

Kyrgyz Republic
Ministry of Transport and Communication

**The Preparatory Survey Report on the Project for the
Reconstruction of the Naryn River Bridge on the
Bishkek-Osh Road in the Kyrgyz Republic**

November 2025

Japan International Cooperation Agency

Katahira & Engineers International
Nippon Koei Co., Ltd.
INGÉROSEC Corporation

IM
JR
25-168

PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to the joint venture consisting of Katahira & Engineers International, Nippon Koei Co., Ltd. and Ingérosec Corporation.

The survey team held a series of discussions with the officials concerned of the Government of the Republic of Kyrgyz and conducted a field investigation. As a result of further studies in Japan, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Kyrgyz for their close cooperation extended to the survey team.

November 2025

SANJO Akihito
Director General,
Infrastructure Management Department
Japan International Cooperation Agency

SUMMARY

1. Outline of the Country

The Kyrgyz Republic (hereinafter referred to as “Kyrgyzstan”) is a landlocked country surrounded by Kazakhstan, Uzbekistan, Tajikistan, and China. Approximately 40% of its territory consists of mountainous areas with elevations exceeding 3,000 meters.

Jalal-Abad Province, where the target bridge is located, covers approximately 17% of Kyrgyzstan's territory (area: 33,647 km²). The population of Jalal-Abad Province is approximately 1.336 million (2024 State Statistics Agency). Approximately 338,000 people live in urban areas, while 998,000 reside in rural areas, making it predominantly rural. Key industries include the Kambarata I and II, and Kurpsai hydroelectric power plants located on the upper reaches of the Naryn River. These supply electricity and water to Kyrgyzstan and neighboring countries, serving as a primary power source for the nation. However, the provincial poverty rate stands at 43.2% (2021: State Statistics Agency), the highest among Kyrgyzstan's seven provinces.

For Kyrgyzstan as a whole, per capita GDP declined in 2020 due to the COVID-19 pandemic, but has been on a recovery trend since 2021, reaching USD 2,075 in 2025.

2. Background of the Project

In Kyrgyzstan, approximately 97% of passenger and freight transport relies on road traffic. The Bishkek-Osh Road (672 km long), connecting the capital city of Bishkek with the southern city of Osh, is a major arterial road used by over 80% of the population (approximately 5.4 million people). Furthermore, it is a strategically important international highway that forms part of the Asian Highway and the CAREC Corridor (Central Asia Regional Economic Cooperation Corridor), and connects to the Caspian Sea Route, an international corridor linking Central Asia and Europe. It is therefore crucial for enhancing regional connectivity and international logistics. Therefore, Japan has supported the development of this road through ODA loans for the “Bishkek-Osh Road Rehabilitation Project” in the 2000s and grant aid for “The Project for Reconstruction of Kok-Art River Bridge on the Bishkek-Osh Road”.

The Naryn River Bridge, spanning the Naryn River (Kyrgyzstan's largest river) along the Bishkek-Osh Road, has deteriorated significantly over the 60 years since its construction in 1964 and no longer meets its current design load capacity. Furthermore, construction vehicles for renovations at the hydropower plant located upstream of the bridge are expected to operate frequently, increasing the risk of collapse. According to a bridge inspection conducted in 2020 by the Kyrgyz Ministry of Transport and Communications' Road Maintenance Department, the bridge exhibits severe damage, including concrete cracking and exposed rebars. The inspection concluded that the bridge requires urgent and significant repairs.

“The Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road” (hereinafter “this project”) aims to eliminate the remaining bottleneck on the Bishkek-Osh Road—a major route connecting southern and northern Kyrgyzstan and also an international trunk road—by replacing the Naryn River Bridge located in Jalal-Abad Province. This will contribute to sustaining international trade and socio-economic development. It is also positioned as a priority project within the context of the aforementioned national strategic program and the national project for the construction of large-scale hydropower plants.

3. Outline design of the study and contents of the project

JICA dispatched the preparatory survey team to Kyrgyzstan for the execution of outline design for the Naryn River Bridge located in Jalal-Abad Province. The field survey was from 16 October to 16 November 2024. During the field surveys, the team conducted the discussions with the respective Kyrgyzstan officials and the site survey of the project. The team carried out the outline design for the appropriate contents of the Project based on the results of the field surveys and prepared the draft report of the survey.

Subsequently, JICA dispatched the team to Kyrgyzstan from 28th August to 7th September 2025, to explain the draft report. The team discussed and confirmed the contents with relevant Kyrgyz officials and reached agreement.

The finally agreed contents of the Project are shown below.

- Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road (Bridge Length, L=190m)
- Improvement of bank protection works upstream and downstream of the Naryn River Bridge
- Improvement of approach roads totaling 450.0 m, consisting of 285.5 m from the existing road connection point on the right bank to Abutment A1, and 164.5 m from the existing road connection point on the left bank to Abutment A2
- Implementation of traffic safety measures by installing road signs before and after curves, pavement markings, and pedestrian crossings

The outline of the project plan is as follows.

Table- 1 Overview of the Project

Project Plan Items		Proposed Plan
Project Area		Toktogul District, Jalal-Abad Province
Bridge Planning	Bridge Structure Type	Three-span continuous prestressed concrete (PC) rigid-frame box girder
	Abutment Type	Inverted T-type abutment
	Bridge Length	190.0 m
	Cross-Sectional Composition	9.5 m
	Revetment Works	Precast concrete block revetment method
Road Planning	Cross-Sectional Composition	11.0 m
	Pavement Structure	Asphalt pavement
	Design Speed	80 km/h
	Min. Radius of Curvature	300 m
	Cross Slope	2.0 %
River Planning	Design High Water Discharge	4,050 m ³ /s
	Design High Water Level (DHWL)	860.7 m

The standard cross-sectional configuration of the project bridge and road is as follows:

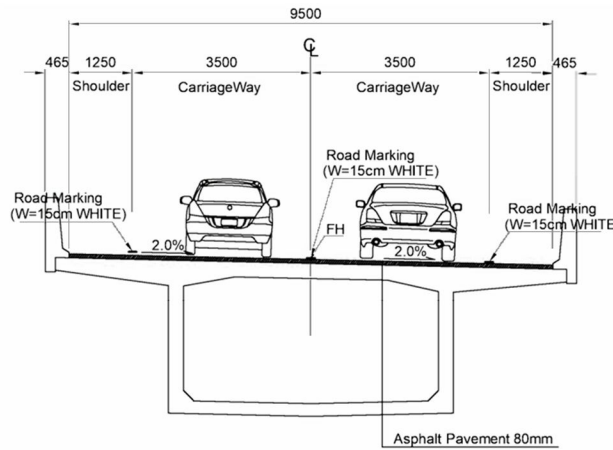


Figure- 1 Typical Cross Section of the Bridge

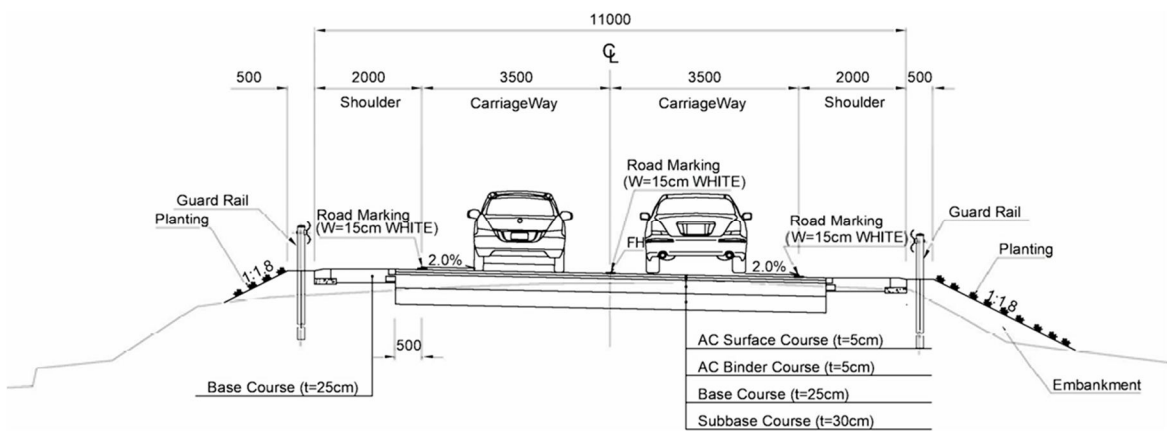


Figure- 2 Typical Cross Section of the Road

4. Implementation Schedule and Project Cost

If this project is implemented under Japan's Grant Aid, the detailed design period will be 7 months, and the total project implementation period will be 43 months. Total cost borne by the Kyrgyz Republic is estimated as 76.9 thousand USD. The project will be carried out in accordance with the provisions of Japan's Grant Aid, and the project cost will be determined prior to the signing of the Exchange of Notes for this project.

5. Project Evaluation

(1) Relevance

Based on the following, it is considered appropriate to implement the cooperation project under Japan's Grant Aid.

- ① The Bishkek-Osh highway, including the Naryn River Bridge, is both a vital international trunk road and an indispensable lifeline for local residents. This project contributes to Sustainable Development Goals (SDGs) 3, 8, 9, 11 and 13 by providing a safe and stable road and bridge infrastructure.

- ✓ GOAL 3 GOOD HEALTH AND WELL-BEING (halve the number of global deaths and injuries from road traffic accidents)
 - ✓ GOAL 8 DECENT WORK AND ECONOMIC GROWTH
 - ✓ GOAL 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
 - ✓ GOAL 11 SUSTAINABLE CITIES AND COMMUNITIES
 - ✓ GOAL 13 CLIMATE ACTION
- 

- ② It is consistent with the major development goals of the transport and road sector in Kyrgyzstan, particularly the rehabilitation of international arterial roads.
- ③ Adequate traffic safety facilities and sidewalks are included as accident countermeasures after road improvement.
- ④ The operation and maintenance can be carried out with Kyrgyzstan’s own financial, human, and technical resources, and it does not require highly advanced technologies.
- ⑤ Through Japan's grant aid system, the project can be implemented without particular difficulty.

(2) Effectiveness

The following effects are anticipated as a result of this project’s implementation:

① Quantitative Effect

Table- 2 Quantitative Effect

Indicator Name	Baseline Value (2024 actual value)	Target Value (2032) [3 years after project completion]
¹⁾ Maximum weight of vehicles that can pass over the bridge (t/vehicle)	50	80
²⁾ Average traffic volume (vehicles/day) Outside snow season (March to October)	5,480	7,500
³⁾ Number of passengers (people/year)	8,210,000	11,240,000
Freight volume (t/year)	3,730,000	5,110,000
⁴⁾ Freight volume to be transported via the Caspian Sea route (t/year)	750,000	1,020,000
Proportion of freight volume in the overall Caspian Sea route	Approximately 18% (Total: 4.1 million tons)	Approximately 19% (Total: 5.5 million tons)

Note: 1) The maximum allowable traffic load was determined based on the damage condition survey of the existing Bridge.

(The Kyrgyz design standard NK-80 corresponds to the Road Bridge Specifications TT-43.)

2) Traffic volume surveys were conducted on the existing Bridge for two days: on October 31, 2024 (24 hours, weekday) and on November 2, 2024 (24 hours, Saturday). The survey period was classified into the snow season (early November to the end of February) and the non-snow season (March to early November).

3) The setting of passenger numbers and freight volumes is referred to in ‘Appendices 7. Technical Data’

4) Cargo volume and share settings on the Caspian Sea route is referred to in ‘Appendices 7. Technical Data’

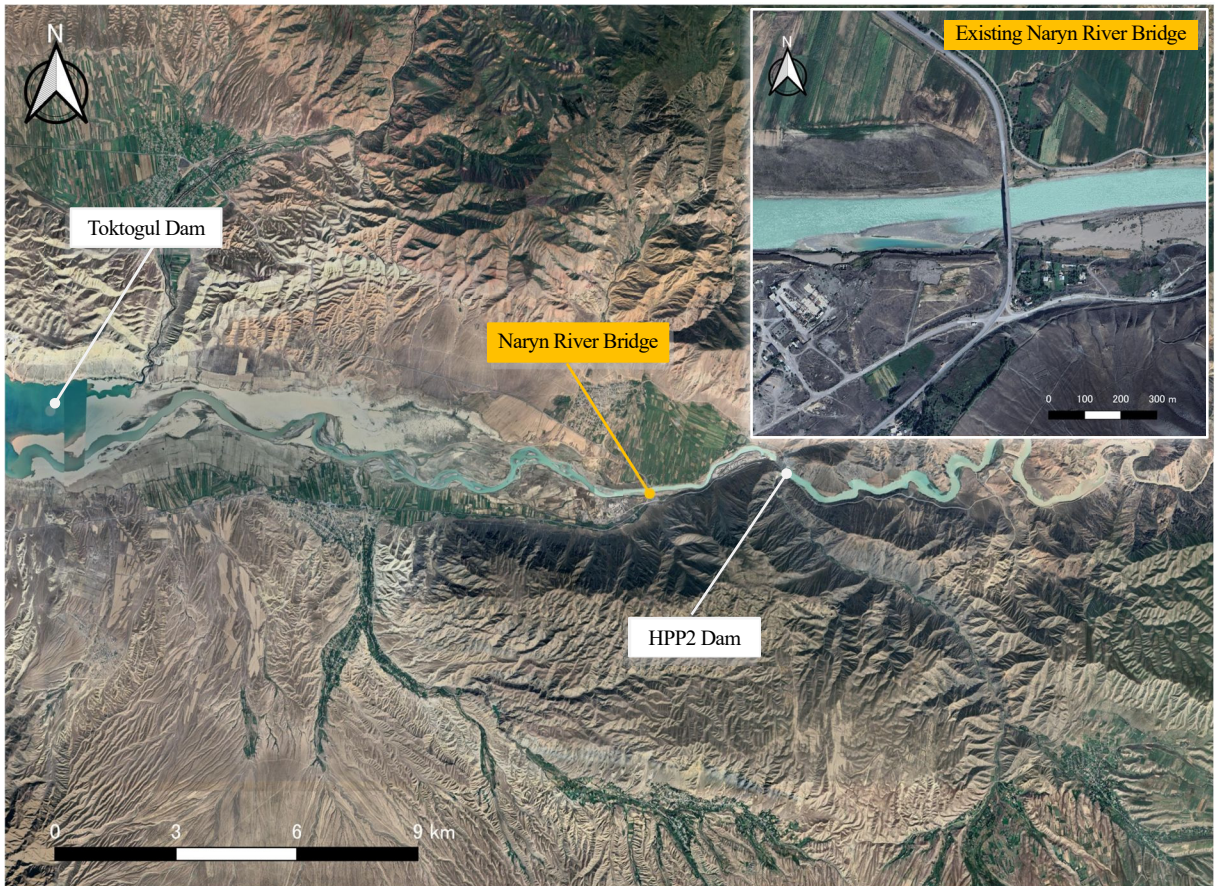
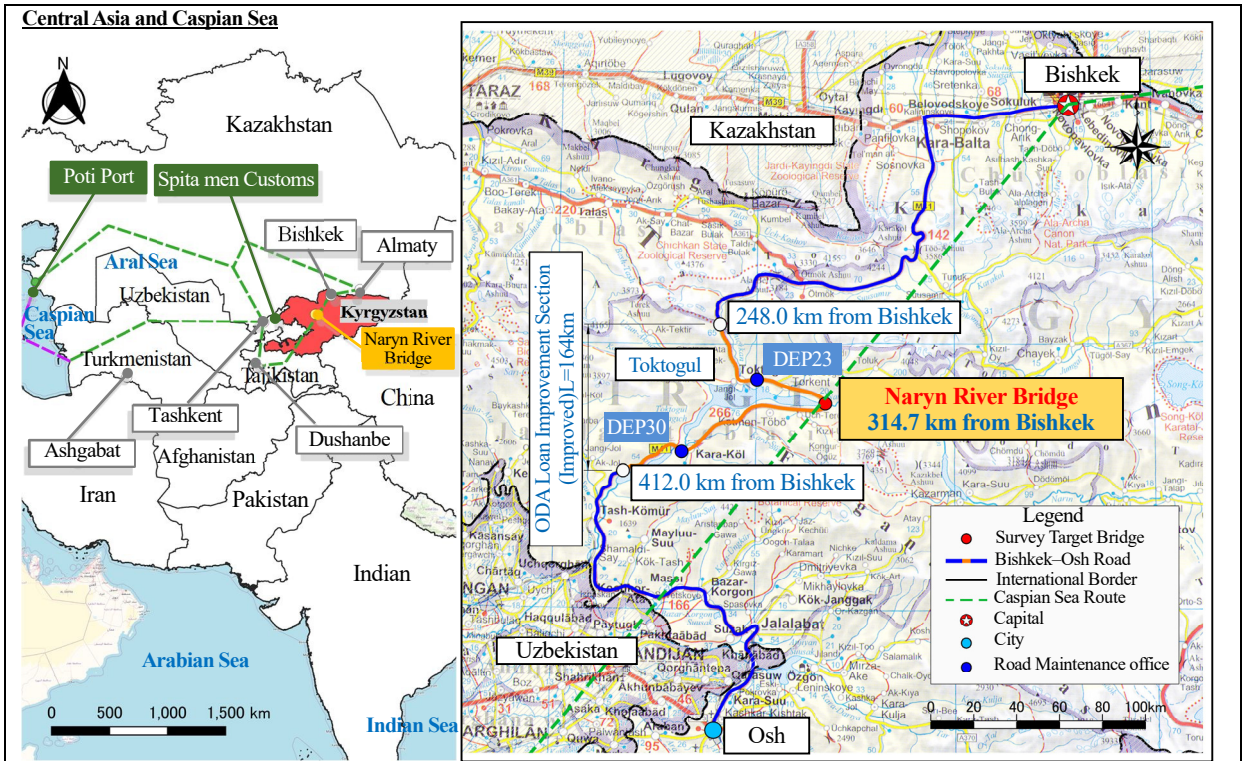
② Qualitative Effect

- ✓ Improvement of safety of the bridge and approach roads
By installing traffic safety facilities and speed reduction measures, conditions are created for vehicles to pass safely, thereby enhancing safety.

- ✓ Ensuring the safety of pedestrians and livestock by separating the traffic flow of vehicles from that of pedestrians and livestock.
Pedestrians and livestock using the existing Naryn Bridge will have their traffic flow separated from vehicles. Additionally, constructing sidewalks along the roadway will ensure the safety of pedestrians and livestock.

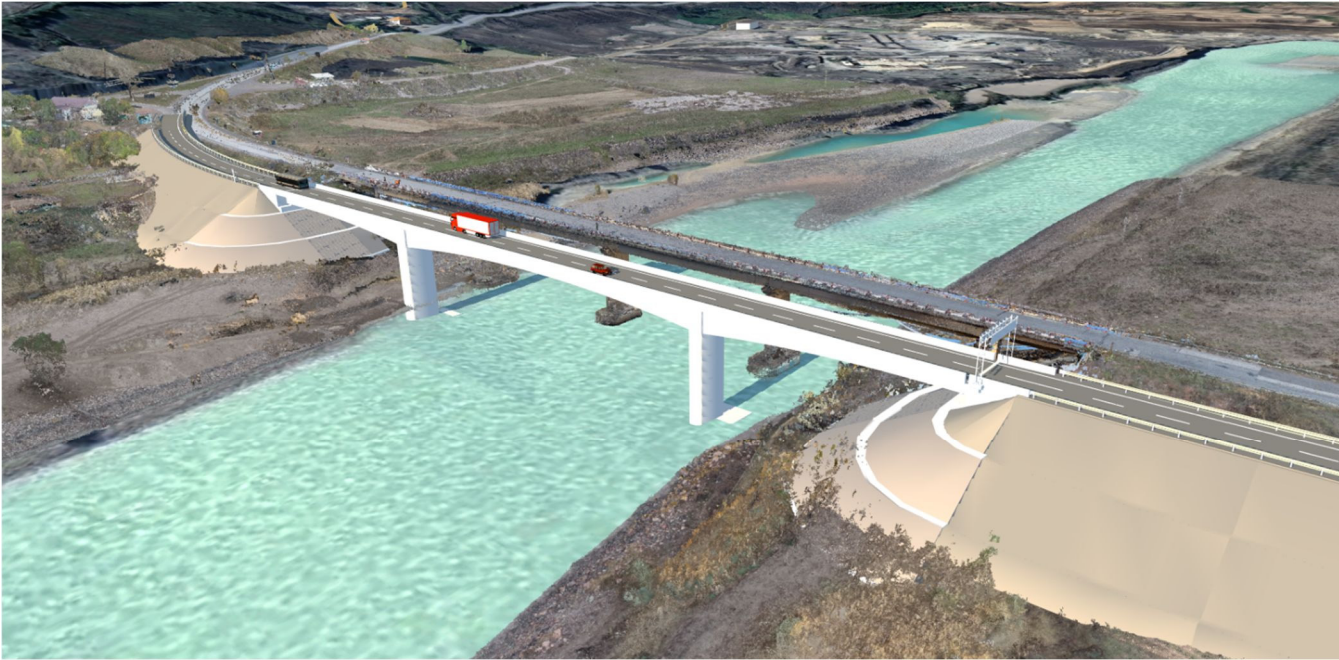
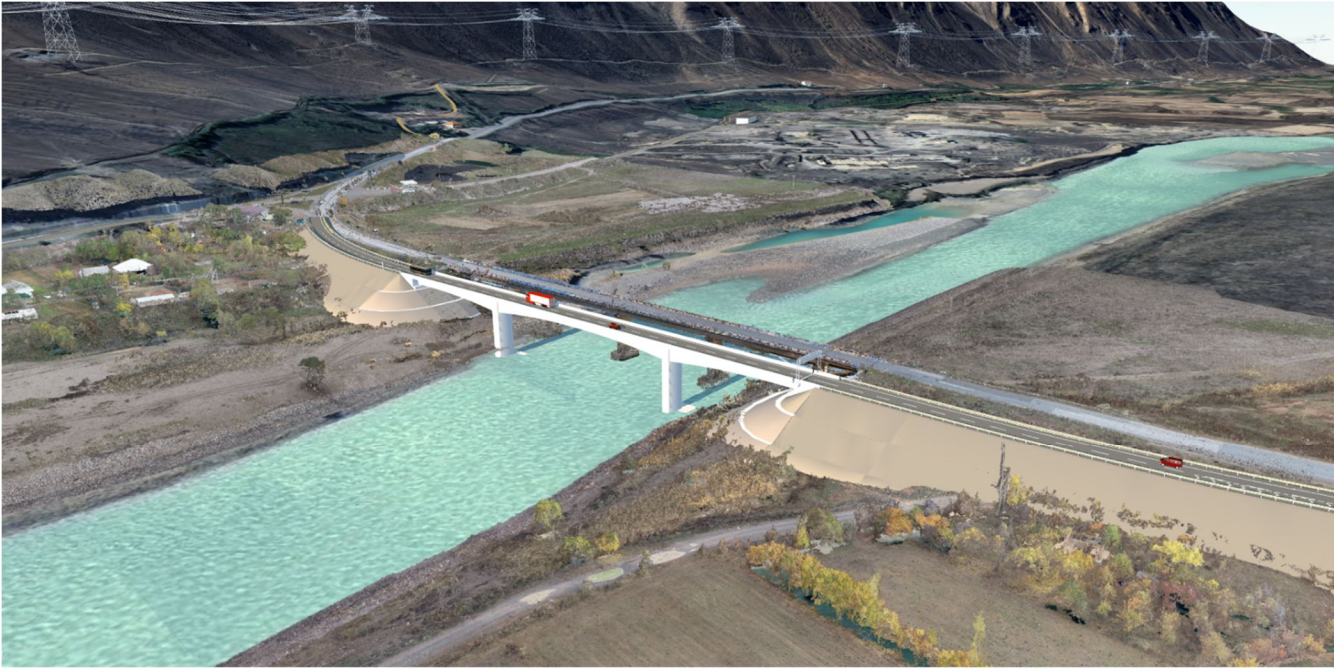
- ✓ Economic growth through the promotion and facilitation of logistics
Increased load capacity of bridges enables large vehicles to pass safely, promoting and facilitating logistics, thereby fostering economic growth.

- ✓ The smooth transportation of equipment will facilitate and accelerate the construction of large-scale hydropower projects.
Increased load-bearing capacity of bridges enables the transport of specialized large-scale equipment for hydroelectric power plant construction projects, thereby accelerating such projects.



Location Map

Perspective Naryn River Bridge



CONTENTS

Preface	
Summary	
Location Map/Perspective	
Contents	
List of Figures and Tables	
Abbreviations	
	Page
CHAPTER 1 BACKGROUND OF THE PROJECT	1-1
1-1 Background of the Project.....	1-1
1-2 Outline of the Project	1-2
1-2-1 Environmental and Social Considerations	1-2
1-2-1-1 Outline of the Project Component Affecting Environment and Society.....	1-2
1-2-1-2 Environmental and Social Condition.....	1-3
1-2-1-3 Environmental and Social Consideration Systems and Organizations in Kyrgyzstan.	1-24
1-2-1-4 Examination of Bridge Location	1-41
1-2-1-5 Scoping.....	1-44
1-2-1-6 Terms of Reference for Environmental and Social Considerations Survey.....	1-47
1-2-1-7 Baseline Survey	1-50
1-2-1-8 Environmental and Social Consideration Survey Results	1-51
1-2-1-9 Impact Assessment	1-61
1-2-1-10 Mitigation Measures and Costs for Implementing Mitigation Measures	1-65
1-2-1-11 Environmental Monitoring Plan	1-70
1-2-1-12 EMP and EMoP Implementation Framework	1-76
1-2-1-13 Stakeholder Consultation.....	1-77
1-2-2 Land Acquisition and Resettlement.....	1-78
1-2-2-1 Necessity of Land Acquisition and Resettlement	1-78
1-2-2-2 Legal Framework for Land Acquisition and Resettlement.....	1-78
1-2-2-3 Scale and Scope of Land Acquisition and Resettlement.....	1-86
1-2-2-4 Measures of compensation and assistance.....	1-92
1-2-2-5 Implementation Framework	1-93
1-2-2-6 Implementation Schedule	1-95
1-2-2-7 Costs and Funding Sources	1-95
1-2-2-8 Monitoring System and Monitoring Forms by Implementing Organization.....	1-96
1-2-2-9 Grievance Redress Mechanism	1-97
1-3 Other Aspects of the Project.....	1-98
1-3-1 Gender Mainstreaming Survey	1-98
1-3-2 Examination as a Climate Change Countermeasure Project	1-103

CHAPTER 2	CONTENTS OF THE PROJECT	2-1
2-1	Basic Concept of the Project.....	2-1
2-1-1	Overall Goal and Project Objectives	2-1
2-1-2	Project Outline.....	2-1
2-2	Outline Design of the Japanese Assistance	2-2
2-2-1	Design Policy	2-2
2-2-2	Basic Plan (Construction Plan / Equipment Plan).....	2-6
2-2-2-1	Design Condition.....	2-6
2-2-2-2	Examination of Bridge Location	2-8
2-2-2-3	River Planning.....	2-9
2-2-2-4	Road and Pavement Design.....	2-14
2-2-2-5	Bridge Design.....	2-17
2-2-2-6	Bank Protection Plan	2-29
2-2-2-7	Traffic Safety and Speed Control Measures	2-31
2-2-2-8	Practical Use of BIM/CIM	2-36
2-2-3	Outline Design Drawing	2-37
2-2-4	Implementation Plan	2-64
2-2-4-1	Implementation Policy.....	2-64
2-2-4-2	Implementation Conditions	2-65
2-2-4-3	Scope of Works.....	2-67
2-2-4-4	Consultant Supervision.....	2-67
2-2-4-5	Quality Control Plan.....	2-68
2-2-4-6	Procurement Plan	2-69
2-2-4-7	Operational Guidance Plan.....	2-72
2-2-4-8	Soft Component (Technical Assistance) Plan.....	2-72
2-2-4-9	Implementation Schedule	2-72
2-3	Security Plan	2-72
2-4	Obligations of Recipient Country	2-76
2-4-1	Obligations of Recipient Country.....	2-76
2-4-2	Tax Exemption	2-77
2-4-2-1	Tax Exemption-related Law	2-77
2-4-2-2	Tax Exemption Procedure	2-77
2-4-2-3	Scope of Tax Exemption.....	2-78
2-5	PROJECT OPERATION PLAN.....	2-79
2-6	PROJECT COST ESTIMATION	2-80
2-6-1	Initial Cost Estimation.....	2-80
2-6-2	Operation and Maintenance Cost	2-81

CHAPTER 3 PROJECT EVALUTION 3-1

- 3-1 Preconditions..... 3-1
- 3-2 Necessary Inputs by Recipient Country 3-1
- 3-3 Important Assumptions 3-1
- 3-4 Project Evaluation..... 3-1
 - 3-4-1 Relevance 3-1
 - 3-4-2 Effectiveness 3-2

[Appendices]

- 1 Member of the Survey Team
- 2 Survey Schedule
- 3 List of Parties Concerned in the Recipient
- 4 Minute of Discussion MD-1
- 5 Minute of Discussion MD-2
- 6 Technical Note
- 7 Technical Data
 - 1) Quantitative Effect
 - 2) Pavement Design (Maximum ESAL Value)

LIST OF FIGURES AND TABLES

LIST OF FIGURES

Figure 1 Typical Cross Section of the Bridge	iii
Figure 2 Typical Cross Section of the Road.....	iii
Figure 1-2-1 Administrative Divisions of Jalal-Abad Region	1-3
Figure 1-2-2 Administrative Division Map of Toktogul District.....	1-4
Figure 1-2-3 Trends in Child Marriage in the Kyrgyz Republic	1-8
Figure 1-2-4 Trend in the Number of Domestic Violence Perpetrators (Individuals Subject to Protection Orders) in Jalal-Abad Region.....	1-8
Figure 1-2-5 Posters Promoting Domestic Violence Prevention and Gender Equality displayed in Kyrgyzstan's Administrative Agencies.....	1-8
Figure 1-2-6 Land Use Around the Project Site	1-10
Figure 1-2-7 Trends of Under-Five Mortality Rate.....	1-12
Figure 1-2-8 Number of crimes occurring in Jalal-Abad Region.....	1-13
Figure 1-2-9 No. of Traffic Accidents in Jalal-Abad Region.....	1-13
Figure 1-2-10 Topographic Map Around the Planned Site.....	1-17
Figure 1-2-11 Designated Areas for Nature Conservation and Cultural Heritage Preservation around the Project Site	1-19
Figure 1-2-12 Cultural and Historical Heritage Sites in the Vicinity of the Planned Site	1-20
Figure 1-2-13 Main Viewpoints of Toktogul Reservoir.....	1-22
Figure 1-2-14 Organizational Structure of the Ministry of Natural Resources, Ecology, and Technical Supervision	1-29
Figure 1-2-15 EIA Procedures in the Kyrgyz Republic	1-30
Figure 1-2-16 Survey Locations and Scope for the Baseline Survey.....	1-50
Figure 1-2-17 Implementation Framework for the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP)	1-76
Figure 1-2-18 Land Subject to Acquisition for this Project	1-88
Figure 1-2-19 Grievance Redress Mechanism (GRM).....	1-98
Figure 1-3-1 Percentage of Women Among National Assembly Members.....	1-99
Figure 1-3-2 Percentage of Women Among Local Assembly Members.....	1-99
Figure 1-3-3 Number of Passengers by Mode of Transportation in Kyrgyzstan.....	1-99
Figure 1-3-4 Number of Violations of Gender-Related Laws	1-100
Figure 1-3-5 Number of DV Victims	1-100
Figure 1-3-6 Age Distribution of DV Victims (Women)	1-101
Figure 1-3-7 Age Distribution of DV Victims (Men).....	1-101
Figure 1-3-8 Number of DV Victims by Region (Women).....	1-101
Figure 1-3-9 Number of DV Victims by Region (Men).....	1-101
Figure 1-3-10 Gender Ratio of Construction Workers (2020).....	1-102

Figure 1-3-11 Average Monthly Income of Construction Workers (Som).....	1-102
Figure 1-3-12 Employment Rate (All Industries: 2020).....	1-102
Figure 1-3-13 Gender Ratio in Management Positions (All Industries: 2021).....	1-102
Figure 1-3-14 Gender Ratio of Public Servants (2021).....	1-103
Figure 1-3-15 Gender Ratio of Public Servants in Management Positions (2021).....	1-103
Figure 1-3-16 Kyrgyzstan's Keppel Climate Classification.....	1-104
Figure 1-3-17 Monthly Average Temperature and Precipitation in Toktogul (2000–2024).....	1-104
Figure 1-3-18 Annual Average Temperature Forecast for Jalal-Abad Region.....	1-105
Figure 1-3-19 Jalal-Abad Region High Temperature Forecast.....	1-106
Figure 1-3-20 Annual Precipitation Trends in Jalal-Abad Region.....	1-106
Figure 1-3-21 Daily Precipitation Trend Forecast for Jalal-Abad Region.....	1-107
Figure 1-3-22 Annual Disaster Count in Toktogul District (2015–2024).....	1-107
Figure 1-3-23 Monthly Disaster Occurrence Count in Toktogul District (2015–2024).....	1-108
Figure 1-3-24 Locations and Dates of Disasters in Toktogul District (2015~2024).....	1-108
Figure 1-3-25 Climate Risk Tree for the project.....	1-116
Figure 2-2-1 International Trunk Road Network Map of the Five Major Routes.....	2-2
Figure 2-2-2 Overview of the 24-Hour Traffic Survey.....	2-2
Figure 2-2-3 Upper-stream Dam (HPP1, HPP2) Location.....	2-3
Figure 2-2-4 Downstream Toktogul Dam Location.....	2-3
Figure 2-2-5 Uchterek Hydrological Observatory Data (01/2000-12/2023).....	2-9
Figure 2-2-6 River Cross-Section Location.....	2-10
Figure 2-2-7 Design High Water Level H.W.L.....	2-11
Figure 2-2-8 Toktogul Dam and Reservoir.....	2-11
Figure 2-2-9 Impact of Backwater Near the Naryn River Bridge (2017, 2023).....	2-11
Figure 2-2-10 Toktogul Reservoir Annual Maximum Water Level, Minimum Water Level (1992~2024).....	2-12
Figure 2-2-11 Correlation between Water Levels at Toktogul Reservoir and Naryn River Bridge.....	2-13
Figure 2-2-12 Proposed Upstream Road Alignment.....	2-14
Figure 2-2-13 Profile of Upstream Road Alignment.....	2-14
Figure 2-2-14 Pavement Structural Calculation.....	2-16
Figure 2-2-15 Pavement Structure.....	2-16
Figure 2-2-16 Cross Section of the Bridge Section.....	2-17
Figure 2-2-17 NK-102.8 Live Load.....	2-19
Figure 2-2-18 Estimated Geological Longitudinal Section.....	2-20
Figure 2-2-19 Seismic Level of Kyrgyzstan.....	2-21
Figure 2-2-20 Span Arrangement for New Naryn Bridge.....	2-23
Figure 2-2-21 Footing Position of Substructure.....	2-23
Figure 2-2-22 Abutment and Pier Selection Guidelines.....	2-24
Figure 2-2-23 Superstructure Type Selection Table.....	2-25
Figure 2-2-24 Outlet of Bridge Deck Drainage.....	2-27
Figure 2-2-25 Functionally Separated Bearing System.....	2-28

Figure 2-2-26 Movable Rubber Bearing.....	2-28
Figure 2-2-27 Bearing Type Selection Process.....	2-28
Figure 2-2-28 Standard Cross-Section of a Revetment.....	2-30
Figure 2-2-29 Riprap Standard Cross-Section.....	2-31
Figure 2-2-30 Riverbed Protection Plan.....	2-31
Figure 2-2-31 Existing Bridge Model using CIM.....	2-36
Figure 2-2-32 Modeling of Area near Abutment A1 and A2 during Construction using CIM	2-36
Figure 2-2-33 Superstructure Construction Using CIM	2-37
Figure 2-2-34 3D Model of Completion Imagination using CIM	2-37
Figure 2-2-35 Potential Procurement Sites, Disposal Sites and Waste Disposal Areas	2-65
Figure 2-2-36 Winter (December–February) outdoor temperatures in Toktogul (average values from 2019 to 2023)	2-66
Figure 2-2-37 Transportation Route	2-71
Figure 2-2-38 Project Implementation Schedule.....	2-72
Figure 2-4-1 Location of Major Facilities.....	2-77

LIST OF TABLES

Table 1-2-1 Overview of the Project	1-3
Table 1-2-2 Population by Administrative Division of Toktogul District (2009).....	1-4
Table 1-2-3 Ethnic Composition of Jalal-Abad Province (2009).....	1-5
Table 1-2-4 Religions Practiced in Kyrgyz and Their Proportions.....	1-6
Table 1-2-5 Gender-Specific School Enrollment Rates in Jalal-Abad Region (2023).....	1-7
Table 1-2-6 Percentage of Primary Languages by Ethnicity (over 15 years old).....	1-7
Table 1-2-7 Trend in the Number of Patients with Major Infectious Diseases Occurring in Kyrgyz.....	1-12
Table 1-2-8 Employment Rate by Administrative District in Kyrgyz (Year 2023).....	1-14
Table 1-2-9 Employment by Industry in Jalal-Abad Region (2012, 2023)	1-15
Table 1-2-10 Average Per Capita Income and Poverty Rate by Administrative Region in Kyrgyz, and Gender Wage Gap (2023).....	1-16
Table 1-2-11 Percentage of People with Access to Basic Living Infrastructure by Administrative Division in Kyrgyz (2022, 2023)	1-17
Table 1-2-12 Designated Areas for Nature Conservation and Cultural Heritage Preservation around the Project Site 1-18	
Table 1-2-13 Cultural Heritage and Historical Heritage around the Project Site.....	1-20
Table 1-2-14 Rare Wild Species Potentially Present near the Project Area	1-21
Table 1-2-15 International Conventions and Agreements Related to Environmental and Social Considerations Concluded by the Kyrgyz Republic	1-25
Table 1-2-16 Types of Economic Activities Requiring EIA Implementation.....	1-26
Table 1-2-17 National Laws and Regulations Related to Environmental and Social Considerations in the Kyrgyz Republic.....	1-27
Table 1-2-18 Environmental Standards in Kyrgyz and International Standards (Air Quality).....	1-33

Table 1-2-19 Environmental Standards in Kyrgyz and International Standards (Noise).....	1-33
Table 1-2-20 Environmental Standards (Vibration) in the Kyrgyz Republic	1-34
Table 1-2-21 Environmental Standards in Japan (Vibration) (Road Traffic Vibration-acceptable limits).....	1-35
Table 1-2-22 Environmental Standards for Water Quality in the Kyrgyz Republic.....	1-35
Table 1-2-23 Comparison between JICA Guidelines and the EIA System of the Kyrgyz Republic, and Measures to Address the Gaps.....	1-36
Table 1-2-24 Comparative Analysis of three Alternative Plans.....	1-42
Table 1-2-25 Scoping Matrix.....	1-44
Table 1-2-26 Survey Methods for Items Expected to Be Affected.....	1-47
Table 1-2-27 Outline of the Baseline Survey.....	1-50
Table 1-2-28 Environmental and Social Considerations Survey Results.....	1-51
Table 1-2-29 Environmental and Social Consideration Assessment Results	1-61
Table 1-2-30 Environmental Management Plan (EMP).....	1-66
Table 1-2-31 Environmental Monitoring Plan (EMoP).....	1-70
Table 1-2-32 Local Stakeholder Meeting Record	1-77
Table 1-2-33 Policy on Resettlement in this Project.....	1-81
Table 1-2-34 Comparison of JICA GL and Kyrgyz Legal Systems.....	1-82
Table 1-2-35 Result of Census Survey.....	1-86
Table 1-2-36 Assets Survey (Land plot).....	1-87
Table 1-2-37 Assets Survey (Structures).....	1-89
Table 1-2-38 Assets Survey (Trees).....	1-90
Table 1-2-39 Livelihood and Income Survey	1-91
Table 1-2-40 Specifics of Affected Assets to be Compensated	1-92
Table 1-2-41 Entitlement Matrix	1-93
Table 1-2-42 Implementation Framework for Land Acquisition and Resettlement.....	1-94
Table 1-2-43 Implementation Schedule	1-95
Table 1-2-44 Land Acquisition and Resettlement Costs	1-96
Table 1-3-1 Gender-Related Laws and Guidelines	1-98
Table 1-3-2 Identification of Climate Hazards.....	1-109
Table 1-3-3 Results of Exposure Assessment	1-110
Table 1-3-4 Criteria for the Evaluation Scale Established in this Project.....	1-110
Table 1-3-5 Evaluation of Existing Impacts.....	1-111
Table 1-3-6 Evaluation of Vulnerabilities Related to Climate Risk.....	1-112
Table 1-3-7 Identification and Prioritization of Future Climate Risks Relevant to the Project.....	1-113
Table 1-3-8 Table of Considered Adaptation Measures	1-114
Table 1-3-9 Climate Risk Matrix for the project.....	1-115
Table 1-3-10 Future Traffic Volume Forecast Results and Passenger Volume.....	1-117
Table 2-1-1 5 Major Development Objectives of the National Development Strategy 2018–2040.....	2-1
Table 2-2-1 Current Traffic Volume at Target Location (24-Hour Section).....	2-3
Table 2-2-2 Road Classification Defined in the SNiP Standards.....	2-6

Table 2-2-3 SNIIP Design Speed	2-7
Table 2-2-4 Geometric Design Values (V = 80 km/h)	2-7
Table 2-2-5 Comparative Analysis of three Alternative Plans	2-8
Table 2-2-6 Probability Flow Calculation Using the Gambel Method	2-10
Table 2-2-7 Non-uniform Flow Calculation Results (i = 1/590)	2-10
Table 2-2-8 Correlation between Flow Data Gaps at the Uchterek Hydrological Observatory and Water Levels in the Toktogul Reservoir	2-12
Table 2-2-9 Pavement Structural Design Load	2-15
Table 2-2-10 Pavement Design Conditions	2-15
Table 2-2-11 Clearance under Girder (Reference Values)	2-18
Table 2-2-12 Comparison between NK-80 and B-Live Load	2-18
Table 2-2-13 Design Horizontal Seismic Coefficient	2-21
Table 2-2-14 Abutment Structure and Location Comparison	2-22
Table 2-2-15 Superstructure Type Comparison	2-26
Table 2-2-16 Proposed Expansion Devices	2-27
Table 2-2-17 Comparison of Revetment Types	2-30
Table 2-2-18 Traffic Safety Facilities	2-32
Table 2-2-19 Responsibility of Both Governments	2-67
Table 2-2-20 Quality Control Plan for Concrete Works	2-68
Table 2-2-21 Quality Control Plan for Earthworks and Pavement Works	2-69
Table 2-2-22 Major Material Procurement Plan	2-69
Table 2-2-23 Major Equipment Procurement Plan	2-70
Table 2-3-1 Security Measures for Contractors and Consultants	2-73
Table 2-4-1 Obligation of GoKR	2-76
Table 2-4-2 Eligibility for Tax Exemption and Applicable Tax Rate	2-78
Table 2-6-1 Cost Brone by GoKR	2-80
Table 2-6-2 Maintenance Item and Costs for Bridge Section	2-81
Table 2-6-3 Maintenance Item and Costs for Road Section	2-81

ABBREVIATIONS

Abbreviations	Complete Expression
AASHTO	American Association of State Highway and Transportation Officials
ADB	Asian Development Bank
ARAP	Abbreviated Resettlement Action Plan
BIM/CIM	Building Information Modeling / Construction Information Modeling
CAREC	Central Asia Regional Economic Cooperation
CBR	California Bearing Ratio
CO	Carbon Monoxide
CO2	Carbon Dioxide
COVID-19	Coronavirus Infectious Disease, emerged in 2019
DEP	Road Maintenance Enterprise
DO	Dissolved Oxygen
DV	Domestic Violence
EDB	Eurasian Development Bank
EIA	Environmental Impact Assessment
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
E/N	Exchange Note
EU	European Union
ESAL	Equivalent Single Axe Load
G/A	Grant Agreement
GDP	Gross Domestic Product
GORK	Government of the Republic of Kyrgyz
HIV	Human Immunodeficiency Virus
HWL	High Water Level
IMF	International Monetary Fund
IsDB	Islamic Development Bank
IUCN	International Union for Conservation of Nature and Natural Resources
JICA	Japan International Cooperation Agency
JICA GL	JICA Guideline
JIS	Japanese Industrial Standards
MNR	Ministry of Natural Resources, Ecology, and Technical Supervision
MOTC	Ministry of Transport and Communication
MWL	Middle Water Level
NO2	Nitrogen Dioxide
NOx	Nitrogen Oxides

Abbreviations	Complete Expression
PAPs	Project Affected Persons
PC	Prestressed Concrete
pH	Potential of Hydrogen
RMD	Road Maintenance Department
ROW	Right of Way
SDGs	Sustainable Development Goals
SEK	State Enterprise Kyrgyz Avoto Jo
SN	Structural Number
SNIp	Stroitelnye Normy I Pravila (Russian Construction Codes and Regulations)
SO2	Sulfur Dioxide
SPM	Suspended Particulate Matter
SS	Suspended Solids
TOR	Terms of Reference
TSP	Total Suspended Particular
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund
UNODC	United Nations Office on Drugs and Crime
W18KIP	Weight 18 Kilo Pound
WB	World Bank
WHO	World Health Organization

CHAPTER 1 BACKGROUND OF THE PROJECT

1-1 Background of the Project

The Kyrgyz Republic (hereinafter referred to as “Kyrgyz”) is a landlocked country surrounded by Kazakhstan, Uzbekistan, Tajikistan, and China, and relies on road transport for approximately 97% of both passenger and freight transportation. In particular, the Bishkek–Osh Road (total length: 672 km), which connects the capital Bishkek with the southern city of Osh, is a major arterial road used by more than 80% of the population (approximately 5.4 million people). Moreover, as it forms part of the Asian Highway and the CAREC (Central Asia Regional Economic Cooperation) Corridor, and connects to the Caspian Sea Route, an international corridor linking Central Asia and Europe, it serves as a strategically important international arterial road that plays a crucial role in strengthening regional connectivity and international logistics. In recent years, the Caspian Sea Route has gained increasing international attention and demand as a logistics corridor connecting the eastern and western parts of the Eurasian continent without passing through Russia, due to the situation in Ukraine. In Kyrgyzstan, improving connectivity with this route contributes to enhancing international competitiveness and promoting sustainable economic growth through the diversification of logistics routes.

The Naryn Bridge in Jalal-Abad Region, which crosses the Naryn River, the largest river in Kyrgyzstan, is the longest bridge (207.2 m) along the Bishkek–Osh Road. The bridge also serves as an important transportation hub providing access to numerous hydropower plants located upstream of the river. Constructed in 1964, the bridge has now been in service for about 60 years and has significantly deteriorated. In addition, as it was designed based on former Soviet-era standards, the bridge does not satisfy the current design load requirements. The bridge is expected to be frequently used for the transportation of construction materials related to large-scale hydropower projects, including the Kambar-Ata-1 Hydropower Plant (1,860 MW), Kambar-Ata-2 Hydropower Plant, and Kurpsai Hydropower Plant. As a result, heavy freight vehicles exceeding the bridge’s current design capacity are likely to pass over it, increasing the risk of structural failure. According to the 2020 bridge inspection conducted by the Road Maintenance Department of the Ministry of Transport and Communications, severe deterioration such as cracks in the concrete and exposed reinforcing bars were observed. The inspection concluded that rehabilitation is urgently required.

The “Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road” (hereinafter referred to as “the Project”) aims to replace the Naryn River Bridge located in Jalal-Abad Region on the Bishkek–Osh Road, an international arterial highway connecting the major cities in the northern and southern parts of the country. By doing so, the Project will eliminate the remaining bottleneck on this road, thereby contributing to the maintenance and promotion of international trade as well as socio-economic development. Furthermore, the Project will strengthen the logistics network in the innermost part of Central Asia by improving connectivity with the Caspian Sea Route, an important international logistics corridor. The Project is also positioned as a priority undertaking within the National Development Strategy and among national projects related to large-scale hydropower development.

This project aims to replace the Naryn Bridge on the international arterial road connecting the northern and southern regions of the country, thereby ensuring the maintenance and safety of the logistics network and contributing to the revitalization of socio-economic activities in the country. It is consistent with Japan and JICA's assistance policies and analyses, as well as the development policies of the Government of the Kyrgyz Republic and contributes to SDGs Goal 3(GOOD HEALTH AND WELL-BEING), Goal 8 (DECENT WORK AND ECONOMIC GROWTH), Goal 9 (INDUSTRY, INNOVATION AND INFRASTRUCTURE), Goal 11(SUSTAINABLE CITIES AND COMMUNITIES) and Goal 13(CLIMATE ACTION).

In the Joint Statement of the 9th Foreign Ministers' Meeting of the "Central Asia + Japan" Dialogue in December 2022, Japan expressed its commitment to supporting the free, open, and sustainable development of Central Asia, in line with a new development model focusing on "investment in people". This project, by utilizing Japan's bridge construction technology, aims to enhance the level of infrastructure development in Kyrgyz and is also aligned with the concept of "investment in people".

1-2 Outline of the Project

This project involves the reconstruction of the Naryn River Bridge on the Bishkek–Osh Road and the development of its approach roads, as requested by the Government of the Kyrgyz Republic. The scope of works to be supported by Japan is as follows:

- ✓ Reconstruction of the Naryn River Bridge (Bridge Length L = 190 m) on the Bishkek–Osh Road
- ✓ Construction of riverbank protection works upstream and downstream of the Naryn River Bridge
- ✓ Improvement of approach roads: 285.5 m from the existing road connection point on the right bank to Abutment A1, and 164.5 m from the existing road connection point on the left bank to Abutment A2, totaling 450.0 m
- ✓ Installation of traffic safety measures, including road signs, pavement markings, and pedestrian crossings before and after curves

1-2-1 Environmental and Social Considerations

1-2-1-1 Outline of the Project Component Affecting Environment and Society

The outline of this project is shown in the table below. The project does not fall under the category of large-scale bridge projects as defined in the "JICA Guidelines for Environmental and Social Considerations (January 2022)" (hereinafter referred to as the "JICA Environmental and Social Guidelines"). It has been determined that the project will not cause significant adverse environmental impacts, nor does it fall under areas with characteristics prone to impacts or regions vulnerable to impacts as stipulated in the same Guidelines. Therefore, the project is classified as Environmental Category B. Accordingly, the preparation of the environmental and social considerations for this report has been conducted in compliance with the "JICA Guidelines for the Preparation of Category B Environmental and Social Consideration Reports (March 2025)".

In the future, the rehabilitation of a large-scale hydropower plant is planned in the area surrounding the project site. However, this project is not necessarily intended for the hydropower plant rehabilitation

works, nor is it the case that such rehabilitation works could not be implemented without this project. Therefore, the rehabilitation of the large-scale hydropower plant is not considered an integral part of this project. It should be noted that although the rehabilitation of a large-scale hydropower plant is planned in the vicinity of the project site, it is still at the planning stage, and the timing and scale have not yet been determined. Accordingly, no cumulative, derivative, or secondary impacts are anticipated. Furthermore, as mentioned above, this project is not necessarily for the hydropower plant rehabilitation works, nor is it indispensable for the implementation of such works. Thus, the rehabilitation of the large-scale hydropower plant is not regarded as an integral component of this project.

Table 1-2-1 Overview of the Project

Project Components		Proposed Plan
Project Area		Toktogul District, Jalal-Abad Region
Bridge Planning	Bridge Structure Type	Three-span continuous prestressed concrete (PC) rigid-frame box girder
	Abutment Type	Inverted T-type abutment
	Bridge Length	190.0 m
	Cross-Sectional Composition	9.5 m
	Revetment Works	Precast concrete block revetment method
Road Planning	Cross-Sectional Composition	11.0 m
	Pavement Structure	Asphalt pavement
	Design Speed	80 km/h
	Min. Radius of Curvature	300 m
	Cross Slope	2.0 %
River Planning	Design High Water Discharge	4,050 m ³ /s
	Design High Water Level	860.7 m

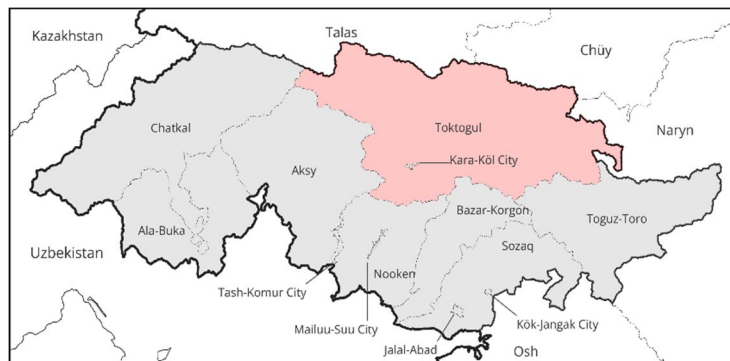
1-2-1-2 Environmental and Social Condition

This section summarizes the current environmental and social conditions in Kyrgyzstan based on existing data and materials, while also compiling information necessary for predicting and assessing the impact items selected for this project, including findings from field surveys conducted by the JICA Study Team and interviews with local residents and stakeholders.

(1) Social Conditions

1) Geography and Population

Jalal-Abad Region, where the project site is located, is situated in the central-western part of Kyrgyz and consists of five special cities and eight districts, as shown in Figure 1-2-1. Toktogul District, where the project site is located, is situated in the northern part of the region and has a population of just under 100,000. Furthermore, as shown in



(Note: Kara kol City is not part of Jalal-Abad Region but is a special city with the same administrative status as a region.)

Figure 1-2-1 Administrative Divisions of Jalal-Abad Region

Figure 1-2-2 and Table 1-2-2, Toktogul District consists of one city (Toktogul City), ten settlements, and forty-nine villages. The project site is located on the right bank in Kara-Jygach Village, Abdy Süyörkulov Settlement, and on the left bank in Uch-Terek Village, Uch-Terek Settlement.

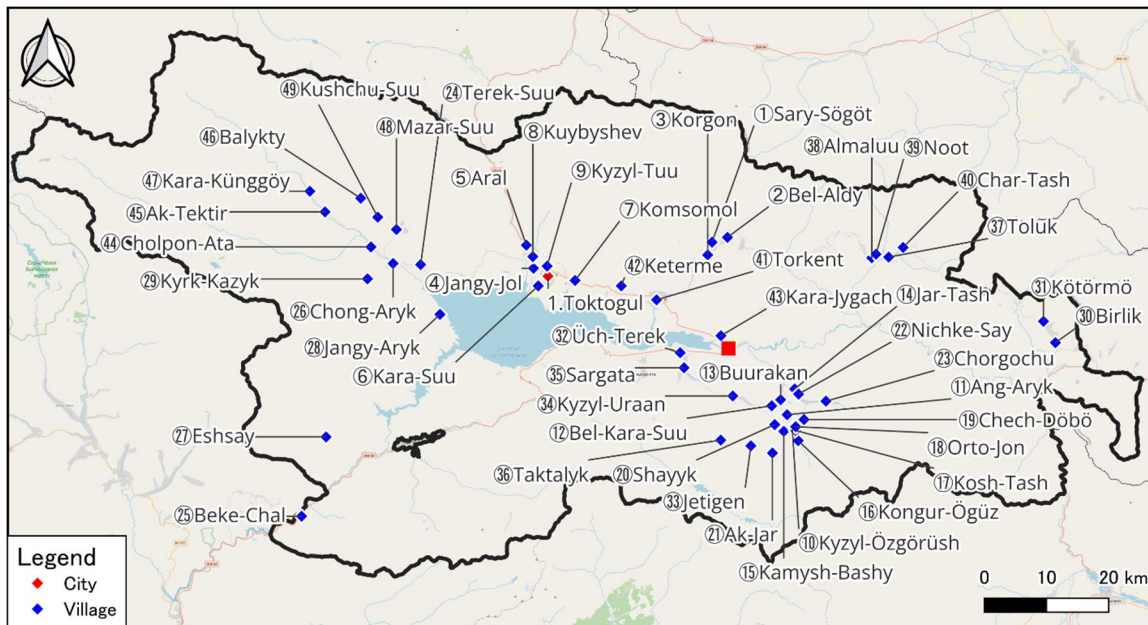


Figure 1-2-2 Administrative Division Map of Toktogul District

Table 1-2-2 Population by Administrative Division of Toktogul District (2009)

Rural District & Village	Population	Rural District & Village	Population	Rural District & Village	Population
1. Toktogul City	20,577	⑰ Kosh-Tash	1,624	⑳ Jetigen	2,747
2. Bel-Aldy	5,074	⑱ Orto-Jon	958	㉑ Kyzyl-Uraan	3,109
① Sary-Sögöt	2,671	㉒ Chech-Döbö	577	㉓ Sargata	2,962
② Bel-Aldy	1,448	㉔ Shayyk	598	㉔ Taktalyk	330
③ Korgon	955	㉕ Ak-Jar	1,109	9. Aralbaev	4,010
3. Jangy-Jol	17,595	5. Nichke-Say	4,136	㉗ Toluk	1,304
④ Jangy-Jol	2,369	㉖ Nichke-Say	2,279	㉘ Almaluu	1,295
⑤ Aral	1,466	㉗ Chorgochu	1,857	㉙ Noot	832
⑥ Kara-Suu	1,770	6. Ketmen-Döbö	8,121	㉚ Char-Tash	579
⑦ Komsomol	3,820	㉘ Terek-Suu	4,598	10. Abdy Süyörkulov	11,254
⑧ Kuybyshev	4,139	㉙ Beke-Chal	0	㉛ Torkent	6,198
⑨ Kyzyl-Tuu	4,031	㉚ Chong-Aryk	3,523	㉜ Keterme	1,793
4. Kyzyl-Özgörüş	12,150	㉛ Eshsay	0	㉝ Kara-Jygach	3,263
⑩ Kyzyl-Özgörüş	2,368	㉜ Jangy-Aryk	225	11. Cholpon-Ata	8,442
⑪ Ang-Aryk	1,041	㉝ Kyrk-Kazyk	137	㉞ Cholpon-Ata	1,508
⑫ Bel-Kara-Suu	758	7. Sary-Kamysh	1,611	㉟ Ak-Tektir	2,618
⑬ Buurakan	680	㉞ Birlük	908	㊱ Balykty	56
⑭ Jar-Tash	0	㉟ Kötörmö	703	㊲ Kara-Künggöy	1,703
⑮ Kamysh-Bashy	1,816	8. Üch-Terek	12,865	㊳ Kushchu-Suu	589
⑯ Kongur-Ögüz	621	㊴ Üch-Terek	3,717	㊴ Mazar-Suu	1,968

Source : Census of Population and Housing of the Kyrgyz Republic 2009

Table 1-2-3 Ethnic Composition of Jalal-Abad Province (2009)

2) Ethnicity

It is said that over 80 ethnic groups reside in Kyrgyz. According to the 2009 Population and Housing Census, the ethnic groups shown in Table 1-2-3 reside in Jalal-Abad Region, with Kyrgyz constituting the largest group at approximately 58%, followed by Uzbeks at approximately 35%. Other diverse ethnic groups residing there include Russians, Tatars, Uyghurs, and Turks.

Ethnicity	Population (persons)	Percentage (%)
Kyrgyz	56,715	58.3%
Uzbeks	33,889	34.9%
Russians	2,995	3.1%
Tatars	1,055	1.1%
Uyghurs	564	0.6%
Turks	474	0.5%
Tajiks	313	0.3%
Kurds	274	0.3%
Ukrainians	223	0.2%
Kazakhs	115	0.1%
Other ethnic groups	555	0.6%

Source: Census of Population and Housing of the Kyrgyz Republic 2009

3) Indigenous Peoples and Ethnic Minorities

“Nomads” are a group with their own distinct culture and customs in the Kyrgyz Republic. Nomads once moved across the country with their livestock, living in traditional dwellings called yurts (Photo 1-2-1). However, after coming under the rule of the former Soviet Union (present-day Russia) in 1922, they increasingly settled down. Even today, some groups continue to live as nomads (including semi-nomads), but there are no official statistics on where nomads reside or their numbers. Generally, they practice a nomadic lifestyle, moving to high-altitude pastures called “jailo” (Photo 1-2-2) during summer to livestock grazing, then returning to lower elevations or villages in winter. However, the Kyrgyz Constitution includes provisions respecting nomadic culture and traditions and protecting their rights; they are not socially isolated or persecuted. Therefore, nomads are not considered indigenous peoples. While nomads do not reside in the vicinity of the project site, they may pass through during seasonal livestock migrations. Additionally, Tatars and Uyghurs are recognized as ethnic minorities in Jalal-Abad Region, but their residence in the project area vicinity has not been confirmed.



