REPUBLIC OF TAJIKISTAN

MINISTRY OF TRANSPORT

CENTRAL ASIA ROAD LINKS – REPUBLIC OF TAJIKISTAN

ENVIRONMENTAL IMPACT ASSESSMENT

(EIA)

Date: August 27, 2014

Table of Contents

Tables

Figures

Appendices

Abbreviations

ACP	Asphalt concrete plan
AADT	Average Annual Daily Traffic
BCP	Border Crossing Post
BoQ	Bill of Quantities
CEP	Committee for Environmental Protection
CFPP	Chance Find Procedure Plan
EA	Environmental Assessment
EFR	Environmental Framework Report
EIA	Environmental Impact Assessment
EMP	Environmental Mitigation Plan
EPNR	Especially Protected Natural Reserve
FS	Feasibility Study
GDP	Gross Domestic Product
IEE	Initial Environmental Examination
IUCN	International Union for the Conservation of Wildlife
FSU	Former Soviet Union
HGV	Heavy Goods Vehicle
HPP	Hydro power plant
LGV	Light Goods Vehicle
MGV	Medium Goods Vehicle
MoC	Ministry of Culture of the Republic of Tajikistan
MoT	Ministry of Transport
NAEP	National Environment Action Plan
NTFP	Non-Timber Forest Products
NGO	Non-Government Organization
NSC	National Statistical Committee
NMT	Non-Motorized Transport
NRRP	National Road Rehabilitation Project
OP/BP	Operational Policy / Bank Procedure (World Bank)
PCR	Physical Cultural Resources
PIG	Project Implementation Group
PSC	Project Supervision Consultant
RoW	Right of Way
RAP	Resettlement Action Plan
RMU	Road Maintenance Unit
RPF	Resettlement Policy Framework
SNiP	FSU Construction Norms and Standards / Строительные нормы и правила
SEE	State Ecological Expertise
ToR	Terms of Reference
RoT	Republic of Tajikistan
USAID	US Agency for International Development
USD	US Dollar
WB	World Bank
WHO	World Health Organization
WWF	World Wildlife Fund for Nature

1. Introduction and Background

1.1 Introduction

The Republic of Tajikistan is a landlocked country and the smallest nation in Central Asia, by area, located between Uzbekistan, Kyrgyzstan in the west and in the north, Afghanistan in the south and China in the east. It is covered by mountains of Pamir range, and more than fifty percent of the country is over 3,000 meters (9,800 ft) above sea level. The Tajik Republic depends on external trade for its development, and is export-driven business in agriculture and industry requires fast, reliable and economically affordable transport (Figure 1).

70% of the Tajik population is under the age of 30 and 35% are between the ages of 14 and 30. The Republic of Tajikistan has a population of 7,349,145 (July 2009). Tajiks who speak the Tajik language (a variety of Persian) are the main ethnic group, although there is a sizable minority of Uzbeks and Russians, whose numbers are declining due to emigration. In 1989, ethnic Russians made up 7.6% of the population, but they are now less than 0.5%, after civil war spurred Russian emigration. The Pamiris of Badakshan are considered to belong to the larger group of Tajiks.

Tajikistan's economic performance has been impressive in recent years, with an annual GDP (US$6.52 billion in 2011) growth of 8% during 2005-2009 and poverty level decreased from 81% in 1999 to 47.2% in 2009. (World Bank, TLSS).

In 2005 the Tajik GDP grew by 6.7%, to about US$1.89 billion, and growth for 2006 was about 8%, marking the fifth consecutive year of annual growth exceeding 6%. The official forecast for GDP growth in 2007 is 7.5%. Per capita GDP in 2005 was US$258, lowest among the 15 countries of the former Soviet Union. In 2005 services contributed 48%, agriculture 23.4%, and industry 28.6% to GDP. The recent global recession has reduced the Tajik GDP growth rate to 2.8% in the first half of 2009. Remittances from expatriate Tajiks are estimated to account for 30-50% of Tajikistan's GDP.

1.2 Project Background

Within the framework of Central Asia Regional Economic Cooperation (CAREC) Program, the countries of Central Asia are working together to increase regional transport connectivity by coordinating investments in transport infrastructure and aligning respective policy and regulatory reforms to make the impacts of those investments sustainable. This is to improve the region's competitiveness, reduce poverty and expand trade, both among Central Asian economies, regionally, and globally. CAREC program focuses on investment and other activities along six transport corridors that link north, south, east and west through Central Asia.

Specifically, the Governments of the Tajik and the Kyrgyz Republic approached the World Bank to consider financing for the Osh-Khujand road corridor of which the Khujand – Isfara Road is an integral part.

The proposed Central Asia Road Links program is being prepared as part of a regional program on improvements of priority road links in Central Asia which is expected to have substantial positive impacts on poverty reduction and economic growth, not only because of the high popula-

tion density along the catchment area of the corridor, but also high poverty rates and related impacts on cohesion and migration.

The following road sections which will link the Tajik Republic with its neighboring countries are expected to be financed by the proposed program: (a) Kuhjand to border crossing point at Madaniyat and Kyrgyzstan (about 26.08 kilometers), (b) Kuhjand to Patar and Uzbekistan (about 80 kilometers) and (c) Kanibadam to border crossing point at Guliston and Kyrgyzstan (about 40 kilometers).

Figure 1: Republic of Tajikistan

1.3 Background of the Study Road

The Kuhjand, Kuchkak - Isfara road runs along the Fergana Valley, basically across the territory of Kuhjand oblast. This road is a continuation of the Dushanbe-Kuhjand road and connects the northern region of the republic with its neighbouring countries Uzbekistan and Kyrgyzstan. Also the given corridor is a continuation of the Osh-Fergana-Kokand-Khujand road.

2. Legal, Policy and Administrative Framework

This section presents an overview of the policy/legislative framework as well as the environmental assessment guidelines of the Republic of Tajikistan that apply to the proposed project. The section also identifies relevant WORLD BANK Safeguard Policies that will be applied in the project.

2.1 Country Policies and Administrative Framework

Environmental legislation in the Tajik Republic includes laws on air quality, noise, mineral resources, land management, forests, health and safety, waste and chemicals management. The Tajikistan —Framework II Environment Law was adopted in 1993 and amended in 1996. The Water Code was adopted in 2000, the Land Code in 1992 and the Law on Land Administration in 2001. The Republic of Tajikistan is party to a number of international environmental treaties including:

(i) Convention on Biological Diversity, 1997;
(ii) UN Framework Convention on Climate Change, 1998;
(iii) The Ramsar Convention (joined 2000);
(iv) Convention on the Conservation of Migratory Species of Wild Animals (joined 2001);
(v) Stockholm Convention on Persistent Organic Pollutants (ratified 2007);
(vi) Aarhus Convention (joined 2001);

Environmental Impact Assessment is subject to the —Law on Environment Protection ‖ (2011) and the —Law on Ecological Expertise ‖ (2011). An environmental licensing system exists in relation to handling hazardous waste and mineral extraction. An environmental permitting system regulates the use of natural resources.

In the Republic of Tajikistan, the organizations with most responsibility for environmental monitoring and management currently are the State Committee for Environmental Protection and Forestry (CEP) under the Government of the Republic of Tajikistan (GoT), the Sanitary Inspectorate of the Ministry of Health, the Inspectorate for Industrial Safety and the Mining Inspectorate.

2.1.1 Framework Environment Law

The —framework environment law ‖ / Law on Environment Protection was adopted in 2011 (21 July, 2011, № 208). The new Law on environment protection stipulates that the Tajik environmental policy should give priority to environmental actions based on scientifically proven principles to combine economic and other activities that may have an impact on the environment, with nature preservation and the sustainable use of resources. The Law defines the applicable legal principles, the protected objects and the competencies and roles of the Government, the Committee for Environmental Protection under Government of Tajikistan, the local authorities, public organizations and individuals.

2.1.2 Water Code

The Water Code (2000) stipulates the policies on water management, permitting, dispute resolution, usage planning and cadastre. It promotes rational use and protection of water resources and defines the types of water use rights, authority and roles of regional and local governments for water allocations among various users, collection of fees, water use planning, water use

rights and dispute resolution. The Code delegates Water User Associations to operate and maintain on-farm irrigation and drainage infrastructure.

2.1.3 Noise, Water and Air Quality Standards

The Republic of Tajikistan has standards for permissible noise levels and air quality. These standards are provided in the following tables:

Air Quality Standards	
Parameter	**Tajikistan Standard mg / m^3**
Particulate Matter	0.150
Nitrogen Oxide (NO)	0.060
Nitrogen Dioxide (NO_2)	0.040
Sulphur Dioxide (SO_2)	0.050
Carbon Dioxide	3.000
Ammonium	0.200

Source: ADB, environmental profile of Tajikistan

Tab. 1 Tajik standards for air quality

Noise Standards	
Parameter	**Tajik Standard in accordance with Sanitary Norms CH 2.2.4/2.1.8.562-96 (provided by Sanitary Epidemiology service of the Ministry of Health of Tajikistan)**
Allowable Noise level for Working place of the drivers and service staff of trucks and construction equipment	70-80 dBA
Allowable Noise level created by cars for area adjoining to residential houses, buildings and other receptors at the distance of 2 m	70+10 dBA in period from 7 a.m to 23 p.m, 60 dB+10 dB = 10 dB in period from 23 p.m. to 7 a.m
Allowable Noise level for areas adjoining to hotels and hostels	75 dB +10 dB in period from 7 a.m to 23 p.m, 65 dB+ 10 dB= 10 dB in period from 23 p.m. to 7 a.m

Source: ADB, environmental profile of Tajikistan

Tab. 2 Tajik standards for noise

2.1.4 Basic EA Laws

There are two laws in the country that stipulate all aspects of the EA: (a) Law on Environment Protection; and (b) Law on Ecological Expertise. The Chapter V, Articles 35-39 of the Law on Environment Protection (2011), introduces the concept of state ecological review (literally, state ecological —expertise ‖ – SEE) that seeks to examine the compliance of proposed activities and projects with the requirements of environmental legislation and standards and ecological security of the society. The mentioned laws stipulate the mandatory cross-sectoral nature of SEE, which shall be scientifically justified, comprehensive, and objective and which shall lead to conclusions in accordance with the law. SEE precedes decision-making about activities that

may have a negative impact on the environment. Financing of programs and projects is allowed only after a positive SEE finding, or conclusion, has been issued. The following activities and projects are subject to state ecological review: a) draft state programs, pre-planning, pre-project, and design documentation for economic development; b) regional and sectoral development programs; c) spatial and urban planning, development, and design; d) environmental programs and projects; e) construction and reconstruction of various types of facilities irrespective of their ownership; f) draft environmental quality standards and other normative, technology, and methodological documentation that regulates economic activities; g) existing enterprises and economic entities. The laws stipulate that all types of economic and other activities shall be implemented in accordance with existing environmental standards and norms and shall have sufficient environmental protection and mitigation measures to prevent and avoid pollution and enhance environmental quality. The EA studies analyzing the short- and long-term environmental, genetic, economic, and demographic impacts and consequences shall be evaluated prior to making decisions on the allocation, construction, or reconstruction of facilities, irrespective of their ownership. If these requirements are violated, construction will be terminated until necessary improvements are made, as prescribed by the GoT and/or other duly authorized control bodies, such as sanitary, geological, and public safety agencies.

2.1.4.1 Environmental Impact Assessment

An Environmental Impact Assessment (EIA) is a component of the State Ecological Expertise, as set out in the 2011 amendments to the Environmental Protection Law and in the Law on the State Ecological Expertise (2011). The EIA is the responsibility of the project proponent. The State Ecological Expertise for all investment projects is the responsibility of the Committee for Environmental Protection under Government of Tajikistan (CEP) and its regional offices. Furthermore, according to the 2011 Law on the State Ecological Expertise, all civil works, including rehabilitation, should be assessed for their environmental impacts and the proposed mitigation measures reviewed and monitored by the CEP.

2.1.4.2 Types of Ecological Expertise

According to the 2011 Law on Ecological Expertise, ecological expertise is intended to prevent negative impacts on the environment as a result of a proposed activity, forecast impacts from activities that are not considered as necessarily damaging to the environment and create databases on the state of the environment and knowledge about human impact on the environment. This Law and the Law on Environment Protection envisage two types of ecological expertise – State ecological expertise and public ecological expertise, which are not given equal importance. While State ecological expertise is a prerequisite for beginning any activity that may have an adverse environmental impact, public ecological expertise becomes binding only after its results have been approved by a State ecological expertise body. The State Ecological Expertise is authorized to invite leading scientists and qualified outside specialists to participate in the review. Approval should be issued within 30 days, unless the project developer agrees to an extension, and remains valid for two years, if the decision is positive. For very complicated projects the term of consideration and approval can be extended till 60 days. According to the Law on SEE the public ecological expertise of economic activities or other activities implementation of which can negatively impact the environment of population which live in relevant area can be carried out by any public organization and citizen. They have right to sent the proposals to the responsible government bodies concerning environmental issues of implementation planned activities; to receive information on results of conducted state ecological expertise from relevant

responsible bodies. The materials reflecting the public expertise delivered to the experts' commission should be taken into consideration under preparation of conclusion of state ecological expertise and decision making on realization of expertise object. The public ecological expertise is carried out under the state registration of application of public organization. The registration can be done by local executive authorities (during 7 days) in place where the expertise activities are planned. The public organizations which are organizing this expertise, should inform the population of initiation of expertise and then on its results.

2.1.5 EA Administrative Framework

The Environmental Protection Law states that a SEE should be conducted by the CEP, which is designated as a duly authorized state environmental protection body. The CEP absorbed the former State Forest Enterprise, and has a staff of over 2000. It has a comprehensive mandate that includes policy formulation and inspection duties. The CEP has divisions at oblast (region), city and rayon (district) level, in the form of Departments of Environmental Protection (DEPs), within the Hukumat (local administration) at each city or rayon.

2.1.5.1 Public Participation

Article 12 of the Environment Protection Law proclaims the right of citizens to live in a favorable environment and to be protected from negative environmental impacts. Citizens also have the right to environmental information (Article 13), as well as to participate in developing, adopting, and implementing decisions related to environmental impacts (Article 13). The latter is assured by public discussion of drafts of environmentally important decisions and public ecological reviews. Public representative bodies have an obligation to take into consideration citizens' comments and suggestions.

2.1.5.2 Licenses

Licenses are legal instruments to regulate certain potentially hazardous activities where minimal qualifications and strict adherence to rules are required to ensure that they are carried out efficiently, safely and do not result in potentially very significant and irreparable damage to the environment and human health . In particular, licenses are required for handling hazardous waste; for activities in industrial safety, sources of ionizing radiation, production and handling of pesticides and other agrochemicals. They are issued by the relevant industry regulator (ministry or committee) or an entity to which it has delegated such right. Licensing is also used to ensure the most efficient and sustainable use of natural resources. For example, licenses are required for prospecting, collecting or extracting mineral resources (borrow areas), or for constructing underground facilities not related to mining.

2.1.5.3 Environmental Permits

Permits are meant to ensure the sustainable use of natural resources. There are two types of permits: (a) permits to use natural resources; and, (b) permits for emissions or discharges. The natural resources use permits allow their holders to take a certain number or amount of a particular natural resource within a defined territory and time period. They are issued both to individuals (e.g. to hunt a particular species of animal or harvest particular factories) and to organi-

zations (e.g. permits to extract ground or surface water for a particular use). By law, permits are needed for any commercial use of any resource. The authority that issues the permit and the legislation (government resolution) that applies depend on the resource. Permits to discharge polluted matter are issued by the relevant inspectorate (e.g. previous State Water Inspectorate or State Air Inspectorate – now departments) of the local state environmental protection committees to industrial or agricultural enterprises and municipal utilities that release by-products into the environment. The permits allow releasing a certain amount of polluted matter (gases, liquids, solid waste) into the environment. The permits are normally granted for one year and indicate the maximum allowed concentration of the pollutants in the released matter, the maximum volume of the polluted matter and the pollutants allowed.

The elaborated existing normative legal base is intended for determination of legal basis for implementation of projects and their compliance with state requirements for environmental protection and mitigation of environmental impact.

