

**KYRGYZ REPUBLIC  
MINISTRY OF TRANSPORTATION AND COMMUNICATIONS  
(MOTC)**

**ENVIRONMENTAL IMPACT ASESMENT**

**THE PROJECT FOR  
AVALANCHE PROTECTION ON BISHKEK-OSH ROAD**

**OCTOBER 2014**



## INTRODUCTION

Environmental Impact Assessment (EIA) for the "Avalanche protection on Bishkek-Osh Road" Project was prepared by the Ministry of Transport and Communications of the Kyrgyz Republic (MOTC KR).

The Project on avalanche protection measures along the Bishkek-Osh road in the Kyrgyz Republic has been awarded on the basis of grant aid provided by Japan International Cooperation Agency (JICA). Preparatory study for the subject project, including the Environmental Impact Assessment was launched in March 2014.

Pursuant to the Law No.386 of the Kyrgyz Republic dated 1997 on the Environmental Impact Assessment (EIA), as well as Law No.54 dated 1999 on the Environmental Examination of the construction of roads is classified as a project affecting the environment, and as such requires the conducting of the EIA by the Ministry of Transport and Communications of the Kyrgyz Republic. In order to begin implementation of this grant project in 2015 on schedule, the EIA has to be completed and the statement of the ecological expertise must be obtained from the State Agency on Environmental Protection and Forestry under the Government of the Kyrgyz Republic (SAEPF) within the year 2014.

EIA was carried out from June to September 2014 in accordance with the legislation of the Kyrgyz Republic and the guidelines of Japan International Cooperation Agency (JICA) responsible for the implementation of the grant aid. Items and criteria to be assessed are in full compliance with the legislation of the Kyrgyz Republic and guidelines of JICA. Three stakeholder consultations are scheduled to be carried out as per regulation in accordance with the laws of the Kyrgyz Republic (Kyrgyz Republic Law No.213 dated 8 December 2006 "On the access to information in charge of public authorities and local self-government bodies of the Kyrgyz Republic") and are subject to mandatory observance of JICA guidelines.

The first stakeholder consultation was held in July 2014 with the participation of the residents of the *Toktogul* district, wherein information on the project and the content of the EIA study was provided.



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## Abbreviations

BO	Bishkek-Osh
BO UAD*	Bishkek-Osh Main Roads Management Unit
CAREC	Central Asian Regional Economic Cooperation
DEP*	Local Level Roads Management Unit
DPS*	
EIA	Environmental Impact Assessment
E/N	Exchange of Note
G/A	Grant Agreement
GOSSTROY*	Kyrgyz State Agency on Construction and Regional Development
GRG	Grievance Redress Group
IPIG	Investment Project Implementation Group
JICA	Japan International Cooperation Agency
KR	Kyrgyz Republic
MES	Ministry of Emergency Situations
M/D	Minutes of Discussion
MOTC	Ministry of Transport and Communications
PLUAD*	Oblast Level Roads Management Unit
R/D	Record of Discussion
RAP	Resettlement Action Plan
RMD	Road Maintenance Department
SAEPF	State Agency of Environment Protection and Forestry
SAGMR	State Agency of Geology and Mineral Resources
SNiP*	Stroitelnye Normy i Pravila (Russian Construction Codes and Regulations)
TOR	Terms of Reference
UAD*	Main Roads Management Unit

\* Abbreviation of the Russian name



# 1. Overview of the Components Affecting Environmental and Social Aspects

## 1.1 Project title

Avalanche protection on Bishkek-Osh road (246 km, Kochku-Bulak section)

## 1.2 Project site

The project site represents the main arterial road, which connects the capital city of Bishkek with the country's second largest city, Osh. Additionally, the road is part of the international Asian Highway Network. The project area is located from the 246km. point to the 248km. point (total project length 2km.) on the Bishkek-Osh automobile road. (Total highway length 672 km.) This section is classified as part of the *Talas* region by form of territorial division, and referred to as the *Toktogul* district of the *Jalal-Abad* region by form of administrative division.

The Bishkek-Osh automobile road is the most important highway in Kyrgyzstan. However, the road runs through steep mountain slopes, resulting in natural disasters such as avalanches, landslides, and rock falls, etc. occur every year. The Project site covers the section, which is a particularly dangerous area with high avalanche risks.

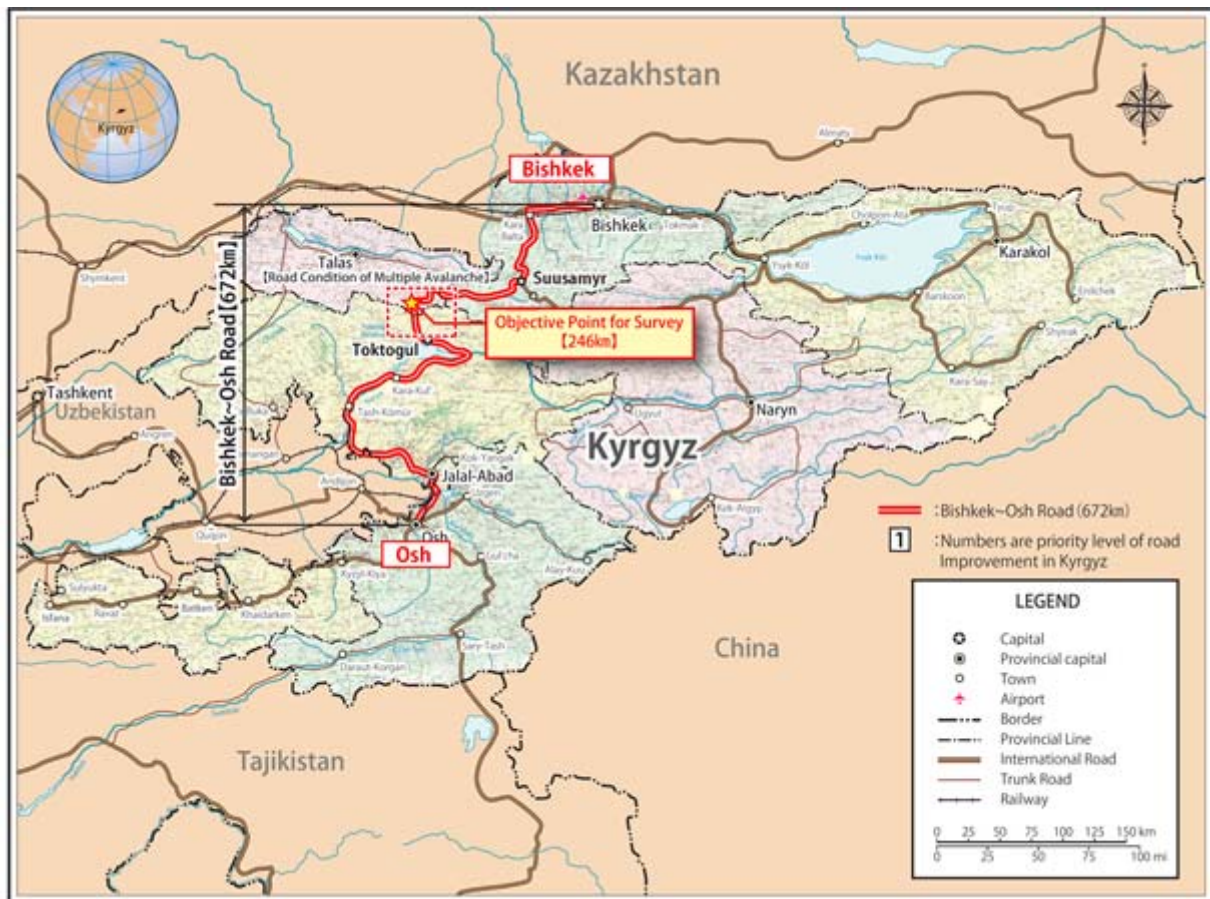
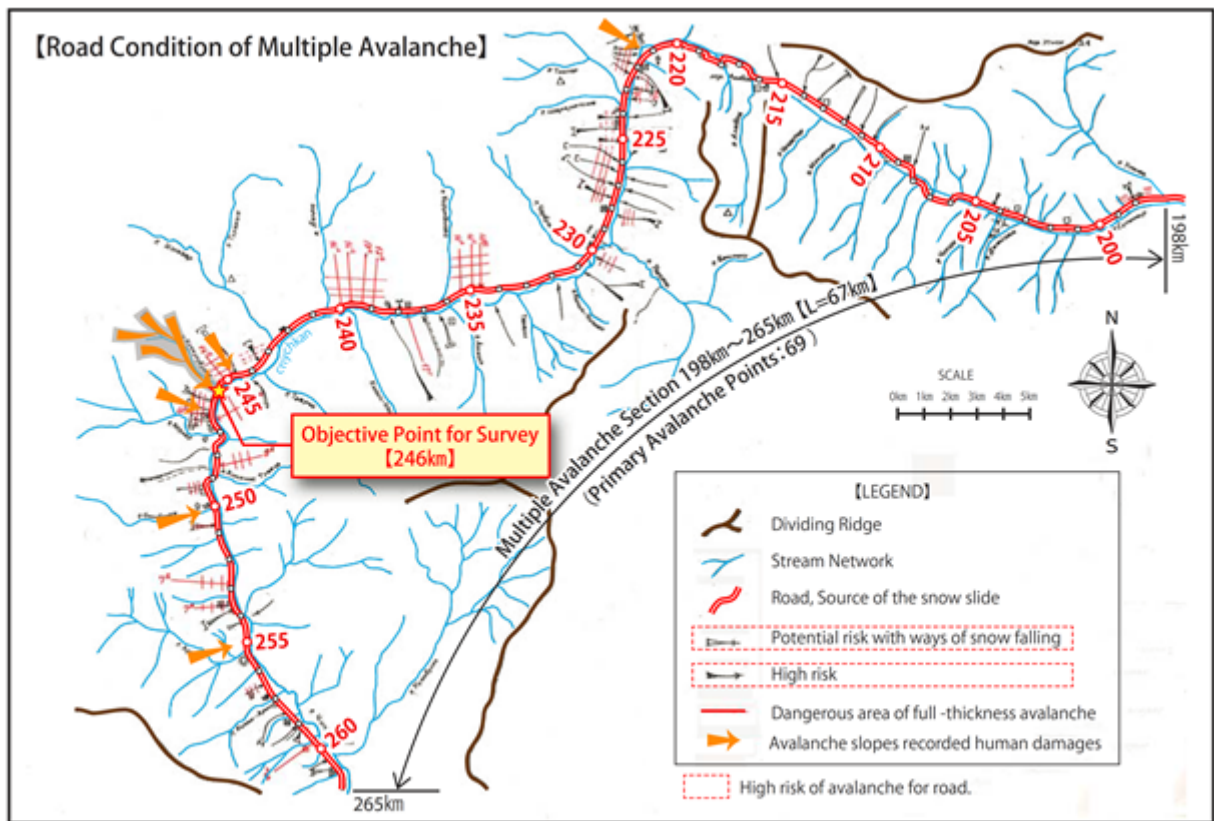


Figure 1.2-2 Objective area (1)





Location Map

Figure 1.2-2 Objective area (2)

### 1.3 General information on the Project

#### 1.3.1. Project aim

The aim of the project is to undertake protective measures against avalanches at the 246 km section of the Bishkek-Osh automobile road, in order to ensure the smooth and safe movement of vehicle traffic during the winter season.

#### 1.3.2 Overview

95% of passenger and cargo transport in the country is conducted by land routes. The roads in Kyrgyzstan comprise a total length of 34,000 km. and play an important role in the life of the population. Each year at the 246 km section of the Bishkek-Osh automobile road, large volume avalanches occur, thereby severely impeding traffic movement. In 2012, the avalanches at this section resulted in 10 critically injured travelers, the highway was closed for a week, and travel was restricted to limited daylight hours. In addition to this, road closures prevented the normal movement of domestic and international cargo, causing a direct negative impact on foreign trade with the neighboring countries, directly affecting the economic development of the country.

Given this situation, the construction of the avalanche protective structure known as the arch type snow shed (hereafter the "arch culvert type") is planned at the 246km. project site.

Table 1.3-1 provides a brief overview of the project. Since the area of the project site includes forest land, consideration of this factor will be taken into account during the implementation of this project by extending efforts to minimize the impact on the terrain, landscape, as well as the impact on the *Chychkan* River, and the rivers of the *Kochku-Bulak* Ravine. These factors will be considered during the planning, surveying and design phases of the avalanche protection structure.

Table 1.3-1 Brief overview of the Project

Items		Specifications
Construction site		246 km. station of the Bishkek-Osh automobile road
Width	snow shed (interior dimensions)	- Carriageway : 7 m (3,5*2), - Side band : 1 m (0.5*2) - Pavement : 1,5 m (0.75*2) <b>Total width : 9,5 m</b>
	Access roads (standard parts)	- Carriageway : 7 m (3.5*2) - Side band : 1 m (0.5*2) - Margin : 4 m (2.0*2) <b>Total width : 12 m</b>
Type of snow shed		Arch culvert type
Structure stretch		Snow shed : 460 m - Access road (from the direction of Bishkek city) : 190 m - Access road (from the direction of Toktogul city) : 360 m <b>Total length : about 1,010 m</b>
Coating		Inside the snow shed : concrete surfacing (t=18 cm) Access roads : asphalt (upper layer t=6cm, base layer t=8 cm)
Illumination		The lighting will be installed inside the snow shed and at the 2 portals of the snow shed
Other data		- Gravity retaining wall (L=208 m) - Strengthening structure, resting on the bank slope (L=73 m) - Rock fall protective fence (L=155 m) - Drainage works (about 3 500 m) - Temporary bypass (L=1 146 m) - Reserve space (2 632 m <sup>2</sup> )
Applied standard		Design standards applied in the Kyrgyz Republic



Figure 1.3 Condition at objective area

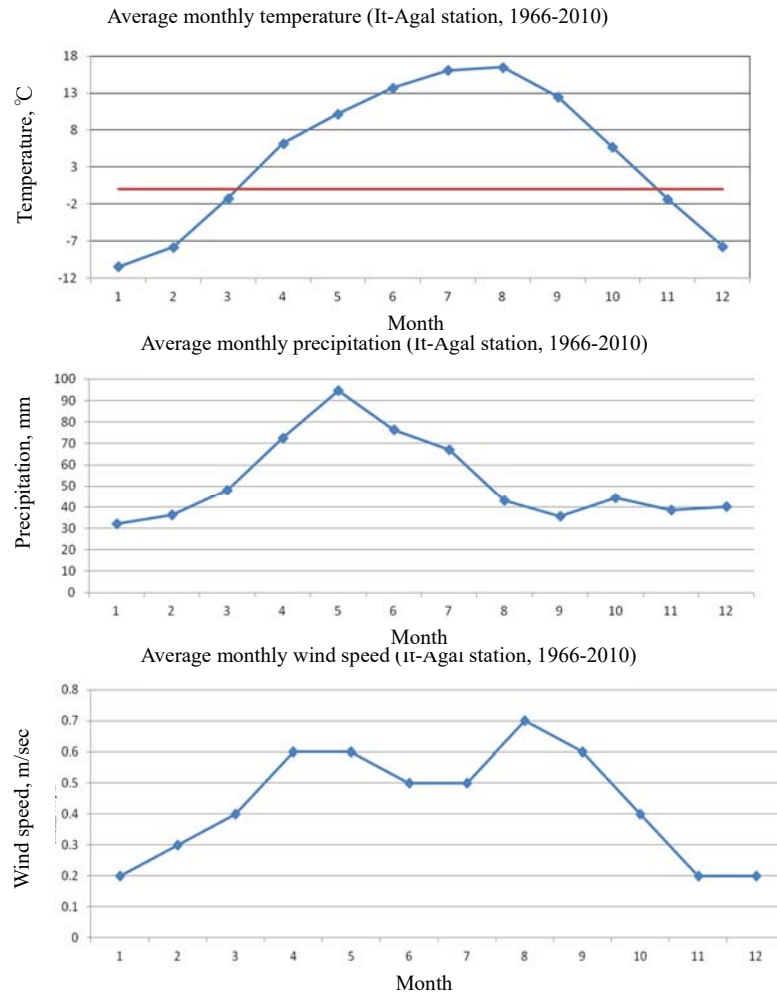
## 2. Natural Condition and Social Situation in the Objective Area

### 2.1 Weather condition

The result of the interview survey and collection of data from MES and the It-Agar Avalanche Observation Station near the objective site is as summarized below.