Photo 1-2-1 Traditional Kyrgyz Dwellings (yurts)



Photo 1-2-2 Sussanmil's jailo

4) Religion

The religions practiced in Kyrgyz and their respective percentages are shown in the table below. Approximately 90% of Kyrgyz's religious population are Muslims, the majority of them are Sunnis. Many residents in the vicinity of the project site are also Sunni Muslims, and as shown in Photo 1-2-3, there are many mosques built in Toktogul city. Additionally, Christians account for about 7%, with most reportedly belonging to the Russian Orthodox Church. Other religions practiced include Judaism, Buddhism, and the Bahá'í Faith, and some people identify as non-religious.



Photo 1-2-3 Mosque in Toktogul City

Table 1-2-4 Religions Practiced in Kyrgyz and Their Proportions

Religion	Percentage
Islam	90%
Christianity	7%
Judaism, Buddhism, Bahá'í Faith, Non-religious	3%

5) Education

The Kyrgyz education system consists of nine years of compulsory education: four years of primary education (ages 7 to 10) and five years of secondary education (ages 11 to 15). This is followed by two years of higher education (ages 16 and 17) at institutions such as high schools, technical colleges, and vocational schools, and a four-year university. The gender-specific enrollment rates in Jalal-Abad Region are shown in Table 1-2-5. While enrollment rates for primary and secondary education are approximately 92%, the higher education enrollment rate is about 85%. However, the enrollment rate for boys in higher education is lower than that for girls. According to analyses by UNICEF and others, this disparity is likely due to traditional gender roles in Kyrgyz. In rural areas, boys are expected to become economic providers. After completing primary and secondary education, they often engage in agriculture or migrate to Russia or Kazakhstan seeking work. Conversely, girls are traditionally expected to prefer staying home and receiving education until marriage.

Furthermore, Kyrgyz has a very high literacy rate due to its advanced education system dating back to the Soviet era. According to a report by the Kyrgyz Japan Human Resources Center, the literacy rate stands at 99.2%. The proportion of first languages by ethnicity in Toktogul District (for those aged 15 and over) is shown in Table 1-2-6. Among literate individuals, 99.8% can read and write either Kyrgyz or Russian, the official languages. Additionally, many Uzbeks and others whose native language is not an official language use Kyrgyz or Russian as their second language. In Kyrgyz's primary education, Kyrgyz is the most common teaching language, and in urban areas, many schools offer education in Russian as well as Kyrgyz. Furthermore, many schools also provide English education starting from the lower grades.

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Table 1-2-5 Gender-Specific School Enrollment Rates in Jalal-Abad Region (2023)

	Girls	Boys	Total
Elementary and Secondary Education	92.3%	92.2%	92.2%
Higher Education	86.0%	84.2%	85.1%

Source : National Statistical Committee of the Kyrgyz Republic

Table 1-2-6 Percentage of Primary Languages by Ethnicity (over 15 years old)

Ethnic Group	Official Language			Uzbek	Other	Total
	Kyrgyz	Russian				
Kyrgyz	85,678	85,663	15	3	2	85,683
Russians	188	13	175	-	-	188
Uzbeks	77	76	1	108	-	185
Uyghurs	86	84	2	31	28	145
Total	86,029 (99.8%)	85,836 (99.6%)	193 (0.2%)	142 (0.2%)	30 (0.03%)	86,201 (100%)

Source : Census of Population and Housing of the Kyrgyz Republic 2009

6) Gender Mainstreaming

According to the World Economic Forum's Global Gender Gap Report, the Kyrgyz Republic's Gender Gap Index for 2024 is 0.700, ranking 90th out of 146 countries. Among the economic, educational, health, and political domains, women's empowerment is particularly low in the political sphere. Women make up only about 22% of the country's parliamentarians, indicating that women's capabilities are not being fully utilized in politics. Other gender challenges facing Kyrgyz include “abduction marriages,” “child marriages,” and “domestic violence (DV).”

Among these, “abduction marriage” involves a man kidnapping a woman who resists, then persuading her through the collective efforts of his entire clan to force her into marriage. In Kyrgyz, this practice is known as “ala kachuu.” Various institutions estimate the number of abduction marriages occurring, but the exact figure remains unknown. While abduction marriage is explicitly prohibited by law, it is reported that numerous cases of abduction marriage and similar abductions continue to occur today, both in urban and rural areas.

Regarding child marriage, according to The “Child Marriage Data Portal”, as shown in Figure 1-2-3, it is estimated that among women aged 20–24 in Kyrgyzstan, 0.3% were married by age 15, and 12.9% were married by age 18. Child marriage not only limits women’s access to education but also exposes them to significant health risks, including increased complications and higher maternal mortality rates associated with adolescent pregnancy and childbirth. Although Government of the Kyrgyz Republic has taken measures to prohibit child marriage by law, it is reported that such practices still persist in rural areas, and the complete eradication of child marriage has not yet been achieved.

Domestic violence (DV) is also one of the significant gender issues in the Kyrgyz Republic.

The trend in the number of perpetrators of DV in Jalal-Abad Region is shown in Figure 1-2-4. Based on the “Law of the Kyrgyz Republic On the Guard and Protection Against Domestic Violence ” enacted in

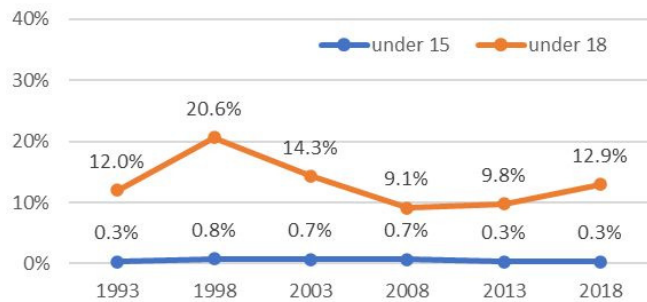


Figure 1-2-3 Trends in Child Marriage in the Kyrgyz Republic

Source: The Child Marriage Data Portal

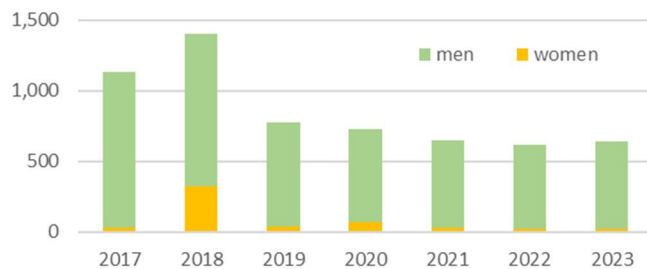


Figure 1-2-4 Trend in the Number of Domestic Violence Perpetrators (Individuals Subject to Protection Orders) in Jalal-Abad Region

Source: National Statistical Committee of the Kyrgyz Republic



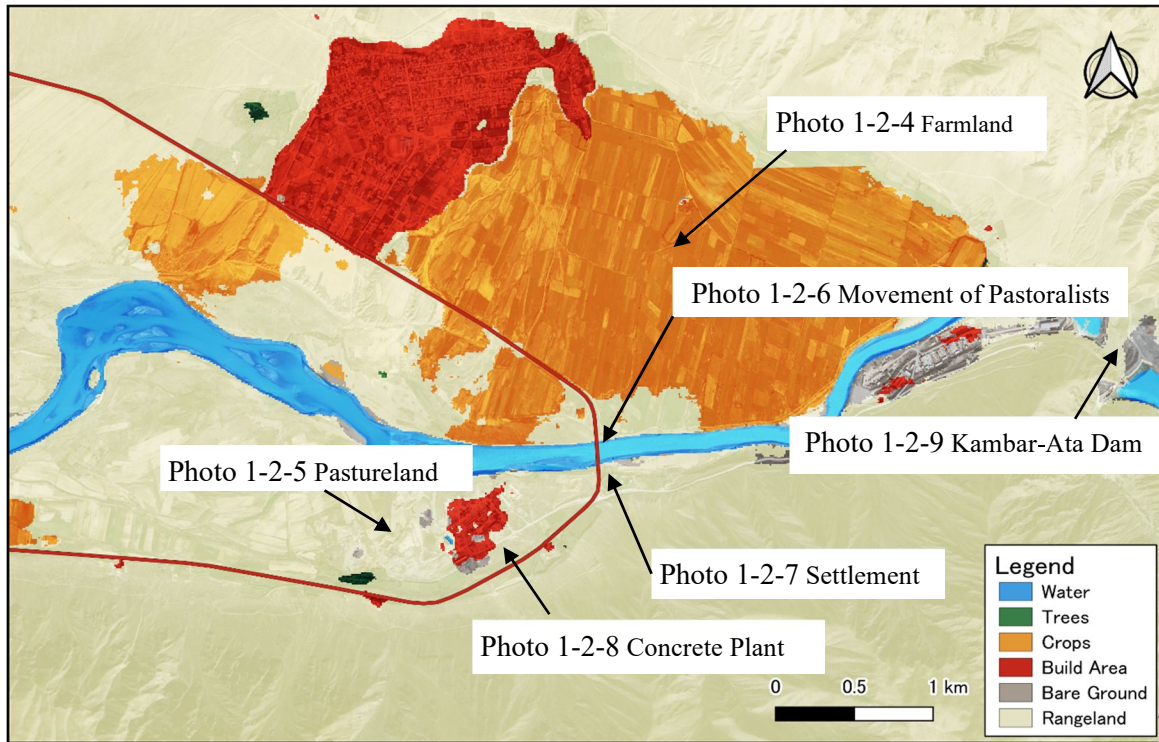
Figure 1-2-5 Posters Promoting Domestic Violence Prevention and Gender Equality displayed in Kyrgyzstan's Administrative Agencies

2017, which allows police to detain perpetrators of DV, the number has been decreasing or remaining stable in recent years. Thus, Kyrgyz faces many gender issues rooted in traditional or regional customs. Consequently, Kyrgyz has promoted initiatives to address domestic gender issues. This includes amending the “Law on Protection from Domestic Violence, Sexual Violence, and Gender-Based Violence” in August 2024 and establishing the “National Council on Family, Gender Development, Social Protection and Protection of Children’s Rights under the Cabinet of Ministers of the Kyrgyz Republic ” under the direct authority of the Cabinet in November of the same year. However, regional or religious customs remain deeply entrenched in rural areas, and it remains uncertain whether these challenges can be resolved.

7) Other Social Conditions

① Land Use

The land use around the project site is as shown in Figure 1-2-6. Most of the area surrounding the project site consists of pastureland, while the northern part of the project site is used as farmland. These pastures and farmlands are used for growing feed crops for livestock during summer season and used as grazing areas for livestock such as cattle, horses, and goats during winter season, as shown in Photo 1-2-4 and Photo 1-2-5. Additionally, the riverbed on the right bank is used for moving livestock, as shown in Photo 1-2-6. The Bishkek-Osh Road runs from east through the project site towards the west, passing between the farmland and pasture. A settlement is located south of the project site (Photo 1-2-7), and a concrete products plant is situated southwest of the project site (Photo 1-2-8). Furthermore, the Kambar-Ata II Hydroelectric Power Plant is located upstream on the Naryn River (Photo 1-2-9). It is used for hydroelectric power generation and regulates the discharge to the Toktogul Reservoir. High discharge years cause flooding in the lower basin, turning pastures and bare land into water bodies.



Source : Esri Sentinel-2 Land Cover Explorer

Figure 1-2-6 Land Use Around the Project Site



Photo 1-2-4 Farmland north of the project site



Photo 1-2-5 Pastureland south of the project site



Photo 1-2-6 Movement of pastoralists



Photo 1-2-7 Settlement south of the project site



Photo 1-2-8 Concrete products plant



Photo 1-2-9 Kambar-Ata dam

② Availability and Utilization Status of Local Resources

Regarding the utilization of local resources around the project site, driftwood washed up on the Naryn Riverbed is used by some residents as raw material for charcoal and other products (Photo 1-2-10). Additionally, a concrete plant located southwest of the project site had been extracting river sand from the Naryn River for use as aggregate in concrete, but this extraction is no longer taking place. The Naryn and Issyk-Kul Regions in the upper reaches of the Naryn River possess abundant mineral resources, with mining activities for gold, coal, and iron ore underway.



Photo 1-2-10 Residents Gathering Driftwood along the Naryn Riverbed

③ Water Use

Water use around the project site includes livestock access to the Naryn River. Photo 1-2-11 shows livestock descending to the riverbed approximately 200 m upstream from the Naryn River Bridge to drink water and bathe. Additionally, the river is utilized for hydropower generation downstream of the Kambar-Ata 2 Hydropower Plant and the Toktogul Reservoir in the upper reaches of the Naryn River. It plays a crucial role in Kyrgyz's electricity supply and also serves as an important



Photo 1-2-11 Water Use for Livestock

source of irrigation water for the lower Naryn River basin, as well as for Kazakhstan and Tajikistan. Furthermore, as of September 2025, restoration work is underway on an irrigation canal that was once installed on the right bank of the Naryn River but is now buried in sand. Upon completion of the work, water will be drawn from the upper reaches of the Naryn River and used to irrigate farmland in the lower reaches via this canal.

④ Health and Medical

In many rural areas of Kyrgyz, including the vicinity of the project site, access to sanitation infrastructure such as sewage systems is inadequate. As shown in Photo 1-2-12, this leads to the installation of simple outdoor toilets, and as shown in Photo 1-2-13, the open burning of household waste outdoors. Sanitation awareness is by no means high. Food hygiene standards in Kyrgyz are also not particularly high. Furthermore, combined with low medical standards in rural areas and low vaccination rates, various infectious diseases are prevalent, leading to increased social vulnerability and health risks.

Table 1-2-7 summarizes the number of patients with major infectious diseases occurring in Kyrgyz over the five-year period from 2019 to 2023. In recent years, a state of emergency was declared from 2020 to 2022 due to the spread of COVID-19, and since 2023, a major measles outbreak has resulted in numerous deaths. Furthermore, cases of anthrax originating from livestock have been frequently

confirmed in Jalal-Abad Region. Furthermore, the number of new human immunodeficiency virus (HIV) infections nationwide in Kyrgyz has remained high in recent years, ranging from over 500 to under 1,000 cases. While the most recent infectious disease data is unavailable, according to the Kyrgyz Republic Ministry of Health's Immunization and Prevention Center, the measles outbreak appears to be ongoing as of April 2025.



Photo 1-2-12 Outdoor Toilet



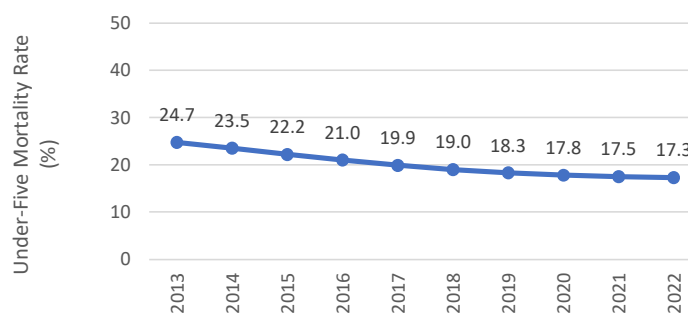
Photo 1-2-13 Burning Household Waste Outdoor

Table 1-2-7 Trend in the Number of Patients with Major Infectious Diseases Occurring in Kyrgyz

Major Infectious Diseases	2019	2020	2021	2022	2023
Measles	2,380	733	3	1	7,046
Influenza, etc.	190,826	190,443	271,358	336,782	273,957
Brucella disease	869	582	796	954	1021
Anthrax	2	12	22	8	20
Echinococcosis	970	653	888	835	866
Human Immunodeficiency Virus (HIV)	< 1000	< 1000	< 1000	< 1000	< 1000

Source: National Statistical Committee of the Kyrgyz Republic, UNAIDS

On the other hand, the under-five mortality rate in Kyrgyz has been declining. Figure 1-2-7 shows the trend in Kyrgyz's under-five mortality rate over the past decade. The rate, which stood at 24.7% in 2013, decreased to 17.3% by 2022. This improvement is largely attributed to enhanced access to medical facilities, facilitated by healthcare and welfare support, as well as infrastructure development assistance provided by international aid agencies, including JICA.



Source: UNICEF

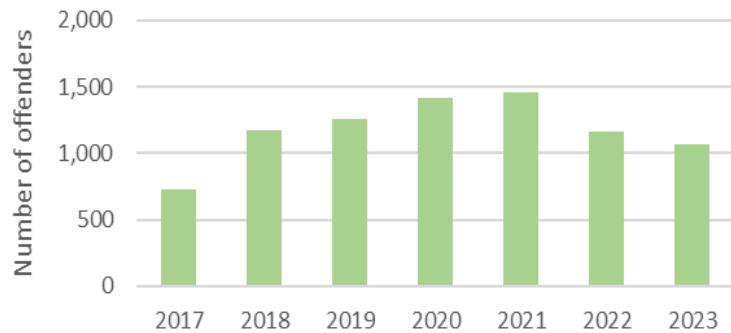
Figure 1-2-7 Trends of Under-Five Mortality Rate

⑤ Social Capital and Community-based Organizations, including Local Decision-Making Bodies
Social capital in rural areas and regional cities of Kyrgyz is based on local communities formed around kinship and neighborhood ties. These local communities are extremely strong, functioning as mutual support networks providing both emotional and economic assistance. Furthermore, in Kyrgyz rural areas,

alongside public institutions, community-based decision-making bodies known as elder courts, composed of older men, sometimes function as social organizations such as local decision-making bodies. These organizations are said to promote social harmony by mediating local disputes. However, since women generally do not participate in these decision-making bodies, there is a possibility that women's perspectives are not reflected.

⑥ Safety and Security

The trend in crime incidents in Jalal-Abad Region is shown in Figure 1-2-8. Jalal-Abad Region has seen over 1,000 incidents annually, with a decreasing trend since 2021. While no organized data on incidents occurring in the vicinity of the project site could be confirmed, local residents report that security around the project area is relatively stable. However, according to the United Nations Office on Drugs and Crime (UNODC), the Bishkek-Osh Highway, which includes the project site, has been reported as part of a drug trafficking route from Afghanistan.

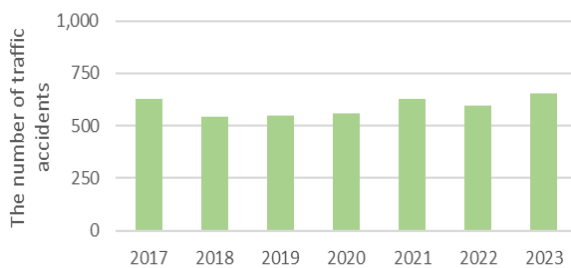


Source: National Statistical Committee of the Kyrgyz Republic

Figure 1-2-8 Number of crimes occurring in Jalal-Abad Region

⑦ Traffic Accidents

The trend in the number of traffic accidents occurring in Jalal-Abad Region is shown in Figure 1-2-9. Approximately 500 to 600 traffic accidents occur annually in Jalal-Abad Region, with the number remaining relatively stable in recent years. According to interviews with personnel at the local police station, there have been no reports of traffic accidents occurring in the vicinity of the project site. However, local residents indicate that minor accidents, such as vehicles slipping on frozen roads and colliding with guardrails during winter, occur frequently but are not reported. Photo 1-2-14 appears to show evidence of a vehicle colliding with a guardrail; multiple such impact marks can be observed on the Naryn River Bridge.



Source: National Statistical Committee of the Kyrgyz Republic

Figure 1-2-9 No. of Traffic Accidents in Jalal-Abad Region



Photo 1-2-14 Scratch Marks on the Guardrail of the Naryn River Bridge

⑧ Conflicts within the community

Residents near the planned site were once forced into large-scale relocation due to the construction of the Toktogul Dam, experiencing a past where the cohesion of their local community was shaken. While no significant disputes between communities have been reported recently, interviews with local residents confirm instances where grazing cattle have entered settlements, causing inconvenience. As shown in Photo 1-2-15, residents have erected fences on the left bank upstream to prevent livestock from entering the settlement. The possibility that livestock entering settlements could lead to disputes within the community cannot be ruled out.



Photo 1-2-15 Fences Installed to Prevent Cattle from Entering the Settlement

⑨ Children’s Rights

According to a UNICEF report on child labor, as of 2018, approximately 22% of children aged 5 to 17 in Kyrgyz were engaged in economic activities or unpaid domestic work, hindering their access to education. While Kyrgyz prohibits labor for those under 16 by law, child labor is reported to occur primarily in the tobacco industry and cotton production.

(2) Economic Conditions

① Employment Rate

The employment and unemployment rates by administrative division in Kyrgyz are shown in Table 1-2-8. The employment rate in Jalal-Abad Region, where the project site is located, is lower for both men and women compared to other Regions and cities. In particular, the male employment rate is lower than that of neighboring Regions such as Naryn, Talas, and Chui. Furthermore, Jalal-Abad Region has the highest unemployment rate in Kyrgyz at 8.2%.

Table 1-2-8 Employment Rate by Administrative District in Kyrgyz (Year 2023)

Administrative Division	Employment Rate (%)			Unemployment Rate (%)
	Women	Men	Total	
Batken Region	28.5	67.1	47.7	5.9
Jalal-Abad Region	34.0	63.6	48.7	8.2
Issyk-Kul Region	37.8	60.3	48.9	5.1
Naryn Region	33.8	71.8	52.9	5.1
Osh Region	52.4	84.2	68.2	1.4
Talas Region	59.9	76.7	68.3	2.0
Chuy Region	36.3	66.3	50.9	4.1
Bishkek City	53.2	72.2	61.5	3.5
Osh City	29.6	73.0	51.8	2.1

Source : National Statistical Committee of the Kyrgyz Republic

② Employment Distribution by Industry Sector

The employment population and its proportion by industry sector in Jalal-Abad Region, where the project site is located, are shown in Table 1-2-9. In Jalal-Abad Region, the largest number of people are engaged in education-related work, followed by construction, wholesale trade, and agriculture. Considering that in 2012, the proportion of people engaged in agriculture, forestry, and fisheries was the highest, accounting for 33.4% of the total, the working



Photo 1-2-16 Livestock Farmers in the Project Area

population and proportion in agriculture, forestry, and fisheries have significantly decreased in recent years. This decline is likely due to many rural residents migrating domestically and internationally in search of employment opportunities, as well as a shift of labor from agriculture to other industrial sectors.

Table 1-2-9 Employment by Industry in Jalal-Abad Region (2012, 2023)

Industry Classification	2012		2023	
	Employment (in thousands)	Percentage (%)	Employment (in thousands)	Percentage (%)
Agriculture, forestry, and fisheries	143.4	33.4%	50.3	12.6%
Mining and quarrying	3.0	0.7%	3.9	1.0%
Manufacturing	18.4	4.3%	39.2	9.8%
Electricity, gas, steam and air conditioning supply	6.9	1.6%	9.6	2.4%
Water supply; sewage, waste management and remediation activities	1.7	0.4%	1.0	0.3%
Construction	68.3	15.9%	60.4	15.2%
Wholesale and retail trade, repair of vehicles and motorcycles	73.4	17.1%	54.8	13.8%
Transportation and storage	25.1	5.8%	29.7	7.5%
Accommodation and food service	10.5	2.4%	27.2	6.8%
Public administration	17.5	4.1%	17.1	4.3%
Education	31.8	7.4%	64.1	16.1%
Human health and social work	16.0	3.7%	20.1	5.0%
Arts, entertainment and recreation	1.1	0.3%	3.0	0.8%
Information and communication	2.4	0.6%	1.9	0.5%
Financial and insurance	3.7	0.9%	6.5	1.6%
Professional, scientific and technical	4.2	1.0%	3.1	0.8%
Administrative and support services	0.5	0.1%	0.7	0.2%
Other services	1.4	0.3%	5.8	1.5%
Activities of households as employers	0.1	0.0%	0.3	0.1%
Total	429.5	100.0%	398.5	100.0%

Source : National Statistical Committee of the Kyrgyz Republic

③ Income and Poverty Rate

The average per capita income, poverty rate, and gender wage ratio by administrative district in Kyrgyz are shown in Table 1-2-10. The average per capita income in Jalal-Abad Region, where the project site is located, is approximately ¥17,500, comparable to that of Bishkek City. However, its poverty rate is 36.1%, the second highest after Batken Region. Meanwhile, women's wages in Jalal-Abad Region are about 76% of men's wages, showing a significant gender gap.

Table 1-2-10 Average Per Capita Income and Poverty Rate by Administrative Region in Kyrgyz, and Gender Wage Gap (2023)

Administrative Division	Average monthly income per person (in yen)	Poverty Rate (%) ¹	Ratio of women's wages to men's wages (%) ²
Batken Region	¥ 16,700	48.1 %	73.4
Jalal-Abad Region	¥ 17,500	36.1 %	76.4
Issyk-Kul Region	¥ 17,100	30.9 %	69.7
Naryn Region	¥ 14,000	38.1 %	43.8
Osh Region	¥ 16,100	20.4 %	90.6
Talas Region	¥ 14,200	23.2 %	87.2
Chuy Region	¥ 15,700	26.6 %	58.1
Bishkek City	¥ 18,200	32.4 %	87.5
Osh City	¥ 12,800	13.9 %	78.5

Note 1 : The poverty line in Kyrgyz is approximately ¥4,400 per person per month.

Note 2 : The ratio of women's wages to men's wages, with men's wages set at 100

Source : National Statistical Committee of the Kyrgyz Republic

④ Standard of Living

The percentage of people with access to basic living infrastructure by administrative district in Kyrgyz is shown in Table 1-2-11. In Jalal-Abad Region, where the project site is located, 92.4% of the population has access to safe drinking water, comparable to urban areas. On the other hand, the percentage of people with access to electricity is 53.6%, which is lower than neighboring Regions such as Naryn, Osh, and Chuy. Furthermore, the percentage of people with access to sewerage is 12.2%, placing it among the lowest in Kyrgyz, alongside Batken and Talas Regions.

Table 1-2-11 Percentage of People with Access to Basic Living Infrastructure by Administrative Division in Kyrgyz (2022, 2023)

Administrative divisions	Drinking Water	Electricity	Sewer system
Batken Region	87.7 %	59.2 %	8.7 %
Jalal-Abad Region	92.4 %	53.6 %	12.2 %
Issyk-Kul Region	100 %	46.9 %	78.5 %
Naryn Region	98.3 %	70.9 %	59.5 %
Osh Region	89.9 %	73.7 %	26.6 %
Talas Region	99.6 %	54.1 %	8.2 %
Chuy Region	100 %	84.7 %	74.6 %
Bishkek City	100 %	100 %	99.2 %
Osh City	100 %	99.9 %	71.0 %

Source : National Statistical Committee of the Kyrgyz Republic

Note : Drinking water and sewage are based on 2023 statistics; electricity is based on 2022 statistics.

(3) Natural Conditions

① Topography

The topography of Toktogul District is as shown in Figure 1-2-10. Toktogul District is located in the western Tianshan Mountains, featuring a rugged terrain with the Susamyr Mountains exceeding 4,000 meters in elevation to the north, the Fergana Mountains to the south, and a basin formed by the erosive action of the Naryn River spreading across the central area. The project site and its surrounding areas are located within this basin, at an elevation

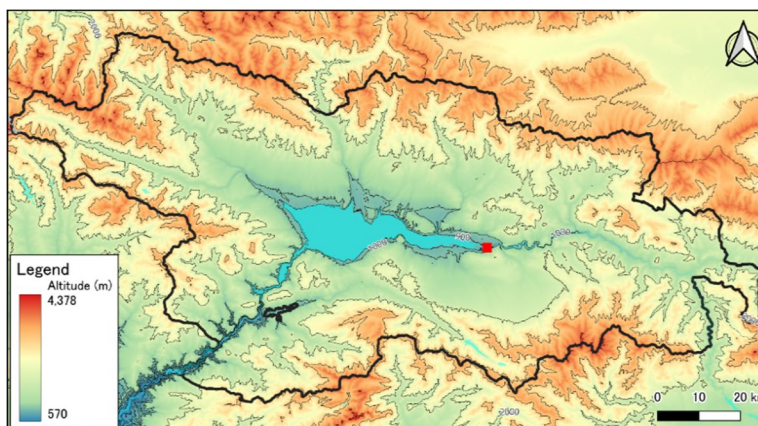


Figure 1-2-10 Topographic Map Around the Planned Site

Source : Shuttle Radar Topography Mission (SRTM) (NASA)

of approximately 900 meters. No significant topography or geology defined by laws, treaties, or similar regulations exists within the project site or its surrounding areas.

② Geology

Toktogul District is primarily composed of geological formations from the Paleozoic to Cenozoic eras. The project site and its surrounding areas consist of Carboniferous strata formed between 359.2 million and 299 million years ago, mainly comprising coal beds, sandstone, and shale.

③ Designated Areas for Nature Conservation and Wildlife Protection

Kyrgyz possesses diverse topography ranging from high-altitude glaciers and alpine pastures to arid steppes and lush forests and is blessed with rich ecosystems. To protect these ecosystems and utilize them as tourism resources, Kyrgyz has designated a total of 35 nature reserves and biosphere reserves.

The nature reserves and biosphere reserves located near the project site are shown in Table 1-2-12 and Figure 1-2-11. The closest designated area is the South Kyrgyz Nature Park, which features rich natural landscapes, diverse ecosystems, and hiking trails. This protected area is approximately 35 km from the project site.

Table 1-2-12 Designated Areas for Nature Conservation and Cultural Heritage Preservation around the Project Site

No	Name	Classification	Area (km ²)	Designated Year
①	Chychkan	Wildlife Sanctuary	635.5	1974
②	South Kyrgyz	Natural Park	180.0	1990
③	Toguz-Torouss	Wildlife Sanctuary	100.0	1975
④	Beshtash	Natural Park	137.3	1996
⑤	Western Tien-shan	World Natural Heritage	5281.8	2016
⑥	Sary-Chelek	UNESCO Biosphere Reserve	238.7	1979
⑦	Sary-Chelekiy	National Biosphere Reserve	238.3	1959
⑧	Kara-Shoro	National Nature Reserve	143.4	1996
⑨	Dzhardy-Kaindin	Wildlife Sanctuary	30.0	1975
⑩	Yassin	Wildlife Sanctuary	50.0	1975
⑪	Aksuiski	Wildlife Sanctuary	76.0	1971
⑫	Ala-Archa	National Nature Reserve	37.9	1976
⑬	Besh-Aral	National Nature Reserve	1120.2	1979
⑭	Chandalash	Wildlife Sanctuary	252.7	1975
⑮	Manass	Wildlife Sanctuary	150.0	1975
⑯	Sonkul	Wildlife Sanctuary	300.0	1989
⑰	Karatal-Zhapyrk NR	National Nature Reserve	212.6	1994
⑱	Chatyrkul	Wildlife Sanctuary	199.8	1971
⑲	Gulchin	Wildlife Sanctuary	5.0	1968
⑳	Akbuurin	Wildlife Sanctuary	100.0	1975
㉑	Kirovskiy	Sanctuary	286.7	1975
㉒	Son-Kol Lake	Ramsar Convention Wetland	368.7	2011
		Key Biodiversity Area (KBA)	300.0	2010
		Important Bird Area (IBA)	300.0	2010
㉓	Chatyr Kul	Ramsar Convention Wetland	161.0	2005

Source : Protected Planet, BirdLife DataZone, The World Database of Key Biodiversity Areas

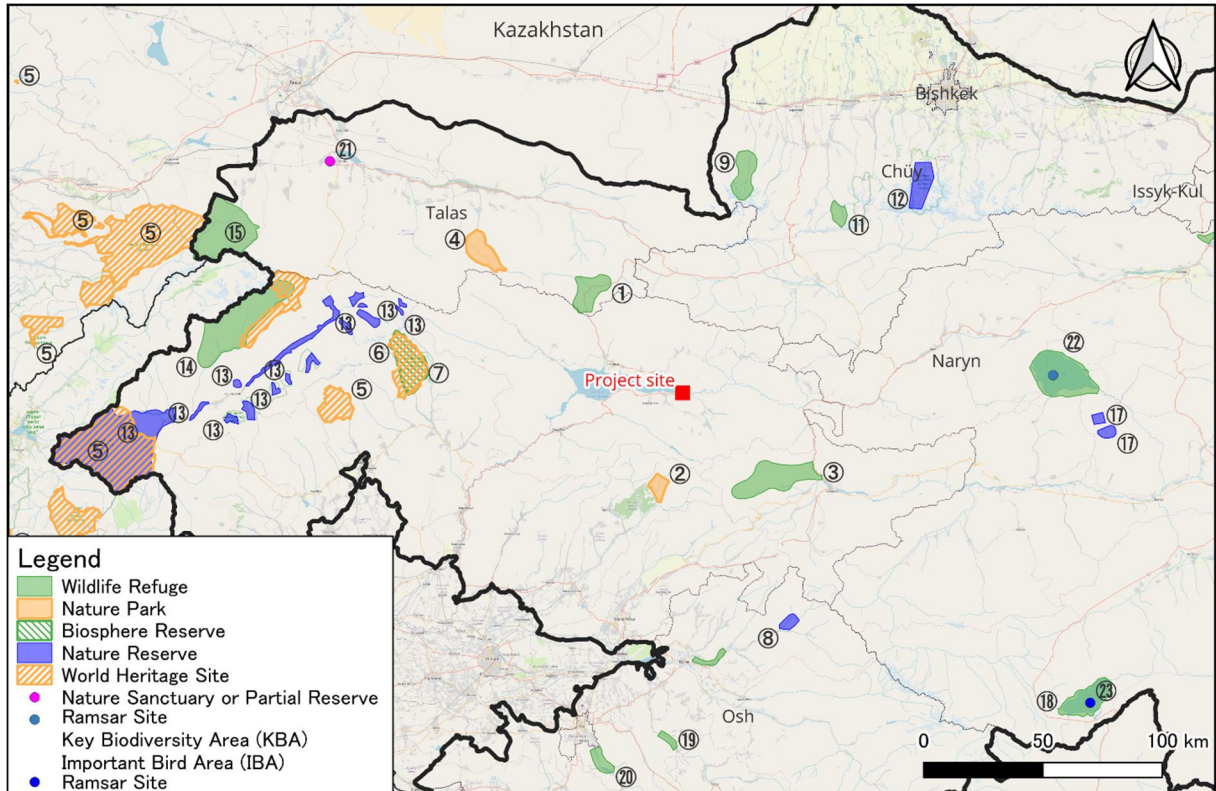


Figure 1-2-11 Designated Areas for Nature Conservation and Cultural Heritage Preservation around the Project Site

Source : Protected Planet, BirdLife DataZone, The World Database of Key Biodiversity Areas

④ Cultural Heritage, Historical Heritage

The Republic of Kyrgyz, once situated at a key point along the Silk Road across the Eurasian continent, possesses abundant tourism resources combined with the cultures of diverse ethnic groups. The cultural and historical heritage sites located around the planned area are shown in Table 1-2-13 and Figure 1-2-12. Northern Kyrgyz is home to the archaeological sites of “The Silk Roads: The Routes Network of Chang'an-Tianshan Corridor,” while the western region features “Xinjiang Tianshan,” a cluster of nature reserves.



Photo 1-2-17 Transportation Network of the Silk Road Chang'an-Tianshan Corridor

(City of Balasagun: Chui State)

Source : Kyrgyz Community Based Tourism Association

Northern Kyrgyz is home to the archaeological sites of “Silk Roads: The Routes Network of Chang'an-Tianshan Corridor,” while the western region features “Xinjiang Tianshan,” a cluster of nature reserves.

The closest cultural and historical heritage site to the project site is the Toktogul Satylganov Memorial House-Museum. This heritage site is a historically and culturally significant property comprising the birthplace and mausoleum of Toktogul Satylganov, one of Kyrgyz's most renowned poets and musicians.

This heritage site is located approximately 60 km west of the planned site. There is also information suggesting that Saka tribe ruins once existed at the site of the current Toktogul Reservoir, but these are now submerged beneath the reservoir.

Table 1-2-13 Cultural Heritage and Historical Heritage around the Project Site

No	Name	Classification	Area (km ²)	Designated Year
①	Western Tien-Shan	World Cultural Heritage	528.2	2016
②	Silk Roads: the Routes Network of Chang'an-Tianshan Corridor	World Cultural Heritage	42.7	2014
③	Sulaiman-Too Sacred Mountain	World Cultural Heritage	0.1	2009
④	Arslanbob	Kyrgyz National Registered Cultural Property	-	-
⑤	Saimaluu Tash	Kyrgyz National Registered Cultural Property	-	-
⑥	Shakh Fazil Mausoleum	Kyrgyz National Registered Cultural Property	-	-
⑦	Uzgen Architectural Complex	Kyrgyz National Registered Cultural Property	-	-
⑧	Toktogul Satylganov Memorial House-Museum	Kyrgyz National Registered Cultural Property	-	-

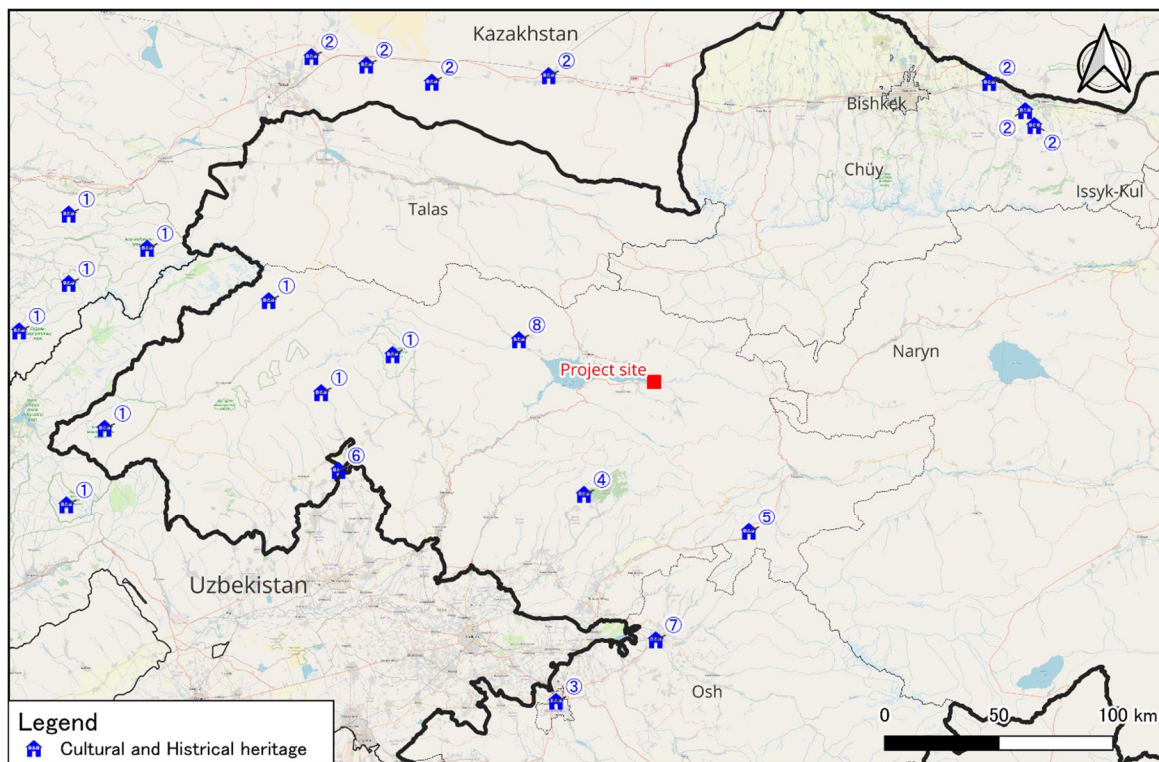


Figure 1-2-12 Cultural and Historical Heritage Sites in the Vicinity of the Planned Site

⑤ Potential Habitat for Rare Wild Flora and Fauna

According to the International Union for Conservation of Nature (IUCN), there are a total of 31 species (29 bird species and 2 mammal species) that may inhabit the area around the project site, as shown in Table 1-2-14. These include 6 endangered (EN) species, 8 vulnerable (VU) species, and 17 near-threatened (NT) species.

Among them, many of the bird species are migratory and may use the area around the project site as a route or temporary stopover between their breeding and wintering grounds. The Egyptian Vulture, European Turtle-dove, and Eastern Imperial Eagle, for example, are not considered resident species in the area but may breed there.

In contrast, species such as the Saker Falcon, Himalayan Griffon, Bearded Vulture, and Cinereous Vulture are resident birds that may live, breed, and overwinter in the vicinity of the project site.

As for mammals, the Eurasian Otter and Siberian Ibex are likely to be resident and breeding species in the area.

Although all of these species are widely distributed across the Eurasian continent, their populations have been declining in recent years.



Photo 1-2-18 Saker Falcon (EN)

Source: IUCN 2025. The IUCN Red List of Threatened Species. Version 2024-2

Table 1-2-14 Rare Wild Species Potentially Present near the Project Area

Classification	Name	IUCN Red List Category	Occurrence Status	Population Trend
Birds	White-headed Duck	EN	Extant (passage)	Decreasing
Birds	Great Bustard		Extant (passage)	Decreasing
Birds	Egyptian Vulture		Extant (breeding)	Decreasing
Birds	Pallas's Fish-eagle		Extant (passage)	Decreasing
Birds	Saker Falcon		Extant (resident)	Decreasing
Birds	Steppe Eagle		Extant (passage)	Decreasing
Birds	European Turtle-dove	VU	Extant (breeding)	Decreasing
Birds	Grey Plover		Extant (passage)	Decreasing
Birds	Yellow-eyed Pigeon		Extant (resident)	Decreasing
Birds	Greater Spotted Eagle		Extant (passage)	Decreasing
Birds	Asian Houbara		Extant (breeding)	Decreasing
Birds	Curlew Sandpiper		Extant (passage)	Decreasing
Birds	Broad-billed Sandpiper		Extant (passage)	Decreasing
Birds	Eastern Imperial Eagle		Extant (breeding)	Decreasing
Birds	Northern Lapwing	NT	Extant (breeding)	Decreasing
Birds	Redwing		Extant (passage)	Decreasing
Birds	Little Bustard		Extant (passage)	Decreasing
Birds	Dalmatian Pelican		Extant (passage)	Decreasing
Birds	Eurasian Curlew		Extant (passage)	Decreasing
Birds	Marbled Duck		Extant (passage)	Decreasing
Mammals	Eurasian Otter		Extant (resident)	Decreasing
Birds	Black-tailed Godwit		Extant (passage)	Decreasing
Birds	Himalayan Griffon		Extant (resident)	Decreasing
Birds	Bearded Vulture		Extant (resident)	Decreasing

The Preparatory Survey Report on the Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Classification	Name	IUCN Red List Category	Occurrence Status	Population Trend
Birds	Great Snipe		Extant (passage)	Decreasing
Birds	Pallid Harrier		Extant (passage)	Decreasing
Mammals	Siberian Ibex		Extant (resident)	Decreasing
Birds	Dunlin		Extant (passage)	Decreasing
Birds	Ferruginous Duck		Extant (breeding)	Decreasing
Birds	Ruddy Turnstone		Extant (passage)	Decreasing
Mammals	Cinereous Vulture		Extant (resident)	Decreasing

Source : IUCN 2025. The IUCN Red List of Threatened Species. Version 2024-2

Note: The IUCN Red List categories and their definitions are as follows.

EN (Endangered) : Species considered to be at very high risk of extinction in the wild

VU (Vulnerable) : Species considered to be at high risk of extinction in the wild

NT (Near Threatened) : Species that are near threatened or likely to become endangered in the near future

⑥ Landscape

The Toktogul Reservoir, located to the west of the project site, plays an important role in supplying water to neighboring countries. In addition to its functional significance, it is also known as a tourist destination for its scenic beauty, with the lakeshore used for recreational activities such as camping.



Photo 1-2-19 Landscape from the Main Viewpoints

The viewpoints overlooking the Toktogul Reservoir are shown in Figure 1-2-13. The landscape photographed from one of these viewpoints is presented in Photo 1-2-19. In general, the view of the Toktogul Reservoir does not include the Naryn River Bridge.

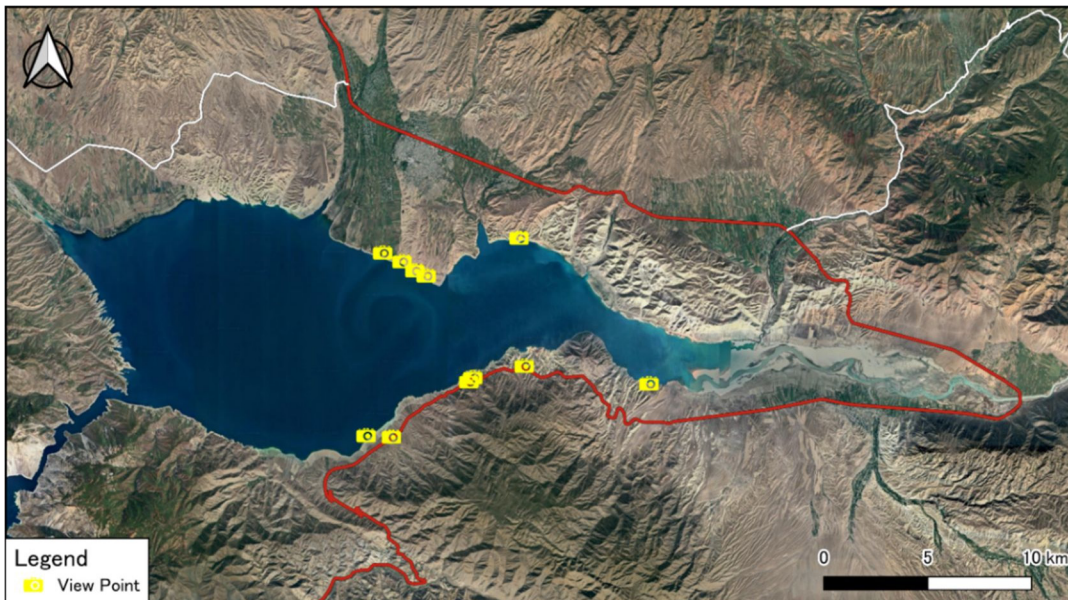


Figure 1-2-13 Main Viewpoints of Toktogul Reservoir

Note : The main viewing points are locations designated based on local tourist guides and similar resources; they are not facilities developed by municipalities or similar entities.

⑦ Pollution Status

● Air pollution

In the Kyrgyz Republic, air pollution is recognized as a serious environmental and public health concern and is said to be the greatest environmental risk factor contributing to premature deaths and health problems among infants. The impact is particularly evident in large cities such as Bishkek, mainly due to exhaust gas emissions from chronically congested traffic, as well as the use of coal for residential heating and cooking during the winter season. Regular air quality monitoring in the Kyrgyz Republic is conducted only in major urban areas such as Bishkek, and the status of air pollution in rural or regional areas remains unclear. As for the project area, air pollutants such as NO_x, Particulate Matter (including dust), SO₂, and CO are assumed to be generated from vehicle traffic, the operation of construction vehicles related to dam construction, concrete product plants, and coal combustion from surrounding households.



Photo 1-2-20 Construction Vehicles passing through the Project Area

● Water pollution

In the Kyrgyz Republic, water pollution is also one of the major environmental issues, posing risks to both public health and ecosystems. The causes of water pollution in the country are diverse and include the discharge of toxic by-products containing heavy metals from mining activities, untreated wastewater from industrial operations, agricultural runoff, improper disposal of industrial waste, and inadequate sewage and sanitation infrastructure. However, pollution control measures remain insufficient. Although environmental standards for water quality have been established in the Kyrgyz Republic, large-scale and regular water quality monitoring has not been implemented, and therefore the extent of water pollution is unclear. While no specific sources of water pollution have been identified around the project site, the possibility cannot be excluded that domestic wastewater or untreated industrial effluents from urban areas upstream of the Naryn River, as well as hazardous substances from gold mining sites, may be contaminating the river.

● Noise and Vibration

In the Kyrgyz Republic, noise generation in urban areas such as Bishkek and Osh has become an issue, mainly due to chronic traffic congestion and aging public transportation systems. However, with air and water pollution, there is no nationwide monitoring of noise and vibration, and the actual situation remains unclear. In the vicinity of the project site, potential sources of noise and vibration are considered to include ordinary vehicles, heavy trucks, and construction vehicles associated with dam construction.

- Sediment pollution

No cases of sediment contamination have been reported in the Kyrgyz Republic to date; however, it cannot be ruled out that domestic wastewater and untreated effluents from industrial facilities in urban areas upstream of the Naryn River, as well as hazardous substances discharged from gold mining sites, may have accumulated in the riverbed around the project area.

Although the Kyrgyz Republic faces various environmental challenges, a nationwide monitoring system has not yet been established, and thus the extent of pollution remains unclear. Therefore, under this project, efforts were made to assess the pollution status by measuring air quality, water quality, and noise and vibration levels within the project site.

Detailed survey results are shown in Section 「1-2-1-8 Environmental and Social Consideration Survey Results」

1-2-1-3 Environmental and Social Consideration Systems and Organizations in Kyrgyzstan

(1) National Plans Related to Environmental and Social Considerations

1) Kyrgyz Republic National Environmental Action Plan

This plan was formulated in 1995 with support from international development organizations such as the United Nations Development Programme (UNDP). It aims to define Kyrgyz's national priorities for environmental protection and the sustainable use of natural resources, to address environmental challenges, and to attract international financial assistance. The plan places emphasis on tackling major environmental issues such as water resource management, land degradation, deforestation and biodiversity loss, air and water pollution caused by industrial activities, and waste management. It also highlights the importance of integrating environmental considerations into the country's economic and social development strategies.

2) National Sustainable Development Strategy 2018–2040

This plan presents the country's long-term vision for achieving sustainable development in the economic, social, institutional, and environmental sectors, as well as for improving the quality of life of its citizens. Within this plan, the strategy for the environmental sector is identified as “Environmental Protection and Green Growth,” which sets forth the following objectives.

- ✓ Promote environmental safety and protect ecosystems
- ✓ Improve the management of water, land, and forest resources
- ✓ Facilitate the transition to a green economy through renewable energy, energy efficiency, and low-carbon development
- ✓ Strengthen resilience to climate change, particularly in mountainous areas

In this plan, “Regional and Rural Development” is also identified as one of the key strategies. It sets goals such as reducing the disparity between urban and rural areas and improving infrastructure in rural and mountainous regions. These objectives are consistent with the purpose of this project, which aims to strengthen regional connectivity between urban and rural areas.

3) National Adaptation Plan (NAP)

This plan was formulated as part of the Kyrgyz Republic’s international obligations under the United Nations Framework Convention on Climate Change (UNFCCC). It aims to assess climate risks and vulnerabilities, integrate climate change adaptation into national policies, and guide financing for building resilience to climate change. The plan identifies priority areas for climate change adaptation, including agriculture and livestock, water resources, ecosystems and biodiversity, infrastructure and disaster prevention, and public health. The introduction of a climate-resilient bridge, which is one of the objectives of this project, aligns with these national priorities.

(2) International Conventions and Agreements Ratified by the Kyrgyz Republic

International conventions and agreements related to environmental and social considerations that the Kyrgyz Republic has ratified are shown in Table 1-2-15. The country has signed major international treaties addressing global environmental issues, such as the United Nations Framework Convention on Climate Change (UNFCCC), as well as biodiversity-related conventions such as the Convention on Biological Diversity (CBD) and the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention). Through these commitments, the Kyrgyz Republic aims to strengthen international cooperation and promote responses to environmental challenges toward the realization of a sustainable society.

Table 1-2-15 International Conventions and Agreements Related to Environmental and Social Considerations Concluded by the Kyrgyz Republic

Name	Effective Date	Acceded Date
The United Nations Framework Convention on Climate Change	1994	2000
Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention)	2001	2001
The Convention on Biological Diversity	1993	1996
he Convention on the Conservation of Migratory Species of Wild Animals	1983	2014
The Cartagena Protocol on Biosafety to the Convention on Biological Diversity	2003	2006
The Convention on Wetlands of International Importance especially as Waterfowl Habitat	1975	2003
Convention on International Trade in Endangered Species of Wild Fauna and Flora	1975	2007
The UN ECE Convention on Long-Range Transboundary Air Pollution	1983	2000
Stockholm Convention on Persistent Organic Pollutants	2004	2006
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, usually known as the Basel Convention	1992	1996
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	2004	2004
United Nations Convention to Combat Desertification	1996	1997

(3) National Laws Related to Environmental and Social Considerations in the Kyrgyz Republic

The national laws and regulations of the Kyrgyz Republic related to environmental and social considerations are shown in Table 1-2-17. Among these, the main laws concerning the implementation

of environmental impact assessment (EIA) are outlined below.

1) LAW OF THE KYRGYZ REPUBLIC on Environmental Protection

This law establishes the legal, economic, and organizational framework for environmental protection, the sustainable use of natural resources, and environmental safety for the population. It serves as the foundation for many other sectoral laws, including those related to forests, water, land, and biodiversity conservation. Chapter 6 of the law stipulates that an Environmental Impact Assessment (EIA) must be conducted for facilities and activities that may have direct or indirect effects on the environment, in order to evaluate the potential environmental impacts of planned projects. Chapter 8 defines the powers of national and public institutions in environmental protection, as well as the rights and obligations of citizens and resource users.

2) LAW OF THE KYRGYZ REPUBLIC "General Technical Regulations for Ensuring Environmental Safety"

This law establishes comprehensive requirements to ensure environmental safety across various sectors in the Kyrgyz Republic. Annex 1 of the law specifies, in tabular form, the types of economic activities subject to mandatory Environmental Impact Assessment (EIA). Annex 2 classifies economic and other activities into Risk Categories I to III, based on the quantity and type of pollutants generated. The scope and content of regulations, as well as the frequency of inspections, are determined according to these risk categories.

Table 1-2-16 Types of Economic Activities Requiring EIA Implementation

Types of activities	
1. Energy facilities	14. Wastewater and exhaust gas treatment facilities
2. Reservoirs	15. Groundwater intake points
3. Petroleum, petroleum products, and gas extraction and refining companies	16. Water supply systems, irrigation, and drainage systems for densely populated areas
4. Production of construction materials (cement, asphalt, slate, asbestos cement pipes, etc.)	17. Construction of roads and railways
5. Agriculture	18. Airports, airfields, test sites, ports, inland waterways, motor racing courses
6. Mining	19. Construction plans for recreational and tourist facilities
7. Metal processing industry	20. Organization of industrial units
8. Glass manufacturing	21. Sewerage networks
9. Pharmaceutical, biological, and protein product manufacturing	22. Mountain lifts and cable cars
10. Chemical manufacturing	23. Recycling, treatment, and disposal of production and consumption waste
11. Food industry	24. Gas stations
12. Textile, leather, and paper industries	25. Vehicle maintenance and pre-sale preparation bases
13. Storage of toxic, hazardous, and radioactive substances	

3) THE LAW OF KYRGYZ REPUBLIC On Ecological Expertise

This law establishes the legal framework for conducting environmental assessments in the Kyrgyz Republic. Its purpose is to prevent adverse environmental impacts by ensuring that economic and other

activities undergo thorough environmental evaluation prior to implementation.

The law stipulates the conduct of assessments by independent experts to evaluate the potential ecological impacts of proposed projects, ensures transparency and public participation in environmental decision-making processes, and defines the accountability of project proponents.

4) Regulations on procedures for evaluating impact on the environment in the Kyrgyz Republic

This regulation establishes the framework for implementing environmental assessments in the Kyrgyz Republic. It designates the Ministry of Natural Resources, Ecology, and Technical Supervision as the main authority responsible for ensuring compliance with environmental assessment procedures. The regulation also defines the procedures for conducting Environmental Impact Assessments (EIA) and specifies the content and requirements of the documents to be submitted.

5) Regulations on procedure for conducting the state environmental assessment in the Kyrgyz Republic

This regulation stipulates the specific procedures for conducting Environmental Impact Assessments (EIA) and requires the implementation of public consultations, the collection of feedback, and the addressing of concerns in order to ensure transparency and public participation in the EIA process.

Table 1-2-17 National Laws and Regulations Related to Environmental and Social Considerations in the Kyrgyz Republic

Category	Title	Entry	Enhancement	Last amended
Governance	CONSTITUTION OF THE KYRGYZ REPUBLIC	-	2021	-
	LAW OF THE KYRGYZ REPUBLIC On the Constitution of the Kyrgyz Republic	59	2021	2023
	LAW OF THE KYRGYZ REPUBLIC On Official Language of the Kyrgyz Republic	52	2000	2013
	LAW OF THE KYRGYZ REPUBLIC On Access to Information	217	2013	-
	LAW OF THE KYRGYZ REPUBLIC On Electronic Governance	127	2017	2025
	LAW OF THE KYRGYZ REPUBLIC About local public administration and local government bodies	123	2021	2024
	LAW OF THE KYRGYZ REPUBLIC On Normative Legal Acts	241	2009	2020
	LAW OF THE KYRGYZ REPUBLIC On access to information held by state bodies and local self-government bodies of the Kyrgyz Republic	213	2006	2022
	Regulations on the Ministry of Natural Resources, Ecology, and Technical Supervision of the Kyrgyz Republic	98	2024	-
Regulations on the Environmental and Technical Supervision Service under the Ministry of Natural Resources, Ecology, and Technical Supervision of the Kyrgyz Republic	366	2023	-	
Environmental Impact Assessment	LAW OF THE KYRGYZ REPUBLIC On Environmental Protection	53	1999	2024
	LAW OF THE KYRGYZ REPUBLIC "General Technical Regulations for Ensuring Environmental Safety "	151	2009	2019
	LAW OF THE KYRGYZ REPUBLIC On Environmental Expertise	54	1999	2015
	Regulations on procedures for evaluating impact on the environment in the Kyrgyz Republic	60	2015	-
	Regulations on procedure for conducting the state environmental assessment in the Kyrgyz Republic	248	2014	2017
Pollution Control	LAW OF THE KYRGYZ REPUBLIC On the Protection of Atmospheric Air	51	1999	2016
	WATER CODE OF THE KYRGYZ REPUBLIC	8	2005	2019
	LAW OF THE KYRGYZ REPUBLIC On Water	1422-XII	1994	2019
	LAW OF THE KYRGYZ REPUBLIC On Drinking Water	33	1999	2012
	LAW OF THE KYRGYZ REPUBLIC On Subsoil	49	2018	2024

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Category	Title	Entry	Enhancement	Last amended
	LAW OF THE KYRGYZ REPUBLIC About protection of soil fertility of lands of agricultural purpose	165	2012	2016
	The Regulations on water protection zones and strips of water bodies in the Kyrgyz Republic	271	1995	2023
	LAW OF THE KYRGYZ REPUBLIC On Production and Consumption Waste	181	2023	-
	LAW OF THE KYRGYZ REPUBLIC About rate of payment for environmental pollution (emissions, dumpings of pollutants, placement of waste)	32	2002	-
	ORDER OF THE GOVERNMENT OF THE KYRGYZ REPUBLIC About approval of Rules of protection of surface water of the Kyrgyz Republic	128	2016	2017
	LAW OF THE KYRGYZ REPUBLIC On Enforcement of the Land Code of the Kyrgyz Republic	46	1999	2012
Natural Environment	FOREST CODE OF THE KYRGYZ REPUBLIC	6	1999	2014
	LAW OF THE KYRGYZ REPUBLIC On Specially Protected Natural Areas	18	2011	2024
	LAW OF THE KYRGYZ REPUBLIC On the Biospheric Territories	48	1999	2024
	LAW OF THE KYRGYZ REPUBLIC On Aquaculture, Fisheries and Protection of Aquatic Biological Resources	35	2021	-
	LAW OF THE KYRGYZ REPUBLIC About protection and use of flora	53	2001	2020
	LAW OF THE KYRGYZ REPUBLIC On Non-material Cultural Heritage of the Kyrgyz Republic	163	2012	2017
	LAW OF THE KYRGYZ REPUBLIC On the Animal World	59	1999	2020
Social Environment, Resettlement	LAW OF THE KYRGYZ REPUBLIC On Protection and Use of Historical and Cultural Heritage	91	1999	2020
	LAND CODE OF THE KYRGYZ REPUBLIC	45	1999	2018
	LAW OF THE KYRGYZ REPUBLIC About management of lands of agricultural purpose	4	2001	2020
	LAW OF THE KYRGYZ REPUBLIC On the Transfer (Transformation) of Land Plots	145	2013	2024
	LABOR CODE OF THE KYRGYZ REPUBLIC	106	2004	2024
	LAW OF THE KYRGYZ REPUBLIC On Pastures	30	2009	2020
	LAW OF THE KYRGYZ REPUBLIC On Labor Protection	167	2003	2016
	LAW OF THE KYRGYZ REPUBLIC On the Procedure for Considering Citizens' Appeals	67	2007	2016
Resettlement Action Plan	CIVIL CODE OF THE KYRGYZ REPUBLIC	15	1996	2025
	LAND CODE OF THE KYRGYZ REPUBLIC	45	1999	2018
	LAW OF THE KYRGYZ REPUBLIC About Management of Agricultural Land	4	2001	2020
	LAW OF THE KYRGYZ REPUBLIC About state registration of the rights to real estate and transactions with it	153	1998	2024
	LAW OF THE KYRGYZ REPUBLIC On the Procedure for Considering Citizens' Appeals	67	2007	2016
	LAW OF THE KYRGYZ REPUBLIC on Valuation Activity	155	2021	2023
	ORDER OF THE GOVERNMENT OF THE KYRGYZ REPUBLIC About approval of the standards of assessment of property obligatory to application by all subjects of estimative activities in the Kyrgyz Republic	217	2006	2016
Others	LAW OF THE KYRGYZ REPUBLIC About the Traffic in the Kyrgyz Republic	52	1998	2024
	LAW OF THE KYRGYZ REPUBLIC On State Regulation and Policy in the Field of Emission and Absorption of Greenhouse Gases	71	2007	2016
	LAW OF THE KYRGYZ REPUBLIC On the Protection of the Ozone Layer	206	2006	2019
	LAW OF THE KYRGYZ REPUBLIC On Renewable Energy Sources	49	2022	2024
	LAW OF THE KYRGYZ REPUBLIC On Energy Saving	88	1998	2019
	LAW OF THE KYRGYZ REPUBLIC On Public Health	10	2024	2024
	ORDER OF THE GOVERNMENT OF THE KYRGYZ REPUBLIC "About approval of acts in the field of public health care"	201	2016	2025
	LAW OF THE KYRGYZ REPUBLIC On Protection of Public Health in the Kyrgyz Republic	14	2024	2024
	LAW OF THE KYRGYZ REPUBLIC On the Guard and Protection Against Domestic Violence	63	2017	2024
	LAW OF THE KYRGYZ REPUBLIC On the State Guarantees of the Equal Rights and Equal Opportunities for Men and Women	184	2008	2011
	LAW OF THE KYRGYZ REPUBLIC On Measures for the Prevention of Damnification to Health of Children, their Physical, Intellectual, Mental, Spiritual and Moral Development in the Kyrgyz Republic	185	2015	2023
	LAW OF THE KYRGYZ REPUBLIC On the Rights and Guarantees of Persons with Limited Opportunities of Health	38	2008	2017
	RESOLUTION OF THE CABINET OF MINISTERS OF THE KYRGYZ REPUBLIC On approval of the State program "Available Country" for Persons with Disability and Other Handicapped National Groups in the Kyrgyz Republic for 2023-2030	69	2023	-

(4) Organizations Related to Environmental and Social Considerations

In the Kyrgyz Republic, the Ministry of Natural Resources, Ecology, and Technical Supervision (MNR) is responsible for the management of natural resources and ensuring environmental protection, overseeing a wide range of environmental matters. To address various aspects of natural resource management, environmental protection, and technical supervision, the MNR has a hierarchical and functional organizational structure, as shown in Figure 1-2-14, which ensures effective governance at the national, regional, and local levels. The Environmental and Technical Supervision Service, under the jurisdiction of the MNR, is responsible for monitoring the environmental impacts of projects and their operations. It serves as the national authority for oversight and control concerning environmental and technical safety issues. It should be noted that in 2021, the former State Agency for Environmental Protection and Forestry (SAEPF), responsible for EIA reviews, was integrated into the newly established MNR during government reorganization.