2.1.5.4 State Environmental Program 2009-2019

The program, approved in 2009, obligates ministries and offices, heads of administrations and mayors of cities to improve environmental conditions and ensure sustainable development of the country during the period of economic transition. It calls for adoption of modern environmental standards for water, air, soil, solid waste, toxic wastes, and noise control, based on maximum permissible amounts. Standards are to be supplemented by discharge permits. The Program is accompanied by broad ecological zoning, dividing the country into ten zones (Syr-Darya, Northern Turkestan, Zeravshan, Gissar, Vaksh, Dangarin, Khulbak-Kulyak-Tchube, Karategin-Baldzhuan - Shurobad, Garm-Muksu-Balandkiik, and Badakshan)

2.2 Assessment Requirements of the World Bank

The World Bank undertakes environmental screening of proposed projects to determine the appropriate extent and type of environmental assessment (EA). The World Bank classifies proposed projects into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

- Category A – describes a proposed project if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project is an environmental impact assessment (EIA) which examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance;
- Category B – describes a project if its potential adverse environmental impacts on human populations or environmentally important areas (including wetlands, forests, grasslands,

and other natural habitats) are less adverse than those of Category A projects. These impacts are site-specific; few if any are irreversible; and in most cases mitigation measures can be designed.

- Category C – describes a project if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project;
- Category FI - Projects are classified as category FI if they involve a credit line 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.

2.3 Recommended Categorization of the Project

The World Bank's system of environmental categorization is determined according to the likelihood and magnitude of risk associated with a project (and subprojects) when implemented without mitigation.

Basically all of the project sections are considered to be Category B since impacts can be mitigated on site. The following Tab. 3 shows sections of the project roads, major impacts to be expected, mitigation measures and proposed categorization according to the assessment requirements of the World Bank. The sections were named according to Figure 2 – 6.

Section	Impacts	Mitigation measures	Proposed Categorization	Comments
1a: Guliston – Isfara bypass (option 1), central subsection	Impact on landscape (agricultural land), cutting of apricot trees	planting of two trees and bushes instead of one to be cut	B	alignment follows agricultural land and local road, agricultural compensation and land acquisition required
1a: Guliston - Isfara bypass (option 1) western and eastern subsections	Impact during construction phase, felling of trees (alley)	planting of two trees instead of one to be cut	B	existing alignment, partly widening of existing alley required
2: Isfara Kim	Impact during construction phase	Prevention of dust, noise, pollution	B	Existing alignment, no land acquisition required
3: Kim – Kanibadam	Impact during construction phase	Prevention of dust, noise, pollution	B	Existing alignment, no land acquisition required
4: Kanibadam – Patar	Impact during construction phase	Prevention of dust, noise, pollution	B	Existing alignment, no land acquisition required
6: Kim - Kuchkak (bypassing Kanibadam)	Impact during construction phase	Prevention of dust, noise, pollution	B	Existing alignment, no land acquisition required
11: Dehmoi - Proletarsk	Impact during construction phase	Prevention of dust, noise, pollution	B	Existing alignment, no land acquisition required

Section	Impacts	Mitigation measures	Proposed Categorization	Comments
11a: Access to Intermodal Terminal	Impact during construction phase	Prevention of dust, noise, pollution	B	Existing alignment, no land acquisition required
12: Proletarsk - Mandaniyat	Impact during construction phase	Prevention of dust, noise, pollution	B	Existing alignment, no land acquisition required

Tab. 3 Sections of the project roads, impacts, mitigation measures and categorization according to World Bank requirements

2.4 World Bank Safeguards Requirements

The objective of environmental and social safeguards is to prevent and mitigate undue harm to people and their environment in the development process. Safeguard policies are the cornerstone of the assistance provided to developing countries by their development partners. The policies provide guidelines for donors and borrowers in the identification, preparation, and implementation of programs and projects. The following safeguards requirements were considered during implementation of the EIA.

2.4.1 Environmental Assessment (OP/BP 4.01)

This policy requires EA of projects to help ensure that they are environmentally sound and sustainable. EA evaluates a project's potential environmental risks and impacts; examines project alternatives; identifies ways of improving the project by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts. Projects that will affect the environment (temporary or permanently) will be subject to EA. The depth of the EA is function of the level of socio-environmental risk associated with a project (i.e. the project category) and depending on the significance of impacts, either an EIA or IEE is required. As all alignments are proposed to be Category B and some risks for the environment cannot be excluded according to World Bank policy an EIA was conducted.

2.4.2 Natural Habitats (OP/BP 4.04)

This policy promotes and supports natural habitat conservation and improved land use by requiring that projects integrate conservation of natural habitats and the maintenance of ecological functions into the project design. If a project is located in a protected area or considered as a critical or sensitive area from an environmental point of view, or if a project can cause irreversible damages to such areas, it will be excluded from financing. No natural habitat will be affected within the project. The Natural Habitats policy will not be applied therefore.

2.4.3 Physical Cultural Resources (OP/BP 4.11)

This policy requires the protection of "cultural property" (including archaeological, historic, religious sites). Cultural property comprises remains left by previous human inhabitants. Projects

that will significantly damage non-replicable cultural property will be excluded from funding. Projects shall include a plan for the protection and/or enhancement of cultural properties accidentally encountered ("chance findings"). This OP/BP is not triggered during this assessment as impacts on cultural property are unlikely to appear within the project.

2.4.4 Forests (OP/BP 4.36)

The Bank's current forests policy aims to reduce deforestation, enhance the environmental contribution of forested areas, promote reforestation, reduce poverty, and encourage economic development. This policy includes adoption of a comprehensive and environmentally sound forestry conservation and development plan that clearly defines the roles and rights of the government, the private sector, and local people. As forests do not exist within the project area this OP/BP is not triggered within this EIA to be conducted.

2.4.5 Involuntary Resettlement (OP/BP 4.12)

This policy covers the direct economic and social impacts that are caused by the involuntary taking of land resulting in (i) relocation or loss of shelter; (ii) loss of assets or access to assets; or (iii) loss of income sources or means of livelihood, whether or not the affected persons must move to another location; or the involuntary restriction of access to legally designated parks and protected areas resulting in adverse impacts on livelihoods. If a project requires either land acquisition or resettlement (as defined above) either a shortened or full Resettlement Action Plan (RAP) will be required, depending on the scale of the impact (significant or non-significant).

A Social Management Framework and a Resettlement Policy Framework (RPF) has been prepared as a stand-alone-document by the client. Site specific RAP will be prepared if one of the Isfara options will be carried out.

3. Methodology of the Environmental Impact Assessment

The purpose of the EIA is to define the baseline environmental conditions in order to identify and assess the impacts of the various activities of the proposed project. This project is on the stage of preliminary design including feasibility study. It has not been the subject of an EIA and several investigations yet. An Environmental Mitigation Plan (EMP) and Environmental Monitoring Plan have been prepared.

The following methodology was applied:

- Existing baseline data (including all available environmental legislation and guidelines) and relevant reports from previous Tajik road projects were collected, reviewed and analyzed.
- Discussions held with local experts from the Ministry of Transport, the Regional Road Administration in Kuhjand, the Regional Department of Environmental Protection Kuhjand,

the Committee of Environmental Protection under the Government of the Republic of Tajikistan Dushanbe and the local associate, the Research and Design Institute

- Informal interviews and participatory discussions were held with people living and working along the project roads
- Additional public consultation has to be carried out in cities of the project area (Isfara and Kuhjand) after publication of the FS, RAP and the EIA through MoT due to changes in design, environmental and social issues
- Design and engineering data were reviewed and taken into account to identify environmental impacts and mitigation measures during design, construction and operating phase.
- A field trip has been implemented from 7 June to 10 June 2014 to examine the proposed alignments from the environmental point of view

The potential environmental impacts have been assessed according to the World Bank policy and the Tajik environmental legislation. In addition institutional aspects have been taken into consideration.

4. Description of the Project

4.1 General

The project being described under this FS consists mainly of road rehabilitation and upgrade, but in addition a new alignment will be considered. Since road rehabilitation mainly comprises improvements along the existing alignment, significant environmental impacts are not usually encountered in these road sections. Figure 2 gives an overview of the proposed road sections.

A new alignment is suggested to bypass the city of Isfara on mainly agricultural land (fields and orchards). Impacts and mitigation measures were described in Chapter 6.

4.2 Description of the Sections to be financed under the Project and potential Impacts

Guliston - Isfara - Section 1A (18.7km)

The first part of the Section starts at Guliston Border Control Post, follows the existing road to Isfara for approximately 4.5 km and then turns to a new alignment through fields and orchards. After the end of the realigned section, the route follows a local road, turns to the second realignment across the fields and joins Isfara Kim road at approximately 0.5 km from the entrance to Isfara. This section requires substantial land acquisition and resettlement. This option requires new construction of approximately 7km Category III road, upgrading of 6.5km of local road and rehabilitation of 4.5km of existing road. In addition a new bridge has to be built (Figure 3). Additional culverts are required to ensure functioning of the existing irrigation system.

Potential environmental impacts are expected as follows:

- Cutting of fruit trees, mostly apricot trees (>1.000)
- Road construction in grain fields
- Cutting of bushes, shrubs and trees
- Cutting of trees (mulberry alley)
- River crossing (bridge)

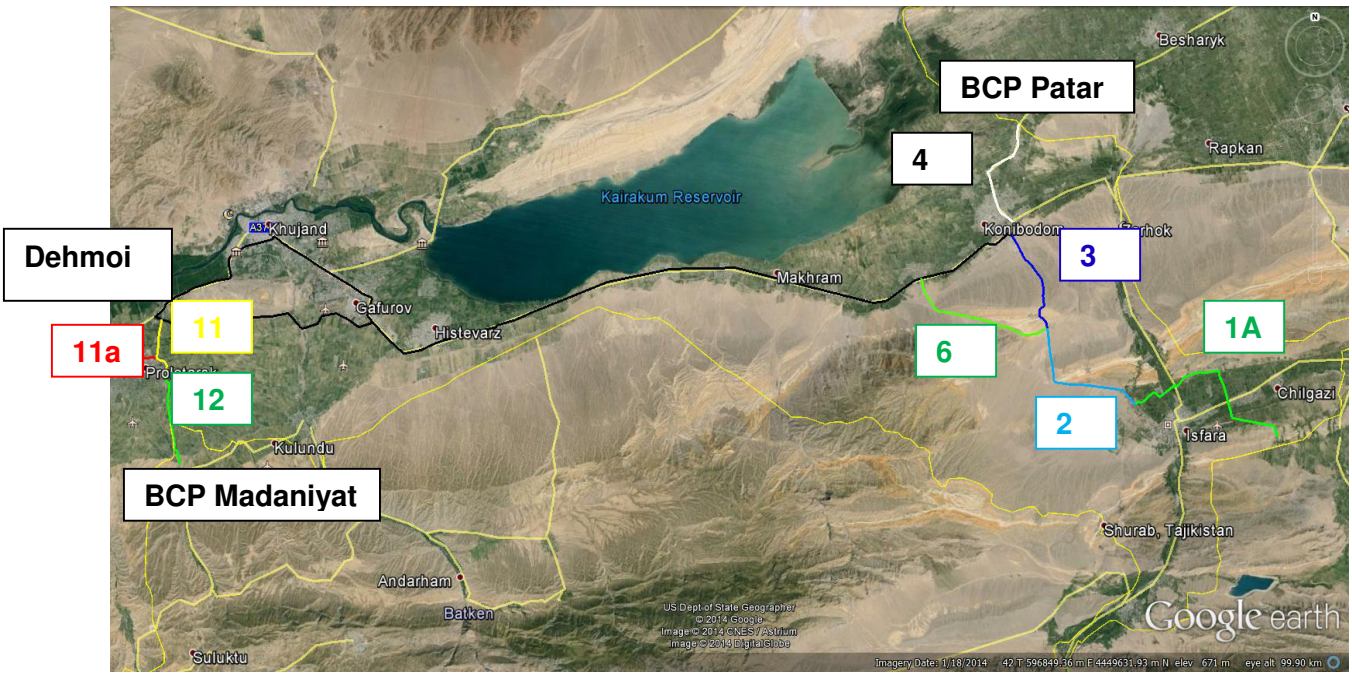


Figure 2: Overview of road design sections
BCP - Border Crossing Post

Sections 2 – 4, 6, 11, 11A and 12

No impacts on the environment are anticipated in the long run for the following sections presented in Figures 2 – 4:

- Section 2 - Isfara – Kim, Category III (13,0 km)
- Section 3 - Kim – Kanibadam, Category III (10,0 km)
- Section 4 – Kanibadam – Patar (12,4 km)
- Section 6 - Kim – Kuchkak (bypassing Kanibadam, 13,9 km))
- Section 11 – Dehmoi – Proletarsk (5,7 km)
- Section 11A - Access to Intermodal Terminal (2,2 km)
- Section 12 – Proletarsk - Madaniyat (9,0 km)

The roads are in fair / poor condition. Road rehabilitation including replacement of existing culverts and bridges is required, if these options should be implemented. Impacts to the environment are expected only during the construction phase. Impacts can be mitigated. Land acquisi-

tion is anticipated only for building new bridges during construction phase. Roads will be designed according to SNIP (Category III roads).