- Average temperatures are below freezing from November.
- It is intensely cold, In December and January average temperatures are approximately 10 degrees below zero.
- Snowfall is light, and snow cover depth is less than 1m.

Part of the weather data related to avalanche occurrence is shown in the Figure 2.1-1.



Source: Itagar Avalanche Observation Station

Figure 2.1-1 Weather Observation Record at Itagar Avalanche Observation Station

### 2.2 Snow condition

Slope topography at the BO Road 246km section spreads from 1 760m to 3 500m above sea level. It is assumed that snow conditions are different depending on altitude. The Study Team carried out the field survey to understand snow conditions at five (5) different points of elevation along the BO Road, as follows:

- Date: March 28, 2014
  - Investigation Item: Snow depth, Snow density, Snow conditions, Snow temperature
  - Investigation Point: 5 points
- Survey result in Table 2.2-1

Table 0.2-1: List of Snow Condition Survey Results

Point	Altitude [m]	Air Temperature [°C]	Depth [cm]	Density [kg/m <sup>3</sup> ]	Snow Temperature [°C]	Condition
No.1	1,720	6.9	25	0.27	0	Granular snow
No.2	2,000	4.8	24	0.28	0	Granular snow
No.3	2,500	0.3	40	0.34	0	Granular snow
No.4	3,000	-5.2	50	0.17	-2 to -5	New snow – Ice layer – Depth hoar
No.5	3,175	-6.0	55	—	—	—

- Snow depth tends to be deeper as altitude becomes higher.
- Snow density is around 0.3 g/cm<sup>3</sup> (0.27 - 0.34) at altitudes of 2,500m below. Snow in the area is granulated, and density in the area at altitudes 3,000m and higher is small (0.17 g/cm<sup>3</sup>).
- Depth hoar exists in the area at altitudes 3,000m and higher. The hoar is very fragile and the risk of avalanche occurrence is high.
- If the depth hoar remains in the beginning of spring, its melt water causes plane-generated wet-snow surface-layer slide.
- It is necessary to scrutinize the relationship of temperature and snow depth, because a depth hoar may be generated when the snow depth is shallow.

### 2.3 Natural Disasters

The Kyrgyz Republic internal road network is constantly exposed to danger from avalanches, landslides, floods, soil erosion, etc., caused by severe weather conditions and terrain features. The number of natural disasters that occurred in Kyrgyz Republic in 1995-1999 and within the jurisdiction of Ministry of Emergency Situations are shown in Table 2.3-1. Every year, several dozen people become victims of natural disasters.

Table 2.3-1 number of natural disasters that have occurred in Kyrgyzstan<sup>1</sup>

Unit: Case

		1995	1996	1997	1998	1999
Natural Disasters	Floods and sill flows	12	53	67	53	39
	Earthquakes	6	22	15	7	13
	Landslides	15	32	17	21	25
	Snow avalanches	51	39	6	3	11
Humanitarian disaster		11	11	37	42	34
Total		95	95	183	147	118
Number of Fatalities		26	26	40	44	8
Damage Costs (million soms)		216	216	3	357	1129

<sup>1</sup> ADB, Environmental Analysis of the country, 2004

The total number of natural disasters in KG from 2000 to 2012 are illustrated in table 2.3.1A below: floods and sill flows amounted to 29.6% of the total, the most affected regions were Jalal-Abad (34.8%) and Osh (23.6%). Avalanches accounted for 11.9%, with the most affected oblast Jalal-Abad (40.0%), and followed by the Osh oblast (24.6%). Landslides accounted for 9% of the total number, with the Osh region - 49.1% and the Jalal-Abad region -31.4%.

**Table 2.3-1A. 2000-2012 Total Number of Natural Disasters**

Nature of Disaster	% of Total Number of Disaster	Most Affected Regions	% by Region
Floods and sill flows.	29.6%	Jalalabad	34.8%
		Osh	23.6%
Avalanches	11.9%	Jalalabad	40%
		Osh	24.6%
Landslides	9%	Osh	49.1%
		Jalalabad	31.4%

Additionally, in Kyrgyzstan annually, there are approximately 3,000 earthquakes, of which 10-20 earthquakes with a magnitude of more than 5 points. From 2000-2012, the greatest of all earthquakes occurred in Osh (43.2%) and Jalalabad (19.7%) regions. This is illustrated in table 2.3-1B

**Table 2.3-1B Earthquakes 2000-2012**

Annual Earthquakes	Earthquakes 5.0 +	Most affected Regions	% percentage
3,000	10-20	Osh	43.2%
		Jalalabad	19.7%

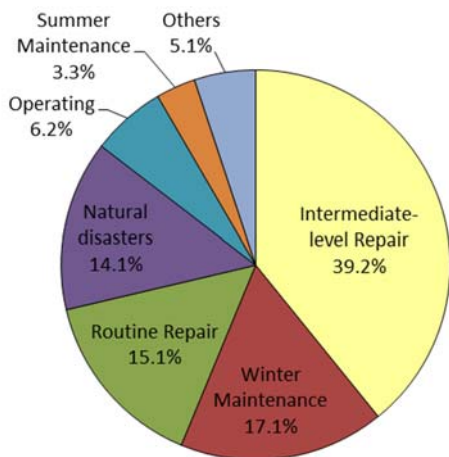
Table 2.3-2 shows the history of avalanches in the project area. From this information 22 avalanches have been recorded over a 46 period from 1968 to 2013. Maximum volume of avalanches were 290 million m<sup>3</sup> with 540m of deposit width and 42m height of debris on the roadway, which was the highest on record.

Table 2.3-2 Record of Avalanches at 246km section.

Date	Volume [1000 m <sup>3</sup> ]	Deposit Width on Roadway [m]	Ave. Debris Height at Run out Area [m]	Debris Height at Roadway [m]
1968/3/15	1,560	150	10.2	10
1969/3/8	976	200	7	
1969/3/11	1,246	300	6.7	
1970/3/26	1,459	320	13.22	
1972/3/28	2,250	250	15	
1973/4/8	800	30	9	5
1973/4/20	750	200	10	7.6
1975/3/3	1,482	360	10	
1976/2/13	726	100	11.3	
1976/3/25	468	100	11.7	7
1984/3/29	1,830	540	20	10
1988/4/15	296	100	7.7	
1993/2/5	200	200		
1996/3/18	2,903	400	19.6	40*
2002/4/10	70	115	5	10
2007/2/26	1,000	250	16	10
2009/3/8	1,200	250	15	
2009/4/27	1,300	325	10	
2010/3/12	1,500	250	20	
2011/11/23	900	200	15	
2012/3/21	1,980	200	33	
2013/3/6	750	250	10.0	

※According to interview survey, actual maximum deposit height was 42m.

Source: State Agency for Hydrometeorology under the MES KR.



Source: BO UAD, MOTC KR

Figure 2.3-1 Cost structure of BO UAD for 2012.

Table 2.3-3 Disaster Recovery Expenses at the 246 km. Bishkek Osh Road

Date	Type of disaster	Volumes of avalanches on the highway	Elimination Costs
November 24, 2011	Avalanche	350 000 m <sup>3</sup>	2 355 000 som
March 17, 2012	Avalanche	21 285 m <sup>3</sup>	237 000 som
March 22, 2012	Artillery shelling	203 580 m <sup>3</sup>	2 404 000 som
April 1, 2012	Avalanche	3 360 m <sup>3</sup>	22 512 som
January 31, 2014	Avalanche	147 000 m <sup>3</sup>	434 500 som

Source: DEP-23 under the BO UAD, MOTC KR

In 2012, disaster prevention and intelligent solutions to the existing dangers have become an important point in the BO UAD road maintenance plans. Figure 2.3-1 shows

the maintenance costs. Article "Disaster" takes 14.1% of the total share of cost, which is about 4 times higher than the cost of summer maintenance.

More importantly, the costs to clear debris from avalanches are astronomical. As for 246 km the Bishkek-Osh road in recent years, 2,600,000 soms were spent on avalanche clean-up projects. (See Table 2.3-3). This is only cost data from MOTC KR. MOTC KR is only one of many ministries involved in disaster relief, and also expend considerable human resources and finance, in order to restore safe and normal travel on the Bishkek-Osh road. In addition, there is no indication, of the amount of the damage and loss of profits to the trade and commerce sectors. That is, the effect of avalanches has not only an influence on the KR economy, but also to neighboring countries that share this highway.

#### 2.4 Topography

The project site is located at 246 km at an altitude of 1700 meters above sea level. The section of the Bishkek-Osh road that is in question is located in a narrow cut between two mountains with a total width of 93 meters. In this area there is the Kochku-Bulak gorge, and a river flowing from the gorge which flows into the Chychkan River.

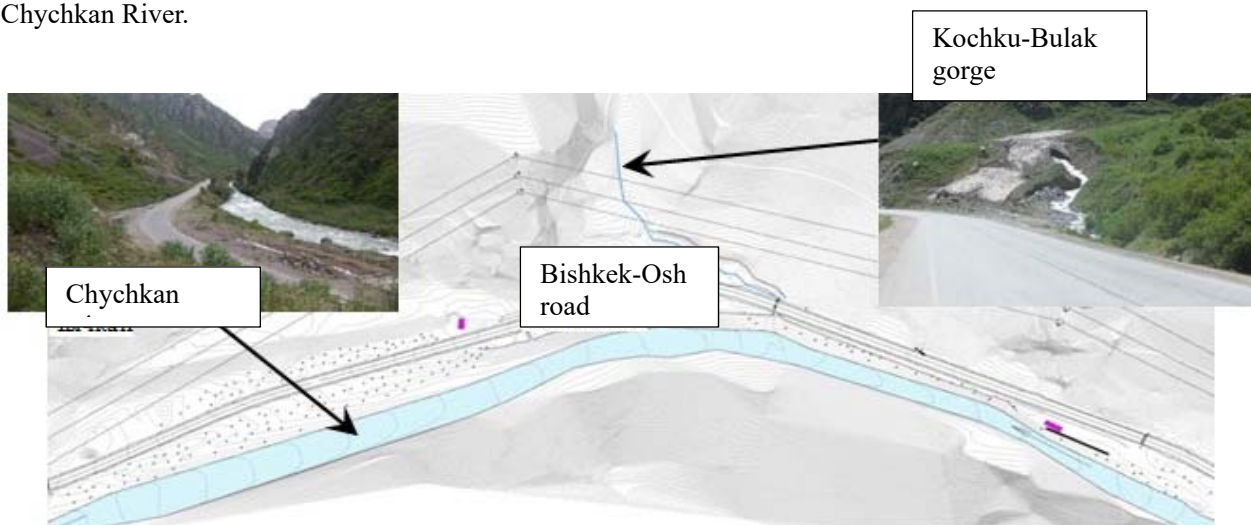
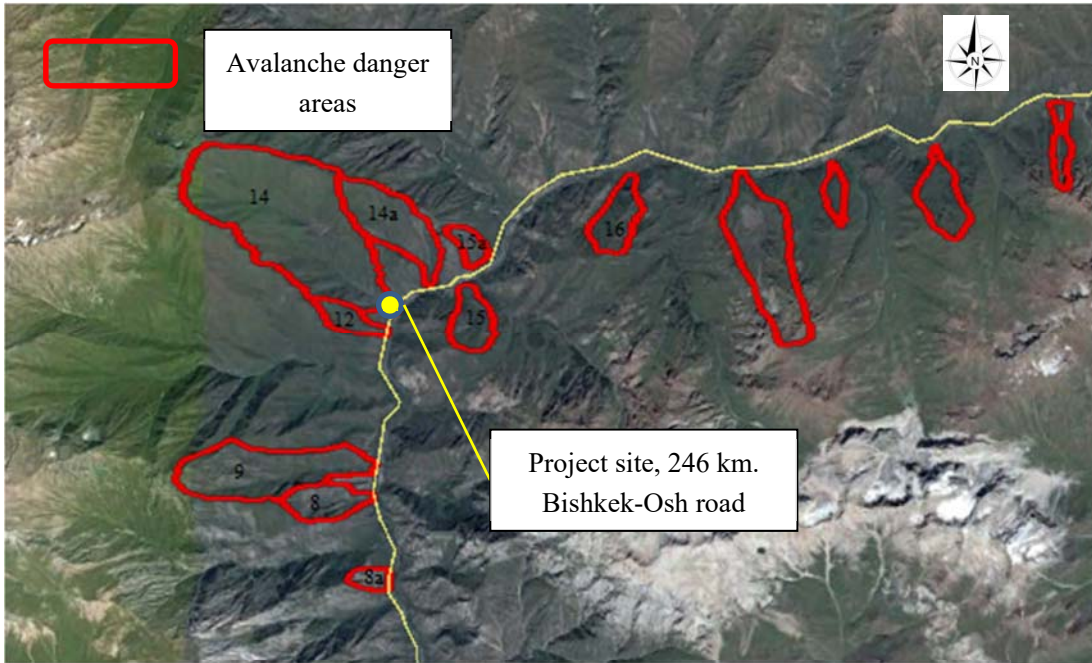


Figure 2.4-1 Location of Kochku-Bulak gorge and river Chychkan  
Towards to Bishkek-Osh road

The length of the Bishkek-Osh road from 198 km to 265 km is a section with frequent avalanches. However, the snow collecting basin at the project site is much greater than in other areas, and therefore the volume of avalanches accordingly are large. Topography represented by different types, there are slopes with exposed rocks, talus and vegetation. Growing conifers, but the scale of these forests is not able to impede avalanches. As a result, this site in terms of type and properties of soil is predisposed to avalanches.



Figure 2.4-2 displays the scheme-map of the project site and its adjacent river avalanche sites.



Prepared by engineer Bayhodzhaev R. (Department of avalanche safety, the State Agency for Hydrometeorology under the MES KR)

### 2.5 Nature of soil

The Project site and the riverbanks consist of argillaceous slate, crystalline slates and sandstone. Based on the results of geological investigations it became known that the solid quality of the soil is formed due to the slate. Therefore, little danger of long-term ground subsidence due to compaction of rock pressure exists. Soil at the site is not a soft clay layer, which is characterized by subsidence due to compaction of rock pressure.

Figure 2.5-1 shows a map of the geological structure of the Project Site.