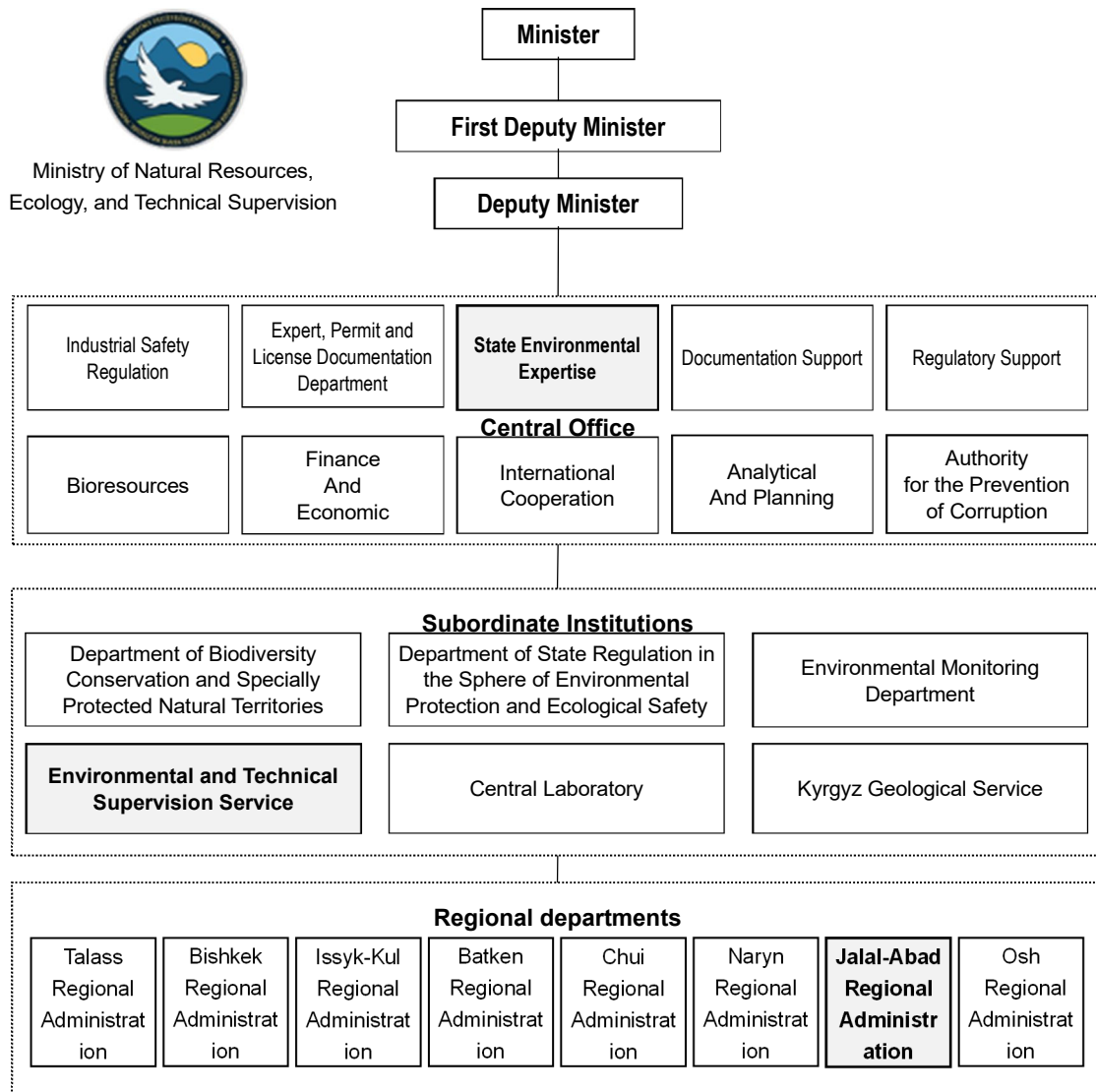


Figure 1-2-14 Organizational Structure of the Ministry of Natural Resources, Ecology, and Technical Supervision

(5) Procedure for the Implementation and Approval of Environmental Impact

The Environmental Impact Assessment (EIA) procedure in the Kyrgyz Republic is stipulated under Decree No. 60 on the Regulation for Conducting Environmental Impact Assessment and Law No. 151 on the General Technical Regulations for Ensuring Environmental Safety in the Kyrgyz Republic, as illustrated in Figure 1-2-15. The outline of each procedural step is summarized below.

1) EIA Screening

The first stage involves decision-making regarding the necessity of conducting an EIA. At this stage, it is determined whether the proposed project requires an environmental assessment, including consideration of potential transboundary impacts. This decision is made by the project proponent, based on the list of activities subject to EIA specified in Annex 1 of the “General Technical Regulations for Ensuring Environmental Safety in the Kyrgyz Republic.” In addition, depending on the amount of air pollutant emissions, wastewater discharge, and waste generation associated with the proposed project, the project is classified by the state authority specially authorized in the field of environmental protection into one of three hazard categories (I, II, or III). Projects falling under Category I, as well as those with a potential for significant adverse transboundary impacts, are required to conduct a Detailed EIA, while projects classified as Categories II and III are subject to a Simplified EIA.

2) Preliminary EIA (Pre-EIA)

The second stage is the Preliminary Environmental Impact Assessment (Preliminary EIA), which is conducted in conjunction with the feasibility study of the project. This stage aims to carry out a comprehensive analysis of potential project outcomes, evaluate alternative options, and develop an Environmental Management Plan (Program).

The results of the preliminary assessment are compiled in the form of an EIA Report.

- ✓ Assessment of the existing environmental conditions within the boundaries of the area potentially affected by the proposed project
- ✓ Evaluation of the types of potential environmental impacts caused by the proposed project
- ✓ Assessment of the environmental impacts of alternative project options
- ✓ Prediction and assessment of changes in environmental conditions during the construction, operation, and decommissioning phases of project facilities
- ✓ Formulation of measures to prevent, minimize, or compensate for significant adverse environmental impacts during construction, operation, and dismantling of project facilities

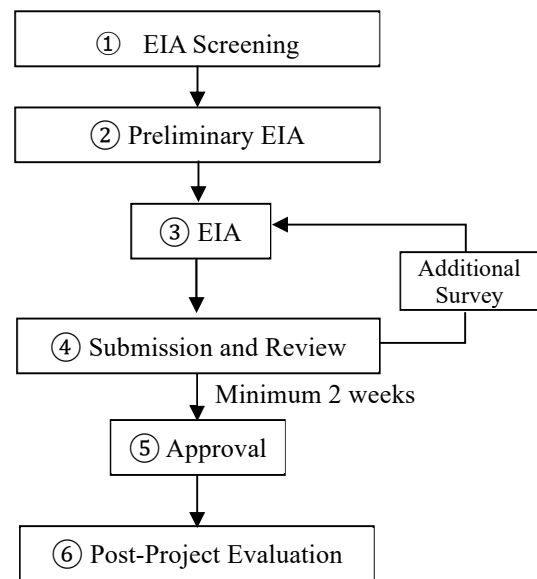


Figure 1-2-15 EIA Procedures in the Kyrgyz Republic

- ✓ Conclusions based on the results of the EIA
- ✓ Environmental Impact Statement (ZVOS): a non-technical summary containing the main findings of the assessment of the project's potential environmental impacts

3) EIA

The third stage involves the assessment of the environmental impacts of the proposed project, which is conducted in conjunction with the design documentation (plans and design proposals).

The results of this impact assessment are reported as part of the “Environmental Protection” section of the project documentation.

- ✓ A detailed and comprehensive impact assessment of the selected basic project implementation plan
- ✓ A set of up-to-date technical solutions and measures to prevent, mitigate, and minimize the impacts of the proposed project, its operation, and decommissioning on the environment and public health
- ✓ A resource-based program for production management and environmental monitoring of each component during the construction, operation, and decommissioning phases
- ✓ Design standards for pollutant emissions, wastewater discharge, and waste generation and treatment
- ✓ Statement on Ecological Impact (ZEP): an official report by the project proponent describing the expected environmental changes resulting from the implementation of the proposed project

4) Submission and Review

The prepared report is submitted to the Ministry of Natural Resources, Ecology, and Technical Supervision (MNR) and undergoes a review process called the State Ecological Expertise (SEE) to verify that the proposed project will not cause environmental harm. During this review, a comprehensive technical and legal analysis of the EIA is conducted, and in some cases, the report is also reviewed by independent experts.

5) Approval

If the review of the EIA report results in a negative conclusion, the project will either be rejected or returned to the project proponent for modification or revision. If a positive conclusion is issued, the project is approved, although certain conditions may be attached to the approval. In the Kyrgyz Republic, there is no fee required for the review of the EIA report, and the review results are typically issued within approximately two weeks after submission.

6) Post-Project Evaluation

The fourth stage of the EIA is the post-project analysis conducted one year after project commencement. It is implemented to confirm the environmental safety of the project and adjust environmental protection measures, with the following points noted.

- ✓ The post-project analysis involves conducting a series of investigations aimed at determining the actual effectiveness of the environmental and other decisions stipulated in the project, seeking timely adjustments and ensuring the project's safety for the environment and public health.
- ✓ Based on the EIA documentation, a post-project monitoring plan is formulated and agreed upon with the relevant national authority responsible for environmental protection.
- ✓ The organization of the post-project analysis and management of this work are ensured by the project implementer.
- ✓ The post-project analysis is carried out by specialized organizations (research, design, or other organizations/enterprises).
- ✓ A report is prepared based on the results of the post-project analysis. The report shall include specific proposals aimed at minimizing the project's negative environmental impacts, amendments to previously established standards or permit conditions, and appendices (measurement data, laboratory analyses, photographic materials, interview results, etc.)
- ✓ Submit a report on the post-project analysis results to implement necessary measures for reducing the project's adverse environmental impacts. This report must be accessible to the document-creating design agency, the EIA contractor, the state agency with authority in the field of environmental protection, and the general public.
- ✓ The operator shall report on the post-project analysis results upon request from the general public.

As of the end of May 2025, the review by Jalal-Abad Region environmental experts has been approved (Approval No. 03-06/61), with the following conditions attached to the approval:

- ✓ Obtain agreement with landowners for the project
- ✓ Prohibit unauthorized tree falling
- ✓ Comply with the requirements of the Kyrgyz Republic's Environmental Law

Furthermore, the Ministry of Natural Resources, Ecology, and Technical Supervision is currently reviewing the project, and approval is expected to be granted before construction begins.

(6) Environmental Standards in Kyrgyz

1) Air Quality

The environmental standards for air quality in the Kyrgyz Republic are stipulated in the Hygienic Standards “Maximum Permissible Concentrations of Pollutants in the Ambient Air of Populated Areas.” The comparison with international standards is as follows. The environmental standards for air quality in the Kyrgyz Republic are set at levels comparable to international standards.

Table 1-2-18 Environmental Standards in Kyrgyz and International Standards (Air Quality)

	Kyrgyz	WHO	Japan
Total Suspended Particulate Matter (TSP)	0.5 mg/m ³	—	—
Suspended Particulate Matter (SPM / PM10)	—	45 µg/m ³	0.1 mg/m ³
Fine Particulate Matter (PM2.5)	—	15 µg/m ³	35 µg/m ³
Nitrogen Dioxide (NO ₂)	40 µg/m ³	25 µg/m ³	0.04-0.06 ppm
Sulfur Dioxide (SO ₂)	50 mg/m ³	40 µg/m ³	0.04 ppm
Carbon Monoxide (CO)	3 mg/m ³	4 mg/m ³	10 ppm
Lead	0.0003 mg/m ³	—	—

Note :SPM :Particulate matter suspended in the atmosphere with a particle diameter of 10µm or less.

PM10 :Particles with an aerodynamic diameter of 10µm at a 50% collection efficiency, meaning that approximately half of the particles have diameters greater than 10µm.

PM2.5 :Particles with an aerodynamic diameter of 2.5µm corresponding to a 50% collection efficiency, meaning that approximately half of the particles have diameters greater than 2.5µm.

Source:Kyrgyz:Hygienic standards "Maximum permissible concentrations of pollutants in the ambient air of populated areas"

WHO:WHO global air quality guidelines (2021)

Japan:Environmental Quality Standards for Air Pollution (Environmental Agency Notification No. 25, May 8, 1973),

Environmental Quality Standards for Nitrogen Dioxide (Environment Agency Notification No. 38, July 11, 1978)

Environmental Quality Standards for Fine Particulate Matter (PM_{2.5}) (Ministry of the Environment Notification No. 33, September 9, 2009)

2) Noise

The environmental standards for noise in the Kyrgyz Republic are stipulated in Sanitary Norms SN 2.2.4/2.1.8.562-96 “Noise at Workplaces, in Residential and Public Buildings, and on the Territory of Residential Development. “A comparison with international standards is shown below. Although the Kyrgyz national standards for noise are slightly higher than international standards, they are generally consistent and comparable in level.

Table 1-2-19 Environmental Standards in Kyrgyz and International Standards (Noise)

	Evaluation Period *1	Kyrgyz	IFC EHS	Japan
Equivalent noise level (LAeq)	Daytime	65 dB	55 dB	60 dB
	Nighttime	55 dB	45 dB	55 dB

*Note 1: The evaluation time periods are as follows.

Kyrgyz:Daytime 7:00–23:00, Nighttime 23:00–7:00

IFC EHS :Daytime 7:00–22:00, Nighttime 22:00–7:00

Japan :Daytime 6:00–22:00, Nighttime 22:00–6:00

*Note 2: The assessment areas are as follows.

Kyrgyz:Areas directly adjacent to residences, hospitals, and buildings (residences facing major local roads receive a +10dB correction)

IFC EHS :Housing, facilities, educational institutions

Japan :Areas within a zone primarily designated for residential use that face a road with two or more lanes

Source:Kyrgyz:Sanitary norms SN 2.2.4/2.1.8.562-96 "Noise at workplaces, in residential, public buildings and on the territory of residential development"

IFC EHS :Environmental, Health, and Safety Guidelines (IFC World bank group)

Japan :Environmental Standards for Noise (Ministry of Environment)

3) Vibration

The environmental standards for vibration in the Kyrgyz Republic are stipulated in Sanitary Norms SN 2.2.4/2.1.8.566-96, clause 4.2. "By the source of vibration," as shown below. While Kyrgyz's vibration standards cannot be directly compared to Japan's vibration standards (road traffic vibration requirements) due to differences in measurement methods, they similarly regulate the impact on roadside areas caused by vehicle traffic.

Table 1-2-20 Environmental Standards (Vibration) in the Kyrgyz Republic

Geometric mean frequency of the band, Hz	Maximum Permissible Vibration Values in the Workplace for Category 2 [Transportation and Technology]							
	Maximum allowable value of the axis: X ₀ , Y ₀ , Z ₀							
	Vibration acceleration				Vibration velocity			
	m/s		dB		m/s		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	
Adjustment Factors and Equivalent Values with Corresponding Levels		0,28		109		0,56		101

Source : Sanitary norms SN 2.2.4/2.1.8.566-96, clause 4.2. "By the source of vibration"

Table 1-2-21 Environmental Standards in Japan (Vibration) (Road Traffic Vibration-acceptable limits)

Classification	Ground vibration level at the boundary between the site containing the vibration source and the neighboring area	
	Day	Night
Category I area	65 dB	55 dB
Category II area	70 dB	65 dB

Note 1 : Category I and Category II are areas designated by the prefectural governor as the areas listed in the following items respectively.

Category I Zone: Areas requiring the preservation of quietness to maintain a favorable residential environment, and areas designated for residential use that require the preservation of quietness.

Category II Zone: Areas used for residential purposes alongside commercial, industrial, or similar uses, where it is necessary to prevent the generation of vibration to preserve the living environment of residents within the area; and areas primarily used for industrial or similar purposes, where it is necessary to prevent the generation of significant vibration to avoid deteriorating the living environment of residents within the area.

Note 2 : Daytime and nighttime refer to the time periods specified by the prefectural governor (or the mayor for areas within a city's jurisdiction) within the ranges listed in the following items:

Daytime: From 5:00 AM, 6:00 AM, 7:00 AM, or 8:00 AM until 7:00 PM, 8:00 PM, 9:00 PM, or 10:00 PM

Nighttime: From 7:00 PM, 8:00 PM, 9:00 PM, or 10:00 PM until 5:00 AM, 6:00 AM, 7:00 AM, or 8:00 AM the following day

Source: Enforcement Regulations of the Vibration Control Act (Cabinet Order No. 58 of November 10, 1976)

4) Water quality

In the Kyrgyz Republic, the environmental standards for water quality are specified in the Hygienic standards "Approximate permissible levels of chemical substances in the water of water bodies for domestic drinking and cultural and household Water usage." As shown below, although the Kyrgyz standards do not specify criteria such as BOD, other parameters are regulated at levels equivalent to those in Japan.

Table 1-2-22 Environmental Standards for Water Quality in the Kyrgyz Republic

	Kyrgyz	Japan
Hydrogen ion concentration (pH)	6.5 - 8.5	6.5 - 8.5
Biochemical oxygen demand (BOD)	-	3 mg/L
Suspended solids (SS)	25 mg/L	25 mg/L
Dissolved oxygen (DO)	4 mg/L	5 mg/L
Coliform bacteria count	-	5,000 MPN/

Source: (Kyrg) Hygienic standards "Approximate permissible levels of chemical substances in the water of water bodies for domestic drinking and cultural and household Water usage"

(Japan) Environmental Standards for Water Pollution (River Type B) (Ministry of the Environment Notice No. 59, December 28, 1971)

(7) Comparison between JICA Guidelines and the EIA System of the Kyrgyz Republic, and Measures to Address the Gaps

The results of comparing the requirements JICA GL imposes on partner countries with Kyrgyz's EIA system and other aspects, and organizing the presence of gaps and countermeasures, are shown in Table 1-2-23.

Table 1-2-23 Comparison between JICA Guidelines and the EIA System of the Kyrgyz Republic, and Measures to Address the Gaps

Main items	Policy of JICA GL	Policy of Kyrgyz	Gaps Existence and Countermeasures
Fundamentals	<p>(1) When implementing a project, during the planning stage, investigations and assessments regarding the environmental and social impacts the project will cause must be conducted as early as possible. Alternative plans and mitigation measures must be considered to avoid these impacts whenever possible, and where avoidance is not possible, to minimize, reduce, or mitigate them. The results of these assessments must be reflected in the project plan.</p> <p>(2) Such consideration must strive for a quantitative assessment of environmental and social costs and benefits wherever possible, supplemented by qualitative evaluation, and must be closely integrated with the economic, financial, institutional, social, and technical analysis of the project.</p> <p>(3) The results of such environmental and social consideration, including alternatives and mitigation measures, must be documented either as a separate document or as part of another document. For projects deemed to have particularly significant impacts, an Environmental Assessment Report must be prepared.</p> <p>(4) For projects deemed to have particularly significant impacts or those subject to significant controversy, a committee composed of experts or other relevant parties shall be established as necessary to seek their opinions, thereby enhancing accountability.</p>	<p>(1) Article 2 of Ordinance No. 54 stipulates that planned management, economic, investment, and other projects shall be evaluated for compliance with the requirements of the Environmental Protection Act both in the preliminary stage of decision-making regarding their implementation and during the construction and implementation process.</p> <p>(2) Supplementary Provision 6 of Ordinance No. 60 stipulates that the duration, frequency, spatial scale, and significance of potential impacts shall be assessed qualitatively and quantitatively.</p> <p>(3) Article 4 of Ordinance No. 60 stipulates that a detailed EIA or simplified EIA must be conducted according to the hazard category, and an Environmental Assessment Report must be prepared.</p> <p>(4) Ordinance No. 60 stipulates that experts shall be appointed to a specialized committee and participate in the environmental assessment of the subject matter.</p>	<p>(1), (2), (3), (4)</p> <p>There are no gaps between the JICA Guidelines and the counterpart country's system.</p> <p>No gaps exist in the national system.</p>
Evaluation for countermeasures	<p>(1) Multiple alternatives must be considered to avoid and minimize undesirable project impacts and select the option that is better from an environmental and social perspective. When considering countermeasures, priority shall first be given to avoiding impacts in accordance with the mitigation hierarchy. Where avoidance is not feasible, consideration shall then be given to minimizing and mitigating impacts, followed by mitigation measures. Compensatory measures shall only be considered when significant impacts remain despite implementing avoidance, minimization, mitigation, or mitigation measures.</p>	<p>(1) Chapter 1, General Provisions, of Cabinet Order No. 60 stipulates that alternative plans, including plans that do not implement the project, must be considered. It also mandates the consideration of environmental measures to prevent, minimize, and/or compensate for the environmental impact of the planned project. Furthermore, it requires the consideration and implementation of environmental protection measures in preparation for the occurrence of significant impacts.</p> <p>(2) Cabinet Order No. 60 stipulates the establishment of an environmental monitoring program.</p>	<p>(1), (2)</p> <p>There is no gap between JICA GL and the partner country's system.</p>

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Main items	Policy of JICA GL	Policy of Kyrgyz	Gaps Existence and Countermeasures
	(2) Plans and systems for appropriate countermeasures, such as environmental management plans and monitoring plans, along with their associated costs and procurement methods, must be established. Detailed environmental management plans must be developed for projects expected to have particularly significant impacts.		
Scope of Impact Under Consideration	<p>(1) The scope of impacts to be investigated and considered regarding environmental and social considerations includes human health and safety, the natural environment (including transboundary or global environmental impacts), and social considerations such as those listed below, through air, water, soil, waste, accidents, Water usage, climate change, biodiversity, and ecosystem services. These include involuntary resettlement and other population movements; the local economy, including employment and livelihoods; land use and utilization of local resources; Social institutions such as social infrastructure and local decision-making institutions; Existing social infrastructures and services; Socially vulnerable people such as the poor and indigenous peoples; distribution of benefits and harms and equity in the development process; gender; children's rights; cultural heritage; local conflicts of interest; infectious diseases such as HIV/AIDS; and working conditions (including occupational safety).</p> <p>(2) The impacts to be investigated and considered include not only the direct and immediate impacts of the project, but also, within a reasonable scope, derivative and secondary impacts, cumulative impacts, and impacts of inseparable integrated projects. It is also desirable to consider impacts throughout the project's lifecycle.</p>	<p>(1) Supplementary Provision 6 of Cabinet Order No. 60 lists the following as subjects for evaluation:</p> <ul style="list-style-type: none"> - Climate and meteorological conditions - Air pollution - Hydrological conditions - Water pollution - Geology - Groundwater - Soil contamination - Flora, fauna, and ecosystems - Radioactive contamination - Potential of natural resources - Economic conditions - Socio-demographic conditions - Public health - Historical and cultural value of the territory - Existing sanitary and epidemiological conditions <p>(2) There are no provisions concerning the investigation or consideration of derivative or secondary impacts, cumulative impacts, or impacts of inseparable integrated projects. Regarding impacts across the life cycle, Chapter 4 of Cabinet Order No. 60 stipulates that an assessment and prediction of environmental impacts after the planned project's discontinuation shall be conducted.</p>	<p>(1) While some gaps exist in the scope of impacts to be investigated and considered, the project complies with JICA Guidelines.</p> <p>(2) Although some gaps exist, this project involves no derivative or secondary impacts, cumulative impacts, or inseparable integrated projects.</p>
Consistency with Laws, Standards, and Plans	<p>(1) The project must comply with the environmental and social laws and standards established by the counterpart government (including local governments). It must also be consistent with the environmental and social policies and plans set forth by the counterpart government.</p> <p>(2) In principle, the project should be implemented outside areas designated by the counterpart government under its</p>	<p>(1) Article 17 of Law No. 53 stipulates that an Environmental Impact Assessment (EIA) must be conducted, in accordance with environmental standards, during the design, location, construction, reconstruction, technical reorganization, and trial operation of facilities or projects that may have direct or indirect impacts on the environment.</p>	<p>(1), (2) There are no gaps between the JICA Guidelines and the counterpart country's system.</p>

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Main items	Policy of JICA GL	Policy of Kyrgyz	Gaps Existence and Countermeasures
	laws or regulations for the protection of nature or cultural heritage, except in cases where the primary objective of the project is to promote or restore such protected areas. Furthermore, the project must not cause significant adverse impacts on these designated areas.	(2) Article 9 of Law No. 18, which establishes the National Protected Area System, prohibits economic activities and other projects that may cause adverse impacts within the territory of national protected areas, except for research purposes.	
Social Consensus	(1) The project must be properly coordinated to ensure that social consensus is obtained in an appropriate manner within the country and region where it is planned. In particular, for projects expected to have significant environmental or social impacts, it is necessary that information be disclosed, and sufficient consultations be held with local residents and other stakeholders from an early stage, such as during the consideration of project alternatives, and that the results of such consultations be duly reflected in the project plan. (2) Special attention must be paid to Socially vulnerable people such as women, children, the elderly, the poor, indigenous peoples, persons with disabilities, refugees and internally displaced persons, and minorities, as they are generally more susceptible to various environmental and social impacts and tend to have limited access to decision-making processes in society.	(1) Article 3 of Decree No. 60 on Participants in the EIA Process stipulates provisions regarding the purpose of public consultation meetings, methods of notifying residents, procedures for holding such meetings, collection and analysis of opinions received from the public, and preparation of reviews based on the consultation results. Through this process, a mechanism is established to ensure that the outcomes of public consultations are reflected in the project contents. (2) The Kyrgyz Republic has ratified the Convention on the Rights of Persons with Disabilities. Under Cabinet Resolution No. 69, it is stipulated that appropriate measures should be taken to ensure equal access for people with disabilities and other Socially vulnerable people to information and communication means, the physical environment, transportation, information and communication technologies and systems, as well as other facilities and services open or provided to the public.	(1), (2) There are no gaps between the JICA Guidelines and the counterpart country's system.
Climate Change	(1) In cases where the project is expected to emit a significant amount of greenhouse gases, the total projected emissions shall be calculated and made public before the commencement of the project.	(1) In the Kyrgyz Republic, there are no explicit provisions requiring the estimation and disclosure of total greenhouse gas emissions prior to project implementation.	(1) Although there is a gap between the JICA Guidelines and the counterpart country's system, the project is not expected to generate greenhouse gas emissions exceeding a certain level (25,000 tons of CO ₂ equivalent per year).
Biodiversity	(1) The project must not involve significant conversion or degradation of critical habitats or important forests. (2) Illegal logging must be avoided. To ensure the prevention of illegal logging, project proponents are required to obtain logging permits from the regulatory	(1) Article 9 of Law No. 18, which establishes the National Protected Area System, stipulates that economic activities and other projects that may cause adverse impacts within the territory of national protected areas are	(1), (2) There are no gaps between the JICA Guidelines and the counterpart country's system.

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Main items	Policy of JICA GL	Policy of Kyrgyz	Gaps Existence and Countermeasures
	<p>authorities, and in the case of forestry-related projects, the acquisition of forest certification is encouraged.</p>	<p>prohibited, except for research purposes.</p> <p>(2) Under the Forest Law of the Kyrgyz Republic, tree felling is permitted for purposes such as scientific research, forest surveys, and the construction of irrigation facilities, pipelines, and roads, except in forests located within national parks, protected areas, or natural monuments. It is also stipulated that a permit must be obtained from the relevant regulatory authority prior to logging into activities.</p>	
<p>Involuntary Resettlement and Loss of Livelihoods</p>	<p>II. It will be described in Table 1-2-33, "Comparison between JICA Guidelines and the Legal System of the Kyrgyz Republic," under Land Acquisition and Resettlement.</p>		
<p>Consultation with Indigenous Peoples</p>	<p>(1) Projects must make every effort to avoid impacts on indigenous peoples through the examination of all possible alternatives. If, after such examination, avoidance is not possible, effective measures for indigenous peoples must be implemented to minimize impacts and compensate for any losses.</p> <p>(2) When a project is expected to affect indigenous peoples, the rights of indigenous peoples to land and resources must be respected in accordance with relevant international declarations and conventions concerning indigenous peoples (including the United Nations Declaration on the Rights of Indigenous Peoples). Sufficient information must be provided to the affected indigenous peoples, and efforts must be made to obtain their free, prior, and informed consent (FPIC).</p> <p>(3) Measures for indigenous peoples must be developed and disclosed as an Indigenous Peoples Plan (which may form part of other environmental and social documents), taking into account relevant national laws and regulations of the country where the project is implemented. In preparing the Indigenous Peoples Plan, sufficient information must be provided in advance, and efforts must be made to obtain the free, prior, and informed consent of the indigenous peoples concerned. Consultations must be conducted in a language and manner understandable to them. The contents of</p>	<p>(1) Although there is no specific law in the Kyrgyz Republic that defines or refers to "indigenous peoples," Article 24 of the Constitution guarantees the protection of the rights and freedoms of all individuals and prohibits discrimination based on ethnicity, language, or other factors.</p> <p>(2) The Kyrgyz Republic is a party to the International Covenant on Civil and Political Rights (ICCPR), which stipulates the right of peoples to self-determination and recognizes their rights to natural wealth and resources.</p> <p>(3) There are no provisions in the Kyrgyz Republic requiring the preparation or disclosure of an Indigenous Peoples Plan (IPP).</p>	<p>(1), (2)</p> <p>Although there are some gaps between the JICA Guidelines and the counterpart country's system, no indigenous peoples reside in or around the project area.</p>

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Main items	Policy of JICA GL	Policy of Kyrgyz	Gaps Existence and Countermeasures
	the Indigenous Peoples Plan are recommended to include the elements specified in ESS7 of the World Bank's Environmental and Social Framework.		
Monitoring	<p>(1) During the implementation period of the project, any unforeseen circumstances and the status and effectiveness of pre-planned mitigation measures must be identified, and appropriate actions must be taken based on the findings.</p> <p>(2) For projects where the implementation of mitigation measures should be accompanied by performance monitoring, or where adequate monitoring is considered essential for proper environmental and social consideration, the project plan must include a monitoring plan, and its feasibility must be ensured.</p> <p>(3) Efforts must be made to disclose the results of monitoring to local stakeholders involved in the project.</p> <p>(4) In cases where specific concerns are raised by third parties or others regarding insufficient environmental and social considerations, efforts must be made to ensure that a forum is established—with sufficient information disclosure—for stakeholders involved in the project to discuss and examine necessary countermeasures, and to reach an agreement on procedures toward problem resolution.</p>	<p>(1) Article 33 of Decree No. 60 stipulates that a series of studies shall be conducted in the post-project analysis to determine the actual effectiveness of the environmental and other decisions established in the project, with the aim of ensuring timely adjustments and securing the safety of the project for the environment and public health.</p> <p>(2) The same article stipulates that a post-project monitoring plan must be developed and agreed upon with the national authority responsible for environmental protection within its jurisdiction.</p> <p>(3) The same article also provides that the report on the results of the post-project analysis must be made available to the design organization that prepared the documents, the contractor responsible for the EIA, the national authority in charge of environmental protection, and the general public.</p> <p>(4) Article 3 of the same decree, Participants in the EIA Process, stipulates the collection and analysis of public opinions, the preparation of a review based on the results of public consultations, and establishes a mechanism by which such results are reflected in the project content.</p>	<p>(1), (2), (3), (4)</p> <p>No gaps were identified between the JICA Guidelines and the national system of the counterpart country.</p>
Grievance Redress Mechanism	<p>(1) A grievance redress mechanism must be established to address complaints from people and communities affected by environmental and social impacts.</p> <p>(2) The grievance redress mechanism must be easily accessible to affected people and communities. The counterpart government and other relevant entities shall disseminate information about the mechanism through consultations and other means with local stakeholders. Affected people and communities must not suffer any disadvantage as a result of filing grievance.</p> <p>(3) Grievances received shall be addressed promptly, with due consideration given to the concerns and requests of the affected people and communities.</p>	<p>(1), (2), (3)</p> <p>Although there are no specific provisions regarding grievance redress in the EIA-related laws of the Kyrgyz Republic, Decree No. 60 stipulates procedures for collecting and analyzing opinions from residents and preparing reviews based on the results of public consultations. A mechanism has been established to ensure that these results are reflected in the project content.</p>	<p>(1), (2)</p> <p>Although there are some gaps between the JICA Guidelines and the counterpart country's system, Decree No. 60 allows for responses to grievances.</p>

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Main items	Policy of JICA GL	Policy of Kyrgyz	Gaps Existence and Countermeasures
Information transparency	<p>(1) Important information related to environmental and social considerations shall be disclosed at the major stages of the project.</p> <p>(2) The information to be disclosed shall include not only information related to environmental and social considerations but also information on the cooperation project itself.</p> <p>(3) In addition to proactively disclosing information, efforts shall be made to provide information related to environmental and social considerations to third parties upon request, to the extent possible.</p> <p>(4) Information related to the project's environmental and social considerations should be disclosed and made available to local stakeholders.</p> <p>(5) When conducting consultations with local stakeholders, information shall be disclosed well in advance, allowing sufficient time for review. The information shall be provided in the official language or a widely used language and in a manner understandable to the local people.</p> <p>(6) When publishing related reports on a website, the publication shall be made in the official language or in a widely used language.</p>	<p>(1) Article 3 of Decree No. 60, EIA Process, defines stages for the disclosure of information to stakeholders and the general public.</p> <p>(2), (3), (4) The same law stipulates that information, including the entity responsible for the planned project, its justification, and an overview of the project, must be disclosed.</p> <p>(5), (6) Article 18 of the same law stipulates that when a local stakeholder meeting is to be held, the relevant parties must be notified at least 30 days in advance. In addition, Article 13 of the Constitution of the Kyrgyz Republic and Decree No. 140 mandate the use of Kyrgyz and Russian as official languages.</p>	<p>(1), (2), (3), (4)</p> <p>There are no gaps between the JICA Guidelines and the counterpart country's system.</p>

1-2-1-4 Examination of Bridge Location

In this project, three alternative plans were considered: **Plan 1** (upstream of the existing bridge); **Plan 2** (same alignment as the existing bridge); and **Plan 3** (downstream of the existing bridge). A comparative study was conducted from the perspective of environmental and social impacts, constructability, safety, and cost. The comparison results of the alternatives are presented in Table 1-2-24. Although **Plan 1** (upstream of the existing bridge) involves the largest number of relocated houses, it was found to be superior to the other options in terms of environmental impact, constructability, and cost. Following discussions with the counterpart government, it was agreed to adopt **Plan 1**, constructing the new bridge upstream of the existing Naryn River Bridge.

The existing Naryn River Bridge has suffered severe damage and does not have sufficient load-bearing capacity. Therefore, there is a risk of collapse when large freight vehicles pass over it, and the necessity and urgency for rehabilitation are high. Consequently, adopting the 'No Project' option is not feasible.

Table 1-2-24 Comparative Analysis of three Alternative Plans

General Layout Plan					
		Plan-1	Plan-2	Plan-3	
		Upstream of the existing bridge	Reconstruction at the existing bridge location	Downstream of the existing bridge	
Overview		Construction of a new bridge with the road centerline 20 m upstream of the existing bridge, while the existing bridge will be retained as a pedestrian bridge.	Replace the existing Naryn River Bridge with a new one at the current location.	Construction of a new bridge with the road centerline 30 m downstream of the existing bridge, with demolition of the existing bridge to avoid potential impacts on the new bridge in case of collapse.	
Align-ment	Horizontal Curve	R=350	R = 300	R = 350	
	Longitudinal Slope	Around 0.3% on the bridge section and a maximum of 4% on the approach road			
Safety	Pedestrian and Livestock	The existing Naryn River Bridge is available for use. Very Good ⊙	Use the new bridge Good ○	Use the new bridge Good ○	
	Traffic Safety	It can be completely separated from pedestrians. Very Good ⊙	Existing bridge removed; pedestrians and vehicles share new bridge deck (safety concern) Fair △	Existing upstream bridge removed; pedestrians and vehicles share new bridge deck (safety concern) Fair △	
	In the event of collapse of the existing bridge	If the existing bridge collapses, the effect on the new upstream bridge will be minimal. Good ○	Existing bridge to be removed; no impact expected. Very Good ⊙	Existing bridge collapse may affect the new downstream bridge (risk of simultaneous failure). Fair △	
Constructability	Surrounding roads	Realignment of the upstream side roads on both banks is required. Fair △	No effect Very Good ⊙	Intersection improvement on the left bank required. Fair △	
	Temporary Diversion	Construction while keeping the existing road in service. Very Good ⊙	Construction of a temporary bridge and traffic diversion. Fair △	Construction while keeping the existing road in service. Very Good ⊙	
	Construction Period	32 months / excluding 4 months winter suspension. Very Good ⊙	43 months excluding 6 months winter suspension (including demolition of existing bridge) Fair △	38 months excluding 6 months winter suspension (including demolition of existing bridge) Fair △	
Environmental Impacts	Pollution Control Measures	As no demolition work is involved, the required pollution control measures (air, noise /vibration, waste, etc.) are minimal. Very Good ⊙	Significant environmental impacts are anticipated due to the installation and removal of the temporary detour bridge and the demolition of the existing bridge. Fair △	Since the demolition of the existing bridge is required, the impacts related to pollution control items are considerable. Fair △	
	Greenhouse Gas emissions	Shortest construction period, and as the existing Naryn River Bridge will be retained, it results in the lowest greenhouse gas emissions. Good ○	Higher GHG emissions due to demolition of the existing Naryn River Bridge. Fair △	Higher GHG emissions due to demolition of the existing Naryn River Bridge. Fair △	

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

		Plan-1	Plan-2	Plan-3
		Upstream of the existing bridge	Reconstruction at the existing bridge location	Downstream of the existing bridge
	Scour Protection	Scour risk is considered minimal. Very Good ☉	Potential scouring on the left bank. Fair △	Potential scouring on the left bank. Fair △
	Land Acquisition	Land acquisition is required to connect the new bridge with the minimum curve radius, but only minimal acquisition is needed. Good ○	None Very Good ☉	Large land acquisition required to connect the new bridge with the minimum curve radius. Fair △
Social Impacts	Houses to be relocated	5 houses Fair △	None Good ○	None Good ○
	Construction Cost	100% Very Good ☉	136% Fair △	125% Fair △
	Overall Evaluation	Requires realignment of upstream service roads, land acquisition, and house relocation; however, it has a shorter construction period, less environmental impact, and the lowest construction cost, making it more advantageous than other options. Very Good ☉	Limited impact on surrounding roads, but requires a temporary detour bridge, leading to lower constructability and greater environmental impacts. No land acquisition or house relocation, but the highest construction cost among the three options. Fair △	Requires demolition of the existing bridge with the greatest environmental impact; significant pollution control impacts; no house relocation, but the largest land acquisition area. Good ○

1-2-1-5 Scoping

The scope of this project was established as shown in Table 1-2-25, taking into consideration the project's content, the project site and its surrounding areas, and the environmental and social conditions.

Table 1-2-25 Scoping Matrix

Field	No.	Contents	Evaluation		Reason of Evaluation
			Before Construction After Construction	During operation	
Pollution countermeasures	1	Air pollution	✓	✓	<p>< During Construction > The operation of construction vehicles and machinery may impact air quality within the project area and its surroundings.</p> <p>< During Operation > Increased traffic volume may impact air quality within the project area and its surroundings.</p>
	2	Water quality	✓	—	<p>< During Construction > Turbid water may occur due to pier construction and other activities, potentially affecting water bodies within the project area and its surroundings.</p> <p>< During Operation > No factors affecting the project area and surrounding water bodies are anticipated after operation begins.</p>
	3	Waste	✓	—	<p>< During Construction > During construction, construction waste (asphalt pavers, concrete blocks, construction timber) and construction-generated soil will be produced. If not properly managed, this could potentially impact on the project area and its surroundings.</p> <p>< During Operation > No waste generation affecting the project area and its surroundings is anticipated after operation begins.</p>
	4	Soil contamination	—	—	<p>< During Construction > There have been no activities within the project area or its surrounding areas that could cause soil contamination, and there is no possibility that the soil is already contaminated. Furthermore, this project will not involve construction activities such as chemical injections that could contaminate the soil or groundwater. Therefore, there is no risk of soil contamination occurring within the project area or its surrounding areas.</p> <p>< During Operation > No factors that could contaminate the soil or groundwater will arise after the facility begins operation.</p>
	5	Noise and vibration	✓	✓	<p>< During Construction > Noise and vibration levels may increase in the project area and its surroundings due to the operation of construction vehicles and machinery.</p> <p>< During Operation > Noise and vibration levels in the project area and its surroundings may increase or decrease due to increased traffic volume and higher vehicle speeds.</p>
	6	Sediment	✓	—	<p>< During Construction > If contaminants are deposited in the sediment, there is a possibility that these contaminants could spread into the project area and surrounding water bodies during abutment construction.</p> <p>< During Operation > After operation begins, no factors are anticipated that would cause sediment to spread.</p>
	7	Subsidence	—	—	<p>< During Construction > Groundwater pumping or large-scale excavation work that could cause subsidence is not anticipated. Furthermore, no weak ground exists within the project area or its surrounding vicinity. Therefore, there is no risk of subsidence occurring.</p> <p>< During Operation > No factors likely to cause subsidence are anticipated after the facility begins operation.</p>

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Field	No.	Contents	Evaluation		Reason of Evaluation
			Before Construction After Construction	During operation	
	8	Odor	—	—	< During Construction/Operation > No construction of factories, facilities, ventilation towers, or similar structures that could cause odor problems during construction or operation is planned. There is no risk of odor affecting the project area or its surroundings.
Natural environment	9	Protected Areas	—	—	< Under Construction / During Operation > There are no nature reserves or wildlife sanctuaries within the project areas or its surrounding vicinity.
	10	Biodiversity and Ecosystem	✓	—	< During Construction > During construction, tree felling and removal of grasslands within the project area and its surroundings may impact the ecosystem. < During Operation > During operation, structures that would fragment existing habitats will not be installed, so there is no risk of impacting the ecosystem.
	11	Hydrology	✓	✓	< Under Construction > During construction, water flow within the river may be partially stopped for bridge pier work, potentially causing changes in the Naryn River's flow direction, velocity, etc. < During Operation > During operation, the abutments and piers constructed within the river may cause changes in the Naryn River's flow direction, velocity, etc.
	12	Topography and Geology	—	—	< During Construction/Operation > The project area and its surroundings contain no valuable topography or geology. The embankment and cut work to be carried out under this project will not affect the existing topography or geology.
Social environment	13	Land acquisition and Resettlement	✓	—	< Under Construction > To construct the bridge and connecting roads/access roads, tree felling and land acquisition will be required, though no resettlement will occur. < During Operation > Activities requiring land acquisition or resettlement are not anticipated
	14	Living and livelihood	✓	✓	< Under Construction > During construction, there is a possibility of affecting the movement of livestock on the riverbed, as well as potentially impacting local residents who collect driftwood for fuel on the riverbed. < During Operation > The riverbed will be opened to the public after the bridge is operational, thus not impacting the daily lives or livelihoods of local residents. Furthermore, during operation, the existing Naryn River Bridge will be used as a passageway for pedestrians and livestock movement, improving convenience for pedestrians and livestock farmers. Additionally, the new Naryn River Bridge will be exclusively for vehicles, facilitating smoother automobile traffic.
	15	Land use and local utilization of resources	✓	—	< During Construction > Land use will change as part of the site is expropriated for use as a construction yard. Furthermore, if use of the riverbed is restricted, this may impact the utilization of local resources. < During Operation > After operation begins, the access road will be relocated and the riverbed will be reopened. Consequently, there will be no new changes to land use, and there is no risk of impacting the utilization of local resources.
	16	Water usage	—	—	< Under Construction > This project does not involve pumping groundwater, so it will not cause groundwater level decline or depletion, nor will it affect water usage. Additionally, while there are watering holes used by livestock and livestock farmers near the planned site, they are located far enough away to have no impact. Also, reconstruction of the irrigation canal on the right bank of the Naryn River is currently underway; however, since the irrigation canal is not included within the scope of earthwork such as embankment construction, there will be no impact. < During Operation > After operation begins, no factors affecting water usage will arise.

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Field	No.	Contents	Evaluation		Reason of Evaluation
			Before Construction After Construction	During operation	
	17	Existing social infrastructures and services	—	—	< During Construction/Operation > This project will not remove or relocate existing social infrastructure laid around the planned site, and the current Naryn River Bridge will remain in place. Therefore, it will not impact existing social infrastructure or social services such as ridesharing.
	18	Social institutions such as social infrastructure and local decision-making institutions	—	—	< Under Construction / During Operation > This project has no factors that would impact social organizations such as social capital or local decision-making bodies.
	19	Misdistribution of benefits and damages	✓	—	< Under Construction > Prioritizing the hiring of workers from specific villages or ethnic groups for this project's construction work could lead to uneven distribution of benefits. < During Operation > After operation begins, no factors causing uneven distribution of damage or benefits will arise.
	20	Local conflicts of interest	✓	✓	< Under Construction > Prioritizing the hiring of workers from specific villages for this project's construction work may lead to conflicts of interest within the community. Furthermore, livestock entering the village could potentially trigger disputes within the area. < During Operation > During operation, the existing Naryn River Bridge will be used as a pedestrian and livestock-only road. This will enhance connectivity between the two banks and may promote greater interaction between the commu
	21	Infectious diseases such as HIV/AIDS	✓	—	< During Construction > If infectious diseases are introduced by construction workers involved in this project, there is a risk of transmission and spreading to local residents. < During Operation > After operation begins, factors that could transmit infectious diseases will not arise.
	22	Children's rights	✓	—	< Under Construction > If children are employed in the construction work for this project, it will violate children's rights. < During Operation > After operation begins, no factors that violate children's rights will arise.
	23	Socially vulnerable people	—	—	< Under Construction / During Operation > No socially vulnerable individuals reside within the project implementation area.
	24	Cultural heritage	—	—	< During Construction/Operation > There are no cultural or historical heritage sites within the project implementation area or its surrounding vicinity.
	25	Landscape	✓	✓	< During Construction/Operation > This project may impact on the landscape overlooking the Toktogul Reservoir.
	26	Gender	✓	—	< Before/During Construction > Construction work for this project may result in gender-based job segregation and potential wage disparities. Construction sites and dormitories may present heightened risks of gender-based violence, including sexual harassment. < During Operation > No factors affecting gender are expected to arise after the facility becomes operational.
	27	Indigenous people, ethnic minorities	—	—	< Under Construction / During Operation > No ethnic minorities or indigenous peoples reside within the project implementation area.

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Field	No.	Contents	Evaluation		Reason of Evaluation
			Before Construction After Construction	During operation	
	28	Working conditions including occupational safety	✓	—	< During Construction > Since the existing road will remain open to traffic during construction, there is a risk of traffic accidents involving workers. < During Operation > No factors affecting the working environment will arise during operation.
	29	Community health, safety, and security (including accidents)	✓	✓	< Under Construction > Construction vehicles using the Bishkek-Osh Road may cause traffic accidents in the local community. Furthermore, the influx of construction workers may lead to a deterioration in local public safety. < During Operation > Safety will improve due to the increased curve radius of the connecting road. However, the potential for automobile accidents may increase as driving speeds rise. On the other hand, safety for pedestrians and livestock herders will improve as the existing Naryn River Bridge will be used exclusively as a pedestrian and livestock passageway.
Others	30	Transboundary Impacts and Climate Change	✓	✓	< During Construction > Climate change (increased heavy rain, heavy snow, etc.) may impact construction and quality. < During Operation > Climate change (increased heavy rain, heavy snow, etc.) may prevent the project from achieving its intended effects.
	31	Greenhouse Gases	✓	✓	< Under Construction > Greenhouse gas emissions may increase due to the operation of construction machinery and the passage of construction vehicles. < During Operation > Greenhouse gas emissions may increase due to automobile traffic.

1-2-1-6 Terms of Reference for Environmental and Social Considerations Survey

This document outlines the Terms of Reference (TOR) for the Environmental and Social Considerations Survey based on the scoping of this project (Table 1-2-25).

● Survey Methods for Items Expected to Be Affected

The survey methods and locations for items in the table above where impacts are anticipated are as shown in Table 1-2-26. Note that for the survey item “sediment,” while sampling surveys were initially planned, sampling and analysis methods for sediment samples are not yet established in Kyrgyz. Therefore, a review of existing documentation was conducted to identify businesses potentially causing sediment contamination around the planned site and to investigate any violations. Furthermore, greenhouse gases were not selected as items for which an impact is anticipated.

Table 1-2-26 Survey Methods for Items Expected to Be Affected

No.	Item	Survey Content	Survey Method
1	Air pollution	① Pollution Conditions • Air Pollution ② Weather Conditions • Wind Direction and Wind Speed ③ Social Conditions • Land Use Status • Existing social infrastructures and services ④ Traffic Conditions • Current Traffic Volume • Future Traffic Volume • Average Travel Speed ⑤ Relevant Laws and Environmental Standards in Kyrgyz ⑥ Parameters Used for Prediction • Vehicle Composition Ratio by Model Year • Number of Construction Vehicles • Travel Speed	① ② Baseline Survey • Survey Location: One point within the planned site • Survey Items: TSP, NO ₂ , SO ₂ , CO, S, Wind Direction and Speed • Survey Frequency: Once ③ ⑤ Existing Data Survey ④ ⑥ Traffic Volume Survey and Future Traffic Volume Estimation ⑤ Confirmation of Construction Plans, etc. ⑥ Confirmation of Existing Data and Construction Plans, etc. ⑦ ⑧ Prediction Method Based on Road Environmental Impact Assessment Techniques

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Survey Content	Survey Method
		<ul style="list-style-type: none"> • Lane Width Composition • NOx and SPM Emission Factors by Vehicle Type • NOx and SPM Emission Factors by Construction Work Type ⑦ Impacts During Construction ⑧ Impacts During Operation 	
2	Water quality	<ul style="list-style-type: none"> ① Pollution Status • Water Quality Pollution ② Social Conditions • Water usage ③ Social Conditions • Land Use Status • Existing social infrastructures and services ④ Relevant Laws and Environmental Standards in Kyrgyz ⑤ Impacts During Construction 	<ul style="list-style-type: none"> ① Baseline Survey • Survey Location: 1 point within the planned site • Survey Items: pH, SS, DO, NH4-N, Turbidity, Oils and Greases • Survey Frequency: 1 time ②③④ Site Inspection, Review of Existing Documentation, On-site Interviews ⑤ Confirmation of Construction Plans, etc.
3	Waste	<ul style="list-style-type: none"> ① Status of Construction Waste Disposal • Location, scale, etc. of waste disposal sites ② Status of Construction Recycling ③ Relevant Laws and Environmental Standards in Kyrgyz ④ Impacts During Construction 	<ul style="list-style-type: none"> ① Site inspection and on-site interviews ② Stakeholder interviews ③ Review of existing documentation ④ Confirmation of construction plans, etc.
5	Noise and Vibration	<ul style="list-style-type: none"> ① Pollution Status • Noise and Vibration ② Social Conditions • Land Use Status • Existing social infrastructures and services ③ Traffic Conditions • Current Traffic Volume • Future Traffic Volume • Average Travel Speed ④ Relevant Laws and Environmental Standards in the Kyrgyz Republic ⑤ Impacts During Construction ⑥ Parameters Used for Prediction • Type of Construction Work, Operating Hours of Construction Machinery • Actual Noise Power Level by Work Type • Reference Point Vibration Level by Work Type ⑦ Impacts During Operation 	<ul style="list-style-type: none"> ① Baseline Survey • Survey Location: One point within the planned site • Survey Items: Noise level, vibration level • Survey Frequency: Once ②④ Existing Data Survey ③⑥ Traffic Volume Survey and Future Traffic Volume Estimation ⑤ Confirmation of Construction Plans, etc. ⑤ Existing Data Survey and Confirmation of Construction Plans, etc. ⑥⑦ Prediction Method Based on Road Environmental Impact Assessment Methodology
6	Sediment	<ul style="list-style-type: none"> ① Contamination Status • Sediment ② Social Conditions • Land Use Status • Existing social infrastructures and services ③ Relevant Laws and Environmental Standards in Kyrgyz ④ Impacts During Construction 	<ul style="list-style-type: none"> ①②③ Site inspection, review of existing documentation, on-site interviews ④ Confirmation of construction plans, etc.
10	Biodiversity and Ecosystem Services	<ul style="list-style-type: none"> ① Habitat Status of Flora and Fauna ② Natural Environment • Designated Areas for Nature Conservation and Biodiversity Protection ③ Kyrgyz's Environmental and Social Consideration Systems and Organizations ④ Impacts During Construction 	<ul style="list-style-type: none"> ① Baseline Survey, On-site Interview Survey • Survey Location: Surrounding planned site (within approximately 300 m of planned site) • Survey Items: Habitat status of endangered species, etc. • Survey Frequency: Once ②③ Review of Existing Documentation ④ Confirmation of Construction Plans, etc.
11	Water-related Issues	<ul style="list-style-type: none"> ① River flow ② Dam discharge ③ Weather conditions (precipitation, etc.) ④ Natural environment • Topography • Geology ⑤ Impacts during construction ⑥ Impacts after operation 	<ul style="list-style-type: none"> ①② Natural Conditions Survey (Meteorological, Hydrological, and Disaster Surveys; Topographic Surveying; Geological Surveys), Existing Data Survey, Stakeholder Interviews ③ Existing Data Survey ④ Confirmation of Construction Plans, etc. ⑤ Confirmation of Bridge Plans, etc.
13	Land Acquisition and Resettlement	<ul style="list-style-type: none"> ① Scale and Scope of Land Acquisition and Resettlement • Population • Property and Land • Household Finances and Livelihood • Socially vulnerable people 	<ul style="list-style-type: none"> ①③ Population Census, Property and Land Survey, Socioeconomic Survey ②③ Replacement Cost Survey

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Survey Content	Survey Method
		<ul style="list-style-type: none"> ② Specific Compensation and Support Measures ③ Impacts Prior to Construction 	
14	Living and livelihood	<ul style="list-style-type: none"> ① Economic Conditions <ul style="list-style-type: none"> • Employment Rate • Employment Population by Industry • Income and Poverty Rate • Standard of Living ② Impact During Construction 	<ul style="list-style-type: none"> ① Review of existing documentation ② Confirmation of construction plans, etc.
15	Land Use and Regional Utilization of resources	<ul style="list-style-type: none"> ① Social Conditions <ul style="list-style-type: none"> • Land Use Status • Regional Resource Availability and Utilization Status ② Impacts During Construction 	<ul style="list-style-type: none"> ① Review of existing materials, site surveys, and stakeholder interviews ② Confirmation of construction plans, etc.
19	Uneven Distribution of Damage and Benefits	<ul style="list-style-type: none"> ① Economic Conditions <ul style="list-style-type: none"> • Employment Rate • Employment Population by Industry • Income and Poverty Rate • Standard of Living ② Social Conditions <ul style="list-style-type: none"> • Gender ③ Impacts During Construction 	<ul style="list-style-type: none"> ①②③ Existing document review, stakeholder interviews
20	Local conflicts of interest	<ul style="list-style-type: none"> ① Social Conditions <ul style="list-style-type: none"> • Geography and Population • Ethnic Groups ② Occurrence of Conflicts Within the Region 	<ul style="list-style-type: none"> ① Existing Document Review ② Stakeholder Interview Survey
21	Infectious diseases such as HIV/AIDS	<ul style="list-style-type: none"> ① Social Conditions <ul style="list-style-type: none"> • Sanitation and Healthcare ② Impact During Construction 	<ul style="list-style-type: none"> ① Review of existing documentation ② Confirmation of construction plans, etc.
22	Children's rights	<ul style="list-style-type: none"> ① Social Conditions <ul style="list-style-type: none"> • School Enrollment Rate • Children's Rights ② Relevant Laws and Regulations in the Kyrgyz Republic ③ Impacts During Construction 	<ul style="list-style-type: none"> ①② Review of existing documentation ③ Confirmation of construction plans, etc.
25	Landscape	<ul style="list-style-type: none"> ① Natural Environment <ul style="list-style-type: none"> • Landscape 	<ul style="list-style-type: none"> ① Site survey and review of existing materials
26	Gender	<ul style="list-style-type: none"> ① Social Conditions <ul style="list-style-type: none"> • Gender • Sanitation and Healthcare ② Economic Conditions <ul style="list-style-type: none"> • Employment Rate • Standard of Living ③ Impacts During Construction 	<ul style="list-style-type: none"> ①② Review of existing materials and interviews with relevant parties ③ Confirmation of construction plans, etc.
28	Working conditions including occupational safety	<ul style="list-style-type: none"> ① Impact of Construction Work 	<ul style="list-style-type: none"> ① Confirmation of construction plans, etc.
29	Community Health, Safety, and Security (including accidents)	<ul style="list-style-type: none"> ① Social Conditions <ul style="list-style-type: none"> • Safety and Security • Accidents • Health and Medical Care ② Impacts During Construction 	<ul style="list-style-type: none"> ① Review of existing documentation ② Confirmation of construction plans, etc.
30	Transboundary Impacts and Climate Change	<ul style="list-style-type: none"> ① Climate Change Situation in Kyrgyz ② Disaster History ③ Impacts During Construction ④ Impacts During Operation 	<ul style="list-style-type: none"> ①② Review of existing documentation ③ Confirmation of construction plans, etc. ④ Confirmation of river plans, road/paving plans, bridge plans, and revetment plans
31	Greenhouse Gases	<ul style="list-style-type: none"> ① Social Conditions <ul style="list-style-type: none"> • Land Use Status ② Transportation Conditions <ul style="list-style-type: none"> • Current Traffic Volume • Future Traffic Volume • Average Travel Speed ③ CO2 Emission Factors by Vehicle Age and Speed ④ Greenhouse Gas Baseline Emissions 	<ul style="list-style-type: none"> ① Existing Data Survey ② Traffic Volume Survey and Future Traffic Volume Projection ③ Existing Data Survey ④ Projection Using JICA Climate-FIT (Mitigation)

1-2-1-7 Baseline Survey

As baseline surveys for this project, investigations were conducted on air quality, water quality, noise and vibration, and flora and fauna. An overview of the surveys is shown in Table 1-2-27. The survey locations for each investigation are as shown in Figure 1-2-16. The survey results are described in Table 1-2-28

Table 1-2-27 Outline of the Baseline Survey

Survey	Contents	Survey Location	Survey Period
Air Quality	TSP, CO, SO ₂ , NO ₂ , Lead, Wind direction, Wind speed	Target area 1 location	December 3, 2024
Water Quality	pH, SS, DO, Arsenic, Mercury, Lead, Cadmium, etc.	Naryn River 1 location	December 3, 2024
Noise and Vibration	Equivalent noise, Maximum noise, Vibration acceleration	Target area 1 location	November 26–27, 2024
Flora and Fauna	-	Target area overall	December 2024–March 2025

Source: JICA Study Team

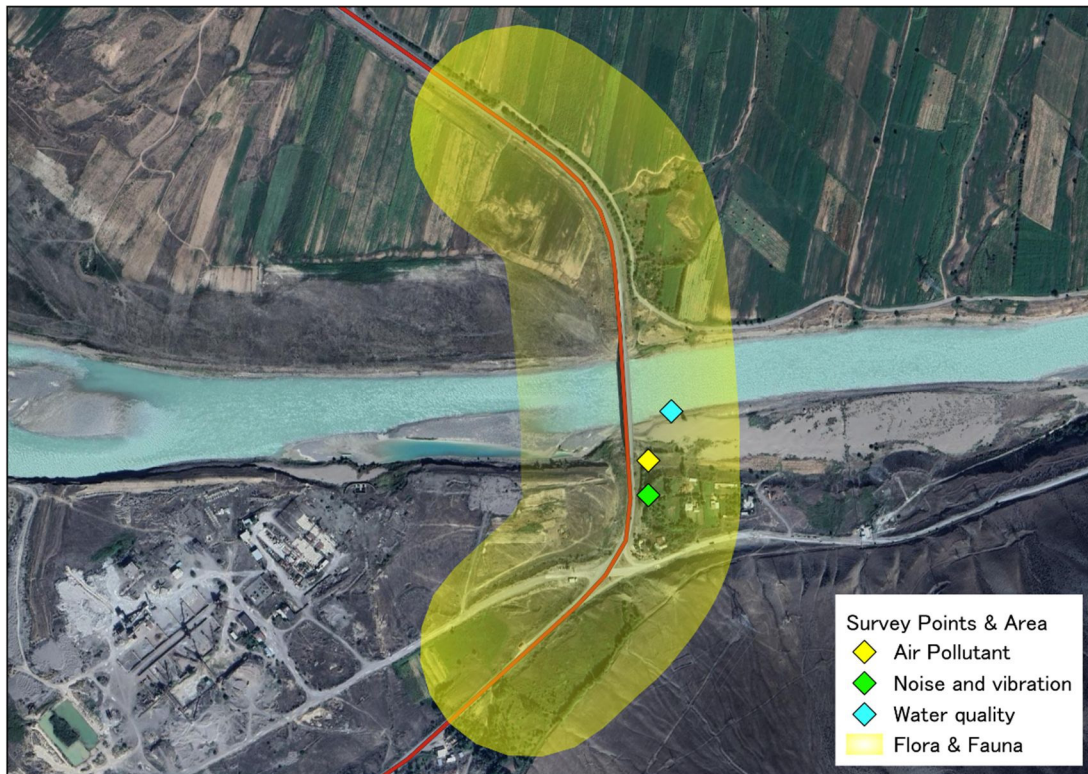


Figure 1-2-16 Survey Locations and Scope for the Baseline Survey

1-2-1-8 Environmental and Social Consideration Survey Results

The survey results based on the survey methods for items where impacts are anticipated are shown in Table 1-2-28.