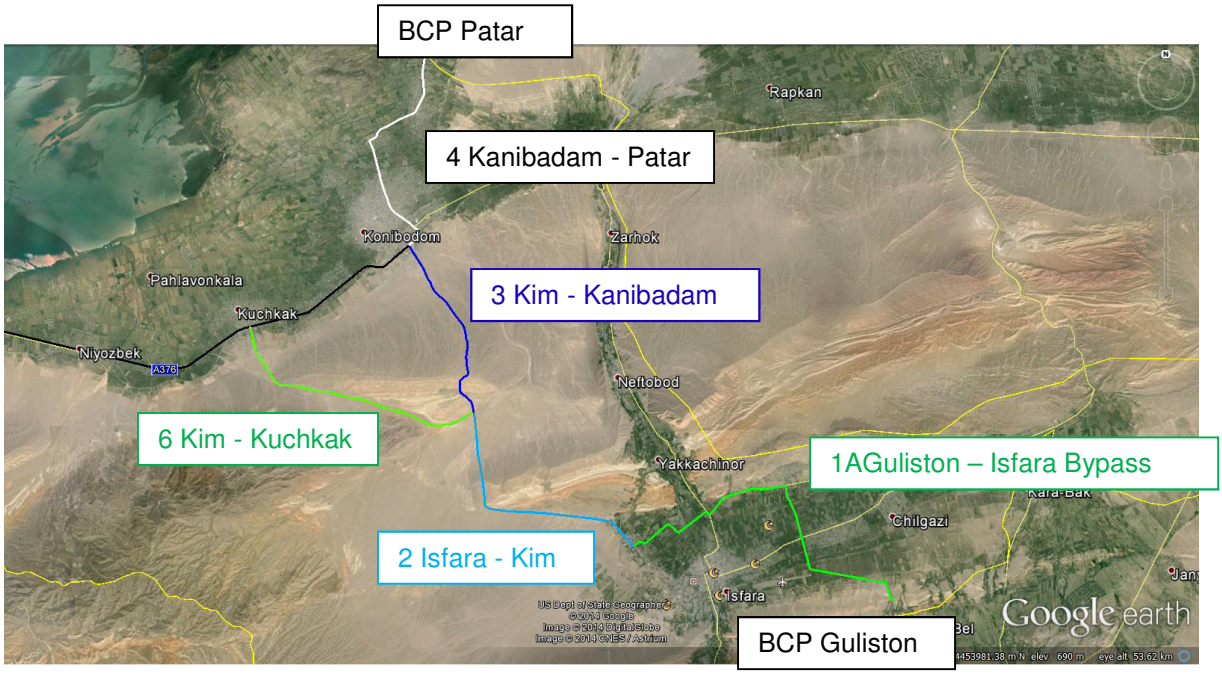


Figure 3: Overview of eastern design sections

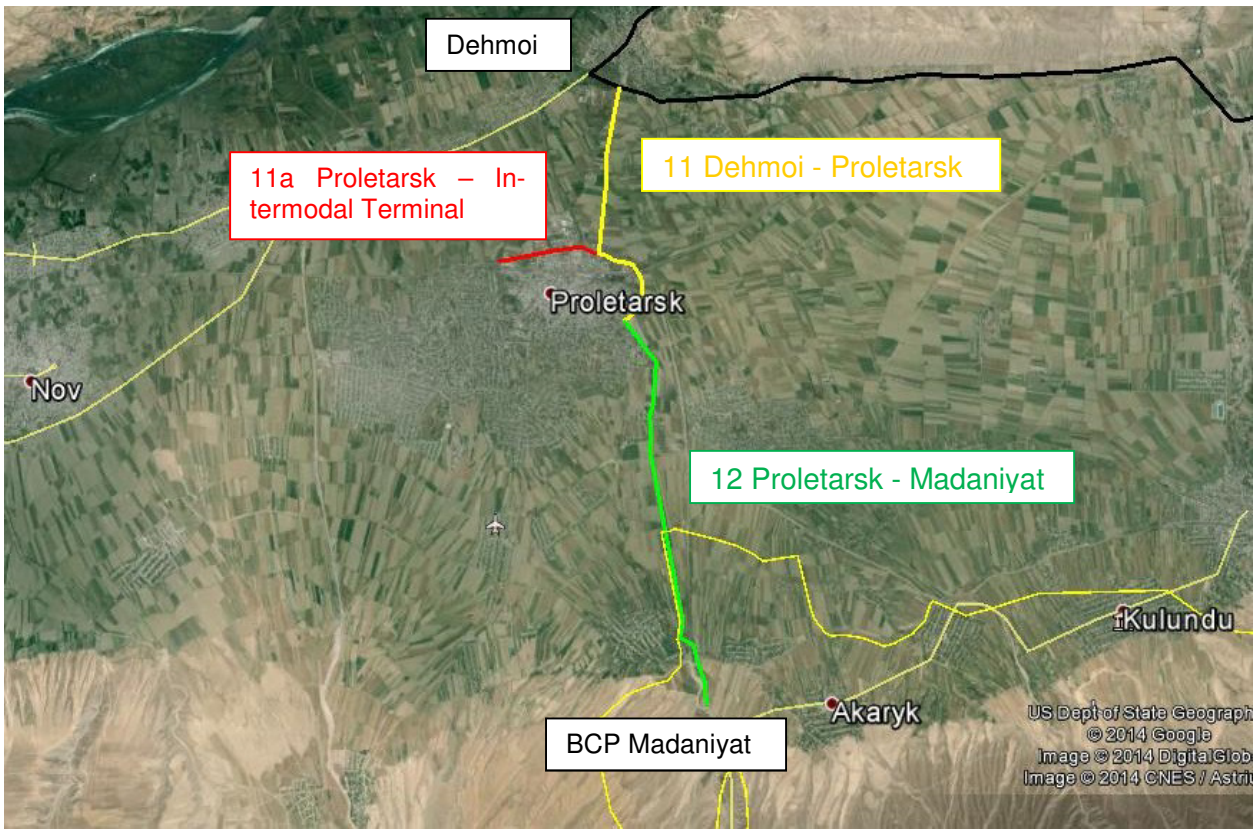


Figure 4: Overview of western design sections

4.3 Need for the Project – the "Do – Nothing – Option"

The project road provides national and regional access to the neighbouring Central Asian republics Kyrgyzstan and Uzbekistan. Poor maintenance has been cited as one of the main factors which had resulted in the present deterioration of some road sections with the resulting extra costs to both regional and national economies.

Improved roads and access, therefore, require more emphasis on a sustainable road network maintenance program, as well as road maintenance capacities and skills to achieve and sustain the benefits from the investment. A program must be put in place to ensure that the regional road network does not deteriorate further. Maintenance equipment should therefore be kept functional regardless of circumstances.

In view of the above, a "do nothing" or "without project" option is not feasible since economic growth of Tajikistan depends on good road networks. Basically rehabilitation of existing alignments in the ROW improves environmental conditions through reduction of dust emissions. Dust is a large contributor of air emissions in Tajikistan (Chapter 5.1.4). Impacts on the environment from upgrading of existing roads and from construction of new road sections can be mitigated.

4.4 Traffic Volumes and Transport Modes

Figures 2 - 4 give an overview of the project area including the road network which was used for the calculation of the traffic volumes. The present day traffic volumes and forecasts for 2016 and 2035 are summarized in Tab. 4 and 5.

Section No.	from	to	Car	LGV	Minibus	Light truck	MGV	3-ax HGV	4+ax HGV	Total
1	*Guliston bcp*	*Isfara*	*1,358*	*0*	*272*	*0*	*0*	*0*	*91*	*1,720*
2	Kim	Isfara	1,801	291	209	252	67	38	29	2,688
3	Kim	Konibodom	946	169	142	161	29	15	0	1,462
4	*Konibodom*	*Patar bcp*	*1,359*	*0*	*388*	*259*	*0*	*0*	*0*	*2,007*
6	Kim	Kuchkak	1,402	168	114	103	42	28	14	1,871

Tab. 4 Traffic forecast for Isfara bypass and Kyrgyz / Uzbek border (annual average daily traffic)

Section No.	from	to	Car	LGV	Minibus	Light truck	MGV	3-ax HGV	4+ax HGV	Total
11	Dehmoi	Proletarsk	4,505	508	436	406	155	81	46	6,138
12	*Proletarsk*	*Madaniyat*	*2,367*	*132*	*395*	*132*	*66*	*395*	*66*	*3,551*

Tab. 5 Traffic forecast for Kuhjand road options and Kyrgyz border (annual average daily traffic)

4.5 Borrow Pits and Quarries - Construction Material

Natural sources for aggregates suitable for road construction are available in the needed quantities in the area adjacent to the construction sites. The location of licensed quarries has been provided by the following authorities:

- Regional Road Department of Sugd Oblast
- State Enterprise Road Maintenance Department Kanibadam
- State Enterprise Road Maintenance Department Isfara

The borrow area southwest of Kuhjand was visited during the fact finding mission. A new Korean asphalt plant and a German crusher were found on site (Figure 5 and 6).

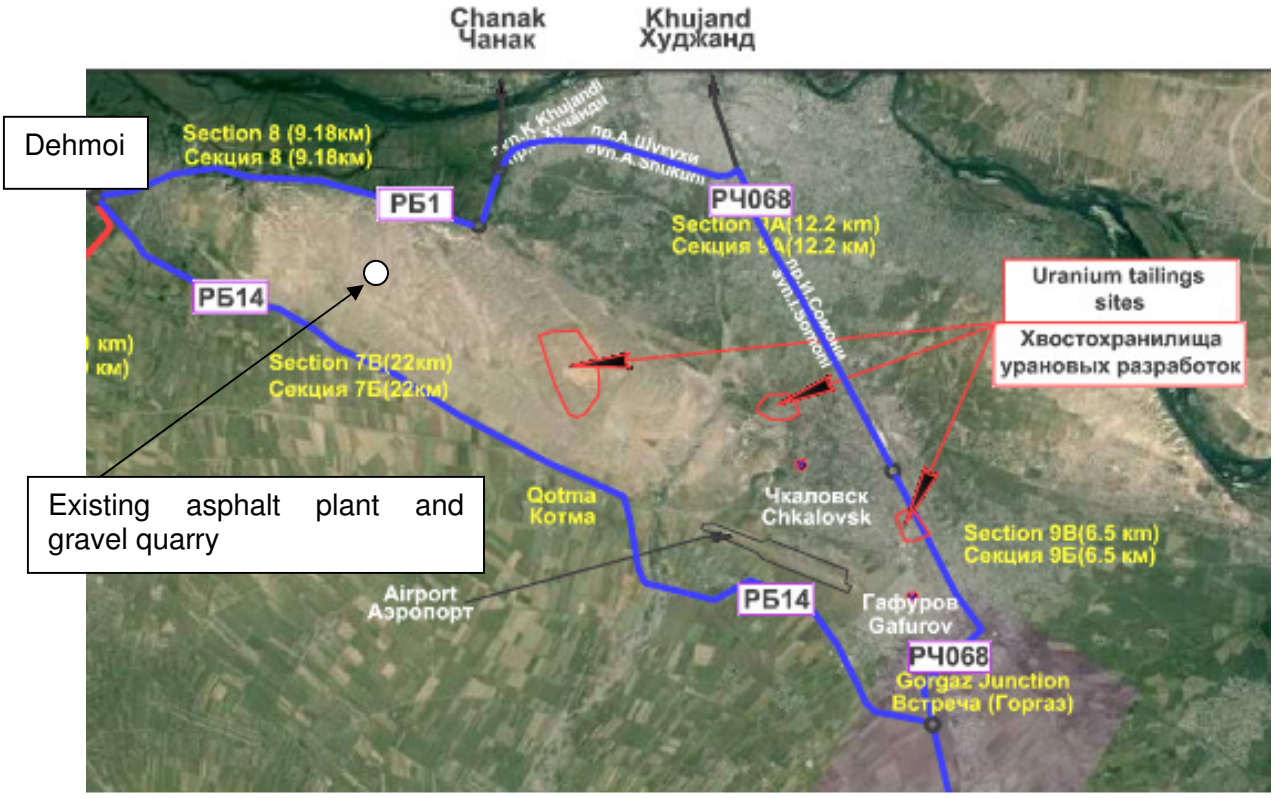


Figure 5: Existing licensed asphalt plant and gravel quarry for western sections of the project area

Figure 6: Existing asphalt plant and crusher southwest of Kuhjand

Further licensed borrow areas can be found at the following locations:

- low quality gravel borrow area at Makhram
- good quality gravel, 2 asphalt plants, 1 crusher between Patar and Ravat
- low quality gravel borrow area south of Kanibadam

Extraction of construction material from licensed quarries mentioned above must be part of the tender documents. Extraction of construction material from unlicensed quarries and river beds must be prevented by the construction supervision and PIG.

Cement can be provided by the Tajik Cement Factory northeast of the town of Isfara.

5. Description of the Existing Environment

This chapter describes the baseline environmental conditions relevant to the road project.

5.1 Physical Characteristics

5.1.1 Topography, Geology and Soils

Mountains occupy around 93% of the Tajik Republic. The main elements of Tajik geography are the following: the Kuramin Mountain Range and the Mogoltau Mountains, Fergana Depression, Hissar-Alai Mountains (the South Tian Shan), the depressed area in southwestern Tajikistan (Tajik depression), and Pamir. Altitudes range from 300 to 7495 meters above sea level. The modern relief of Tajikistan is the result of activities of alpine tectonic movements of the earth surface as well as the denudation process. The majority plain territories of the country are the broad areas of river valleys or the vast depressions between the mountains. Most of the country‘s population is concentrated in these particular areas along with the main fields of industrial production and agricultural potential of the country.

North- East of Tajikistan (5000 km^2) is represented by the western part of the Fergana basin. The latter is composed of folded thick (up to 12,000m) of Mesozoic and Cenozoic strata of clastic and carbonate sediments deposited at the Hercynian folded complex, similar to the composition of its geological formations of the Paleozoic mountain frame. From the south and from the north the basin is bounded on its mountain frame, respectively, of the South and the North boundary of Fergana faults. Along the southern border of the Fergana basin it installed by numerous, mostly small oil and gas deposits (Selroha, Kanibadam Neftabad). Quaternary sediments occur in the Ferghana basin (silt, sand, gravel, clay). Triassic – Jurassic sediment stone can be found in the northeastern part of the project area close to the Kyrgyz border (sandstone, marl, conglomerate, siltstone).

The project road is situated in primarily agricultural land and southwest of Kuhjand and its outskirts. It is passing through the Fergana Valley and some sections through scarcely vegetated hills. The Isfara River flows through the eastern part of the project area. The height of the project area varies between 360m near Kuhjand and almost 1,000m northwest of Isfara.

Existing soil can often be found as sediments in vertical layers varying from black earth via steppe soil to rock, also with deposits of snow and ice. Regarding mechanical properties the black earth belongs to the group of silty soils.

Intensive agricultural use during the centuries has caused degradation. Wind and water erosion caused further degradation and salinization.

5.1.2 Landslides, Avalanches and Earthquake Activity

Soil erosion and landslides are significant problems in Tajikistan. Erosion is a widespread natural phenomenon due to the relief and climate of the country, but it is accelerated by poor land management practices, such as the cultivation of land on steep slopes; excessive cuttings of forests, shrubs and bushes including wind shelters, overgrazing; and improper irrigation.

The Tajik Republic is a highly disaster prone country, being exposed to 20 different kinds of natural hazards, the most dangerous in terms of prevalence and, recurrence and damage include; earthquakes, debris flow, flash floods, landslides, rock-falls, and avalanches. Almost all of the country has a high – to very high risk for earthquakes (Figure 9).

The greatest risk of landslides and spring floods comes from breakthrough of high altitude lakes, created by glaciers, snow or rock avalanches or glacial clay. The risk of a snow avalanche is at its maximum in February and March in the Pamir and Fan Mountains.

The project area is located at the edge of the Central Asian Fold Belt in the Tien-Shan Mountain System formed by the collision of the Siberian and the North Chinese, Tarim, Afghan-Tajik and Kazakhstan-North Tien-Shan plates. The area of the project roads is still seismically active. Earthquakes with magnitudes of 5 – 5.9 on the Richter scale are rather frequent and there are records of earthquakes in the relatively recent past.

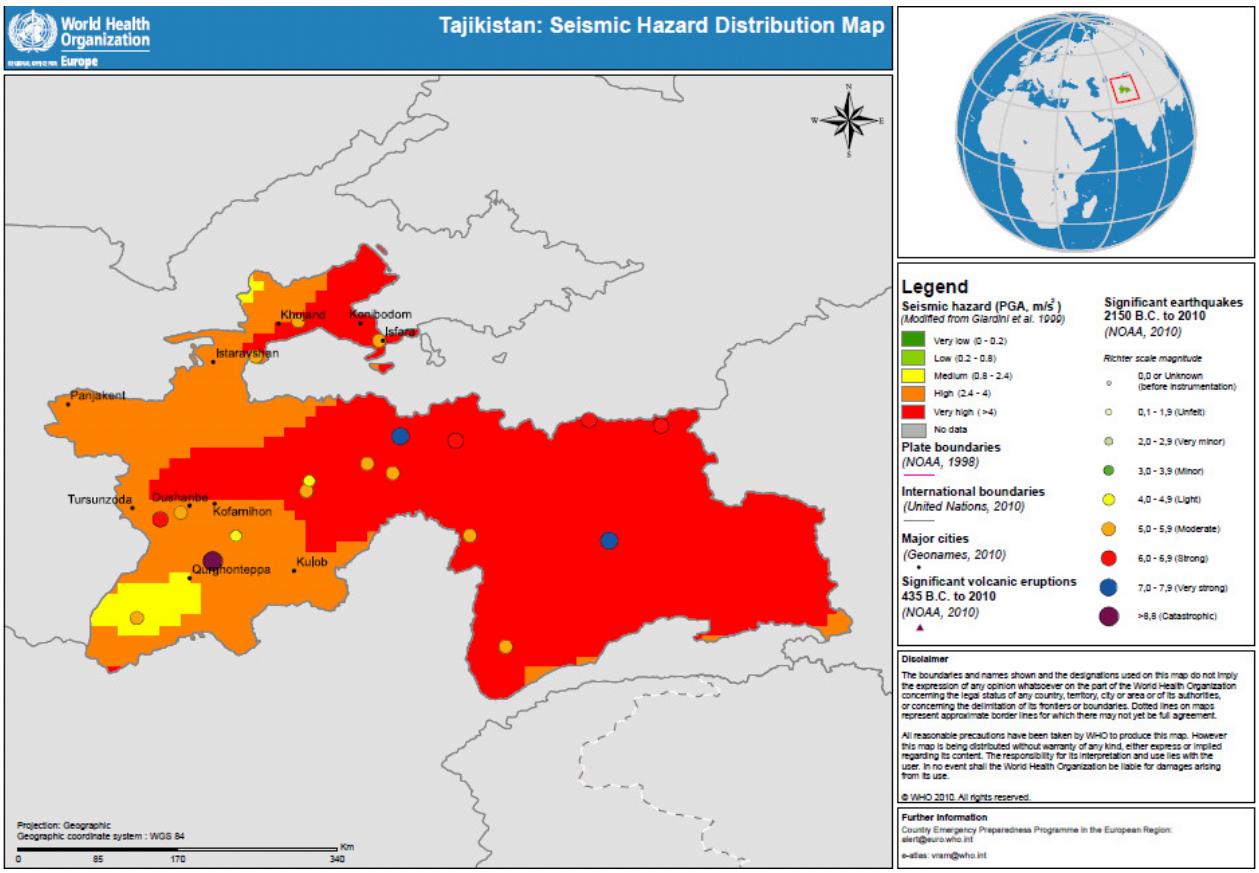


Figure 7: Seismic Activity Map of Republic of Tajikistan

Source: WHO 2010

5.1.3 Erosion

Some locations of the project area are subject to erosion.