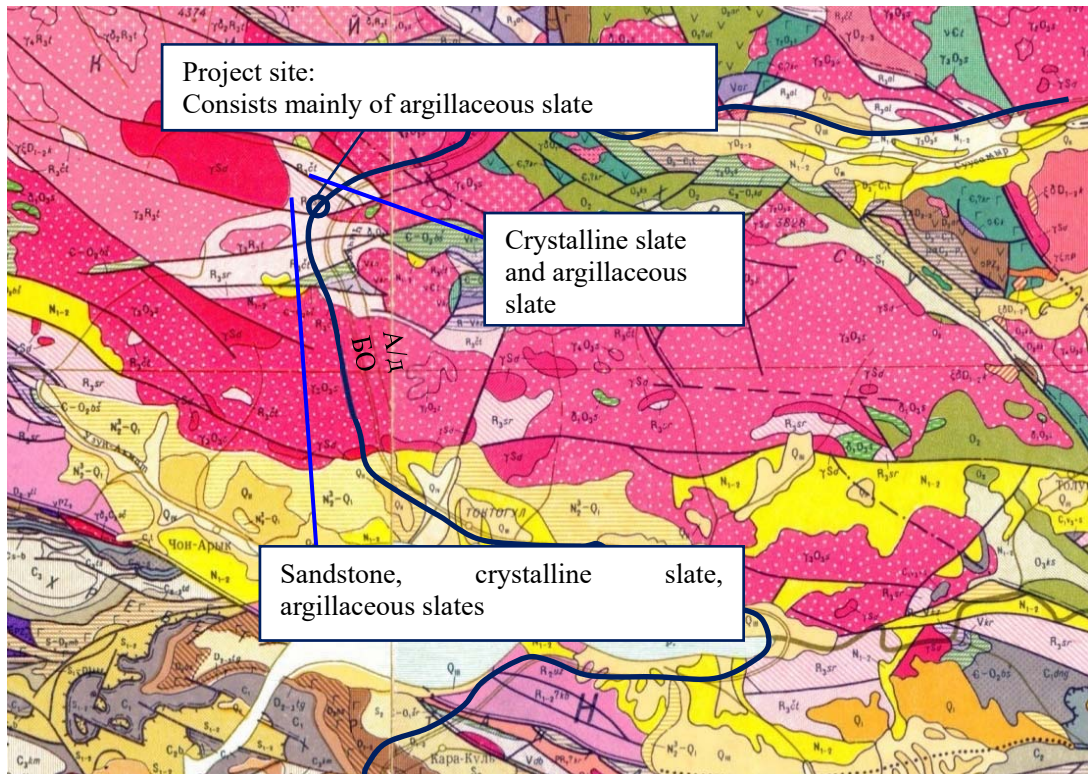


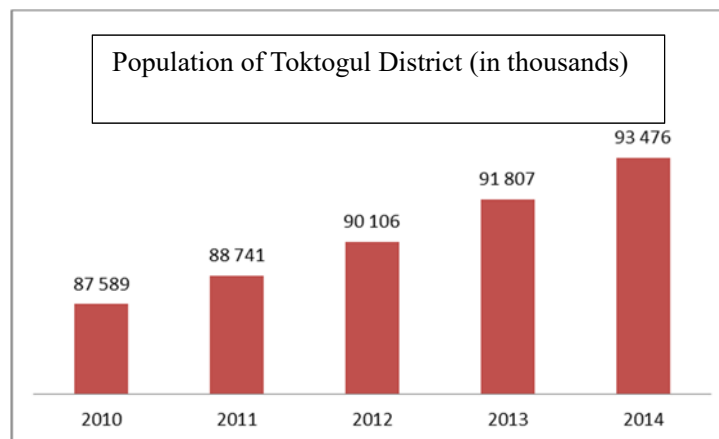
Figure 2.5-1 Map of the geological structure of the river bank adjacent to Project Site

## 2.6 Land use

During the discussions and negotiations with representatives of The Environmental Protection Territorial Administration and Forestry discovered that the area surrounding the Project Site is a forest (public land), but it is not a landscape protected area.

## 2.7 Population

Project sites in the form of administrative divisions refers to the Toktogul District of the Jalal-Abad region, and the population, who are residents, have a direct relationship to the immediate area. Figure 2.7-1 shows the dynamics of the population of the Toktogul District. The population from 2010 to 2014 increased by 7%. However, the project site is a mountainous area, where there are no permanent settlements, hence, it is assumed that the increase of population is due to the increasing population of the Toktogul District city center.

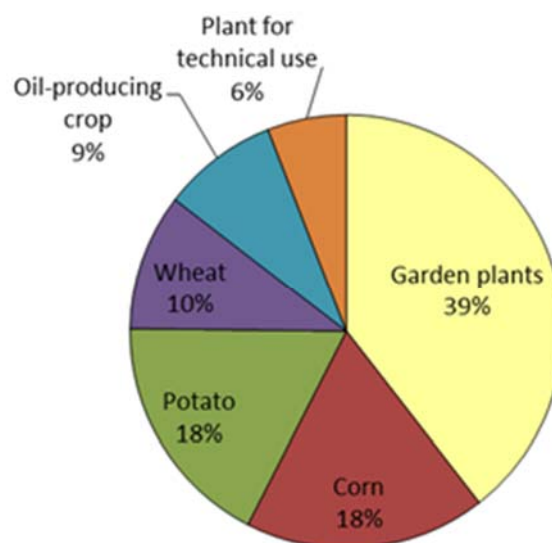


Source: Data obtained during the interview of Toktogul district administration employees)

Figure 2.7-1 Population Dynamics of the Toktogul district

## 2.8 Industry

In the southern regions of the Kyrgyz Republic, in the Jalal-Abad region, which includes the Toktogul district, agriculture is the chief industry and source of personal income. Figure 2.8-1 shows the percentage ratio of agricultural crop production. Garden plants (39%), corn (18%), potatoes (18%) make up a large part of the agricultural crops.

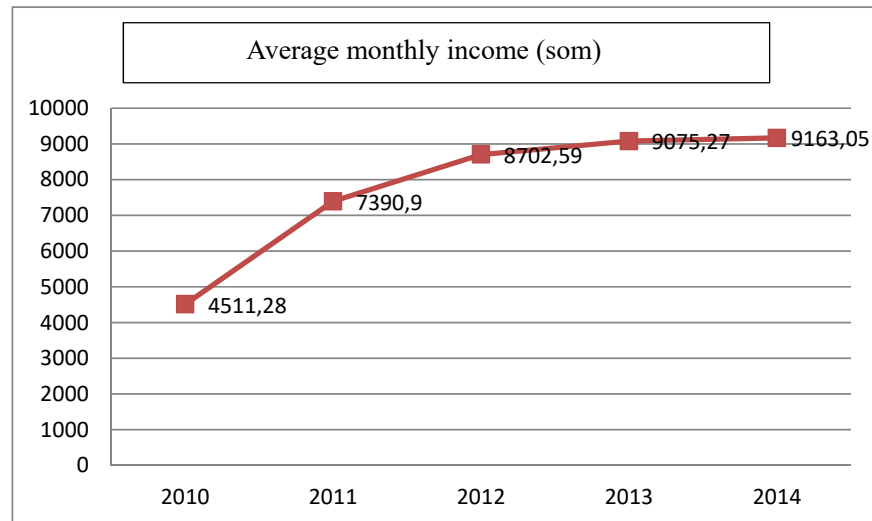


Source: Data obtained during the interview of employees of the Toktogul district administration)

Figure 2.8-1 Agricultural product production (2013)

## 2.9 Average monthly income

Figure 2.9-1 shows the dynamics of the average monthly income of Toktogul District residents. As shown in the figure, from 2010 to 2014 the average monthly income increased more than 2 times.

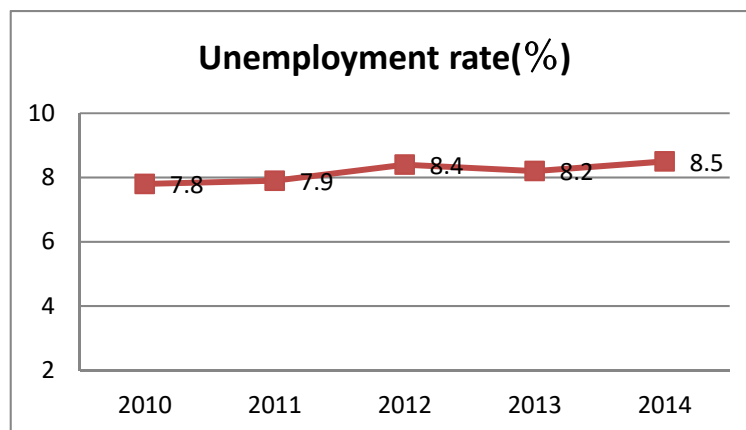


Source: Data obtained during the interview of employees of the Toktogul district administration.

Figure 2.9-1 Dynamics of average monthly earnings

## 2.10 Unemployment

The dynamics of unemployment over the past few years is shown in Figure 2.10-1. As shown in the Figure, unemployment is at a level below 10%. However, in the Kyrgyz Republic a villager is not considered unemployed even in cases of low income. Therefore, there is a strong likelihood that this data does not accurately reflect the actual financial situation in rural areas.



Source: Data obtained during the interview of employees of the Toktogul District Administration)

Figure 2.10-1 Dynamics of unemployment.

### 2.11 Social insurance system

The Kyrgyz Republic social insurance system is provided in the form of pension for individuals reaching retirement age and also for the disabled. In the Toktogul region for 2013 the total number of retirees was 7,199, while the total number of disabled individuals was 1,978.

Figure 2.11-1 Summary of social insurance and the number of recipients of social benefits in the Toktogul region in 2013.

Type	Subjects and provided amount	Laws	Social Beneficiaries in the Toktogul region
Retirement pension	Men from 60 years, women over 55 years, approximately 3,000 soms per month. (average)	Retirement Pension law №	Total number of Retirees 7,199
Disability pension	Depending on the degree of disability 1000-4000 soms per month (average)	KR Law on State Pension Social Insurance № 57, 1997	Total number of disabled 1,978

Source: Data obtained during the interview of employees of the Toktogul District administration)

### 3. Comparative Review of Alternatives

MOTC KR and JICA (the "Consultant») regarding technical supervision during the preparatory studies, have searched the most appropriate alternatives avalanche-protection measures under the project "Protection against avalanches on the" Bishkek-Osh road." Below are the results of this study.

#### 3.1 Selection Policy for Avalanche Measures

Measures against avalanche disaster fall roughly into two categories; namely, "Control Measures" which will prevent or absorb the avalanche; and "Protective Measures" which will block the debris at the run-off area. It would not be feasible to apply avalanche control measures to the Project in terms of cost, constructability and maintenance, since the starting area and track area of the avalanche is very large, 5000m in horizontal distance and 1,600m in vertical interval. From this point of view, the Protective Measure at the run-off area shall be applied to the Project.

Protective Measures are shown in the figure below. As described in paragraph 2.3. Natural disasters, the maximum height of avalanche's deposits can reach more than 40 m. The avalanche scale is so large that the fences or retaining wall would be damaged or destroyed by the impact force of the avalanche. Therefore it is not applicable to the Project.

Also, if we consider that the avalanche would cover the roadway, then, the open snow gallery design is neither suitable as protection. As for the rectangular gallery closed type, it would not be able to withstand the pressure of the avalanche. Therefore, among the types of closed snow galleries, variants of arched galleries and tunnels will be considered.

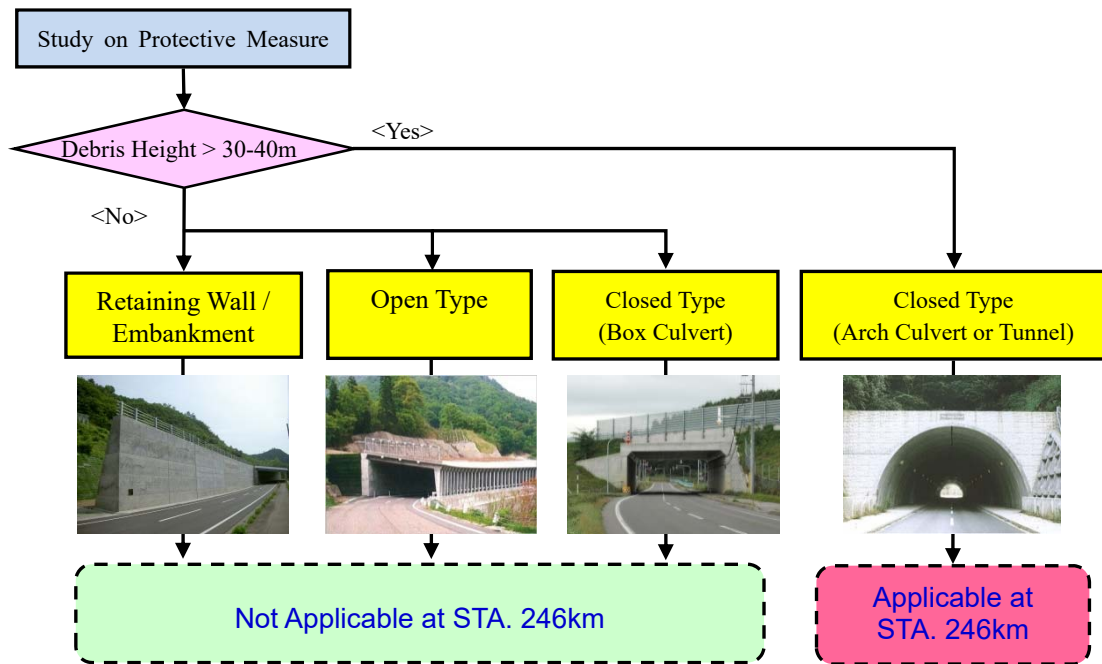


Figure3.1-1: Flowchart for Selection of Protective Measures

**Conclusion:** During extensive research and comparison of alternatives, it is concluded that if the height of snow deposits exceed 40 m, then variants of open galleries or snow shields are not suitable. The most suitable variant is an arched gallery or the tunnel option, which can withstand the deposition of snow in heights of more than 40 m. Therefore, these two options have been selected as objects for further comparison which is explained in detail in section 3.2.

#### 3.2 Comparative Review of Alternatives

A comparative review of the Project and alternatives are shown in **Table 3.2-1**, including the no project (zero

option) scenario. The most appropriate option is the selected arched gallery, which will ensure road safety and unimpeded vehicle movement.

Table 3.2-1 Comparative Review of Alternatives (including “zero option”)

Items	Zero Option	Option 1 (Arch Culvert Type Snow Shed)	Option 2 (Tunnel Type Snow Shed)
Outline	No project is planned.	Avalanche protection by arch gallery construction near existing road  -Arch type gallery: 460m -Approach road	Avalanche avoidance by tunnel construction on the opposite bank:  -Tunnel: 360m -Bridges: 2 bridges -Approach road
Technical Aspects	—	-Adoption of the arch form of structure which can withstand even the thickest layer of avalanche debris (+) -It is necessary to maintain lighting systems and other equipment. (-) -The minimum radius is $R = 330m$ , which provides sufficient visibility even inside the Snow Shed. (+)	-It is necessary to maintain bridges and lighting systems and other equipment in tunnel. (-) - Road surface on the bridge quickly freezes; it is difficult to provide traffic safety in winter season. (-)
Social and Economic Aspects	-Road blockage due to the occurrence of the avalanche may have a considerably negative impact on logistics and local economies. (-)	- Movement of people and goods is activated and economy is developed by securing traffic in winter. (+) -Construction will cost 3.2 billion JPY. (-)	- Movement of people and goods is activated and economy is developed by securing traffic in winter. (+) -Construction will cost 3.2 billion to 3.7 billion JPY. (-)
Environmental and Social Aspects	-Social disruption may be induced due to road blockage and traffic restrictions caused by the occurrence of avalanche have a negative impact on and local economies. (-) -Human casualties may be caused by the avalanche. (-)	-Excavation work is needed to install an arch culvert under the ground. (-) -Resettlement of residents is needed. (-) -Human casualties caused by avalanche is prevented. (+)	-For bridge construction at that location, deforestation is required. -It is essential to construct a waste processing facility because of tunnel construction. (-) -Resettlement of residents is needed. (-) -Human casualties caused by avalanche is prevented. (+)
Judgment	Not recommended  Human casualties may be caused and no contribution to measures against avalanche is expected.	Recommended  Economic efficiency is nearly the same as Option 2; however, traffic safety and performance are superior to Option 2.	Not recommended  Economic efficiency is nearly the same as Option 1; however, traffic safety is not superior to the others because road alignment is substandard.

**Conclusion:** After considering all 3 options, (zero option, the first option (arched gallery), and the second option (the tunnel)) the following conclusion resulted: The first option is the most appropriate from a technical standpoint, the construction of which is able to withstand the avalanche of high altitude, and can provide uninterrupted traffic flow. From the socio-economic point of view, both options achieve the desired traffic goals, which promotes economic development. From an environmental and social point of view, the first and second options will prevent loss of human life. Therefore, first option, the option of arched gallery, was selected and approved as the construction of the arched gallery presents less of an environmental impact in comparison with the second (tunnel) option.

Ultimately, the first option was approved by representatives of MOTC KR and JICA consultants.

## 4. Organization and Legislation for Environmental and Social Considerations in KR

### 4.1 Organization for Environmental Considerations

Organizations related to the Project are the Ministry of Transport and Communications (MOTC, the regulatory entities), the Ministry of Finance (MOF), and the State Agency of Environmental Protection and Forestry (SAEPF). Jalal-Abad Regional Office in SAEPF and the Toktogul District Administration in the Jalal-Abad State will manage the project area.

Environmental measurement is implemented by the following institutions.

- Testing chamber for Ecosystem in Chui, where most chemical analysis are performed.
- Testing chamber of SAEPF, where some chemical analysis are performed.
- Testing chamber of Hygiene and Infectious Disease Association.

The function of SAEPF includes:

- Provision of ecosystem information
- Management of Forest Development and Wild Animal Hunting (gaming)
- Monitoring of ecosystem
- Issuance of Environmental Permits
- International Cooperation of Environmental Protection

### 4.2 Legislation and Institution of Environmental Considerations

Legislations and institutions related to Environmental Impact Assessment are shown below.