Table 1-2-28 Environmental and Social Considerations Survey Results

No.	Item	Survey contents	Survey and Forecast Results																																							
1	Air pollution	① Pollution Conditions • Air Pollution	The results of the baseline survey are as follows.																																							
			<table border="1"> <thead> <tr> <th>Measure parameters</th> <th>Unit</th> <th>Predicted Value</th> <th>Max. allowable value</th> </tr> </thead> <tbody> <tr> <td>Sulfur dioxide (SO₂)</td> <td>μg/m³</td> <td>0.176</td> <td>0.5</td> </tr> <tr> <td>Nitrogen dioxide (NO₂)</td> <td>mg/m³</td> <td>0.034</td> <td>0.085</td> </tr> <tr> <td>Carbon monoxide (CO)</td> <td>mg/m³</td> <td>1.0</td> <td>3</td> </tr> <tr> <td>Particulate matter (PM)</td> <td>mg/m³</td> <td>0.139</td> <td>0.5</td> </tr> </tbody> </table>	Measure parameters	Unit	Predicted Value	Max. allowable value	Sulfur dioxide (SO ₂)	μg/m ³	0.176	0.5	Nitrogen dioxide (NO ₂)	mg/m ³	0.034	0.085	Carbon monoxide (CO)	mg/m ³	1.0	3	Particulate matter (PM)	mg/m ³	0.139	0.5																			
			Measure parameters	Unit	Predicted Value	Max. allowable value																																				
			Sulfur dioxide (SO ₂)	μg/m ³	0.176	0.5																																				
			Nitrogen dioxide (NO ₂)	mg/m ³	0.034	0.085																																				
			Carbon monoxide (CO)	mg/m ³	1.0	3																																				
		Particulate matter (PM)	mg/m ³	0.139	0.5																																					
		The survey results indicate that all measured parameters are below the maximum allowable values, confirming that the air quality around the planned site is good.																																								
		② Weather Conditions • Wind Direction and Speed	The results of the baseline survey are as follows.																																							
			<table border="1"> <thead> <tr> <th></th> <th>Jan</th> <th>Feb</th> <th>Mar</th> <th>Apr</th> <th>May</th> <th>Jun</th> <th>Jul</th> <th>Aug</th> <th>Sep</th> <th>Oct</th> <th>Nov</th> <th>Dec</th> </tr> </thead> <tbody> <tr> <td>Wind speed (m/s)</td> <td>1.7</td> <td>1.7</td> <td>1.8</td> <td>1.8</td> <td>1.7</td> <td>1.7</td> <td>1.8</td> <td>1.7</td> <td>1.8</td> <td>1.7</td> <td>1.7</td> <td>1.6</td> </tr> <tr> <td>Wind direction</td> <td>E</td> <td>S</td> <td>S</td> <td>S</td> <td>S</td> <td>W</td> <td>W</td> <td>S</td> <td>S</td> <td>S</td> <td>E</td> <td>E</td> </tr> </tbody> </table>		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Wind speed (m/s)	1.7	1.7	1.8	1.8	1.7	1.7	1.8	1.7	1.8	1.7	1.7	1.6	Wind direction	E	S	S	S	S	W	W	S	S	S	E	E
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec																											
			Wind speed (m/s)	1.7	1.7	1.8	1.8	1.7	1.7	1.8	1.7	1.8	1.7	1.7	1.6																											
Wind direction	E	S	S	S	S	W	W	S	S	S	E	E																														
The average wind speed around the planned site shows little variation throughout the year, averaging around 1.7 m/s at a height of 2 meters. This corresponds to a very light breeze on the Beaufort scale, characterized by smoke curling gently in the air. On the other hand, wind direction changes throughout the year. South winds prevail from early February to early June, west winds from early June to early August, south winds again from early August to late November, and east winds from late November to early February.																																										
③ Social Conditions • Land Use Conditions	Major sources of air pollution in the vicinity of the planned site include vehicle traffic (including construction vehicles for dam construction), operation of concrete product factories, and charcoal burning in nearby homes.																																									
	④ Traffic Conditions • Current Traffic Volume • Future Traffic Volume • Average Travel Speed	The results of the traffic survey are as follows.																																								
<Current Traffic Volume>																																										
<table border="1"> <thead> <tr> <th>Year</th> <th>Compact vehicles (veh)</th> <th>Large vehicles (veh)</th> <th>Total (veh)</th> </tr> </thead> <tbody> <tr> <td>2024</td> <td>4,504</td> <td>978</td> <td>5,482</td> </tr> </tbody> </table>		Year	Compact vehicles (veh)	Large vehicles (veh)	Total (veh)	2024	4,504	978	5,482																																	
Year		Compact vehicles (veh)	Large vehicles (veh)	Total (veh)																																						
2024		4,504	978	5,482																																						
<Average travel speed>																																										
<table border="1"> <thead> <tr> <th>Year</th> <th>Compact vehicles (km/h)</th> <th>Large vehicles (km/h)</th> </tr> </thead> <tbody> <tr> <td>2024</td> <td>68</td> <td>52</td> </tr> </tbody> </table>		Year	Compact vehicles (km/h)	Large vehicles (km/h)	2024	68	52																																			
Year		Compact vehicles (km/h)	Large vehicles (km/h)																																							
2024		68	52																																							
Based on the traffic volume estimation results, the future traffic volume by vehicle type is as follows.																																										
<Future Traffic Volume>																																										
<table border="1"> <thead> <tr> <th>Year</th> <th>Compact vehicles (veh)</th> <th>Large vehicles (veh)</th> <th>Total (veh)</th> </tr> </thead> <tbody> <tr> <td>2039</td> <td>5,479</td> <td>1,188</td> <td>6,667</td> </tr> </tbody> </table>	Year	Compact vehicles (veh)	Large vehicles (veh)	Total (veh)	2039	5,479	1,188	6,667																																		
Year	Compact vehicles (veh)	Large vehicles (veh)	Total (veh)																																							
2039	5,479	1,188	6,667																																							
<Future average travel speed (design speed)>																																										
<table border="1"> <thead> <tr> <th>Year</th> <th>Compact vehicles (km/h)</th> <th>Large vehicles (km/h)</th> </tr> </thead> <tbody> <tr> <td>2039</td> <td>80</td> <td>80</td> </tr> </tbody> </table>	Year	Compact vehicles (km/h)	Large vehicles (km/h)	2039	80	80																																				
Year	Compact vehicles (km/h)	Large vehicles (km/h)																																								
2039	80	80																																								
Based on the above, traffic volume during the operational phase of this project is expected to increase by approximately 22% compared to pre-construction levels. Furthermore, the average travel speed during the operational phase is projected to increase to 80 km/h.																																										

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Survey contents	Survey and Forecast Results																																																															
		⑤ Environmental Standards in the Kyrgyz Republic	In Kyrgyz, the maximum permissible concentrations of air pollutants are established in the following sanitary standards: <ul style="list-style-type: none"> • Sanitary Standard No. 15 “Approximate Safe Levels of Exposure to Air Pollutants in the Ambient Air of Populated Areas” • Sanitary Standard No. 17 “Maximum Permissible Concentrations of Air Pollutants in the Ambient Air of Populated Areas” • Sanitary Standard No. 18 “Maximum Permissible Concentrations of Hazardous Substances in the Air of Work Areas” • Sanitary Standard No. 19 “Approximate Safe Levels of Exposure to Hazardous Substances in the Air of Work Areas” 																																																															
		⑥ Parameters Used for Prediction <ul style="list-style-type: none"> • Vehicle composition ratio by model year • Number of construction vehicles and travel speed • Lane width composition • NOx and SPM emission factors by vehicle type • NOx and SPM emission factors by construction work type 	<p>< Vehicle Composition by Model Year ></p> <p>Emissions factors for air pollutants (NOx, SPM, CO, SO2) emitted from vehicles vary depending on the vehicle's model year and its composition ratio. A review of existing data did not confirm the vehicle age distribution for Kyrgyz. However, according to a United Nations Development Program (UNDP) report (2021), it is estimated that approximately 93% of vehicles in Kyrgyz were manufactured before 2005. Therefore, the vehicle age distribution for automobiles and construction vehicles operating in the vicinity of the project site will adopt the 2005 values.</p> <p>< Number of Construction Vehicles and Travel Speed ></p> <p>According to the construction plan, the maximum number of construction vehicles (10-ton dump trucks) travel during construction is approximately 24 per day. The travel speed of construction vehicles is assumed to be 60 km/h.</p> <p>< Road Width Composition-Typical Cross section ></p> <p>The current and future cross-section configurations are shown in the figure below.</p> <div style="text-align: center;"> <p style="text-align: center;">Shoulder Carriageway Carriageway Shoulder</p> <p style="text-align: center;">2.5m 3.5m 3.5m 2.5m</p> </div> <p>< NOx and SPM Emission Factors by Vehicle Type ></p> <p>Emission factors for air pollutants (NOx, SPM, CO, SO2) emitted from road vehicles were estimated using the 2005 estimated values calculated in the “Basis for Calculating Vehicle Emission Factors for Use in Road Environmental Impact Assessments, etc. (FY2010 Edition).</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2" style="background-color: #e0f2f7;">Average Travel Speed (km/h)</th> <th colspan="2" style="background-color: #e0f2f7;">Nox Emission factor (g/km·veh)</th> <th colspan="2" style="background-color: #e0f2f7;">SPM Emission factor (g/km·veh)</th> </tr> <tr> <th style="background-color: #e0f2f7;">Compact vehicles</th> <th style="background-color: #e0f2f7;">Large vehicles</th> <th style="background-color: #e0f2f7;">Small vehicles</th> <th style="background-color: #e0f2f7;">Large vehicles</th> </tr> </thead> <tbody> <tr><td>50</td><td>0.056</td><td>1.393</td><td>0.000884</td><td>0.013666</td></tr> <tr><td>55</td><td>0.053</td><td>1.315</td><td>0.000853</td><td>0.012687</td></tr> <tr><td>60</td><td>0.051</td><td>1.293</td><td>0.000839</td><td>0.012027</td></tr> <tr><td>65</td><td>0.05</td><td>1.304</td><td>0.000857</td><td>0.0117</td></tr> <tr><td>70</td><td>0.052</td><td>1.36</td><td>0.000952</td><td>0.011716</td></tr> <tr><td>75</td><td>0.054</td><td>1.461</td><td>0.001096</td><td>0.012066</td></tr> <tr><td>80</td><td>0.058</td><td>1.596</td><td>0.001289</td><td>0.012747</td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2" style="background-color: #e0f2f7;">Average Travel Speed (km/h)</th> <th colspan="2" style="background-color: #e0f2f7;">CO Emission factor (g/km·veh)</th> <th colspan="2" style="background-color: #e0f2f7;">SO2 Emission factor (g/km·veh)</th> </tr> <tr> <th style="background-color: #e0f2f7;">Compact vehicles</th> <th style="background-color: #e0f2f7;">Large vehicles</th> <th style="background-color: #e0f2f7;">Small vehicles</th> <th style="background-color: #e0f2f7;">Large vehicles</th> </tr> </thead> <tbody> <tr><td>50</td><td>0.502</td><td>0.873</td><td>0.004901</td><td>0.020304</td></tr> <tr><td>55</td><td>0.478</td><td>0.826</td><td>0.004744</td><td>0.019635</td></tr> </tbody> </table>	Average Travel Speed (km/h)	Nox Emission factor (g/km·veh)		SPM Emission factor (g/km·veh)		Compact vehicles	Large vehicles	Small vehicles	Large vehicles	50	0.056	1.393	0.000884	0.013666	55	0.053	1.315	0.000853	0.012687	60	0.051	1.293	0.000839	0.012027	65	0.05	1.304	0.000857	0.0117	70	0.052	1.36	0.000952	0.011716	75	0.054	1.461	0.001096	0.012066	80	0.058	1.596	0.001289	0.012747	Average Travel Speed (km/h)	CO Emission factor (g/km·veh)		SO2 Emission factor (g/km·veh)		Compact vehicles	Large vehicles	Small vehicles	Large vehicles	50	0.502	0.873	0.004901	0.020304	55	0.478	0.826	0.004744	0.019635
Average Travel Speed (km/h)	Nox Emission factor (g/km·veh)		SPM Emission factor (g/km·veh)																																																															
	Compact vehicles	Large vehicles	Small vehicles	Large vehicles																																																														
50	0.056	1.393	0.000884	0.013666																																																														
55	0.053	1.315	0.000853	0.012687																																																														
60	0.051	1.293	0.000839	0.012027																																																														
65	0.05	1.304	0.000857	0.0117																																																														
70	0.052	1.36	0.000952	0.011716																																																														
75	0.054	1.461	0.001096	0.012066																																																														
80	0.058	1.596	0.001289	0.012747																																																														
Average Travel Speed (km/h)	CO Emission factor (g/km·veh)		SO2 Emission factor (g/km·veh)																																																															
	Compact vehicles	Large vehicles	Small vehicles	Large vehicles																																																														
50	0.502	0.873	0.004901	0.020304																																																														
55	0.478	0.826	0.004744	0.019635																																																														

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Survey contents	Survey and Forecast Results																															
			60	0.493	0.791	0.004644	0.01925																											
65	0.549	0.782	0.004596	0.019161																														
70	0.648	0.808	0.004599	0.019367																														
75	0.789	0.849	0.004652	0.019858																														
80	0.973	0.925	0.004753	0.020643																														
		<p>Source: Basis for Calculating Vehicle Emission Factors Used in Road Environmental Impact Assessments (FY2010 Edition)” (National Institute for Land and Infrastructure Management Research Materials No. 671, February 2012) pp. 5-6.</p> <p>< NOx and SPM Emission Factors by Construction Work Type ></p> <p>The NOx and SPM emission factors for each work type implemented in this project are as shown in the table below.</p> <table border="1"> <thead> <tr> <th rowspan="2">Type of Construction</th> <th colspan="2">Emission factor (g/unit/day)</th> </tr> <tr> <th>NOx</th> <th>SPM</th> </tr> </thead> <tbody> <tr> <td>Excavation Work (Earth Excavation)</td> <td>9,700</td> <td>290</td> </tr> <tr> <td>Embankment Work (Road Body, Subgrade)</td> <td>8,600</td> <td>260</td> </tr> <tr> <td>Slope Shaping Work (Excavated Areas & Embankment Areas)</td> <td>4,400</td> <td>140</td> </tr> <tr> <td>Retaining Wall & Temporary Closure Work (Steel Sheet Piles)</td> <td>34,000</td> <td>—</td> </tr> <tr> <td>Cast-in-Place Pile Work</td> <td>18,000</td> <td>—</td> </tr> </tbody> </table> <p>Source: Technical Methods for Road Environmental Impact Assessment (2012 Edition) (National Institute for Land and Infrastructure Management, March 2013).</p>	Type of Construction	Emission factor (g/unit/day)		NOx	SPM	Excavation Work (Earth Excavation)	9,700	290	Embankment Work (Road Body, Subgrade)	8,600	260	Slope Shaping Work (Excavated Areas & Embankment Areas)	4,400	140	Retaining Wall & Temporary Closure Work (Steel Sheet Piles)	34,000	—	Cast-in-Place Pile Work	18,000	—												
Type of Construction	Emission factor (g/unit/day)																																	
	NOx	SPM																																
Excavation Work (Earth Excavation)	9,700	290																																
Embankment Work (Road Body, Subgrade)	8,600	260																																
Slope Shaping Work (Excavated Areas & Embankment Areas)	4,400	140																																
Retaining Wall & Temporary Closure Work (Steel Sheet Piles)	34,000	—																																
Cast-in-Place Pile Work	18,000	—																																
	⑦ Impacts During Construction	<p>(Air Pollution from Construction Vehicle Operations)</p> <p>Emissions of air pollutants from construction vehicle operations are predicted as follows using an atmospheric dispersion prediction model (plume-puff model) based on the “Technical Methods for Road Environmental Impact Assessment (2020 Edition)” (National Institute for Land and Infrastructure Management, September 2020).</p> <table border="1"> <thead> <tr> <th>Measure items</th> <th>Unit</th> <th>Predicted Value</th> <th>Max. allowable Value</th> </tr> </thead> <tbody> <tr> <td>Sulfur dioxide (SO₂)</td> <td>μ g/m³</td> <td>0.176</td> <td>0.5</td> </tr> <tr> <td>Nitrogen dioxide (NO₂)</td> <td>mg/m³</td> <td>0.034</td> <td>0.085</td> </tr> <tr> <td>Carbon monoxide (CO)</td> <td>mg/m³</td> <td>1.0</td> <td>3</td> </tr> <tr> <td>Particulate matter (PM)</td> <td>mg/m³</td> <td>0.139</td> <td>0.5</td> </tr> </tbody> </table> <p>Note 1) The emission source of air pollutants was set at a height of 1.0 m at the center of each lane. Note 2) The prediction point was set at a height of 1.5 m at the roadside. Note 3) Background concentrations were based on measurements from the baseline survey. Note 4) The conversion formula from NOx to NO2 followed the National Institute for Land and Infrastructure Management (NILIM) reference material.</p> <p>The prediction results indicate that the amount of air pollutants emitted by construction vehicles during operation is minimal, falling below the maximum allowable values for all measured items.</p> <p>(Air Pollution from Construction Machinery Operation)</p> <p>The amount of air pollutants emitted from construction machinery operation is predicted as follows using an atmospheric dispersion prediction model (plume-puff model) based on the “Technical Methods for Road Environmental Impact Assessment (2012 Edition)” (National Institute for Land and Infrastructure Management, March 2013).</p> <table border="1"> <thead> <tr> <th>Measure items</th> <th>Unit</th> <th>Predicted Value</th> <th>Max. Allowable Value</th> </tr> </thead> <tbody> <tr> <td>Nitrogen dioxide (NO₂)</td> <td>mg/m³</td> <td>0.045</td> <td>0.085</td> </tr> <tr> <td>Particulate matter (PM)</td> <td>mg/m³</td> <td>0.139</td> <td>0.5</td> </tr> </tbody> </table> <p>Note 1) The emission source height for air pollutants was set at 2.0 m. Note 2) It was assumed that retaining and temporary closure works (steel sheet piles) would be conducted for 200 days per year.</p>	Measure items	Unit	Predicted Value	Max. allowable Value	Sulfur dioxide (SO ₂)	μ g/m ³	0.176	0.5	Nitrogen dioxide (NO ₂)	mg/m ³	0.034	0.085	Carbon monoxide (CO)	mg/m ³	1.0	3	Particulate matter (PM)	mg/m ³	0.139	0.5	Measure items	Unit	Predicted Value	Max. Allowable Value	Nitrogen dioxide (NO ₂)	mg/m ³	0.045	0.085	Particulate matter (PM)	mg/m ³	0.139	0.5
Measure items	Unit	Predicted Value	Max. allowable Value																															
Sulfur dioxide (SO ₂)	μ g/m ³	0.176	0.5																															
Nitrogen dioxide (NO ₂)	mg/m ³	0.034	0.085																															
Carbon monoxide (CO)	mg/m ³	1.0	3																															
Particulate matter (PM)	mg/m ³	0.139	0.5																															
Measure items	Unit	Predicted Value	Max. Allowable Value																															
Nitrogen dioxide (NO ₂)	mg/m ³	0.045	0.085																															
Particulate matter (PM)	mg/m ³	0.139	0.5																															

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Survey contents	Survey and Forecast Results																												
			<p>Note 3) Background concentrations were based on measurements from baseline surveys. Note 4) The conversion formula from NO_x to NO₂ followed the National Institute for Land and Infrastructure Management (NILIM) guidelines. Predictions indicate that air pollutant emissions from construction machinery operation will be approximately 0.011 mg/m³ for NO₂. Combined with background concentrations, this remains below the maximum allowable value.</p>																												
		⑧ Impact during operation	<p>(Air Pollution from Vehicle Operation) The amount of air pollutants emitted from vehicle operation is predicted as follows using an atmospheric dispersion prediction model (plume puff model) based on the “Technical Methods for Road Environmental Impact Assessment (2012 Edition)” (National Institute for Land and Infrastructure Management, March 2013).</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="background-color: #e1f5fe;">Measure items</th> <th style="background-color: #e1f5fe;">Unit</th> <th style="background-color: #e1f5fe;">Predicted Value</th> <th style="background-color: #e1f5fe;">Max. Allowable Value</th> </tr> </thead> <tbody> <tr> <td>Sulfur dioxide (SO₂)</td> <td>μ g/m³</td> <td>0.176</td> <td>0.5</td> </tr> <tr> <td>Nitrogen dioxide (NO₂)</td> <td>mg/m³</td> <td>0.043</td> <td>0.085</td> </tr> <tr> <td>Carbon monoxide (CO)</td> <td>mg/m³</td> <td>1.004</td> <td>3</td> </tr> <tr> <td>Particulate matter (PM)</td> <td>mg/m³</td> <td>0.139</td> <td>0.5</td> </tr> </tbody> </table> <p>Note 1) The emission source height for air pollutants was set at 1.0 m above ground level at the center of each lane. Note 2) The prediction point was set at 1.5 m above ground level at the roadside. Note 3) Background concentrations were based on measurements from baseline surveys. Note 4) The conversion formula from NO_x to NO₂ followed the National Institute for Land and Infrastructure Management (NILIM) guidelines. The prediction results show that the air pollutant emissions from vehicle traffic, with NO₂ being the higher-emission pollutant at approximately 0.009 mg/m³, remain below the maximum allowable value even when combined with background concentrations.</p>	Measure items	Unit	Predicted Value	Max. Allowable Value	Sulfur dioxide (SO ₂)	μ g/m ³	0.176	0.5	Nitrogen dioxide (NO ₂)	mg/m ³	0.043	0.085	Carbon monoxide (CO)	mg/m ³	1.004	3	Particulate matter (PM)	mg/m ³	0.139	0.5								
Measure items	Unit	Predicted Value	Max. Allowable Value																												
Sulfur dioxide (SO ₂)	μ g/m ³	0.176	0.5																												
Nitrogen dioxide (NO ₂)	mg/m ³	0.043	0.085																												
Carbon monoxide (CO)	mg/m ³	1.004	3																												
Particulate matter (PM)	mg/m ³	0.139	0.5																												
2	Water quality	<p>① Pollution Status • Water Pollution</p>	<p>The results of the baseline survey are as shown in the table below.</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="background-color: #e1f5fe;"></th> <th style="background-color: #e1f5fe;">Unit</th> <th style="background-color: #e1f5fe;">Predicted Value</th> <th style="background-color: #e1f5fe;">Max. Allowable Value</th> </tr> </thead> <tbody> <tr> <td>Ammoniacal nitrogen (NH₄-N)</td> <td>mg/l</td> <td>0.36 ± 0.07</td> <td>1.5</td> </tr> <tr> <td>Hydrogen ion concentration (pH)</td> <td>-</td> <td>7.68 ± 0.10</td> <td>6.5 - 8.5</td> </tr> <tr> <td>Transparency</td> <td>cm</td> <td>22</td> <td>—</td> </tr> <tr> <td>Dissolved oxygen (DO)</td> <td>mg/l</td> <td>15.39 ± 2.46</td> <td>Above 4</td> </tr> <tr> <td>Suspended solids (SS)</td> <td>mg/l</td> <td>2.4</td> <td>0.75</td> </tr> <tr> <td>Oils and fats</td> <td>mg/l</td> <td>0.020 ± 0.007</td> <td>0.3</td> </tr> </tbody> </table> <p>The survey results indicate that dissolved oxygen levels are high, and ammonia nitrogen and oil/grease levels also meet standards, indicating generally good water quality. However, suspended solids are high and transparency is somewhat low, making the water unsuitable for direct use as domestic water. Generally, high suspended solids require oxygen for microbial decomposition, leading to a tendency for dissolved oxygen levels to decrease. Furthermore, when suspended solids are organic matter, microbial decomposition produces ammonia, leading to elevated ammonia nitrogen levels. However, in the Naryn River, despite high suspended solids, ammonia nitrogen levels are low and dissolved oxygen levels are high. Considering the low transparency as well, it is inferred that this suspended matter is not organic matter discharged from the upper reaches of the Naryn River, but primarily inorganic sediment discharged from upstream dams. Therefore, it is inferred that the water quality around the planned site is not contaminated by organic matter or similar substances.</p>		Unit	Predicted Value	Max. Allowable Value	Ammoniacal nitrogen (NH ₄ -N)	mg/l	0.36 ± 0.07	1.5	Hydrogen ion concentration (pH)	-	7.68 ± 0.10	6.5 - 8.5	Transparency	cm	22	—	Dissolved oxygen (DO)	mg/l	15.39 ± 2.46	Above 4	Suspended solids (SS)	mg/l	2.4	0.75	Oils and fats	mg/l	0.020 ± 0.007	0.3
	Unit	Predicted Value	Max. Allowable Value																												
Ammoniacal nitrogen (NH ₄ -N)	mg/l	0.36 ± 0.07	1.5																												
Hydrogen ion concentration (pH)	-	7.68 ± 0.10	6.5 - 8.5																												
Transparency	cm	22	—																												
Dissolved oxygen (DO)	mg/l	15.39 ± 2.46	Above 4																												
Suspended solids (SS)	mg/l	2.4	0.75																												
Oils and fats	mg/l	0.020 ± 0.007	0.3																												
		② Social Conditions • Water usage	<p>Water usage around the project site includes livestock access to the Naryn River and hydropower generation at the Kambal-Ata 2 hydroelectric plant and Toktogul Reservoir. No local residents using water from the Naryn River for irrigation or domestic purposes have been identified in the project area.</p>																												
		③ Social Conditions • Land Use Status	<p>No land uses or facilities that cause water pollution have been identified in the vicinity of the planned site.</p>																												

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Survey contents	Survey and Forecast Results																					
		⑤ Environmental Standards in Kyrgyz	In Kyrgyz, maximum permissible concentrations for drinking water and public water bodies are established in the following laws and sanitary standards: <ul style="list-style-type: none"> • Law of the Kyrgyz Republic “On the Safety of Drinking Water” Sanitary Standard “Maximum Permissible Concentrations of Chemical Substances in Water for Domestic Use, Drinking Water, Cultural Water, and Water Bodies for Domestic Use”																					
		⑥ Impacts During Construction	During construction, turbid water from the work may flow into the Naryn River.																					
3	Waste	① Status of Construction Waste Disposal Sites	Construction waste can be disposed of using municipally managed land located approximately 10 km from the bridge toward Osh.																					
		② Status of Construction Recycling	No statistical data on construction recycling has been confirmed. However, according to interviews with the Ministry of Environment, recycling is encouraged, including for construction waste; however, quality inspections are required when reusing construction waste.																					
		③ Environmental and Social Consideration Systems and Organizations in Kyrgyz	The relevant law governing construction waste is Law No. 131 of 2023, “The Law of the Kyrgyz Republic on Production and Consumption Waste,” which establishes regulations concerning the generation, collection, storage, treatment, transportation, and disposal of various types of waste, including construction waste. However, there are no specific provisions regarding the recycling of construction waste.																					
		④ Impacts During Construction	During construction, construction waste such as asphalt shells, concrete shells, construction-generated wood, and construction-generated soil is generated. This waste is disposed of at construction waste treatment facilities. However, construction-generated soil is reused as filling material or backfill whenever possible.																					
5	Noise and Vibration	① Pollution Status • Noise and Vibration	The results of the baseline survey are as shown in the table below. <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="3"></th> <th rowspan="3">Unit</th> <th colspan="2">Predicted Value</th> <th colspan="2">Standard Value</th> </tr> <tr> <th>Day</th> <th>Night</th> <th>Day</th> <th>Night</th> </tr> </thead> <tbody> <tr> <td>Equivalent noise level (LAeq)</td> <td>53</td> <td>54</td> <td>60</td> <td>50</td> </tr> <tr> <td>Vibration level (Lv)</td> <td>dB</td> <td>78</td> <td>68</td> <td colspan="2">108~124</td> </tr> </tbody> </table> The survey results indicate that the equivalent noise level during the day falls below the standard value but exceeds it at night. This is presumed to be because, while nighttime traffic volume of small vehicles is lower compared to daytime, heavy vehicle traffic is higher. Furthermore, vibration levels remain below the standard value both during the day and at night.		Unit	Predicted Value		Standard Value		Day	Night	Day	Night	Equivalent noise level (LAeq)	53	54	60	50	Vibration level (Lv)	dB	78	68	108~124	
			Unit			Predicted Value		Standard Value																
						Day	Night	Day	Night															
				Equivalent noise level (LAeq)	53	54	60	50																
		Vibration level (Lv)	dB	78	68	108~124																		
		② Social Conditions • Land Use Status	The primary sources of noise and vibration around the planned site are believed to be vehicles traveling on the Bishkek-Osh Highway.																					
③ Transportation Conditions	Refer to Traffic Conditions ③ for air pollution.																							
④ Environmental Standards in Kyrgyz	Regarding noise, the Hygiene Standard SN 2.2.4/2.1.8.562-96 “Noise in Workplaces, Residential Buildings, Public Buildings, and Residential Areas” specifies maximum permissible noise levels and equivalent noise levels (dBA) in workplaces for various categories of work activities based on their severity and intensity. Regarding vibration, the Hygiene Standard SN 2.2.4/2.1.8.566-96 “Industrial Vibration, Vibration in Residential and Public Buildings” specifies permissible vibration values for residential and public buildings.																							
⑥ Parameters used for prediction	< Vehicle Composition by Model Year > < Number of Construction Vehicles and Traveling Speed > < Lane Width Composition > 1. Refer to the parameters used for air pollution prediction (⑥).																							

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Survey contents	Survey and Forecast Results																																				
			<p><Effective Noise Power Levels by Work Type> The effective noise power levels for each work type to be performed in this project are as shown in the table below.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Type of Construction</th> <th style="text-align: center;">Effective Sound Power Level (dB)</th> </tr> </thead> <tbody> <tr> <td>Excavation Work (Earth Excavation)</td> <td style="text-align: center;">103</td> </tr> <tr> <td>Embankment Work (Road Body/Subgrade)</td> <td style="text-align: center;">108</td> </tr> <tr> <td>Slope Shaping Work (Embankment Section)</td> <td style="text-align: center;">100</td> </tr> <tr> <td>Cast-in-Place Pile Work (All-Casing Method)</td> <td style="text-align: center;">106</td> </tr> <tr> <td>Retaining Structures/Temporary Closure Work (Steel Sheet Piles (Water Jet Vibro-Hammer Method))</td> <td style="text-align: center;">114</td> </tr> <tr> <td>Subgrade Work (Upper/Lower Subgrade)</td> <td style="text-align: center;">102</td> </tr> <tr> <td>Asphalt Paving Work</td> <td style="text-align: center;">106</td> </tr> <tr> <td>Base Course/Backfill Crushed Stonework</td> <td style="text-align: center;">103</td> </tr> </tbody> </table> <p>Source: “Technical Methods for Road Environmental Impact Assessment (FY2012 Edition)” (National Institute for Land and Infrastructure Management, March 2013)</p> <p><Reference Point Vibration Levels by Construction Type> The reference point vibration levels for each construction type to be implemented in this project are as shown in the table below.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Type of Construction</th> <th style="text-align: center;">Reference Point Vibration Level (dB)</th> </tr> </thead> <tbody> <tr> <td>Excavation Work (Earth Excavation)</td> <td style="text-align: center;">53</td> </tr> <tr> <td>Embankment Work (Road Body/Subgrade)</td> <td style="text-align: center;">63</td> </tr> <tr> <td>Slope Shaping Work (Embankment Section)</td> <td style="text-align: center;">53</td> </tr> <tr> <td>Pile Driving Work (All-Casing Method)</td> <td style="text-align: center;">63</td> </tr> <tr> <td>Retaining Structures/Temporary Closure Work (Steel Sheet Piles (Water Jet Vibro Hammer Method))</td> <td style="text-align: center;">75</td> </tr> <tr> <td>Subgrade Work (Upper/Lower Subgrade)</td> <td style="text-align: center;">59</td> </tr> <tr> <td>Asphalt Paving Work</td> <td style="text-align: center;">56</td> </tr> <tr> <td>Base Course/Backfill Crushed Stonework</td> <td style="text-align: center;">63</td> </tr> </tbody> </table> <p>Source: “Technical Methods for Road Environmental Impact Assessment (2012 Edition)” (National Institute for Land and Infrastructure Management, March 2013).</p>	Type of Construction	Effective Sound Power Level (dB)	Excavation Work (Earth Excavation)	103	Embankment Work (Road Body/Subgrade)	108	Slope Shaping Work (Embankment Section)	100	Cast-in-Place Pile Work (All-Casing Method)	106	Retaining Structures/Temporary Closure Work (Steel Sheet Piles (Water Jet Vibro-Hammer Method))	114	Subgrade Work (Upper/Lower Subgrade)	102	Asphalt Paving Work	106	Base Course/Backfill Crushed Stonework	103	Type of Construction	Reference Point Vibration Level (dB)	Excavation Work (Earth Excavation)	53	Embankment Work (Road Body/Subgrade)	63	Slope Shaping Work (Embankment Section)	53	Pile Driving Work (All-Casing Method)	63	Retaining Structures/Temporary Closure Work (Steel Sheet Piles (Water Jet Vibro Hammer Method))	75	Subgrade Work (Upper/Lower Subgrade)	59	Asphalt Paving Work	56	Base Course/Backfill Crushed Stonework	63
Type of Construction	Effective Sound Power Level (dB)																																						
Excavation Work (Earth Excavation)	103																																						
Embankment Work (Road Body/Subgrade)	108																																						
Slope Shaping Work (Embankment Section)	100																																						
Cast-in-Place Pile Work (All-Casing Method)	106																																						
Retaining Structures/Temporary Closure Work (Steel Sheet Piles (Water Jet Vibro-Hammer Method))	114																																						
Subgrade Work (Upper/Lower Subgrade)	102																																						
Asphalt Paving Work	106																																						
Base Course/Backfill Crushed Stonework	103																																						
Type of Construction	Reference Point Vibration Level (dB)																																						
Excavation Work (Earth Excavation)	53																																						
Embankment Work (Road Body/Subgrade)	63																																						
Slope Shaping Work (Embankment Section)	53																																						
Pile Driving Work (All-Casing Method)	63																																						
Retaining Structures/Temporary Closure Work (Steel Sheet Piles (Water Jet Vibro Hammer Method))	75																																						
Subgrade Work (Upper/Lower Subgrade)	59																																						
Asphalt Paving Work	56																																						
Base Course/Backfill Crushed Stonework	63																																						
	⑤ Impact During Construction		<p><Noise from Construction Vehicle Traffic > During construction, noise will occur at the project site and its surrounding areas due to construction vehicle traffic. According to the construction plan, the maximum number of construction vehicles (10-ton dump trucks) operating during construction will be approximately 24 per day. Calculations using the road traffic noise prediction model (ASJ RTN-Model 2018) indicate that the increase in noise level will be a maximum of 1 dB during the day, which does not exceed the maximum allowable value. Furthermore, since construction will not be conducted at night, no noise from construction vehicle operations will occur during nighttime hours.</p> <p><Vibration Caused by Construction Vehicle Traffic > During construction, vibration will occur at the project site and its surrounding areas due to construction vehicle traffic. According to the construction plan, the maximum number of construction vehicles (10-ton dump trucks) operating during construction will be approximately 24 per day. Calculations using the formula proposed by the Public Works Research Institute for predicting the upper limit of the 80% range of vibration levels indicate that the increase in vibration levels will be a maximum 3 dB during the day, which does not exceed the maximum allowable value. Furthermore, since construction will not be conducted at night, no vibration associated with the operation of construction vehicles will occur during nighttime hours.</p>																																				

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Survey contents	Survey and Forecast Results
			<p><Noise from Construction Equipment Operation > Furthermore, noise will be generated within the project area and its surrounding areas due to the operation of construction equipment. The construction work generating the highest noise levels in this project involves retaining and temporary closure work (steel sheet piles using vibratory hammers with water jets). According to simplified calculations based on the ASJ CN-Model 2007 construction noise prediction model, continuous 8-hour daily operation would result in daytime noise levels of approximately 57 dBA in the center of the settlement, which does not exceed the maximum permissible value. No construction work will be performed at night, so no noise from construction machinery operations will occur during nighttime hours.</p> <p><Vibration Caused by Construction Machinery Operation > Vibration will occur within the project area and its surrounding areas due to the operation of construction machinery. The construction activities generating the highest vibration levels in this project are retaining wall and temporary closure works (steel sheet piles using vibratory hammers with water jets). According to simplified calculations using vibration propagation theory equations, continuous 8-hour daily operation would result in daytime levels of approximately 53 dBA at the center of the settlement, which does not exceed the maximum allowable value. Furthermore, since no construction work is conducted at night, no vibration from construction machinery operation occurs during nighttime hours.</p>
		⑥ Impact During Operation	<p><Noise Levels Associated with Vehicle Traffic > During operation, noise levels will increase in the project area and its surroundings due to increased traffic volume and higher vehicle speeds. According to calculations using the Road Traffic Noise Prediction Model (ASJ RTN-Model 2018), the increase in noise levels is up to 3 dB during both daytime and nighttime. While daytime noise levels are projected to remain within the maximum permissible values, nighttime noise levels are predicted to exceed the maximum permissible values.</p> <p><Vibration Levels Associated with Vehicle Operation > During operation, increased traffic volume and higher travel speeds will cause vibration levels to rise in the project area and its surroundings. Calculations using the formula proposed by the Public Works Research Institute for predicting the upper limit of the 80% range of vibration levels indicate that the increase in vibration levels after operation will be a maximum of 3 dB during both daytime and nighttime, which does not exceed the maximum allowable value.</p>
6	Sediment	①Contamination Status •Sediment	No past instances of sediment contamination involving mercury (Hg), polychlorinated biphenyls (PCBs), dioxins, or dioxin-like compounds (DLCs) have been confirmed in the vicinity of the project site or in the upper reaches of the Naryn River. There is no risk of sediment contaminants being deposited in the area surrounding the project site.
		②Social Conditions •Land Use Status	There are no operations in the vicinity of the project site or in the upper reaches of the Naryn River that generate sediment contaminants. While there are small-scale gold mines in the upper Naryn River, mercury-based smelting is not practiced.
		③Environmental Standards in Kyrgyz	Kyrgyz has not established environmental standards for sediment.
		④Impacts During Construction	During construction, no work will be performed that generates sediment contaminants.
10	Biodiversity and Ecosystem Services	①Habitat conditions of flora and fauna	The results of the ecological survey of flora and fauna around the planned site indicate that the species inhabiting the area are common species. No rare species, endangered species, or species listed in the Red Book have been confirmed.
		②Natural Environment •Designated areas for nature conservation and wildlife protection	There are no designated areas for nature conservation or biological protection around the planned site.
		③ Environmental and Social Consideration Systems and	Law No. 59 of the Kyrgyz Republic “On the Animal Kingdom” protects wild animals and their habitats while regulating the hunting, capture, and trade of wild animals. It also prohibits the destruction of habitats critical for migration, breeding, and feeding.

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Survey contents	Survey and Forecast Results
		Organizations in Kyrgyz	Law No. 53 of the Kyrgyz Republic "On the Protection and Use of Flora" prohibits the collection, harvesting, or destruction of rare or endangered plants without permission.
		⑤ Impact During Construction	During construction, minor impacts on the ecosystem are anticipated due to tree felling and the removal of pastureland within and around the project area.
11	Hydrological Condition	① River flow	Snowmelt from the upper Naryn River basin flows into the river over several months starting in early spring, causing river flow to peak from May to July. Peak flow ranges from 1,000 to 2,000 m ³ /s.
		② Dam discharge	The current discharge capacity of the Qambar-Atadam (HPP2) hydropower plant is 2,400–2,600 m ³ /s. However, plans are in place to increase this discharge capacity to 4,050 m ³ /s.
		③ Weather conditions (precipitation, etc.)	Jalal-Abad Region receives approximately 900 mm of rainfall annually, with the highest monthly rainfall occurring around April at 130 mm. Rainfall does not significantly impact river flow.
		④ Natural environment • Topography and geology	The Toktogul Reservoir is located in the planned downstream basin. Changes in the Toktogul Reservoir water level may cause backwater effects, potentially influencing water levels near the Naryn River bridge.
		⑤ Impacts during construction	During construction, partial water stoppage within the river for pier construction may alter the Naryn River's flow direction and velocity.
		⑥ Impacts during operation	The new Naryn Bridge has a clearance height of over 1.2m, ensuring no impact on the bridge during floods. However, the abutments and piers may alter the Naryn River's flow direction and velocity, and during heavy floods, they may affect the bank protection structures.
13	Land Acquisition and Resettlement	① Scale and Scope of Land Acquisition and Resettlement • Population • Property and Land • Household Finances and Livelihood • Socially vulnerable people	The project site has identified 3 affected households and 16 affected individuals. The land acquisition scope and scale comprise a total of 1,061.31 m ² of land parcels, 171.65 m ² of structures, and 53 trees. No socially vulnerable individuals have been identified within the project site. (See Section 2-2-4: Land Acquisition and Resettlement for details.)
		② Impacts Prior to Construction	Land acquisition is required prior to construction, which may impact residents within the planned site. (See Section 2-2-4: Land Acquisition and Resettlement for details.)
14	Living/Livelihood	① Economic Conditions • Employment rate • Income and poverty rate • Standard of living	The employment rate in Jalal-Abad Region, including the project site, is lower than in other Regions for both men and women, while the unemployment rate is high. The poverty rate is also higher than in other Regions, and the economic situation is far from favorable. Furthermore, while electricity and water supply are available in the project site area, sewage systems are not yet in place.
		⑤ Impacts during construction	During construction, employing local residents for this project may have a positive impact on the local economy. Furthermore, during construction, livestock movement routes will be secured, and local residents' collection of driftwood will not be hindered.
15	Land use and Regional resource use	① Social Conditions • Land Use Status • Regional Resource Availability and Utilization Status	The area surrounding the planned site is primarily known for its thriving livestock industry, with grazing of livestock occurring including within the planned site itself. Additionally, the floodplain of the Naryn River near the planned site contains high-quality driftwood suitable for charcoal production, which is collected and utilized by local residents.
		② Impact During Construction	A portion of the land will be expropriated for use as a construction yard (see Figure 1-2-18). During construction, livestock migration routes will be maintained, and local residents' collection of driftwood will not be impeded.
		② Impacts After Operation	At this time, there are no plans to add social infrastructure to the new Naryn River Bridge after its opening. However, space for adding social infrastructure and the necessary load-bearing capacity have been secured. Therefore, if water pipes or similar infrastructure are added, it could have a positive impact.
19	Uneven Distribution of Damage	① Economic Conditions • Employment Rate • Employment Population	The employment rate in Jalal-Abad Region, including the project site, is lower than in other Regions for both men and women, while the unemployment rate is high. By industry, the largest number of people are engaged in education-related work, while those

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Survey contents	Survey and Forecast Results
	and Benefits	by Industry • Income and Poverty Rate	engaged in agriculture and similar sectors are decreasing. Furthermore, the poverty rate is also higher than in other Regions, and the economic situation is by no means favorable.
		③ Impacts During Construction	While the project has the potential to revitalize the local economy, prioritizing the hiring of construction workers from specific villages or ethnic groups for this project's construction work could lead to uneven distribution of benefits.
20	Conflicting interests within the region	① Social Conditions • Conflicting interests within the region	At present, no Local conflicts of interest have been identified. However, incidents of livestock entering villages have occurred, which could potentially escalate into disputes between villagers and livestock farmers.
		② Impact During Construction/Operation	Prioritizing the hiring of workers from specific villages for the project's construction work could potentially create Local conflicts of interest. During operation, the existing Naryn River Bridge will be used as a pedestrian and livestock-only road, potentially strengthening connectivity between the two banks and promoting greater inter-regional exchange.
21	Infectious diseases such as HIV/AIDS	① Social Conditions	In Jalal-Abad Region, which includes the project site, cases of measles, anthrax, Infectious diseases such as HIV/AIDS have been confirmed.
		• Sanitation and Medical Care	If infectious diseases are introduced by construction workers for this project, there is a risk of transmission and spread to local residents.
		② Impact During Construction	
22	Children's rights	① Social Conditions • School Enrollment Rate • Children's Rights	The enrollment rate for primary and secondary education is approximately 92%, while the enrollment rate for higher education is approximately 85%, with boys having a lower rate than girls. Furthermore, it is estimated that approximately 22% of children aged 5 to 17 are engaged in economic activities or unpaid domestic service, hindering their access to education.
		② Impact During Construction	Children may be engaged in construction work during construction.
		③ Laws and Regulations in the Kyrgyz Republic	Law No. 106, the Labor Code of the Kyrgyz Republic, sets the minimum working age at 16. Furthermore, children under 18 are prohibited from working in hazardous conditions, night work, or overtime work.
25	Landscape	① Natural Environment • Major Viewpoints • Views from Viewpoints	Multiple vantage points overlooking the Toktogul Reservoir have been identified around the project site. The view of the project site area from one such vantage point is shown in Photo 1-2-19.
		② Impact During Construction/Operation	This project does not include views of the Toktogul Reservoir from the main viewing points. Even if it did, it would only be a very small portion.
26	Gender	① Social Conditions • Gender	Kyrgyz faces numerous gender-related issues, including “abduction marriages,” “child marriages,” and “domestic violence (DV).”
		② Economic Conditions • Employment Rate • Income and Poverty Rate	In Jalal-Abad Region, the female employment rate is lower than that of males, and women's wages are 76% of men's, indicating a significant gender disparity in employment conditions.
		② Impact During Construction	While the project will create employment opportunities for women, there is a risk of occupational segregation, wage gaps, and the occurrence of violence or harassment at construction sites. Furthermore, women may be disadvantaged during resettlement and compensation processes.
28	Working Environment (including occupational safety)	① Laws and Regulations of the Kyrgyz Republic	Law No. 106 “Labor Code of the Kyrgyz Republic” stipulates the rights and responsibilities of workers and employers. It establishes standards such as a statutory work week of 40 hours, overtime limited to 4 hours per day and less than 120 hours per year. It also prohibits discrimination based on gender, race, nationality, etc., and mandates that employers ensure safe working conditions.
		② Impact During Construction	During construction, Kyrgyz labor laws will be strictly adhered to. A dedicated safety engineer will be stationed on-site to ensure the safety of all personnel involved in the work. Furthermore, security personnel will be stationed at the gate of the dormitory to ensure safety.
29	Community Health, Safety, and	① Social Conditions • Safety and Security • Accidents	While no major accidents such as fatalities have occurred in the project area, incidents like skidding and contact with guardrails have been reported. Sewage systems are not widespread, hygiene standards are low, and medical care is inadequate. However, public

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Survey contents	Survey and Forecast Results
	Security (including accidents)	•Health and Medical Care	safety is relatively stable.
		② Impact During Construction	During construction, traffic can be maintained as the existing bridge remains passable. Traffic control will be applied for with the Toktogul District Police, and sufficient traffic controllers will be deployed to ensure the safety of local residents.
		③ Impact during operation	Upon completion, concrete blocks will be installed on the existing bridge to prevent vehicle access, converting it into a pedestrian and livestock-only bridge. This will ensure safe passage for local residents, including livestock.
30	Climate Change	① Climate Change Situation in Kyrgyz	In Kyrgyz, significant increases in average temperature, maximum temperature, and short-duration rainfall (maximum daily rainfall) are evident. Climate hazards such as “heavy rain (including localized downpours)” are expected to increase.
		② Disaster History	Disasters such as avalanches and floods occur frequently, causing damage such as flooding of houses and temporary closure of the Bishkek-Osh Road.
		③ Impact During Construction	During construction, heavy rainfall may cause the water level of the Naryn River to rise, potentially affecting the construction schedule.
		③ Impact During Operation	During operation, exposed components such as “main girders, piers, and abutments” and “retaining structures” may be affected by climate hazards including heavy rain (including localized downpours).
31	Greenhouse gases	① Social Conditions • Land Use Conditions	The primary source of greenhouse gas emissions in the vicinity of the planned site is carbon dioxide (CO ₂) emitted from automobiles. Methane gas (CH ₄) emissions from livestock (primarily cattle) rumination are also a factor; however, due to the difficulty in estimating these emissions, they are excluded from this study.
		② Traffic Conditions	Refer to section ③ Traffic Conditions regarding air pollution.
		⑥ Parameters used for prediction • Vehicle composition ratio by model year • Emission factors	According to a United Nations Development Program (UNDP) report (2021), approximately 93% of vehicles in Kyrgyz were manufactured before 2005. Therefore, the CO ₂ emission factor used for estimating greenhouse gas emissions employed the following estimated values calculated in the “Basis for Calculating Vehicle Emission Factors for Road Environmental Impact Assessments, etc. (FY2010 Edition)”.
		④ Baseline greenhouse gas emissions	The baseline greenhouse gas emissions from vehicles traveling within the planned site, calculated based on traffic conditions and CO ₂ emission factors, are approximately 5,800 tons of CO₂ equivalent .

Average Travel Speed (km/h)	CO ₂ Emission factor (2005)	
	Small Vehicles	Large Vehicles
50	132.3	595.4
55	128.9	576.2
60	126.8	567.1
65	126.1	564.8
70	126.6	572.7
75	128.3	587.5
80	131.3	611.3

Source: “Basis for Calculating Vehicle Emission Factors Used in Road Environmental Impact Assessments, etc. (FY2010 Edition)” (National Institute for Land and Infrastructure Management Research Materials No. 671, February 2012) p.8-50

Distance of the Road Section (km)	Small Vehicles		Large Vehicles		Baseline emissions (tCO ₂ /year)
	Traffic volume (veh/year)	CO ₂ Emission factor (tCO ₂ /km)	Traffic volume (veh/year)	CO ₂ Emission factor (tCO ₂ /km)	
1	3,200	0.001266	2,000	0.005954	5,825

1-2-1-9 Impact Assessment

Based on the above survey results, the evaluation of the project's impact on the border communities is shown in Table 1-2-29.

Table 1-2-29 Environmental and Social Consideration Assessment Results

No.	Item	Impact Assessment During Scoping		Impact Assessment Based on Survey Results		Reasons
		Before /During Construction	During Operation	Before /During Construction	During Operation	
1	Air pollution	✓	✓	B-	B-	<p>< During Construction > Air pollutants emitted from operating construction machinery may impact air quality within the project area and its surroundings. However, air pollutants emitted from construction vehicles in transit are minimal, and their impact on air quality within the project area and its surroundings is small.</p> <p>< During Operation > Air pollutants emitted from increased traffic volume after operation will be minimal, posing no potential impact on air quality within the project area and its surroundings. However, the possibility of affecting air quality in the project area and its surroundings cannot be entirely ruled out, such as if future traffic volumes exceed projections.</p>
2	Water quality	✓	—	B-	B-	<p>< During Construction > Turbid water may occur due to pier construction and other activities, potentially affecting the project area and surrounding waters.</p> <p>< During Operation > After operation begins, factors affecting the project area and surrounding waters are not anticipated. However, in the unlikely event of sediment runoff from embankment slopes or similar areas, the possibility of impact on the project area and surrounding waters cannot be entirely ruled out.</p>
3	Waste	✓	—	B-	N/A	<p>< During Construction > During construction, construction waste (such as asphalt waste, concrete chunks, and construction lumber) and construction-generated soil will be generated. If not properly processed, this could impact on the project area and its surrounding areas.</p> <p>< During Operation > After operation begins, the generation of waste that could impact on the project area and its surrounding areas is not anticipated.</p>
4	Soil contamination	—	—	N/A	N/A	<p>< During Construction > No activities that could cause soil contamination have occurred within the project area or its surrounding areas to date, and there is no possibility that the soil is already contaminated. Furthermore, since this project will not involve construction activities that could potentially contaminate soil or groundwater, such as chemical injection, there is no risk of causing soil contamination within the project area or its surrounding areas.</p> <p>< During Operation > No factors that could contaminate the soil or groundwater will arise after the facility begins operation.</p>
5	Noise and vibration	✓	✓	B-	B-	<p>< During Construction > Noise and vibration levels may increase within the project area and its surroundings due to the operation of construction vehicles and machinery.</p> <p>< During Operation > Noise and vibration levels will increase due to higher traffic volume, but the impact on the project area and its surroundings will be minimal. However, the</p>

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Impact Assessment During Scoping		Impact Assessment Based on Survey Results		Reasons
		Before /During Construction	During Operation	Before /During Construction	During Operation	
						possibility of affecting noise and vibration levels in the project area and its surroundings cannot be entirely ruled out, particularly if future traffic volumes exceed projections.
6	Sediment	✓	—	D	N/A	<p>< During Construction > There is no risk of sediment contaminants deposited around the planned site spreading to surrounding areas due to construction activities.</p> <p>< During Operation > No factors likely to cause sediment dispersion are anticipated after the facility becomes operational.</p>
7	Subsidence	—	—	N/A	N/A	<p>< During Construction/Operation > Groundwater pumping that could cause subsidence is not anticipated. Furthermore, no soft ground exists within the project area or its surrounding vicinity. Therefore, there is no risk of subsidence occurring.</p>
8	Odor	—	—	N/A	N/A	<p>< During Construction/Operation > No factories, facilities, or ventilation towers that could cause odor issues during construction or operation are planned. There is no risk of odor affecting the project area or its surroundings.</p>
9	Protected area	—	—	N/A	N/A	<p>< Under Construction/Operation > There are no nature reserves or wildlife sanctuaries within the project area or its surrounding vicinity.</p>
10	Biodiversity and ecosystem services	✓	—	B-	B-	<p>< During Construction > During construction, tree felling and pasture removal within and around the project area may impact the ecosystem.</p> <p>< During Operation > If trees are transplanted, failure to properly manage the transplanted trees may impact the ecosystem.</p>
11	Hydrological conditions	✓	✓	B-	B-	<p>< Under Construction > During construction, water flow within the river may be partially stopped to construct bridge piers, potentially altering the flow direction and velocity of the Naryn River.</p> <p>< During Operation > During operation, the abutments and piers constructed within the river may alter the flow direction and velocity of the Naryn River.</p>
12	Topography and geology	✓	✓	B-	B-	<p>< During Construction > During construction, embankment work will be performed as part of connecting road improvements. However, if proper compaction is not performed, embankment failure may occur.</p> <p>< During Operation > During operation, if rainwater is not properly drained, it may infiltrate the embankment. This could reduce the embankment's stability and potentially cause embankment failure.</p>
13	Land acquisition and resettlement	✓	—	B-	N/A	<p>< During Construction > To construct bridges and connect roads/access roads, tree felling and land acquisition will be necessary, though no resettlement will occur.</p> <p>< During Operation > Activities requiring land acquisition or resettlement are not anticipated.</p>
14	Livelihoods	✓	✓	B-	B+	<p>< During Construction > During construction, there is a possibility of affecting the movement of livestock on the riverbed, as well as potentially impacting local residents who collect driftwood for fuel on the riverbed.</p>

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Impact Assessment During Scoping		Impact Assessment Based on Survey Results		Reasons
		Before /During Construction	During Operation	Before /During Construction	During Operation	
						<p><During Operation ></p> <p>During operation, the existing Naryn River Bridge will be used as a passageway for pedestrians and livestock, improving convenience for pedestrians and livestock farmers. Furthermore, the new Naryn River Bridge will be exclusively for vehicles, leading to smoother vehicle traffic.</p>
15	Land use and regional utilization of resources	✓	—	B-	N/A	<p><During Construction ></p> <p>Land use will change as part of the farmland is expropriated and part of the pasture is used as a construction yard. Furthermore, if use of the riverbed is restricted, this may impact local residents who collect driftwood for fuel on the riverbed.</p> <p><During Operation ></p> <p>After operation begins, there will be no new changes in land use. However, if use of the riverbed is restricted, it may affect local residents who collect driftwood for fuel from the riverbed.</p>
16	Water usage	—	—	N/A	N/A	<p><During Construction ></p> <p>This project does not involve pumping groundwater, so it will not cause groundwater level decline or depletion, nor will it affect water usage. Additionally, while there are watering places for livestock and livestock farmers near the planned site, they are located far enough away to have no impact.</p> <p><During Operation ></p> <p>After operation begins, no factors affecting water usage will arise.</p>
17	Existing social infrastructures and services	—	—	N/A	N/A	<p><During Construction ></p> <p>This project will not relocate the water pipes laid around the planned site or the communication cables attached to the existing Naryn River Bridge. Therefore, there will be no impact on existing social infrastructure. Furthermore, the existing bridge will remain in use during construction, so there will be no impact on transportation services such as shared rides.</p> <p><During Operation ></p> <p>The communication cables attached to the existing Naryn River Bridge will remain in place after the bridge becomes operational. Therefore, there will be no impact on existing social infrastructure.</p>
18	Social institutions such as social infrastructure and local decision-making institutions	—	—	N/A	N/A	<p><During Construction/Operation ></p> <p>There are no factors affecting social organizations such as social capital or local decision-making bodies.</p>
19	Uneven distribution of damage and benefits	✓	—	B-	N/A	<p><During Construction ></p> <p>Prioritizing the hiring of workers from specific villages or ethnic groups for this project's construction work could lead to uneven distribution of benefits.</p> <p><During Operation ></p> <p>After operation begins, no factors causing uneven distribution of damage or benefits will arise.</p>
20	Local conflicts of interest	✓	✓	B-	B+	<p><During Construction ></p> <p>Prioritizing the hiring of workers from specific villages for this project's construction work may lead to Local conflicts of interest.</p>

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Impact Assessment During Scoping		Impact Assessment Based on Survey Results		Reasons
		Before /During Construction	During Operation	Before /During Construction	During Operation	
						< During Operation > During operation, the existing Naryn River Bridge will be used as a pedestrian and livestock-only road. This will enhance connectivity between the two banks and potentially promote greater inter-regional exchange.
21	Infectious diseases such as HIV/AIDS	✓	—	B-	N/A	< During Construction > If infectious diseases are introduced by construction workers involved in this project, there is a risk of transmission and spreading to local residents. < During Operation > After operation begins, factors that could transmit infectious diseases will not arise.
22	Children's rights	✓	—	B-	N/A	< During Construction > If children are employed in the construction work for this project, it will violate children's rights. < During Operation > During operation, the current Naryn River Bridge will be used as a pedestrian and livestock-only road, improving safety for children when crossing.
23	Socially vulnerable people	—	—	N/A	N/A	< During Construction/Operation > No socially vulnerable individuals reside within the project implementation area.
24	Cultural Heritage	—	—	N/A	N/A	< During Construction/Operation > There are no cultural or historical heritage sites within the project implementation area or its surrounding vicinity.
25	Landscape	—	—	N/A	N/A	< During Construction/Operation > This project will have no impact on the view overlooking the Toktogul Reservoir. Even if there is any impact, it will be extremely minor.
26	Gender	✓	—	B-	N/A	< Before Construction > Compensation for resettlement may not be distributed equally between genders. < During Construction > Gender-based occupational segregation may occur during this project's construction work, potentially leading to wage disparities. Risks of gender-based violence, such as sexual harassment, may increase at construction sites and dormitories. < During Operation > After operation begins, there are no factors affecting gender. Or, even if there are impacts, they are extremely minor.
27	Minority Groups and Indigenous Peoples	—	—	N/A	N/A	< During Construction/Operation > No ethnic minorities reside within the project implementation area.
28	Working conditions including occupational safety	✓	—	B-	N/A	< During Construction > As existing roads remain open to traffic during construction, there is a risk of construction personnel being involved in traffic accidents. < During Operation > No factors affecting the working environment will arise during operation.
29	Community Health, Safety, and Security	✓	✓	B-	B±	< During Construction > Construction vehicles using the Bishkek-Osh Road may cause traffic accidents in the local community.