The erosion includes:

- Bank erosion, close to roads;
- Line erosion along the road bed in the ditches and atmospheric flows, irrigating waters, temporary waterways;
- Erosion of road slopes as a rule at the sections with overflow;
- Erosion of lower slopes at the sections with location of small engineering structures (pipes/culverts), especially at the sections of mudflow valleys

The occurrence of mud flows is typically for the whole study area during the rainfall season from end of spring till beginning of summer. Disturbed grass cover and vegetation, fissured mountain formation, easy to loosen soil types and locally uneven rain events with high daily maximums cause them. These mud flows, occurring a few times per year, can have unfavourable influence to the study road sections.

5.1.4 Climate and Air Quality

In general, Tajikistan's climate is continental, subtropical, and semiarid, with some desert areas. The climate changes drastically according to elevation, however. The Fergana Valley and other lowlands are shielded by mountains from Arctic air masses, but temperatures in that region still drop below freezing for more than 100 days a year. In the subtropical southwestern lowlands, which have the highest average temperatures, the climate is arid, although some sections now are irrigated for farming. At Tajikistan's lower elevations, the average temperature range is 23 to 30 °C in July and –1 to 3 °C in January. In the eastern Pamirs, the average July temperature is 5 to 10 °C, and the average January temperature is –15 to –20 °C.

Tajikistan is the wettest of the Central Asian republics, with the average annual precipitation for the Kafiristan and Vakhsh valleys in the south being around 500 to 600mm, and up to150 mm in the mountains. At the Fedchenko Glacier, as much as 223.6 cm of snow falls each year. Only in the northern Fergana Valley and in the rain shadow areas of the eastern Pamirs is precipitation as low as in other parts of Central Asia: in the eastern Pamirs less than 100mm falls per year. In the project area annual precipitation is 146mm at Isfara and 193mm at Kuhjand (source: local weather stations). Most intensive precipitation occurs in spring.

Weather station	I	II	III	IV	V	VI
Kuhjand	-0,9	2,0	8,5	15,6	21,6	25,8
Farkhad HPP	-1,8	1,6	8,1	15,0	21,2	25,6
Isfara	-2,2	0,8	7	14,2	19,5	23,8
Tangi Vorukh	-4,7	-1,9	4,6	11,4	16,2	20,1

Weather station	VII	VIII	IX	X	XI	XII
Kuhjand	27,4	25,2	19,7	12,4	6,4	2,0
Farkhad HPP	27,4	25,2	19,8	13,1	6,4	1,8
Isfara	25,8	24,2	18,8	11,9	5,5	0,8
Tangi Vor-ukh	22,7	21,6	16,8	9,8	3,4	1,1

Weather station	annual average	MAX	MIN
Kuhjand	13,8	45	-26
Farkhad HPP	13,6	44	-28
Isfara	12,5	42	-25
Tangi Vorukh	9,9	37	-30

Tab. 6 temperature data from Tajik weather stations close to the project road (monthly average, annual average, maximum, minimum)

Air quality also differs across the project area, largely as a result of micro-climates and density of industry and transport routes. The level of air pollution is especially high in cities and towns (Kuhjand, Isfara). Major contributors including vehicle emissions (leaded or poor quality gasoline

and diesel), and emissions from mining and processing industries. One of the main sources of air pollution in the region relates to the burning of fossil fuels for heating, cooking and power within the urban areas, although this impact is being reduced as more portions of the valley become powered by hydroelectricity from the Tajik vast hydro resources.

There are also concerns regarding trans-boundary air pollution, especially in the Ferghana Valley (Isfara – Kuhjand) which is shared by Uzbekistan, Tajikistan and the Kyrgyz Republic. Uzbekistan is the largest contributor to air pollution in the Ferghana Valley because of its higher emissions and prevailing wind patterns, some of this pollution is transmitted to Tajik territory.

5.1.5 Hydrology and Water Quality

The study area belongs to the water basin of the Syr Darya River. Geographically the north hang of the Turkestan mountain chain forms part of this area. The Turkestan mountain chain servers as the main water shed of the biggest water systems in Central Asia: the Syr Darya and Amu Darya.

The rivers of the Tajik Republic are important sources of fresh water for the Aral Sea. The glaciers and permanent snow feed the rivers of the Aral Sea basin with over 13 km3 of water a year. The major rivers are the Syr Darya (total length 2,400 km), which flows for 195 km across the Fergana Valley in the north, the Zaravshan, which runs through central Tajikistan, and the Kafirnigan, Vakhsh and Panj rivers, all of which together drain more than three fourths of the Tajik territory.

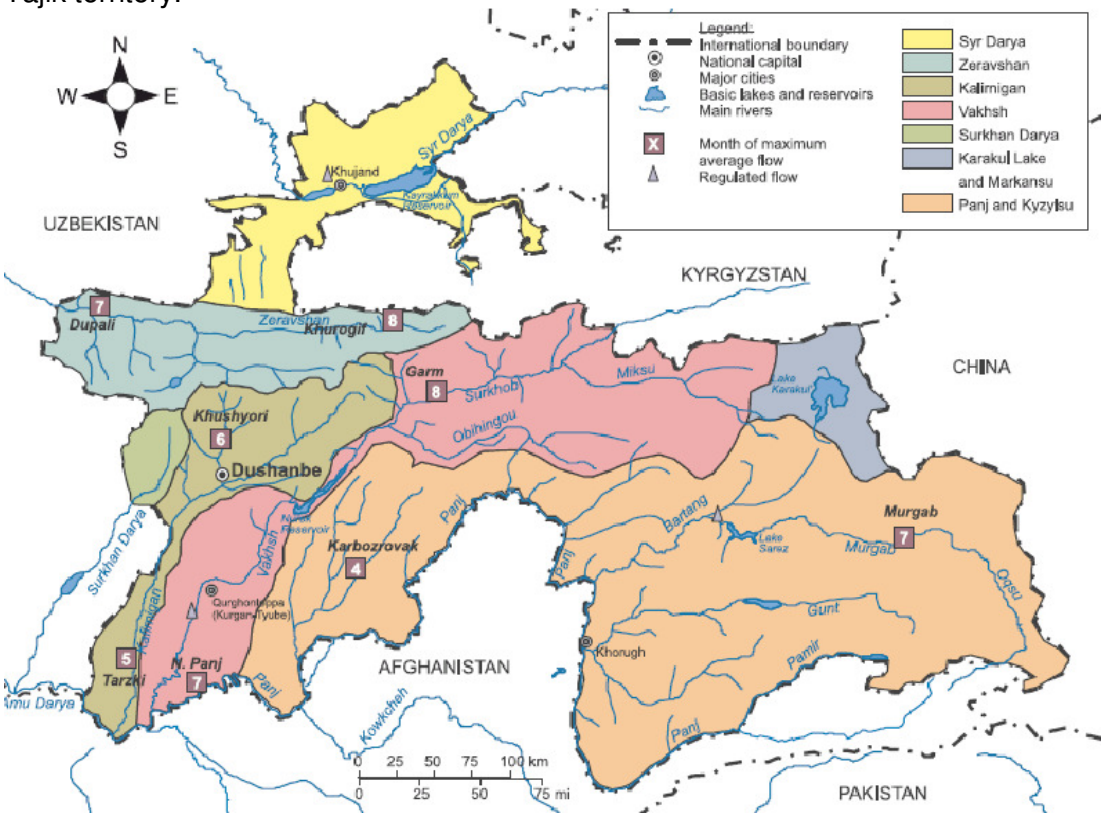


Figure 8: River basins of Republic of Tajikistan

Surface water courses originating mostly from mountainous areas create conditions for the formation of aquifers. The capacity of these resources depends on rainfall, snow melt and the abundance of glaciers in the upper reaches of the rivers. The complex geological structure of the territory, diversity of kinds of rocks and lengthy period of their formation, relief and climate, as well as human activities (irrigation and water-supply) have defined the peculiarities of hydro-geological and hydro-chemical conditions of ground water resources.

No data were available concerning water quality of Syr Dar River and Isfara River. It is assumed that both rivers are subject to untreated domestic and industrial pollution.

5.2 Biological Resources

5.2.1 Flora

The Ferghana Valley has a long history of human settlement featuring agricultural development with some limited industrial activity. As such, within the immediate vicinity of the Project Road very little flora is present. Degraded slopes exist along many portions of the road which have led to increased soil erosion. Much of the forest on these slopes has been cut by the local population to provide fuel wood as a result of the lack of a reliable power network in the Valley. Most vegetation in the Project Area now occurs in irrigated land and gardens, growing fruits, vegetables, and cereals. Both introduced and local species and varieties are used.

Trees have been planted along parts the roads in the eastern sections. Most of them are ornamental species, primarily Populus (poplar) species. Also fruit and nut trees, including apricot, persimmon, walnut and mulberry trees occur. No important, rare, endangered, or protected species are found within the vicinity of the road.

Isfara bypass follows agricultural land (orchards and fields) where crop is grown. There is no evidence for protected and endangered species.

Some eastern road sections run through semi-desert and steppe (section 3 and 6). Potential vegetation consists of semi-bushes & shrubs and grass plants like perennial plants as blue-grasses (meadow grass), sedges and other ephemeral grasses (Poa bulbosa L., Carex pachystylis , Astragalus, Vulpia, Trisetum cavanillesii Trin, Leptaleum filifolium (Willd.) DC). Also there are wormwood – Artemisia scotina Nevski , in more saline soils - Hammada leptoslada (M.Pap.) Iljin, on more sand soils –Calligonum gruseum Korov. Et Pavl., Salsola richteri Kar., occasionally Haloxylon persicum Bge. Et Boiss., Pholomis bucharika Rgl , Convolvulus subhirsutus Rgl. et Schmalh., Thaeniatherum asperum (Simk.) Nevski.

The orchards and gardens observed in this area mainly consist of Mulberry (Morus alba), Russian olive (Ealagnus angustifolia), Poplar Tree (Populus sp.), Plane Tree (Platanus orientalis) and willows (Salix) along pathways and channels.

5.2.2 Fauna

While the Republic of Tajikistan is home to a wide diversity of animals and birds, generally the biodiversity of the wildlife / fauna in the project road area is rather low. There are relatively few species and few individuals. The following animals may rarely stray into the area: Jackals (Asiatic jackal), Eared Hedgehog (Paraechinus hypomelas), Porcupine (Hystrix indica), Tolai Hare (Lepus nigricollis), Steppe Cat, and Gazelle (markhoor). There are no critical habitats for these species within project area. Within the agricultural areas, typical farm birds of Tajikistan occur. These include the following potential occurring species like hoopoe, roller, bee-eater, doves, quail, corn crake, lapwing, golden oriole, larks and most commonly large flocks of myna birds. No endangered species are expected in the vicinity of the road sections.

5.2.3 Protected Areas

There is no protected area to be touched by the project roads. Aktash preserve (No. 19) is located north of the project area (Figure 9).

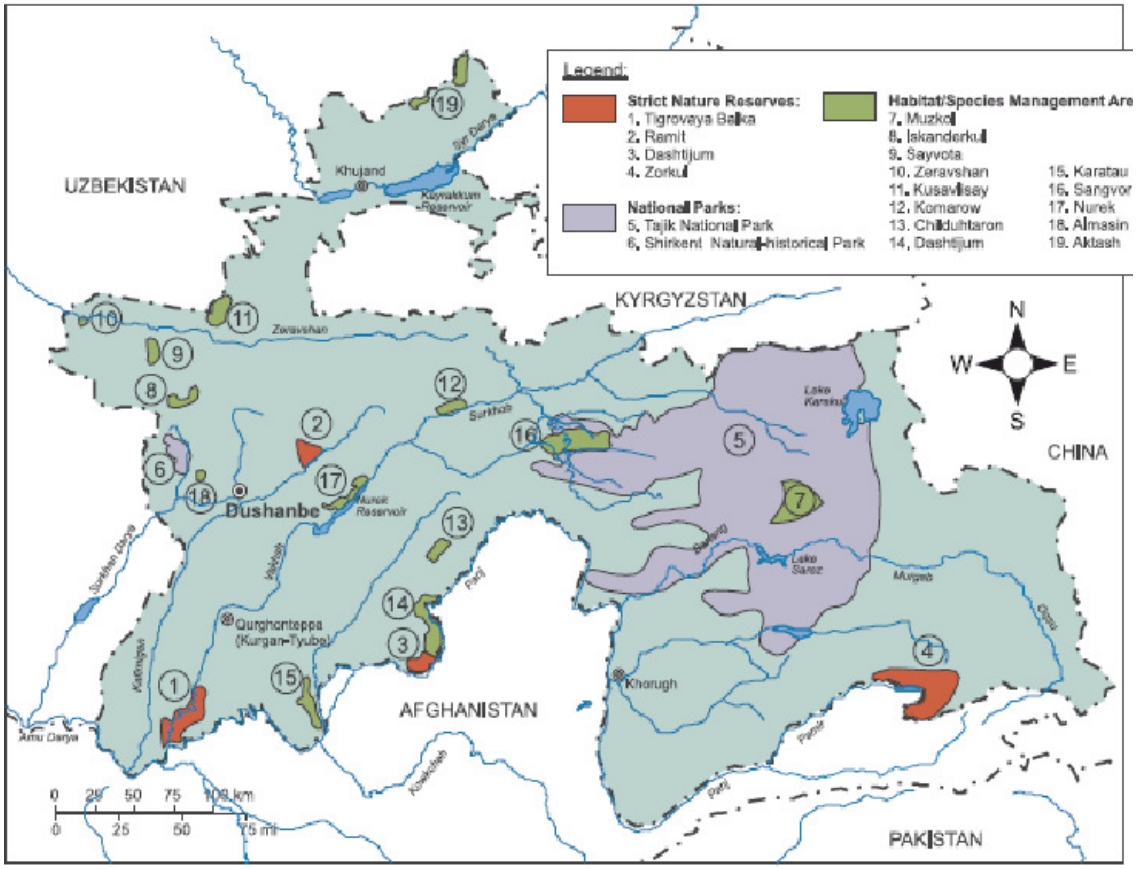


Figure 9: Protected areas of Republic of Tajikistan

5.3 Socio – Economic Characteristics

5.3.1 Industry

The Tajik economy, which had been the poorest in the Soviet Union, was severely disrupted by the collapse of the Soviet Union in 1991 and the civil war of 1992–97. With independence, Tajikistan lost the nearly 50% of its state revenue that had come as transfers from Moscow, as well as barter arrangements that brought food from other republics in exchange for cotton and aluminum. The civil war disrupted both agricultural and industrial production. Particularly hard-hit was the cotton industry, a key economic element in the Soviet era. In 2005 the economy remained fundamentally agricultural and highly dependent on the export of aluminum and cotton, although significant growth occurred in light industries and services. Sughd Province, where the Project Road is located, in the north accounts for the majority of industrial and agricultural output. Per capita GDP in 2005 was US$258, lowest among the 15 countries of the former Soviet Union. In 2005 services contributed 48%, agriculture 23.4%, and industry 28.6% to GDP.

5.3.2 Agriculture

Agriculture is the mainstay of the economy within the Project Corridor. A range of crops are grown, including corn, tobacco, rice, wheat, grapes, apples, apricot and other fruits. Irrigated farms range from 7 to 300ha in size.

5.3.3 Population and Demographics

In 2006 Tajikistan‘s population was estimated at 7,320,815 people. The growth rate was 2.19 % per year. The average density was 51.3 people per km^2. But the population was concentrated heavily in the western, southwestern, and northwestern regions. Some 30 percent of the population was classified as urban, the lowest percentage among the former Soviet republics. In 2006 an estimated 700,000 Tajikistanis, mostly men, spent some or all of the year as migrant workers in Russia and other countries, creating a significant male- female imbalance in the adult population. In 2006 the net migration rate was about –2.5 per 1,000 population.

According to the 2000 census, 79.9 percent of the population was Tajik, 15.3% Uzbek, 1.1% Russian, and 1.1% Kyrgyz. Smaller ethnic groups include Germans, Jews, Koreans, Turkmens, and Ukrainians. Tajikistanis also have a strong regional affiliation: mountains divide the country into northern and southern regions, whose rivalry spurred the civil war of the 1990s.