Table 4.2–1 Environmental Legislation and institutions of the Kyrgyz Republic

No.	Title
1	Constitution of the Kyrgyz Republic (2010.6.27)
2	Land Code of the Kyrgyz Republic No.45 (1992.6.2)
3	Law of the Kyrgyz Republic No.53 “Environmental Protection” (1999.6.16)
4	Law of the Kyrgyz Republic No.54 “Environmental Review” (1999.6.16)
5	Law of the Kyrgyz Republic No.151 “General Technical Regulations on Environmental Safety” (2009.5.8)
6	Law of the Kyrgyz Republic No.165 “The Protection of Soil Fertility of Agricultural lands” (2012.8.10)
7	Law of the Kyrgyz Republic No.4 “Agricultural Land Management” (2001.1.11)
8	Law on Production and Consumption Waste No.89 (2001.11.13)
9	Law of the Kyrgyz Republic No.160 “Mineral Resources” (2012.8.9)
10	Law of the Kyrgyz Republic No.32 “The Rate of Payments for Environmental Pollution” (2002.3.10)
11	Resolution of the Kyrgyz Republic No.559 “The Methodology for Calculating Payments for Environmental Pollution” (2011.9.19)
12	Law of the Kyrgyz Republic No.200 “The Rates of Fees for the Use of Wildlife ” (2008.8.11)
13	Law of the Kyrgyz Republic No.15 “The Prohibition of Logging, Transportation, Purchase and Sale, Harvest and Use and Exports of valuable Tree Species” (2007.2.12)
14	Law of the Kyrgyz Republic No.89 “International Treaties” (1999.7.21)
15	Law of the Kyrgyz Republic No.30 “Pastures” (2009.1.26)
16	Resolution of the Kyrgyz Republic No.515 “The Procedure for Granting Use Rights to Pasture Resources for Purposes Unrelated to Grazing” (2013.9.13)
17	Decree of the Government of the Kyrgyz Republic No.458 “The Approval of the Procedure of Determination of the Cost Estimate (Standard Price) (2013.8.13)
18	Resolution of the Kyrgyz Republic No.224 “Approval of Rates for Calculation of Compensation for Damage caused to Objects of Flora and Fauna (2013.5.3)
19	Law of the Kyrgyz Republic No.151 “The Mountainous Areas” (2002.11.1)

### 4.3. Ratified International Treaties and dates of Ratification



International treaties on the environment ratified by the Kyrgyz Republic are given below.

Table 4.3-1 International Environmental Treaties

No.	Title
1	The Convention on Environmental Impact Assessment in a Trans boundary Context (2001)
2	Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (2001)
3	Convention on Biological Diversity (1996)
4	United Nations Convention to Combat Desertification (1999)
5	Convention on Long-range Trans-boundary Air Pollution (2000)
6	United Nations Framework Convention on Climate Change (2000)

#### 4.4 Environmental Standards

The Kyrgyz Republic has no original environmental standard. The pre-existing Russian standards recommended by the national organization “Kyrgyz Standard” are generally referred to in the Kyrgyz Republic. The environmental standards referred to in the Kyrgyz Republic are summarized below:

##### 4.4.1 Air quality

Russian Standards for ambient air quality referred in the Kyrgyz Republic are given below.

Table 4.4-1 Ambient Air Quality Standards

Unit: mg/m<sup>3</sup>

No.	Pollutant	Maximum Permissible
1	Suspended Particulate Matter (SPM)	0.5
2	Sulfur Dioxide (SO <sub>2</sub> )	0.5
3	Nitrogen Dioxide (NO <sub>2</sub> )	0.085
4	Carbon Monoxide (CO)	5
5	Sulfates (S)	-

Source: Guidelines for the Control of Air Pollution, RD 52.04.186-89, 1991

##### 4.4.2 Water quality

Russian Standards for ambient water quality referred in the Kyrgyz Republic are shown below.

Table 4.4-2 Ambient Water Quality Standards

Unit: mg/l

Item	Standards
Arsenic	0.01
Mercury	0.0005
Lead	0.01
Cadmium	0.001

Source: Maximum permissible concentration (MPC) of chemicals in water for drinking water, cultural and community use, Hygiene Regulations GN2.1.5.1315-03, 2003

##### 4.4.3 Noise and Vibration

Russian Standards for noise and vibration referred in the Kyrgyz Republic are given below.

Table 4.4-3 Noise Standards

Unit: dB

Category	L <sub>eq</sub>	L <sub>max</sub>
Areas immediately adjacent to hospitals and sanitariums	Day=45 Night=35	Day=60 Night=50
Areas immediately adjacent to dwellings, polyclinics, dispensaries, rest homes, holiday hotels, libraries, schools, etc.	Day=55 Night=45	Day=70 Night=60
Recreational areas in hospitals and sanatoriums	Day=60 Night=50	Day=75 Night=65
Recreational areas in hospitals and sanitariums	35	50

Source: State General Standards 23337-78, CH 2.1.8.562-96

Table 4.4-4 Vibration Standards (Category 2)

Geometric mean frequency bands, Hz	Maximum allowable vibration levels at work places Category 2: Transportation - Technological Type							
	Maximum limit values X <sub>o</sub> , Y <sub>o</sub> , Z <sub>o</sub>							
	Vibro acceleration				Vibro speed			
	m/s <sup>2</sup>		dB		m/s x 10 <sup>-2</sup>		dB	
1/3 octave	1/1 octave	1/3 octave	1/1 octave	1/3 octave	1/1 octave	1/3 octave	1/1 octave	
1.6	0.25		108		2.50		114	
2.0	0.22	0.40	107	112	1.80	3.50	111	117
2.5	0.20		106		1.30		108	
3.15	0.18		105		0.98		105	
4.0	0.16	0.28	104	109	0.63	1.30	102	108
5.0	0.16		104		0.50		100	
6.3	0.16		104		0.40		98	
8.0	0.16	0.28	104	109	0.32	0.63	96	102
10.0	0.20		106		0.32		96	
12.5	0.25		108		0.32		96	
16.0	0.32	0.56	110	115	0.32	0.56	96	101
20.0	0.40		112		0.32		96	
25.0	0.50		114		0.32		96	
31.5	0.63	1.10	116	121	0.32	0.56	96	101
40.0	0.79		118		0.32		96	
50.0	1.00		120		0.32		96	
63.0	1.30	2.20	122	127	0.32	0.56	96	101
80.0	1.60		124		0.32		96	
Corrected and equivalent corrected levels and their values		0.28		109		0.56		101

Source: Sanitary Norms "Industrial vibration, vibration in residential and public buildings", CH 2.2.4/2.1.8.556-96

Table 4.4-5 Vibration Standards (Category 3)

Maximum allowable vibration levels at work places Category 3 - Technological Type "B"								
Geometric mean frequency bands, Hz	Maximum limit values $X_o, Y_o, Z_o$							
	Vibro acceleration				Vibro speed			
	m/s <sup>2</sup>		dB		m/s x 10 <sup>-2</sup>		dB	
	1/3 octave	1/1 octave	1/3 octave	1/1 octave	1/3 octave	1/1 octave	1/3 octave	1/1 octave
1.6	0.0130		82		0.130		88	
2.0	0.0110	0.020	81	86	0.089	0.180	85	91
2.5	0.0100		80		0.063		82	
3.15	0.0089		79		0.045		79	
4.0	0.0079	0.014	78	83	0.032	0.063	76	82
5.0	0.0079		78		0.025		74	
6.3	0.0079		78		0.020		72	
8.0	0.0079	0.014	78	83	0.016	0.032	70	76
10.0	0.0100		80		0.016		70	
12.5	0.0130		82		0.016		70	
16.0	0.0160	0.028	84	89	0.016	0.028	70	75
20.0	0.0200		86		0.016		70	
25.0	0.0250		88		0.016		70	
31.5	0.0320	0.056	90	95	0.016	0.028	70	75
40.0	0.0400		92		0.016		70	
50.0	0.0500		94		0.016		70	
63.0	0.0630	0.110	96	101	0.016	0.028	70	75
80.0	0.0790		98		0.016		70	
Corrected and equivalent corrected levels and their values		0.014		83		0.028		75

Source: Sanitary Norms "Industrial vibration, vibration in residential and public buildings", CH 2.2.4/2.1.8.556-96

#### 4.5 Acquisition of Environmental Permission

##### 4.5.1 Acquisition Procedures for Environmental Permission

A road development project is classified as a project which possibly affects the environment under the law of the Kyrgyz Republic No.54 "Environmental Review", 1999 and the Instructions establishing the modalities for assessment of proposed activities on the environment (EIA) in the Kyrgyz Republic, 1997 No.386.

The project requires environmental impact assessment (EIA) by MOTC and EIA approval by SAEPF.

EIA for the project was carried out after discussing the survey contents with SAEPF, and public consultations were held according to the Law of Kyrgyz Republic and the JICA Guidelines for Environmental and Social Considerations.

The procedure of EIA Approval is shown below.

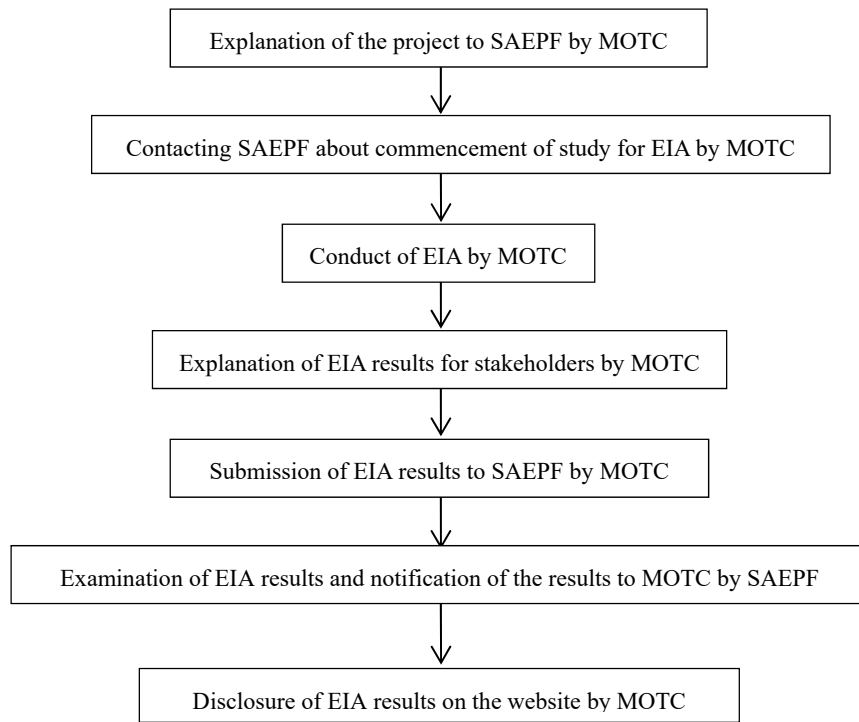


Figure 4.5-1 Acquisition Procedures for Environmental Permission

#### 4.5.2 Felling Permission for Valuable Plants

Valuable plants are protected by the law regarding “the prohibition of cutting, transportation, utilization, purchasing and selling of particular valuable wood species (walnut and archa trees) in Kyrgyz Republic” and it is necessary to obtain a felling permission of those plants in the implementation of projects such as public undertakings. The implementing entities of the project (MOTC) need to compensate for the affected plants by either one of the compensation methods, pecuniary compensation or non-pecuniary compensation of planting seedlings selected in a conference between SAEPF and the implementing entities (MOTC).



Photo 4.5-2 Archa

The procedures for obtaining the felling permission of valuable plants mentioned in Decree of the Government of the Kyrgyz Republic No. 458 are shown below.

##### Procedures for Felling Permission of Valuable Plants

1. Implementing entities file an application for felling permission of valuable plants with the SAEPF.
2. The SAEPF central office instructs the SAEPF regional office which manages the object plants to consider compensation criteria.
3. The SAEPF regional office investigates the habitat status of the object plants and the environmental impact by the project with the implementing entity.
4. SAEPF assesses the environmental impact to valuable plants and considers compensation criteria.

## 5. Scoping and Times of Reference (T.O.R.) for Survey on Environmental and Social Considerations

### 5.1 Scoping

EIA for the project is carried out based on the Environmental Legislation and Institutions of the Kyrgyz Republic mentioned in “4.2, エラー! 参照元が見つかりません。” and the JICA Guideline for Environmental and Social Considerations (the JICA GL) since the project is implemented as a Japanese grant aid project. Therefore, scoping is also essential according to the legislation and institutions of the Kyrgyz Republic and the JICA GL. There is no specific regulation on the criteria for assessment of the impact in the legislation of the Kyrgyz Republic, so the criteria for assessing the impact were taken from the JICA GL. It must be emphasized that the basic principles of assessment of the impact does not differ from the principles in the Kyrgyz Republic. Scoping result was organized on Scoping Table in accordance with JICA GL (Table 5.1 1).

Table 5.1-1 Scoping Result of the Project

Category	Impacts		Evaluation		Reasons (Expected Negative Impact)	
			Pre-/At-work	In-use	Pre-/At-work	In-use
Social Environment	1	Involuntary Resettlement	B	B	About 2 households are affected at the project site. Involuntary resettlement is required according to the JICA Guidelines with compensation mainly providing alternative lands. The objective area is a part of state land.	Confirmation of the recovery conditions of living is needed when involuntary resettlement is required.
	2	Local Economy such as Employment and livelihood, etc.	D	D	There are no local economies affected by the project.	
	3	Land Use and Utilization of Local Resources	B	D	Land use for construction office and lodging for workers, plant facilities and quarries are expected and it may impact on land development and local resources such as natural resources.	No land use is expected in-use.
	4	Water Usage or Water Rights and Rights of Common	B	D	Water use from Chychkan River or Kochku-Bulak Stream for sprinkling during construction is expected and it may impact on local people who use water from Chychkan River or Kochku-Bulak Stream as living water.	Negative impacts on local residents are not expected, as water usage/consumption is not planned during construction.
	5	Social Institutions Such as Social Infrastructures and Local Decision-making Institutions	D	D	There are no social institutions affected by the project.	

Category	Impacts		Evaluation		Reasons (Expected Negative Impact)		
			Pre-/At-work	In-use	Pre-/At-work	In-use	
	6	Existing Social Infrastructures and Services	B	D	A part of existing road may be used as a bypass road while a temporary bypass road is constructed along the river.	Negative impacts on existing social infrastructures and services are not expected.	
	7	Poverty Group	D	D	There are no poverty groups in affected people.		
	8	Indigenous and Ethnic Population	D	D	There are no indigenous and ethnic population affected by the project.		
	9	Misdistribution of Benefit and Damage	D	D	Nothing brings misdistribution of benefit and damage to the project site.		
	10	Local Conflict of Interests	D	D	No local conflict of interests are expected in the project site vicinity.		
	11	Cultural Heritage	B	D	Discussion of relocation of memorial monuments for the avalanche victims is needed.	No impacts on cultural heritage are expected.	
	12	Landscape	D	D	Existence of construction equipment at the work site will have minimal impact on surrounding scenery as the site is not a scenic area.	Snow Shed may change the sight, but there is no particular impact because the site is not a scenic area.	
	13	Accident	B	D	Consideration for accidents during construction and avalanche is required.	Reduction of accidents is expected by improving traffic potential.	
	14	Infectious Diseases such as HIV/AIDS	B	D	An infected worker may flow into construction camp.	There is no risk of HIV/AIDS infection.	
	15	Work Environment (incl. Work Safety)	B	D	Considering work environment is needed to prevent occupational injury or accidents.	No negative impacts on workers are expected.	
	16	Gender	B	D	Gender discrimination in wages may occur among workers.	Work which may cause gender disparities is not planned.	
	17	Children's Right	D	D	No impact on children's right is expected because workers must be 16 years of age or over and passports are required for employment contracts in the Kyrgyz Republic.		
	Natural Environment	18	Sanctuary	D	D	There are no national parks or sanctuaries around the project site.	
		19	Ecosystem	B	D	Forestland may be lumbered for road construction causing impacts on rare species of plants, archa are expected.	No impact on ecosystem is expected.
		20	Hydrological Situation	B	B	-The outflow and inflow of sediment is expected. -Kochku-Bulak Stream may be affected.	Kochku-Bulak Stream may be affected by the project.
		21	Topography and	D	D	Topography and geographical features will not be	

Category	Impacts		Evaluation		Reasons (Expected Negative Impact)	
			Pre-/At-work	In-use	Pre-/At-work	In-use
		Geographical Features			affected as large scale cutting and embankment are not planned.	
Pollution	22	Trans boundary Impact and Global Warming	C	D	The global warming gas emission from construction vehicles is anticipated.	Increase of traffic is expected, however decreasing of global warming gases is expected due to a reduction in the use of snow blowers and traffic congestion caused by traffic regulations at the time of avalanche.
	23	Air Pollution	B	D	Construction work, equipment and vehicle use may cause air pollution such as exhaust gas or dust.	Increased traffic is expected, however a decrease in air pollution levels are expected because of reduction in the use of snow blowers and improvement of traffic flow.
	24	Water Pollution	B	D	Drainage from the construction site is a concern of a potential source of water pollution.	Work affecting water quality is not expected.
	25	Soil Contamination	B	D	Leakage of asphalt or gasoline from construction equipment is concerned.	Work affecting soil is not expected.
	26	Waste	B	D	Waste from construction work or workers are expected.	Wastes are not expected.
	27	Noise and Vibration	B	D	Noise and vibration from construction equipment are expected.	Noise and vibration affecting the local population are somewhat expected.
	28	Ground Subsidence	D	D	Ground subsidence is not expected as the project site is on gravel ground	
	29	Offensive Odor	C	D	Offensive odor may be generated from wastes or exhaust gas from construction equipment.	Offensive odor is not expected.
	30	Bottom Sediment	D	D	Work to affect bottom sediment is not expected.	