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Item	Impact Assessment During Scoping		Impact Assessment Based on Survey Results		Reasons
		Before /During Construction	During Operation	Before /During Construction	During Operation	
	(including accidents)					< During Operation > The reduced curve radius of the connecting road may increase automobile accidents. However, concrete blocks will be installed on the existing Naryn River Bridge to prevent vehicle access, allowing its use as a dedicated pedestrian and livestock road, thereby improving safety for pedestrians and livestock owners.
30	Transboundary Impacts and Climate Change	✓	✓	B-	B-	< During Construction/Operation > Climate hazards caused by climate change (such as heavy rain and heavy snow) may prevent the project's intended functions and expected effects from materializing.
31	Greenhouse Gases	✓	✓	N/A	N/A	< During Construction/Operation > The increase or decrease in greenhouse gases resulting from the operation of construction machinery and the passage of construction vehicles, as well as from changes in automobile traffic volume after operation begins, is minimal.

Impact Level A: Significant impact is anticipated; careful consideration is required

B: Impact is anticipated to be smaller than A, but consideration is required

C: Impact level is currently unknown

D: No impact is anticipated

+/-: Positive/Negative impact

N/A: Impact assessment not performed as scoped as D

1-2-1-10 Mitigation Measures and Costs for Implementing Mitigation Measures

Among the above evaluation items, mitigation measures and the costs for implementing mitigation measures are as shown. Implementation of mitigation measures shall be the responsibility of the MOTC, the consultant, and the contractor. Prior to commencement of construction, the consultant and contractor shall review the mitigation measures, prepare an Environmental Management Plan, and obtain approval from the MOTC and the Jalal-Abad Region Environmental Department. Furthermore, the consultant and contractor shall manage environmental management activities, implement countermeasures when issues arise, and prepare monthly, fortnightly, and annual reports. MOTC shall review these reports and instruct additional measures as necessary. These environmental measures are activities generally implemented in construction projects, and the costs for implementing mitigation measures, excluding monitoring survey costs, are included in the construction costs.

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Table 1-2-30 Environmental Management Plan (EMP)

【Before Construction / During Construction】

No.	Content	Reasons for Evaluation	Mitigation measures	Implementing Organization	Responsible Organization	Cost
1	Air Pollution	The operation of construction vehicles and machinery may impact air quality within the project area and its surroundings.	<ul style="list-style-type: none"> • Use appropriate construction machinery and perform regular maintenance • Avoid unnecessary idling • Perform regular watering to prevent dust • When backfilling or temporarily storing construction materials at sites, cover them with sheets to prevent scattering • Conduct regular baseline surveys; if conditions deteriorate beyond standard values, investigate causes and implement necessary countermeasures • Request relevant authorities to strengthen enforcement against poorly maintained vehicles 	<ul style="list-style-type: none"> • Contractor • Consultant • MOTC 	•MOTC	10,000 USD
2	Water Quality	Turbid water generated during pier construction and related activities may affect water bodies within the project area and its surroundings.	<ul style="list-style-type: none"> • Use appropriate construction machinery and perform regular maintenance • Do not discharge construction-related wastewater into rivers without proper treatment • Do not wash construction machinery in rivers • Conduct regular baseline surveys; if conditions deteriorate beyond baseline values, investigate the cause and implement necessary countermeasures 	<ul style="list-style-type: none"> • Contractor • Consultant • MOTC 	•MOTC	12,500 USD
3	Waste	Construction waste (asphalt pavers, concrete blocks, construction timber) and excavated soil will be generated. If it is not properly managed, this may impact the project area and its surroundings.	<ul style="list-style-type: none"> • Recycle and reuse waste as much as possible • Dispose of waste that cannot be recycled or reused at designated locations • Prohibit the dumping of waste into rivers 	<ul style="list-style-type: none"> • Contractor • Consultant • MOTC 	•MOTC	Contractor's responsibility
5	Noise and Vibration	The operation of construction vehicles and machinery may increase noise and vibration levels within the project area and its surroundings.	<ul style="list-style-type: none"> • Use appropriate construction machinery and perform regular maintenance • Use low-noise construction machinery whenever possible • Conduct construction work only during designated work hours • When performing work at night, notify local residents in advance and obtain permission. • Install sound barriers as necessary • Conduct regular baseline surveys; if conditions deteriorate beyond baseline values, investigate causes and implement necessary countermeasures. 	<ul style="list-style-type: none"> • Contractor • Consultant • MOTC 	•MOTC	12,500 USD

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Content	Reasons for Evaluation	Mitigation measures	Implementing Organization	Responsible Organization	Cost
			<ul style="list-style-type: none"> Request relevant authorities to strengthen enforcement against poorly maintained vehicles. Immediately repair any road damage discovered during construction. 			
10	Biodiversity and Ecosystem Services	During construction, tree felling and the removal of pastureland within the project area and its surroundings may impact the ecosystem.	<ul style="list-style-type: none"> Avoid cutting down trees that do not affect construction work whenever possible Transplant trees whenever feasible Obtain approval from the Toktogul District Environmental Protection Agency and relevant government agencies when cutting down trees. 	<ul style="list-style-type: none"> Contractor Consultant MOTC 	•MOTC	Contractor's responsibility
11	Hydrology	During construction, water flow and velocity in the Naryn River may change due to partial water stoppage within the river for bridge pier construction.	<ul style="list-style-type: none"> Develop construction plans that take riverbed conditions into account. 	<ul style="list-style-type: none"> Contractor Consultant MOTC 	•MOTC	Contractor's responsibility
12	Topography and Geology	During construction, embankment work will be carried out as part of connecting road improvements. If proper compaction is not performed, embankment collapse may occur.	<ul style="list-style-type: none"> During embankment construction perform proper compaction. As necessary, use waterproof sheets to block rainwater from infiltrating the embankment, preventing strength reduction and collapse. 	•Contractor	•MOTC	Contractor's responsibility
13	Land Acquisition and Resettlement	Resettlement will not be required for bridge and connecting/access road construction, but tree felling and land acquisition will be necessary.	<ul style="list-style-type: none"> When relocating structures, take every precaution. Complete compensation before construction begins. If a complaint is submitted, handle it appropriately according to the grievance mechanism. 	<ul style="list-style-type: none"> Contractor MOTC 	•MOTC	Contractor's responsibility
14	Livelihoods	During construction, livestock movement on the riverbed may be affected, and local residents collecting driftwood for fuel on the riverbed may be impacted.	<ul style="list-style-type: none"> Access roads will be rerouted before construction begins. Prepare livestock movement routes. Ensure movement routes for local residents collecting driftwood for fuel along the riverbed. 	<ul style="list-style-type: none"> Contractor MOTC 	•MOTC	Contractor's responsibility
15	Land Use and Local Resource Use	Land use will change as part of the farmland is expropriated and part of the pasture is used as a construction yard. Furthermore, if riverbed use is restricted, local residents collecting driftwood for fuel on the riverbed may be impacted.	<ul style="list-style-type: none"> Keep the construction yard as compact as possible. Obtain gravel from existing quarries; do not quarry from rivers. Provide a designated route for livestock movement. Do not interfere with local residents collecting driftwood for fuel on riverbanks. 	<ul style="list-style-type: none"> Contractor MOTC 	•MOTC	Contractor's responsibility

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Content	Reasons for Evaluation	Mitigation measures	Implementing Organization	Responsible Organization	Cost
19	Mis-distribution of benefits and damages	Prioritizing the hiring of construction workers for this project from specific villages or ethnic groups could lead to uneven distribution of benefits.	<ul style="list-style-type: none"> • Ensure transparency in the selection of workers. 	<ul style="list-style-type: none"> • Contractor • MOTC 	<ul style="list-style-type: none"> • MOTC 	Contractor's responsibility
20	Local conflicts of interest	Prioritizing the hiring of construction workers for this project from specific villages could potentially cause conflicts of interest within the community.	<ul style="list-style-type: none"> • Ensure transparency in the selection of workers. • During construction, consult with residents and implement measures to prevent livestock from entering the settlement. 	<ul style="list-style-type: none"> • Contractor • MOTC 	<ul style="list-style-type: none"> • MOTC 	Contractor's responsibility
21	Infectious Diseases such as HIV/AIDS	If infectious diseases are introduced by construction workers involved in this project, there is a risk of transmission and spread to local residents.	<ul style="list-style-type: none"> • Strictly prohibit drug use. • Conduct HIV/AIDS awareness campaigns. • Work to gather the latest information on infectious disease outbreaks. • Collaborate with local hospital medical staff regarding matters such as the necessity of vaccinations. 	<ul style="list-style-type: none"> • Contractor • MOTC 	<ul style="list-style-type: none"> • MOTC 	Contractor's responsibility
22	Children's Rights	If children are employed in the construction work for this project, it would violate children's rights.	<ul style="list-style-type: none"> • Thoroughly verify the age of workers during selection. • Comply with the Labor Law of the Kyrgyz Republic and prohibit the employment of individuals under 16 years of age. Even for those aged 16 or older but under 18, prohibit their engagement in hazardous work, night work, or overtime work. 	<ul style="list-style-type: none"> • Contractor • MOTC 	<ul style="list-style-type: none"> • MOTC 	Contractor's responsibility
26	Gender	Compensation for resettlement may not be distributed equally between genders.	<ul style="list-style-type: none"> • Ensure compensation is distributed equally between genders. • Include provisions prohibiting gender-based wage discrimination and sexual harassment in construction contracts. • Monitor contractors' wage payment records. • Provide separate changing rooms and restrooms for men and women at construction sites. 	<ul style="list-style-type: none"> • Contractor • Consultant • MOTC 	<ul style="list-style-type: none"> • MOTC 	Contractor's responsibility
28	Working conditions including occupational safety	Gender-based job segregation may occur in the construction work for this project, potentially leading to wage disparities. The risk of gender-based violence, such as sexual harassment, may increase at construction sites and dormitories.	<ul style="list-style-type: none"> • Develop a safety management plan to ensure work safety and worker protection. • Conduct safety training. • Strictly enforce the wearing of work clothes, safety shoes, protective eyewear, gloves, helmets, etc. • Establish an emergency response system. 	<ul style="list-style-type: none"> • Contractor • Consultant • MOTC 	<ul style="list-style-type: none"> • MOTC 	Contractor's responsibility
29	Community Health,	Since existing roads will remain	<ul style="list-style-type: none"> • To ensure traffic safety in the 	<ul style="list-style-type: none"> • Contractor 	<ul style="list-style-type: none"> • MOTC 	Contractor's

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Content	Reasons for Evaluation	Mitigation measures	Implementing Organization	Responsible Organization	Cost
	Safety, and Security (including accidents)	open to traffic during construction, there is a risk of traffic accidents involving workers.	area, road signs and pavement markings will be installed. •Residents will be informed about the construction plan.	•Consultant •MOTC		responsibility
30	Trans-boundary Impacts and Climate Change	Construction vehicles using the Bishkek-Osh Road may cause traffic accidents within the local community.	•During severe winter conditions, concrete placement will be avoided to account for potential delays in concrete strength development. • Flooding will prevent riverbed construction work.	•Contractor •MOTC	•MOTC	Contractor's responsibility

【During Operation】

No.	Content	Reasons for Evaluation	Mitigation measures	Implementing Organization	Responsible Organization	Cost
1	Air Pollution	Air pollutants emitted from increased traffic volume after operation will be minimal, and there is no potential for impact on air quality within the project area or its surrounding areas. However, the possibility of impact on air quality within the project area and its surroundings cannot be entirely ruled out, such as in the event of future traffic volumes exceeding projections.	• Conduct baseline surveys regularly. If conditions deteriorate beyond baseline values, investigate the causes and implement measures such as requesting relevant agencies to further strengthen enforcement against poorly maintained vehicles that may be sources of air pollutant emissions. • Request relevant agencies to strengthen enforcement against poorly maintained vehicles.	•MOTC	•MOTC	4,000 USD
2	Water Quality	No factors affecting the water bodies within or surrounding the project area are anticipated after operation commences. However, in the unlikely event of sediment runoff from embankment slopes, the possibility of impact on the water bodies within or surrounding the project area cannot be entirely ruled out.	•Conduct baseline surveys regularly, and if conditions deteriorate beyond the baseline values, investigate the cause and implement necessary countermeasures.	•MOTC	•MOTC	5,000 USD
5	Noise and Vibration	Noise and vibration levels will increase due to increased traffic volume, but the impact on the project area and its surroundings will be minimal. However, if future traffic volumes exceed projections, the possibility of affecting noise and vibration levels in the project area and its surroundings cannot be entirely ruled out.	•Conduct baseline surveys regularly and, if conditions deteriorate beyond the baseline values, investigate the causes and implement necessary countermeasures • Request relevant agencies to strengthen enforcement against vehicles in poor repair	•Contractor •Consultant •MOTC	•MOTC	4,000 USD
10	Biodiversity and Ecosystem Services	If transplanted trees are not properly maintained, there is a potential impact on the ecosystem.	•Monitor the condition of transplanted trees regularly.	•MOTC	•MOTC	Implementing org's responsibility
11	Hydrological Conditions	During operation, the bridge abutments and piers constructed within the river may alter the flow direction and velocity of the Naryn River.	•Conduct regular visual monitoring. •If a serious problem occurs, investigate the cause and implement countermeasures.	•MOTC	•MOTC	Implementing org's responsibility

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	Content	Reasons for Evaluation	Mitigation measures	Implementing Organization	Responsible Organization	Cost
			<ul style="list-style-type: none"> If driftwood accumulates, remove it promptly. 			
12	Topography and Geology	During operation, if stormwater is not properly drained, it may infiltrate the embankment, reduce its stability and potentially cause embankment failure.	<ul style="list-style-type: none"> Install drainage facilities to ensure proper rainwater drainage, preventing rainwater from infiltrating the embankment and causing its collapse. Plant vegetation to enhance slope stability. 	•MOTC	•MOTC	Implementing org's responsibility
14	Livelihoods	During operation, the existing Naryn River Bridge will be used as a passageway for pedestrians and livestock, improving convenience for pedestrians and livestock farmers.	<ul style="list-style-type: none"> Install concrete blocks at the current Naryne River Bridge to prevent vehicle intrusion. 	•MOTC	•MOTC	Implementing org's responsibility

1-2-1-11 Environmental Monitoring Plan

The monitoring plan during the construction and operation stages is shown in Table 1-2-31 Details will be reviewed as necessary during detailed design. The results of the monitoring surveys will be compiled by MOTC and reported to MNR/JICA attached to the Project Progress Report.

Table 1-2-31 Environmental Monitoring Plan (EMoP)

【Before Construction / During Construction】

No.	Item	Mitigation Measures	Item	Standard	Location	Implementing Organization	Duration and Frequency	Cost
1	Air pollution	• Use appropriate construction machinery and perform regular maintenance	Implementation status	None	Project Implementation Area and Surrounding Areas	•Contractor	Daily	Included in construction costs
		• Avoid unnecessary idling	Implementation status	None	Project Implementation Area and Surrounding Areas	•Contractor	Daily	Included in construction costs
		• Perform regular watering to prevent dust	Implementation status	None	Yard Entrances and Exits	•Contractor	Daily	Included in construction costs
		• Cover backfills and construction materials stored temporarily at sites with sheets to prevent scattering	Installation status	None	Project Implementation Area	•Contractor	Daily	Included in construction costs
		• Conduct regular baseline surveys; if conditions deteriorate beyond baseline values, investigate causes and implement necessary countermeasures	<ul style="list-style-type: none"> Sulfur dioxide Nitrogen dioxide Carbon monoxide Particulate matter 	Sanitary Standard No. 17 "Maximum Allowable Concentrations of Air Pollutants in the Ambient Air of Populated Areas"	Project Implementation Area: 1 location	•Consultant	Quarterly	3,000 USD/time
		• Request relevant authorities to strengthen enforcement against poorly maintained vehicles	Implementation status	None	Project Implementation Area and Surrounding Areas	•MOTC	Prior to commencement of construction	Through consultation with MOTC

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No	Item	Mitigation Measures	Item	Standard	Location	Implementing Organization	Duration and Frequency	Cost
2	Water pollution	• Use appropriate construction machinery and perform regular maintenance	Implementation status	None	Project implementation area	• Contractor	Daily	Included in the construction cost
		• Do not discharge construction wastewater into rivers without proper treatment	Implementation Status	None	Project Implementation Area	• Contractor	Daily	Included in the construction cost
		• Do not wash construction machinery in rivers	Implementation Status	None	Project Implementation Area	• Contractor	Daily	Included in the construction cost
		• Conduct baseline surveys regularly; if conditions deteriorate beyond baseline values, investigate the cause and implement necessary countermeasures	<ul style="list-style-type: none"> • Ammoniacal Nitrogen • Hydrogen Ion Concentration • Transparency • Dissolved Oxygen • Suspended Solids • Oils and Greases 	Sanitary Standards: “Maximum Allowable Concentrations of Chemical Substances in Water for Domestic Use, Drinking Water, Cultural Water, and Domestic Water Areas”	Project Implementation Area: 1 location	• Consultant	Monthly	2,500 USD/time
3	Waste	• Recycle and reuse waste as much as possible	Implementation Status	None	Project Implementation Area	• Contractor	Daily	Included in the construction cost
		• Dispose of waste that cannot be recycled or reused at designated locations	Implementation Status	None	Project Implementation Area and Surrounding Areas	• Contractor	Daily	Included in the construction cost
		• Prohibit the dumping of waste into rivers	Implementation Status	None	Project Implementation Area and Surrounding Areas	• Contractor	Daily	Included in the construction cost
5	Noise and Vibration	• Use appropriate construction machinery and perform regular maintenance.	Implementation Status	None	Project Implementation Area and Surrounding Areas	• Contractor	Daily	Included in the construction cost
		• Use low-noise construction machinery whenever possible.	Implementation Status	None	Project Implementation Area and Surrounding Areas	• Contractor	Daily	Included in the construction cost
		• Conduct construction work only during designated work hours.	Implementation Status	None	Project Implementation Area and Surrounding Areas	• Contractor	Daily	Included in the construction cost
		• When performing work at night, notify local residents in advance and obtain permission.	Implementation Status	None	Project Implementation Area and Surrounding Areas	• Contractor	Each time implementation occurs	Included in the construction cost
		• Install sound barriers as necessary.	Implementation Status	None	Project Implementation Area and Surrounding Areas	• Contractor	Prior to commencement of construction	Included in the construction cost
		• Conduct baseline surveys regularly. If conditions deteriorate beyond baseline values, investigate the cause	<ul style="list-style-type: none"> • Noise level • Vibration level 	Hygiene Standard “Noise in Workplaces, Dwellings, Public	Project Implementation Area: 1 location	• Consultant	Quarterly	2,000 USD/time

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No	Item	Mitigation Measures	Item	Standard	Location	Implementing Organization	Duration and Frequency	Cost
		and implement necessary countermeasures.		Buildings, and Residential Areas” Hygiene Standard “Industrial Vibration, Vibration in Dwellings and Public Buildings”				
		• Request relevant agencies to strengthen enforcement against vehicles in poor repair.	Implementation Status	None	Project Implementation Area and Surrounding Areas	• Contractor	Daily	Included in the construction cost
		• If road damage is discovered during construction, repair it immediately.	Road damage status, Repair status	None	Project Implementation Area and Surrounding Areas	• MOTC	Daily	Through consultation with MOTC
10	Biodiversity and Ecosystem Services	• Avoid cutting down trees that do not affect construction work whenever possible.	Implementation Status	None	Project Implementation Area and Surrounding Areas	• Contractor	Prior to commencement of construction	Included in the construction cost
		• Transplant trees whenever feasible	Implementation status, if transplanted, the number of plants, etc.	None	Through consultation with relevant agencies	• MOTC	Daily	Included in the construction cost
		• Obtain approval from the Toktogul District Environmental Protection Agency and relevant government agencies when cutting down trees	Implementation Status	None	—	• MOTC	Daily	Included in the construction cost
11	Water Resources	• Develop construction plans considering the riverbed.	Implementation Status	None	Project Implementation Area	• Contractor	Prior to commencement of construction	Included in the construction cost
12	Topography and Geology	• Perform proper compaction during embankment construction.	Implementation Status	None	Project Implementation Area	• Contractor	Daily	Included in the construction cost
		• Use waterproof sheets as needed to block rainwater infiltration into the embankment, preventing strength reduction or collapse.	Implementation Status	None	Project Implementation Area	• Contractor	Daily	Included in the construction cost
13	Land Acquisition and Resettlement	• Exercise utmost care when relocating structures.	Implementation Status	None	Project Implementation Area	• Contractor	Prior to commencement of construction	Included in the construction cost
		• Complete compensation before construction begins.	Implementation Status	None	Project Implementation Area	• MOTC	Prior to commencement of construction	15,473.99 USD
14	Living and livelihood	• Access roads will be rerouted before construction begins.	Implementation Status	None	Project Implementation Area	• Contractor	Prior to commencement of construction	Included in the construction cost
		• Prepare livestock movement routes.	Implementation Status	None	Project Implementation Area	• Contractor	Prior to commencement of construction	Included in the construction cost
		• Do not obstruct local residents from collecting driftwood for fuel along riverbanks.	Countermeasures Status	None	Project Implementation Area	• Contractor	as needed	Included in the construction cost

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No	Item	Mitigation Measures	Item	Standard	Location	Implementing Organization	Duration and Frequency	Cost
15	Land Use and Regional Utilization of resources	• Keep the construction yard as compact as possible.	Implementation Status	None	Project Implementation Area	• Contractor	Prior to commencement of construction	Contractor's responsibility
		• Obtain gravel from existing quarries; do not quarry from rivers.	Implementation Status	None	Project Implementation Area	• Contractor	Daily	Contractor's responsibility
		• Provide livestock movement routes.	Installation Status	None	Project Implementation Area	• Contractor	Prior to the start of construction	Contractor's responsibility
		• Do not interfere with local residents collecting driftwood for fuel on riverbanks.	Countermeasures Status	None	Project Implementation Area	• Contractor	Daily	Contractor's responsibility
19	Uneven Distribution of Damage and Benefits	• Ensure transparency in the selection of construction workers.	Implementation Status	None	—	• Contractor	Daily	Contractor's responsibility
20	Local conflicts of interest	• Ensure transparency in the selection of workers.	Implementation Status	None	—	• Contractor	Daily	Contractor's responsibility
		• During construction, consult with community residents and implement measures to prevent livestock from entering the settlement.	Countermeasures Status	None	Project Implementation Area and Surroundings	• Contractor	Prior to the start of construction	Contractor's responsibility
21	Infectious Diseases such as HIV/AIDS	• Strictly prohibit drug use.	Implementation Status	None	—	• Contractor	as needed	Contractor's responsibility
		• Conduct HIV/AIDS awareness campaigns.	Implementation Status	None	—	• Contractor	Prior to the start of construction	Contractor's responsibility
		• Work to gather the latest information on the occurrence of infectious diseases.	Implementation Status	None	—	• Contractor	as needed	Contractor's responsibility
		• Collaborate with local hospital medical staff regarding matters such as the necessity of vaccinations.	Implementation Status	None	—	• Contractor	as needed	Contractor's responsibility
22	Children's Rights	• Thoroughly verify the age of workers during selection.	Implementation Status	None	—	• Contractor	Prior to the start of construction	Contractor's responsibility
		• Comply with the Labor Law of the Kyrgyz Republic and prohibit the employment of individuals under 16 years of age. For those aged 16 to under 18, prohibit their engagement in hazardous work, night work, or overtime work.	Implementation Status	None	—	• Contractor	Daily	Contractor's responsibility
26	Gender	• Ensure compensation is distributed equally between genders.	Compensation Status	None	—	• Contractor	Prior to the start of construction	Contractor's responsibility
		• Include provisions prohibiting gender-based wage discrimination and sexual harassment in construction contracts.	Implementation Status	None	—	• Contractor	Prior to the start of construction	Contractor's responsibility
		• Monitor contractors' wage payment records.	Wage payment status	None	—	• Contractor	Monthly	Contractor's responsibility
		• Provide separate changing rooms and restrooms for men and women at construction sites.	Installation Status	None	Within the yard	• Contractor	Prior to the start of construction	Contractor's responsibility
28	Working Environment (including occupational safety)	• Develop a safety management plan to ensure work safety and worker protection.	Implementation Status	None	—	• Contractor	Prior to commencement of construction	Contractor's responsibility

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No	Item	Mitigation Measures	Item	Standard	Location	Implementing Organization	Duration and Frequency	Cost
		• Conduct safety training.	Implementation Status	None	—	• Contractor	Prior to commencement of construction	Contractor's responsibility
		• Ensure strict compliance with wearing work clothes, safety shoes, protective eyewear, gloves, helmets, etc.	Implementation Status	None	—	• Contractor	Daily	Contractor's responsibility
		• Establish an emergency response system.	Implementation Status	None	—	• Contractor	Prior to commencement of construction	Contractor's responsibility
29	Community Health, Safety, and Security (including accidents)	• To ensure traffic safety in the area, road signs and pavement markings will be installed.	Implementation Status	None	—	• Contractor	Prior to commencement of construction	Contractor's responsibility
		• Residents will be informed about the construction plan.	Implementation Status	None	—	• Contractor	Prior to commencement of construction	Contractor's responsibility
30	Transboundary Impacts and Climate Change	• During severe winter conditions, concrete placement will be avoided to account for potential delays in strength development.	Implementation Status	None	—	• Contractor	Prior to commencement of construction	Contractor's responsibility
		• Flooding will prevent riverbed construction work.	Implementation Status	None	—	• Contractor	Prior to commencement of construction	Contractor's responsibility

【During Operation】

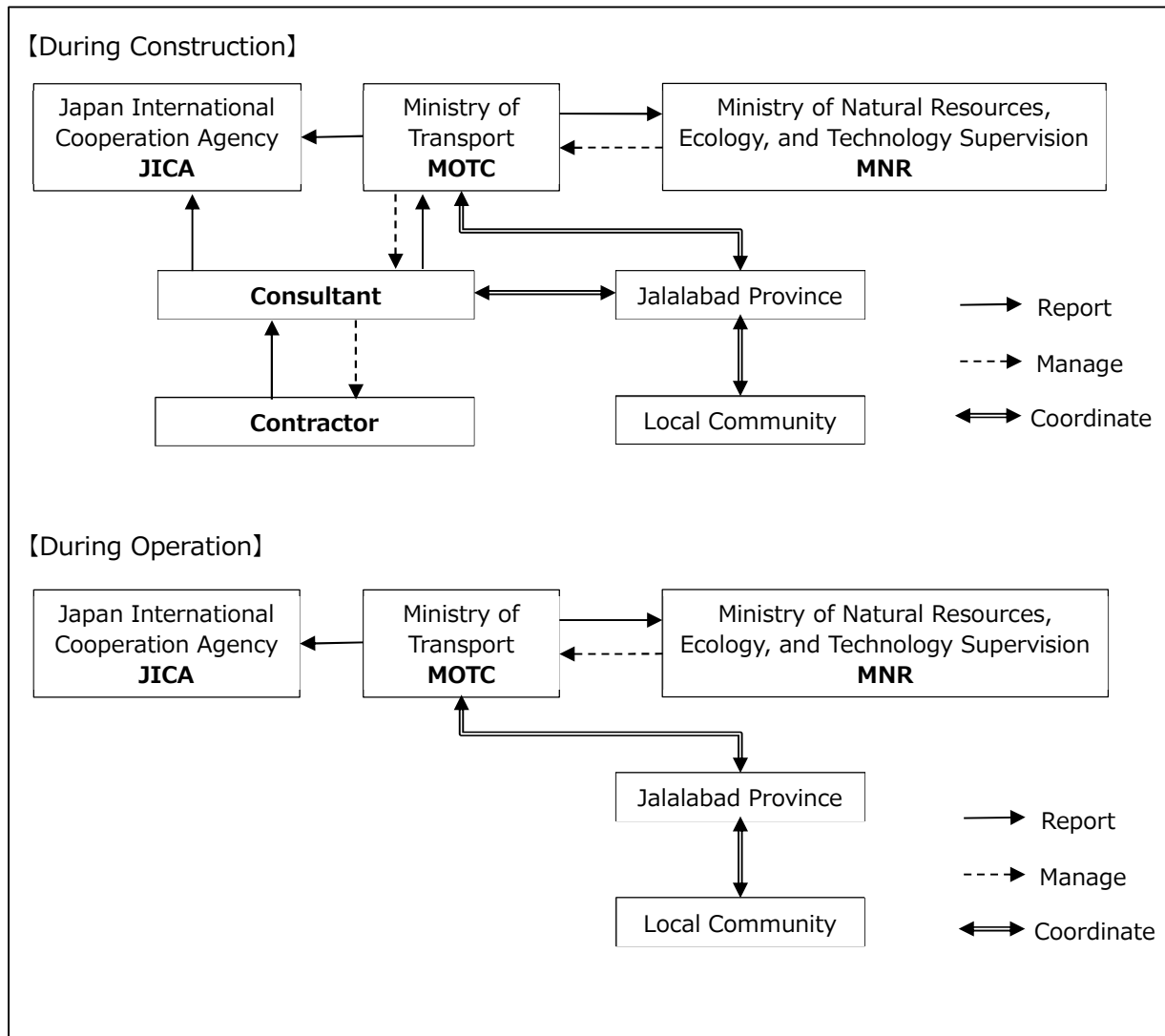
No	Item	Mitigation Measures	Item	Standard	Location	Implementing Organization	Duration and Frequency	Cost
1	Air Pollution	• Conduct baseline surveys regularly. If conditions deteriorate beyond baseline values, investigate the cause and implement necessary countermeasures.	• Sulfur dioxide • Nitrogen dioxide • Carbon monoxide • Particulate matter	Sanitary Standard No. 17 “Maximum Allowable Concentrations of Pollutants in Ambient Air in Populated Areas”	Project Implementation Area: 1 location	• MOTC	Every six months	3,000 USD/time
2	Water Quality	• Conduct baseline surveys regularly. If conditions deteriorate beyond baseline values, investigate the cause and implement necessary countermeasures.	• Ammonia nitrogen • Hydrogen ion concentration • Transparency • Dissolved oxygen • Suspended solids • Oils and fats	Sanitary Standard “Maximum Allowable Concentrations of Chemical Substances in Water for Domestic Use, Drinking Water, Cultural Water, and Domestic Water Areas”	Project Implementation Area: 1 location	• MOTC	Every six months	2,500 USD/time
5	Noise and Vibration	• Conduct baseline surveys regularly. If conditions deteriorate beyond baseline values, investigate the cause and implement necessary countermeasures.	• Noise level • Vibration level	Sanitary Standard “Noise in Workplaces, Dwellings, Public Buildings, and Residential Areas” Sanitary Standard “Industrial Vibration, Vibration in Dwellings and Public Buildings”	Project Implementation Area: 1 location	• MOTC	Every six months	2,000 USD/time
10	Biodiversity and Ecosystem Services	• Monitor the condition of transplanted trees regularly.	Condition of Trees	None	Transplant Site	• MOTC	Monthly	Contractor's responsibility
11	Water Features	• Conduct regular visual monitoring.	Scouring Conditions	None	Project Implementation Area	• MOTC	Monthly	Contractor's responsibility

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No	Item	Mitigation Measures	Item	Standard	Location	Implementing Organization	Duration and Frequency	Cost
		<ul style="list-style-type: none"> If a serious problem occurs, investigate the cause and implement countermeasures. 	Piers and Retaining Walls	None	Project Implementation Area	•MOTC	Monthly	Contractor's responsibility
		<ul style="list-style-type: none"> If driftwood accumulates, promptly remove it. 	Driftwood Accumulation	None	Project Implementation Area	•MOTC	Monthly	Contractor's responsibility
12	Topography and Geology	<ul style="list-style-type: none"> Install drainage facilities to ensure proper rainwater drainage, preventing rainwater from infiltrating the embankment and causing its collapse. 	Drainage conditions, etc.	None	Project Implementation Area	•MOTC	Monthly	Contractor's responsibility
		<ul style="list-style-type: none"> Plant vegetation to enhance slope stability. 	Plant establishment status, etc.	None	Project Implementation Area	•MOTC	Monthly	Contractor's responsibility
14	Lifestyle and Livelihood	<ul style="list-style-type: none"> Install concrete blocks at the current Naryn River Bridge to prevent vehicle intrusion. 	Vehicle intrusion status	None	Project Implementation Area	•MOTC	Monthly	Contractor's responsibility

1-2-1-12 EMP and EMoP Implementation Framework

The implementation framework for the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) during construction and operation is as shown in Figure 1-2-17.



Source: JICA Study Team

Figure 1-2-17 Implementation Framework for the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP)

1-2-1-13 Stakeholder Consultation

In this project, MOTC representatives, with the cooperation of local authorities, identified affected residents, residents of Kara-Jigachi Village and Uchtelek Village in Toktogul District, as well as the Uchtelek Village Chief, the Village Council Chairperson, and the Elders' Council Chairperson as local stakeholders. The timing and location of the meetings were announced, and two local stakeholder meetings have been held to date. During these two meetings, no particular objections to the project were raised. Instead, gratitude and welcome were expressed for the project's implementation. Several questions and suggestions regarding the project were raised, but these can already be addressed within the current plan, and no new items need to be incorporated into the plan. A third local stakeholder meeting is scheduled to be held before construction commences. The results of the local stakeholder meetings held to date and the schedule for future meetings are shown in Table 1-2-32.

Table 1-2-32 Local Stakeholder Meeting Record

No. of times	Date	Place	Number of participants	Content of the discussion	Main Opinions and Responses
1st Public Hearing	December 26, 2024	Toktogul District State Government Office Building	Male: 25 Female: 1 Total: 26	<ul style="list-style-type: none"> • Current Status of the Narim Bridge • Provision of Project Information (Project Implementation Objectives, Introduction of JICA Support, Project Overview and Feasibility) • Environmental Impact Assessment (EIA Necessity, Scoping Proposal) 	<ul style="list-style-type: none"> • The current Naryn Bridge is deteriorating, so we welcome the plan to construct a new bridge. We are prepared to provide support as needed. • We understand the MOTC's policy not to demolish the current Naryn Bridge, but we wish to inform you that a plan to install water pipes alongside the existing bridge has already been approved. • We propose installing sidewalks on the new Naryn Bridge for students commuting to school. • We request consideration of the load capacity for transporting materials to the Kanbal-Ata Hydropower Plant on the new Naryn Bridge.
2 nd Public Hearing	March 6, 2025	Toktogul District State Government Office Building	Male: 31 Female: 1 Total: 32	<ul style="list-style-type: none"> • Report on baseline survey results • Explanation of environmental impact assessment results and mitigation measures • Explanation regarding land acquisition and compensation 	No particular issues.
3 rd Public Hearing	To be conducted prior to the commencement of construction work	Toktogul District State Government Office Building	Undetermined	Detailed information about the project.	—



Photo 1-2-21 1st Stakeholder Meeting



Photo 1-2-22 2nd Stakeholder Meeting

1-2-2 Land Acquisition and Resettlement

1-2-2-1 Necessity of Land Acquisition and Resettlement

A settlement exists on the south side of the project site (left bank of the upper Naryn River). The road targeted in this project falls under Category III classification in Kyrgyzstan. Under the Road Act, the right-of-way (ROW) width is 30 m, thus requiring the acquisition of part of the settlement land for project implementation. However, this plan confirms the policy to secure only the land width necessary for the alignment of the replacement bridge and approach roads, in order to avoid or minimize land acquisition and resettlement.

1-2-2-2 Legal Framework for Land Acquisition and Resettlement

(1) Overview of the Kyrgyz legal system regarding land acquisition and Resettlement

The domestic laws and regulations related to environmental and social considerations in the Kyrgyz Republic are as shown in Table 1-2-17. Among these, the overview of laws pertaining to land acquisition and resettlement is as follows.

1) Constitution of the Kyrgyz Republic

The Constitution of the Kyrgyz Republic establishes and protects rights of the property owners, determines the types of property and provides the possibility of the property seizure for public needs specified through the legislation of the Kyrgyz Republic. Article 15 of the Constitution of the Kyrgyz Republic provides that the property is inviolable and no one may be arbitrarily deprived of his/her property. Property acquisition for public needs defined by the law may be made through a court decision with fair and preventive security for the reimbursement of the value of this property and other losses incurred as a result of the expropriation. The Constitution of the Kyrgyz Republic determines that land may also be in private, municipal and other forms of ownership, with the exception of pastures, which cannot be privately owned.

2) Civil Code of the Kyrgyz Republic

This law is a comprehensive legal framework designed to protect assets and individual rights, ensuring fairness, freedom, and legal certainty in civil society. Article 14 of this law stipulates that a party whose rights are violated can claim full compensation for its losses, unless the national legislation or agreements (contracts) prepared in line with the national legislation indicate the contrary. The article 15 provides compensation for losses caused by state bodies and local authorities. Articles 233-17 and 233-18 define acquisition of the owner's land for public needs. A land plot may be taken from the owner for public needs on the basis of a court decision with reimbursement of its value and other losses caused by its expropriation.

3) Land Code of the Kyrgyz Republic

This law establishes the legal framework governing the ownership, use, protection, and management of land in the Kyrgyz Republic, with the aim of achieving a balance between economic development, environmental protection, and the rights of citizens and local communities. Article 68, Paragraph 1 of this law stipulates that land can be acquired (purchased) for state and public purposes based on agreement between the authorized body and land owner or land user. In case the land owner or land user disagrees with the acquisition (purchase), the authorized body can, within 2 months, appeal to the court with the request to make the land acquisition with the payment of compensation for the land to the owner or land user. And Article 68, Paragraph 3 stipulates that when determining the compensation for the land being acquired, it (compensation) should reflect the market value of the right to the land and associated structures, losses that the land owner or land user incurs and liabilities to the third parties. And Article 68, Paragraph 4 stipulate that when acquiring the land for state or public purposes with the consent of the land owner/user, a replacement land with the same value can be allocated as an in-kind compensation for the land acquired. And Article 66 stipulates that the acquisition of the land can be affected only after compensating the costs of the rights termination and associated costs.

4) Law of the Kyrgyz Republic about Management of Agricultural Land

The law on the management of agricultural land regulates legal matters of agricultural land management and is aimed at ensuring the efficient and safe use of land. Article 30 of this law provides that the land allotments/shares (part of the jointly owned agricultural land plots) and agricultural land plots owned by citizens of the Kyrgyz Republic, in cases required by the state objectives (construction of strategic facilities and engineering structures), may be acquired by decision of the Government of the Kyrgyz Republic only after payment of the market value of land and other related costs or the provision of an equivalent plot of land from the State-owned Agricultural Land Reserve. Article 31 provides that the owners of land shares and agricultural plots, under unconvincing arguments for the expropriation of their lands for state purposes, have the right to apply to the court. Article 32 provides that the agricultural land owned by the state and leased out shall be expropriated for state purposes after payment to the tenant (lessee) of the estimated compensation for losses occurred at the time of the expropriation.

5) Law of the Kyrgyz Republic about State Registration of the Rights to Real Estate and Transactions with it

This law was established to form the legal foundation for a transparent and secure real estate market in the Kyrgyz Republic. Article 31 provides that the right to immovable property and related transactions enters into legal force after the registration of the relevant title and title documents. From the moment the registration enters into legal force, the state recognizes and ensures the protection of registered rights and related transactions in the manner prescribed by the Law.

6) Law of the Kyrgyz Republic on the Procedure for Considering Citizens' Appeals

This law guarantees that all citizens of the Kyrgyz Republic have the legal right to submit complaints, requests, and proposals to government agencies and receive timely, fair, and formal responses. Article 2 and 4 provides that the appeals from the Kyrgyz Republic citizens should be registered, given due consideration, and addressed in an equitable, timely and accountable manner. Article 8 provides that the appeal registered with the state agency or the local government should be processed within 14 business days from the day of registration. However, in case the special examination, additional materials or other measures, which require deadlines for grievance processing, might be extended as exception but not more than 30 calendar days.

7) Law of the Kyrgyz Republic on Valuation Activity

This law establishes a legal framework to ensure transparency and fairness in the valuation of various assets, including real estate. It stipulates the procedures for asset valuation, the methods to be used, and the requirements for valuation reports.

8) Order of the Government of the Kyrgyz Republic about Approval of the Standards of Assessment of Property Obligatory to Application by All Subjects of Estimative Activities in the Kyrgyz Republic

This law was enacted to ensure consistency, transparency, and professionalism in appraisal activities across various sectors within the Kyrgyz Republic. It establishes mandatory real estate appraisal standards applicable to all appraisal professionals and organizations operating within Kyrgyz.

(2) Policy on Resettlement

The policy for resettlement in this project follows JICA Guidelines. However, as JICA GL states, “JICA confirms that environmental and social considerations of a project do not deviate significantly from the World Bank’s environmental and social policies”, the JICA GL has been supplemented based on the World Bank Environmental and Social Standards (ESS5). The policy for resettlement in this project is as shown in Table 1-2-33.

Table 1-2-33 Policy on Resettlement in this Project

Guideline	Policy on Resettlement
JICA GL	<p>1. Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. If avoidance is not possible even after such examination, effective measures to minimize impacts and to compensate for losses must be taken upon agreement with the affected people.</p> <p>2. Project affected people, such as people to be resettled involuntarily and/or people who may lose their livelihoods by the project, must be provided sufficient compensation and supports by the project proponents in a timely manner. Compensation must be calculated at full replacement cost as much as possible and provided in advance. Project proponents must make efforts for the affected people to improve or at least restore their standards of living, income opportunities and production levels to the pre-project levels. Measures to achieve this may include: Providing land or monetary compensations for losses of land or assets, supporting for alternative sustainable livelihood, supporting for expenses necessary for relocation, and supporting for re-establishment of communities at resettlement sites.</p> <p>3. Compensation standards are disclosed and consistently applied. The project affected people need to be aware of the compensation standards. In principle, the contents of the individual compensation to be agreed are explained to the project affected persons in writing, and the project affected persons can confirm the contents at any time.</p> <p>4. Appropriate participation of the project affected people, and their communities must be promoted in the planning, implementation and monitoring of measures against involuntary resettlement and loss of livelihood.</p> <p>5. For projects that result in large-scale involuntary resettlement, Resettlement Action Plans (RAP) must be prepared and made available to the public prior to the resettlement and provision of compensation and support. In preparing the RAP, consultations must be held with the project affected people and communities, based on sufficient information made available to them in advance. When consultations are held, explanations must be given in languages and forms that are understandable to the project affected people.</p>
World Bank Environmental and Social Standards (ESS)	<p>1. (omitted) the Borrower will, as part of the environmental and social assessment, conduct a census to identify the persons who will be affected by the project, to establish an inventory of land and assets to be affected to determine who will be eligible for compensation and assistance and to discourage ineligible persons, such as opportunistic settlers, from claiming benefits.</p> <p>Affected persons may be classified as persons:</p> <ul style="list-style-type: none"> (a) Who have formal legal rights to land or assets; (b) Who do not have formal legal rights to land or assets, but have a claim to land or assets that is recognized or recognizable under national law; or (c) Who have no recognizable legal right or claim to the land or assets they occupy or use. <p>(omitted) the Borrower will offer affected persons compensation at replacement cost, and other assistance as may be necessary to help them improve or at least restore their standards of living or livelihoods, subject to the provisions of paragraphs 26 through 36 of this ESS.15</p> <p>3. Where livelihoods of displaced persons are land-based,16 or where land is collectively owned, the Borrower will offer the displaced persons an option for replacement land in accordance with paragraph 35(a), unless it can be demonstrated to the Bank's satisfaction that equivalent replacement land is unavailable</p> <p>4. Transitional support will be provided as necessary to all economically displaced persons, based on a reasonable estimate of the time required to restore their income-earning capacity, production levels, and standards of living.</p> <p>5. Particular attention will be paid to gender aspects and the needs of the poor and the vulnerable.</p> <p>6. The Borrower will prepare a plan proportionate to the risks and impacts associated with the project:</p>

(3) Comparison between JICA GL and Kyrgyz Legal System

The results of comparing the requirements JICA GL and the partner country demand with Kyrgyz legal frameworks concerning land acquisition and resettlement, identifying any gaps, and clarifying this project's resettlement policy are shown in Table 1-2-34.

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Table 1-2-34 Comparison of JICA GL and Kyrgyz Legal Systems

No.	JICA Guideline	Laws of the Kyrgyz Republic	Gap between JICA GL and the Kyrgyz Republic's System.	Relocation Policy for This Project
1	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL 8.(1))	Property shall be inviolable. No one can be arbitrarily deprived of his/her property. (Article 15 of the Constitution of the Kyrgyz Republic)	The laws of the Kyrgyz Republic do not stipulate specific measures to prevent loss of livelihood.	Complies with JICA GL.
2	If avoidance is not possible even after such examination, effective measures to minimize impacts and to compensate for losses must be taken upon agreement with the affected people. (JICA GL 8.(1))	The alienation of property for public needs defined in the law may be effected upon the decision of the court with ensuring of prior and equitable compensation for the value of such property as well as for other losses incurred as a result of such alienation (Article 15 of the Constitution of the Kyrgyz Republic)	There is no gap between JICA GL and the Kyrgyz Republic's system.	Complies with JICA GL.
3	Project affected people, such as people to be resettled involuntarily and/or people who may lose their livelihoods by the project, must be provided sufficient compensations and support by the project proponents in a timely manner. (JICA GL 8.(2))	The alienation of property for public needs defined in the law may be effected upon the decision of the court with ensuring prior and equitable compensation for the value of such property as well as for other losses incurred as a result of such alienation. (Article 15 of the Constitution of the Kyrgyz Republic). A person whose right has been violated may demand full compensation for the losses caused to him. (Article 14, Civil Code of the Kyrgyz Republic).	The laws of the Kyrgyz Republic do not stipulate specific measures to prevent loss of livelihood.	Complies with JICA GL. but There are no affected people who will lose their means of livelihood due to this project.
4	Compensation must be calculated at full replacement cost as much as possible and provided in advance. (JICA GL 8.(2))	The alienation of property for public needs defined in the law may be effected upon the decision of the court with ensuring prior and equitable compensation for the value of such property as well as for other losses incurred as a result of such alienation. (Article 15 of the Constitution of the Kyrgyz Republic). Compensation of losses is based at market value. (Article 14, Civil Code of the Kyrgyz Republic)	There is no gap between JICA GL and the Kyrgyz Republic's system.	Complies with JICA GL.
5	Project proponents must make efforts for the affected people to improve or at least restore their standards of living, income opportunities and production levels to the pre-project levels. (JICA GL 8.(2))	There is no applicable legal provision.	The laws of the Kyrgyz Republic don't stipulate measures for improving or restoring livelihood standards, income opportunities, or levels of production.	Complies with JICA GL, there are no affected people who will lose their standard of living or income opportunities due to this project.
6	Measures to achieve this may include: Providing land or monetary compensation for losses of land or assets, supporting alternative sustainable livelihood, supporting for expenses necessary for relocation, and supporting for re-establishment of communities at resettlement sites.	Property may be acquired from the owner after payment of compensation for losses caused by the acquisition. (Article 284, Civil Code of the Kyrgyz Republic)	The laws of the Kyrgyz Republic do not stipulate provisions regarding support for sustainable alternative livelihoods, support for relocation costs, or support for reconstruction of communities at	Complies with JICA GL, there are no affected people who will lose their standard of living or income opportunities due to this project, nor are

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	JICA Guideline	Laws of the Kyrgyz Republic	Gap between JICA GL and the Kyrgyz Republic's System.	Relocation Policy for This Project
	(JICA GL 8.(2))		relocation sites.	there any affected people requiring relocation.
7	Compensation standards are disclosed and consistently applied. The project affected persons need to be aware of the compensation standards. (JICA GL 8.(3))	Everyone shall have the right to obtain information on the activity of state authorities, local self-governance bodies as well as officials thereof, legal entities with the participation of state authorities and local self-governance bodies as well as organizations financed from the republican and local budgets. (Article 33 of the Constitution of the Kyrgyz Republic). Public authorities shall inform the public about the acquirement and allocation of land for the facilities whose activities affect the interests of the population. (Article 51, Land Code of the Kyrgyz Republic).	There is no gap between JICA GL and the Kyrgyz Republic's system.	Complies with JICA GL.
8	In principle, the contents of the individual compensation to be agreed are explained to the project affected persons in writing, and the project affected persons can confirm the contents at any time. (JICA GL 8.(3))			
9	For projects that result in large-scale involuntary resettlement, Resettlement Action Plans (RAP) must be prepared and made available to the public prior to the resettlement and provision of compensation and support. (JICA GL 8.(5))			
10	In preparing the RAP, consultations must be held with the project affected people and communities, based on sufficient information made available to them in advance. (JICA GL 8.(5))			
11	When consultations are held, explanations must be given in languages and forms that are understandable to the project affected people. (JICA GL 8.(5))	In the Kyrgyz Republic, Kyrgyz and Russian are designated as official languages. The use of these official languages (Kyrgyz and Russian) is mandatory in the activities of state agencies, local governments, enterprises, organizations, and entities of all forms of ownership. (Article 1 and 3 of the Constitution of the Kyrgyz Republic).	There is no gap between JICA GL and the Kyrgyz Republic's system.	Complies with JICA GL. This project is typically conducted in Kyrgyz and Russian.
12	Appropriate participation of the project affected people and their communities must be promoted in the planning, implementation and monitoring of measures against involuntary resettlement and loss of livelihood. (JICA GL 8.(4))	Citizens of the Kyrgyz Republic and their associations have the right to participate in the consideration of the use and protection of land affecting interests of the population, through meetings, assemblies and other forms Citizens of the Kyrgyz Republic and their public associations assist public authorities in the implementation of measures for land use and protection and improvement of environmental protection. (Article 51, Land Code of the Kyrgyz Republic)	There is no gap between JICA GL and the Kyrgyz Republic's system.	Complies with JICA GL.
13	A mechanism for handling concerns and grievances from people and communities affected by the project's environmental and social impacts must be in place. (JICA GL 11.(1))	Each state institution / ministry and local authorities should determine the process of registration and consideration of problems and claims of citizens. (Article 4. Law of the Kyrgyz Republic on the procedure for considering citizens' appeals)	There is no gap between JICA GL and the Kyrgyz Republic's system.	Compliance with JICA GL. In this project, a grievance redress mechanism (GRM) will be

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	JICA Guideline	Laws of the Kyrgyz Republic	Gap between JICA GL and the Kyrgyz Republic's System.	Relocation Policy for This Project
				established in accordance with both guidelines.
14	Where land acquisition or restrictions on land use are unavoidable, the Borrower will, as part of the environmental and social assessment, conduct a census to identify the persons who will be affected by the project, to establish an inventory of land and assets to be affected, to determine who will be eligible for compensation and assistance, and to discourage ineligible persons, such as opportunistic settlers, from claiming benefits. (ESS5 Para. 20)	There is no applicable legal provision.	Although there is no corresponding legal provision, a census is typically conducted. Furthermore, under the law of the Kyrgyz Republic About state registration of the rights to real estate and transactions with it , ineligible persons cannot assert any benefit.	Complies with ESS5.
15	Affected persons may be classified as persons: (a) Who have formal legal rights to land or assets; (b) Who do not have formal legal rights to land or assets, but have a claim to land or assets that is recognized or recognizable under national law;14 or (c) Who have no recognizable legal right or claim the land or assets they occupy or use. The census described in paragraph 20 will establish the status of the affected persons. (ESS5 Para. 10) When land acquisition or restrictions on land use (whether permanent or temporary) cannot be avoided, the Borrower will offer affected persons compensation at replacement cost, and other assistance as may be necessary to help them improve or at least restore their standards of living or livelihoods, subject to the provisions of paragraphs 26 through 36 of this ESS.1. (ESS5 Para. 12)	Rights to real estate and related transactions take legal effect upon registration of the relevant ownership and title documents. From the moment they take legal effect, the state acknowledges and guarantees the protection of the registered rights and related transactions. (Article 30, Law of the Kyrgyz Republic About state registration of the rights to real estate and transactions with it)	In the Kyrgyz Republic, people in categories (b) or (c) are not considered affected people, nor is the provision of other assistance to improve or at least restore their standard of living or livelihoods stipulated.	Affected residents comply with the ESS5 definition; however, among affected people, those using state-owned land irregularly retain claims regarding residences and trees on that land but are not entitled to land compensation.
16	Where livelihoods of displaced people are land-based, or where land is collectively owned, the Borrower will offer the displaced persons an option for replacement land in accordance with paragraph 35(a), unless it can be demonstrated to the Bank's satisfaction that equivalent replacement land is unavailable. (ESS5 Para. 14)	When a land plot is acquired for state or public needs with the consent of the landowner or land user, another land plot may be provided to him/her with the offset of value of the rights to it at the redemption (replacement) price (Article 68, Land Code of the Kyrgyz Republic)	There is no gap between ESS5 and the Kyrgyz Republic's system.	Complies with ESS5.

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

No.	JICA Guideline	Laws of the Kyrgyz Republic	Gap between JICA GL and the Kyrgyz Republic's System.	Relocation Policy for This Project
17	Transitional support will be provided as necessary to all economically displaced people, based on a reasonable estimate of the time required to restore their income-earning capacity, production levels, and standards of living. (ESS5 Para. 36)	There is no applicable legal provision.	There are no provisions for restoring income-earning capacity, production levels, and living standards.	Complies with ESS5, but no affected people will lose their standard of living or income opportunities due to this project.
18	Particular attention will be paid to gender aspects and the needs of the poor and the vulnerable. (ESS5 Para. 26)	Kyrgyz Republic shall ensure the support to socially vulnerable categories of citizens, protection of labor and health. (Article 19 of the Constitution of the Kyrgyz Republic).	There is no gap between ESS5 and the Kyrgyz Republic's system.	Complies with ESS5.
19	The Borrower will prepare a plan proportionate to the risks and impacts associated with the project: (ESS5 Para. 21)	In the Kyrgyz Republic, incorporating an environmental monitoring plan as part of the environmental impact assessment documentation is mandatory. (Article 23, Regulations on procedure for evaluating impact on the environment in the Kyrgyz Republic)	There is no gap between ESS5 and the Kyrgyz Republic's system.	Complies with ESS5.

(4) Land Acquisition and Resettlement Policy

The land acquisition and resettlement policy for this project shall be as follows. Where gaps exist between Kyrgyz's legal framework for land acquisition and resettlement and JICA's policy, a feasible and mutually agreeable approach consistent with Kyrgyz government practice and JICA policy shall be developed.

1. Land acquisition and involuntary resettlement will be avoided where feasible, or minimized, by identifying possible alternative project designs that have the least adverse impact on the communities in the project area.
2. Where displacement of households is unavoidable, all PAPs (including communities) losing assets, livelihoods or resources will be fully compensated and assisted so that they can improve, or at least restore, their former economic and social conditions.
3. Compensation and rehabilitation support will be provided to any PAPs, that is, any person or household or business which on account of project implementation would have his, her or their:
 - Standard of living adversely affected.
 - Right, title or interest in any house, interest in, or right to use, any land (including premises, agricultural and grazing land, commercial properties, tenancy, or right in annual or perennial crops and trees or any other fixed or moveable assets, acquired or possessed, temporarily or permanently.
 - Income earning opportunities, business, occupation, work or place of residence or habitat adversely affected temporarily or permanently; or
 - Social and cultural activities and relationships affected or any other losses that may be identified during the process of resettlement planning.
4. All affected people will be eligible for compensation and rehabilitation assistance, irrespective of tenure status, social or economic standing and any such factors that may discriminate against achievement of the objectives outlined above. Lack of legal rights to the assets lost or adversely affected tenure status and social or economic status will not bar the PAPs from entitlements to such compensation and rehabilitation measures or resettlement objectives. All PAPs residing, working, doing business and/or cultivating land within the project impacted areas as of the date of the latest census and inventory of lost assets (IOL), are entitled to compensation for their lost assets (land and/or non-land assets), at replacement cost, if available and restoration of incomes and businesses, and will be provided with rehabilitation measures sufficient to assist them to improve or at least maintain their pre-project living standards, income-earning capacity and production levels.

5. PAPs that lose only part of their physical assets will not be left with a portion that will be inadequate to sustain their current standard of living.
6. People temporarily affected are to be considered PAPs and resettlement plans address the issue of temporary acquisition.
7. The resettlement plans will be designed in accordance with the Kyrgyz Republic's national policy and legislation and JICA's Policy on Involuntary Resettlement.
8. The Resettlement Plan will be translated into local languages and disclosed for the reference of PAPs as well as other interested groups.
9. Payment for land and/or non-land assets will be based on the principle of replacement cost.
10. Resettlement assistance will be provided not only for immediate loss, but also for a transition period needed to restore livelihood and standards of living of PAPs. Such support could take the form of short-term jobs, subsistence support, salary maintenance, or similar arrangements.
11. The resettlement plan must consider the needs of those most vulnerable to the adverse impacts of resettlement (including the poor, those without legal title to land, ethnic minorities, women, children, elderly and disabled) and ensure they are considered in resettlement planning and mitigation measures identified. Assistance should be provided to help them improve their socio-economic status.
12. PAPs will be involved in the process of developing and implementing resettlement plans.
13. PAPs and their communities will be consulted about the project, the rights and options available to them, and proposed mitigation measures for adverse effects, and to the extent possible be involved in the decisions that are made concerning their resettlement.
14. Adequate budgetary support will be fully committed and made available to cover the costs of land acquisition (including compensation and income restoration measures) within the agreed implementation period. The funds for all resettlement activities will come from the Government.
15. Displacement does not occur before provision of compensation and of other assistance required for relocation. Acquisition of assets, payment of compensation, and the resettlement and start of the livelihood rehabilitation activities of PAPs, will be completed prior to any construction activities, except when a court of law orders so in expropriation cases.
16. Appropriate reporting (including auditing and redress functions), monitoring and evaluation mechanisms, will be identified and set in place as part of the resettlement management system.