5.3.4 Livelihood and Poverty

The western part is one of the more industrialized parts of the project area, relatively well served by transport and other infrastructure. Though the poorest of the former Soviet Republics, the Tajik Republic benefitted from the industrial development, advances in agricultural production, medical care, education, established trade avenues within the Soviet Union and from infrastruc-

ture under that regime. Tajikistan suffered from the loss of the Soviet support structure on acquiring independence in 1991, and was left ill prepared to find new markets for agricultural produce and to adapt to a free market style economy. Budgetary support from Moscow for social services came to an abrupt end, transport links had been built to serve the Soviet Union as a whole, rather than the specific needs of the individual republics, and the human resource base began to erode rapidly. While these disadvantages were shared by Tajikistan's neighbors in the former Soviet Union, infrastructure and social support systems, such as they were, were subject to accelerated collapse as result of civil war between 1991 and 1997. Also, in contrast to most of Tajikistan's neighbors, the country has limited reserves of natural resources and therefore heightened challenges in re-establishing infrastructure and social services, and reducing poverty. Following the cessation of the civil war, economic growth took place, averaging 9% per year between 2000 and 20078. However, changes in economic fortunes in the region, notably reduced commodity prices, including cotton prices, and reduced investment in construction in countries such as Russia and Kazakhstan (which provide significant employment to Tajik workers who send money home) are now taking their toll on the economy in Tajikistan. The poor are particularly hard hit by the fall in remittances from family members working abroad.

Connectivity in the region is important to facilitate ongoing development of trade links on which increasing economic development within the free market context is dependent.

5.3.5 Cultural Heritage

Historic and cultural resources include monuments, structures, works of art, the sites of outstanding universal value from historical, aesthetic, scientific ethnological and/or anthropological points of view, including graveyards and burial sites. The responsibility for preservation, maintenance and assessment of historical and cultural monuments in the Tajik Republic rests with the Ministry of Culture.

There are no cultural-historical and architectural monuments on the site of works and near it, so the project realization will have no impacts concerning this aspect.

6. Assessment of the Environmental Impacts and Mitigation Measures

6.1 Baseline Environmental Considerations

Water, wind and pasture erosion are some of the most significant factors affecting the environment in Tajikistan. Erosion is a major threat, not only to the physical and biological environment, but also for the people dependent on arable land for farming or on land fertile enough for grazing.

Erosion is caused by wind, water and through overgrazing. Erosion is one of the fundamental environmental problems in the country. Thus, these issues should not be overlooked in any project, especially one having direct impacts, positive or negative, on erosion.

In the road corridor, the main active form is erosion at existing perennial or frequently running natural rivers and streams, and mudflow activity. Wind erosion also occurs. The main reason for

wind erosion is desiccation of fine-grained granular non-cohesive local soils, either as a result of drainage of water resources by surface channels or groundwater extraction or drought, and removal of vegetation cover. The soils in these areas consist to a high percentage of gravel, in a cohesive matrix. Basically the terrain is naturally barren and sparsely vegetated because of low precipitation mainly in summer.

Erosion processes caused by human activities occur mainly in the outskirts of settlements due to overgrazing and cattle treading especially on steep slopes. Care must be taken to ensure that the new or existing roads to rehabilitate do not further aggravate erosion in vulnerable terrain.

River bottoms should not be used as borrow pits for gravel to preserve this habitat. River extraction has been common practice for many years. Spawning grounds, feeding habitats and habitats for juvenile fish were impaired. Fish populations and species composition changed during the past 10 to 20 years. Populations of new fish species introduced by man grew very rapidly while populations of original species declined.

6.2 Screening of Impacts

Screening is used to determine the extent of the environmental studies required for the project. This screening is carried out in accordance with the checklist contained in World Bank's Environmental Assessment Sourcebook. Using criteria such as the type, scale and location of project, the sensitivity of the environment and the magnitude of the impacts, the purpose of this checklist is to screen out those impacts of no significance thus enabling the emphasis to be placed on those impacts which require measures for their mitigation.

The purpose of mitigation is the avoidance or reduction of any potential adverse environmental impacts. There are often different alternatives to mitigate certain effects. Selecting mitigation methods to be used should therefore be a joint process between the engineering and environmental specialists. The methods used should be economically feasible and the best available. The selection of appropriate mitigation methods is not however, enough to guarantee the desired outcome. Co-operation and supervision is needed to ensure that the method is implemented correctly. Adequate supervision is frequently neglected.

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 screening:

- **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 that will create 'no impact');

- **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 Tajik Republic and World Bank. Where potential major negative impacts are identified, mitigation measures are developed to reduce them to acceptable levels; and

- **Unknown impact** - the potential impact of the project will be assessed as being unknown if the magnitude of the effect cannot 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'.

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 preconstruction 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.

There are several types of impacts to be considered. Direct impacts are caused by a project activity, and occur at the same time and place and can be created during both project construction and operation. Direct impacts will be limited in this project because the work is to be con-

centrated within existing rights-of-way (ROW) of the road for the most part, and along currently unformed tracks and routes.

Indirect impacts, which may include growth-inducing impacts, are caused by a project activity, or the overall project, and while they are later in time or farther removed in distance, they are still reasonably foreseeable.

Short-term impacts, like the noise and fumes associated with heavy equipment occur during road construction and are usually without long-lasting effects. Long-term impacts, on the other hand, could affect regional land use and development patterns and even mobility and migration. Long-term environmental impacts in this project might occur where new alignments have to be considered. Impacts during design stage and alternative alignments were discussed accordingly (Chapter 6.2.1).

The environmental screening for the project identifies the range of potential environmental impacts that occur from activities proposed for the subprojects. 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 EMP.

The following section describes the environmental impacts that will occur as a result of implementation of the proposed road project. It also describes the developed mitigation measures that aim on mitigating the identified impacts to the technically feasible minimum.

The text distinguishes between the different project stages, the design, construction and operational phase of the project. Ultimately, all proposed measures for impact avoidance or mitigation that relate to construction will be incorporated into the bidding or contract documents thereby becoming binding elements of the construction and construction supervision contracts.

6.2.1 Impacts and Mitigation Measures - Design Phase

In this chapter various options for the implementation of some road sections are introduced and discussed form the environmental point of view. Within the planning process the chosen alignment was developed in close cooperation between the design team and environmental planners. This iterative planning process aimed at avoiding and minimizing potential impacts as far as technically feasible. The following items have to be considered mainly:

- Loss of vegetation structures
- Loss of agricultural land
- Disruption of habitats and animal migration routes
- Impact on existing settlements
- New alignment in a formerly not built up area

- Impact on landscape
- Impact on cultural heritage
- Surface sealing and embankments

The following alternatives are compared at design stage:

Isfara Route Options

Section 1A – Guliston – Isfara bypass (option 1, Figure 2 and 3)

Adverse impact during design phase is expected for construction of new bypass on a new alignment running through agricultural land. Acquisition of agricultural land is required. In addition fruit trees (mostly apricot trees), alley trees and bushes in the northern and northeastern outskirts of Isfara have to be cut. Impact on landscape is anticipated. The design of this new alignment results in surface sealing within range of the driving lanes and paved shoulders and cover of formerly natural surfaces with artificial fill material. Water infiltration rate will reduce and surface runoff increase. To mitigate impacts from increased road surface runoff and potential impact on the watercourse it is suggested to provide semi permeable drainage ditches alongside the road to avoid that potentially polluted or contaminated storm water from the road would be discharged uncontrolled into Isfara River. Bringing a new alignment into a formerly not built up area will add a technical element to the former not built up landscape and will be considered as an impact. To compensate for this impact, trees and shrubs shall be planted alongside the new alignment. Compensation will be implemented by an enterprise specialized in landscape conservation. The compensating area and the compensating measures will be coordinated by competent local authorities.

Section 2 Isfara – Kim (Figure 3)

Section 3 Kim – Kanibadam (Figure 3)

Section 4 – Kanibadam – Patar (Figure 3)

Section 6: Kim – Kuchkak (Figure 3)

Section 11A: Access to Intermodal Terminal (Figure 4)

Section 11 – Dehmoi – Proletarsk (Figure 4)

Section 12 – Proletarsk – Madaniyat (Figure 4)

No adverse impact on the environment is anticipated during the design phase since these sections follow existing alignments. No widening is required. No animal habitats will be fragmented. Cutting of bushes and trees cannot be excluded entirely. Tree fellings can be mitigated by planting two trees instead of one to be cut. Land acquisition is not required. No long termed mitigation measures are required. These options are uncritical from the environmental point of view.

6.2.2 Impacts and Mitigation Measures – Construction Phase

6.2.2.1 Impacts on the Physical Environment - Construction Phase

6.2.2.1.1 Air Quality

During construction the rehabilitation and ongoing maintenance works will have a minor 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. The rehabilitation of the road, including construction of new sections, will result in reduction of dust emissions compared with existing unpaved or damaged sections. 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.

Air quality impacts from asphalt plant, aggregate crushers, and dust emissions have been addressed in the above sections. The following mitigation measures have to be implemented by the contractor to reduce emission levels of construction equipment:

- Burning of waste or material is prohibited
- Construction equipment has to be 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;
- 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;
- During periods of high wind any dust generating activities will not be permitted within 200 m of populated settlements located in the direction of prevailing wind;
- Material stockpiles being located in sheltered areas and be covered with tarpaulins or other such suitable covering to prevent material becoming airborne;
- Regular watering/spraying of unpaved project roads and all unpaved roads being used for haulage of materials during the dry season;
- Preparation of a dust suppression program, submitted to the Project Implementation Group (PIG) 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 unpaved

roads with water, covering stock-piles, and blasting with use of small charges etc.) and will identify the type, age and standard of equipment to be used; and

- Periodic air quality monitoring.

6.2.2.1.2 Quarries and Borrow Pits

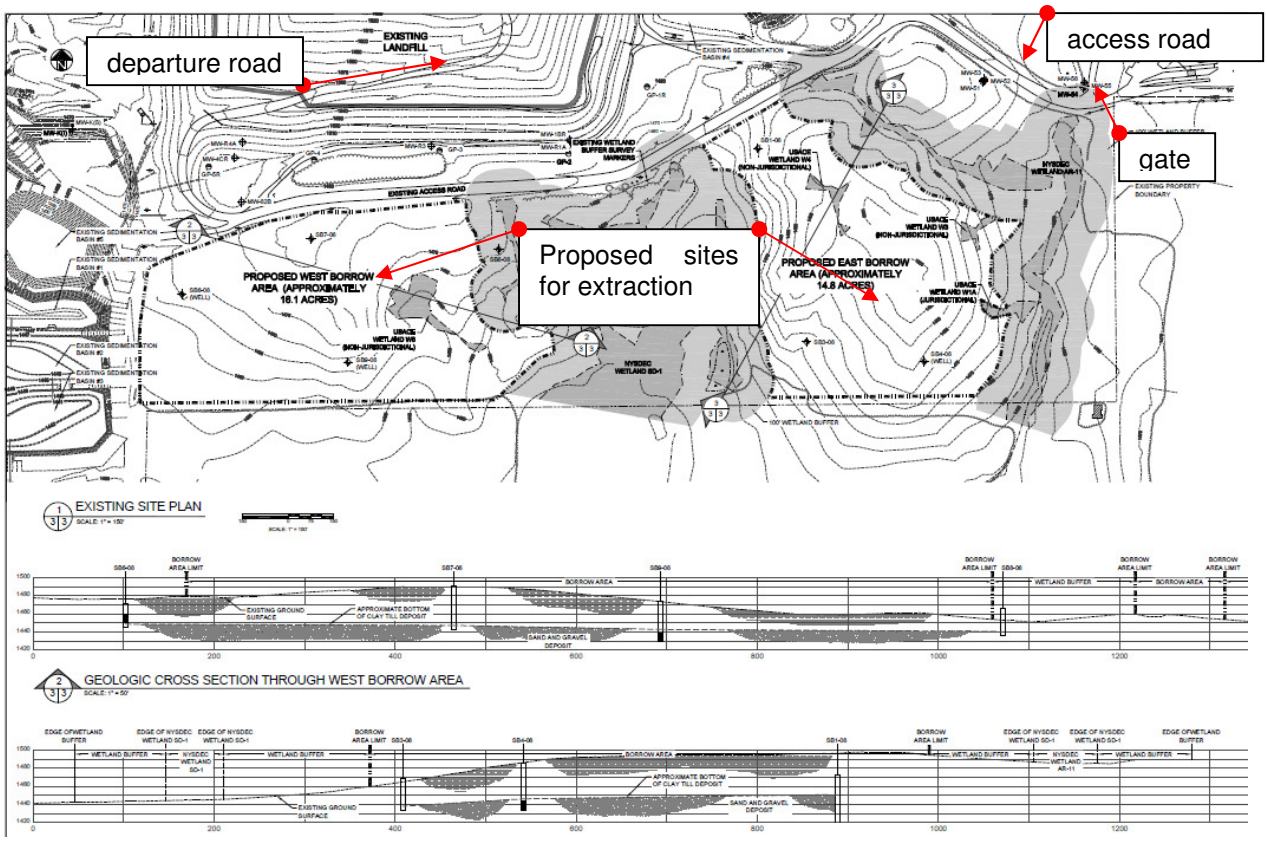
Quarry sites were identified during the site visit (Chapter 4.5). In order to reduce impacts associated with quarry activities and borrow pits, contract documents will specify only licensed quarrying operations to be used for material sources (Figure 12). If licensed quarries are not available the contractors will be responsible for setting up dedicated crusher plants at quarry sites approved by the PIG and CEP. Further, for all borrow sites, contractors will ensure that they acquire appropriate environmental permits from CEP before sourcing the material.

The contractors will be required to prepare a plan to identify the sources of material and that will be used for the embankments. The plan will be agreed with the engineer of the construction works supervisor and submitted to PIG, 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. PIG will approve and monitor implementation of the plan.

Prior to the start of the construction, the contractor should also prepare a borrow area operation plan indicating the borrow area, access and departure road, proposed area for extraction of material, and geological cross section (Figure 12, sample cross section).

However, no quarry shall be located within 500m of any urban area, protected area or sensitive receptor. In addition, Contractors should ensure that quarries and crusher plants are:

- located at least 500 meters from urban areas to prevent noise and dust impacts;
- located outside of agricultural land; and
- where possible located on government owned lands.



(Source: Waste Management of New York, Chaffee Facility, 2009)

Figure 10: Outline of a Borrow Area Operation Plan - sample cross section

The following good practice for excavation, material storage and transportation is recommended:

- top soil must be stored separately, covered and used for re-vegetation of borrow area or slopes at the construction site
- material has to be excavated only in designated areas in coordination with PSC
- excavated material has to be stored at designated areas in coordination with PSC
- excavated material should not be stored in the vicinity of open water courses to prevent siltation or obstruction of water ways
- The contractor has to wet unpaved routes which go next to settlements to suppress dust pollution when hauling material from borrow pits
- fine material (sand) has to be covered with tarpaulin to prevent dust generation and contamination of transport roads
- Aggregate load has to be wetted by the contractor to reduce potential dust emissions
- trucks must not be overloaded to prevent road accidents

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 documents specify that (i) pit restoration will follow the completion of works in full compliance all applicable standards and specifications; (ii) arrangements for opening and using material borrow pits will contain enforceable provisions; (iii) 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) Site supervision by PSC will be required before final acceptance and payment under the terms of contracts; (iv) topsoil from borrow pit areas will be saved and reused in re-vegetating the pits to the satisfaction of the PSC. Extraction of construction material from the river bed should be avoided to prevent erosion and destruction of the river banks including alongside infrastructure (roads, settlements).

6.2.2.1.3 Landscape

Natural landscape is considered to be a valuable factor in the inhabitant's perception and also an important part of the ecological balance. Therefore, the need of inclusion the road into the natural landscape is of great importance. A good integration of the road into the landscape provides psychological clearness of the road for drivers, while change of landscapes on the road promotes traffic safety. The requirements for a combination of road design with natural landscape cannot be underestimated.

However, being in the surrounding landscape, the existing road does not improve the aesthetics. Most parts have the old asphalt-concrete surface. The surface is uneven and wavy.

The existing reinforced concrete culverts and bridges and the sub-grade of the roads are in bad condition. Considering the above mentioned facts, the design of the rehabilitated road, which will improve landscape of the road.

Construction of new alignments will disturb the existing landscape (agricultural land, pastures). Plantation of trees and bushes alongside the road will be an adequate mitigation measure.

