	DO, COD, SS, fecal coliform, conductivity, turbidity, pH, temperature	After pollution event	Contractor; PIU/PSC	As required
Air Quality	Asphalt Plant	Visual inspection to ensure asphalt plant is located >500 m from residential areas	Monthly	Contractor; PIU/PSC	14,460
	Dust	Visual inspection to ensure dust suppression plan being impl. Particulate matter and smoke per EMP	Monthly After complaint	Contractor; PIU/PSC	Incl. in above
Noise	Sensitive areas	dBA at sensitive areas per EMP	Monthly	Contractor; PIU/PSC	16,200
Vibration	Sensitive areas	Ensure mitigation measures are being implemented per EMP	Monthly or after complaint	Contractor; PIU/PSC	Incl. in above
Re-vegetation	Road corridor	Monitoring of progress of reforestation activities per EMP	Monthly	Contractor; PIU/PSC	Incl. in erosion mon. costs
Community	Road corridor	Consult with government and community groups along the alignment to monitor environmental concerns	Ongoing	Contractor; PIU/PSC	2, 700

Parameter	Location	Monitoring	Frequency	Responsibility	Estimated Cost (US\$)
Operation Phase					
Noise	Sensitive areas (densely settled areas, schools,	dBA at sensitive areas as per EMP	Twice/year for 3 years or after complaint. Mid-	PIU; ADB	TBA

	hospitals)		term and post-eval. monitoring.		
Air Quality	Sensitive areas (densely settled areas, schools, hospitals)	Particulate matter and smoke as per EMP	Twice/year for 3 years or after complaint. Mid-term and post-eval. monitoring.	PIU; ADB	TBA
Erosion	Road subproject corridors	Visual assessment of erosion resulting from project	Twice/year for 3 years or after complaint. Mid-term and post-eval. monitoring.	PIU; ADB	TBA
Water Quality	Road corridor	Visual assessment of increased suspended solids from areas of erosion, if identified	Twice/year for 3 years or after complaint. Mid-term and post-eval. monitoring.	PIU; ADB	TBA
Road Safety	Road corridor	Collect road accident data	Twice/year for 3 years or after complaint. Mid-term and post-eval. monitoring.	PIU; ADB	TBA
Re-vegetation	Road corridor	Ongoing monitoring of re-vegetation as per EMP	Twice/year for 3 years or after complaint. Mid-term and post-eval. monitoring.	PIU; ADB	TBA

5.3. COSTS OF MITIGATION AND MONITORING

It should be noted that the costs of side-slope protection such as gabion baskets, rockfall protection (fences etc) and retaining structures are considered to be standard engineering practices and requirements for road rehabilitation works and as such are not included as costs of environmental mitigation, these costs will be included in the detailed design costs.

The costs of mitigating the adverse environmental impacts and monitoring are included in the Table.

Table 22: Mitigation and Monitoring Costs

Item	Unit	Quantity	Unit Cost	Total (\$)
Estimated Mitigation Costs				
Chemical storage compounds ¹	site	15	1,000	15,000
Dust suppression measures ²	day	125	125	15,625

Re-vegetation and embankment regrassing ³	km	65	550	35,750
Estimated Monitoring Costs				
Air quality and dust monitoring	site	15*2	482	14,460
Soil and erosion monitoring	day	180	60	10,800
Water quality monitoring ⁴	site	26	732	19,032
Social and community impact monitoring ⁵	site	15*3	60	2,700
Noise and vibration monitoring	site	15*2	540	16,200
Total				129,567

1 Assumes 15 compounds required based on a compound sited approximately every 11 km. Cost estimate includes safe drinking water, proper drainage facilities, solid waste disposal, first aid and other facilities.

2 Assumes only required in five main settlements along the road, construction likely to take between 1 and 1.5 month in vicinity of settlements, dust suppression likely required for a period of 25 days.

3 Grassing for road sections requiring reconstruction and landscaping for slope protection (along approximately 65 km of road) by plantation or grass turfs of 150-200m strip.

4 Assumes two monitoring sites (upstream and downstream) at each of the 7 reconstructed bridge locations and 12 other sites along the Kyzyl-Suu River.

5 Assumes three sites or locations in five main settlements. Will include observation and participatory approaches. Benefit monitoring and evaluation undertaken as part of PSA.