A: Serious negative impact is expected.

B: Some negative impacts are expected.

C: Extent of negative impact is not known  
(Further study and examination is needed to clarify the impact as the study progresses).

D: No negative impact is expected.

## 5.2 TOR for Survey on Environmental and Social Considerations

Based on the scoping in the previous section, a TOR for the required survey on environmental and social considerations is designed as shown in the following table after selecting the items that are ranked B or C.

Table 5.2-1 TOR for Survey on Environmental and Social Considerations

Items	Item of Survey	Method of Survey
Involuntary Resettlement	<ul style="list-style-type: none"> <li>- Understanding of involuntary resettlement scale</li> <li>- Planning of Resettlement Schedule</li> </ul>	<ul style="list-style-type: none"> <li>- Hearing survey with the related organizations</li> <li>- Site survey</li> </ul>
Land Use and Utilization of Local Resources	<ul style="list-style-type: none"> <li>- Confirmation of land acquisition for construction (material storage, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>- Hearing survey with the related organizations</li> <li>- Site survey</li> </ul>
Water Usage	<ul style="list-style-type: none"> <li>- Confirmation of water usage situation of local residents (river etc.)</li> </ul>	<ul style="list-style-type: none"> <li>- Hearing survey with the related organizations</li> <li>- Site survey</li> </ul>
Existing Social Infrastructure and Services	<ul style="list-style-type: none"> <li>- Confirmation of existing social infrastructures around the project site</li> <li>- Understanding of actual status of infrastructures</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> <li>- Site survey</li> </ul>
Cultural Heritage	<ul style="list-style-type: none"> <li>- Confirmation of installation state of Avalanche Victim Monuments</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> <li>- Hearing survey with the related organizations</li> <li>- Site survey</li> </ul>
Accident	<ul style="list-style-type: none"> <li>- Analysis of accidents during construction work and traffic accident</li> <li>- Consideration of road safety practice</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> </ul>
Infectious Diseases such as HIV/AIDS	<ul style="list-style-type: none"> <li>- Understanding of actual status</li> <li>- Consideration of efforts against infectious disease</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> </ul>
Work Environment (incl. Work Safety)	<ul style="list-style-type: none"> <li>- Consideration of work safety practice</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> <li>- Hearing survey from the relating organizations</li> <li>- Collection and confirmation of the information on the project work description, method, period, location /area and equipment used</li> </ul>
Gender	<ul style="list-style-type: none"> <li>- Understanding of actual status</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> </ul>
Ecosystem	<ul style="list-style-type: none"> <li>- Confirmation of habitat status of plants around the project site</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> <li>- Hearing survey from the relating organizations</li> <li>- Collection and confirmation of the information on the project work description, method, period, location /area and equipment used</li> </ul>
Hydrological Situation	<ul style="list-style-type: none"> <li>- Understanding of actual status</li> <li>- Checking the affected area during construction</li> </ul>	<ul style="list-style-type: none"> <li>- Hearing survey from the relating organizations</li> <li>- Site survey</li> </ul>
Trans boundary Impact and Global Warming	<ul style="list-style-type: none"> <li>- Prediction of CO2 emission amount</li> <li>- Checking the affected area during construction</li> <li>- Consideration of emission reduction measures</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> <li>- Site survey</li> <li>- Collection and confirmation of the information on the project work description, method, period, location /area and equipment used</li> </ul>
Air Pollution	<ul style="list-style-type: none"> <li>- Understanding of actual status</li> <li>- Prediction of future concentration of atmospheric pollutant</li> <li>- Checking the affected area during construction</li> <li>- Consideration of emission reduction measures</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> <li>- Site survey</li> <li>- Collection and confirmation of the information on the project work description, method, period, location /area and equipment used</li> </ul>
Water Pollution	<ul style="list-style-type: none"> <li>- Understanding of actual status</li> <li>- Checking the affected area during construction</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> <li>- Site survey</li> <li>- Collection and confirmation of the information on the project work description, method, period, location</li> </ul>




Items	Item of Survey	Method of Survey
		/area and equipment used
Soil Contamination	<ul style="list-style-type: none"> <li>- Understanding of actual status</li> <li>- Checking the affected area during construction</li> <li>- Consideration of pollutant outflow prevention measures</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> <li>- Site survey</li> <li>- Collection and confirmation of the information on the project work description, method, period, location /area and equipment used</li> </ul>
Waste	<ul style="list-style-type: none"> <li>- Confirmation of waste disposal method</li> <li>- Consideration of tree reuse method</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> <li>- Hearing survey from the relating organizations</li> </ul>
Noise and Vibration	<ul style="list-style-type: none"> <li>- Understanding of actual status</li> <li>- Checking the affected area during construction</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> <li>- Hearing survey from the relating organizations</li> <li>- Collection and confirmation of information on the project work description, method, period, location /area and equipment used</li> </ul>
Offensive Odor	<ul style="list-style-type: none"> <li>- Checking the affected area during construction</li> </ul>	<ul style="list-style-type: none"> <li>- Research of data &amp; resources</li> <li>- Site survey</li> <li>- Collection and confirmation of the information on the project work description, method, period, location /area and equipment used</li> </ul>
Alternatives	<ul style="list-style-type: none"> <li>- Reviewing the alignment</li> <li>- Reviewing work methods</li> </ul>	<ul style="list-style-type: none"> <li>- Reviewing alignment alternatives to optimize technical, economic, social and environmental aspects of the Project.</li> <li>- Reviewing work methods to minimize impacts on the environment and traffic congestion during construction.</li> </ul>
Stakeholder Consultation	<ul style="list-style-type: none"> <li>- Holding of stakeholder consultations for affected persons and region</li> <li>- Analysis of opinions and reflections gained from public consultation for the Project</li> </ul>	<ul style="list-style-type: none"> <li>- Holding of stakeholder consultations</li> <li>- Comparison with other cases, checking of the opinions gained, and reflection on the project</li> </ul>

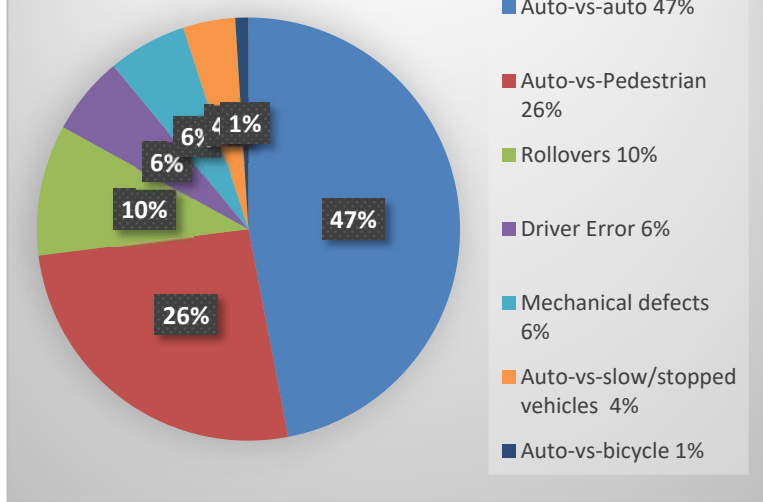
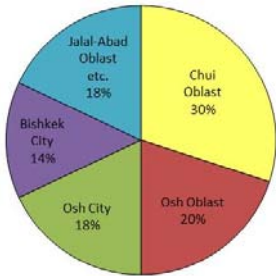
## 6. Survey Results on Environmental and Social Considerations

Table 6-1 indicates the survey results in accordance with the TOR in Section 5.2

Table 6-1 Survey Results on Environmental and Social Considerations

<i>Impact</i>	<i>Results</i>
Involuntary Resettlement	<p>See “10.2, Legal Framework of Involuntary Resettlement” for related legislation and regulations.</p> <p>Site survey and hearing survey on involuntary resettlement were implemented by MOTC and the survey team. As a result of the surveys it was found that two households including apiaires with seven people are affected. Affected people on the Bishkek city side have been settling on government land leased from the Toktogul forestry office of SAEPF for several years. Affected people on the Toktogul city side are temporary settlers of land leased from a third person and their dwellings can be removed by a tractor. MOTC has considered relocation of the two households and compensation contents and decided that alternative lands are provided to affected people without monetary compensation. Notice to the households and consultation on compensation contents shall be implemented by MOTC and Toktogul District before construction. MOTC is planning to establish the persons responsible for relocation and to start monitoring of the activities after E/N. Relocation is scheduled to be completed by November 2015.</p> <p>Details are described in «10.3 Range of impacts».</p>
Land Use and Utilization of Local Resources	<p><b>1. Quarry site</b></p> <p>There are two (2) possible quarry sites. One is located in the compound of the existing asphalt plant in Toktogul City which is planned to be provided with a crushing machine. No license is required for using this facility because it is managed by MOTC. The other is the Kayrak Quarry in Toktogul City with an area of more than 10ha. It was proposed by the State Agency of Geology and Mineral Resources (SAGMR) during the survey; therefore, the Contractor and the Consultant have a responsibility to prepare the required documents from the regional office of SAEPF and the local authority before beginning construction work. MOTC has the responsibility of obtaining the license for quarry operation from SAGMR. Due to its close proximity to the residential area, the quarry is to be equipped only with a sifting machine.</p> <p>These two quarry sites can provide enough materials required by the project.</p> <div data-bbox="943 887 1401 1227" data-label="Image"> </div> <p data-bbox="943 1227 1295 1261">Photo 6-1 The Quarry Kayrak</p> <div data-bbox="560 1487 1390 1677" data-label="Image"> </div> <p data-bbox="560 1686 1050 1720">Figure 6-1 The Image of Shifting Machine</p> <p><b>2. Temporary Stockyard</b></p> <p>The temporary stockyard for excavated materials such as earth and stones has been secured by MOTC at the area of about 0.5 ha beside the Equipment Yard of DEP No. 23 located at the 242km point where SAEPF manages. It is judged to be the best area in consideration of the distance from the project site and width.</p>

	 <p style="text-align: center;">Photo 6-2: Temporary Stockyard</p> <p><b>3. Plant Facility</b> Concrete plant is planned to be installed near the project site. The existing asphalt plant in Toktogul City that is managed by DEP 23 is planned to be used as the asphalt plant for the project.</p>
Water Usage	It was confirmed that local people use water from Chychkan River or Kochku-Bulak Stream as a palatable water source for laundry, etc.
Existing Social Infrastructures and Services	<p>Traffic volume at the project site was surveyed by the consultants in winter and summer (March and June 2014 year). The summary of the traffic volume is as follows:</p> <ul style="list-style-type: none"> <li>- Traffic volume in winter: 2000 to 2200 per day, 400 to 500 of which is truck volume</li> <li>- Traffic volume in summer: 3300 to 3500 per day, 650 to 750 of which is truck volume</li> <li>- Traffic volume in winter, December to March is about 60% to 70% compared to summer.</li> <li>-Traffic on weekends is 10% heavier compared with the weekday volume in winter and summer.</li> </ul> <p>BO road is the most important road in the Kyrgyz Republic; however, traffic in winter is light, which is 60% less than in summer because of the high risk of avalanche, and traffic congestion does not usually occur.</p> <p>However, the existing road may be partially included following the construction of the bypass route; therefore accident prevention occasionally will be needed.</p>
Cultural Heritage	There are two memorial monuments for the avalanche victims in the Project site. Relocation of the monuments is required under the responsibility of MOTC as they are in the right-of-way, within 14m from the road center, and they obstruct construction.
Accident and Casualty/ Fatality Rates	<p>There were 7000 traffic accidents and 1000 deaths in the Kyrgyz Republic in 2007, while the number of deaths per year in Japan is 5000. Population of the Kyrgyz Republic is about 5 million as compared to 13 million in Japan; therefore, it is shown that the number of deaths in the Kyrgyz Republic is abnormally high in comparison to Japan from the perspective of percentage of deaths to population. The primary causes are possibly the slippery conditions on the frozen road and the low visibility due to snowstorm or dust (from unpaved road sections) in addition to speeding and reckless driving.</p> <p>There were 159 traffic accidents, 47 deaths and 261 wounded on BO road in 2011. The details of the number of traffic accidents are shown in the table on page 29.</p>

	<h3 style="text-align: center;">Accident Data</h3>  <p style="text-align: center;">Source: JOC, Road safety advice, CAREC Transport Corridor 1, 2009 Figure 0-1 Details of the Number of Traffic Accidents</p> <p>There is no published data in the Kyrgyz Republic of accidents and road accidents during construction. According to Japanese statistics, the number of accidents at road construction sites were 12% of all incidents and accidents, 10% of which a serious accident (suspension of work exceeding 4 days or more). Scale construction work, is shown to increase the likelihood of accidents and crashes. The main causes of crashes are the errors, of inexperienced workers operating construction equipment, construction tools, hardware, and falling from heights. There is a need for notification of construction work (posters, signs and Light boxes), and for the regulation of traffic on all detours to ensure the prevention of traffic accidents.</p>																					
<p>Infectious Diseases such as HIV/AIDS</p>	<p>5060 people infected with HIV were confirmed in the Kyrgyz Republic in 2013, which is 0.09% of the population. The number of people infected with HIV is increasing by 50 to 70 people every month and the regional breakdown shows a high percentage in Chui Oblast (30%), followed by Osh Oblast (20%) and Osh City (18%). There were 9 persons affected in Toktogul District after 2010, which is about 0.01% of the total population of Toktogul District.<sup>2</sup></p> <p style="text-align: center;"><b>Table 6-2 Ratio of the Number of People infected with HIV (by Region)</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Region</th> <th>The Number of People infected with HIV</th> <th>Ratio</th> </tr> </thead> <tbody> <tr> <td>Chui Oblast</td> <td>1,518</td> <td>30%</td> </tr> <tr> <td>Osh Oblast</td> <td>1,012</td> <td>20%</td> </tr> <tr> <td>Osh City</td> <td>911</td> <td>18%</td> </tr> <tr> <td>Bishkek City</td> <td>708</td> <td>14%</td> </tr> <tr> <td>Jalal-Abad Oblast Naryn Oblast Issyk-kul Oblast Batken Oblast</td> <td>911</td> <td>18%</td> </tr> <tr> <td>Total</td> <td>5,060</td> <td>100%</td> </tr> </tbody> </table> <p style="text-align: center;">Source: Public Broadcasting Company of Kyrgyz Republic</p>  <p style="text-align: center;">Source: Public Broadcasting Company of Kyrgyz Republic Figure 6-3 Ratio of the Number of People infected with HIV (by Region)</p>	Region	The Number of People infected with HIV	Ratio	Chui Oblast	1,518	30%	Osh Oblast	1,012	20%	Osh City	911	18%	Bishkek City	708	14%	Jalal-Abad Oblast Naryn Oblast Issyk-kul Oblast Batken Oblast	911	18%	Total	5,060	100%
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Total	5,060	100%																				
<p>Work Environment (incl. Work</p>	<p>Working environment and Labor Protection Law "on labor protection" (April 17, 2009 year, no. 127) establishes the legal framework for regulation of labor relations between employers and employees and aims to create working conditions that conform to the requirements of maintaining the life and health of workers in the course of employment. Additionally there are approved versions by GOSSTROY, Snips on labor protection as Snip</p>																					