1-2-2-3 Scale and Scope of Land Acquisition and Resettlement

(1) Census

In this project, February 10, 2025, the start date of the census survey was set as the cut-off date. To ensure transparency and clarity in the process of identifying affected people and granting eligibility, this date was formally disclosed to affected people and other stakeholders during stakeholder meetings and public meetings. The results of the census survey covering all affected people in the project area are shown in Table 1-2-35. The survey identified three affected households and 16 affected people within the project area. Among these unaffected households, two households on the left bank of the Naryn River are relatives.

Table 1-2-35 Result of Census Survey

Household Number	Head of household	Location	Affected people
1	Myrzabay Mokuev	Kara-Zhygach village (the right bank of the Naryn River)	6
2	Kubanychbek Chokogulov	Uch-Terek village (the left bank of the Naryn River)	6
3	Nazgul Sultanalieva	Uch-Terek village (the left bank of the Naryn River)	4
Total			16

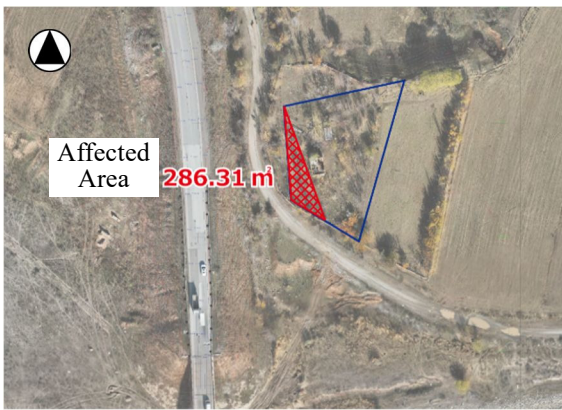
(2) Assets Survey

1) Land plots

The results of the asset and land survey indicate that the land subject to acquisition and resettlement for this project is as shown in Table 1-2-36 and Figure 1-2-18. The land plot (No. 1) on the right bank of the Naryn River is a state-owned registered agricultural land plot, but it is not currently used for agricultural purposes. A portion of this land plot, 286.31 m², is subject to land acquisition for this project. The land plot (No. 2) on the left bank of the Naryn River is an informal land plot voluntarily used as residential land; 262 m² of it is subject to land acquisition for this project. Land plot (No. 3) is also informal land, with 413 m² subject to acquisition for this project. Note that the owner of land plot (No. 2) and land plot (No. 3) is the same household head (household number 2). This owner lives in a separate, legally registered land plot and residence. Land plot (No. 4) is a legal plot with a total area of 100 m² and is subject to acquisition for this project. Although registered for commercial use, no commercial activity has been conducted on this plot for over seven years. The affected household of land plot (No. 4) also owns another land plot and residence where they currently live.

Table 1-2-36 Assets Survey (Land plot)

Affected Land plot	Household Number	Land Use	The Status of Law	Affected Area (m ²)	Total (m ²)
No. 1	1	Agricultural land	Formal	286.31	286.31
No. 2	2	State-owned land	Informal	262	675
No. 3	2	State-owned land	Informal	413	
No. 4	3	Commercial use	Formal	100	100
Total					1,061.31



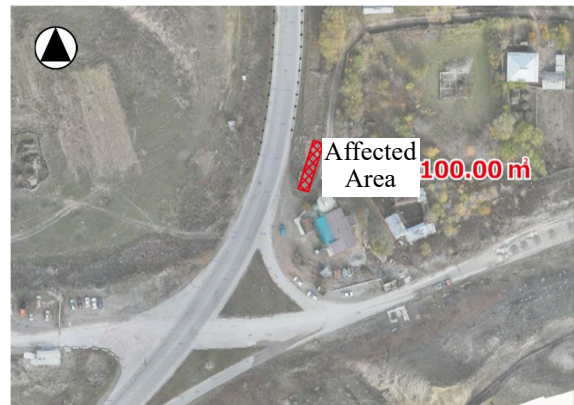
Land Plot (No.1)



Land Plot (No.2)



Land Plot (No.3)



Land Plot (No.4)

Figure 1-2-18 Land Subject to Acquisition for this Project

2) Structure

The structures subject to land acquisition and resettlement under this project are as shown in Table 1-2-37 and Photo 1-2-23 to Photo 1-2-27. On the left bank of the Naryn River, within land plot No. 2, one non-residential building with an area of 55.2 m² has been identified. This non-residential building is

used as a warehouse during the summer and for family events. It has electricity for lighting but lacks heating equipment and water supply facilities. The walls are brick, the floor is wooden, and the roof is metal sheeting. The pediment (the triangular section enclosed by the lower part of the gable roof and the horizontal beam) is open. Approximately 21.38 m² of this non-residential building is within the ROW. However, the remaining portion after demolition of this section would be unusable as a building, and due to its proximity to the project area, it is planned for complete demolition. Other structures include a dilapidated brick fence, 0.3 to 0.9 meters high, along the boundary with the road in land plot No. 1. Additionally, land plot No. 2 has a 1-meter-high fence made of tree branches, and land plot No. 3 has a 1.2-meter-high concrete fence. A prefabricated structure is installed on land plot No. 2, but it is currently unused and does not serve as a livelihood source. In Kyrgyz, movable structures like prefabricated buildings are typically relocated by construction contractors to locations specified by the owner.

Table 1-2-37 Assets Survey (Structures)

Affected Land Plot	Household Number	Types of Structures	Affected Area (m ²)	Total (m ²)
No. 1	1	Adobe fence (Height: 0.3–0.9 m)	57	57
No. 2	2	Building (non-residential)	55.2	103.2
		Wooden fence (Height: 1.0 m)	48	
No. 3	2	Concrete fence (Height: 1.0 m)	11.45	11.45
Total				171.65



Photo 1-2-23 Adobe Fence in Land Plot (No.1)



Photo 1-2-24 Non-residential Building in Land Plot (No.2)



Photo 1-2-25 Wooden Fence in Land Plot (No.2)

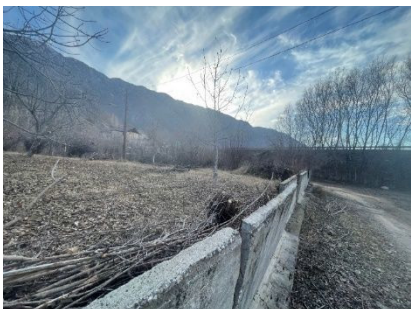


Photo 1-2-26 Concrete Fence in Land Plot (No.3)



Photo 1-2-27 Pavilion in Land Plot (No.4)

3) Trees

The trees subject to acquisition and relocation of residents under this project are as shown in Table 1-2-38 and Photo 1-2-28 to Photo 1-2-30. In the land plot (No.1) on the right bank of the Naryn River, 17 trees of poplar and karagach species were confirmed. In the land plot (No. 2) on the left bank of the Naryn River, 21 trees of the genus Karatal were confirmed. Additionally, in land plot (No. 3), 15 trees of the genus Karatal were confirmed. All trees confirmed in this survey are deciduous trees that do not bear fruit.

Table 1-2-38 Assets Survey (Trees)

Affected land plot	Household Number	Tree Species	Tree height (m)	Tree diameter (cm)	Number of trees	Total
No. 1	1	Poplar	7.0	20	3	17
		Karagach	6.0	16	4	
		Karatal	6.0	16	10	
No.2	2	Karatal	7.0	40	1	21
		Karatal	6.0	16	20	
No.3	2	Karatal	6.0	16	15	15
Total						53



Photo 1-2-28 Trees in Land Plot (No.1)



Photo 1-2-29 Trees in Land Plot (No.2)



Photo 1-2-30 Trees in Land Plot (No.3)

4) Other Assets

Other assets include livestock owned by affected households. However, this project does not impact livestock fattening, and the livelihood acquisition methods of affected households remain unchanged; therefore, they are not eligible for compensation.

(3) Livelihood and Income Survey

This project conducted a socioeconomic survey of all affected people to clarify their demographic characteristics, socioeconomic status, and educational levels. The results of the livelihood and income survey are as follows.

1) Demographic characteristics

All affected households are headed by male heads of household belonging to the Kyrgyz ethnic group. Each household averages approximately five (5) members. Among the sixteen (16) affected individuals, nine (9) are female and seven (7) are male. The heads of households are aged 46 to 55, while the average age of household members is approximately 30, indicating a relatively young demographic.

2) Socioeconomic Conditions

Six (6) of the affected people are engaged in agriculture, and six (6) are self-employed, working in public institutions or in trade, commerce, and services. The remaining two (2) are mainly engaged in household duties, and two (2) are students. The primary income sources for affected households are agriculture and self-employment, with an average household income of approximately 50,000 to

Table 1-2-39 Livelihood and Income Survey

Occupation	Number of Affected People (Heads of Households)	Percentage (%)
agriculture	6 (2)	37.5%
working in public institutions, self-employment	6 (1)	37.5%
household duties	2	12.5%
students	2	12.5%
Total	16	100%

70,000 Kyrgyz Som (approximately ¥ 83,000 to 116,000). Furthermore, all affected households are adequately equipped with housing, vehicles, farmland, livestock, and other standard household goods necessary for daily life, indicating a relatively high level of material well-being. Medical, educational, and other public services are generally located within a 3 to 20 km radius of the affected households. Shops and markets are also situated nearby, making it a highly convenient area.

3) Educational level

Of the sixteen (16) affected people, eight (8) had completed primary or secondary education, and eight (8), including three (3) heads of households, held higher education degrees. The survey also indicated that the literacy rate among affected people was generally high.

4) Vulnerable groups

Vulnerable groups, such as those affected disproportionately by land acquisition and resettlement due to gender, ethnicity, age, physical or mental disability, economic disadvantage, or social status, may face limitations in resettlement support and related assistance. Therefore, land acquisition and resettlement plans shall include provisions to provide supplementary support to these groups for a specified period to ensure equitable treatment and protection. In this project, vulnerable groups are defined as those meeting the vulnerability criteria outlined below.

- ✓ Households with income below the national poverty line
- ✓ Female-headed households
- ✓ Households with at least one disabled member
- ✓ Households headed by a person aged over 65

According to the findings of the census and socio-economic survey, no vulnerable households have been identified among those currently affected by the Project.

1-2-2-4 Measures of compensation and assistance

(1) Loss Compensation

In this project, compensation for affected assets shall be based on replacement value in accordance with JICA GL, ensuring that affected people do not suffer any disadvantage. The valuation method for assets eligible for compensation under this project is as shown in Table 1-2-40.

Table 1-2-40 Specifics of Affected Assets to be Compensated

Compensable assets	Asset Valuation Policy
Agricultural Land	Compensation will be based on actual current market value that reflects recent land sales for comparable plots in similar locations. All taxes, duties, and transaction costs will be covered. Valuation is conducted using the comparative market method, based on verified local sales data. Adjustments will be made to account for differences in characteristics or terms. The estimated transaction costs are calculated in advance, depending on the size of the affected portion and the total area of the household's land. Final transaction costs will be determined during the land acquisition process by the District Cadastre State Agency.
Commercial Land	The methodology for commercial land mirrors that of agricultural land, with compensation provided at current market value, including payment of all applicable taxes, fees, and transaction-related costs. The actual transaction cost will be confirmed by the District Cadastre State Agency at the time of transaction.
Buildings (Residential and non-residential)	Compensation will be provided at full replacement cost, defined as the current cost to construct or acquire an identical asset using similar materials, design, and quality under prevailing market conditions. No deductions will be made for depreciation, salvageable materials, or any benefits gained from the Project.
Non-Land Assets (e.g., fences and other structures)	Non-land structures such as fences will be compensated at full replacement cost. In the case of movable structures (e.g., kiosks or pavilions), relocation will be arranged by the Contractor to a suitable location specified by the owner.
Non-Fruit Trees and Shrubs	Compensation will be based on the local market cost of the wood, primarily for firewood purposes. The construction contractor will cut and harvest the trees or shrubs, and the wood shall remain the property of the owner.

(2) Income Restoration Measures

In this project, relocation of affected people is not anticipated. Based on the results of the socioeconomic survey's household and living conditions survey, the property subject to compensation does not generate income, and this project will not significantly impact the livelihoods of affected people. Therefore, no Income restoration measures will be formulated.

(3) Entitlement Matrix

The entitlement matrix for land acquisition and resettlement in this project (including loss type, affected people, compensation details, and responsible compensation agencies) is shown in Table 1-2-41. Note that no vulnerable groups have been identified among the affected people in this project.

Table 1-2-41 Entitlement Matrix

No	Type of Loss	Entitled Persons	Entitlements	Implementation Issues / Guidelines	Responsible Organization
1	Loss of Agricultural and Commercial Land	Owner with registered title.	Compensation at full replacement cost, including market value, taxes, duties, and transaction costs for purchasing equivalent land.	The affected property owners holding state-registered ownership rights under “Land Code of the Kyrgyz Republic”, “the law of the Kyrgyz Republic about Management of Agricultural Land”, and “the law of the Kyrgyz Republic about state registration of real estate and transactions with it” are eligible; however, unregistered informal land owners are excluded.	MOTC
2	Loss of building (residential and non-residential).	All PAPs regardless of their legal status.	Compensation at full replacement cost, reflecting current market value, with no deductions for depreciation, salvageable materials, or any project-related benefits.	Based on “Land Code of the Kyrgyz Republic”, the loss of rights to related structures shall be compensated. However, as there are no provisions for compensation to persons without legal rights or claims to land or property, all affected people shall be covered regardless of legal status, in accordance with JICA GL and ESS5.	MOTC
3	Loss of fence.	All PAPs regardless of their legal status	Compensation at full replacement cost for the full affected structure, with no deductions for depreciation, salvageable materials, or project-related benefits.		MOTC
4	Loss of non-fruit trees and shrubs.	Owners of non-fruit trees and shrubs, regardless of the legal status of land use.	Compensation will be provided based on the local market value of the wood for firewood purposes.		MOTC
5	Assistance to Vulnerable Groups.	Vulnerability Criteria: - Income below poverty line. - Woman Head of household. - Disability of a household member - The head of the HH over 65 years of age.	One-time special allowance equal to six times the national minimum monthly wage of the Kyrgyz Republic.	In Kyrgyz, specific support measures for vulnerable groups affected by land acquisition and resettlement are not stipulated, but the following compensation is provided.	MOTC
6	Unforeseen Impact.	Concerned PAPs.	To be decided in accordance with the project resettlement policy.	—	MOTC

1-2-2-5 Implementation Framework

The implementation of land acquisition and resettlement for this project requires the involvement of various organizations, including the Ministry of Transport and Communications of the Kyrgyz Republic (MOTC), the Ministry of Finance of the Kyrgyz Republic, and other stakeholders. Table 1-2-42 summarizes the roles, responsibilities, and other aspects of each organization involved in implementing land acquisition and resettlement for this project. For this project, a District Working Group will be established, comprising representatives from the MOTC, the Toktogul District Regional Government, regional government agencies, village councils, and other stakeholders. The District Working Group

The Preparatory Survey Report on the Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

will be coordinated and led by a representative from the MOTC, supporting the implementation of the resettlement plan with the assistance of local governments.

Table 1-2-42 Implementation Framework for Land Acquisition and Resettlement

Organization	Role
Ministry of Transport and Communications of the Kyrgyz Republic (MOTC)	<ul style="list-style-type: none"> ① Reviewing and update of the RAP in accordance with the requirements and procedures described in the RAP, and its implementation ② Conducting stakeholders' meetings with PAPs, representatives of local authorities and other stakeholders ③ GRM establishing and implementation ④ RAP Publication ⑤ Monitoring implementation
Ministry of Finance of the Kyrgyz Republic	The Ministry of Finance of the Kyrgyz Republic bears overall responsibility over activity financing under the Project which are not covered by the grant aid. The Ministry will finance the RAP implementation.
Cadastre State District Agency	Cadastre State District Agency is responsible for identifying owners of affected lands and boundaries of those lands, as well as for those registrations.
State District Administration and Local authorities	Local authorities is responsible for providing assistance in determining land owners of affected lands, informing representatives of local communities about the project activities, participating in resolving emerging disputes, providing information on vulnerable PAPs and addressing other issues within their competence.
Working Group	<ul style="list-style-type: none"> ① Assistance in PAP identification ② Collection of required data and information on the PAPs ③ Informing representatives of local communities about the Project ④ Taking part in dispute settlement, if necessary

1-2-2-6 Implementation Schedule

Under the resettlement plan, all measures, including compensation for affected people, will be fully completed prior to the commencement of civil works. Therefore, the following tasks will be implemented under the responsibility of the Ministry of Transportation and Communications (MOTC) before the start of construction.

Table 1-2-43 Implementation Schedule

No.	Tasks	Responsibility
1.	Preparations	
1.1	MOTC's approval of the final RAP	MOTC
1.2	JICA's approval of the final RAP	MOTC
1.3	Review and approval of RAP by Ministry of Finance, Ministry of Justice, and other agencies (if necessary)	MOTC
1.4	Approval and endorsement of RAP by Cabinet Ministries of the Kyrgyz Republic (if necessary)	MOTC
1.5	MOTC's orders to approve GRM and establish GRGs	MOTC
1.6	Distribution of the RAP among PAPs	MOTC
2.	LARP Implementation	
2.1	Develop RAP implementation action plan in order to update the draft RAP based on the final detailed design.	MOTC
2.2	MOTC's order about compensations	MOTC
2.3	Preparation and approval of agreements for PAPs	MOTC
2.4	Processing LAR agreements between MOTC & PAPs	MOTC
2.5	Payment of compensations to PAPs	MOTC
3.	Internal Monitoring and Reporting	
3.1	Submission of monthly, quarterly, semi-annual and annual progress monitoring reports	MOTC

1-2-2-7 Costs and Funding Sources

(1) Replacement Cost Survey

In this project, a replacement cost survey is conducted to assess lost property by applying the evaluation criteria required by the Kyrgyz Republic's appraisal agency. In the replacement cost survey, the assessment of lost property was conducted based on results obtained from desk research using secondary data such as official statistical data and private transaction data, and from field research using primary data such as interviews with local residents, including both affected and unaffected people.



Photo 1-2-31 Interviews with Local Residents

(2) Calculation of Loss Asset Compensation Amount

Based on the valuation results of lost property, the costs associated with land acquisition and resettlement for this project are as shown in Table 1-2-44. For this project, compensation amounts for the three (3) affected households, costs for registering land acquired from affected households, and contingency funds are included. The total estimated cost for the resettlement plan is 1,346,238 KGS (15,473.99 USD). All costs related to the resettlement plan are planned to be procured and borne by the Ministry of Transportation and Communications (MOTC).

Table 1-2-44 Land Acquisition and Resettlement Costs

	Items	Scope of Impact		Compensation Amount	
		Unit	Quantity	KGS	USD
	I. Direct Costs				
1	Compensation for agricultural land	m2	286.31	15,750	\$181.03
2	Compensation for commercial land	m2	100	187,500	\$2,155.17
3	Compensation for non-residential building	m2	55.2	670,920	\$7,711.72
4	Compensation for affected fences	m2	116.45	139,740	\$1,606.21
5	Compensation for trees	No.	53	33,080	\$380.23
	Sub-total			1,046,990	\$12,034.37
6	Transaction costs /Cost for re-registration of land plots	HH	2	30,000	\$344.83
	Total			1,076,990	\$12,379.20
7	II. Administration expenses (5% of direct costs)		1	53,850	\$618.96
	III. Contingency (20% of direct costs)		1	215,398	\$2,475.84
	Grand Total			1,346,238	\$15,473.99

Note 1: Calculated at an exchange rate of 87.00 KGS/USD

Note 2: Under Kyrgyz law, the valuation results for replacement cost remain valid for one year, provided there are no changes in the composition of the real estate and no significant fluctuations in market prices.

1-2-2-8 Monitoring System and Monitoring Forms by Implementing Organization

(1) Monitoring System and Monitoring Items

MOTC shall conduct regular internal monitoring to ensure the provision of compensation and support to affected people under this Resettlement Plan. Internal monitoring shall focus on the timely delivery of entitlements, grievance resolution, and the overall progress of the implementation process, monitoring the following items:

- ✓ Results of the public meeting
- ✓ Progress on RAP preparation
- ✓ Progress on RAP approval
- ✓ Progress on land acquisition
- ✓ Progress on compensation payments
- ✓ Details of complaints received

Furthermore, as the number of affected people under this resettlement plan is minimal and no income restoration measures need to be formulated, external monitoring is unnecessary. However, the Ministry of Transportation and Communications (MOTC) shall confirm that all measures based on the RAP are fully completed prior to the commencement of civil works, and that records of compensation, consultations, and grievance redress are properly documented and maintained.

(2) Monitoring Form

The monitoring form for this project is attached at the end of this document.

1-2-2-9 Grievance Redress Mechanism

This project establishes a grievance redress mechanism (GRM), as shown in Figure 1-2-19, to enable affected people to file complaints seeking resolution and reconciliation for various issues arising during project implementation. The Ministry of Transportation and Communications (MOTC) will establish a Grievance Redress Group (GRG) to resolve various issues during project implementation. The GRG will receive complaints from residents, assess their validity, determine possible outcomes, and resolve issues arising during project implementation in a timely manner. A document will be created for each complaint received, containing the complainant's name, the date and location of submission, and supporting documentation as necessary.

Complaints are first submitted to the local municipality. If not resolved within three (3) days, the application is forwarded to the Local Level Complaints Handling Group (CLG). Here, representatives from the Road Maintenance Office DEP 23 will consult with the complainant, and a decision regarding the application will be made.

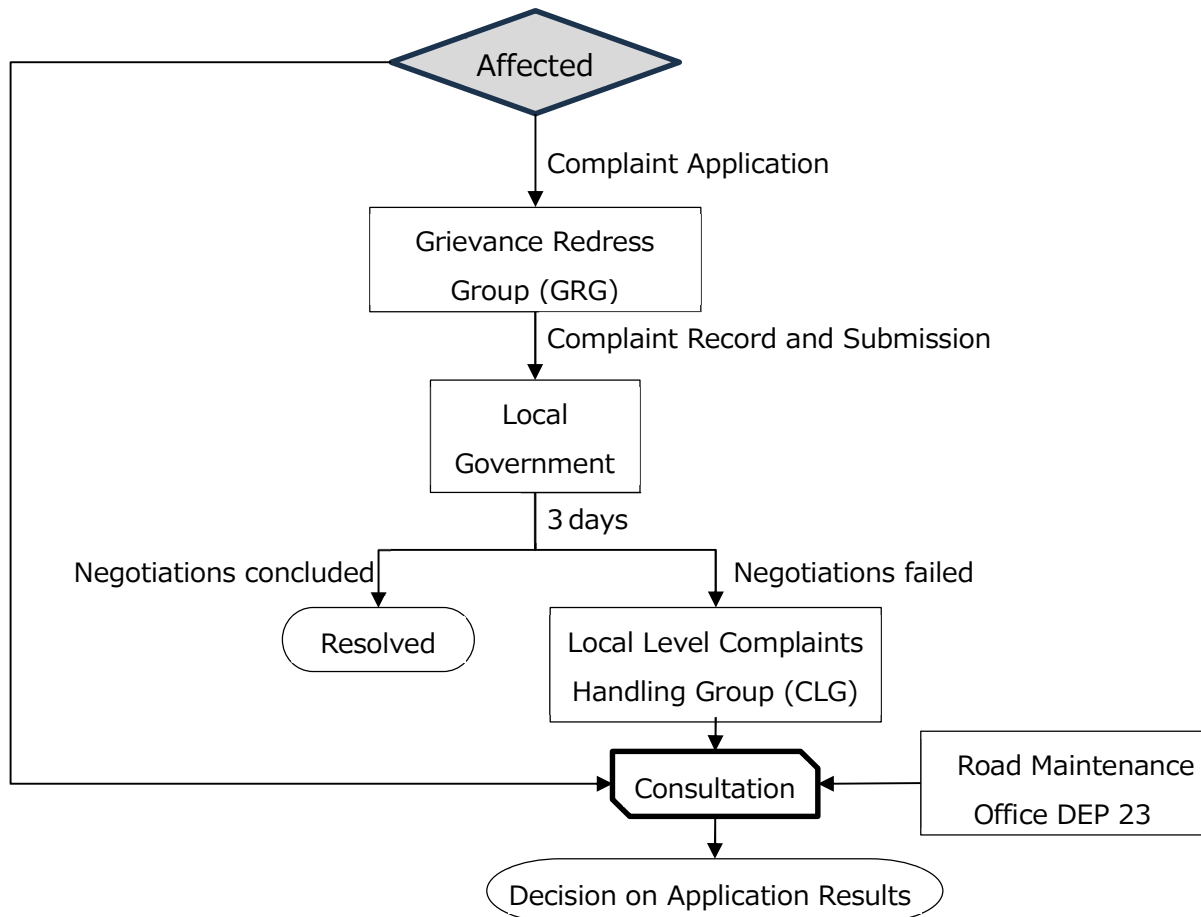


Figure 1-2-19 Grievance Redress Mechanism (GRM)

1-3 Other Aspects of the Project

1-3-1 Gender Mainstreaming Survey

(1) Relevant Laws and Guidelines

The main laws and guidelines related to gender in Kyrgyz are presented in the table below.

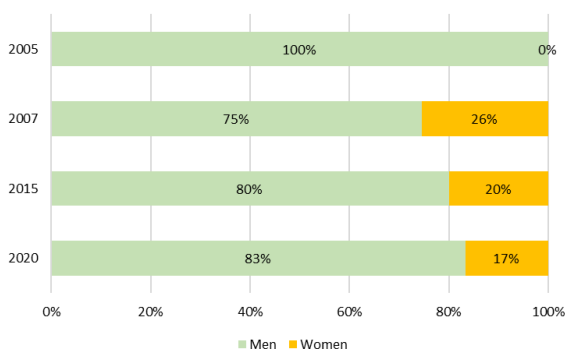
Table 1-3-1 Gender-Related Laws and Guidelines

Law / Guideline	Year of Enactment (Revision)	Purpose / Content
On state guarantees of equal rights and opportunities for men and women	2008	Aims to guarantee equal rights and opportunities for all individuals in political, social, economic, cultural, and other spheres of personal activity, and to eliminate discrimination based on social status, thereby establishing progressive and democratic relations between men and women.
Kyrgyz National Gender Strategy 2012-2020	2012	Developed to establish gender equality. It stipulates actions to eliminate harmful practices such as early marriage, prevent violence against women and girls, and expand women's political participation at the local level.
Kyrgyz National Action Plan 2018-2020	2018	Focuses on strengthening the role and participation of women in peace and security activities, preventing conflicts, enhancing cooperation among government, local authorities, and the private sector to reduce risks of violence against women and girls, and improving protection systems for gender-based violence victims with consideration of the specific needs of women and girls during emergencies.

UNDP KYRGYZ GENDER EQUALITY STRATEGY, 2018- 2022	2018	A strategy developed by UNDP to implement the core principles of gender equality and empowerment, as defined in UNDP’s Strategic Plan 2018–2021, UNDP’s Global Gender Equality Strategy 2018–2022, the United Nations Development Assistance Framework (UNDAF) for the Kyrgyz Republic 2018–2022, and the Country Programme Document for Kyrgyz 2018–2022.
--	------	--

In addition, the amendment to the Law on Local Council Elections (Keneshes), adopted on August 8, 2019 (No. 117), introduced a mandatory quota system requiring that 30% of seats in local councils be allocated to women, with the aim of promoting women’s participation in local governance.

On the other hand, the Election Code, amended in 2007, 2011, and 2019, requires that 30% of candidates on parliamentary lists (note: not seats) be women. While the proportion of women in parliament increased in 2007, it has since continued to decline.



Source: Kyrgyz Republic: special measures to ensure that gender quotas bring more women into local politics

Figure 1-3-1 Percentage of Women Among National Assembly Members

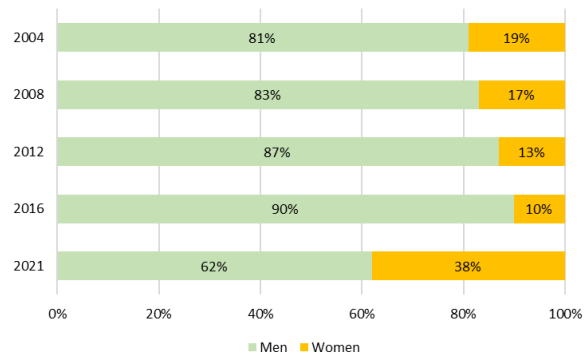


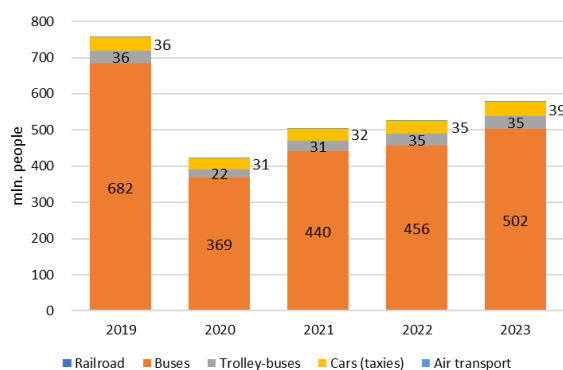
Figure 1-3-2 Percentage of Women Among Local Assembly Members

(2) Key Issues and Factors in the Transport Sector of Kyrgyz from a Gender Perspective

1) Reflection of Gender-Differentiated Needs in Transport Policies and Project Plans

According to national data on the number of trips by mode, buses are the most widely used means of transport in Kyrgyz.

However, interviews conducted in the project area revealed that there is no public transport service such as buses operating in the vicinity of the target bridge, nor is there street lighting. For women in the surveyed communities, the main modes of travel were walking, family-owned private cars driven by male relatives, and taxis. While men also showed a high share of walking trips, the second most common response among them was driving their own private cars. Consequently, it is assumed that most bridge users, particularly drivers, are men.



Source: National Statistical Committee of the Kyrgyz Republic

Figure 1-3-3 Number of Passengers by Mode of Transportation in Kyrgyzstan

Furthermore, interviews with nearby settlements indicated that women have little opportunity to speak or participate in decision-making within their local communities.

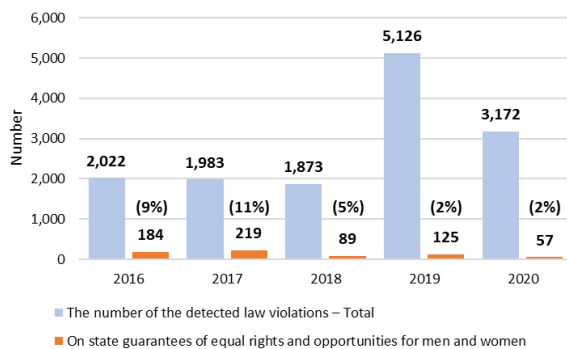
In contrast, in Toktogul city, located about 30 minutes by car from the project site, women were observed engaging in economic activities, such as selling vegetables at the local market.

These findings suggest that women’s needs may not be adequately reflected in transport policies and project planning, due to both gender-differentiated mobility patterns and social restrictions stemming from gender norms that limit women’s participation in community activities.

2) Risks of Gender-Based Violence Against Women and Girls

According to data from the Office of the Prosecutor General of Kyrgyz, the number of legal violations prosecuted in the field of human rights, civil rights, and freedoms between 2016 and 2020 under the “Law on State Guarantees of Equal Rights and Opportunities for Men and Women” accounted for no more than approximately 10% of all related violations.

At the same time, the overwhelming majority of reported victims of domestic violence (DV¹) were women. An age-based analysis shows that among female victims, the largest share (37%) were young women aged 18–34, whereas no clear age trend was observed among male victims. The number of DV cases is disproportionately concentrated in urban areas such as Bishkek and Osh, in proportion to their larger populations. In contrast, the number of reported cases in Jalal-Abad Region, where the project site is located, accounts for only about 3% of the national total. It should be noted, however, that in issues such as DV, many cases remain unreported, and the actual number of victims may be considerably higher.



Source: Women and Men of the Kyrgyz Republic

Figure 1-3-4 Number of Violations of Gender-Related Laws

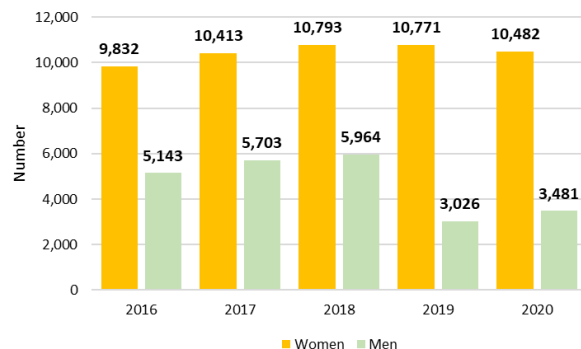
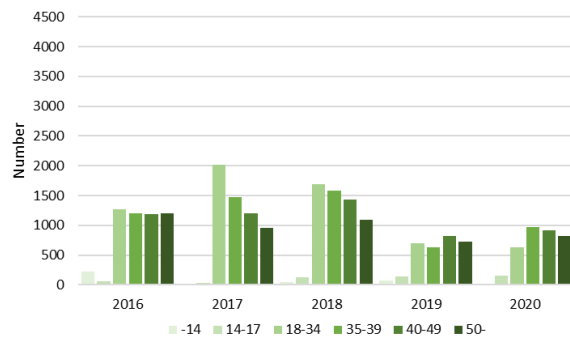
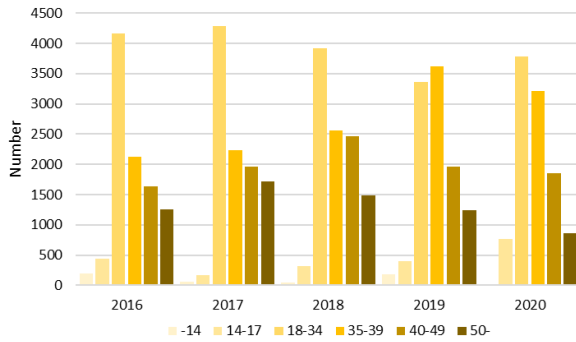


Figure 1-3-5 Number of DV Victims

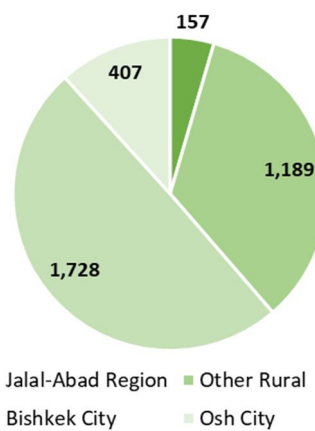
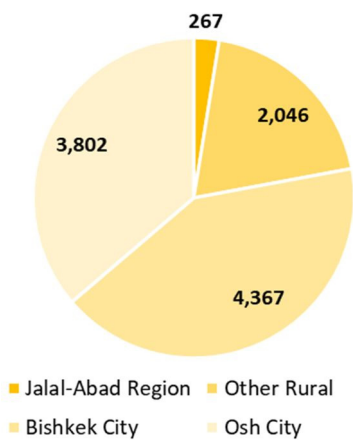
¹ DV is defined as physical, economic, psychological violence, and other forms of abuse.



Source: Women and Men of the Kyrgyz Republic

Figure 1-3-6 Age Distribution of DV Victims (Women)

Figure 1-3-7 Age Distribution of DV Victims (Men)



Source: Women and Men of the Kyrgyz Republic

Figure 1-3-8 Number of DV Victims by Region (Women)

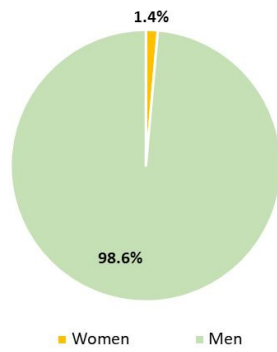
Figure 1-3-9 Number of DV Victims by Region (Men)

3) Occupational Segregation by Gender

Under the “Law on State Guarantees of Equal Rights and Opportunities for Men and Women,” Kyrgyz stipulates the principle of equal pay for equal work. The law also obliges employers to make efforts to ensure that the proportion of either male or female employees does not exceed 70% of the total workforce, while promoting equal employment opportunities.

Nevertheless, statistical data show that the proportion of women employed in the construction industry is significantly lower than in other sectors (sectoral average: 38.8%). Interviews with local construction companies during the survey further confirmed that there are very few women working in construction, particularly in technical or skilled positions. In addition, although wage levels in the construction sector vary by year, in all surveyed years women’s wages were consistently lower than men’s.

Interviews regarding the challenges faced by non-male workers at construction sites revealed that both men and women most frequently cited “differences in ability”. However, women additionally reported challenges such as “violence from men” (10%) and “patriarchal attitudes” (12%), whereas the proportion of male respondents giving these answers was 0%.



Source: Women and Men of the Kyrgyz Republic

Figure 1-3-10 Gender Ratio of Construction Workers (2020)

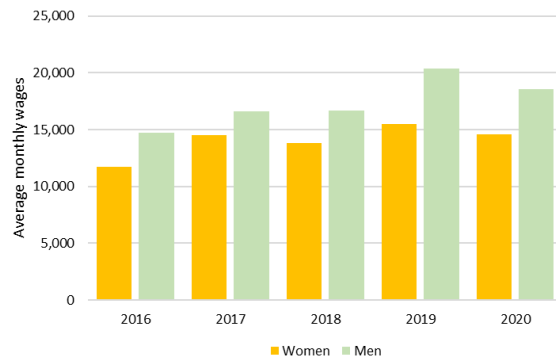
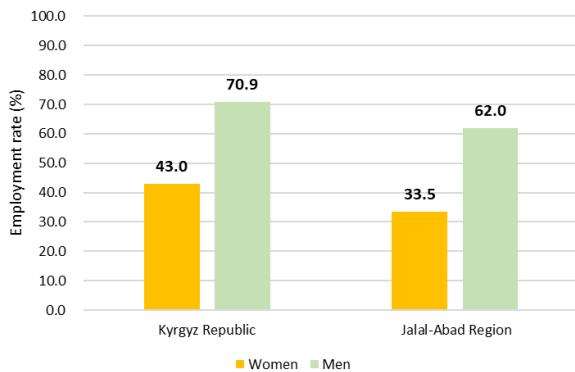


Figure 1-3-11 Average Monthly Income of Construction Workers (Som)

Focusing on Jalal-Abad region, the female employment rate is approximately half that of men and is lower than the national average. Moreover, the proportion of women in managerial positions in the region is the second lowest nationwide.



Source: Women and Men of the Kyrgyz Republic

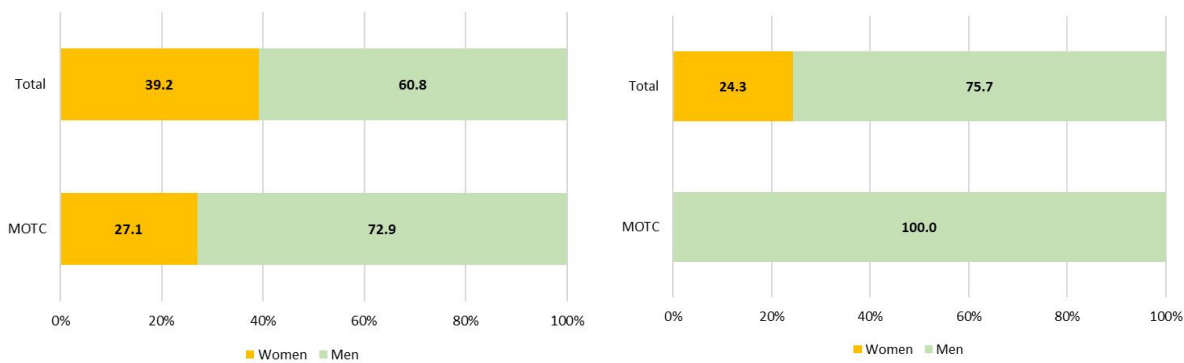
Figure 1-3-12 Employment Rate (All Industries: 2020)



Figure 1-3-13 Gender Ratio in Management Positions (All Industries: 2021)

Interviews conducted in the project area revealed that no negative opinions were expressed by men regarding women working outside the home. However, some women responded that they did not view it as desirable for non-male individuals to work outside the home.

Within MOTC, approximately 30% of staff are women, yet all managerial positions are occupied by men.



Source: Women and Men of the Kyrgyz Republic

Figure 1-3-14 Gender Ratio of Public Servants (2021)

Figure 1-3-15 Gender Ratio of Public Servants in Management Positions (2021)

4) Positive and Negative Impacts of Infrastructure Development

Typical impacts of infrastructure development include resettlement of residents and effects on economic activities. In this project, no resettlement will occur. Regarding economic activities, there is a small shop located at the end of the bridge, operated by a local family. However, the project will not negatively affect their ability to continue their business.

Since the existing bridge will be retained as a pedestrian- and livestock-only bridge, the project is expected to enhance pedestrian safety. For vehicles, on the other hand, the construction of the new bridge will improve drivability, and it is anticipated that vehicles may travel at significantly higher speeds. By introducing pedestrian crossings leading to the pedestrian- and livestock-only bridge (existing bridge), warning traffic signs, and speed-calming devices, the project can improve the safety of pedestrians (many of whom are women), livestock herders, animals, and drivers.

1-3-2 Examination as a Climate Change Countermeasure Project

The Republic of Kyrgyz is highly vulnerable to various natural disasters such as floods, landslides, earthquakes, glacial lake outburst floods, and landslides due to its rugged terrain and climatic conditions. The country has already suffered significant human and economic losses from these disasters, and there are concerns that climate change, including an increase in short-duration heavy rainfall, will lead to more frequent disasters and greater damage in the future. In light of these factors, this project aims to build a climate-resilient society. It will thoroughly examine Kyrgyz's current meteorological conditions and future climate change outlook. During the project planning and preparation phase, it will conduct a comprehensive climate risk assessment and explore adaptation strategies to address these risks.

(1) Climate Change Situation in Kyrgyz

1) Climate Zones of Kyrgyz

The climate classification of Kyrgyz is as shown in Figure 1-3-16. Due to its highly varied topography, Kyrgyz experiences regional climate differences. The western and eastern regions feature a lowland steppe climate (BSk), characterized by low annual precipitation and an average annual temperature below 18°C. In the southern mountainous areas and along the western shore of Lake Issyk-Kul, a cold desert climate (BWk) prevails, marked by an average annual temperature below 18°C, extremely low precipitation, and dry winters. The central

mountainous and plain areas feature a highland Mediterranean climate (Dsa) with dry summers and wet winters. The northern shore of Lake Issyk-Kul and the central mountainous areas exhibit a humid subarctic climate (Dfa, Dfb), characterized by warm summers and long, severely cold winters with heavy snowfall. The project site and its surrounding areas belong to the highland Mediterranean climate (Dsa).

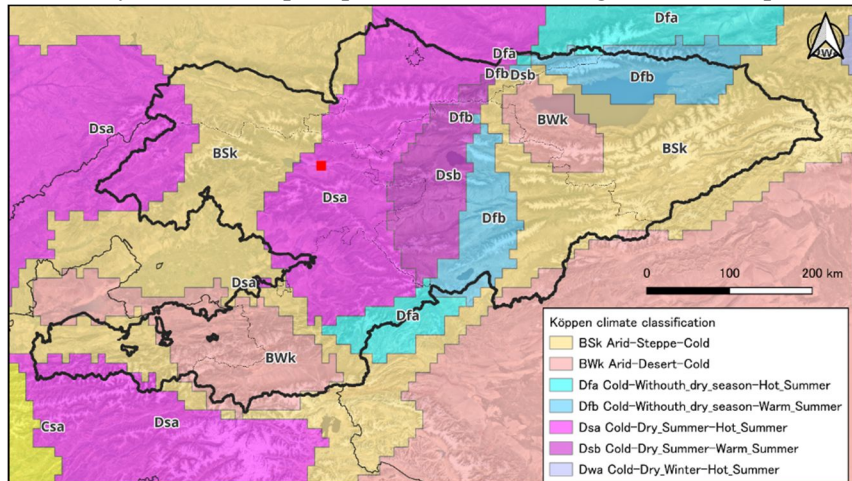


Figure 1-3-16 Kyrgyzstan's Keppel Climate Classification

The project site and its surrounding areas belong to the highland Mediterranean climate (Dsa).

2) Meteorological Conditions of Toktogul District

The climate of Kyrgyz varies significantly depending on the region and topography, but it is generally characterized by hot and dry summers and cold winters. In Toktogul District of Jalal-Abad Region, where the project site is located, the average temperature exceeds 24°C in summer and drops to around -4°C in winter, as shown in Figure 1-3-17. Precipitation is relatively low in summer and higher from winter through spring, with snowfall typically occurring from late November to February and rainfall from March to late November.

Although the period from June to September is relatively dry with low precipitation, there is no distinct rainy or dry season in the region.

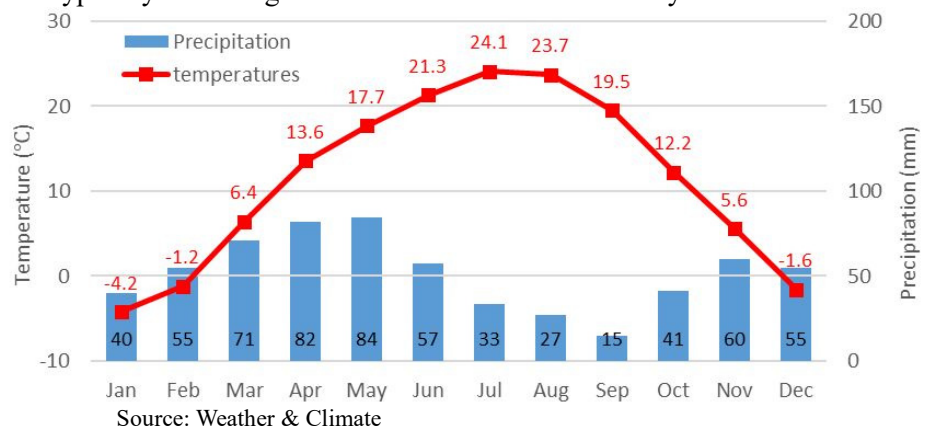


Figure 1-3-17 Monthly Average Temperature and Precipitation in Toktogul (2000–2024)

3) Climate Change in Kyrgyz (Jalal-Abad Region)

According to the World Bank and Asian Development Bank's Climate Risk Profile: Kyrgyz Republic (2021), climate change is projected to cause the following phenomena in Kyrgyz.

(i) Rise in Average Temperature

According to the Intergovernmental Panel on Climate Change (IPCC), the average temperature in Jalal-Abad Region has been on an upward trend since 1990, as shown in Figure 1-3-18 Under the SSP 5-8.5 scenario, which represents the highest greenhouse gas emissions, it is projected to rise by approximately 5.3°C by 2100. Considering that the global average temperature increase by 2100 is projected to be 3.8°C, it is evident that Kyrgyz is a country that will be significantly impacted by climate change.

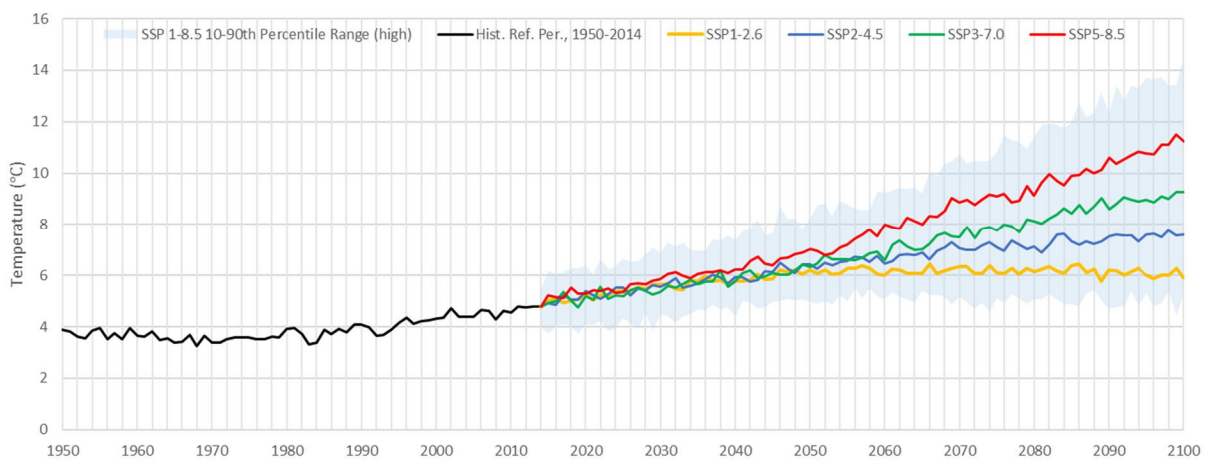


Figure 1-3-18 Annual Average Temperature Forecast for Jalal-Abad Region

Source: Climate Change Knowledge Portal (The World Bank Group)

(ii) Rise in Maximum Temperature

According to the Intergovernmental Panel on Climate Change (IPCC), as shown in maximum temperatures in Jalal-Abad Region are trending upward. Under the SSP 5-8.5 scenario, which represents the highest greenhouse gas emissions, maximum temperatures are projected to reach 34°C by 2100. When such higher-than-normal temperatures persist for several days or more, they constitute an extreme weather event known as a heatwave, increasing the risk of health hazards such as heatstroke. Furthermore, a concurrent long-term decrease in precipitation can cause droughts. This not only damages crop but also impairs hydropower generation, significantly impacting the regional economy and potentially affecting surrounding ecosystems.

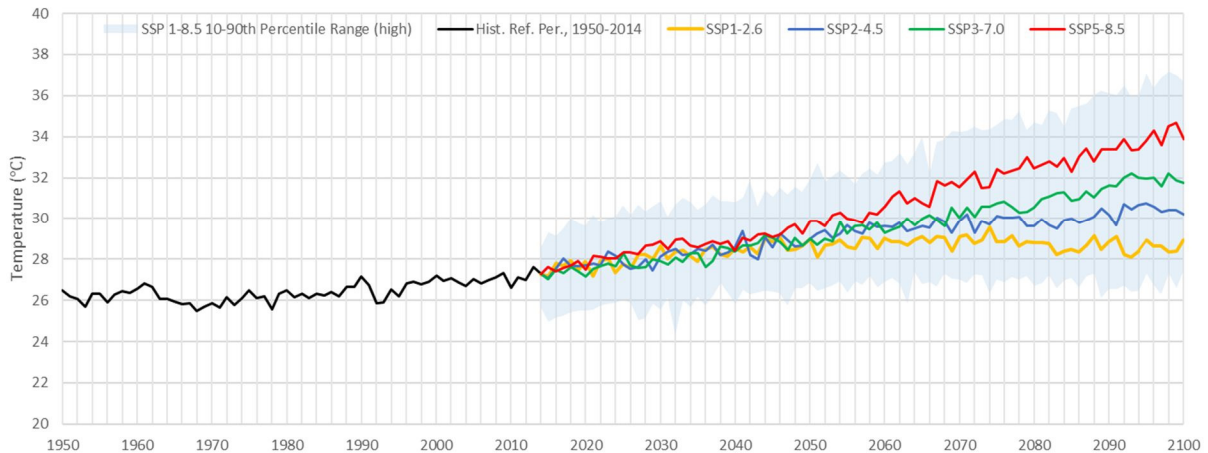
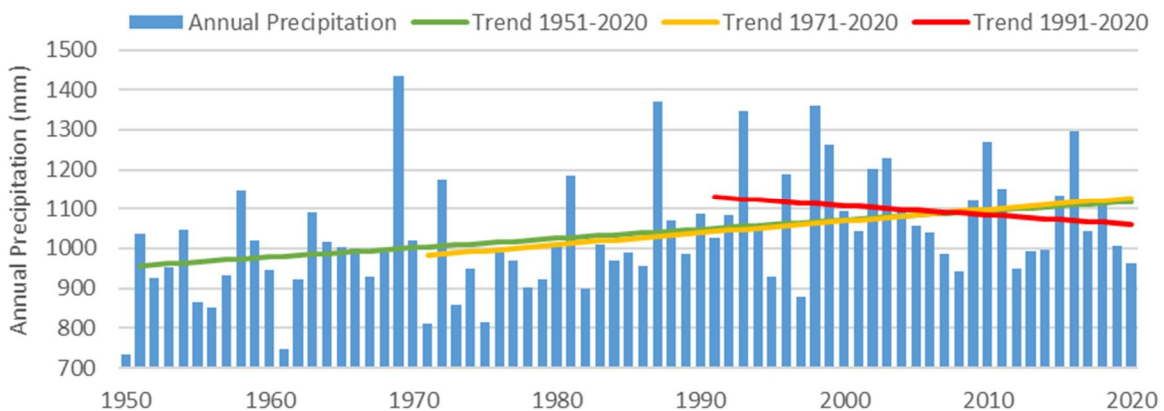


Figure 1-3-19 Jalal-Abad Region High Temperature Forecast

(iii) Increase or Decrease in Annual Precipitation

The trend in annual precipitation for Jalal-Abad Region, where the project site is located, is shown in Figure 1-3-20. While Jalal-Abad Region's annual precipitation has shown a long-term increasing trend, it has been decreasing since 1991. However, IPCC reports also state that there is significant uncertainty regarding the relationship between Kyrgyz's annual precipitation trends and climate change.



Source: Climate Change Knowledge Portal (The World Bank Group)

Figure 1-3-20 Annual Precipitation Trends in Jalal-Abad Region

(iv) Short-term Rainfall (Maximum Daily Precipitation)

It is generally known that climate change increases atmospheric water vapor, leading to changes in precipitation patterns such as an increase in the annual frequency of intense short-duration rainfall events. Similarly, in Kyrgyz, the intensity of extreme rainfall events, including short-duration rainfall, is projected to increase in the future. Figure 1-3-21 shows estimated daily precipitation amounts for different emission scenarios. Under the scenario with the highest greenhouse gas emissions, daily precipitation exceeding 30 mm is projected. Increased short-duration rainfall intensity, which delivers large amounts of rain in a short time, could lead to an increase in disasters such as flooding and landslides caused by rapid river rises, levee breaches, and associated inundation.

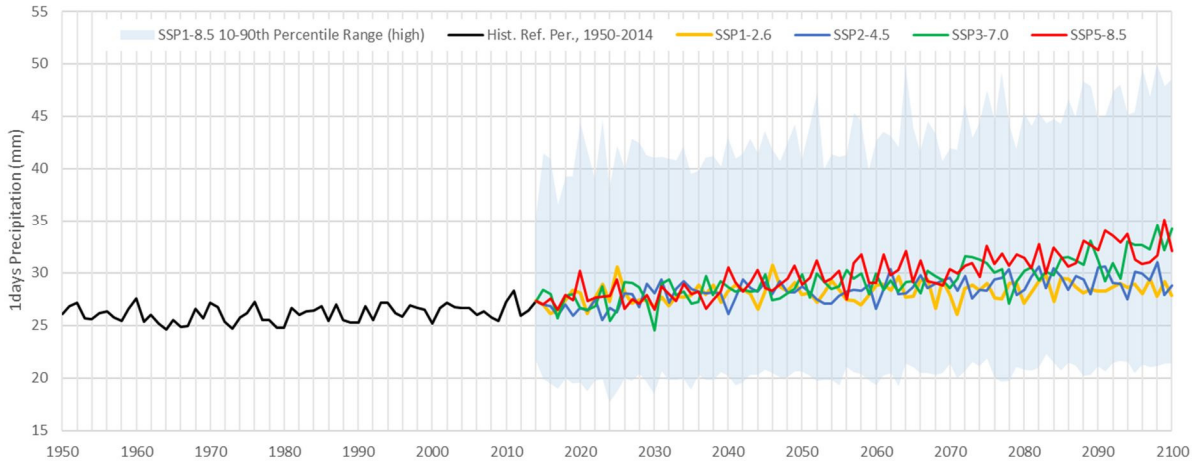


Figure 1-3-21 Daily Precipitation Trend Forecast for Jalal-Abad Region

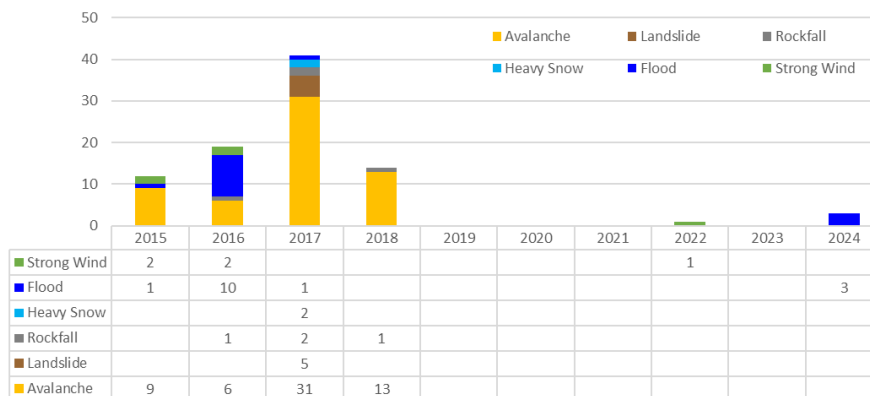
(2) Disaster History (Excluding earthquakes)

Figure 1-3-22~Figure 1-3-24 show the occurrence history of natural disasters (excluding earthquakes) in Toktogul District (including Karakol City) over the past decade. Prior to 2018, Toktogul District experienced frequent disasters such as avalanches and floods. Avalanches primarily occurred between December and March, frequently affecting the Bishkek-Osh Road and the Torqen-Torq Road. Floods and other water-related disasters mainly occurred between May and July, frequently affecting the Uch-Terek settlement and the Kizil-Ozgorush settlement located south of the project site. While disasters remained relatively quiet from 2019 onward, in June 2024, heavy rains caused large-scale flooding in Uch-Terek Village, Uch-Terek settlement, near the project site. This resulted in flooding damage to houses and other structures. Additionally, the Bishkek-Osh Highway was temporarily closed due to sediment flow.



Source: AKIpress News Agency - 2001-2025

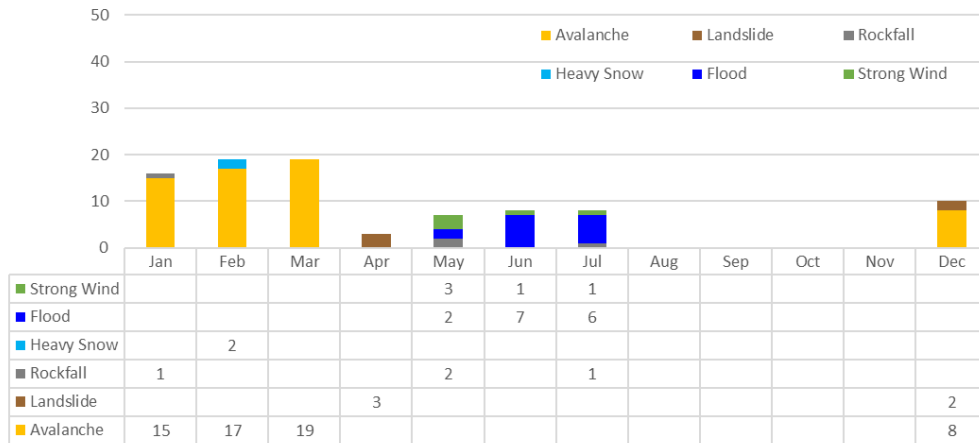
Photo 1-3-1 Flood occurred at Uchterek Village in 2024



Source: Information on emergency situations that occurred in the territory of the Republic

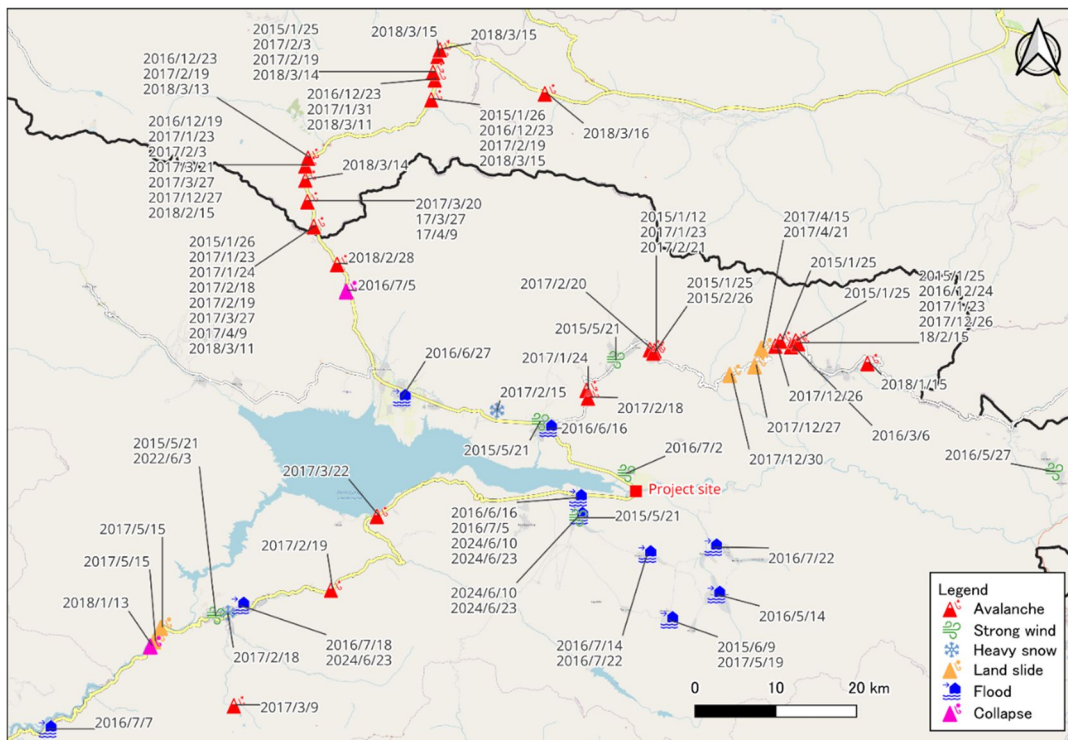
Figure 1-3-22 Annual Disaster Count in Toktogul District (2015–2024)

The Preparatory Survey Report on the Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic



Source: Information on emergency situations that occurred in the territory of the Republic.