6. CONSULTATION AND INFORMATION DISCLOSURE

6.1. CONSULTATION ACTIVITIES UNDERTAKEN

The outcomes of the following public consultation activities have been integrated into the preparation of the IEE:

- Consultation with SAEP&FM (1st Deputy Head of Osh Territorial Department on Environmental Protection and Forestry Management (Mr. Ilyas M. Sarybaev), Chief Forestry Officer at Chon-Alay rayon (Mr. Tursunali Gazybekov) and local authorities (1st Deputy Head of Osh Oblast Administration (Mr. Bolot Burgoev), 1st Deputy Head of Alay Rayon (Mr. Almazbek A. Osmonov), Deputy Head of Alay Rayon in charge of socioeconomic issues (Mrs. Ulbu Mamyrova), 1st Deputy Head of Chon-Alay Rayon (Mr. Tynchbek Toktosunov), Chon-Alay Rayon State Administration Staff (Mr. Faizidin Meزامov), Head of the Sary-Mogol Aiyl Okmotu (Kutmanali Kendjebaev), Coordinator on Health Care of Alay Rayon (Mr. Orzomamat Temirov), Chief of Veterinary Laboratory (Mr. Sydyk Kalbaev) on the planned Project activities and practices – in respect of environmental and social assessment, consultation and disclosure on other and similar projects as well as during the field visits to the Project sites to identify issues related to the Project environmental assessment and approval procedures;



Picture 34: Meeting with 1st Deputy Head of Alay Rayon (Mr. Almazbek A. Osmonov)



Picture 35: Meeting with the 1st Deputy Head of Chon-Alay Rayon Administration (Mr. Tynchbek Toktosunov), and Chon-Alay Rayon Administration Staff (Mr. Faizidin Meزامov)



Picture 36: Meeting with the Head and Assistant Head of the Chon-Alay Forestry Department

- Consultation with the communities through meetings and focus groups²¹ in various villages along the road. In addition, a socio-economic survey was carried out in the communities along the project's roads. The outcomes of that survey have been integrated into the relevant sections of the IEE.
- Consultation with other ST-KM road users such as Director General of "Parity Coal" Ltd. (a coal mine that supplies coal of the whole population of Osh Oblast) Mr. Berdybay Primov and other business community operation along the ST-KM road.

A summary of the consultation outcomes is provided in the following sections and the record of public consultation is provided in the Attachment. The number of the people participated in the community meetings were app. 230 persons as it was noted above. Majority of them were registered in the lists provided in the relevant Attachment.

Community consultation included several public workshops held in Sary-Mogol, Kaska-Suu, Taldy-Suu, and Karamyk villages, interviews with stakeholders.

- The workshop in Sary-Mogol village was attended by app. 90 persons representing the general public, and stakeholder agencies, including local authorities, from Alay rayon, and was chaired by the 1st Deputy Head of the Alay Rayon Administration Mr. Almazbek Osmonov. A record of meeting minutes and workshop participants was taken. During the meeting the participants expressed their great satisfaction that the road would be improved and wider opportunities will be obtained by the local population regarding the agricultural production delivery to the neighboring towns and settlements markets, visiting Rayon center (Gulcha village) for documents legalization (internal affairs (police) department,

²¹ More detailed description and analysis is provided in the PSA report made by a group of Project Sociological Experts.

civilian registrar's office etc.) as well as development of industrial capacities of the area. They also noted that the road dust that presented a serious problem in the area would be decreased after the finishing the construction works that would provide a positive impact for the local population's health and its everyday life. The attendees also asked whether a possible negative impact on the houses located nearby the Project road can be expected during and after the road rehabilitation activities.



Pictures 37-38: Community meeting in Sary-Mogol village, Alay Rayon

- The workshop in Taldy-Suu village was attended about 100 persons (see: pictures provided below). The meeting was chaired by the Deputy Head of the Alay Rayon in charge of the socioeconomic affairs Mrs. Ulbu Mamyrova. She noted that no any significant impact is expected on the environment along the road as there would no probably be any increase in traffic, and hence, no air pollution can occur. The attendees noted that the road use was hampered by the snow driftings in winter time and asked to provide some special machinery for clearing the snow away from the road or to provide some measures for the road itself to be protected of snow. The local people also requested to be provided with winterized, of the close type bus stops along the road to be protected of permanent strong winds and snow driftings during the time of their trips to the neighboring populated areas. Additionally, there was a proposal to construct a special feeder road to have a better access to the coal open pit of the mentioned below "Coal Parity" company. As winters in this area are rather cold and long, the local population has to heat 8-9, sometimes up to 11 months a year and such an opportunity - to have a good access to the coal supplier - would be a good support for the local inhabitants, people said. They also assured that if the road would be improved they would probably purchase private cars to travel to the neighboring settlements and rayon and oblast centers.