<sup>2</sup> Public Broadcasting Company of Kyrgyz Republic (November 28, 2013)  
29

Safety)	CD 1/12/99-01-99 safety in construction ", snip the CD 12-02: 2004" Organization of construction production. These SNiPah established uniform standards for occupational health and safety management in organizations, organizational and technological preparation of production safety, safety in the production of interdisciplinary work.
Gender	There are no records of court actions regarding women’s wages. The only labor protection Laws currently on file is Law no.27, April 2009 which is not specific of gender issues in employment. Currently women’s wages are 70% of those of men.
Ecosystem	<p>(1) Animal Species It was confirmed that there are no rare animals in the project site. The following animals were mainly identified in the survey by MOTC.</p> <ul style="list-style-type: none"> <li>- Mammals: wood mouse, forest dormouse, rabbit, etc.</li> <li>-Birds: rock bunting, rock pigeon, tawny pipit, etc.</li> <li>-Reptiles: Pevtsova toad, Kyrgyz lizard, snake, etc.</li> <li>-Fishes: carp, freshwater minnow, char, etc.</li> </ul> <p>(2) Plant Species 5 archa trees which are among the valuable plants in Kyrgyz Republic were identified. When archa trees are needed to be cut, MOTC needs to obtain approval for the felling of archa according to the procedures to obtain felling permission of valuable plants mentioned above. The compensation method was considered by MOTC in the survey for the permission. MOTC is planning to newly plant 5 seedlings for cutting 1 tree. This provides a 5 to 1 ratio. MOTC will plan the planting schedule and location (to plant the seedlings) near the project site and then obtain the permission. Planting is scheduled in April or in the period of October to November which is the preferable time, and the budget for planting will be prepared by MOTC in 2015.</p>
Hydrological Situation	<p>The survey team acquired the materials at the time the highest water level was observed during the First Field Survey. Information regarding the largest scale of debris deposit from avalanches resulting in river closure was obtained (Photo 6-3). Therefore, it is apparent that, in order to maintain the current road dimensions, there can be no impact on river water level that could result in flooding.</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="518 1102 933 1429"> </div> <div data-bbox="1021 1124 1420 1406"> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div data-bbox="598 1438 917 1550" style="text-align: center;"> <p>Photo 6-3 River Condition during Water Level Rising in the Past (Depth)</p> </div> <div data-bbox="1173 1438 1396 1550" style="text-align: center;"> <p>Photo 6-4 Range of Flooding during Water Level Rising</p> </div> </div> <p>The construction planned is to not affect the water quality and water flow of the Kochku-Bulak Stream. During the construction, the use of drainage installed on the existing road is planned. After the construction, the use of drainage installed on top of the arch culvert and joining the Chychkan River are planned. The drainage used during construction is to be used as sub-drainage after the construction work.</p>

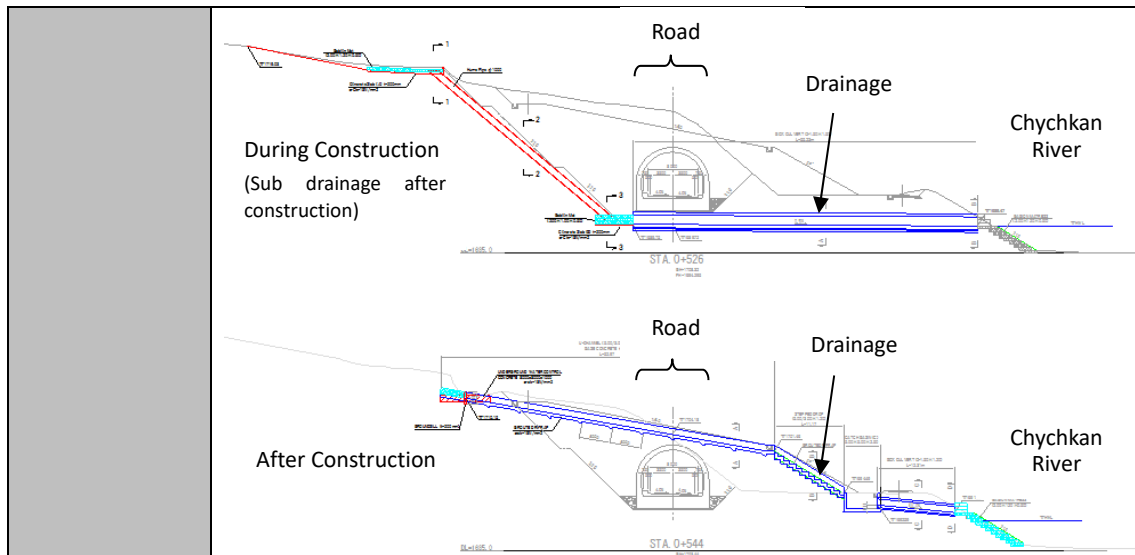


Figure 6-4 Drainage Structure

Trans-boundary Impact and Global Warming

Global warming gas emissions were estimated with emission basic unit based on “the Environmental Impact Assessment Guideline on Global Warming Gas Emissions in Road Project” by the Ministry of Environment. This estimation is the emission of working construction equipment, excluding equipment used to transport materials or wastes. The accurate estimation of global warming gases produced by this transportation equipment can be estimated upon approval of the detailed plan. The global warming gases capable of reducing emissions shall be identified based on the estimation and measures to reduce them are needed.

Table 0-1 Global Warming by Gas Emission

Type of Construction	Main Work	Base Unit of CO2 (t-CO2/km)	Length (km)	Emission (t-CO2)
Road Construction	Cut and embankment, Slope, Lower part of overpass, Box culvert, Ancillary, Drainage, Traffic control device, Pavement	2,267.8	0.9	2,041.1

\*Note: It is assumed that arch culvert is constructed with earthwork.

Air pollution

As the result of the survey on air quality at 3 points in the objective area by MOTC and the survey team, it was found that SO2 and SPM were falling below the environmental standard value. CO at the point A-T2 and A-T3 exceeded the reference values; however, the measured values were greatly affected by not only traffic volume but also vehicles without exhaust emission control devices.

In the quarry site, CO exceeded the reference value. It is presumed that the measured values were affected by the puddle at the entrance of the quarry and the dump site. That means that oxygen was possibly generated by the relation between soil microorganism and humidity around the area.

The summary of the survey in the project site is shown below. For details of survey result and result of quarry site survey see Appendix 3.

Table 6-4 Summary of the Results of Air Quality Survey (Project Site)

Point	Date	SO2 (mg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	SPM (mg/m <sup>3</sup> )
A-T1	2014.06.23	0.0-0.1	2.3-3.9	0.1-0.2
	2014.06.24	0.0-0.1	3.1-4.2	0.1-0.2
A-T2	2014.06.23	0.0-0.0	1.1-6.8	0.1
	2014.06.24	0.0-0.1	2.4-3.6	0.1-0.4
A-T3	2014.06.23	0.0-0.1	1.4-8.8	0.1-0.4
	2014.06.24	0.1	2.6-5.3	0.1-0.2
The Environmental Reference Value		Max 0.5	Max 5.0	Max 0.5

\*Values: The lowest value – The highest value

	Survey Result: SO <sub>2</sub> and SPM were falling below the reference values and CO exceeded the values at Points A-T2 and A-T3.																																					
Water Pollution	<p>As the result of the survey of water quality in the objective area, it was found that pH, DO and SS were falling below the environmental standard value.</p> <p>Soil, dust and mineralogical dust, etc., due to working of construction equipment are expected to be main factors; however, there is no possibility that raw sewage is directly discharged. Sprinkled water for prevention of scattering dust and rainwater may be naturally evaporated. Monitoring is continued and to prevent water deterioration, continuous monitoring is required and drainage from the construction site need to be discharged after clarifying turbid water through a turbid water treatment apparatus.</p> <p>Excess of the referred values was not found in the survey at the quarry site. For details of survey result and result of quarry site survey see Appendix 3.</p> <p style="text-align: center;"><b>Table 6-5 Summary of the Water Quality Survey Results (Project Site)</b></p> <table border="1"> <thead> <tr> <th>Points</th> <th>Date</th> <th>pH</th> <th>Dissolved Oxygen (mg/l)</th> <th>Suspended Solids (mg/l)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">W-T1</td> <td>AM</td> <td>7.5</td> <td>9.25</td> <td>3</td> </tr> <tr> <td>PM</td> <td>7.6</td> <td>9.05</td> <td>5.2</td> </tr> <tr> <td rowspan="2">W-T2</td> <td>AM</td> <td>7.61</td> <td>8.98</td> <td>2.6</td> </tr> <tr> <td>PM</td> <td>8.78</td> <td>9.13</td> <td>6.2</td> </tr> <tr> <td rowspan="2">W-T3</td> <td>AM</td> <td>7.6</td> <td>8.81</td> <td>5.2</td> </tr> <tr> <td>PM</td> <td>7.61</td> <td>9.00</td> <td>5.6</td> </tr> <tr> <td colspan="2">Environmental Reference Value</td> <td>6.5-8.5</td> <td>&gt;4.0</td> <td>&lt;0.75</td> </tr> </tbody> </table> <p>Survey Result: pH, SS and DO at the project site are falling below the environmental standard value.</p>	Points	Date	pH	Dissolved Oxygen (mg/l)	Suspended Solids (mg/l)	W-T1	AM	7.5	9.25	3	PM	7.6	9.05	5.2	W-T2	AM	7.61	8.98	2.6	PM	8.78	9.13	6.2	W-T3	AM	7.6	8.81	5.2	PM	7.61	9.00	5.6	Environmental Reference Value		6.5-8.5	>4.0	<0.75
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Environmental Reference Value		6.5-8.5	>4.0	<0.75																																		
Soil Contamination	<p>Soil contamination is possibly caused by gasoline leaking from construction equipment or vehicles and seeping into the ground a further possible contaminant is engine oil. Drip pans should be used when possible.</p> <p>This contamination is caused by insufficient management of equipment; therefore, daily maintenance and inspection of all equipment related to the construction are required to avoid soil contamination.</p>																																					
Waste	Wastes from construction work are expected to be construction generated soil by cutting work, the felling of trees, other wastes, etc.																																					
Noise and Vibration	<p>As the result of the survey of noise and vibration in the project site and the quarry site, almost all of the measured values did not exceed the environmental standard value. Noise and vibration from construction equipment need to be monitored during construction, because there are many apiaries along the BO road although there are no public facilities such as schools and hospitals. Noise tends to become bigger in proportion from the traffic volume; however, noise and vibration are not expected to impact local residents after the construction work. For details see Appendix 3.</p> <p style="text-align: center;"><b>Table 6-6 Summary of the Noise and Vibration Survey Results (Project Site)</b></p> <table border="1"> <thead> <tr> <th>Point</th> <th>Date</th> <th>Sound Level (dBA)</th> <th>Vibration Level (dBA)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">A-T1</td> <td>2014.06.23</td> <td>65-77.4</td> <td>79.5-81.2</td> </tr> <tr> <td>2014.06.24</td> <td>61.2-74</td> <td>78-80.3</td> </tr> <tr> <td rowspan="2">A-T2</td> <td>2014.06.23</td> <td>66.9-76</td> <td>78.9-95.4</td> </tr> <tr> <td>2014.06.24</td> <td>66.2-72.6</td> <td>77-91.2</td> </tr> <tr> <td rowspan="2">A-T3</td> <td>2014.06.23</td> <td>59.3-74</td> <td>79.1-80.9</td> </tr> <tr> <td>2014.06.24</td> <td>63-80.2</td> <td>79.8-83.7</td> </tr> <tr> <td colspan="2">Environmental Reference Value</td> <td>75</td> <td>83</td> </tr> </tbody> </table> <p>*values: The lowest value – The highest value</p> <p>Survey Result: Noise and vibration are mostly falling below the environmental standard value.</p>	Point	Date	Sound Level (dBA)	Vibration Level (dBA)	A-T1	2014.06.23	65-77.4	79.5-81.2	2014.06.24	61.2-74	78-80.3	A-T2	2014.06.23	66.9-76	78.9-95.4	2014.06.24	66.2-72.6	77-91.2	A-T3	2014.06.23	59.3-74	79.1-80.9	2014.06.24	63-80.2	79.8-83.7	Environmental Reference Value		75	83								
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	2014.06.24	63-80.2	79.8-83.7																																			
Environmental Reference Value		75	83																																			
Offensive Odor	<p>Household wastes generated in the construction camp can produce offensive odor if appropriate treatment for the wastes is not carried out.</p> <p>The contractor must secure an agreement for the treatment of household wastes with the Department of Housing and Public Buildings in Jany-DjolVillage adjacent to the</p>																																					

	Contractor's camp for project implementation.
Alternatives	See "3, Comparative Review of Alternatives."
Stakeholder Consultation	Stakeholder consultation was held with people living in Toktogul District on July 2, 2014. There were negative opinions and many requests for early implementation of the project.

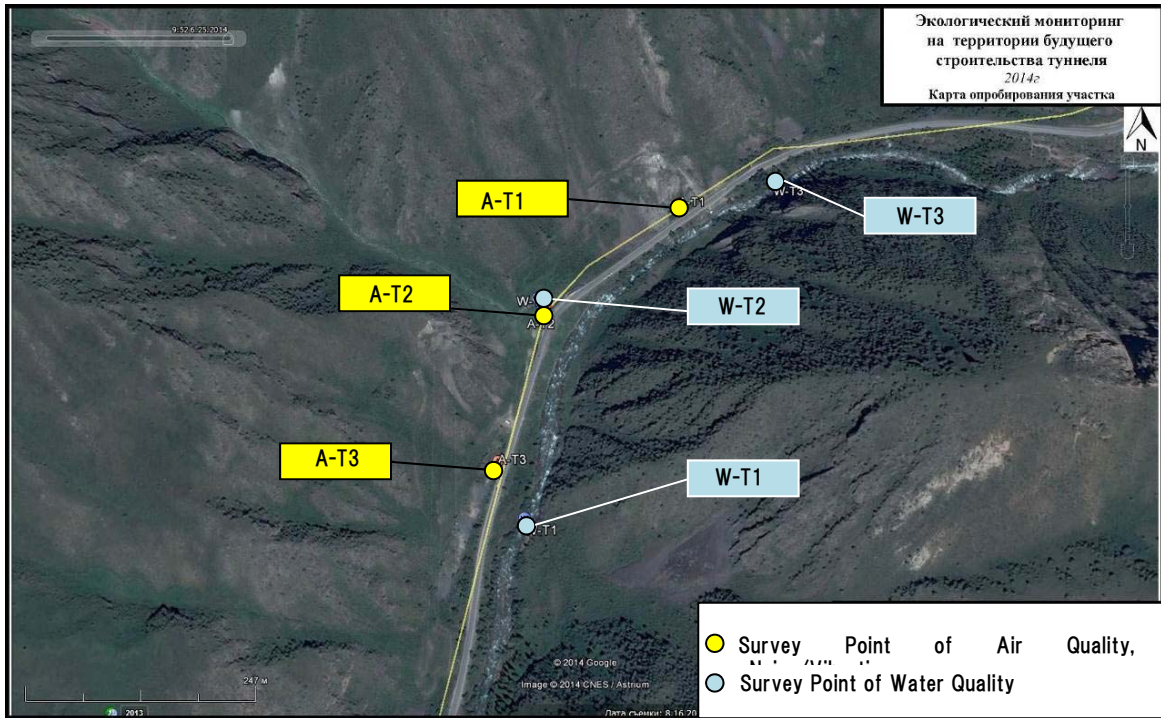


Figure 6-5 Map of the Survey Point (the Project Site)



## 7. Impact Evaluation and Mitigation Plan

The following table shows the re-evaluation of the scoping, based on the survey results on environmental and social considerations in the previous chapter, and mitigation plan for the items possibly affected.