6.2.2.1.4 Soils, Erosion and Slope Stability

Surplus material originating from earth works has to be disposed properly without adverse impact on landscape and nature. Basically this material could be used for noise protection walls and stabilization of slopes or as embankment material if suitable. It is suggested to use this material as fill material for re-cultivation of mine galleries or open pit mines. Reuse for road construction should also be taken into consideration if the material is suitable. Disposal on existing landfills cannot be recommended if the volume of the excavated material will exceed existing capacities. Disposal of this material close to the road alignment has to be prevented to protect landscape and nature. Environmentally sound disposal of cut material and reuse of cut material for road construction must be part of the tendering documents.

Soil characteristics and topographic conditions have to be taken into account in the proposal of works and maintenance activities.

The main impacts on soil and slope stability during rehabilitation works 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 uncompacted embankments; and (v) soil contamination from chemicals and/or construction material spillage.

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.

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 prevent erosion;
- To prevent soil erosion gabion baskets for river bank protection should be included in the engineering design;
- For embankments greater than 6 m, stepped embankments will be used;
- Material that is susceptible to erosion will be replaced by adequate material around bridges and culverts;
- Random and uncontrolled deposition of excavated material will not be permitted. Suitable deposit sites will be designated (generally wide gently sloping areas located away from streams and rivers) at a maximum average spacing of approximately 1 km, and usually with a tipping zone from the road edge of not more than 10m width (unless a wider area clearly will not be detrimental), to minimise the area affected by depositing and requiring reinstatement;
- Re-vegetation of exposed areas including; (i) selection of fast growing and grazing resistant species of preferably local grasses and shrubs; (ii) immediate re-vegetation of all slopes and embankments if not covered with gabion baskets; (iii) placement of fiber mats to encourage vegetation growth, although due to the arid conditions in most of the road, this may only feasible where there is regular rainfall or other natural water supply;
- Acquisition of all necessary permits and approvals for location of construction camps, quarry sites and sources of construction materials from CEP and local government agencies prior to any construction or erection of camps and extraction of material;

Contaminations with mineral oil were discovered in both roadside ditches between Kim and Kuchkak about 4km southeast of Kuchkak (Section 6). The oil leaks from pumps on adjacent oil fields. Remediation of these oil contaminations has to be carried out if rehabilitation of this section should be implemented. Remediation costs should be financed by the oil company (polluter, Figure 11 and 12).

Figure 11: Contamination with mineral oil in road side ditches (Section 6)

Figure 12: Oil pump close to the road Kim - Kuchkak (Section 6)

6.2.2.1.5 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 bridge sites; (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.

In addition to a number of the items outlined 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, 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.
- 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 CEP 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 where necessary;
- 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 PIG;
- 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.

6.2.2.2 Impacts on the Biological Environment - Construction Phase

6.2.2.2.1 Flora and Fauna

Sections 2 - 6, 11, 11A and 12

No adverse impact upon habitats and flora of the project area during construction phase are expected as a result of road rehabilitation on existing alignments: Trees alongside the road shall be protected against damage caused by construction machines.

Guliston - Isfara bypass (Option 1) section 1A

The new alignment runs through agricultural land which is intensively used. Disruption of animal habitats is not expected. Trees alongside the road shall be protected against damage caused by construction machines. Construction works should be limited to the future road track to prevent impact on adjacent fields.

Contractor's Work Camp

Sites for contractor work camps will all be approved by the PSC and will not be permitted in any ecological 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 contractors will be responsible for providing adequate information to the workers regarding the protection of fauna.

Contractors will be responsible for supplying appropriate and adequate fuel in workers' camps (coal, liquid gas, electricity etc.) to prevent fuel-wood collection. Construction vehicles shall use carefully-located designated temporary access and haulage roads to minimize damage to habitats.

6.2.2.2.2 Impacts on the Social Environment during Construction Phase

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 of foundations and grading produces 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.

The most sensitive areas within the project area are hospitals, housing areas and rest homes. 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 or health service provision activities.

All reasonable measures will be taken to limit noise generation to the EHS Guidelines of the World Bank Group which sets that receptors such as residential, institutional, and educational areas should have noise level of 55 dB(A) from 7AM to 10PM (daytime) and no greater than 45 dB(A) from 10PM to 7AM (nighttime). Use of construction equipment and vehicles will be limited to acceptable time when they have the least impact.

Vibration during the construction period will also be a significant consideration, particularly vibratory rolling of the granular pavement layers, or blasting, or diversion of abnormal amounts of public traffic onto usually lightly trafficked side roads. 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. The contractor will be required to carry out trials of his proposed construction methods close to vulnerable structures, for prior approval, and will not be permitted to use methods which will cause damage (even if he offers to be responsible for compensation). A joint (building owner/consultant/contractor/PIG) dilapidation survey of vulnerable structures close to the new road will be carried out before construction. This will be used to verify any claims of damage allegedly caused by his work, for possible compensation. In addition, a similar prior survey will be made of condition of the road and adjacent structures along proposed diversion roads (whether to be used by the general public only, or by construction traffic also), which will be required to be maintained to at least their preconstruction condition, and reinstated after use.

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, diversion roads, 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:

- 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 10 pm and 7 am 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 new road and diversion roads (also the original pavement condition of diversion roads);
- 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 proven to be due to the contractor's activities, owners of structures will be fully compensated.

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, or by abnormal amounts of diverted public traffic, and this issue was raised during consultation. 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 roads remain open to traffic during construction activities;
- The contractor will prepare a traffic control plan, to be approved by the project supervision consultant. 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 for construction or diverted public traffic are established;

- Footpaths and roads 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 maintained and reinstated to their original condition after the completion of work.

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) risks from construction work (noise, risk of injury), (ii) facilitation of transmission of communicable disease; (iii) contamination of local water supplies; and (iv) traffic safety issues.

The transmission of communicable diseases such as sexually transmitted infections (STIs) and even HIV/AIDS is a potential impact posed by construction workers engaging in either commercial sex or sexual relationships with local people. The civil works phase of the project can pose risks for both the construction workforce and the communities along the roads 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 people (who risk passing it on to their spouses or partners), intravenous 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 do not include design improvements that could encourage higher speeds above the design speed. However, some improvements may be carried out to improve safety, particularly line-of-sight, and at accident black spots. In towns, the design speed will be set at the statutory speed limit for such areas, with prominent speed limit and hazard signage and a ban on non-delivery parking, which are usually strictly enforced by the traffic police, and footpaths, pedestrian crossings, and other safety features. 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 in towns, 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, if budget permits, or at least strong, self-draining outward fall.

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 a STIs/HIV/AIDS awareness and prevention campaign which includes HIV in the Workplace seminars and training 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.

Uranium Tailings

During the fact-finding-mission, the Consultants visited one and discovered two additional sites of radioactive tailings in poorly constructed containment areas 9 - 13 km northeast of Dehmoi and northeast of section 11 (Figures 5, 13, 14). They remain from the Soviet era, when Chkalovsk was a ‘closed location’ where the Soviets processed uranium for their first atomic bomb and nuclear weapons. The Consultants’ internet searches show that there are three main uranium tailings preservation sites in the area, which are known to constitute a serious danger for the environment and human life not only in nearby cities and towns but in Central Asia as a whole.

The tailings will not be touched during construction works. But increased radioactive radiation cannot be excluded during construction phase at the western sections 11A, 11 and 12 to impair the health of workers. Radiation measures should be carried out before construction works begin. Work should not start if radiation is higher than the natural background radiation. Construction material from borrow area (Figure 5) should be tested for radiation. Work must be coordinated with the Regional Department of Environmental Protection in Kuhjand.

Figure 13: Warning sign informing about radioactive radiation at the fence of the uranium tailing

Figure 14: Uranium tailing close to the city of Chkalovsk

6.2.2.2.3 Impacts on Cultural Resources

The assessment included a process involving local communities in the process of identifying, assessing, surveying and protecting physical cultural resources. The heritage and cultural resources in the wider project area will not be impaired by the project works as they are located sufficiently far from the works corridor.

In the event that a “chance” finding is made during any pre-construction clearance activities or construction works, the EMP, Appendix 1, and the construction contracts include specific guidelines for the management of “chance finds” and management of physical cultural resources discovered during road project implementation.

6.2.2.2.4 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), water supply, and prayer areas.

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 mitigation measures require a number of specific provisions to be included in contract documents including provisions for (i) a set aside for jobs for the poor (60% of the direct unskilled and semi-skilled labour), including a minimum number of persons to be given agreed structured training for more skilled posts; (ii) explicitly prohibiting the use of foreign unskilled and semi-skilled workers or unskilled and semi-skilled workers from elsewhere in Tajikistan 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 labour for construction and maintenance activities; (v) inclusion of women as well as poor in the local construction force, in accordance with the local gender balance, to the maximum extent possible; (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;

6.2.3 Impacts and Mitigation Measures - Operating Phase

6.2.3.1 Impacts on the Physical Environment - Operating Phase

6.2.3.1.1 Air Quality

Following the rehabilitation of the road, the project (through increased traffic) will create air pollution such as HC, CO, NOx, SO2 and particulate matter. The current volume of traffic and forecasted traffic growth are such that emissions will remain below ambient air quality standards.

The Republic of Tajikistan has standards for permissible air quality and should be enforced to alleviate these sources of pollution (Chapter 2.1.3, Tab. 2.). The anticipated levels of traffic and the excessive capacities of the road network (and therefore lack of congestion and concentration of traffic) are likely to result in more significant adverse impacts to air quality in the busier project areas without the project since dust production is enormous on existing roads.

Proposed road rehabilitation activities are unlikely to have any substantial impact on the numbers of vehicles using the roads 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 from 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 asphalting the existing unformed earth roads/tracks and repairing poor condition pavements which generate dust within 20 m to 30 m corridor 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 their design capacity and no significant air quality impacts warranting mitigating actions in the operational phase are anticipated.

6.2.3.1.2 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 of protection structures and gabion baskets for embankment protection. No mitigation measures are required for the operating phase.

6.2.3.1.3 Water Quality

Potential impacts on water quality and availability of water for domestic or agricultural use are not expected to occur. Storm water from the road does not drain directly into open water courses. Storm water will not be used as drinking water. Negative impacts on water quality due to accidental spills with polluting or hazardous material cannot be excluded completely. Preparation of an alarm plan at the fire department to prevent soil and water pollution could be a mitigation measure.

During operation, negative impacts on water quality could be caused by accidental spills of polluting or hazardous materials if 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, there will also be longer term environmental benefits for water quality created by the project through upgrading and reduced silt laden run-off during rainfall. Water quality in water courses adjacent to the road may show slight improvements after road 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.

6.2.3.2 Impacts on the Biological Environment – Operating Phase

6.2.3.2.1 Flora and Fauna

No impacts on flora are expected during the operating phase. There is a potential for road kills depending on traffic forecast and speed limits. Installation of speed limits is suggested as a mitigation measure.

6.2.3.2.2 Protected Areas

Operation phase activities will not create any impacts on protected areas, as the project road is not located near protected areas.

6.2.3.3 Impacts on the Social Environment – Operating Phase

6.2.3.3.1 Noise

Even under the most optimistic scenario of increased commercial traffic, the ambient noise level after the completion of rehabilitation activities along the roads (operating 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 in the short term. Noise should be monitored in the long run if traffic volume will increase significantly and exceed outdoor noise standards of Tajikistan (Tab. 2). Mitigation measures have to be implemented accordingly (speed limits, noise barriers). There are a number of sensitive receptors i.e. hospitals, schools and public buildings were noted along sections of the roads (mostly in the towns and settlements). Speed limits to reduce noise levels are adequate mitigations measures at these receptors.

6.2.3.3.2 Health and Safety

Traffic safety of the project road will be improved. 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.

Measurements of radioactive radiation should be carried out regularly at the western road section to prevent impact on health of road users. Measurements should be arranged with the Regional Department of Environmental Protection in Kuhjand and competent authorities.

7. 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 achieve their nominated roles and responsibilities are identified.

An environmental monitoring program has been prepared and the cost associated with its implementation has been prepared on a preliminary basis.

7.1 Organization Roles and Responsibilities

The institutions to be involved in the environmental management of the project are the following:

- Government of the Tajik Republic
- Ministry of Transport (MoT)
- World Bank
- Committee of Environmental Protection under the Government of the Republic of Tajikistan
- MoT – Project implementing Group (PIG)
- Project Supervision (Consultant)
- PIG – Environmental staff
- Contractor
- Regional and local administration
- Affected communities

7.2 Ministry of Transport

MoT has overall responsibility for preparation, implementation and financing of environmental management and monitoring tasks as they pertain to the project. MoT will exercise its functions through the PIG which will be responsible for general project execution, and which will be tasked with day-to-day project management activities, as well as monitoring.

Specialist staff will be assigned to the PIG to undertake all environmental assessment related tasks. The PIG environment staff will be supported by the PSC (Project Supervision Consultant). The PSC's team will need to provide an environmental monitoring specialist and social impact monitoring specialist. Currently there are no full-time staff in the PIG assigned to environmental assessment, management or monitoring. Such tasks will be undertaken on a project by project basis by Consultants.

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 environmental planning and implementation, internal monitoring and evaluation (M&E), and training of PIG and relevant government staff on environmental assessment and World Bank's Environment Policy; and

- An independent monitoring agency (IMA) could be hired to (i) conduct periodic monitoring and evaluation, (ii) third party validation of implementation of the IEE and EMP activities, and (iii) to ensure that all the identified adverse impacts are being/have been mitigated.

The Committee of Environmental Protection under the Government of the Republic of Tajikistan (CEP) will be consulted during the feasibility and detailed design processes and will also be requested to confirm, or otherwise, the categorization of the project. The CEP will be requested to review the EIA and approve the project for its environmental importance. Ongoing consultation with CEP will be required during the implementation of the project.

The rural communities 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 PIG.

World Bank clearance of this EIA will be provided by a World Bank Environment Specialist.

Responsibilities for the implementation of the monitoring requirements of this EIA are shown in Tab. 7. 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 project supervision consultant 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 PIG and World Bank.

After project completion, MoT will be in charge of the operation and maintenance of the project roads. PIG in cooperation with the district/regional administrations will undertake routine and random monitoring and analyze samples in CEP's analytical control laboratory in Dushanbe as scheduled in the monitoring plan.

Project Stage	Responsible Organization	Responsibilities
Detailed Design	PIG	Review and approve environmental mitigation and management measures. Translation of mitigation measures into clauses in contract documentation
Construction	Contractor	Implementation of required mitigation measures
	Project supervision consultant, PIG	Supervise contractor's implementation of environmental measures on a daily basis. Enforce contractual requirements
	Project supervision consultant, Independent monitoring agency (IMA), CEP	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.
Operation	MoT	Provide budget to undertake environmental monitoring
	MoT's regional maintenance department	Undertake environmental monitoring and prepare bi-annual reports
	MoT	Review monitoring reports

Tab. 7 Responsibilities for Environmental Monitoring

It is considered that no formal long-term environmental monitoring is necessary following the construction of the roads.

It is desirable that the formal acceptance of the works following the completion should include a full examination of the contractor's compliance with the specified requirements for the protection of the environment. This should include verification of the proper clean-up and restoration of all temporary work sites (quarries, camps, etc) and of the proper landscaping, planting and draining of all borrow and spoil areas.

In the longer term, it is essential that the road authorities monitor the effectiveness of the erosion protection measures. Some form of reporting should be implemented to ensure that information regarding defects in design or construction methods is fed back to the centre and to the Road Maintenance Units.

It is also recommended that periodic assessments of the fatality rate of livestock and migratory herds and migratory animals especially at new alignments if to be built due to traffic impact be

carried out. Corrective measures should be taken if the frequency of such occurrences increases significantly.

The different phases of the implementation of the EIA are as follows:

1. Planning of the road project with special account being taken of:

- areas with large excavations (cuttings) and embankments, and quarries for construction materials,
- soil reserves for embankments and dumping areas for spoil,
- storage areas for toxic waste and garbage,
- locations of temporary batching and other material processing plants,
- contractors' camps,
- sources of water for construction purposes,
- temporary access roads and other temporary constructions,

2. Obtain written agreement from local administrative authorities concerning spoil dumps, burial of garbage, contaminated soils and toxic substances.

3. Obtain written permits (from local authorities, representatives of the environmental protection authority and sanitary inspector) concerning permanent and temporary allotment of land area for road construction, quarries, spoil dumps, contractors' camps, batching plants and other materials processing plant.