Figure 1-3-23 Monthly Disaster Occurrence Count in Toktogul District (2015–2024)



Note: Most of the avalanches that occurred on the Bishkek-Osh highway took place within Taraz Region. However, since the following source categorizes them as disasters occurring in Toktogul District, we have followed that classification here.

Source: Information on emergency situations that occurred in the territory of the Republic.

Figure 1-3-24 Locations and Dates of Disasters in Toktogul District (2015~2024)

(3) Climate Risk Assessment and Adaptation Measures

1) Assessment of Climate Hazards

In conducting the climate risk assessment, potential climate hazards that could occur in the project area during the project period due to climate change were identified based on sources such as the World Bank’s Climate Risk Profile. The listed hazards include heavy rainfall (including localized torrential

rain), heavy snowfall, strong winds (including gusts), cold waves, and heat waves. For these climate hazards, the current frequency and potential future changes (projections) were determined as shown in Table 1-3-2 taking into account past disaster records in the Kyrgyz region, findings from local interviews, and discussions within the JICA Study Team.

Table 1-3-2 Identification of Climate Hazards

Climate Hazards		Main Phenomena	Examples of Disasters Caused by Climate Hazards	Current Occurrence Frequency		Potential Future Changes	
H1	Heavy rain (including localized heavy rain)	A phenomenon where a large amount of rain falls within a specific period of time, or where heavy rain falls intensely in a localized area over a short period	River flow rates may increase rapidly, potentially causing floods and debris flow. Furthermore, rising groundwater levels due to increased rainfall may reduce the resistance of slope failure surfaces, potentially triggering landslides and rockfalls.	++	Flooding caused by heavy rain frequently occurs in the tributaries of the Naryn River near the project site.	↗	Climate change may increase short-duration rainfall intensity, potentially causing localized heavy rainfall.
H2	Heavy snow	A phenomenon where a large amount of snow falls within a specific period of time	Increased snowfall loads may trigger avalanches. Additionally, road closures and other disruptions may occur, potentially affecting daily life, transportation, and infrastructure.	+	While avalanches frequently occur in Toktogul District due to heavy snowfall, heavy snowfall is rare near the project site.	↗	Precipitation is projected to decrease, but uncertainty is high, so the change is considered significant.
H3	Strong winds (including gusts)	A phenomenon where strong winds exceeding a specific wind speed blow within a specific period or suddenly	Damage may occur, such as the collapse of structures and trees, or damage to crops.	+	Strong winds have occurred multiple times near the project site over the past decade.	→	Future projections due to climate change are unclear, so no change is assumed.
H4	Low temperature (Cold wave)	A phenomenon where temperatures remain significantly lower than normal for a specific period	Disruptions to traffic infrastructure, such as road closures due to icy roads, and disruptions to daily life, such as frozen water pipes, may occur.	—	There is no record of cold waves occurring near the project site.	→	Future projections due to climate change are unclear, so no change is assumed.
H5	High temperature (Heat wave)	A phenomenon where temperatures abnormally higher than the average temperature persist for a long period	Damage may occur, such as health hazards like heatstroke, impacts on crops due to drought, and depletion of water resources.	—	There is no record of cold waves occurring near the project site.	→	Future projections due to climate change are unclear, so no change is assumed.

Note: The evaluation scale for the current frequency of climate hazards is set as follows:

- ++ : has occurred five or more times in the past decade.
- + : has occurred at least once in the past 10 years.
- : has not occurred in the past 10 years.

2) Study of Exposure

Considering that this project involves the construction of a new bridge and based on discussions with stakeholders and within the JICA Study Team, the following exposure elements that could potentially be affected by the climate hazards identified in (1) during the project period were selected: bridge piers, revetment structures, slopes, and approach roads (including connecting roads). The potential impacts on each exposure element in the event of a climate hazard are summarized in Table 1-3-3.


Table 1-3-3 Results of Exposure Assessment

Exposure		Expected Impacts
E1	Bridge Pier	<ul style="list-style-type: none"> • During floods or high-water conditions, driftwood may collide with bridge piers, potentially damaging the structure. • If flooding or high-water levels exceeding the design high-water level occur, the bridge piers may become submerged or subjected to increased water pressure, which could compromise the structural stability. • Scouring caused by floods or rising water may erode the foundations of the bridge piers, leading to a loss of structural stability.
E2	Revetment Structure	<ul style="list-style-type: none"> • During floods or high-water conditions, local scouring of the riverbed around the revetment foundation may create cavities beneath the foundation, leading to the outflow of backfill material behind the revetment. • During floods or high-water conditions, the revetment blocks may be displaced or washed away due to hydrodynamic forces. • A suction (piping) phenomenon may occur behind the revetment, causing the outflow of soil and potentially resulting in overall damage to the revetment structure. • When floodwater overtops the crest of the revetment or erosion occurs from the top, cavities may form behind the revetment, leading to structural failure of the revetment.
E3	Slope	<ul style="list-style-type: none"> • Rainwater and snowmelt may infiltrate the slope, reducing soil strength and potentially causing slope failure. • If the slope collapses, it may cause damage to roads and private properties located nearby.
E4	Approach road	<ul style="list-style-type: none"> • Heavy rainfall or snowmelt may cause water to infiltrate the pavement and accumulate on the upper surface of the roadbed, leading to pavement cracking under vehicle loads. • When temperatures drop, water within the roadbed may freeze, causing cracks in the pavement. • Pavement surface freezing may occur due to heavy snowfall or cold waves.

3) Evaluation of Impacts

In this section, the impacts of the “climate hazards” identified in (2) on the selected “exposure” elements are evaluated. Since this project involves the construction of a new bridge, the assessment of potential impacts is based on examples of impact observed on the existing Naryn River Bridge. The evaluation scale used to assess the level of impact is shown in Table 1-3-4.

Table 1-3-4 Criteria for the Evaluation Scale Established in this Project

Impact Level Scale	Criteria Established for this Project	Examples of Impacts from “Climate Hazards” (Current Naryn River Bridge)
3	Damage resulting from events that have occurred to date is visible, and the structure is not functioning properly. There is a risk that if damage worsens, the structure will be unable to perform its intended function.	Due to the effects that have occurred thus far, the bridge has subsided and tilted, resulting in its closure to traffic. There have been no previous occurrences of this nature.
2	Damage resulting from events that have occurred to date is visible. While there are no structural issues or problems with vehicle passage, there is a risk that if damage worsens, the structure will be unable to perform its intended function. The impact from events that have occurred to date is minor.	Flooding and rising water levels have caused scouring around the bridge piers, compromising their stability. If the damage worsens, it could lead to the bridge collapsing or being washed away. 

The Preparatory Survey Report on the Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic




Impact Level Scale	Criteria Established for this Project	Examples of Impacts from “Climate Hazards” (Current Naryn River Bridge)
		<p>Flooding and rising water levels have damaged the revetment structures, and there is a risk that further flooding or rising water levels could cause even greater damage.</p> 
		<p>Heavy rainfall is causing soil erosion on the Revetment slope due to rainwater runoff. If the damage worsens, there is a risk of slope collapse.</p> 
1	Damage resulting from events that have occurred to date is visible, and the structure is not functioning properly. There is a risk that if damage worsens, the structure will be unable to perform its intended function.	<p>Asphalt pavement damaged by climate hazards such as freeze-thaw cycles caused by heavy snowfall and frost heave due to low temperatures, as well as by vehicle loads. It has been relatively well repaired.</p> 
0	Damage resulting from events that have occurred to date is visible. While there are no structural issues or problems with vehicle passage, there is a risk that if damage worsens, the structure will be unable to perform its intended function.	—

Table 1-3-5 Evaluation of Existing Impacts

		Climate Hazard				
		H1 Heavy Rainfall (Including Localized Torrential Rain)	H2 Heavy snow	H3 Strong Winds (Including Gusts)	H4 Low Temperature (Cold Wave)	H5 High Temperature (Heat Wave)
	Frequency	+++	++	+	—	—
	Future	↗	↗	→	→	→
Exposure	E1 Bridge Pier	2	1	0	1	1
	E2 Revetment structure	3	1	0	0	0
	E3 Slope	2	1	0	0	0
	E4 Approach road	1	1	0	1	1

4) Selection of Key Combinations of Climate Hazards and Exposure Elements

Based on the evaluation conducted in ③ and taking into account the future trends of climate hazard changes, combinations of climate hazards and exposure elements that should be closely monitored in this project were identified.

These combinations were selected based on the following considerations.

- ✓ Among the combinations currently evaluated as having an impact level of “3,” those that are likely to continue experiencing similar impacts or may experience increased impacts in the future, considering the projected direction of climate hazard changes, were selected.
- ✓ Among the combinations currently evaluated as having an impact level of “2,” those that may experience significant impacts comparable to level “3” in the future considering the projected direction of climate hazard changes were selected.

Based on the above, three combinations of climate hazards and exposure elements to be closely monitored in this project were identified:

H1 (Heavy Rainfall) + E1 (Bridge Piers), H1 (Heavy Rainfall) + E2 (Revetment Structure), and H1 (Heavy Rainfall) + E3 (Slope) as indicated by red circles in the table.

5) Evaluation of the Vulnerability of “Exposure Elements”

For the four combinations of climate hazards and exposure elements identified above, the susceptibility to impacts and the adaptive capacity to cope with such impacts were analyzed. The results of the assessment of vulnerabilities contributing to climate risk in this project are presented in Table 1-3-6. The information on adaptive capacity was confirmed through field surveys and interviews with relevant stakeholders.

Table 1-3-6 Evaluation of Vulnerabilities Related to Climate Risk

	(A)	(B)
	Key Combinations of “Climate Hazards” and “Exposure Elements” to Be Monitored	Evaluation of Vulnerabilities Contributing to Climate Risk
1	<u>H1 (Heavy Rainfall) + E1 (Bridge Piers)</u> Scouring may occur around the bridge piers due to flooding or increased water levels associated with heavy rainfall.	Scouring has been observed around the bridge piers due to flooding and high water levels, and such impacts are expected to continue in the future. In addition, maintenance and repair works have not been adequately implemented.
2	<u>H1 (Heavy Rainfall) + E2 (Revetment Structures)</u> During floods or high-water conditions associated with heavy rainfall, hydrodynamic forces may cause revetment blocks to be displaced or washed away. In addition, riverbed scouring may occur, leading to subsidence at the foundation and potential settlement or collapse of the revetment structure.	The revetment structures have been damaged by past flooding and high-water events, and such impacts are expected to continue in the future. In addition, maintenance and repair works have not been adequately implemented.
3	<u>H1 (Heavy Rainfall) + E3 (Slope)</u> During heavy rainfall, surface runoff may erode the slope surface, and infiltration of rainwater into the slope may reduce soil strength, potentially leading to slope failure.	Since no drainage facilities have been installed, rainwater flows into the Revetment slope during heavy rainfall, causing soil erosion. Such impacts are expected to continue in the future. In addition, maintenance and repair works have not been adequately implemented.

6) Identification of Potentially Significant Future Climate Risks

Based on the combination of “Climate Hazards” and “Exposure”, as well as “the assessment of vulnerabilities contributing to the occurrence of climate risks”, the potential future climate risks that may become significant for this project were examined. The identified potential future climate risks for each combination of climate hazard and exposure are presented in Table 1-3-7.

Table 1-3-7 Identification and Prioritization of Future Climate Risks Relevant to the Project

	(A)	(B)	(C)
	Combinations of Climate Hazards and Exposures Requiring Attention	Assessment of Vulnerabilities Contributing to the Occurrence of Climate Risks	Potentially Significant Future Climate Risks
1	<u>H1 (Heavy Rainfall) + E1 (Bridge Piers)</u> Potential for scouring around bridge piers due to flooding and high water levels associated with heavy rainfall.	Flooding and high-water levels have caused scouring around the bridge piers, and this impact is expected to continue. Repairs are inadequate.	In the event of future flooding or rising water levels caused by heavy rain, scouring around the bridge piers will intensify, reducing their stability and potentially causing settlement or tilting. In the worst case, collapse or washout could occur.
2	<u>H1 (Heavy Rainfall) + E2 (Revetment Structures)</u> Possible displacement or loss of revetment blocks due to hydraulic forces during floods; riverbed scouring may cause foundation subsidence and revetment collapse.	Previous flooding and high-water levels have damaged the revetment structures, and repairs are inadequate.	In the event of future flooding or rising water levels caused by heavy rain, the revetment blocks may be washed away. Furthermore, suction phenomena could occur behind the revetment, causing sediment to be washed out and potentially leading to damage to the entire revetment.
3	<u>H1 (Heavy Rainfall) + E3 (Slopes)</u> Surface erosion and reduced soil strength due to rainwater infiltration may cause slope failure during heavy rainfall.	During heavy rain, drainage facilities are not installed, causing rainwater to flow into the embankment slopes, resulting in soil erosion. Repairs are inadequate.	Heavy rainfall in the future could cause large volumes of rainwater to flow down the slope. This could erode the surface or infiltrate the slope, weakening the soil strength and potentially causing a collapse.

7) Consideration of Adaptation Measures

To reduce the potential future climate risks that may become significant for this project, possible adaptation measures were examined.

The adaptation measures considered are shown below.

Table 1-3-8 Table of Considered Adaptation Measures

Risk	Potentially Significant Future Climate Risks	Adaptation Measures for Climate Risks	Relevant SDG Goal Number
1	Bridge Piers: Flooding and rising water levels caused by heavy rain may lead to scouring, potentially causing bridge piers to sink or tilt.	<u>(Adaptation Measure 1)</u> To minimize disturbance to the flood flow streamlines, the new bridge piers shall be installed along the alignment of the existing bridge piers.	11, 13
		<u>(Adaptation Measure 2)</u> The bridge piers shall adopt an oval (elliptical) shape to reduce resistance to water flow and to prevent scouring and debris accumulation.	
		<u>(Adaptation Measure 3)</u> As a countermeasure against scouring, the embedment depth of the bridge piers shall be secured at least 2.0 m below the deepest riverbed level.	
2	Bank Protection Structures: Flooding and rising water levels caused by heavy rain may result in the displacement of bank protection blocks. Riverbed scouring may cause bank protection to sink or collapse.	<u>(Adaptation Measure 1)</u> For the bank protection works, a concrete block revetment method shall be adopted, which resists sliding and uplift caused by hydraulic forces through its self-weight and allows relatively easy maintenance.	13
		<u>(Adaptation Measure 2)</u> As a countermeasure against scouring, gabion mattresses shall be installed in combination with the revetment.	
3	Bridge Piers: Flooding and rising water levels caused by heavy rain may lead to scouring, potentially causing bridge piers to sink or tilt.	<u>(Adaptation Measure 1)</u> Drainage channels shall be installed to collect rainwater and discharge it into the river.	13
		<u>(Adaptation Measure 2)</u> Vegetation shall be planted on the slopes to prevent erosion caused by rainfall and to enhance slope stability.	

As a result of the above examinations, the climate risk matrix for this project is shown in Table 1-3-9, and the climate risk tree is presented in Figure 1-3-25.

The Preparatory Survey Report on the Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

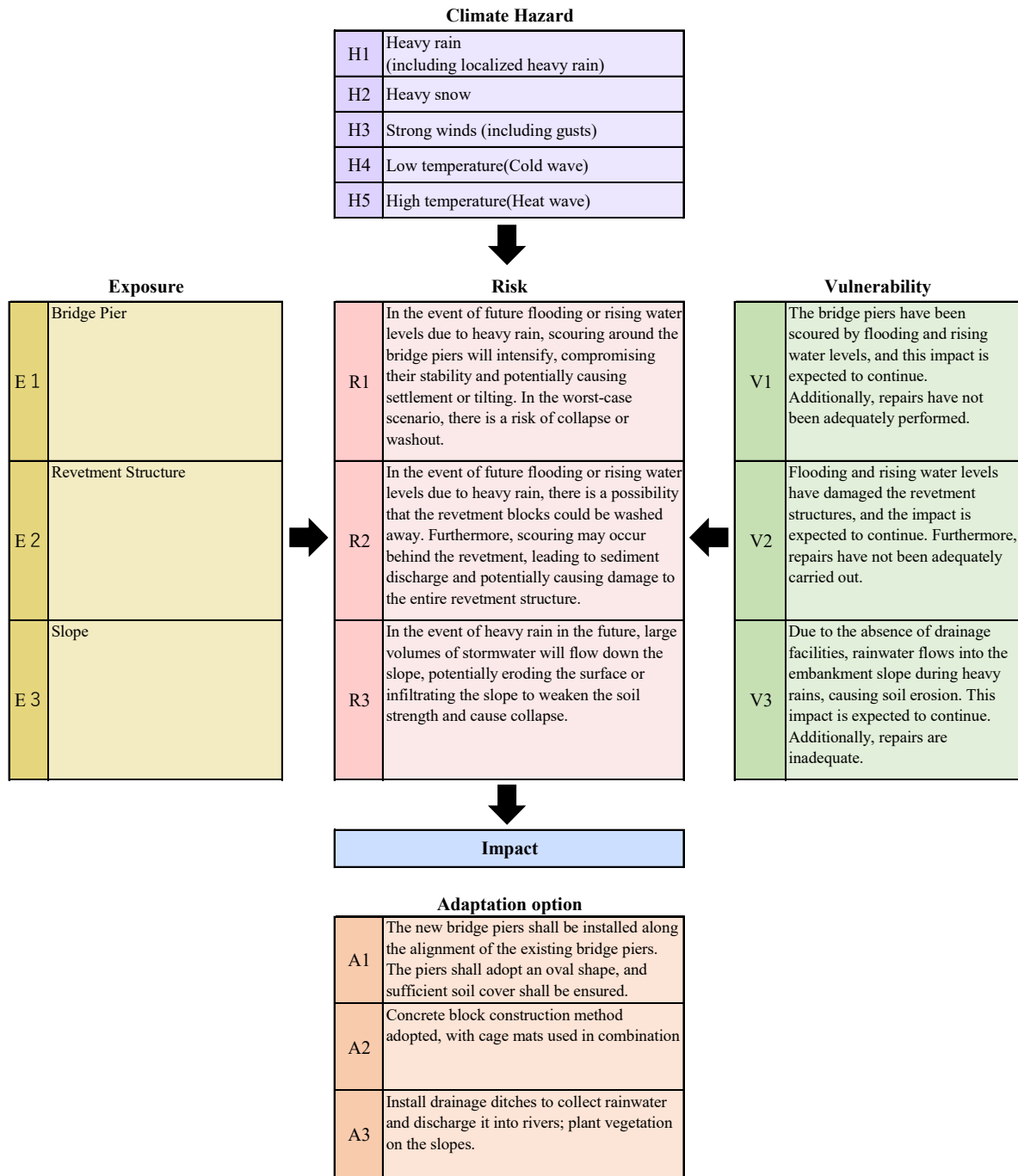


Figure 1-3-25 Climate Risk Tree for the project

(4) Estimated Beneficiary Population

The beneficiaries of this project are users in 2039, ten years after the new bridge opens. The beneficiary count (beneficiary population) is based on the number of passengers in vehicles using the new bridge. The estimated number of passengers for each projected year, calculated using the future traffic volume estimates from this study and the average number of passengers per vehicle determined from past surveys, is shown in Table 1-3-10.

The estimation results indicate that the future traffic volume for the new bridge in 2039 is projected to be approximately 9,861 vehicles per day, with 24,449 passengers. This translates to an estimated 8.92 million people using the new bridge annually. Therefore, the beneficiary population for this project is set at approximately **8.92 million** people.

Table 1-3-10 Future Traffic Volume Forecast Results and Passenger Volume

Estimated Fiscal Year	Average Daily Traffic Volume (vehicles/day)					Passengers (persons/day)				
	Small Vehicles	Minie Bus	Large Bus	Large Vehicles	Total	Small Vehicles	Minie Bus	Large Bus	Large Vehicles	Total
2024	4,068	436	4	972	5,480	6,102	6,148	122	1,264	13,636
2029	4,949	530	4	1,182	6,665	7,424	7,473	122	1,537	16,556
2034	6,020	645	4	1,437	8,106	9,030	9,095	122	1,868	20,115
2039	7,324	785	4	1,748	9,861	10,986	11,069	122	2,272	24,449

Average Passengers (Persons/day)

Small Vehicles	Minie Bus	Large Bus	Large Vehicles
1.5	14.1	30.4	1.3

※ 「THE STUDY ON IMPROVEMENT OF URBAN TRANSPORTATION IN BISHKEK CITY OF THE KYRGYZ REPUBLIC FINAL REPORT」 (Year 2013 JICA)

CHAPTER 2 CONTENTS OF THE PROJECT

2-1 Basic Concept of the Project

2-1-1 Overall Goal and Project Objectives

The Kyrgyz Republic (hereinafter referred to as Kyrgyzstan) Development Plan approved the “National Development Strategy of the Kyrgyz Republic for 2018-2040” in November 2018, identifying “Development of Strategic Economic Industries” as one of its key focus areas. The primary development objectives for the transport and road sector are outlined below. Regarding the rehabilitation of international trunk roads (5 routes), which are closely related to this project and constitute a priority item, details are provided below.

Table 2-1-1 5 Major Development Objectives of the National Development Strategy 2018–2040

①	To enhance the domestic road network and international transport corridors
②	To construct an alternative north–south road; rehabilitation of 5 international trunk roads; and construction of two new international highways
③	To improve the quality of road infrastructure in major cities and develop public transport and railway networks
④	To modernize major domestic airports
⑤	To promote the “open skies” policy and improve the aviation industry

As a priority area of focus, the strategy emphasizes the development of economic industries, positioning the transport and road sector as a key element. For Kyrgyzstan, a landlocked country with limited access to seaports, the strategy sets forth the goal of transforming the nation into a hub of ‘transportation’.

Overall Goal	Kyrgyzstan, as a landlocked country, is to be transformed into a key transportation hub, where stabilization and facilitation of inland transport will promote economic activities.
Project Objectives	The international trunk road connecting the capital Bishkek and the southern city of Osh (Bishkek–Osh Road) will ensure safe and stable traffic.
Project Outcomes	The Naryn River Bridge, located at the 314.7 km point on the international trunk road connecting the capital Bishkek and the southern city of Osh (Bishkek–Osh Road), will be reconstructed, along with the improvement of its approach roads.

2-1-2 Project Outline

This project involves the reconstruction of the Naryn River Bridge on the Bishkek–Osh Road and the development of its approach roads, as requested by the Government of the Kyrgyz Republic. The scope of works to be supported by Japan is as follows:

- ✓ Reconstruction of the Naryn River Bridge (Bridge Length L = 190 m) on the Bishkek–Osh Road
- ✓ Construction of riverbank protection works upstream and downstream of the Naryn River Bridge
- ✓ Improvement of approach roads: 285.5 m from the existing road connection point on the right bank to Abutment A1, and 164.5 m from the existing road connection point on the left bank to Abutment A2, totaling 450.0 m
- ✓ Installation of traffic safety measures, including road signs, pavement markings, and pedestrian crossings before and after curves

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

(1) Road Traffic Conditions

The traffic survey conducted in this project (2024) recorded 5,165 vehicles per day (summer weekdays) on the Bishkek-Osh Highway (L=672km) where the target bridge is located. This traffic volume exceeds that of the “Bishkek-Naryn-Torugart” highway (L=539km) and positions it as Kyrgyzstan's most important international trunk road, playing a vital role in the country's international logistics road network.

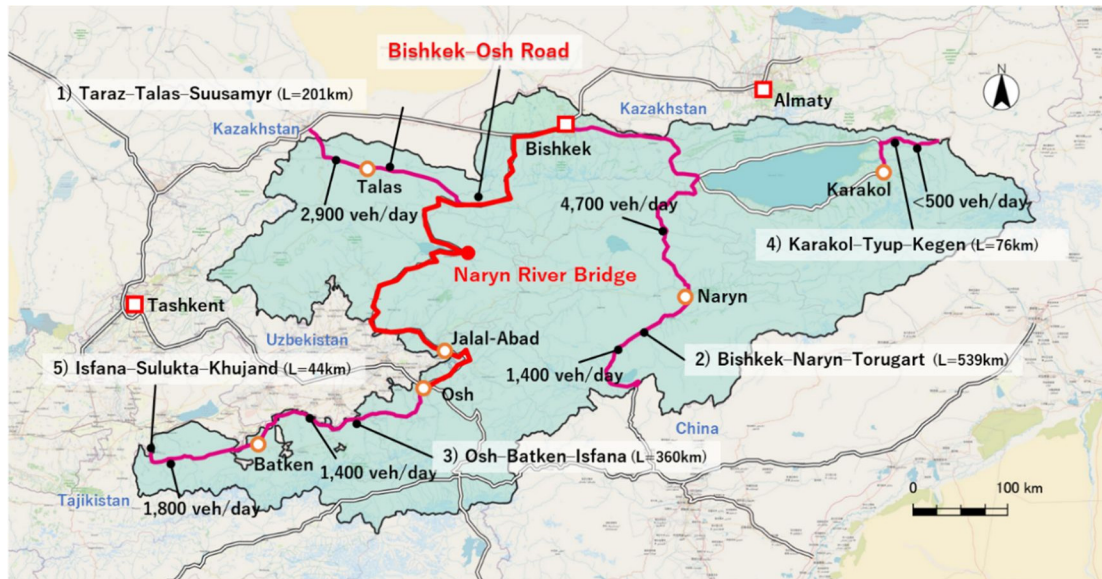


Figure 2-2-1 International Trunk Road Network Map of the Five Major Routes

Traffic volume surveys were conducted at the following survey points along the Bishkek-Osh road, yielding the results shown in Table 2-2-1.

Location map of Survey Site	Implementation Date
	<p>October 3, 2024 (24-hour) Weekday November 2, 2024 (24-hour) Saturday</p> <p>Vehicle Classification Motorized : 8 classes (cars+autobike) Non-motorized : 2 classed (bicycle, pedestrian)</p>

Figure 2-2-2 Overview of the 24-Hour Traffic Survey

Table 2-2-1 Current Traffic Volume at Target Location (24-Hour Section)

Date	Passenger car	Mini Bus	Mini Truck	Large bus	2-wheel truck	3-wheel truck	4-wheel truck/trailer	Total
October 31, 2024	3,697	427	83	6	215	92	645	5,165
November 2, 2024	4,256	443	99	1	335	61	598	5,793

Traffic volume near the target bridge ranges from 5,200 to 5,800 vehicles per day, with a heavy vehicle mix ratio (large buses, 3-axle trucks, 4-axle trucks/trailers) of 11.4% to 14.4%. The target route, the Bishkek-Osh Highway, is a major international trunk road. The projected traffic volume for 2039, ten years after opening, is 9,876 vehicles per day. Road specifications were set based on this projection.

(2) Naryn River Bridge and the Impact of Upstream and Downstream Dams

Upstream of the Naryn Bridge, there are two Kambar-Ata Dams (the upstream Kambar-Ata 1 Hydropower Plant [HPP1] and the downstream Kambar-Ata 2 Hydropower Plant [HPP2]). Among them, HPP2 is currently in operation, while HPP1 remains under the planning stage.

Downstream of the bridge, the Toktogul Dam and its reservoir are located. Since the operation of these upstream and downstream dams and reservoirs may affect the bridge construction plan on the Naryn River, due consideration should be given to their management and operation.



Figure 2-2-3 Upper-stream Dam (HPP1, HPP2) Location

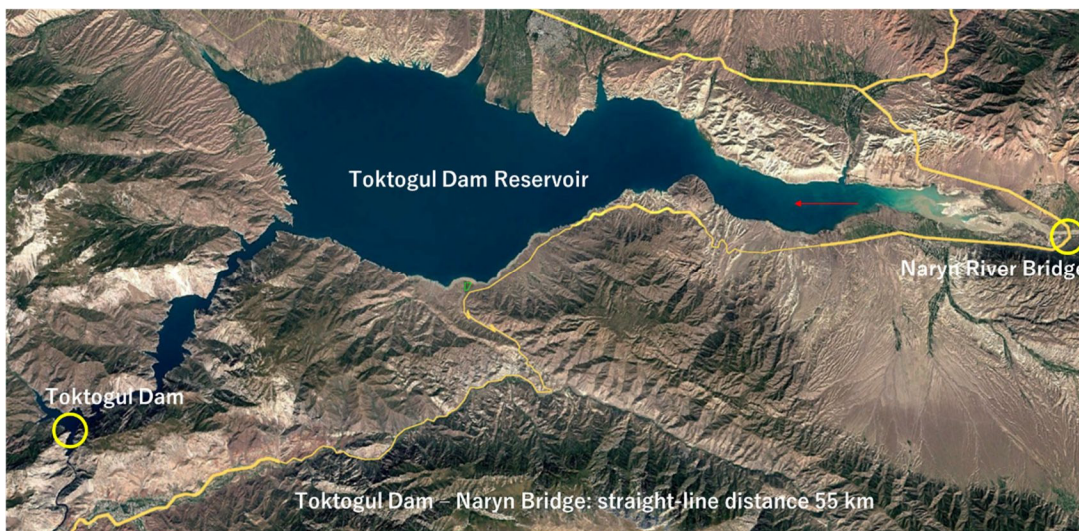


Figure 2-2-4 Downstream Toktogul Dam Location

(3) Existing Condition of the Bridge

An inspection was conducted on the current condition of the bridge deck in accordance with the damage evaluation standards of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) of Japan. The existing bridge has undergone concrete deck slab extensions to widen the roadway. Additionally, repairs have been completed through overlaying the bridge deck pavement. Due to increased dead loads since the design phase, bending moments have increased, making the passage of heavy vehicles hazardous and rendering the structure unable to adequately support traffic loads.

(4) Construction Circumstance in the Site

There is a little experience on bridge construction in Kyrgyzstan, and no construction companies in Jalal-Abad Region, there are virtually no construction contractors. Subcontractors for construction are expected to be sourced from the vicinity of Bishkek. Concrete plants dedicated to bridge construction are difficult to procure locally and will therefore be sourced from Japan. Regarding asphalt plants, a 35 t/hr class plant is provided from the “The Project for Improvement of Workshops for Road Maintenance Equipment” and is currently operational. Procurement of asphalt pavement from this plant can be expected.

(5) Operation and Maintenance

Regarding bridge maintenance and management, the “ The Project for Capacity Development for Maintenance Management of Bridges and Tunnels in the Kyrgyz Republic.” has implemented database creation, inspection manual development, and training on bridge inspections. While maintenance and management technical capabilities have improved, they are still in the process of being acquired. Therefore, bridge type with less maintenance shall be selected for this project.

(6) Obstacle Facilities

Residential houses and sheds requiring relocation exist at road installation locations (both left and right banks). Additionally, obstacles such as roadside signs and utility poles must be removed or relocated. Internet cables are attached to the existing bridge, but since they are located downstream of the existing bridge (including buried sections) and do not intersect with the new bridge construction, the policy is to maintain the current status.

(7) Design Standard

The design standard is basically adopted with the SNiP standard (Russian Federation Construction Standards), Japan Road Structure Ordinance etc. are adopted supplementary.

The bridge design will be implemented based on a comparison between Japan’s Live Load Type B and the Kyrgyz national design standard NK-80 (temporary traffic load: NK-102.8). Pavement design is conducted by using AASHTO standard.

The Preparatory Survey Report on the Project for the Reconstruction
of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

- 1) Geometric Design of roads
 - ✓ Design of Highways SNiP KP 32-01-2004, 2004
 - ✓ Road Structure Ordinance 2015, Japan Road Association
- 2) Bridge Design Standards
 - ✓ Design of Bridges and Pipes SNiP 2.05.03-84
 - ✓ Specifications for Highway Bridges 2012, Japan Road Association
 - ✓ River Management Facilities Ordinance 2000, Japan River Association
- 3) Pavement Structure Design
 - ✓ Guide for Design of Pavement Structures 1993, AASHTO
 - ✓ Ordinance on Road Structure 2021, Japan Road Association

2-2-2 Basic Plan (Construction Plan / Equipment Plan)

2-2-2-1 Design Condition

(1) Road Classification

Kyrgyzstan does not have its own road design standards and basically adopts SNiP (Russian Federation Construction Standards). The Bishkek–Osh Road is classified as a Category II road.

However, based on hearings with MOTC (Ministry of Transport and Communications) regarding the existing road around the Naryn River Bridge, it was confirmed that the current road is classified as Category III.

In addition, according to the traffic survey conducted at the project site, the traffic volume is approximately 5,000 vehicles/day for passenger cars and 1,000 vehicles/day for heavy vehicles, which corresponds to Category III under the SNiP standards.

Therefore, for this project, the SNiP Category III standard will be applied. For items that are not clearly defined in the SNiP standard, AASHTO and the Japanese Road Structure Ordinance will be used as supplementary references.

Table 2-2-2 Road Classification Defined in the SNiP Standards

Road Categories	Traffic Load Level	Traffic Serviceability	Calculated traffic		Type, Economical and Administrative Impact of Highways
			Modified to passenger car unit/day	Transport units, vehicle/day	
IA	0.25–0.40	B (high)	More than 18,000	More than 9,000	International and state highways
IB	0.25–0.45	B (high)	More than 14,000	More than 7,000	Main international and state auto roads not belonging to category IA
II	0.40–0.60	B (average)	From 6,000 to 14,000	From 3,000 to 7,000	Main international and state auto roads not belonging to category IA and IB
III	0.40–0.60	B (average)	From 2,000 to 6,000	From 1,000 to 3,000	Main international and state auto roads not belonging to category IA, IB and II
IV	0.60–0.80	G (low)	From 200 to 2,000	From 100 to 1,000	State and local auto roads not belonging to categories IB, II and III
V	0.70–1.00	D (very low)	Up to 200	Up to 100	Local auto roads with low traffic not belonging to categories III and IV

(2) Design speed

According to the SNiP standards, the design speed for Category III roads is $V = 100$ km/h in general sections, with special allowances of 80 km/h in arid (sparsely populated) areas and 50 km/h in mountainous areas. Since there are residential buildings along the target section, and the existing road includes curve sections with a posted speed limit of 60 km/h, a design speed of 100 km/h is considered inappropriate. Therefore, taking into account the current speed limit of the target section, the design speed for this project is set at $V = 80$ km/h, applying the value specified for arid areas under the Category III road classification of the SNiP standards.

Table 2-2-3 SNiP Design Speed

Road category	Calculated Speed, km/h		
	General Calculated Speed	Acceptable Calculated Speed on Difficult and Narrow Sections	
		Rolling Terrain	Mountainous Terrain
1A	140	110	70
1B	120	100	60
II	120	100	60
III	100	80	50
IV	80	60	40
V	60	40	30

(3) Geometric Design

Geometric design values are set based on the SNiP standards, with reference to AASHTO and the Japanese Road Structure Ordinance, as follows.

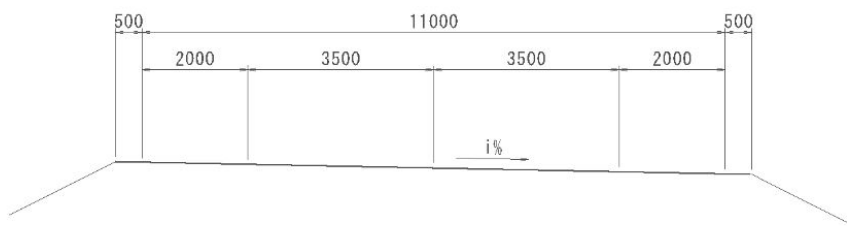
Table 2-2-4 Geometric Design Values (V = 80 km/h)

	Adopted	SNiP	AASHTO	Road Structure Ordinance	
Minimum curve radius	300m	300m	135m	280m	
Minimum length of easement curve	45m	45m	33m	70m	
Sight Distance	150m	150m	85m	110m	
Maximum vertical slope Grade	4.0%	3.5%	7.0%	4.0%	
Minimum curve radius	Crest	5,000m	5,000m	K=11	3,000m
	Sag	2,000m	2,000m	K=18	2,000m
Maximum super elevation	6%	6%	11%	6%	
Standard cross slope	2.0%	2.0%	2.0%	2.0%	

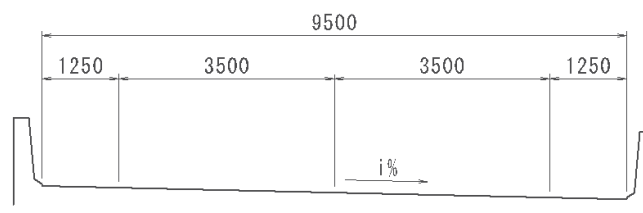
(4) Typical Cross-Section

Typical Cross-Section of the planned road has been approved by MOTC as described below.

• Roadway Section



• Bridge Section

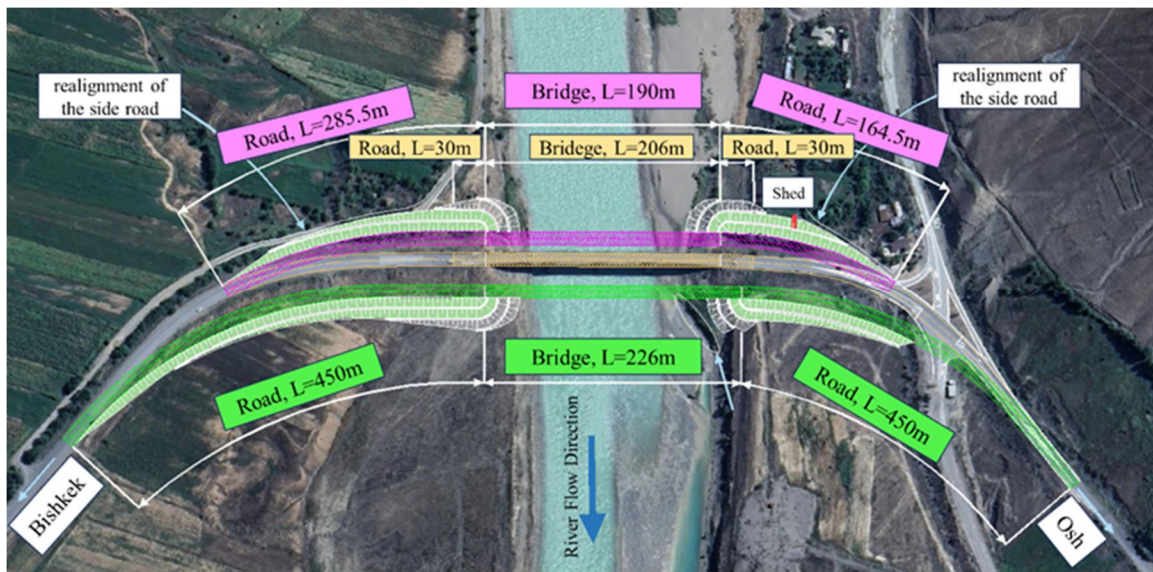


2-2-2-2 Examination of Bridge Location

A comparative study was conducted on three alternative plans for the replacement of the existing Naryn River Bridge: **Plan 1** (upstream of the existing bridge), **Plan 2** (same alignment as the existing bridge), and **Plan 3** (downstream of the existing bridge).

The results indicated that Alternative 1 was superior in many aspects. Furthermore, through discussions with the counterpart government, it was agreed to adopt **Plan 1** as the bridge location. It should be noted that if the route were to be shifted significantly downstream to create a shortcut, the river width would increase and the bridge length would exceed 500 meters. Therefore, this option was excluded from comparison, and the bridge location was set near the existing bridge where the river is the narrowest.

Table 2-2-5 Comparative Analysis of three Alternative Plans



	Plan-1 (upstream)	Plan-2 (existing alignment)	Plan-3 (downstream)
Overview	Construction of a new bridge with the road centerline 20 m upstream of the existing bridge	Replace the existing Naryn River Bridge with a new one at the current location.	Construction of a new bridge with the road centerline 30 m downstream of the existing bridge
Horizontal Curve	R=350	R=300	R=350
Longitudinal Slope	Around 0.3% on the bridge section and a maximum of 4% on the approach road		
Temporary Diversion	Construction while keeping the existing road in service. Very Good ◎	Construction of a temporary bridge and traffic diversion. Fair △	Construction while keeping the existing road in service. Very Good ◎
Exis. Naryn Bridge	Reuse as a pedestrian bridge. Very Good ◎	Demolition Fair △	Dangerous during runoff, must be removed. Fair △
Pedestrian and Livestock	The existing Naryn River Bridge is available for use. Very Good ◎	Use the new bridge Good ○	Use the new bridge Good ○
Traffic Safety	Can be completely separated from pedestrians Very Good ◎	The shared use of the bridge by pedestrians and vehicles poses a safety hazard. Fair △	It is dangerous because pedestrians and vehicles share the same bridge. Fair △

The Preparatory Survey Report on the Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Surrounding roads	Realignment of the side road is required. Fair △	No effect Very Good ⊙	Intersection improvement is required. Fair △
Scour Protection	Scour risk is considered minimal. Very Good ⊙	Risk of local scouring on the left bank. Fair △	Risk of local scouring on the left bank. Fair △
Land Acquisition	Few Good ○	None Very Good ⊙	None Fair △
Pollution Control Measures	As no demolition work is involved, the required pollution control measures (air, noise /vibration, waste, etc.) are minimal. Very Good ⊙	Significant impacts are expected from the temporary detour bridge installation and existing bridge demolition. Fair △	Since the demolition of the existing bridge is required, the impacts related to pollution control items are considerable. Fair △
Construction cost	100% Very Good ⊙	136% Fair △	125% Fair △
Construction period	36 months Very Good ⊙	49 months Fair △	44 months Fair △
Overall Evaluation	Very Good ⊙	Fair △	Good ○

2-2-2-3 River Planning

(1) Estimation of Design Flood Discharge and Flood Level for the Naryn River Bridge

The design flood discharge and design flood level for the Naryn River bridge length shall be determined by comparing data from the Uchterek Hydrological Observatory (located 300m upstream of the existing Naryn Bridge) with the design parameters of the HPP dam.

1) Uchterek Hydrological Observatory Data

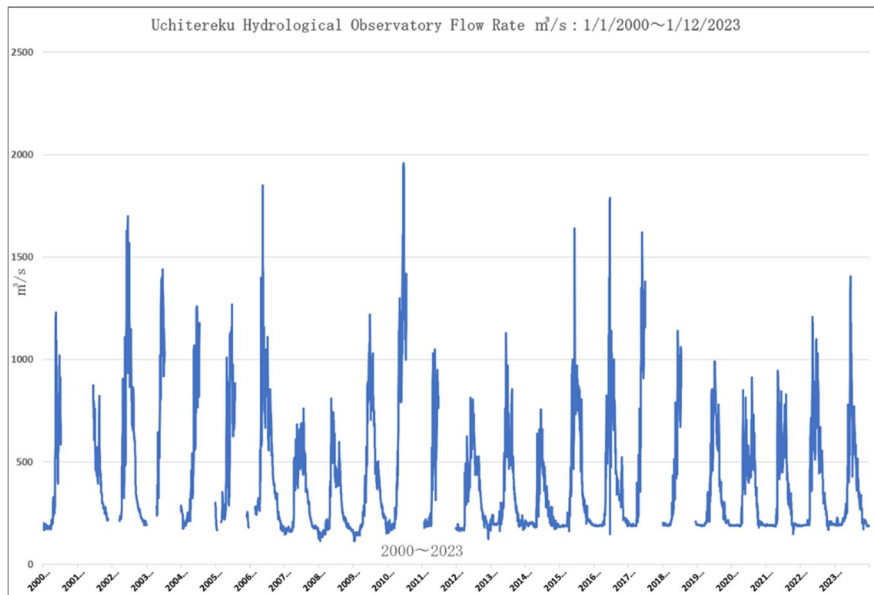


Figure 2-2-5 Uchterek Hydrological Observatory Data (01/2000-12/2023)

2) Estimation of Design High Water Volume-1 (Uchterek Hydrological Observatory Data)

Using the flow data from this observatory, the Gumbel distribution method was applied to calculate the probability flow.

Table 2-2-6 Probability Flow Calculation Using the Gambel Method

Probability Year	Design High Water Flow: m ³ /s (Calculated Value)
25	2,200 (2,210)
35	2,350 (2,352)
50	2,500 (2,504)
75	2,700 (2,676)
100	2,800 (2,798)
200	3,100 (3,091)

3) Estimation of Design High Water Volume-2 (Upstream Dam Planning)

HPP1 Dam: Maximum High Water Flow Volume	Q = 4,050 m ³ /s
HPP2 Dam: Current Maximum Discharge Capacity	Q = 2,500 m ³ /s
HPP2 Dam: Future Maximum Discharge Capacity	Q = 4,050 m ³ /s planned expansion

4) Determination of Design High Water Volume

Based on the above results, the design High Water volume for the Naryn River Bridge is determined as follows, based on the future plans for the HPP2 Dam.

Naryn River Bridge-Design High Water Volume	Q = 4,050 m³/s
--	----------------------------------

5) Determination of Design High Water Level

The water level at the design location is set based on the non-uniform flow calculations from 10 river cross-sections.

The bridge erection point for the new bridge is Survey Point ②-②.

Table 2-2-7 Non-uniform Flow Calculation Results

(i = 1/590)

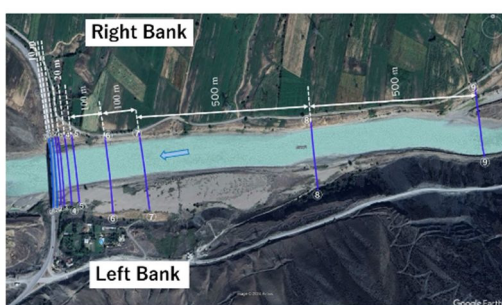
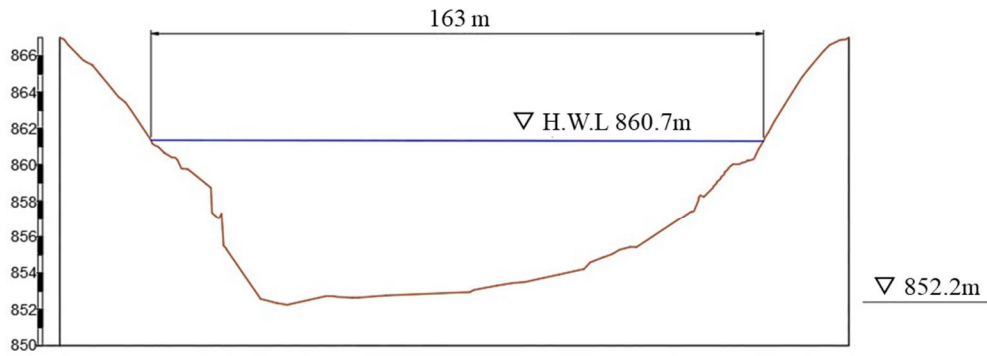


Figure 2-2-6 River Cross-Section Location

Point	Position(m)	H.W.L(m)	Flow velocity(m/s)
①-①	0	860.63	7.93
②-②	10	860.65	4.97
③-③	20	860.70	4.89
④-④	30	860.97	4.92
⑤-⑤	50	860.91	5.27
⑥-⑥	70	860.91	5.36
⑦-⑦	170	861.50	5.00
⑧-⑧	270	861.88	5.10
⑨-⑨	770	863.03	5.12
⑩-⑩	1,270	863.25	6.67

The design High Water level H.W.L. shall be 860.70 m at a design High Water volume flow Q = 4,050 m³/s.



River Longitudinal Profile

- Subcontract Deliverables, January 8, 2025
- Longitudinal profile, 20 m from existing bridge centerline

Figure 2-2-7 Design High Water Level H.W.L

(2) Impact of Toktogul Dam Reservoir Water Level

1) Toktogul Dam and Reservoir

Toktogul Dam is located 55 km west of the Naryn River Bridge in a straight line. It possesses a vast reservoir. When the reservoir water level rises above a certain value, backwater effects cause water levels to rise near the Naryn River.

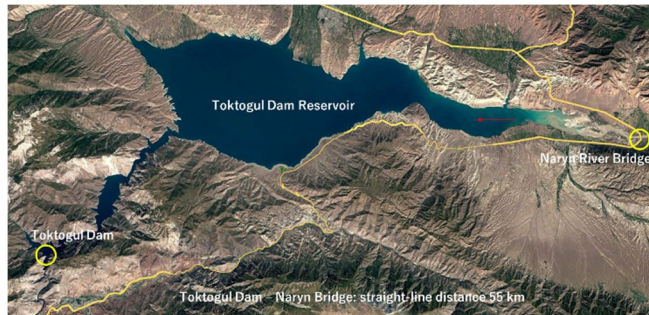


Figure 2-2-8 Toktogul Dam and Reservoir



Figure 2-2-9 Impact of Backwater Near the Naryn River Bridge (2017, 2023)

2) Water Level Fluctuations in Toktogul Reservoir

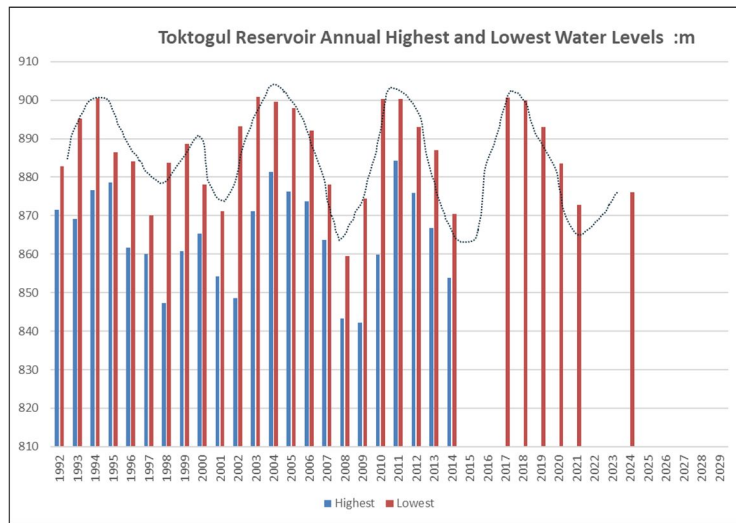


Figure 2-2-10 Toktogul Reservoir Annual Maximum Water Level, Minimum Water Level (1992~2024)

3) Correlation between Flow Data Gaps at the Uchterek Hydrological Observatory and Water Levels in the Toktogul Reservoir

At the Uchterek Hydrological Observatory (located 300 meters upstream of the existing Naryn Bridge), data collection becomes impossible once the water level exceeds a certain point due to the backwater effect from the Toktogul Reservoir.

Table 2-2-8 Correlation between Flow Data Gaps at the Uchterek Hydrological Observatory and Water Levels in the Toktogul Reservoir

Year	Data Missing	Uchiterek Hydrological Observatory Period of Flow Data Missing		Toktogul Water Level EL:m on Days with Missing Data at Uchterek		Highest Value for That Year EL:m 100 million ³	
		Start Date of Missing Data	End Date of Missing Data	Start Date of Missing Data	End Date of Missing Data	Highest Water Level	Highest Reservoir Storage
2000	✓	2000/7/6	~ 2001/6/15	No data	866.36 ↑	878.1	137.31
2001	✓	2001/11/21	~ 2002/3/19	869.61 ↓	850.53 ↓	871.1	121.09
2002						893.21	175.73
2003	✓	2003/1/1	~ 2003/4/18	886.15 ↓	871.14 ↓	900.9	196.57
		2003/7/31	~ 2003/12/31	898.7 ↑	892.09 ↓		
2004	✓	2004/7/16	~ 2004/12/31	896.55 ↑	890.15 ↓	899.62	193.5
		2005/1/19	~ 2005/3/3	887.2 ↓	879.71 ↓		
2005	✓	2005/8/1	~ 2005/11/29	896.09 ↑	893.07 ↓	897.88	188.58
		2005/12/21	~ 2006/2/24	890.12 ↓	879.21 ↓		
2006						892.07	172.66
2007						878.09	137.29
2008						859.59	96.21
2009						874.41	128.66
2010	✓	2010/7/21	~ 2011/1/23	895.25 ↑	892.71 ↓	900.29	195.4
2011	✓	2011/6/26	~ 2011/12/26	895.16 ↑	892.84 ↓	900.31	195.46
2012						892.98	175.11
2013						887.05	159.48
2014						870.45	119.63

↑ : Water Level Rise Period ↓ : Water Level Fall Period

From the aforementioned Table 2-2-8 and Figure 2-2-10, the following points are evident:

- ✓ When the water level at Toktogul Reservoir reaches EL=893m or higher, the backwater effect causes the still water level near the Naryn River Bridge to rise.
- ✓ The backwater effect persists for approximately six months, from July to December.
- ✓ In 2017, backwater caused the river width to expand downstream to the immediate vicinity of the Naryn River Bridge, raising the still water level near the bridge by 4.5m.

Note that in Table 2-2-8, data for 2015 and later years is unavailable (difficult to obtain).

In the October 2024 Ministry of Energy (MOE) interview, we obtained the comment that “the water level of the Toktogul Reservoir will not significantly rise in the future.”

In the unlikely event that the reservoir water level rises above normal during the bridge construction (substructure) phase, river water could flow into the substructure site, making bridge construction impossible. Early confirmation through the Ministry of Transportation and Communications (MOTC) is necessary.

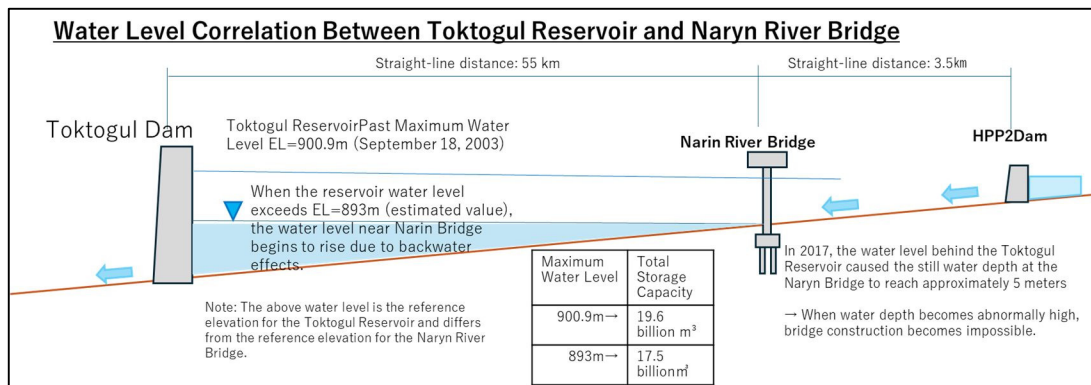


Figure 2-2-11 Correlation between Water Levels at Toktogul Reservoir and Naryn River Bridge

2-2-2-4 Road and Pavement Design

(1) Plan View

Based on the results of the bridge location selection, the new road centerline is designed 20 m upstream and parallel to the centerline of the existing road.

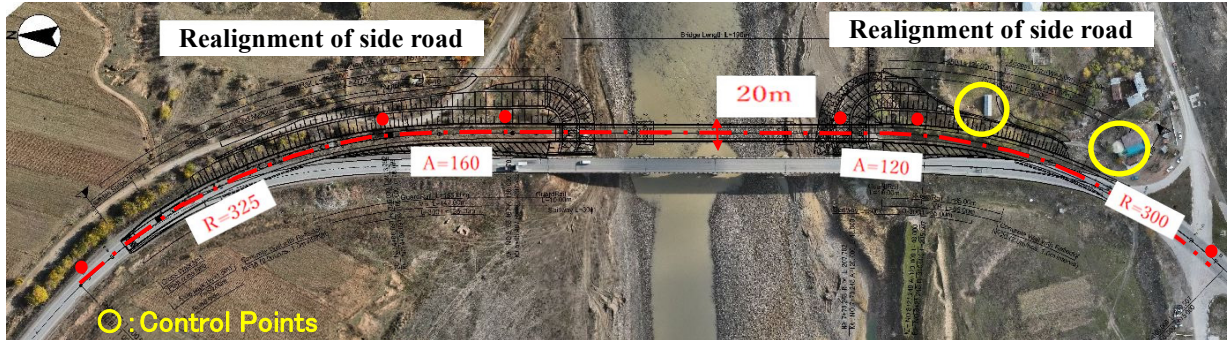


Figure 2-2-12 Proposed Upstream Road Alignment

(2) Profile

Profile was planned to match the existing road elevations in the sections before and after the Naryn Bridge. In the bridge section, vertical curves were minimized as much as possible, and the design water level according to the bridge plan was taken into consideration.

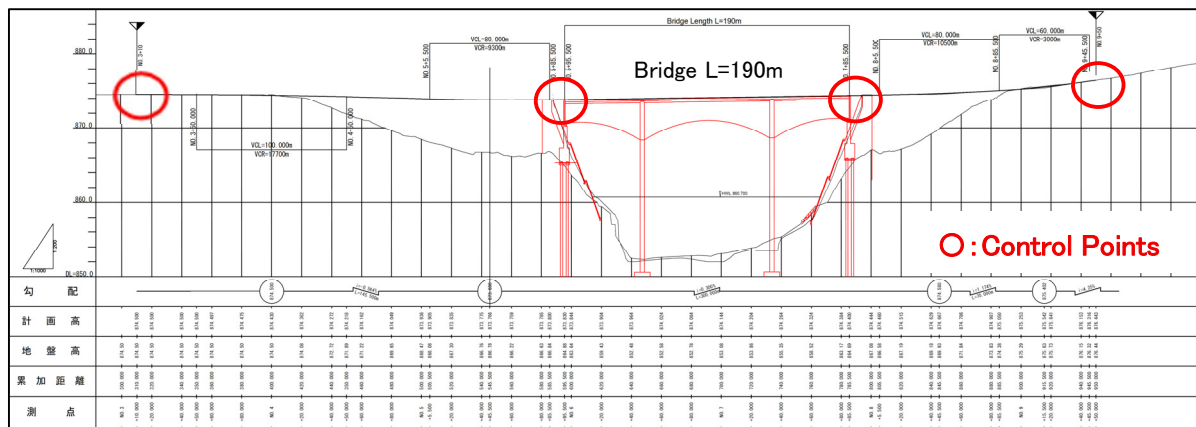


Figure 2-2-13 Profile of Upstream Road Alignment

(3) Pavement Design

Based on economic considerations and local construction experience, asphalt pavement was adopted. The design standards for pavement were primarily based on “SNiP KR32-01:2004”, and their validity was verified using the AASHTO Guide for Design of Pavement Structures (1993). The pavement design period was set to 10 years and approved by MOTC.