Table 7-1 Impact Evaluation and Mitigation Plan  
 A: Serious negative impact, B: Some negative impact, C: Uncertain negative impact, D: Little negative impact

Category	Impacts		Evaluation		Evaluation Based on the Survey		Reason		Mitigation Measures
			Pre-/At-work	In-use	Pre-/At-work	In-use	Pre-/At-work	In-use	
Social Environment	1	Involuntary Resettlement	B	B	B	B	Two households including apiaries with seven people are affected by the project. MOTC considered relocation of those households and compensation contents and decided that alternative lands are provided for the affected people without monetary compensation.	Confirmation of the recovery conditions of living is needed when involuntary resettlement is required.	MOTC shall compensate losses for affected people according to the JICA GL. Provision of alternative locations by MOTC and Toktogul District is expected as compensation; however, contents of compensation are decided through stakeholder meetings. Also, re-construction support of lives shall be given to them.
	2	Local Economy such as Employment and Livelihood, etc.	D	D	D	D	There are no local economies affected by the project.		-
	3	Land Use and Utilization of Local Resources	B	D	B	D	There is some impact on land use because unutilized land is developed for a quarry site. Additionally, existing facilities are used for temporary stockyards and plant facilities with no new land use.	No land use is expected	Consultants and contractors shall prepare the appropriate construction plan and execute the appropriate construction management so as to minimize land disruption.

Category	Impacts		Evaluation		Evaluation Based on the Survey		Reason		Mitigation Measures
			Pre-/At-work	In-use	Pre-/At-work	In-use	Pre-/At-work	In-use	
	4	Water Usage or Water Rights and Common Rights	B	D	D	D	Use of Water from Chychkan River or Kochku-Bulak Stream for sprinkling during construction is expected; however; there is no particular impact on the local population.	No water use is planned during construction	
	5	Social Institutions such as Social Infrastructures and Local Decision-making Institutions	D	D	D	D	There are no social institutions affected by the project.		-
	6	Existing Social Infrastructures and Services	B	D	B	D	Accidents may occur because the existing road is partly included when bypass route along the river is constructed	Negative impacts on existing social infrastructures and services are not expected	- In order to mitigate traffic congestion, the contractor shall take measures through advance consultation with MOTC and the local police. -Speed limits for construction vehicles and placement of signs and protective facilities to prevent accidents.
	7	Poverty Group	D	D	D	D	There are no poverty groups in affected people.		-
	8	Indigenous and Ethnic People	D	D	D	D	There are no indigenous and ethnic people affected by the project.		-
	9	Misdistribution of Benefit and Damage	D	D	D	D	Nothing brings misdistribution of benefit and damage to the project site.		-
	10	Local Conflict of Interests	D	D	D	D	No local conflict of interests is expected around the project site.		-
	11	Cultural Heritage	B	D	B	D	Memorial monuments for the avalanche victims need to be relocated.	No impact on cultural heritage is expected.	When relocation is needed, the consultant and contractor shall prepare the plans for relocation, storage, and reinstallation to minimize impacts on the monuments.

Category	Impacts		Evaluation		Evaluation Based on the Survey		Reason		Mitigation Measures
			Pre-/At-work	In-use	Pre-/At-work	In-use	Pre-/At-work	In-use	
	12	Landscape	B	B	D	D	Existence of construction equipment in the work site may impact the surrounding scenery, However, there is no particular impact because the site is not a scenic area.	Snow Shed may change the sight, but there is no particular impact because the site is not a scenic area.	-
	13	Accident	B	D	B	D	Consideration of accidents during construction and avalanche is required.	Prevention of accidents is expected by improving traffic potential.	The contractor shall conduct the following mitigation measures for the prevention of accidents during construction: administration of medical supplies and safety equipment for working from heights; provision of enough traffic guides, emergency response measures, safety education, and daily meetings prior to beginning work and safety measures for danger prevention such as the installation of road signs. Also, an environment, health and safety manager shall be appointed for sanitary and environmental issues, and to record and report accidents during the construction.

Category	Impacts		Evaluation		Evaluation Based on the Survey		Reason		Mitigation Measures
			Pre-/At-work	In-use	Pre-/At-work	In-use	Pre-/At-work	In-use	
	14	Infectious Diseases such as HIV/AIDS	B	D	B	D	An infected worker may flow into construction camp.	No negative impact on workers is expected.	The spread of HIV infection is possibly caused by unprotected sexual activities with workers who are possibly HIV positive and needle sharing among drug users. Therefore, the contractor shall strictly control the use of drugs and also ensure health workers and first-aid providers are mandated to wear gloves for all persons treated at the site and to change them for each individual treated regardless of injury/illness. Also, the contractor shall invite experts and the police to teach and educate newly admitted persons and implement the campaign to prevent unprotected sexual activities and give workers contraceptives in advance.
Natural Environ	15	Work Environment (incl. Work Safety)	B	D	B	D	Consideration of work environment is needed to prevent occupational injury or accidents.	No negative impact on workers is expected.	The contractor shall require workers to wear proper work clothes and protective gear such as helmets etc. for the prevention of injuries or accidents and implement training activities for occupational health through morning meetings or lectures. Emergency response system to accidents shall be established.
	16	Gender	B	D	B	D	Gender discrimination in wages may occur among workers.	Work to cause gender disparities is not planned.	The contractor shall regularly monitor the wage ledgers of the original, sub and sub-contractor so as to prevent wage disparities between men and women workers of particularly the sub-contractor, despite any management difficulties associated with this issue.
	17	Children's Right	D	D	D	D	No impact on children's rights are expected.		-
	18	Sanctuary	D	D	D	D	There are no national parks or sanctuaries around the project site.		-
	19	Ecosystem	B	D	B	D	Lumbering of 5 archa, rare species is expected. When archa is needed to be cut down, MOTC	No impact on ecosystem is expected.	The consultant and the contractor shall prepare the appropriate construction plan and execute the appropriate construction management so as to prevent unneeded

Category	Impacts		Evaluation		Evaluation Based on the Survey		Reason		Mitigation Measures
			Pre-/At-work	In-use	Pre-/At-work	In-use	Pre-/At-work	In-use	
							must obtain approval. MOTC is planning to newly plant a total of 25 seedlings.		lumbering of trees.
	20	Hydrological Situation	B	D	B	B	There is less impact on hydrological situation by the outflow and inflow of sediment. Kochku-Bulak Stream may be affected by the project.	Kochku-Bulak Stream may be affected by the project.	A drainage plan shall be prepared by the contractor so as to minimize the impact on Kochku-Bulak Stream and construction management shall be executed taking water flow into consideration.
	21	Topography and Geographical Features	D	D	D	D	Topography and geographical features may not be affected because large cutting and embankment are not planned.		-
Pollution	22	Trans boundary Impact and Global Warming	C	D	B	D	The global warming gas emission from construction vehicles is anticipated.	Increase of traffic is expected; however, a decrease in global warming gases is expected because of a reduction in the use of snow blowers and traffic congestion caused by traffic restrictions at the time of avalanche.	The consultant and the contractor shall predict the emission of global warming gas from construction work, and specify the measures capable of reducing emissions.
	23	Air Pollution	B	D	B	D	Current air quality is falling below the reference values; however, the spread of global warming gases from construction equipment is expected. Increase of CO2 emission from construction vehicles is anticipated.	Traffic increases are expected; however, a decrease in air pollution is also expected because of the reduction in the use of snow blowers and improvement of traffic flow.	The consultant and the contractor shall strictly maintain and manage construction equipment and avoid unnecessary use. Water shall be sprinkled and construction equipment shall be covered with fling-up dust prevention facility. Furthermore, early greening shall be effectively carried out in addition to the avoidance of unnecessary traffic and speed limitations for all construction vehicles.

Category	Impacts		Evaluation		Evaluation Based on the Survey		Reason		Mitigation Measures
			Pre-/At-work	In-use	Pre-/At-work	In-use	Pre-/At-work	In-use	
	24	Water Pollution	B	D	B	D	Drainage from the construction site is anticipated to be a potential source of water pollution.	Work affecting water quality is not expected.	The consultant and the contractor shall discharge drainage from the construction site after identifying turbid water via turbid water treatment apparatus for the mitigation water quality impact. Moreover, they shall prohibit unnecessary storage of containers of fuel or lubricant, parking and washing vehicles and dumping construction wastes.
	25	Soil Contamination	B	D	B	D	Leakage of asphalt or gasoline from construction equipment is anticipated.	Work that will affect soil is not expected.	The consultant and the contractor shall strictly conduct daily maintenance and inspection of e construction equipment to avoid the leakage of gasoline/oil etc. from them. Also, they shall store fuel and chemicals in a fenced storage area free from the elements of weather.
	26	Waste	B	D	B	D	Wastes from the construction work or workers are expected.	Wastes are not expected.	The consultant and the contractor shall bring construction wastes to the specified disposal site and appropriately treat them. Also, by-products such as trees shall be reused as much as possible.
	27	Noise and Vibration	B	D	B	D	Noise and vibration from construction equipment are expected.	Noise and vibration that will affect local people are expected.	The consultant and the contractor shall measure noise from construction equipment during construction and prevent noise with the use of sound proofing covers/mufflers as necessary in addition to noise reduction devices.
	28	Ground Subsidence	D	D	D	D	Ground subsidence is not expected because the project site is on gravelly ground.		-
	29	Offensive Odor	C	D	B	D	Offensive odor may be generated from wastes or exhaust gas from construction equipment.	Offensive odor is not expected.	The consultant and the contractor shall strictly maintain and manage construction equipment and prevent unnecessary use. Also, they shall appropriately treat living wastes for offensive odor prevention.
	30	Bottom Sediment	D	D	D	D	Work to affect bottom sediment is not expected.		-

## 8. Environmental Management Plan and Environmental Monitoring Plan

Draft Environmental Management Plan on the impacts to environmental items, expected impacts, mitigation measures, monitoring parameters and the implementation organization based on the survey result are proposed below. The plan shall be made and implemented by MOTC, the Consultant or the Contractor, and the contents of the plan is to be reported to the Jalal-Abad regional office of SAEPP.

The consultant and the contractor shall prepare a Draft Environmental Management Plan and obtain approval from MOTC, supervise the status of the implemented monitoring and take corrective measures when monitoring is not executed as specified. They shall also prepare monthly, quarterly, and annual environmental reports, to be confirmed and evaluated by MOTC. MOTC shall further instruct any and all corrective measures to be taken, if necessary.

These environmental countermeasures and construction cost are generally included in the construction plan.

Table 8-1 Environmental Management Plan / Environmental Monitoring Plan

Environmental Items		Expected Impacts	Mitigation Measures	Implementing Organization	Monitoring Contents - Frequency
1	Involuntary Resettlement	Affected households: 2 Affected persons :7	Implementation of involuntary resettlement to alternative lands according to the JICA GL: MOTC in cooperation with the Toktogul District shall prepare and organize a comprehensive relocation and resettlement plan of those affected by the Project. The affected individuals shall be compensated as follows: 1. The replacement of land is to be equal to or greater than the existing land/structure. 2. This replacement shall provide and equal or improved standard of living and quality of life.	MOTC	<u>At- work (monthly monitoring)</u> - Confirmation of living conditions and their monthly income. - Confirmation of grievances. <u>In-use</u> *When recovery of livelihood is not confirmed at work - Confirmation of living conditions and their income - every month for two years - Confirmation of grievances - every month for two years - Consideration of the necessity of additional countermeasures for the recovery of livelihood.
2	Land Use and Utilization of Local Resources	Use of undeveloped lands as the quarry site.	Preparation of the construction plan and execution of the construction management so as to minimize land development.	Consultant and Contractor	- Confirmation of land use as the quarry – every month
3	Existing Social Infrastructures and Services	Use existing road as the temporary bypass.	- Advance consultation with MOTC and the local police. - Limitation of speed of construction vehicles, installation of signs and protective facilities.	Contractor	- Confirmation of the number of grievances against traffic congestion on the temporary road / for every occurrence of grievance.
4	Cultural Heritage	Relocation, storage and reinstallation of the	Appropriate plan and implementation of relocation, storage and reinstallation.	MOTC	- Confirmation of plan and implementation of the monuments of

Environmental Items		Expected Impacts	Mitigation Measures	Implementing Organization	Monitoring Contents - Frequency
		monuments of avalanche victims.			the avalanche victims - when the plan is formulated and after construction
5	Accident	Accidents and avalanche during construction.	<ul style="list-style-type: none"> <li>- Administration of medical supplies and safety equipment for working from heights, provision of enough traffic guides emergency response measures, safety education, daily safety meeting prior to beginning work, and activities for danger prevention such as the installation of road signs.</li> <li>- Records and reports of accidents, environmental, health and safety issues from site manager.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>- Confirmation of execution and success of the safety and health plan – monthly</li> <li>- Accident reports – immediately after each occurrence</li> </ul>
6	Infectious Diseases such as HIV/AIDS	Influx of workers who are HIV positive.	<ul style="list-style-type: none"> <li>- Strict control of the use of drugs.</li> <li>- Implementation of the campaign by the experts and police to prevent unprotected sexual activities.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>- Confirmation of implementation status of control of drug use campaign – monthly</li> </ul>
7	Work Environment (incl. Work Safety)	Injuries and accidents of workers.	<ul style="list-style-type: none"> <li>- Requirements for the proper wear and use of safety, protective gear, and appropriate clothing etc.</li> <li>- Implementation of occupational health education and training.</li> <li>- Establishment of an emergency response system when accidents occur.</li> </ul>	Contractor	<ul style="list-style-type: none"> <li>- Confirmation of safety procedure adherence</li> <li>- Confirmation of implementation status of education and training programs – monthly</li> <li>- Accident reporting- immediately after each occurrence</li> </ul>
8	Gender	Wage disparities between men and women workers.	Regular monitoring of the wage ledgers of the original, sub and sub-subcontractor.	Consultant	<ul style="list-style-type: none"> <li>- Confirmation of the wage ledgers - monthly.</li> </ul>
9	Ecosystem	Felling of trees.	<ul style="list-style-type: none"> <li>- Preparation of a construction plan taking the schedule of lumbering of and planting of archa into consideration.</li> <li>- Systematic lumbering of archa and planting of seedlings and appropriate construction management after planting.</li> </ul>	Consultant and contractor	<ul style="list-style-type: none"> <li>- Confirmation of the planting plan of archa and the implementation status of planting - when the plan is formulated and after planting</li> </ul>
10	Hydrological Situation	Change of water flow of Kochku-Bulak Stream	Preparation and appropriate execution of the drainage plan.	Consultant and contractor	<ul style="list-style-type: none"> <li>- Confirmation of water flow by visual observation - daily</li> </ul>
11	Air Pollution	Spread of global warming gas by construction equipment	<ul style="list-style-type: none"> <li>- Strict maintenance and management of the construction equipment and prevention of unnecessary use.</li> <li>- Water sprinkling and the use of covering material</li> <li>-Air quality monitoring quarterly</li> </ul>	Consultant and contractor	<ul style="list-style-type: none"> <li>- Confirmation of air by visual observation - daily</li> <li>- Water sprinkling for dust generation point - when needed</li> <li>- Air quality monitoring (SO<sub>2</sub>,CO,SPM) (three points) - quarterly</li> </ul>
12	Water Pollution	Water pollution by drainage	- The use of a turbid water treatment	Consultant and	<ul style="list-style-type: none"> <li>- Water quality monitoring (pH, SS, DO)</li> </ul>



Environmental Items		Expected Impacts	Mitigation Measures	Implementing Organization	Monitoring Contents - Frequency
			apparatus, etc. - Water quality monitoring monthly	contractor	(three points) - monthly
13	Soil Contamination	Soil contamination from leaking asphalt or gasoline from construction equipment.	- Strict adherence to the daily maintenance and inspection plan of all construction equipment.	Consultant and contractor	Monitoring of leaking status - daily
14	Waste	Construction wastes and human wastes.	- Appropriate treatment of wastes at the specified disposal - Reuse of lumbered trees etc.	Contractor	- Confirmation of waste transportation records - monthly
15	Noise and Vibration	Noise and vibration from construction equipment.	- The use of sound proof covers, etc. - Adoption of noise reducing device and construction work with low noise. - Noise and vibration monitoring quarterly	Consultant and contractor	Noise and vibration monitoring (three points) - quarterly
16	Offensive Odor	Offensive odor from emitted gas or waste.	- Strict maintenance and management of construction equipment and prevention of unnecessary work for them. - Appropriate treatment of living wastes. - Waste management and monitoring monthly	Contractor	- Confirmation of waste management records - monthly

The above draft environmental management plan is the preliminary plan. The detailed plan shall be determined in consideration of environmental protection requirements by MOTC before the start of construction work in December, 2015.