4. Agree any changes with the local agencies responsible for the irrigation networks if these are affected by the project.

5. Agree the planning requirements for bridges and other structures in rivers or other water bodies with the agencies responsible for fisheries and the local representatives of the environmental protection authorities.

7. Monitor (by measurement) emissions to the atmosphere and discharges into the ground during construction.

8. Monitor (by measurement) vehicle emissions during the operation of the road.

9. Monitor (by measurement) noise levels in towns and other settlements during construction, and the subsequent operation of the road.

10. Monitor effects of construction-related vibrations, contractor to be responsible for any avoidable damage caused by himself. Contractors who do not comply with the legislative requirements must be held responsible for the violations and required to compensate for any damages caused.

Following approval of the EIA document, a copy of the approval and a summary of the document will be sent to all relevant communities and villages. Information regarding the approved

project and the proposed environmental management measures will be posted at suitable locations on the project site.

8. Environmental Mitigation Plan

The construction phase, including bridge and culvert reconstruction, has the potential to cause the greatest number of adverse impacts. These can be mitigated and/or avoided.

Potential Impact	Mitigation Measures	Responsibility	Costs
Construction Phase			
discovery of physical/heritage resources	Stop activity, prepare "chance find procedures (Appendix)	MoT, MoC	part of construction costs
Erosion or sedimentation caused during clearing or earthworks	Install sediment fences and/or sediment traps to collect sediment before it enters watercourses	Contractor	part of construction costs
	Minimize size and duration of cleared areas		no costs
	Undertake progressive re-vegetation of cleared areas		part of construction costs
	Avoid clearing activities during heavy rain where possible		no costs
Soil erosion, land slide or rock fall	Undertake progressive re-vegetation of cleared areas	Contractor	part of construction costs
	Embankments in areas of steep slopes to be stepped	Design and contractor	part of construction costs
	Side slopes of cuttings and embankments designed to reflect soil strength etc	Design and contractor	part of construction costs
Soil contamination with mineral oil at section 6	Soil remediation	Contractor, PIG, CEP, construction supervision	Oil company

Potential Impact	Mitigation Measures	Responsibility	Costs
	Re-use excavated material wherever possible	Contractor, construction site supervision	no costs
	Rip-rap, retaining structures, gabion baskets etc to be used wherever necessary for slope and river-bank protection	Design and contractor	part of construction costs
Domestic waste on section 1A (Isfara bypass)	Collection and disposal on licensed waste dump	Contractor, construction site supervision	part of construction costs
Impact on trees close to construction site	tree protection measures	Contractor, construction site supervision	part of construction costs
Setting up and utilization of construction camp			
Soil contamination from spillage of oil or other chemical substances	Store chemicals, fuel and oil products in secure area / compound, with concrete floor and weatherproof roof	Contractor	Part of construction costs
	Ensure construction plant is maintained in good condition and any leaks are quickly repaired	contractor	Part of construction costs
	Remediation of soil spills	contractor	Part of construction costs
	Storage of hazardous substances at minimum distance of 100m from water courses	contractor	
	Installation of car washing chambers	contractor	Part of construction costs
	preparation of an emergency response plan	Contractor, MoT/PIG, fire department	Part of construction costs

Potential Impact	Mitigation Measures	Responsibility	Costs
Waste disposal problems from solid waste generated during construction activity or wastes generated in construction camps	Prepare and implement "waste management plan"	contractor, PSC	Part of construction costs
	Train construction workers in appropriate waste disposal methods	contractor	Part of construction costs
	Remove waste regularly from site for disposal to landfill	contractor	Part of construction costs
	Install waste collection and temporary storage facilities in construction camps	contractor	Part of construction costs
	Ensure construction camps are maintained in a clean and hygienic conditions	contractor	Part of construction costs
	Consult with local authorities to plan construction worker housing arrangements	contractor	Part of construction costs
Discharge of waste water from contractor's camp	Wastewater from construction camps must not discharge into water bodies, installation of latrines and environmentally friendly disposal of waste water	contractor	Part of construction costs
Construction workers cause social disruption or sanitation / health conditions	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, NGO or UNAIDS	Part of construction costs

Potential Impact	Mitigation Measures	Responsibility	Costs
Establishment and operation of asphalt plants and aggregate crushers - odor and safety risks	acquiring the needed asphalt from an existing asphalt plant	Contractor	Part of construction costs
	Installation downwind of settlements at a distance of 1000 m or more.	Contractor / PSC / PIG	Part of construction costs
	Asphalt plants and crushers shall not be located close to plantations and farm land	Contractor / PSC / PIG	Part of construction costs
	the contractor must receive all relevant permissions and the site selection for the asphalt plant and aggregate crusher	Contractor, MoT, PSC	Part of construction costs
	Provide spill and fire protection equipment and submit an emergency response plan to the authority in responsibility prior to operation of the asphalt plant	Contractor, MoT, PSC	Part of construction costs
Establishment and operation of asphalt plants - Water pollution due to spilled bitumen	Bitumen will not be allowed to enter either running or dry stream beds nor shall it be disposed of in ditches or small waste disposal sites prepared by the contractor. Bitumen storage and mixing areas must be protected against spills and all contaminated soil must be properly handled according to legal environmental requirements. Such storage areas must be contained so that any spills can be immedi-	Contractor, PSC, local fire department	Part of construction costs

Potential Impact	Mitigation Measures	Responsibility	Costs
	ately contained and cleaned up. Development of an emergency response plan		
Air pollution from dust or exhaust emissions (CO, NOx, SOx, etc)	Implement dust suppression measures including watering of exposed surfaces	contractor	Part of construction costs
	Cover all trucks carrying dispersible materials to or from the construction site	contractor	Part of construction costs
	Minimize size and duration of cleared areas	contractor	Part of construction costs
	Ensure all construction vehicles and equipment are well maintained	contractor	Part of construction costs
Interference with existing infrastructure (telecom, electricity, water, waste water)	Research of underground cables and pipes	contractor	Part of construction costs
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	Part of construction costs
Exploitation of local resources incl. poaching	Poaching 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 for poaching for felling trees unnecessary for the project	contractor	

Potential Impact	Mitigation Measures	Responsibility	Costs
Noise from construction machinery and equipment	Ensure all construction vehicles and equipment are well maintained	contractor	Part of construction costs
	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; construction activities from 7.00 am to 7.00 pm to be discussed with local stakeholders	contractor	Part of construction costs
	concrete and asphalt mixing stations must not located nearby residential areas, schools and hospitals	contractor	Part of construction costs
	Inform nearby community of schedule and duration of construction works	Contractor, PSC, PIG	Part of construction costs
	Provide workers with noise abatement equipment (ear-plugs etc)	contractor	Part of construction costs
Changes to road safety / traffic movements, property access	Install signage and lighting in vicinity of works on public roads	contractor, local authorities, police	Part of construction costs
	Install temporary access to affected properties	contractor	Part of construction costs
	Rebuild good quality permanent access to affected properties on completion of construction works	contractor	Part of construction costs
	inform nearby community of schedule and duration of construction works	contractor	Part of construction costs

Potential Impact	Mitigation Measures	Responsibility	Costs
	limit construction vehicle movements to main transport routes as far as possible	contractor	Part of construction costs
	Development of a traffic control plan	Contractor, PIG, MoT	Part of construction costs
Interference with commercial activities on roadside	Install temporary access to affected properties	contractor	Part of construction costs
	rebuild good quality permanent access to affected properties on completion of construction works	contractor	Part of construction costs
	Notify nearby community of schedule and duration of construction works not less than two weeks in advance of works.	contractor	Part of construction costs
Visual and landscape impacts	Re-vegetation measures, use of stored topsoil; planting of trees at road sides	contractor	Part of construction costs
	Only material from licensed borrow pits to be used for construction; excavated material to be used as fill material for base layer and embankments if suitable to reduce volume of surplus material	contractor, PSC	Part of construction costs
Disposal of surplus soil, excavated material	Disposal at designated site (mining pits, mining galleries); storage of top soil to be used for re-vegetation, reuse of surplus material for road construction	Contractor / PSC / PIG	Part of construction costs
Risks to public or construction worker health or safety	Provide safety equipment to workers and train them in its use	contractor	Part of construction costs
	Secure construction	contractor	Part of construction

Potential Impact	Mitigation Measures	Responsibility	Costs
	site and restrict access by local community		costs
Oil spill at section 6	Remediation of spill	Contractor / PSC / PIG, Oil Company	Oil company
Radioactive radiation at eastern sections	measurement	Contractor / PSC / PIG	Part of construction costs
Operating Phase			
Changes to road safety	Installation of road safety/speed limit signage where accidents are likely to occur	MoT, local authorities, police	
	Work with local authorities to carry out enforcement of traffic regulations on upgraded roads	MoT, local authorities, police	
Environmental damage from accidents involving spills of chemicals or other hazardous substances	Install speed limits and warning signs in areas of difficult driving conditions; no transportation of hazardous substances in water protection areas; development of emergency plan	MoT, PIG, fire department	
Changes in dust levels or air quality	Upgrade / rehabilitation of the road decreases dust generation	PIG / MoT	
	Vehicle emissions must be monitored according to national standards	PIG / MoT	
	Implement landscaping along the roadside and in settlements to reduce dust impacts	MoT	
	Work with local authorities to ensure regular cleaning of the road surface	PIG / MoT	
	Work with local authorities to implement regulations for trucks to wheel washing and	PIG / MoT	

Potential Impact	Mitigation Measures	Responsibility	Costs
	covering of dispersible loads		
Erosion at water courses crossings (bridges and culverts), or in areas of fill or embankments	Implement stabilization and anti-scouring measures as required at bridges and culverts	PIG / MoT	
areas of standing water	Drain and fill areas of standing water	PIG / MoT	
surface water or groundwater pollution from contaminated road surface runoff	Undertake regular maintenance and cleaning of roads; construction of water retention measures	PIG / MoT	
	Work with local authorities to restrict movements of polluting vehicles	PIG / MoT / Police	
	Maintenance of road drainage system	PIG / MoT	
Changes to visual amenity & landscape values	Cutting back of roadside vegetation	PIG / MoT	

Tab. 8 Environmental Management Plan

9. Environmental Monitoring Plan

Environmental monitoring is a very important aspect of environmental management during construction and operating phase 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, material storages, location of asphalt plants, community relations, and safety provisions are discussed within the EMP. During operation, air, noise, and surface water quality monitoring of the roads will be an important parameter of the monitoring program.

In response to the environmental impacts identified during the study, an environmental monitoring plan has been developed and is presented in Tab. 9. The contract documents will contain a list of all required mitigation measures 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 MoT during project implementation will be required to:

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- The contractor will develop site-specific EMPs. The PSCs will use this monitoring plan as a basis for supervision of the Contractor's compliance with these EMPs.
- Supervise the environmental monitoring regularly, and submit quarterly reports: the main parameters to be monitored are outlined in Tab. 9. Usually the PSC provides an Environmental Specialist as part of the PSC team.
- Supervise the subproject roads 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 Tab. 9. The contractor and the supervising consultant will be responsible for subcontracting data collection of environmental monitoring to a recognized organization (e.g., CEP's Analytical Control Laboratory).

A lump sum budget is allocated to cover monitoring cost during construction phase of the project. PIG will hire a consultant for environmental monitoring and ensure that the road is monitored regularly during construction 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 Chapter 6 of this EIA 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.
- The PIG will recruit an environmental supervising consultant as part of the PSC team who will supervise the contractor's environmental, safety and health performance. The consultant will cooperate with the local administration.

Parameter	Location	Monitoring	Frequency	Responsibility	Costs
Construction Phase					
quarries	Road corridor	Visual inspection to ensure fill is only obtained from designated quarries per EMP	Weekly	Contractor / PIG / PSC	Part of construction and supervising costs
	Quarry site	Visual inspection to ensure quarry rehabilitation is conducted per EMP	weekly	Contractor / PIG / PSC	Part of construction and supervising costs
	Quarry site between northeast of Dehmoi (Figure 5)	Radiation measurement of construction material	weekly	Contractor / PIG / PSC	Part of construction and supervising costs
Surplus excavated material	Road corridor	Disposal of material at designated sites as per EMP	Weekly / daily	Contractor / PIG / PSC	Part of construction and supervising costs
Material Storage Sites	Road corridor	Visual inspection. Ensure vegetation clearance has been minimized.	monthly	Contractor / PIG / PSC	Part of construction and supervising costs
Erosion	Road corridor	Visual inspection of prevention measures per EMP and occurrence of erosion	monthly	Contractor / PIG / PSC	Part of construction and supervising costs
Rock fall	Active rock fall sections, steep slopes	Visual inspection	monthly	Contractor / PIG / PSC	Part of construction and supervising costs

Parameter	Location	Monitoring	Frequency	Responsibility	Costs
Soil spill (mineral oil)	section 6	Visual inspection, soil sampling	During and after remediation	Contractor / PIG / PSC	Oil company
Storage of hazardous substances	Construction camp	Visual Inspection of storage facilities as per EMP and emergency response plan	monthly	Contractor / PIG / PSC	Part of construction and supervising costs
		containment of hazardous materials, oil spills, and work-site accidents.	monthly	Contractor / PIG / PSC	Part of construction and supervising costs
Waste management	Construction camp	Visual inspection that solid waste is disposed properly	monthly	Contractor / PIG / PSC	Part of construction and supervising costs
Surface Water Quality	Bridge sites	Visual inspection of water management per EMP			
	Directly downstream of pollution event	DO, COD, SS, fecal coliform, conductivity, turbidity, pH, temperature; additional parameters to be defined	After pollution event	Contractor / PIG / PSC	To be paid by originator of spill
Air quality	Asphalt plant	Visual inspection to ensure asphalt plant is located >500 m from residential areas	monthly	Contractor / PIG / PSC	Part of construction costs
dust	Sensitive areas	Visual inspection to ensure dust suppression plan being implemented; Particulate matter and smoke per EMP	monthly	Contractor / PIG / PSC	Part of construction costs

Parameter	Location	Monitoring	Frequency	Responsibility	Costs
noise	Sensitive areas	dBA at sensitive areas as per EMP	monthly	Contractor / PIG / PSC	Part of construction costs
vibration	Sensitive areas	Ensure mitigation measures are being implemented as per EMP	monthly	Contractor / PIG / PSC	Part of construction costs
Re-vegetation	Road corridor	Monitoring of progress of re-vegetation activities as per EMP			
community	Road corridor	Consult with Local authorities and community groups along the alignment to monitor environmental concerns	ongoing	Contractor / PIG / PSC	Part of construction costs
Operating Phase					
noise	Sensitive areas (densely settled areas, schools, hospitals)	dBA at sensitive areas as per EMP	Twice/year for 3 years or after complaint. Mid-term monitoring	PIG, World Bank, MoT and regional road departments	
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 monitoring	PIG / World Bank, MoT and regional road departments	
erosion	Road sub-project corridors	Visual assessment of erosion resulting from project	Twice/year for 3 years or after complaint. Mid-term monitoring	PIG / World Bank, MoT and regional road departments	
Radioactive radiation	Eastern sections	measurement	weekly	PIG	Part of construction costs

Parameter	Location	Monitoring	Frequency	Responsibility	Costs
Water quality	Road corridor	Visual assessment of increased suspended solids from areas of erosion	Twice/year for 3 years or after complaint. Midterm monitoring	PIG /World Bank, MoT and regional road departments	
Road safety	Road corridor	Collect road accident data	Twice/year for 3 years or after complaint. Midterm monitoring	PIG /World Bank, MoT and regional road departments	
Re-vegetation	Road corridor	Ongoing monitoring of re-vegetation as per EMP	Twice/year for 3 years or after complaint. Midterm monitoring	PIG / World Bank, MoT and regional road departments	

Tab. 9 Environmental Monitoring Plan

Costs of side-slope protection such as gabion baskets, erosion 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 following costs during construction phase will also be part of the construction costs:

- building of storage compounds for hazardous substances in the contractor' camp
- dust suppression measures during construction phase
- re-vegetation measures
- air quality monitoring
- dust monitoring
- soil and erosion monitoring
- water quality monitoring
- social and community impact monitoring
- noise and vibration monitoring

10. Disclosure and Public Consultation

10.1 Public Consultation

Public consultations regarding the project broadly took place in the past such as consultation with the communities through focus group meetings in various villages along the roads and informal interviews on 23 – 28 May:

- Lokhuti
- Kechkut
- Patar

A summary of the consultation outcomes is provided in the following:

Consultations with the communities in the project area revealed that they use the roads frequently for visiting and trading in local markets and for access to services such as health clinics and schools located in rayon headquarters. People who work nearby use the road for their daily travel and those who migrate to neighbouring 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 roads.