Pictures 39-42: Community meeting in Taldy-Suu and Kashka-Suu, Alay Rayon

- The workshop in Kashka-Suu was held with participation of about 20 persons representing the village and Ayil Okmot leadership and headmen as well as local farmers, school teachers, and entrepreneurs. The consultant informed about the forthcoming activities of the Project in the road rehabilitation and answered a number of questions of the local people. They were mostly interested to know when the Project construction works begin and whether an opportunity for the local dwellers to be involved into the road construction activities would be provided. They accentuated that due to the high unemployment rate in the area, it would be very helpful for them to be employed at the road works. The consultant of the Project was not authorized to provide any promises concerning the issue, but nevertheless she informed that according to the ADB strategic directions on poverty reduction, an opportunity of the jobs providing for the local population is considered to be one of the means of additional income generation for the poor.
- The meeting with “Parity Coal” leadership was attended 4 persons including the owner and the director of the coal pit Berdybay Primov, chief geologist Ulukbek

Aliev, chief engineer Abdumitalip Berdiev, and stockkeeper Kalmurat Turganbaev. The people expressed their satisfaction that the road would be improved. In their opinion, the better road would provide an opportunity for them to supply coal for the local population in a faster manner and reduce coal to fill the air with coal dust during its transporting. They requested to establish road direction signs with the local populated areas' names and number of kilometers left to them if a settlement is located apart from the road.

- The workshop in Karamyk village was attended by about 20 persons. The consultant informed about the forthcoming Project activities on the road rehabilitation. The local people expressed their interest in improvement of the road and told that its rehabilitation would improve the quality of their life and contribute into the development of the rayon. Later a meeting with the local representative of Aga Khan Foundation (Mr. Razyk Ghaparov) was held. Mr. Razyk Ghaparov, land specialist of the Djekendy Ayil Okmot (local administration) and the president of the local VO (village organization under the Aga Khan Foundation) told that along the road, a clean drinking water pipeline establishment would be useful for the village people in Karamyk.

6.2. RESULTS OF THE CONSULTATION

Consultations with the communities in the project area revealed that they use the Sary-Tash – Karamyk Road frequently for visiting and trading in local markets and for access to services such as health clinics and schools located in rayon headquarters and Osh City.

People who work in the nearby towns use the road for their daily travel and those who migrate to neighboring oblasts in search of employment also use the road. The communities expressed positive responses towards the need for the road improvements as well as ongoing maintenance of the road. They are of the opinion that the project will improve and augment transportation and linkages between project oblasts as well with neighboring countries (PRC and Tajikistan) which are seen as vital in harnessing the use of resources, expanding markets and increasing employment opportunities.

The project will not entail any land acquisition as the proposed rehabilitation and maintenance works will take place within the existing rights-of-way land or unutilized lands of the government. The communities perceive very few negative impacts and these are able to be mitigated.

Major benefits of the project as the different stakeholders perceive include increase in passenger and freight traffic, savings in travel time and costs, safe and rapid transportation of cargo and passenger, better connectivity between villages and towns, decrease in breakage and spoilage giving long lasting to high quality vehicles.

The main issues, as raised and discussed are as follows:

- Increase in income and employment opportunities - a major benefit from the road improvement, as perceived by those consulted, is the expected increase in income and employment opportunities through the direct involvement into the road construction activities, on the one hand, and the greater connectivity and access to resources and markets increasing labor and trade mobility in the project area, on the other hand. Overall connectivity would increase trans-boundary trade and transportation, tourism development essentially augmenting local employment and income. Farmers will get improved access to transportation of their fruits and vegetables to the important internal markets in Bishkek, Osh, Jalal-Abad and Naryn as well as external markets;
- Reduction in travel time and vehicle operating costs - a significant benefit perceived by the communities (especially transporters, truck drivers, and passenger vehicle operators) is the reduction in the travel time by improving road conditions and a subsequent reduction in vehicle operating costs. Currently the subproject roads pose serious impediments for motorized and NMT. A comment frequently made was that improvement of the roads would reduce travel time and thereby increase mobility;
- Health and safety - most people consulted stated that improvement of the roads will reduce the number of road accidents. However, there were others who considered that the improvements could induce accidents. Under the circumstances, where the road passes through the four settlement areas provisions should be made for intersections, paved shoulders, and service roads for local traffic. As many of the consulted people asked for a help in solution of the problem with snow driftings during the winter period, possibly special machinery clearing the road of the snow should be provided or some other special measures to protect the road of snow driftings should be undertaken to make the travel easier for the local population that will make a significant contribution into their health and safety in the road use. This also can be supported by arrangement of the winterized, of the close type bus stops along the road.
- Other social impacts - some communities expect for a possible negative impact on the houses located nearby the Project road during and after the road rehabilitation activities, including those from the temporal workers' camps along the road. Possibly construction of a special feeder road providing a better access to the coal open pit and establishment of the road direction signs will also be a part of the positive social impact of the road construction and rehabilitation.

During the consultations the following suggestions were made; (i) engage local skilled and unskilled workforce in the rehabilitation works and further look at the possibility of community participation in ongoing maintenance; (ii) restrict the contact of construction workforce with villagers, carefully monitor the workforce and prohibit workers from drinking while working, and restrict access to construction sites and camps by locals; (iii) co-ordinate rehabilitation works with local authorities; (iv) take into consideration probability of rock-falls, torrents, and landslides; and (v) build high quality and solid roads that could serve long-term.

Further, the conclusions of the PSA were that the absorptive capacity of project beneficiaries is adequate and their willingness to participate is high. The beneficiaries are strongly in favor of rehabilitating the road.²² In addition, there is an educated but currently under-employed labor force available. Transport cost savings will be substantial for existing traffic, benefiting almost all residents of the primary impact area and providing them with the means to make any necessary contributions, so long as those contributions are proportional to their benefits.

6.3. RESULTS OF THE SOCIO-ECONOMIC SURVEY

As part of preparation of the PSA and consultation for the project, a survey was conducted in villages and settlements along each of the roads by the ADB consultants. Due to the fact that no any other surveys concerning the socioeconomic issues in the project zone have been conducted, the data and conclusions made by the ABD consultants were used in the current report. For the survey, between 15 and 50 surveys were completed in each rayon, depending on the number and size of settlements the roads passed through.²³ Along the project roads surveys were completed in three settlements (refer to Attachment 3).

In the survey, household respondents provided information on their perceptions of the project, overall 89 % considered that the project will bring tangible benefits to their household, while some 29 % considered that the project would also create some adverse impacts. The main benefits that people considered they would derive from the project are shown in Table 23.

Table 23: Benefits of Project

Type of benefit	Response of beneficiaries (%)			
	Will benefit household	Rank		
		Very important	Important	Unimportant
Improved access to schools, and health facilities	64	64	30	6
Improved access to employment opportunities	52	67	23	10
Improved access to markets	63	59	31	10
Improved travel experience (more comfortable trips)	67	49	40	11
Improved pedestrian safety	65	70	21	9
Reduced damage to agricultural products	44	63	29	8
Reduced travel time	68	55	34	11

²² As indicated by both the survey and Focus Group Meetings

²³ Originally the TOR for the PPTA included nine roads and these were surveyed over the period Dec-06 to Jan-07. The roads pass through 17 rayons and 55 villages or settlements and some 38 settlements were included in the survey. A total of 527 surveys were completed.

Reduced travel costs	52	60	33	7
Bus services will be more reliable	63	64	29	7
Employment during construction	60	70	24	6
Reduced dust and noise	70	67	19	14

Source: PPTA Socio-economic Survey (2007)

The household respondents were asked to identify what they considered to be adverse or negative impacts of the project the comments most commonly made can be included under four types of impact; (i) the generation of dust and noise during the works, (ii) increased noise from traffic, (iii) increased traffic accidents due to more traffic and increased speeding, and (iv) the “bad influences” brought in to a village by outside construction workers. It should be noted that the adverse impacts identified re-iterated those identified during the focus group meetings.