1) Pavement Design

Table 2-2-9 Pavement Structural Design Load

Commencement Year	Year	Vehicle	Mini Bus	Mini Truck	Large Bus	2-axle Truck	3-axle Truck	4-axle Truck / Trailer
			0.010	0.100	0.100	1.268	2.378	2.378
1	2024	1,988	218	46	2	138	38	310
2	2025	2,068	227	48	2	144	40	322
3	2026	2,151	236	50	2	150	42	335
4	2027	2,237	245	52	2	156	44	348
5	2028	2,326	255	54	2	162	46	362
6	2029	2,419	265	56	2	168	48	376
7	2030	2,516	276	58	3	175	50	391
8	2031	2,617	287	60	3	182	52	407
9	2032	2,722	298	62	3	189	54	423
10	2033	2,831	310	64	3	197	56	440
	2034	2,944	322	67	3	205	58	458
	2035	3,062	335	70	3	213	60	476
	2036	3,184	348	73	3	222	62	495
	2037	3,311	362	76	3	231	64	515
	2038	3,443	376	79	3	240	67	536
	2039	3,581	391	82	4	250	70	557
	Total 2030-2039	30,211	3,305	691	30	2,104	593	4,698
	ESAL per Vehicle/day	302	331	69	39	5,003	1,410	20,136

Toatal ESAL value day 27,290

W18= 9.824 ×10⁶

2) Structural Number (SN)

Design Condition	Design Value
18-kip Equivalent Single Axle Load Applications (W18)	ESAL : 9.824×10 ⁶

The required Structural Number (SN) for the above equivalent single axle applications is calculated using the following equation.

$$\log_{10}(W_{18}) = Z_R \times S_0 + 9.36 \times \log_{10}(SN+1) - 0.20 + \frac{\log_{10} [\Delta PSI / (4.2 - 1.5)]}{0.40 + 1094 / (SN+1)^{5.19}} + 2.32 \times \log_{10}(MR) - 8.07$$

W₁₈ : Number of 18-kip (8.16 t) equivalent single axle loads during the service period

Z_R : Reliability factor

S_o : Overall standard deviation

MR : Resilient modulus of subgrade soil = CBR × 1500

ΔPSI : Allowable loss of serviceability index

SN : Structural Number

Table 2-2-10 Pavement Design Conditions

Design Period	10 years (2030–2039)
ESAL	9.824×10 ⁶
Subgrade CBR	6
Required SN	4.44

The Preparatory Survey Report on the Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Required Pavement Structure Index

Pavement Design Section		Naryn River Bridge 10years
Predicted number of 18-kip equivalent single axle load applications	W18	9,824,000
Functional Classification (Principal Arterial)	R (%)	80
Standard Normal Deviate	ZR	-0.841
Combined Standard Error of the Traffic Prediction and Performance Prediction	S0	0.45
Initial Serviceability	P0	4.2
Terminal Serviceability Index	P1	2.5
Difference between the Initial (P0-P1)	ΔPSI	1.7
CBR (%)	CBR	6
Resilient Modulus (psi)	MR	9,000
Structural Number of the Pavement	SN	4.342

$$\log_{10}(W_{18}) = Z_R \times S_0 + 9.36 \times \log_{10}(SN+1) - 0.20 + \{ \log_{10}[\Delta PSI / (4.2 - 1.5)] / [0.40 + 1094 / (SN+1)^{5.19}] \} + 2.32 \times \log_{10}(M_R) - 8.07$$

Left side of the equation $\log_{10}(W18)=$	6.992
Right side of the equation= $$	6.992

Structural Number for the Proposed Pavement

Asphalt Concrete 10cm

Pavement Composition (New Road)	Layer Drainage Coefficient (m)	Layer Coefficient (a)	Layer Thickness (cm)
Pavement Design Section			
Asphalt Concrete Surface Course	-	0.440	10.0
Base Course (Graded Aggregate) CBR > 80	1.1	0.130	25.0
Subbase Course (Crushed Stone) CBR > 30	1.0	0.110	30.0
Structural Number for the Proposed Pavement (SN)			4.44

$$SN = a_1 \cdot D_1 + a_2 \cdot m_2 \cdot D_2 + a_3 \cdot m_3 \cdot D_3$$

$$4.44 > 4.342 \text{ OK}$$

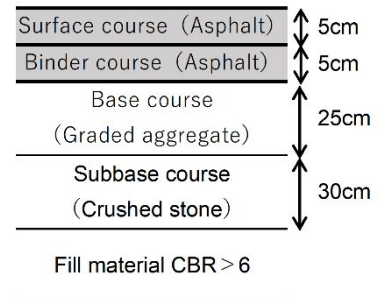


Figure 2-2-14 Pavement Structural Calculation

The adopted pavement structure is shown below.

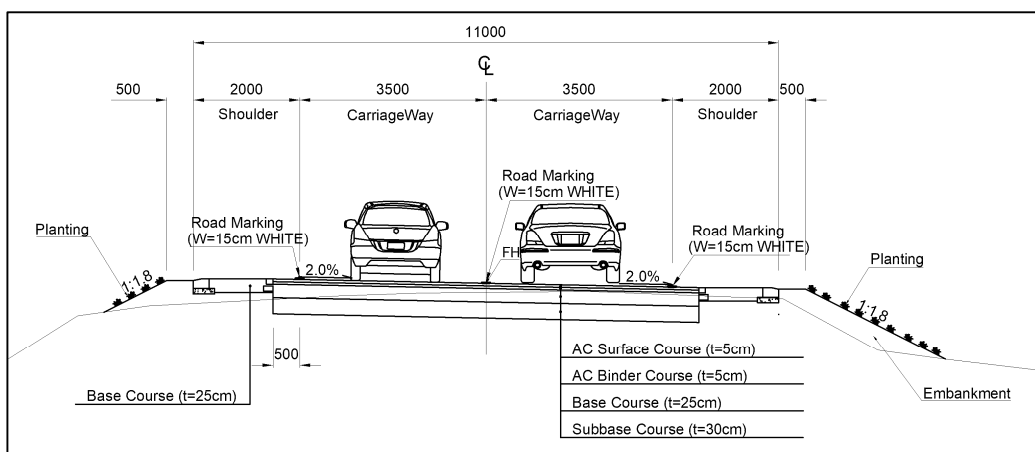


Figure 2-2-15 Pavement Structure

The maximum allowable ESAL value for the above pavement configuration is 1.135×10^7 . The results of the investigation are shown in “Appendices 7 2) Technical Data”.

2-2-2-5 Bridge Design

(1) Applicable Standards

The applicable technical standard shall be “Design of Bridges and Pipes SNiP 2.05.03-84.”.

For items not specified in this standard, “Specifications for Highway Bridges (Japan Road Association, 2012 Edition)” shall be applied in bridge design.

The applicable standards have been confirmed in the Technical Note.

(2) Design Conditions

1) Road Design Conditions

- Design Cross Section

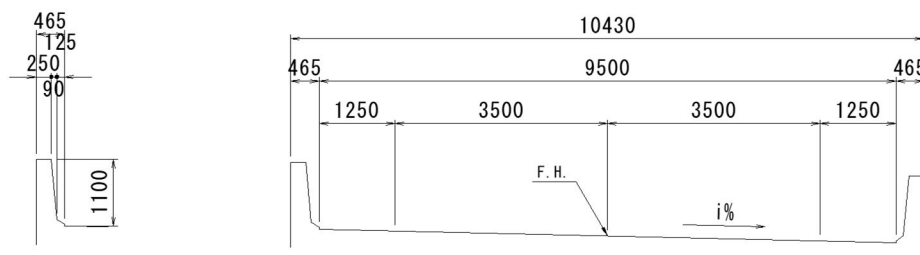


Figure 2-2-16 Cross Section of the Bridge Section

- Road Surface Elevation

The road surface elevation of the new Naryn River Bridge shall be set the same as the existing bridge for the following reasons.

- ✓ Lowering the road surface would require extending the 4% downgrade section at the end section of downstream side, which leads to reduce safety due to potential of surface freezing in winter.
- ✓ If the road surface on the upstream side is lowered, two vertical alignment inflection points (concave and convex) would occur, resulting in undesirable vertical alignment when connecting to the existing road.
- ✓ As the new and existing bridges will be located close to each other, the downstream view of road users would be obstructed by the existing bridge, which is also an undesirable from of aesthetic perspective.

2) River Conditions

- Design Discharge: 4,050 m³/s (based on referenced hydrological data).
- Span Length: The span length shall be determined in accordance with Article 29 “Special Provisions for Adjacent Bridges” of the “River Management Facilities Structure Ordinance”, on the assumption that the existing bridge will remain in place.
- Design High Water Level: Based on hydraulic analysis, the design High Water level at the bridge location is 860.700m.
- Clearance under the Girder: The clearance shall be determined with reference to Article 20 (Height Provisions) of the “River Management Facilities Structure Ordinance”.

Table 2-2-11 Clearance under Girder (Reference Values)

Design Discharge (m ³ /s)	< 200	200-500	500-2,000	2,000-5,000	5,000-10,000	>10,000
Clearance(m)	0.6m	0.8m	1.0m	1.2m	1.5m	2.0m

● Design Water Level

For the design of substructures, the design water level shall follow the “Specifications for Highway Bridges”:

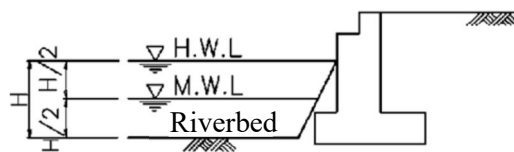
Under normal conditions: H.W.L.

Under seismic conditions: M.W.L. = (H.W.L. – Design Riverbed Level)/2

H.W.L.: 860.700m

Design Riverbed: 852.700m

M.W.L.: 856.700m



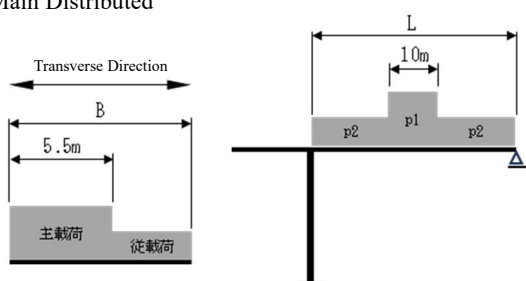
3) Design Live Loads

A comparison between the NK-80 live load specified in the SNIp *Standard* and the B-load specified in the “Specifications for Highway Bridges” is described in Table 2-2-12.

As the B-live load produces the larger design effect, it shall be adopted as the design live load. In addition, the weight and transportation conditions (e.g., trailer specifications) for future transport of hydropower turbine components shall be confirmed with the relevant governmental authorities, and safety verification shall be performed accordingly.

Table 2-2-12 Comparison between NK-80 and B-Live Load

	NK-80	B-Live Load
	<p>(m)</p> <p>$P = 785\text{kN}/4\text{axles} = 196.25\text{ kN}/\text{axle}$</p>	<p>• T Load</p> <p>Longitudinal Direction Transverse Direction</p> <p>• L Load</p> <p>(mm)</p>
Transverse Design	Wheel Load: 196.25kN/2wheels=98.125kN/wheel	T concentrated load : 100kN/wheel

<p>Longitudinal Direction Design</p>	<p>Two NK-80 vehicles are assumed to be loaded within the main loading width of 5.5 m for the B-live load, resulting in a total weight of 1,570 kN.</p>	<p>Consider the side span with small effect of B-Live load $L=50.0\text{m}$, $B=9.500\text{m}$ • Main Distributed</p>  <p>Load: $p1=10.0\text{kN/m}^2$, $p2=3.5\text{kN/m}^2$ • Secondary Distribution Load: 50% of main load • Load Calculation $P1=(10.0 \times 5.5\text{m} + 6.0 \times 4.5\text{m}) \times 10\text{m} = 820\text{kN}$ $P2=(3.5 \times 5.5\text{m} + 1.75 \times 4.5\text{m}) \times 40\text{m} = 1085\text{kN}$ Total $P=P1+P2=1,905\text{kN}$</p>
--------------------------------------	---	---

Furthermore, temporary moving load NK-102.8 shown in below figure will be considered.

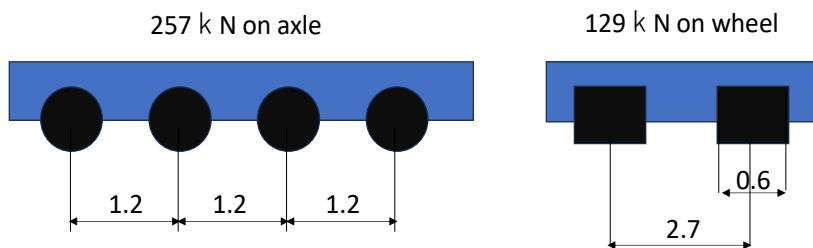


Figure 2-2-17 NK-102.8 Live Load

4) Geotechnical Condition

The ground parameters used for the foundation design are determined based on the results of the geotechnical investigation.

- Stratification and Ground Parameters

The ground in the vicinity can be classified into the following four layers, which representative ground parameters have been estimated.

1. Bedrock Layer:

This layer was formed in an ancient geological era, shaping the surrounding mountainous area, and is considered equivalent to the support layer for the upstream Kambar-Ata dam. 10m from surface is assumed to be sandy soil with an N-value of 20, and the layer below this depth corresponds to sandy soil with an N-value of 50.

2. Lacustrine Deposits:

This layer was formed as a result of sedimentation by the Naryn River during the process of disappearance of an ancient lake once existing in the area. Although mainly composed of gravel and cobbles, it also contains a considerable amount of fine material deposited during the existing lake period. Natural riverbanks up to about 10 m high have been observed along the Naryn River. The layer is assumed to have equivalent properties to sandy soil with an N-value of 20.

3. Riverbed Deposits:

Given the steep gradient and relatively high discharge of the Naryn River, the riverbed is

expected to contain relatively recent alluvial deposits mainly composed of cobbles. While the N-value is expected to be high due to coarse particles, the bonding between particles is weak, indicating low strength. The thickness of this layer is estimated to be about 3 m. As this is shallower than the footing bottom level of the pier (approximately 5 m), this layer is not considered in the pile foundation design.

4. Existing Embankment Material:

If the new abutment is constructed as an earth-fill type abutment, the existing embankment material around the current abutment will form part of the foundation ground around the piles. Embankment material for such structures is generally assumed to have an equivalent N-value of 15. The dynamic cone penetration test conducted on the existing embankment during this investigation showed N-values exceeding 15, confirming that the existing and new embankments can jointly form a stable fill-type abutment. The thickness of the embankment layer is assumed based on the elevation of the lacustrine deposit surface and the configuration of the existing fill, which rests atop the lacustrine deposits.

● Determination of Structure Support Layer

The structure support layer for the bridge foundation is assumed to be the N-value 50 layer located approximately 10 m below the top of the bedrock layer. From the riverbed surface down to the support layer, the following layers are expected in sequence: riverbed deposits (approximately 3 m of thickness), lacustrine deposits (approximately 5 m of thickness), and weathered upper bedrock (approximately 10 m of thickness). Consequently, the supporting layer is anticipated to be encountered at a depth of approximately 18 m below the riverbed surface.

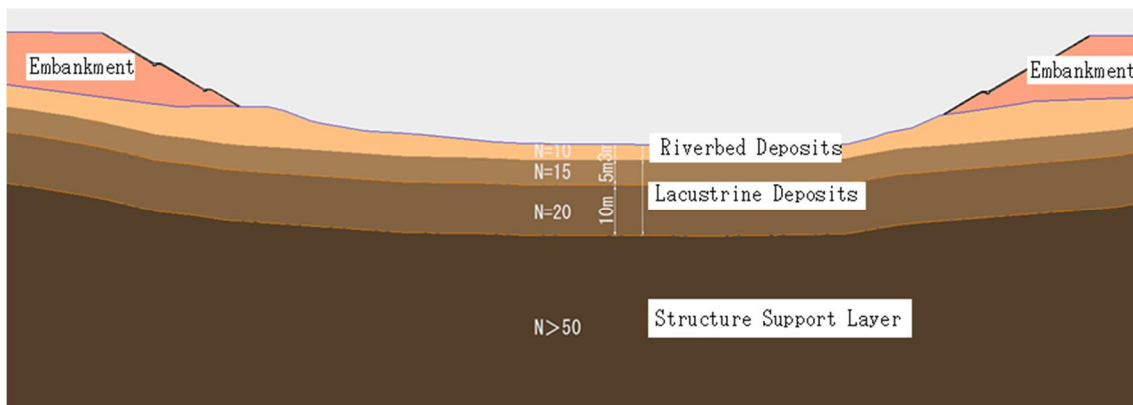


Figure 2-2-18 Estimated Geological Longitudinal Section

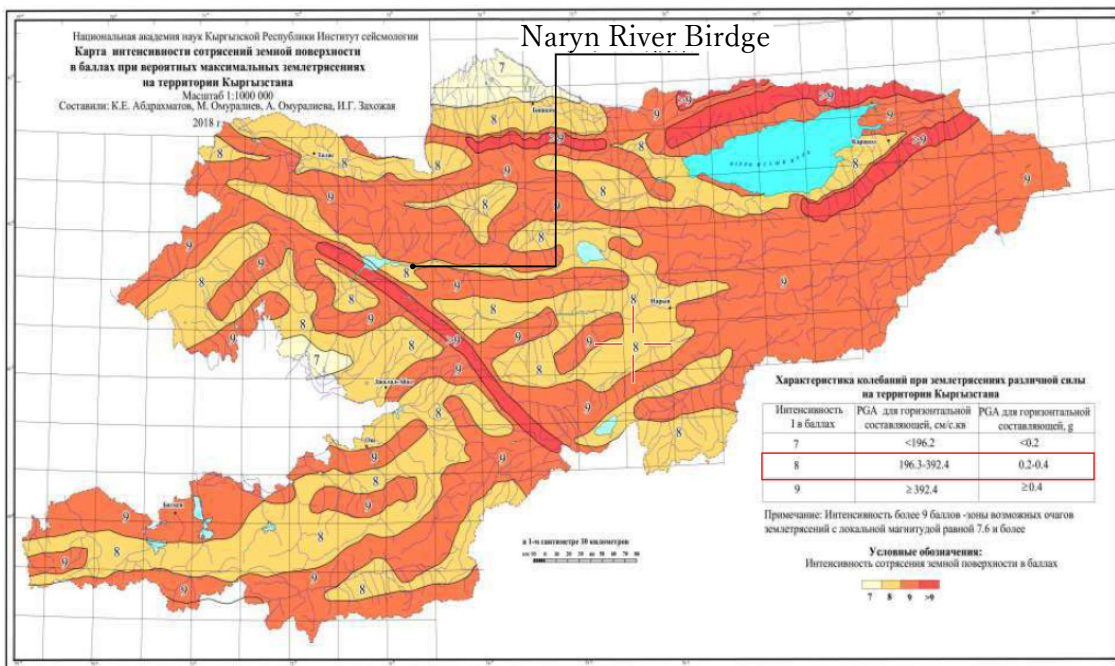
5) Seismic Design Condition

● Seismic Design Policy

Seismic design shall be carried out in accordance with “Specifications for Highway Bridges V: Seismic Design (2012)”. The design considers both earthquake motions with a high probability of occurrence during the bridge’s service life (Level 1 seismic motion, L1) and those with a low probability but potential for rare occurrence (Level 2 seismic motion, L2).

● Seismic Intensity at Bridge Location

For the Naryn River Bridge, the assumed seismic motion is classified as Zone 8 according to the seismic zoning map of Kyrgyzstan. The design horizontal seismic coefficient is determined based on a peak ground acceleration (PGA) range of 200–400 gal. Since this range is relatively wide, it is necessary to set a specific PGA for design, based on the seismic classification of major nearby sources. The bridge site is classified as Zone 7 with respect to Source A and Zone 6 with respect to Source B, indicating that it lies within a comparatively low-seismic-expectation area within Zone 8. Therefore, to maintain a degree of conservatism, the median value of 300 gal (midpoint of 200–400 gal) is adopted as the surface acceleration for Level 2 seismic motion.



Source : Seismic Standard of Kyrgyzstan (CH KP 20-02:2024)

Figure 2-2-19 Seismic Level of Kyrgyzstan

● Design Horizontal Seismic Coefficient

The design horizontal seismic coefficient for the Naryn River Bridge is shown below. The ground type is assumed to be Type II, and Level 2 seismic motion is considered to be Type II.

Table 2-2-13 Design Horizontal Seismic Coefficient

		Highway Bridge Specifications V (Reference)	Naryn River Bridge
Maximum Ground Acceleration(gal)		654~736	300
L1 Seismic Motion	Structural Design	0.25	0.90/1.75x0.25=0.13
	Surface Seismic Coefficient	0.20	0.13/0.25x0.20=0.10
L2 Seismic Motion	Structural Design	1.75	0.90*
	Surface Seismic Coefficient	0.70	0.90/1.75x0.70=0.36

Note: The structural response acceleration is set as 2.5–3 times the maximum ground surface acceleration. The structural response acceleration shall be verified through dynamic analysis

(3) Bridge Structure Considerations

1) Examination of Bridge Length

The bridge abutment structures and locations were examined for four cases, including the existing abutment location (Case 0).

Table 2-2-14 Abutment Structure and Location Comparison

	Case 0	Case 1	Case 2	Case 3
Side View				
Structural Overview	<ul style="list-style-type: none"> Aligned with existing abutment location To control abutment height, the embankment below the footing is treated with cement stabilization to prevent initial settlement 	<ul style="list-style-type: none"> 8m moving forward of existing abutment location To control abutment height, the embankment below the footing is treated with cement stabilization to prevent initial settlement 	<ul style="list-style-type: none"> 11.5m moving forward of existing abutment location To control abutment height, the embankment below the footing is treated with cement stabilization to prevent initial settlement 	<ul style="list-style-type: none"> Front wall of abutment placed forward to the existing bridge piers P1 and P5 position to shorten bridge length Box-type abutment applied to control 15 m abutment height and reduce backfill weight
Bridge Length	206.0m	190.0m	183.0m	175.8m
Abutment Height	7.0m	9.0m	11.0m	15.0m
Abutment Type	Reversed T-type	Reversed T-type	Reversed T-type	Box Type
Number of Piles	4	4	9	12
Construction Cost Ratio	1.562	1.000	1.005	1.736
Advantages/Disadvantages	<ul style="list-style-type: none"> Economically inefficient compared to forward placement type 	<ul style="list-style-type: none"> Most economical 	<ul style="list-style-type: none"> Wing wall length exceeds 8 m, requiring counter walls Difficult to compact backfill behind abutment 	<ul style="list-style-type: none"> With the large scale of structure, although bridge length is reduced, it is still economically inefficient
Evaluation	△	○	△	×

2) Examination of Span Arrangement

The existing bridge is planned to be retained. Therefore, the new bridge qualifies as an adjacent bridge, and the positions of the new piers shall be aligned with the sight lines of the existing bridge piers, in accordance with Article 29 of the “River Management Facilities Structural Regulations”. The proposed span arrangements are shown in .

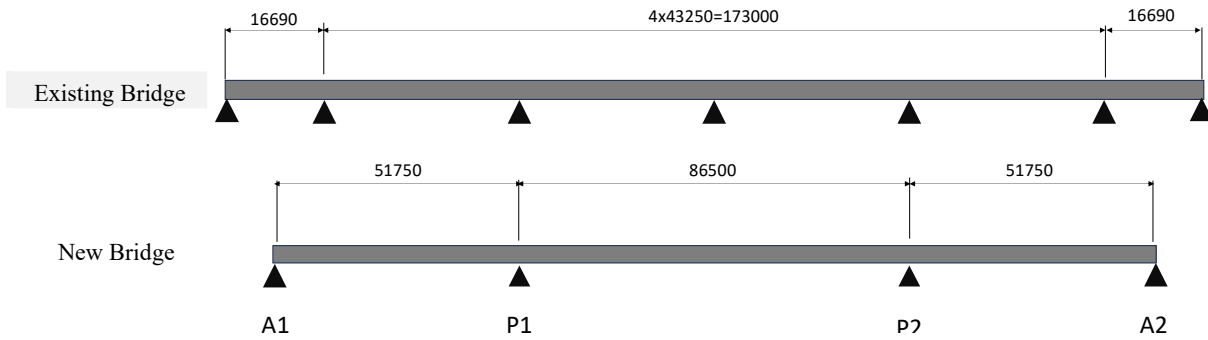


Figure 2-2-20 Span Arrangement for New Naryn Bridge

3) Examination of Foundation Types

The foundation type is determined based on site conditions, using the selection tables provided in the “Specifications for Highway Bridges”. The following conditions were considered:

- Gravel with particle sizes ranging from 100–500 mm has been confirmed.
- Depth to the supporting layer is approximately 18 m below the riverbed.
- The bearing layer corresponds to soft rock.
- Bearing piles will be used.

Based on these conditions, cast-in-place piles using the all-casing method are selected.

4) Examination of Substructure Type

● Position of Footings

The footing positions are determined based on the characteristics of the river and the “River Management Facilities Structural Regulations”. For abutments, a soil cover of at least 0.5 m is maintained above the footing. For piers, a minimum of 2.0 m is maintained from the deepest riverbed.

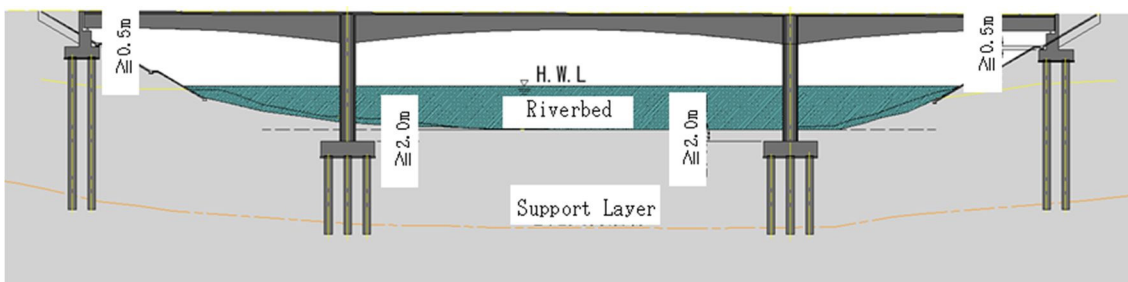


Figure 2-2-21 Footing Position of Substructure

● Substructure Type

The substructure type is determined according to the following table

- ✓ Abutments: Height is approximately 8 to 10 m. Reversed T-type abutment is adopted.
- ✓ Piers: Height is approximately 15 m. Since they are located within the river, an oval shaped wall pier is adopted.

The Preparatory Survey Report on the Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Abutment type	Height (m)			Remarks
	10	20	30	
Reverse T type <small>Earth pressure reduction method</small>	6 15			
Rigid Frame		15		
Box type		15		
Overfill	h H	7		

Abutment Type Selection

Pier Type	Height (m)			Remarks
	10	20	30	
Column Type Wall Type				including hollow
Interlocking-type				
Steel Pipe- Concrete Composite Type				≅ about 40m
Rigid Frame Type (two layers)				
Rigid Frame Type (two layers)				
Two-column Type				RC slab girder bridge

Pier Type Selection

Source: Ministry of Land, Infrastructure, Transport and Tourism – Civil Engineering Design Manual

Figure 2-2-22 Abutment and Pier Selection Guidelines

5) Examination of Superstructure Type

● Selection of Superstructure Type

In addition to the three-span option, the applicability of a six-span simple girder option is also examined since this option is identical to the existing bridge. In this case, the four spans across the river are assumed to be continuous girder in structure, while the end spans are designed as simple girders. The span length of the four river spans is 43.25m. According to the Superstructure Type Selection Table (), the following superstructure types are selected:

For prestressed concrete bridges: Post-tensioned continuous T-girder bridge

For steel bridges: Steel main girder with PC deck bridge

For the end spans, RC simple hollow slab bridges are assumed.

On the other hand, for the three-span option, the Superstructure Type Selection Table indicates that a PC continuous rigid frame box girder bridge is appropriate.

The Preparatory Survey Report on the Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic

Superstructure		Span Length L (m)		Single Girder Type Span Length 43.25m		Continuous Girder Type Span Length 86.5m		Girder Height	Consideration	Remarks
				10	20	30	40			
Metal Girder	Plate Girder	Simple Girder	H-beam Girder	[Grey bar from 15 to 25]				$L/25$	×	Span length is out of range.
			Non-composite Plate Girder	[Grey bar from 20 to 30]				$L/18$	×	Not considered due to the continuous type
			Non-composite Box Girder	[Grey bar from 20 to 30]				$L/20$	×	Not considered due to the continuous type
		Continuous Girder Type	Non-composite Plate Girder	[Grey bar from 25 to 35]				$L/18$	×	Not adopted due to being less economical compared with a few-girder bridge.
			Non-composite Box Girder	[Grey bar from 35 to 45]				$L/23$	×	Span length is out of range.
			Plate Girder with Steel Deck	[Grey bar from 25 to 35]				$L/25$	×	Not adopted due to being less economical
			Box Girder with Steel Deck	[Grey bar from 50 to 60]				$L/27$	×	Not adopted due to being less economical
			π shape Rigid Frame	[Grey bar from 30 to 40]				-	×	Not adopted due to incompatibility with the topographical conditions.
			Few-girder	[Green bar from 35 to 45]		●		$L/15$	○	
			Open Section Box Girder	[Grey bar from 40 to 50]				$L/25$	×	Not adopted due to being less economical
			Narrow Section Box Girder	[Grey bar from 50 to 60]				$L/25$	×	Not adopted due to being less economical
		Truss Type	Single Truss	[Grey bar from 40 to 50]				$L/9$	×	Not considered due to the continuous type
	Continuous Truss		[Grey bar from 50 to 60]				$L/10$	×	Not adopted due to being less economical	
	Prestress Concrete Bridge	Precast Girder	Post Tension	Simple Girder	[Grey bar from 20 to 30]				$L/18$	×
Composite Girder				[Grey bar from 20 to 30]				$L/15$	×	Not considered due to the continuous type
Continuous Girder			T Girder	[Green bar from 25 to 35]		●		$L/18$	○	
			Composite Girder	[Grey bar from 25 to 35]				$L/15$	×	Not considered due to the special structure components such as PC plate
			U-composite Girder	[Grey bar from 35 to 45]				$L/18$	×	Not considered due to the special structure components such as PC plate
Falsework Erection		Simple & Continuous Girder	Hollow Slab Girder	[Grey bar from 15 to 25]				$L/20 \sim L/25$	×	Span length is out of range.
			Box Girder	[Grey bar from 20 to 30]				$L/16 \sim L/18$	×	Not considered since the construction in the river part
			Slab Girder	[Grey bar from 25 to 35]				$L/32$	×	Span length is out of range.
Cantilever Erection		Continuous Rigid Frame	Box Girder	[Grey bar from 40 to 50]				$L/16 \sim L/20$	○	
				[Grey bar from 50 to 60]						
Others	Pre-beam Composite Girder		[Grey bar from 15 to 25]				$L/20 \sim L/35$	×	Not adopted due to being less economical in considering of girder fabrication, prestressing system, etc.	
	Bi-prestressing Girder		[Grey bar from 25 to 35]				$L/32$	×	Not adopted due to being less economical	

Note:

[Grey bar] : Generally applicable range

○ : Selection for study

[White bar] : Relatively applicable range

× : Out of range or inapplicable

Figure 2-2-23 Superstructure Type Selection Table

● Superstructure Type Comparison

Table 2-2-15 Superstructure Type Comparison

Option-1 3 spans continuous PC rigid frame box girder					
		Structure	Rigid-frame structure with high seismic resistance and reduced bearings, advantageous for maintenance	○	○
		Construction	Standard construction method for a PC rigid-frame box girder bridge, repetitive operations resulting in a low level of construction difficulty	○	
		Erection	Cantilever Erection Method	—	
		Period	34months	○	
		Economic	100%	○	
Option-2 4 spans continuous PC simple T girder					
		Structure	Continuous structure reducing expansion joints but requiring the most number of bearings.	△	△
		Construction	On-site casting ensures quality, but girder weight (~130 tons) is assumed to be critical fo construction.	×	
		Erection	Erection Girder Method	—	
		Period	44months	×	
		Economic	120% (of option-1)	△	
Option-3 4 spans continuous metal girder					
		Structure	Continuous structure: fewer expansion joints, more bearings, require repainting.	△	×
		Construction	Lightweight girders, but river work constraints make incremental launching moderately difficult.	△	
		Erection	Incremental Launching Method	—	
		Period	42months	△	
		Economic	140%(of option-1)	×	

6) Bridge Appurtenances Planning

● Drainage System

Pavement water will be drained by a gravity flow system, collecting runoff in drainage inlets and conveying into the river via drainage pipes. Since the site experiences very low rainfall, the spacing between inlets is limited to within 20 m, in accordance with the “Road Earthwork Drainage Guidelines”. To prevent damage from freezing, the drainage pipes are planned to be constructed using general-purpose carbon steel pipes (SGP).

Since a bridge deck waterproofing layer is planned, a bridge deck drainage system will be installed. Infiltrated water from the pavement is conveyed to drainage inlets via drainers. Water collected up to the expansion devices is then discharged under the girders through drains.

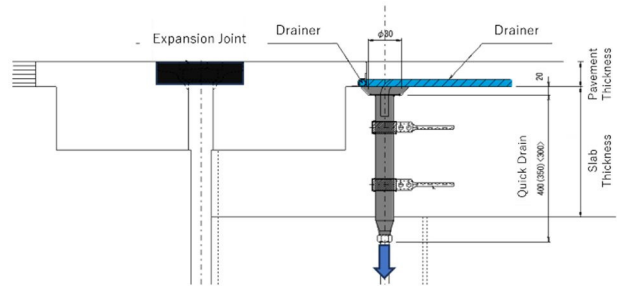
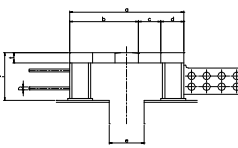
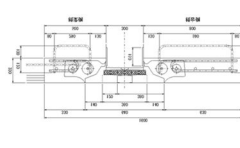
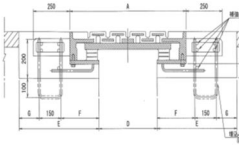
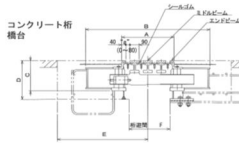


Figure 2-2-24 Outlet of Bridge Deck

● Expansion Devices

Expansion devices are selected based on the girder’s expansion range and the girder gap. At this stage, approximately four types are being compared to determine the optimal solution in terms of economy and durability.

Table 2-2-16 Proposed Expansion Devices

Option-1	Option-2	Option-3	Option-4
Load-bearing type, steel (comb-type)	Load-bearing type, aluminum alloy casting	Load-bearing type, rubber	Load-bearing type, steel (modular type)
			
Service life: 30 years	Service life: 40 years	Service life: 20 years	Service life: 20 years
370,000 JPY/m/100 years	150,000 JPY/m/100 years	340,000 JPY/m/100 years	4,200,000 JPY/m/100 years
-	Best Option (Accepted)	-	-

● Bearing

The end supports of the three-span PC box girder bridge shall be movable (Figure 2-2-27). Rubber bearings are selected for durability, and Type B bearings are used to account for Level 2 seismic motion. An economic structure minimizing metal fittings was considered for corrosion prevention. Concrete blocks are placed on the bridge abutment face to support the main girder perpendicular to the bridge axis. A functionally separated bearing system is adopted, where the rubber bearings bear only vertical forces (Figure 2-2-25).

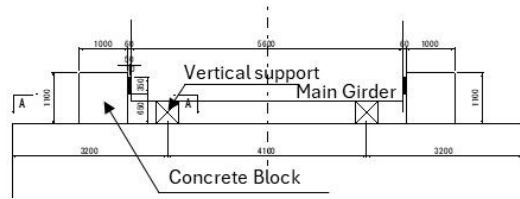


Figure 2-2-25 Functionally Separated Bearing System

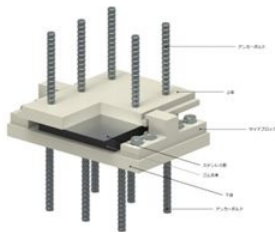


Figure 2-2-26 Movable Rubber Bearing

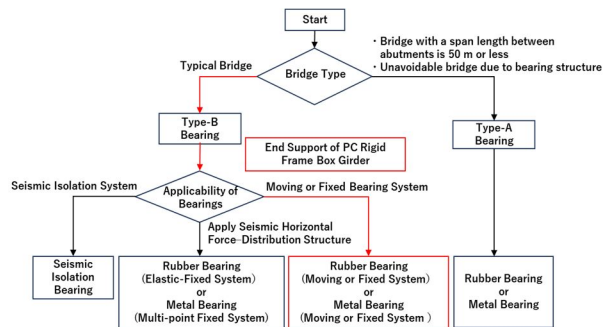


Figure 2-2-27 Bearing Type Selection Process

● Safety Barriers

Vehicles Protection Type

Vehicle safety barriers will be installed at the edges of the shoulder along the bridge section. While flexible barriers, which provide superior energy absorption, are generally preferred, in Kyrgyzstan there is a concern that components may not be rapidly available for repair if damaged by vehicle collisions, leaving the barrier in a hazardous condition. Therefore, rigid barriers are planned, as they are less likely to suffer major damage upon collision and repair materials are readily obtainable.

Barrier Classification

Design speed: $V = 80 \text{ km/h}$

Consideration of safety in the event of fallout from the road:

- ✓ 22m of height from pavement surface to the riverbed
- ✓ Depth of river from 1.5m to 8.0m

This road section is considered to have a high risk of severe consequences in case of vehicle accidents. Based on these conditions, an SB-class barrier (lateral-use, impact strength $\geq 280 \text{ kJ}$) is applicable. However, due to:

1. Winter traffic accidents caused by icy pavement confirmation,
2. High speeds of heavy vehicles on downhill sections, and
3. Road alignment that may increase collision angles,

A higher-class SS barrier (lateral-use, impact strength $\geq 650 \text{ kJ}$) shall be used, in accordance with the “Standards and Commentary for Safety Barrier Installation”.

- Bridge Collapse Prevention System

The necessity of installing a bridge collapse prevention system is reviewed in accordance with “Specifications for Highway Bridges V: Seismic Design (Section 16.1)”.

Length between girder and edge of abutment : Ensures that the superstructure does not disengage from the top of the substructure in the event of bearing failure, in accordance with Section 16.2.

Bridge Collapse Prevention Structure : Since the bridge (a three-span continuous PC rigid-frame bridge) has structural characteristics that limit large longitudinal displacements, this feature is omitted.

Lateral Displacement Restraint Structure : Since the bridge is not only 1 or 2 span nor the bridge with the narrow space at the top of substructure, this structure is omitted.

- Memorial Board

A memorial board will be installed at the bridge ends to indicate that the bridge construction was funded through Japan’s Official Development Assistance (ODA). Based on previous installations in Kyrgyzstan, a two-pillar gate-type design will be used.



Photo 2-2-1 Memorial Board (Reference)

2-2-2-6 Bank Protection Plan

(1) Existing Bank Protection

The embankment sections of the existing road and bridge are protected from flowing water, etc., by laying precast concrete slab blocks (dimensions 50cm × 50cm × 15cm).



Panoramic view: Left bank revetment



Panoramic view: Right bank revetment



Close-up of left bank



Block dimensions 50×50×15



Close-up of right bank




Photo 2-2-2 Existing Naryn River Bridge Revetment

(2) **Newly Constructed Revetment**

1) Comparison and Selection of Revetment Types

The new bridge will be constructed upstream parallel to the existing bridge. Therefore, to ensure compatibility with the existing bridge, the embankment shape and slope gradient will be identical to those of the existing bridge. The best option is selected by comparing three alternative types of revetments.

Table 2-2-17 Comparison of Revetment Types

Method	Concrete Block	Gabion	Stone-faced concrete
Shape			
Characteristics	<ul style="list-style-type: none"> Resists sliding and peeling under its own weight. 	<ul style="list-style-type: none"> Preventing curling at the top and bottom edges is critical. 	<ul style="list-style-type: none"> Construction methods using fresh concrete and natural stone.
Flow velocity	3~6m/s	3~5m/s	3~6m/s
Environmental characteristics	<ul style="list-style-type: none"> In the long term, there is potential for vegetation recovery. 	<ul style="list-style-type: none"> In the long term, there is potential for vegetation recovery. 	<ul style="list-style-type: none"> Vegetation is not expected.
Workability	<ul style="list-style-type: none"> Install precast products. Materials are readily available. No special construction methods are required; installation is simple. 	<ul style="list-style-type: none"> Deliver cage components to the site and fill them with aggregate. Construction requires skilled labor. 	<ul style="list-style-type: none"> Perform on-site concrete pouring and pebble laying. Construction period is lengthy.
Economy	1.00	1.04	1.00
Response to this matter	<ul style="list-style-type: none"> Material procurement and on-site construction are feasible. 	<ul style="list-style-type: none"> Material procurement and on-site construction are feasible. 	<ul style="list-style-type: none"> Material procurement and on-site construction are feasible..
Overall evaluation	<ul style="list-style-type: none"> This construction method is recommended for its compatibility with existing revetments and its ability to shorten the construction period. <p style="text-align: center;">Very Good</p>	<ul style="list-style-type: none"> In the long term, there is concern that damaged wire mesh cages could adversely affect livestock passing through. <p style="text-align: center;">Poor</p>	<ul style="list-style-type: none"> Requires a longer construction period than other methods. <p style="text-align: center;">Good</p>

As a result of the comparison, concrete blocks of the same type as the existing revetment structure were selected for ease of construction.

The embedment depth of the revetment is secured at 1 meter below the existing ground level. Mortar will be filled between the blocks during installation to enhance bonding. Additionally, one drainage hole per 10 square meters will be provided to facilitate the release of backwater pressure.

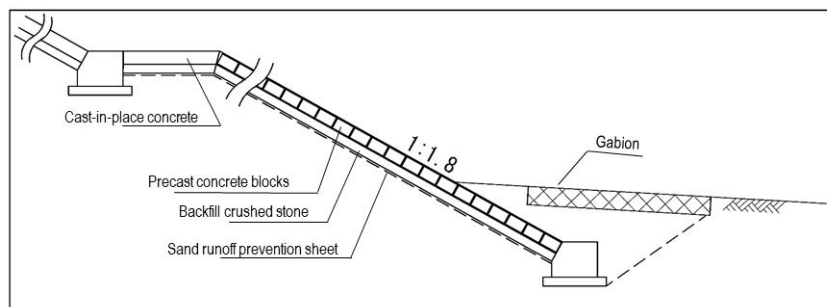


Figure 2-2-28 Standard Cross-Section of a Revetment

2) Scour Prevention Measures for Right Bank Retaining Wall

The existing right bank irrigation channel retaining wall serves as a low-water protection structure. While no bed lowering trend is currently observed in front of the retaining wall, riprap will be installed in front of the wall to prevent riverbed scouring, considering the potential impact of installing new bridge piers.

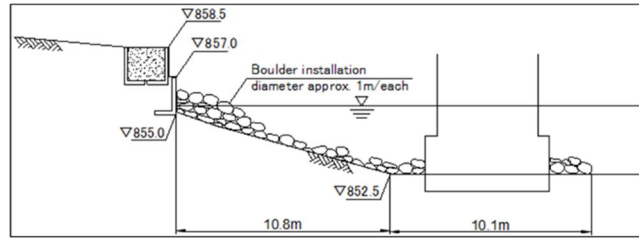


Figure 2-2-29 Riprap Standard Cross-Section

3) Existing Bridge - Area Around Piers' I

Construction of new bridge piers P1 and P2 may cause scouring around the two existing piers. Therefore, scour protection will be provided using riprap.

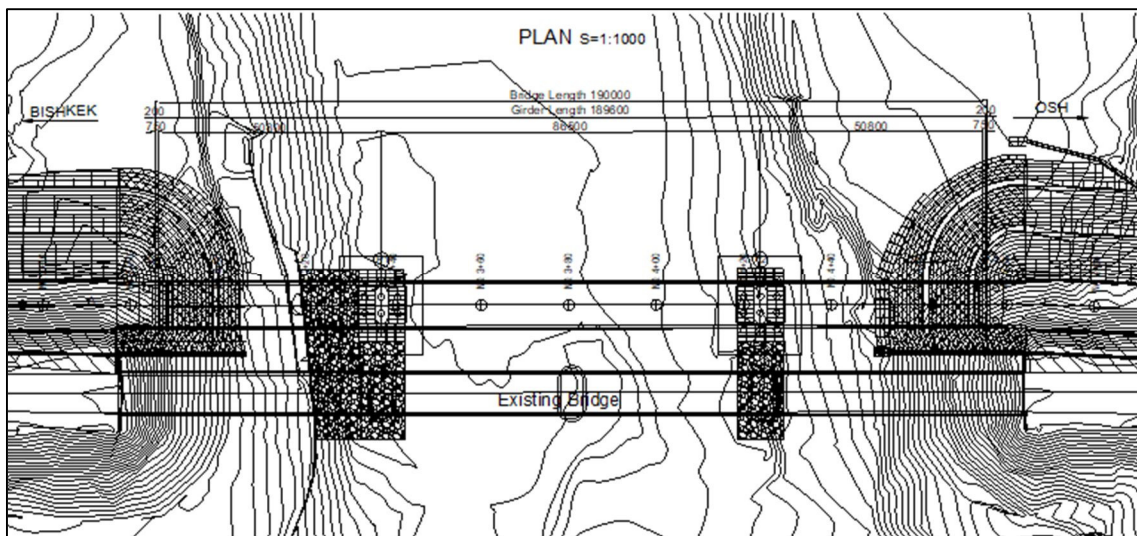


Figure 2-2-30 Riverbed Protection Plan

2-2-2-7 Traffic Safety and Speed Control Measures

For winter traffic accident prevention, particular attention was given to reducing slip accidents caused by speeding. The main measures are as follows:

Speed Control Measures

- Provide warnings before curves to encourage drivers to slow down.
- Use road surface markings to visually prompt deceleration and promote safe driving.
- Install rumble strips on the road surface to reduce speed. (Their effectiveness has been confirmed in places like Hokkaido, and they are also adopted for roads in Kyrgyzstan.)

Nighttime Safety Measures

- Since the target section has no lighting, reflectors, which are also used on the Urmara Bridge, will be installed to improve safety.

Pedestrian and Animal Safety

- The bridge designed in this project does not include sidewalk, and the existing bridge will be utilized as pedestrian walkway.
- Crosswalks will be installed at the embankment at the start of the road for pedestrians and animals such as cattle using the existing bridge.
- Signs will be installed to alert drivers and promote safe driving.

These measures aim to reduce the risk of traffic accidents in winter and create a safer road environment.

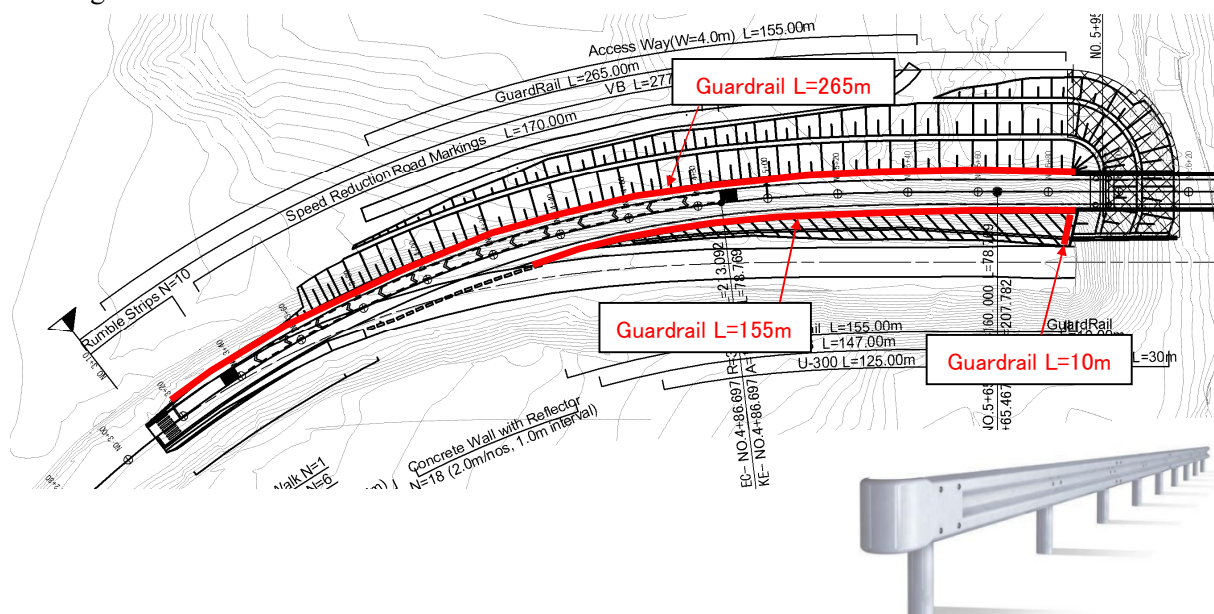
Table 2-2-18 shows the traffic safety facilities adopted.

Table 2-2-18 Traffic Safety Facilities

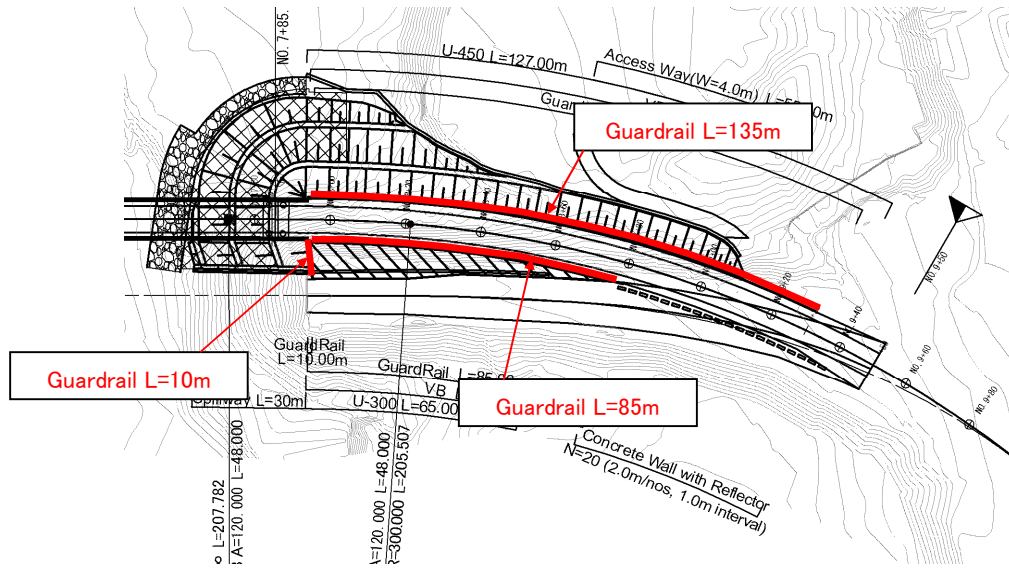
Safety Facility	Location	Purpose / Reason
Guardrail	Embankment sections with elevation differences and sections before and after bridges	<ul style="list-style-type: none"> • To prevent vehicles from leaving the roadway and alert drivers, while reducing the impact of collisions to prevent serious accidents. • To prevent collision damage to the bridge.
Post Cone	Crosswalk locations	Post cones installed to make drivers aware of the crosswalk and encourage caution.
Rumble Strips		Small bumps installed on the road surface, producing sound and mild vibrations to alert drivers to crosswalks.
Speed Reduction Road Markings		Pavement markings with three-dimensional effect to visually encourage drivers to reduce speed.
Warning Signs	Crosswalks and curves	Installed to alert drivers to crosswalks, curves, and speed regulations.
Concrete Wall	Intersection with existing road	<ul style="list-style-type: none"> • Installed to prevent vehicles from entering the intersection incorrectly. • Reflectors are added to the wall surface to prevent collisions at night.

● **Guardrail**

Installed along road edges in embankment sections with elevation differences and in sections before and after bridges.

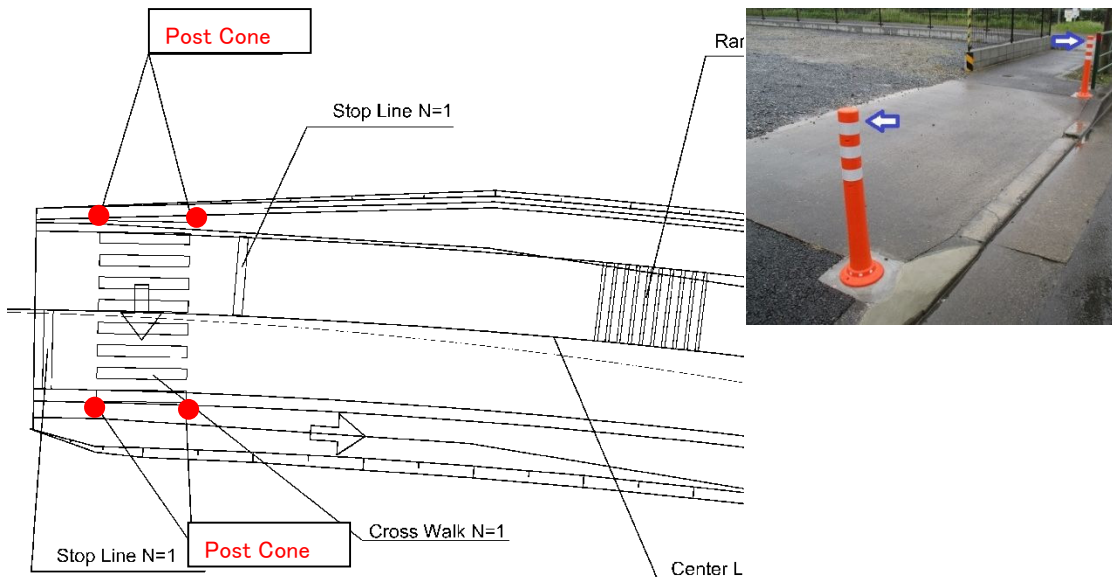


The Preparatory Survey Report on the Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic



- Post Cone

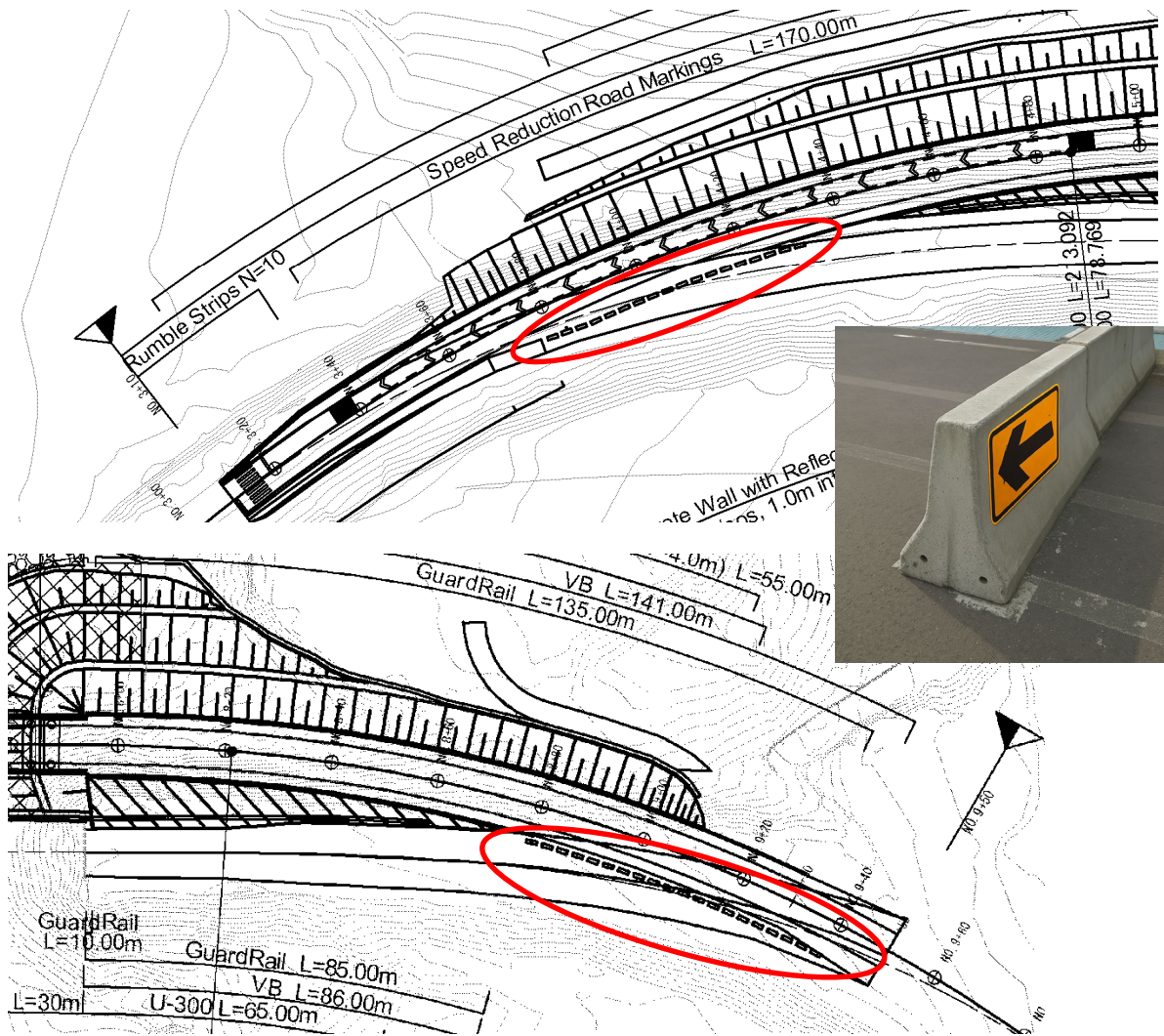
Installed at crosswalk locations to alert drivers.



- Concrete Wall

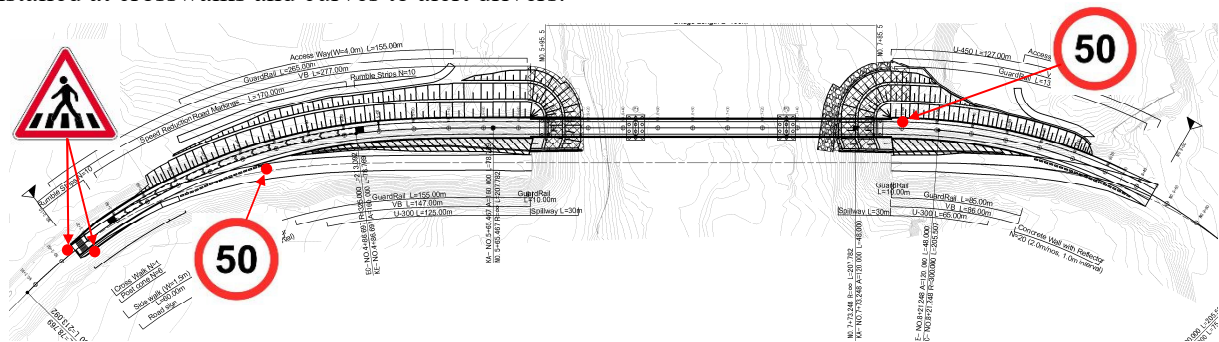
Installed at intersections with existing roads to prevent mis entry and improve nighttime safety.

The Preparatory Survey Report on the Project for the Reconstruction of the Naryn River Bridge on the Bishkek-Osh Road in the Kyrgyz Republic



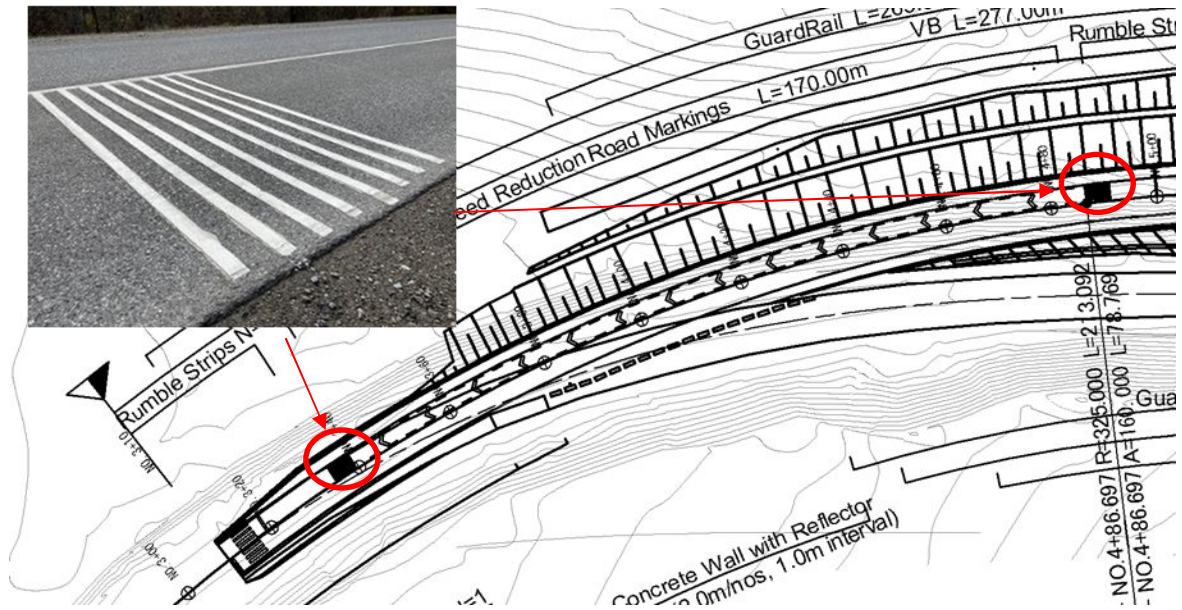
● **Warning Signs**

Installed at crosswalks and curves to alert drivers.



- **Rumble Strips**

Installed to alert drivers through sound and vibration.



- **Speed Reduction Pavement Markings**

Installed to visually encourage speed reduction.