Public consultations on draft RPF and EIA were organized by MoT after these documents had been disclosed and been published on the website of MoT as well as in infoshop of the World Bank. Various media were used to announce the information about public consultations being held at two locations, namely Isfara and Proletarsk (Jabbor Rasulov district). The first consultation was held on 5th of August in Isfara in the hall of the local administration (Hukumat). On 6th of August the second consultation took place in Proletarsk.

Both public meetings were attended by local community members, local authorities and various administration staff. (Full list of participants are available in Annex C). No CSOs were present. Mr. Ganjalzoda explained the likely road sections with the help of maps posted across the room and the potential impacts. During the meeting, the participants were provided with hard copies of handouts in Russian and Tajik languages, which included the project description, road sections being considered and color print of the Google Map showing these road sections.

Questions asked during the meetings were focused on social and resettlement issues and no questions were asked with regard to the environmental impacts. The minutes of meeting prepared by MoT are attached as Annex B.

10.2 Disclosure

The EIA documenting the mitigation measures and consultation process will be submitted to PIG and World Bank 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 for the community as well as for the region. More informal consultation and disclosure will be done during implementation through:

- The preparation and dissemination of a brochure in Tajik, Russian and other languages as required, explaining the project, works required and anticipated timing of the works; and

- Setting up a formal grievance 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 grievance redress program.

Following approval of the EIA, a copy of the approval and a summary of the document will be sent to all relevant communities. 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 policies of World Bank which requires that environmental assessment reports for World Bank projects be accessible to interested parties and the general public. The EIA as part of World Bank project documents will be uploaded onto the World Bank website and made available through the Development Infoshop as well as on the website of the PIG of MoT.

11. Findings, Recommendations and Conclusions

The main findings of this EIA are that there are no significant adverse environmental effects resulting from the proposed road sections provided that full compliance with the recommendations set out below and the provisions of the EMP are achieved.

The following recommendations result from this EIA:

- Apart from the realignments, the design of the rehabilitated road should not deviate significantly from the existing road alignment.
- Designs should make full provision for the incorporation of the various mitigation measures previously described.
- Contract documentation shall include appropriate clauses to cover all of the environmental protection requirements previously listed in chapter 8 and 9. Construction material (gravel and sand) should only be taken from licensed borrow pits. Surplus material should be disposed in an environmental friendly way.

Appendix A

Chance Find Procedure Plan

Contracts for civil works involving excavations should normally incorporate procedures for dealing with situations in which buried physical cultural resources (PCR) are accidentally discovered or unexpectedly encountered. The final form of these procedures will depend upon the local regulatory environment, including any 'chance find' procedures already incorporated in legislation dealing with antiquities or archaeology.

The chance finds procedures plan (CFPP) will require the following elements:

1. Definition of Physical Cultural Resources

1. Definition of Physical Cultural Resources This section should define the types of PCR covered by the procedures in Tajik law and regulation and World Bank's Policy on Cultural Property. In some cases the Chance-Finds procedure is confined to archaeological finds; more commonly it covers all types of PCR. In the absence of any other definition from the local cultural authorities, the following definition could be used: "movable or immovable objects, sites, structures or groups of structures having archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance".

2. Ownership

This section should state the identity of the owner of the artifacts found. Depending on the circumstances, the owner could typically be, for example, the state, the government, a religious institution, the land owner, or could be left for later determination by the concerned authorities.

3. Recognition

This is the most difficult aspect to cover. As noted above, in PCR-sensitive areas, the procedure may require the contractor to be accompanied by a specialist. In other cases, the procedures may not specify how the contractor will recognize a PCR, and a clause may be requested by the contractor disclaiming liability.

4. Procedure upon discovery

<u>Suspension of Work</u>

This paragraph may state that if a PCR comes to light during the execution of the works, the contractor shall stop the works. However, it should specify whether all works should be stopped, or only the works immediately involved in the discovery, or, in some cases where large buried structures may be expected, all works may be stopped within a specified distance (for example, 50 m) of the discovery. This issue should be informed by a qualified archaeologist.

After interruption of the work, the contractor must immediately report the discovery to the construction supervision.

The contractor may not be entitled to claim compensation for work suspension during this period. The construction supervision may be entitled to suspend work and to request from the contractor some excavations at the contractor's expense if he thinks that a discovery was made and not reported.

Demarcation of the Discovery Site

With the approval of the Resident Engineer, the contractor is then required to temporarily demarcate, and limit access to, the site.

Non-Suspension of Work

The procedure may empower the Resident Engineer to decide whether the PCR can be removed and for the work to continue, for example in cases where the find is one coin.

Chance Find Report

The contractor should then, at the request of the construction supervision, and within a specified time period, make a Chance Find Report, recording:

- Date and time of discovery;
- Location of the discovery;
- Description of the PCR;
- Estimated weight and dimensions of the PCR;
- Temporary protection implemented.

The Chance Find Report should be submitted to the construction supervision, and other concerned parties as agreed with the cultural authority, and in accordance with national legislation.

The construction supervision, or other party as agreed, is required to inform the cultural authority accordingly.

Arrival and Actions of Cultural Authority

The cultural authority undertakes to ensure that a representative will arrive at the discovery site within an agreed time such as 24 hours, and determine the action to be taken. Such actions may include, but not be limited to:

- Removal of PCR;
- Execution of further excavation within a specified distance of location of the discovery;
- Extension or reduction of the area demarcated by the contractor.

These actions should be taken within a specified period, for example, 7 days. The contractor may or may not be entitled to claim compensation for work suspension during this period.

If the cultural authority fails to arrive within the stipulated period (for example, 24 hours), the construction supervision may have the authority to extend the period by a further stipulated time.
If the cultural authority fails to arrive after the extension period, the construction supervision may have the authority to instruct the contractor to remove the PCR or undertake other mitigating measures and resume work. Such additional works can be charged to the contract.

Further Suspension of Work

During this 7-day period, the Cultural authority may be entitled to request the temporary suspension of the work at or in the vicinity of the discovery site for an additional period of up to, for example, 30 days.

The contractor may, or may not be, entitled to claim compensation for work suspension during this period.

However, the contractor will be entitled to establish an agreement with the cultural authority for additional services or resources during this further period under a separate contract with the cultural authority.

Appendix B

Minutes of meeting on review of the Drafts of Reports on Resettlement Policy Framework and Environment Impact Assessment

In accordance with Decree № 139 dated 01.08.2014, issued by Ministry of Transport, was formed a Working Group to implement the Project of Khujand-Isfara road upgrade, and its composition was approved as well.

Following the agreement with the World Bank and the Decree №12/8-93 dated 01.08.2014 issued by MoT, the Working Group led by the First Deputy Minister Mr. Ganjhalzoda Sherali was in business trip in towns of Kujhand and isfara and the district of jhabor Rasulov during the period from 04 to 07.08.2014.

The Group consisted of the following persons:

- Mr. Anoyatshoev A – Deputy Head of Department for Construction and Road Administration of MOT
- Mr. Odinaev S – Main Specialist of Department for the foreign investment of MoT
- Mrs. Abdulloeva M – Leading Engineer of SUE "Research, Design and Survey Institute"
- Ms. Asli Gurkan – Social Development Specialist (World Bank)
- Ms. Norova S – Programme Assistant (World Bank)
- Mr. Thomas Voigt – Head of Design Team (Kocks Consult)
- Mrs. Lela Shatirishvili - Social Development Specialist (Kocks Consult)

On August 5, 2014, there was held a meeting in the town of Isfara with participation of the representatives of local communities (Jamoat), teachers, and the population living along the Project Road, farmers, and agricultural owners. The following persons from the town administration attended that meeting:

- Mr. O. Mamatov - Deputy Chairmen of the town of Isfara
- Mr. Mahmudov K - Head of Department for Public Services
- Mr. Makhmudov S – Head of Department for Land Management
- Mr. Fattoev M – Head Engineer of the town
- Mr. Sobitov U – Head of Headquarters for Emergency Response and Civil Defense

On August 6, 2104, the Group conducted another meeting in the District of Jhabbor Rasulov with participation of the representatives of local communities (Jamoat), teachers, the population living along the Project Road, farmers, agricultural owners, and others. The District Administration members also attended the meeting, represented by:

- Mr. Isomaddinov S – Deputy Chairman of the District of Jhabbor Rasulov
- Mr. Zikriyoyev S – the Head of Department of the State Enterprise on Road Administration

The local population inquired about compensation of assets, the final alignment of project road, and the commencement of civil works.

In response to their questions, the First Deputy Minister, Mr. Ganjhalzoda Sherali explained the conditions and requirements of the abovementioned Reports to attendees. He noted that the

compensation should be provided for affected trees, structures, and other assets. The amount of compensation will be determined by a special Evaluation Commission. The selection of final alignment will be defined in the course of detailed design and civil works will commence in the first half of 2015.

It should be noted that the purpose of the meeting was well received by participants and the population has expressed its readiness to provide all kinds of assistance during the project implementation.

Prepared by:

Odinayev S. Signature

Appendix C

List of Participants

Ministry of Transport of the Republic of Tajikistan

Mr. Sherali Ganjalzoda, First Deputy Minister, Ministry of Transport
Mr. Suhrob Odinaev, International Projects Unit, Ministry of Transport
Mr. Alovuddin Anoyatshoev, Deputy, Road Assets Management Department, Ministry of Transport

Other Ministries and Agencies of the Republic of Tajikistan

Mr. Mahbuba Abdullaeva, Transport Economist, Project Design Institute

Sugd oblast

Isfara town

Mr. Isomiddin Saidov, First deputy of chairman of Jabbor Rasulov's district
Mr. Avliyo Khojaev, Head of State transport and road control department
Mr. Abduvohid Soliev, Deputy Head of Navgilem village, Isfara district
Mr. Abdurasul Sattorov, Director of MTNU # 43, village Shurtag, Isfara district
Ms. Ughulkhon Abdulloeva, Deputy Head of Women of Isfara district
Mr. Boshirkhon Juraev, Member of Mahalla Committee in Isfara
Mr. Khoshim Madaminov, Head of village, Isfara district
Mr. Abdufattoh Sattorov, Deputy head of water supply department in Isfara
Mr. Mustafo Sanginov, Delegate, Shahrom village, Isfara district
Mr. Idris Kiyomov, Director of sub office Boghiyor, village Nurmand, Isfara district
Mr. Rustam Atobekov, director of NBTI of Isfara
Ms. Mehri Ibrohimova, Head of Shahrom Jamoat, Isfara district
Ms. Nazirabonu Arnamisheva, Head of Jahoni surh, Isfara district
Mr. Murtazo Okhonov, Head of HR department of Ruzori Eshon, Isfara
Mr. Ravshan Yuldoshev, agricultural specialist of Shahrom jamoat, Isfara district
Mr. Faiziddin Vohidov, Sr. specialist of Zaminsoz, Isfara district
Mr. Abdumavlon Juraev, Deputy Head of Kulkand Jamoat
Mr. Zokirjon Obidov, Head of Shahrom Jamoat
Mr. Sharipov Sharifjon, Head of environmental protection department, Isfara
Mr. Sahiyuvsho Mahmudov, Head of land committee, Binosoz, Isfara
Mr. I. Usmonov, Tojiktelekom, Isfara
Mr. Mubin Fattoev, Sr. Architect of Isfara city
Mr. Dodokhon Saburov, Head of workers # 6, Isfara district
Mr. Hakomjon Edgorov, Sr. hydro technician, V. Navgilem, Isfara district
Mr. Muhtor Ahmedov, Sr. Agronomist in Navgilem, Isfara district
Mr. Alokim Rajabov, Head of workers # 1, kolhoz Mukarramov, Isfara district
Mr. Joma Boltaev, citizen of Vorukh district
Mr. M. Gafurov, head of Agromin, Isfara district
Mr. I. Yaheev, head of household department of Shahrak Jamoat
Mr. Usmonhuja Sobitov, Sr. Specialist, Isfara
Mr. Nosirjon Kholmatov, specialist of department on tax colletions
Mr. Muzaffarov, citizen of Isfara district
Mr. Hakim Mahmudov, Head of public utilities department of Isfara

J. Rasulov district

Ms. Bihomida Abdulloeva, Head of Committee of Proletarsk
Ms. Fotima Abdurahimova, Designer, Jamoat Proletarsk
Ms. Zuhra Abdurahimova, Designer, Jamoat Proletarks
Ms. Nigora Rahmonova, Teacher , Village Mahsum, Proletarsk
Ms. Mutabar Haidarova, Teacher, village Dusmatov, Gulakandoz village
Ms. Umeda Madaminova, Teacher, Gulakandoz village
Ms. Madina Azimova, Teacher village Gulakandoz
Ms. Nafisa Dusmatova, Teacher, Gulakandoz village
Mr. Hodiyatullo Tuychiev, head of school in Proletarsk
Ms. Munira Jabborova, Teacher, Proletarsk. district
Ms. Shahnoza Yusupova, Teacher, Proletarsk district
Ms. Nilufar Ayubova, Teacher, Gulakandoz district
Ms. Iroda Sharipova, Teacher, Gulakandoz district
Ms. Marhabo Melikova, Teacher, Gulakandoz district
Ms. Zamira Otaboeva, Teacher, Gulakandoz district
Ms. Mavzuna Kayumova, Teacher, Gulakandoz district
Ms. Zarifa Mirkurbonova, Teacher, Gulakandoz district
Ms. Shahlo Hotirova, Teacher, Gulakandoz district
Ms. Gulnoza Zabilloeva, Teacher, Gulakandoz district
Ms. Shahlo Usmonova, Teacher, Gulakandoz district
Mr. Sh. Zikriyayev, Head of Moira organization
Ms. S. Najmiddinova, Accountant of Moira organization
Ms. Z. Khojaeva, Accountant in LTD Vatan, Proletarsk, district
Ms. Faroghat Solieva, Accountant, Proletarsk
Ms. Hakima Pulotova, Accountant, Proletarsk
Ms. Farida Mannonova, citizen of Proletarsk
Mr. Ghulom Ikromov, citizen of Proletarsk
Mr. Bobur Ulmasov, citizen of Proletarsk
Mr. Nurullo Nishonov, Sr. specialist, J. Rasulov
Mr. Nuriddin Shokirov, Deputy head of Dekhmoy district
Mr. Otajon Otajonov, Head of Gulhona district
Ms. Sanavbar Tojibaeva, citizen of Gulhona district
Mr. Furkat Tojibaev, Sr. specialist on education issues, Gulhona district
Ms. Munira Mavlonberdieva, specialist
Ms. Nazira Toshpulatova, Deputy head of Gulhona Jamoat
Ms. Isroil Ismoilov, Deputy director of household department, Proletarsk
Ms. Muhabbat Yuldosheva, housewife, Proletarsk
Ms. Oftob Boimatova, pensioner, Proletarsk
Ms. Manzura Rozikova, pensioner, Proletarsk
Ms. Omina Urunboeva, housewife, Proletarsk
Ms. M. Mirzoeva, pensioner, Proletarsk
Mr. B.Mahmudov, Head of Community Committee, Proletarsk
Ms. Mamadjanova, citizen of Proletarsk
Ms. Bobobekova, citizen of Proletarsk
Ms. Otamurodova, citizen of Proletarsk
Mr.Mavlonov, citizen of Proletarsk
Mr. Dadaboev, citizen of Dehmoy Jamoat
Mr. Normatov, driver, Proletarsk district
Mr. Narzullaev, Head Jamoat of Proletarsk
Mr. Karimov, Head of Jamoat Proletarsk district
Mr. Yusuf Ergashev, head of Jamoat, Proletarsk district
Ms. Bobokuzieva, citizen of Proletarsk

World Bank Mission Members

Ms. Asli Gurkan, Social Development Specialist, World Bank Regional Office, Almaty
Ms. Nigina Alieva, Communication Associate, World Bank Country Office, Republic of Tajikistan
Ms. Shahlo Norova, Program Assistant, World Bank Country Office, Republic of Tajikistan
Mr. Thomas Voigt, Project Team Leader, Kocks Consult, Tajikistan
Ms. Leila Shatirishvili, Social Development Specialist, Kocks Consult, Georgia