The respondents were also asked to specify what measures they would like to see included in the project as ways to reduce or mitigate the adverse impacts they identified. These included:

- Completing the works in the shortest possible time-frame;
- Using an asphalt seal on the roads;
- Using new and modern equipment to reduce noise and particulate emission;
- Engaging local people for the construction works;
- Permitting noisy activities to only be undertaken during the day;
- Frequently watering the road to reduce dust;
- Engaging only honest (as opposed to corrupt) contractors;
- Enforcing traffic rules and regulations and monitoring traffic speed;
- Provision of footpaths;
- Provision of traffic lights, signage and bus stops;
- Keeping the construction workers away from the village and controlling or monitoring their behavior (particularly in terms of times and places for drinking alcohol);
- Not acquiring any land for the project; and
- Keeping the community informed through regular bulletins and information sharing.

It should be noted that the above are reflected in the recommendations of this IEE, are included as measures in the EMP or included in the project’s Social Action Plan (refer to the PSA).

6.4. INCREASING COMMUNITY PARTICIPATION IN ROAD MAINTENANCE

As part of Institutional Support to the Transport Sector, an investigation into the ways to make the management and operations of road maintenance more effective and efficient

was undertaken.²⁴ The study included assessment of the ability and willingness of communities to participate in road maintenance. The results of the investigation in full were reflected in the relevant report of the ADB consultant.²⁵

6.5. DISCLOSURE

The IEE documenting the mitigation measures and consultation process will be submitted to PIU and ADB and will be available for public review. The affected people and the local communities expressed support for the project during the consultations as they clearly saw the benefit to the community as well as the region. Further consultation and disclosure will be done during implementation through:

- The preparation and dissemination of a brochure in Kyrgyz, Russian and other languages as required, explaining the project, works required and anticipated timing of the works; and
- Setting up a formal complaints redress committee with a representation from the affected people. The project supervision consultant in association with the contractor will be responsible for managing the effective complaints redress program.

Following approval of the IEE, a copy of the approval and a summary of the document will be sent to all relevant ayil-okmots. Information regarding the approved project and the proposed environmental management measures will be posted at suitable locations on the project site. Disclosure will conform to the Public Communications Policy of the ADB: Disclosure and Exchange of Information (March 2005) which requires that environmental assessment reports for ADB projects be accessible to interested parties and the general public. The project's SIEE as part of ADB project documents will be uploaded onto the ADB website while the IEE will be available to the public upon request.

²⁴ Lea International; Institutional Support to the Transport Sector – General Approach and Methodology for Community Participation on Road Maintenance – Training and Demonstration Project Manual (TA 3757-KGZ, March 2005)

²⁵ PSA report prepared for IEE Karamyk to Sary-Tash Section rehabilitation. June 2007.

7. CONCLUSIONS

The project road does not traverse state level protected areas or areas of ecological importance. It does not impact on any cultural or heritage sites and neither does it pass through densely populated areas or an area subject to heavy development. The proposed project will not create conflict with natural resource allocation.

During construction the project will create some minor and temporary adverse environmental impacts. There will be no land acquisition or resettlement as a result of the project.

The project will also result in a range of environmental improvements and benefits such as; (i) less re-suspension of dust; (ii) improved landslide and rock fall protective measures; (iii) less soil erosion and reduced dumping of spoil into the rivers due to construction of retaining structures; (iv) increased development and growth in the economies of the settlements that make up the project area; (v) income and employment opportunities; (vi) improved access and living conditions; (vi) contributions and support to poverty reduction; (vii) advanced environmental skills and awareness level among MOTC and contractor staff as well as road maintenance officials; (viii) improved road safety; and, (ix) rehabilitation and ongoing maintenance of a key regional corridor between PRC, Tajikistan, and Kyrgyz Republic.

Implementation of appropriate mitigation measures during the design, construction, and operation phases will minimize the negative impacts of the project to acceptable levels. To ensure that these mitigation measures are implemented and negative impacts avoided, the measures will be included in the contract specification of the project. Environmental monitoring of the project will be undertaken regularly through the first three years of its operation to ensure that the measures are being implemented properly.

Contractors' conformity with contract procedures and specifications during construction will be carefully monitored. Contractors will be required to follow standard construction practices and comply with a series of contractual requirements which will be monitored and supervised by project supervision consultant engaged under the project.

The project will have overall beneficial impact, reducing landslides and rock falls and reducing dust and improving air quality, traffic accidents, and travel time and improving socio-economic conditions along the project road. It will have insignificant negative impacts that will nevertheless be carefully monitored and adequately mitigated. Therefore, the completion of this IEE fully meets the ADB and government standards and no further environmental study is required for this project.

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