## 9. Stakeholder Consultations

The first stakeholder consultation meeting was held for local people in the objective area, Toktogul District, by MOTC after the project explanation to Toktogul City on July 2, 2014. The implementing schedule is shown in Table 9-1. The second stakeholder consultation meeting is scheduled after the EIA is approved, and the third before construction. Table 9-2 gives a summary of the first stakeholder consultation meeting.

Minutes from the meeting and the List of participants are given in Appendix 3, Appendix -4

Table 9-1 Implementation Schedule of Stakeholder Consultation Meeting

	Date / Time	Place	Contents
1 <sup>st</sup>	July 2, 2014 / 14:00 -	Toktogul City	-Explanation of the project summary -Explanation of the contents of the EIA survey
2 <sup>nd</sup>	Mid November, 2014 (tentative)	Toktogul City (tentative)	-Explanation of the EIA survey results -Explanation of compensation policy
3 <sup>rd</sup>	Undecided (before start of construction)	Undecided	-Explanation of Project detail, etc.

Table 9-2 Summary of the First Stakeholder Consultation

Date/Time	July 2, 2014 / 14:00-	
Place	Toktogul Regional Office, Toktogul City	
Attendees	Deputy Governor of Toktogul District, Local people in Toktogul District, Personnel of relevant administrative organizations	
Contents	-Explanation of the project summary -Explanation of the contents of the EIA survey	
Language	Russian	
Opinions	Question 1.	When will the construction start? Immediate implementation is desired.
	Answer 1.	Construction will start in 2016.
	Question 2.	Will Japanese contractors implement the construction work? The use of local contractors is desired for the employment of countermeasures.
	Answer 2.	The prime contractor will be Japanese because the project will be implemented as a grant aid project of Japan. However, Kyrgyz companies will be included as cooperative companies.
	Question 3.	Are there any countermeasures to maintain the water quality of Chychkan River? The maintenance of water quality of the river and Kochku-Bulak Stream is desired.
	Answer 3.	The drainage from the construction site is planned to be discharged into Chychkan River after clarifying turbid water through a turbid water treatment apparatus, etc.
	Question 4.	What scale of avalanche can the Snow Shed withstand?
	Answer 4.	The Snow Shed is designed to withstand the magnitude of one of the greatest avalanches in the past, which is 42m of debris height based on the hearing survey.
	Question 5.	Occurrence of avalanche of earth and rocks is anticipated in the objective area. Can the Snow Shed withstand sediment deposition?
	Answer 5.	The Snow Shed can withstand sediment deposition because 42m of debris height is equivalent to about 15m of earth covering.

## 10. Land Expropriation and Resettlement

In this section, the land expropriation and resettlement of the project are described. Their description is required in the JICA GL although not required in the legislation of the Kyrgyz Republic.

### 10.1 Necessity of Land Expropriation and Resettlement

The Project site is state land. Therefore, land expropriation is not required. However, involuntary resettlement is required because there are people who rent and live on the land. MOTC shall decide the compensation method and contents and securely implement them.

The contractor and the consultant have the responsibility to prepare the required documents from the regional office of SAEPPF and the local authority before the commencement of construction work. MOTC has the responsibility to obtain the license for quarry operation from SAGMR.

### 10.2 Legal Framework on Involuntary Resettlement

Involuntary resettlement in the Kyrgyz Republic is conducted based on the Constitution of the Kyrgyz Republic (2010.6.27), the Civil Code of the Kyrgyz Republic No. 16 (1992.6.2), and the Land Code of the Kyrgyz Republic No. 45 (1992.6.2). Recently, it has been conducted based on the regulation of MOTC or the guidelines of the donor of each project in addition to the legislation; therefore, the project is also based on these regulations and the guidelines.

The differences between the laws and guidelines of the Kyrgyz Republic and the JICA GL are shown in Table 10.2-1.

Table 10.2-1 Comparison between Laws and Guidelines of the Kyrgyz Republic and JICA Guidelines

No.	JICA Guidelines	Laws and Guidelines of the Kyrgyz Republic	Difference with the JICA GL	Project Policy
1.	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL)	The Constitution of Kyrgyz Republic (KR), Land Code, Civil Code	None	Same as JICA GL
2.	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	The Constitution of KR, Land Code, Civil Code	None	Same as JICA GL
3.	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at a minimum restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	The Constitution of KR, Land Code, Civil Code	None	Same as JICA GL
4.	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	The Appraisal of properties is carried out according to market value and market price based on the decrees, Government Resolution No. 537 as of 21 August 2003 and No. 217 as of 03 April 2006.	None	Same as JICA GL
5.	Compensation and other forms of	The Constitution of KR,	None	Same as JICA GL

No.	JICA Guidelines	Laws and Guidelines of the Kyrgyz Republic	Difference with the JICA GL	Project Policy
	assistance must be provided prior to displacement. (JICA GL)	Land Code, Civil Code		
6.	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	Not specified	Necessity of preparing resettlement action plan is not clear.	Same as JICA GL
7.	In preparing a resettlement action plan, consultations must be held with the affected parties and their communities based on sufficient information made available to them in advance. (JICA GL)	Not specified	Necessity of consultations is not clear.	Same as JICA GL
8.	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)	Not specified	Necessity of consultations is not clear.	Same as JICA GL
9.	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICA GL)	Not specified	Necessity of consultations is not clear.	Same as JICA GL
10.	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	Grievance Redress mechanism will be established by MOTC based on the Order of the MOTC No. 95 (04 October 2012) and the Act of KR No. 67 (05 April 2007).	Treatment of these vulnerable groups is not clear.	Same as JICA GL
11.	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advantage of such benefits. (WB OP4.12 Para.6)	“Cut-off date” is not specified in the Kyrgyz Republic. However, “cut-off date” has been set by MOTC based on the donor policy in many projects, and affected people have been identified and recorded through an initial baseline survey from the date.	Identification of affected people is not clear, but there is no difference in actual conditions.	Same as JICA GL
12.	Eligibility of benefits include the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under the law), the PAPs who do not have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP4.12 Para.15)	Only the PAPs who have formal right to property are eligible for compensation. (Land Code)	PAPs who do not have formal legal rights to land at the time of census are not eligible for compensation.	All PAPs will be eligible for compensation and rehabilitation assistance, regardless of tenure status under the JICA Guidelines.
13.	Preference should be given to land-based resettlement strategies for	Not specified.	Land-based resettlement is	Same as JICA GL

No.	JICA Guidelines	Laws and Guidelines of the Kyrgyz Republic	Difference with the JICA GL	Project Policy
	displaced persons whose livelihoods are land-based. (WB OP4.12 Para.11)		not clear.	
14.	Provide support for the transition period (between displacement and livelihood restoration). (WB OP4.12 Para.6)	Not specified. PAPs have only the right to receive compensation of losses.	Support for the transition period is not provided.	Same as JICA GL
15.	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities, etc. (WB OP4.12 Para.8)	Not specified. However particular attention has been paid to the needs of the vulnerable groups as necessary.	Attention to the vulnerable groups is not clear, but there is no difference in actual conditions.	Same as JICA GL

### 10.3 Range of Impacts

Cut-off date of the project is set on the day of the second stakeholder consultation meeting in the middle of November, 2014. Since the inflow of new population is not expected, the household interview survey and the assets inventory survey were conducted after the first stakeholder consultation meeting. The results of the surveys are shown below.

#### 10.3.1 Household Interview Survey

Two (2) affected households and seven (7) affected persons were found in the household interview survey. The information on households and the number of affected people by age are shown below.

Table 10.3-1 Information of Households

	Place	Sex	Age	Marital Status	Family Structure
1	Bishkek City Side (End Point Side)	Female	30	Married	Household Spouse Daughters (2) Sons(2)
2	Toktogul City Side (Starting Point Side)	Male	48	Married	Household *Others are in Bishkek

Table 10.3-2 The Number of Affected People by Age



Age	Number
0-4	2
5-9	1
10-14	1
15-19	0
20-24	0
25-29	0
30-34	1
35-39	1
40-44	0
45-49	1
50 or over	0
Total	7

#### 10.3.2 Assets Inventory Survey

The state of assets of affected people is shown below.

Table 10.3-3 State of Assets of Affected People

	Bishkek City Side (End Point Side)	Toktogul City Side (Starting Point Side)
Sex of Household	Female	Male
Number of Residents	6 including 4 children	1 (Disabled) *Others are in alternative housing. Wife is disabled.
Stay Period	From May to October every year	From June to September (2014)
Land	- Area: 800m <sup>2</sup>	- Area: 800m <sup>2</sup>

	Bishkek City Side (End Point Side)	Toktogul City Side (Starting Point Side)
	- Ownership pattern: lease from the Toktogul Forestry until 2016 and plan to lease after 2016	- Ownership pattern: temporary lease from a third person who leased the land from Toktogul Forestry for three months.
Building	- House: 3, Doghouse: 1 - Display base of honey: 1 - Beehive: 40	- House: 1 *movable by a tractor - Display base of honey: 1 - Beehive: 120
Crop	- Onion: 2m <sup>2</sup> - Garlic: 0.5 m <sup>2</sup> - Radish: 0.5 m <sup>2</sup>	None
Tree	- Cassis: 13 trees, 15 m <sup>2</sup> - White birch: 5 trees, 2 m <sup>2</sup> - Flower: 1 m <sup>2</sup> *All of the above are for greening with guidance from the Forestry.	None
Income	Honey sales: 30,000KGS/month (during stay period)	- Honey sales: 200,000-300,000KGS/three months (during stay period) - Disability benefits
Appearance		

### 10.3.3 Other Affected Items

#### (1) Monuments

There are two monuments of avalanche victims located in the objective area. MOTC and Toktogul District investigated the monuments. However, no record of installation was found and the installation personnel were not identified. It was judged that they were installed without prior permission. Therefore, their temporary removal and reinstallation were permitted by Toktogul District.



Photo 10-1 Monuments

#### (2) Archa

Archa is protected by the prohibition of cutting, transportation, utilization, purchasing and selling of particular valuable wood species (walnut and archa trees) in Kyrgyz Republic. Archas are located in the objective area. Five of which are required to be cut down in the execution of the Project. MOTC must apply to SAEPF for the felling of archa and consider compensation contents before implementing the project.

## 10.4 Contents of Compensation and Assistance

Compensation contents are shown below. The land utilized by the affected parties of the involuntary resettlement is managed by the Forestry Office. Therefore, the right of land use will be terminated upon expiration of the current lease contract with the Forestry Office. The provision of alternative lands is adopted as the total compensation package including compensation for buildings, relocation cost, mobilization cost and so on. Compensation Contents are explained in table 10.4

Table 10.4 Compensation Contents

Affected Items	Compensation Contents	Responsible Institutions
Affected People	<ul style="list-style-type: none"> <li>-Basically, alternative lands where affected people have the ability to maintain living standards equal to or greater than that of present life shall be provided appropriate dwellings, in Jany-Djor village located in close proximity to the affected area. The alternative lands shall be used from 2015.</li> <li>-MOTC (DEP23) shall prepare vehicles and manpower to assist affected people transfer houses.</li> <li>- No compensation for crops is required because they are annual plants and are in small quantity. No compensation for trees is required as they are for greening. (Affected people in Bishkek side)</li> </ul>	MOTC Jany-Djol village in Toktogul District
Monuments	<ul style="list-style-type: none"> <li>-No compensation as the monuments were installed without permission.</li> <li>- They will be temporarily removed and stored during construction and reinstalled after construction.</li> </ul>	MOTC Toktogul District
Archa	<ul style="list-style-type: none"> <li>- Planting of 5 trees per one archa which are approximately 15 year-old trees and 1m height, total 25 trees.</li> <li>- 35,000KGS is expected as the cost of planting 25 trees including the planting fee 10,000KGS.</li> </ul>	MOTC

### 10.5 Grievance Redress Mechanism

A grievance redress group (GRG) will be established for the duration of project implementation. Firstly, the complaint, etc., will be received in the community that the affected people are members of and will be submitted to the Local GRG. If the complaint is not resolved in three days, the Local GRG discusses the complaint with the complainant and seeks guidance from the local Roads Maintenance Unit and the representative of affected persons for possible solutions. (Stage 1, Local level). If the complaint is not resolved in fifteen days, it is submitted to the Central GRG, MOTC headquarters and a solution will be determined following approval from MOTC- IPIG (Stage 2, Central level)

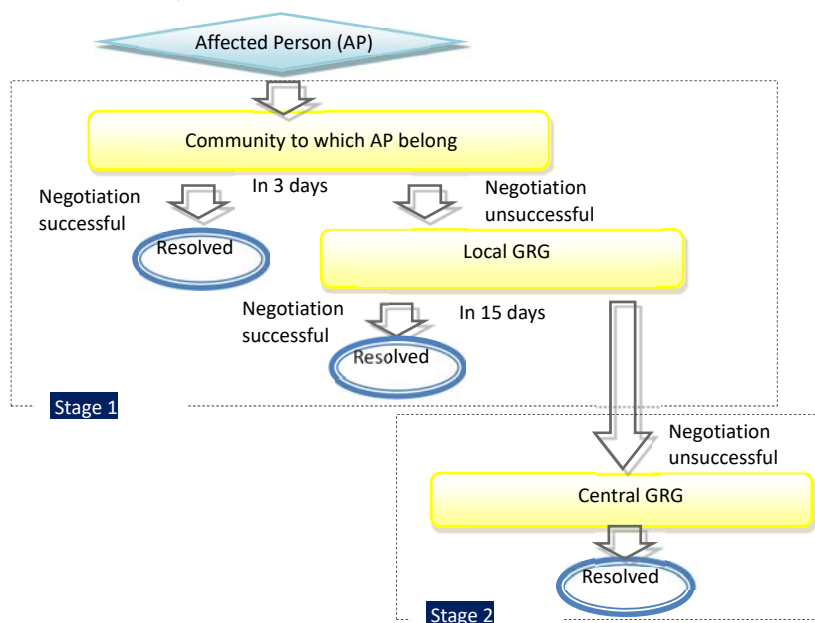


Figure 10.5 Grievance Redress Process

### 10.6 Implementing System

Involuntary resettlement shall be conducted by MOTC-IPIG until the Exchange of Notes (E/N) between the Kyrgyz and Japanese Governments is concluded and it shall be conducted by MOTC-IPIG or another group of MOTC after the E/N.

### 10.7 Implementing Schedule

Various applications and compensation conducted by MOTC were confirmed. The agreed implementation schedule is shown in the following table, including the preparation of alternative lands and holding of the 2<sup>nd</sup> and the 3<sup>rd</sup> stakeholder consultation meetings in 2014, compensation and relocation from spring and start of construction in December 2015

Table 10.7-1 Implementing Schedule

	2014						2015												
	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
1 Implementation of EIA by MOTC	████████████████████																		
2 Submission of the EIA report to SAEPF from MOTC				▲															
3 Examination of EIA results and notification of the results to MOTC by SAEPF (for about one month after submission)				████████															
4 Holding of the stakeholder consultation by MOTC (Toktogul district)	▲					▲													
5 Cut-Off Date						▲													
6 Preparation of compensation by MOTC (Alternativelands etc.)			████████████████████																
7 Compensation and relocation																			
8 Construction start																			▲

### 10.8 Costs and Funds

The survey team explained that MOTC should prepare the relocation cost of apiaries and other costs for compensation based on the JICA GL and an agreement was obtained.

### 10.9 Monitoring System of Implementing Organization

Confirmation of living conditions after relocation and grievances shall be monitored by MOTC during construction. When recovery of livelihood is not confirmed at work, the quarterly monitoring shall be continued for two years. Monitoring form described in Attachment.